COMMANDER'S LETTER

EXECUTIVE SUMMARY

Introduction

Exec. Summary.

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Chapter 1 — Background

Purpose

Can a U.S. Joint Task Force (JTF) execute a Rapid Decisive Operation (RDO) in this decade? That's the question U.S. Joint Forces Command's (USJFCOM) Rapid Decisive Operations 2007 experiment; Millennium Challenge 2002 (MC02) tested. The resulting Doctrine, Organization, Training, Materiel, Leadership, Personnel, and Facilities (DOTMLPF) change recommendations, based on the findings derived from multiple events over the last three years and culminating with the MC02 findings and lessons learned, target the expectations of our forces, civilian leaders, and public with regard to military transformation and Joint Vision 2020 (JV2020) goals.

Scope

MC02 did not have a traditional training audience. A training audience and specific training objectives were not the experiment's focus and this distinction was an important factor in the control of the experiment. Neither training, nor exercising was the primary goal. MC02 was designed to create the environment, which would allow the experiment to proceed toward some reasonable conclusion – the outcome was not preordained – within which concepts for transformation of forces into the Joint Vision 2010 and 2020 precepts could be observed. Congressional language in the FY01 Defense Authorization Act (HR 5408) directed JFCOM, the Services, and the U.S. Special Operations Command (USSOCOM) to demonstrate in FY02, the armed forces' ability to conduct RDO using capabilities and technologies available in this decade.

While MC02 assessed U.S. Joint capability to carry out RDO in this decade, a number of related and supporting technical and conceptual experiments were included in the experiment design, along with the integration of concurrently conducted Service-live experiments. The combination of live force maneuvers and training built around and supporting a virtual scenario was unique in both its size and proportion. Integration of information regarding both live and simulated forces into a single common operational picture (COP) was a goal of the experiment as was support of a longer range project for instrumenting and integrating the Services' western test and training ranges to support Joint training.

MC02 Live Force Participants

The XVIII Airborne Corps was to have provided the core of the JTF Headquarters, supplemented by a standing Joint Force headquarters element from USJFCOM. However, real world operations required Commanding General, III Corps and his staff, from Fort Hood, TX, to stand-in on short notice. The new JTF Commander, taking the reins just prior to Spiral 3, operated from JFCOM's Joint Training, Analysis, Simulation Center (JTASC), before deploying forward to the USS CORONADO (AGF 11) in San Diego, CA, mid-way through the experiment. The Commanding General, II Marine Expeditionary Force (MEF) established a Joint Force Land Component Commander (JFLCC) headquarters at Camp LeJeune, NC. The JFLCC's force included elements of the 82nd Airborne Division from Fort Bragg, NC, and 1st Marine Regiment from Marine Corps Base Camp Pendleton, CA. The San Diego, CA, based Third Fleet staff, aboard the THIRDFLT flagship USS CORONADO (AGF 11), formed the Joint Force Maritime Component Commander (JFMCC) with Commander, Second Fleet acting as the

JFMCC commander. Various Navy and Marine Corps elements of the U.S. Pacific Fleet worked in support of the JFMCC Commander. Commander, Twelfth Air Force operated as the Joint Force Air Component Commander (JFACC), operating out of the Combined Air Operations Center at Nellis Air Force Base, NV, with support from Air Force activities CONUS-wide. USSOCOM provided the Joint Special Operations Task Force (JSOTF), with elements of Special Operations Group in direct support. USJFCOM established a Joint Psychological Operations Task Force (JPOTF) in Suffolk, VA.

An Interagency group made up of departments within the U.S. State Department participated at various times before and during the exercise, primarily in development and sustainment of the Operational Net Assessment (ONA), and during the transition phase of the operation.

Specific MC02 assignments included:
Exercise Director – Deputy Commander in Chief, USJFCOM
Deputy Director Exercise Control/Officer Conducting the Exercise – USJFCOM, J7
Deputy Director Experiment Control – USJFCOM, J9
Deputy Exercise Director – USJFCOM, JW01
Director, Joint Exercise Planning Group (JEPG) - USJFCOM, JW01
Director, Joint Exercise Control Group (JECG) - USJFCOM, JW01
Commander, Joint Task Force – CDR, III Corps
Deputy Commander, Joint Task Force - TBD
Commander, Army Forces – CDR, 82nd Airborne Division
Commander, Air Force Forces – CDR, 12th AF
Commander, Naval Forces – COMSECONDFLEET
Commander, U.S. Marine Corps Forces – CDR II MEF
Joint Force Air Component Commander – CDR, 12th AF
Joint Force Land Component Commander – CDR II MEF
Joint Force Maritime Component Commander – COMSECONDFLEET
Commander, Joint Special Operations Task Force – ?
Commander, Joint Psychological Operations Task Force – ?
The supporting Commands and Agencies were comprised of US Space Command, US Special Operations Command, US Strategic Command, US Transportation Command, Central Intelligence Agency, Defense Information Support Agency, Joint Communications Support Element, Joint Information Operations Center, Joint National Test Facility, Joint Warfare Analysis Center, Marine Standards and Training Program, National Assessment Group, National Reconnaissance Office, and the National Security Agency.

Live Forces:

By Congressional direction, MC02 was to be an assimilation of live and simulated events. This MC02 combination was the first attempt at making the real-world training exercise support the simulated training exercise. In general, combinations of this sort are built around the live event with simulations plugged in to support that live event. This effort required an

extraordinary amount of coordination and multi-service cooperation to get the events off in a timely manner. Not all events worked, but the effort was noteworthy. Approximately 13,500 personnel from all of the services participated in the MC02 experiment and the accompanying Service experiments to include the following units:

UNIT	TYPE	OPERATING LOC	HOME BASE/REMARKS
162ND FIGHTER WING	5 X F-16	NELLIS AFB, NV	AATC
20TH FIGHTER WING	6 X F-16	NELLIS AFB, NV	
2ND BOMBER WING	1 X B-52	BARKSDALE AFB,LA	
4TH WING	6 X F-15E	NELLIS AFB, NV	
53RD WING	2 X A-10	NELLIS AFB, NV	
	4 X F-15E	NELLIS AFB, NV	
	5 X F-15C	NELLIS AFB, NV	
	5 X F-16CJ	NELLIS AFB, NV	
	2F-16CG	NELLIS AFB, NV	
	1 X HH-60	NELLIS AFB, NV	
	1 X F-117	EDWARDS AFB,CA	
55TH RECON WING	1 X RC-135	OFFUTT AFB,NE	
57TH WING	1 X RQ-1B	INDIAN SPRINGS AFB, NV	
	4 X F-16C	NELLIS AFB, NV	
509ND BOMBER WING	1 X B-2	WHITEMAN AFB, MO	
552ND AIR CONTROL WG	2 X E-3	NELLIS AFB, NV	
9TH RECON WING	1 X U-2	BEALE AFB, CA	
917TH WING	1 X A-10	NELLIS AFB, NV	AATC
93RD AIR CONTROL WG	2 X E-8	NELLIS AFB, NV	
939TH RECON WING	1 X HH-60	NELLIS AFB, NV	
VMA 214	8 X AV-8	NELLIS AFB, NV	USMC

UNIT	TYPE	OPERATING LOC	HOME BASE/REMARKS
VMGR 352	1 X KC-130	NELLIS AFB, NV	USMC
645TH MATS	1 X EC-130H	PALMDALE AFB, CA	AFMC
16TH SOW	1 X AC-130	NELLIS AFB, NV	AFSOC
16TH SOW	2 X MC-130	NELLIS AFB, NV	AFSOC
160TH SOAR	3 X MH-60	NELLIS AFB, NV	USA
193RD SOW	1 X EC-130H	NELLIS AFB, NV	ANG
VP40	1 X P-3	NAS WHIDBEY ISLAND, WA	USN
92ND AIR REFUEL WG	7 X KC-135	NELLIS AFB, NV	AFMC
COMSECONDFLT	JFMCC	USS CORONADO	AFLOAT
	DJFMCC	USS CORONADO	AFLOAT
COMTHIRDFLT STAFF	JFMCC	USS CORONADO	AFLOAT PLANS STAFF
COMCARGRU EIGHT	DJFACC	NELLIS AFB, NV	
COMCARGRU THREE	JFMCC	USS CORONADO	AFLOAT OPS STAFF
USS CORONADO (AGF 11)	COMMAND SHIP	AFLOAT	JFMCC, IWC EMBARKED SOCAL
USS FITZGERALD (DDG 62)		AFLOAT	SOCAL
USS BENFOLD (DDG 65)		AFLOAT	SOCAL
USS SALT LAKE CITY (SSN 716)		AFLOAT	SOCAL, VIRTUAL SSGN
USS BOXER (LHD 4)		AFLOAT	SUPPORT STOM JSHIP, CPR 1 EMBARKED
JOINT VENTURE (HSVX-1)	MIWC	AFLOAT	NSWTG EMBARKED SOCAL OPAREAS
SEA SLICE		AFLOAT	MIW, ASUW SOF
OPFOR SUBMARINE		AFLOAT	SOCAL
COM AIR WING 11		CHINA LAKE, NV	STRIKE WARFARE CDR
COMDESRON 9		FCTCPAC SD, CA	SEA COMBAT COMMANDER

UNIT	TYPE	OPERATING LOC	HOME BASE/REMARKS
COMPHIBRON 1		FCTCPAC SD, CA	CATF AMWC STAFF AFLOAT CPR 1 EMBARKED USS BOXER
FIWC		NAB LITTLE CREEK, VA	IO REAR AREA
COMCMRON 3	MIWC	AFLOAT	
EMBARKED ON HSV			
		FCTCPAC SD	AFTER EBARK HSV
CTF 12	THEATER ASWC	PEARL HARBOR	
CO ANTIETAM	AAWC RADC	GREENSBORO	AADC MODULE (FACTORY PRODUCTION UNIT)
VIRTUAL SSGN		NUWC NEWPORT	
VIRTUAL DDX		FCTCPAC SD, CA	
NAWC SEA TEST RANGE		PT MUGU, CA	
SAN NICOLAS ISLAND		SNI, CA	
UAV DOWN LINK SITE			
TSC NORTH ISLAND		NASNI, CA	
ASW C2 SITE			
SCORE-FACSFAC		NASNI, CA	
SURROGATE ADS			
VC-6	PIONEER UAV DET		
PATRECON DET		NASNI, CA	
VP/VPU DET			
PT MUGU NRL	1 X NP3D		
SOCAL			
VAW 116	1 X E2C	PT MUGU, CA	
VMFA 242	1 X FA-18 (ATARS)	MCAS MIRAMAR, CA	
VP 9	1 X AIP P-3	NASNI, CA	ASW MISSIONS

UNIT	TYPE	OPERATING LOC	HOME BASE/REMARKS
VP 46	1 X AIP P-3 PREDATOR (JOTBS)	NASNI, CA CHINA LAKE, NV	ISR MISSIONS
VX 9	2 X FA-18 (MIDS)	CHINA LAKE, NV	
VAQ 135	1 X EA-6B	CHINA LAKE, NV	
VAQ 132	1 X EA-6B	NELLIS AFB, NV	GSTF SUPPORT
HSL 43,45,47,49	SH-60	NASNI, CA	
VS 33	S-3B	NAS LEMORE, CA	
HS-2	NASNI, CA		ASW SUPPORT
HS-6	NASNI, CA		ASUW SUPPORT
II MEF	COMMANDER, JFLCC	CAMP LEJEUNE	PROVIDED JFLCC STAFF STAFF ELEMENT FOR JOINT TASK FORCE LAND COMPONENT
1ST MARINE REGIMENT	COMMAND ELEMENT	EMBARKED USS BOXER	CAMP PENDLETON, CA
1/1 BLT	1X RIFLE CO, 1 X LT ARM RECON CO, 1 X RECON PLATOON	EMBARKED USS BOXER/HSVX-1	CAMP PENDLETON, CA
HMM 268	8 X CH-46 4 X CH-53E 4 X AH-1W 3 X UH-1N	EMBARKED USS BOXER	MCAS, CAMP PENDLETON ALSO SUPPORTED MC SERVICE EXPERIMENT AT SCLA, VICTORVILLE, CA
3/7 BLT	2 X RIFLE COMPANIES, 1 X AAV PLATOON, 1 X LT ARM RECON CO 1 X TANK PLATOON, 1 X RECON PLATOON, 1 X ENGINEER PLATOON	SOUTHERN CALIF LOGISTICS AIRPORT, SUPPORTED VICTORVILLE SERVICE EXP AT SCLA	MCB 29 PALMS
3/20 SFG(A)			
SOCJFCOM	JSOTF STAFF	SUFFOLK	
NAVAL SPECIAL WARFARE GROUP ONE			

UNIT	TYPE	OPERATING LOC	HOME BASE/REMARKS
SOLE			AFSOC
JSOAC			AFSOC
III CORPS HQ (AS JTF)	200 PERSONNEL	SUFFOLK, VA	FT HOOD, TX
32AAMDC	50 EAC	NELLIS AFB, NV	FT BLISS W/JFACC, TX ADA
1ST BCD	8 EAC	NELLIS AFB, NV SUFFOLK, VA	FT BRAGG W/JFACC, NC
JICC-D	7 EAC	NELLIS AFB, NV SUFFOLK, VA	FT MCPHERSON, GA
82ND AIRBORNE DIV	250 PERSONNEL	FT BRAGG, NC	FT BRAGG, NC ARFOR MAIN
82ND AIRBORNE DIV TACTICAL CMD POST	100 PERSONNEL	FT IRWIN (NTC), CA	FT BRAGG, NC ARFOR FWD
C/82D SIG BN (-)	25 PERSONNEL	FT IRWIN (NTC), CA	FT BRAGG, NC
2ND BRIGADE COMBAT TEAM	1,300 PERSONEL	FT IRWIN (NTC), CA	FT BRAGG, NC
1ST BATTALION, 325TH REGIMENT	INF BN	FT IRWIN (NTC), CA	FT BRAGG, NC
1-325 TACTICAL COMMAND POST	SEC		FT BRAGG, NC
1/B/3-4 ADA	PLT ADA	FT IRWIN (NTC), CA	FT BRAGG, NC
HSB/2-319 FA	FA BATTERY	FT IRWIN (NTC), CA	FT BRAGG, NC
A/2-319 FA	FA BATTERY	FT IRWIN (NTC), CA	FT BRAGG, NC
2ND BATTALION, 325TH REGIMENT	INF BN	FT IRWIN (NTC), CA	FT BRAGG, NC
2-325 TACTICAL COMMAND POST	RESPONSE CELLS	FT IRWIN (NTC), CA	FT BRAGG, NC
3RD BATTALION, 325TH REGIMENT	INF BN	FT IRWIN (NTC), CA	FT BRAGG, NC
3-325 TACTICAL COMMAND POST	RESPONSE CELLS	FT IRWIN (NTC), CA	FT BRAGG, NC
B/313 MI BN	MI COMPANY	FT IRWIN (NTC), CA	FT BRAGG, NC
82ND MP CO	MP PLATOON	FT IRWIN (NTC), CA	FT BRAGG, NC
21ST CHEM CO	CHEMICAL PLATOON	FT IRWIN (NTC), CA	FT BRAGG, NC
A/3-27 FA BN (HIMARS)	3 X HIMARS FA BTRY	FT IRWIN (NTC), CA	FT BRAGG, NC

UNIT	TYPE	OPERATING LOC	HOME BASE/REMARKS
234 FAD	DETACHMENT	FT IRWIN (NTC), CA	FT BRAGG, NC
HHC DISCOM-82ND ABN DIV	1,100 PERSONNEL	FT IRWIN (NTC), CA	FT BRAGG BDE SUPPORT, NC
782ND MSB	BN SUPPORT	FT IRWIN (NTC), CA	FT BRAGG, NC
407 FWD SPT BN	BN SUPPORT	FT IRWIN (NTC), CA	FT BRAGG, NC
HHC 1ST COSCOM (-) SPT	COMMAND SPT	FT IRWIN (NTC), CA	FT BRAGG, NC
HHC 311TH COSCOM(-) SPT	COMMAND SUPPORT	FT IRWIN (NTC), CA	FT LEWIS
B/82D SIG BN (-)	SIGNAL COMPANY	FT IRWIN (NTC), CA	FT BRAGG, NC
B/1-58 ATS	ATC COMPANY	FT IRWIN (NTC), CA	FT BRAGG, NC
313TH MI BN, 82ND ABN DIV	RESPONSE CELL MI BN	FT IRWIN (NTC), CA	FT BRAGG, NC
82ND SIG BN, 82ND ABN DIV	RESPONSE CELL SIG BN	FT IRWIN (NTC), CA	FT BRAGG, NC
11 HHC TRANS TERM BN	50 PERSONNEL BN SUPPORT	FT IRWIN (NTC), CA	FT EUSTIS, VA
372 TRANS CGO TRANS CO	COMPANY SUPPORT	FT IRWIN (NTC), CA	FT EUSTIS, VA
1066 MVT CTL TM (CGO DOC)	SUPPORT TEAM	FT IRWIN (NTC), CA	FT EUSTIS, VA
STRYKER BRIGADE COMBAT TEAM	850 PERSONNEL	FT IRWIN (NTC), CA	FT LEWIS, WA
3RD BDE, 2ND INF DIV HQ (SBCT)			
SBCT TOC	2 X STRYKER	FT IRWIN (NTC), CA	FT LEWIS, WA
5TH BATTALION, 20TH REGIMENT	INF BN	FT IRWIN (NTC), CA	FT LEWIS, WA
5-20 TACTICAL COMMAND POST		FT IRWIN (NTC), CA	FT LEWIS, WA
A/5-20 INF (SBCT)	14 X STRYKER CO	FT IRWIN (NTC), CA	FT LEWIS, WA
1ST SQUADRON, 14TH REGIMENT	RSTA SQDN, CAV	FT IRWIN (NTC), CA	FT LEWIS, WA
1-14 TACTICAL COMMAND POST	SEC CAV	FT IRWIN (NTC), CA	FT LEWIS, WA
1ST BATTALION, 23TH REGIMENT	FA BN	FT IRWIN (NTC), CA	FT LEWIS, WA
1-23 TACTICAL COMMAND POST	SEC FA	FT IRWIN (NTC), CA	FT LEWIS, WA

UNIT	TYPE	OPERATING LOC	HOME BASE/REMARKS
3RD BATTALION, 2D REGIMENT	FA BN	FT IRWIN (NTC), CA	FT LEWIS, WA
3-2 TACTICAL COMMAND POST	SEC FA	FT IRWIN (NTC), CA	FT LEWIS, WA
296TH BRIGADE SUPPORT BATTLION	BN SUPPORT	FT IRWIN (NTC), CA	FT LEWIS, WA
HDC, 296TH BDE SPT BN	CO SUPPORT	FT IRWIN (NTC), CA	FT LEWIS, WA
BSC, 296TH BDE SPT BN	CO SUPPORT	FT IRWIN (NTC), CA	FT LEWIS, WA
BSMC, 296TH BDE SPT BN	CO SUPPORT	FT IRWIN (NTC), CA	FT LEWIS, WA
HHC 101ST AVN BDE HQ (-)	250 PERSONNEL AVIATION COMMAND POST	FT IRWIN (NTC), CA	FT CAMPBELL, KY
2ND BATTALION, 101ST AVIATION	17 X AH-64, 3 X UH-60	FT IRWIN (NTC), CA	FT CAMPBELL, BN AVIATION
2-101 TACTICAL OPERATIONS CENTER	SEC AVIATION	FT IRWIN (NTC), CA	FT CAMPBELL, KY
HHC 82DAVN BDE(-)	AVIATION COMMAND POST	FT IRWIN (NTC), CA	FT BRAGG, NC

Locations

The overall joint experiment force structure was an integrated organization including live (Service experiment) and simulated forces. Central control of Service experiment live forces, to include opposing forces (OPFOR), was restricted to agreed upon joint events. Outside of those events, Services had full control over live forces. Control over all simulated forces included in the joint experiment remained with JFCOM's Joint Experiment Control Group (JECG).

Live forces were located primarily on ranges in the western United States (Fort Irwin, CA; Camp Pendleton, CA; China Lake, CA; Nellis AFB, NV) and the San Nicholas Sea Ranges off the coast of Southern California. In addition, component response cells with their simulations were located at Fort Irwin, CA; Camp LeJeune, NC; Hurlburt Field, FL, and Fleet Combat Training Center Pacific in San Diego, CA. The component commands were located at Camp LeJeune, NC – JFLCC; at Nellis AFB, NV – JFACC; and on board the USS CORONADO – JFMCC.

The JTF, along with the JIACG, the JSOTF, and the Joint Psychological Operations Task Force (JPOTF), was located in the JFCOM, JTASC in Suffolk, VA. Mid-way through the operation, the Commander, JTF and elements of his staff forward deployed to the USS CORONADO (AGF-11), joining the JFMCC and operating in the Pacific Ocean waters off San Diego, CA.

Senior Simulation Controllers and Simulation Tech Controllers controlled simulation forces at the JTASC. JTASC controllers managed all simulated OPFOR in the joint experiment, as well as live forces participating in certain key joint events supporting specific experiment

objectives. Central control over live OPFOR and live forces during joint events did not extend to control over these forces during Service specific experiments.

Figure 1: Response Cell and Live Forces Locations

Chapter 2 — Objectives

MC02 experiment designers identified five objectives. Unequivocal attainment of the objectives through employment of the concepts and tools at the center of RDO would provide the basis for support of the RDO process. Equally, failure to attain those objectives could indicate a need to rework the concept or reconsider support for the entire proposal. The actual findings, of course, fall somewhere in between and are provided in detail in Chapter 6. The five objectives are summarized below.

Establish & Maintain Information Superiority

Information Superiority (IS), according to Joint Publication 1-02, occurs when the degree of dominance in the information domain permits the conduct of operations without effective opposition. There are multiple tasks and challenges within this objective.

The initial task or challenge was the ability to provide situational awareness to everyone. The first piece of this task was keeping the Blue picture clear. The JTF disseminated the composite picture by maintaining and distributing a timely, accurate, relevant, and integrated picture of friendly units' locations, and operational status. The success of this step was measured by determining if the Common Relevant Operational Picture (CROP)-provided Blue Force information was sufficient to meet the operational needs of the Blue Force Commander. The second side of this task involved the adversary's forces. The JTF had to issue timely and accurate reports on the adversary's relevant operational capabilities, location, courses of action, and intentions. The success of this element of the task, like the first, was measured by determining if the CROP-provided, Red Force information, was sufficient to meet the needs of the Blue Force Commander.

The next task was demonstrating the ability to use the CROP and collaborating within the force to enhance JTF operational timelines. The JTF measures of success revolved around the degree of shared awareness within the force, the decision-making timeline, synchronization of efforts, economical employment of forces, maintenance of operational tempo, and logistical support.

The last task was to use information to prevent surprises by the adversary. The effectiveness of having superior information available at the JTF decision-making level to predict adversarial actions was measured by documenting instances in which Blue Forces were surprised or confused by actions taken by the adversary.

Set Conditions for Decisive Operations

The JTF needed to establish early in the conflict the right conditions from which to launch RDO. The right conditions meant a shortened deployment period, and very rapid Joint Reception, Staging, Onward Movement, and Integration (JRSOI) times or a condition which JRSOI lead time was not a factor at all.

During Effects-Based Operations (EBO), the staffs used a revised joint deployment process. In collaboration with the components, they synchronized the force flow, and equipment arrival times and established a distributed deployment and sustainment intermediate staging and support base (ISB) infrastructure. The ISB reduced deployment times for inserting and sustaining "ready off the ramp" forces. A new tool, the Joint Force Capabilities Register (JFCR), aided planners during mission analysis and course of action development.

Assured Access

In order to conduct RDO against a capable adversary, the Component Commander must provide his on scene commanders access to the battlefield in sufficient volume to ensure the task force has room to maneuver and an unbroken logistics train. Assured Access is defined as the ability to set and sustain the battlespace conditions necessary to provide the Joint Force Commander (JFC) sufficient freedom of action to achieve the desired effects in conducting a rapid decisive operation. The Component Commanders and the JFC were faced with continually addressing this objective as the adversaries pressed constantly to reduce the Blue footprint in the theater. Future JFC's should expect to encounter foes that have any or all of the following:

- Robust intelligence, surveillance, and reconnaissance (ISR) architectures, or open access to commercially available space-based ISR products
- Cruise and ballistic missiles with improved range and lethality and capabilities that allow for salvo fire against in–theater bases, staging areas, and maritime forces
- Integrated air defense systems to protect their offensive capability and infrastructure, while inflicting attrition losses on the Joint Force
- Long range strike aircraft
- Weapons of mass-effect
- Maritime capabilities, mine warfare, coastal defense cruise missiles, cruise missile armed patrol boats, and submarines, all designed and deployed to deny access to the region
- Full spectrum information capabilities to include military deception, electronic warfare, psychological operations, operational security, physical destruction, and information attacks aimed at countering the heavy reliance of U.S. forces on integrated information systems

The MC02 foes had at their disposal many of the area denial capabilities that have the potential to deny U.S. forces rapid access to the region of sanctuary once in theater.

Conduct Decisive Effects-Based Operations

The Joint Force Commander, his staff, and the component headquarters were expected to conduct decisive, effects-based operations in execution of their RDO.

EBO is a process for obtaining a desired strategic outcome or "effect" through the synergistic and cumulative application of the full range of military and nonmilitary capabilities at all levels of conflict. The entire EBO concept is discussed in detail in the next chapter. An "effect" is the physical, functional, or psychological outcome, event, or consequence that results from specific military or non-military actions.

The EBO process can be depicted as a planning and execution cycle, which is continuous and iterative. The cycle begins with the development of a comprehensive insight, (i.e., knowledge), into the nature of the adversary, the environment, and our own capabilities. EBO envisions the development of this insight to a broader and deeper level than is currently achieved through the production of an interrelated system's analysis of the adversary. The comprehensive insight developed through systems analysis will enable planning staffs to determine more accurately the strength or cohesion that holds the adversary together and motivates him to action. In consonance with other national actions, the Joint Force Commander's intent will then stress the desired effects necessary to break that cohesion and convince or compel the adversary to change his behavior. Guidance given in terms of desired effects is an essential piece of the strategy-to-task linkage. Application is then a function of determining and applying those elements of national power that will be most effective in achieving the desired effects in a

coordinated and synergistic manner. An aggressive, fully integrated, and continuous assessment process measures the impact of the effects created. This assessment must determine if the desired effects were achieved, what unintended effects were produced, their overall impact on the joint effort, and why effects either contributed or failed to contribute to achieving the campaign objectives. The assessment process facilitates decisions the commander must make to adapt and adjust his current course of action to more effectively and rapidly reach his desired end-state.

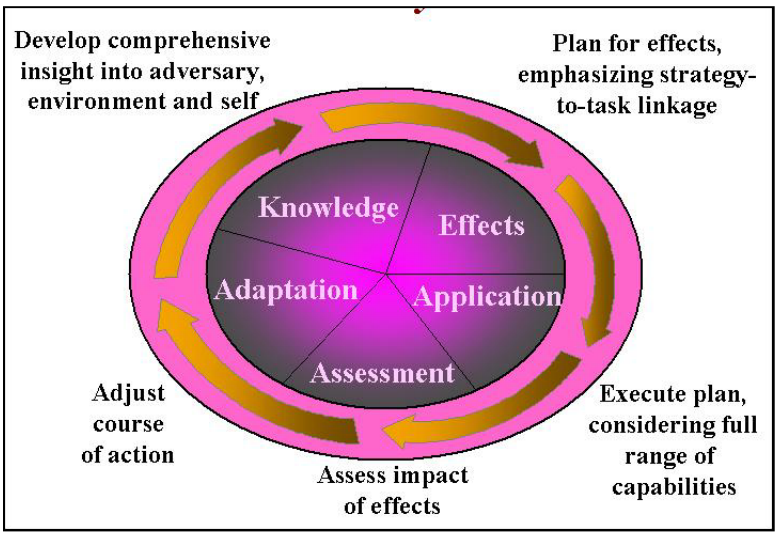


Figure 2: EBO Cycle

EBO take the objectives-based approach with commander's intent one step further, by having commanders examine the causal linkages and effects through which actions lead to objectives. From a planner's perspective, causal linkages help to understand why a proposed action could be expected to produce a desired effect given the current circumstances. What separates effects from objectives is the scope of results that are called effects vice the scope of results that are called objectives. Effects include all of the results of actions, including the undesired and unexpected. Objectives only include the results to be achieved—the desired results. It is, therefore, the consideration of the full range of potential results of actions that is the key to, and the challenge of, effects-based operations.

Sustain the Force

Demonstrating the ability to provide agile sustainment was a goal of MC02 designers. To meet the goal, participants had to successfully satisfy the JFC deployment, employment and sustainment requirements for RDO. They also had to gain and maintain knowledge of force health status and provide medical care.

Concurrent collaboration and emerging technologies such as Joint Total Asset Visibility (JTAV), Global Combat Support System (GCSS), a Logistics CROP, and Joint Logistics Decision Support Tools (DSTs) allowed the staff to rapidly process data and manage the logistics environment.

Employing a distribution structure to satisfy the JFC deployment, employment, and sustainment requirements included the use of ISBs, sea based logistics, forward rearming and refueling points, tailored support packages, and alternate delivery methods such as using the High Speed Vessel (HSV).

The JTF staff tracked patients from the theater of operations and back to CONUS, satisfying the medical requirements. Advanced life support was provided well forward consistent with the distance between casualties, the care required, and the size of the medical footprint in the JOA.

Chapter 3 — Concepts

Joint Concept Development and Experimentation, USJFCOM's charge, takes a promising, emerging idea like RDO, from concept development to implementation. MC02 was the experimentation phase of RDO development. Here, seven concepts at the core of RDO were tested in whole or in part and a short overview follows.

Standing Joint Forces Headquarters (SJFHQ)

RDO require a greater coherence of operational level advanced planning and command and control than current ad hoc or augmented Service core-headquarters can generate (See Figure 3). Successful, rapid response in future operations requires a headquarters that has a detailed understanding of the designated region and is immediately responsive to the regional Combatant Commander for crisis response planning and execution. The SJFHQ meets these requirements. The SJFHQ, as part of the commander's staff, develops continually updated procedures for joint force operations within the designated region, as well as pre-crisis planning for areas of focus as assigned by the Combatant Commander. Pre-crisis planning includes managing the development of the ONA, the development of contingency plans for the focus areas, and relationship building with other potential participants across the U.S. Government Interagency Community (IAC). These relationships, established through a network of collaboration, become the basis for expanding the SJFHQ's core capabilities as a crisis develops. As a crisis in one of the focus areas develops, the SJFHQ rapidly and seamlessly shifts from planning to execution. It employs its developed knowledge of all aspects of the crisis area to advise the Combatant Commander on the use of flexible deterrent options and to facilitate the ramp-up of a subordinate staff designated to handle the crisis. The SJFHQ may be incorporated into the Joint Task Force (JTF) Commander's staff. In all cases, the JTF would be supported by extensive reach-back to the Combatant Commander's staff and other supporting agencies.

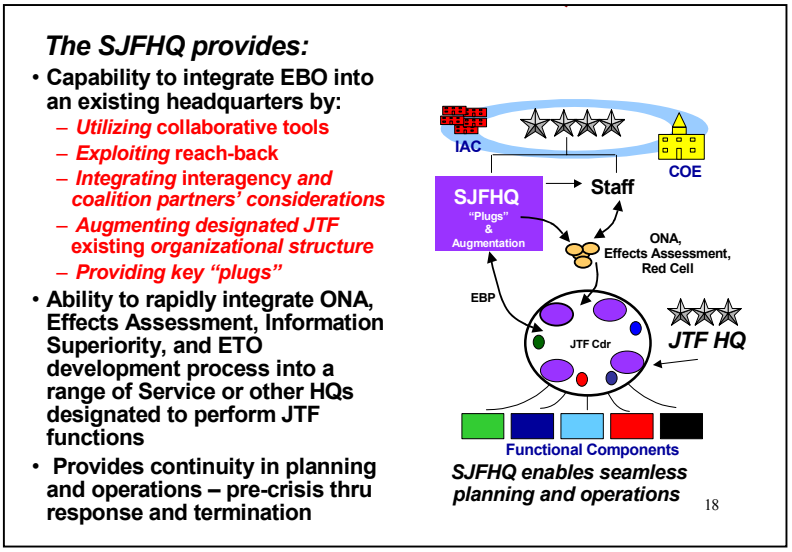


Figure 3: MC02 Joint Force HQ

The MC02 SJFHQ was functionally organized to facilitate effects-based operations and to conduct rapid planning and execution. It conducted pre-crisis planning activity, including the development of a contingency plan and an initial Effects Tasking Order (ETO), as a portion of a notional Combatant Commander staff. The SJFHQ then augmented and merged into the staff of the III Corps Commander, who was designated as the JTF Commander to resolve the crisis presented by the experiment scenario. The SJFHQ participants included former, retired, and current military members from all Services with an average of 23 years of military experience

and over three years of joint experience. These participants included a former operations chief and a former plans chief on a Combatant Commander's staff.

The primary elements of the SJFHQ organization are the Command Group, the Operations Group, the Plans Group, the Information Superiority Group, and the Knowledge Management Group. This architecture was also utilized by the III Corps JTF Commander as the organizational structure for the JTF HQ.

Operational Net Assessment (ONA)

ONA provides the foundation of knowledge and understanding about an adversary needed for RDO. It provides knowledge in sufficient detail to apply integrated diplomatic, information, military, and economic (DIME) friendly actions decisively against an adversary's political, military, economic, social, infrastructure, and information (PMESII) systems. This knowledge base includes systems analyses that identify critical adversary vulnerabilities and potential friendly DIME actions with the goal of causing desired effects. It is a product of collaboration among a wide variety of organizations and informs decision makers from strategic to tactical levels. The ONA provides a joint task force commander and components visibility of effects-to-task linkages supporting EBO.

ONA is one of the supporting concepts enabling RDO. It also provides the foundation for a coherent knowledge base that enables EBO. As EBO requires all echelons to view operations and supporting activities in terms of the effect they produce, ONA requires an understanding of both adversary and friendly forces as a set of interdependent systems – PMESII. The ONA is a product of collaboration among strategic, operational, and tactical levels. It provides a common knowledge base available to customers from the national strategic level to the tactical. These potential customers all participate in and contribute to the development of the ONA. Their contributions impact each element of the ONA.

Figure 4: **Naval Station San Diego, Calif., Jul. 24, 2002** — A harbor tug pulls the guided missile destroyer *USS Fitzgerald* (DDG 62) away from Pier 3 at the Naval Station, San Diego. *Fitzgerald* was participating in *Millennium Challenge 2002*. U.S. Navy photo by Photographer's Mate 2nd Class Dawn C.Montgomery. [020724-N-2354M-002] Jul. 24, 2002

Under the concept, a National Knowledge Advantage Center supports the system-of-systems analysis. The Interagency Community (IAC), through the JIACG, which represents the IAC on the theater Combatant Commander's Staff, articulates effects on adversary PMESII. The IAC and components contribute to identification of DIME actions to create a desired effect. All

participants formulate the resource and support requirements associated with each action. While this concept of operations (CONOPS) addresses the ONA from the perspective of the SJFHQ of the Combatant Commander's staff, the production of a credible ONA requires sustained involvement from the JIACG and service components. It is not and cannot be done by the Combatant Commander's staff alone.

The ONA views a potential adversary as an inter-dependent system-of-systems, all of which contribute to some degree toward his public unity, will, and capability to pursue a course of action unfavorable to U.S. interests. The ONA supports EBO, which require that all levels – strategic to tactical – collaborate to plan and execute synchronized operations producing desired effects upon the adversary's capability to conduct operations. The ONA goes far beyond traditional intelligence assessments. It is an action-oriented process, which provides a continuous stream of knowledge from desired effects to adversary vulnerabilities to tasks. As such, ONA represents a philosophy that continuously drives a process to develop an actionable product. The process builds situational awareness and understanding. The product supports plans and execution of operations. The ONA product changes and expands over time. The ONA is a medium that provides the analytic knowledge and questions that drive the collection process.

Effects-Based Operations (EBO): Planning and Assessments

The Effects-Based Planning (EBP) process is a modification of the current Joint Planning Process. The EBP leverages knowledge systems and the benefits of collaboration. Furthermore, it forces the JFC to explore and consider the complex strategic and operational-level interrelationships coincident with application of all elements of national power. The modifications to the current process better leverage knowledge systems, improve collaboration, and address the complex strategic and operational-level interrelationships caused by the globalization of economies and mass media. The modified military planning process is designed to leverage the attributes of the Joint Force as described in Joint Vision 2020 (dominant maneuver, precision engagement, focused logistics, and full-dimensional protection) in synchronization with activities applying other elements of national power. Furthermore, the process requires an iterative feedback mechanism that collects, processes, analyzes, and disseminates information and knowledge in a sufficiently timely manner to enable commanders at all levels to make better decisions. It should allow commanders to make better decisions more rapidly than the opposing commander. The improved functionality of the EBP combined with the effects-based strategy-to-task linkage supports the rapid adaptation element desired to promote decisiveness, unpredictability, and increased decision-to-action tempo.

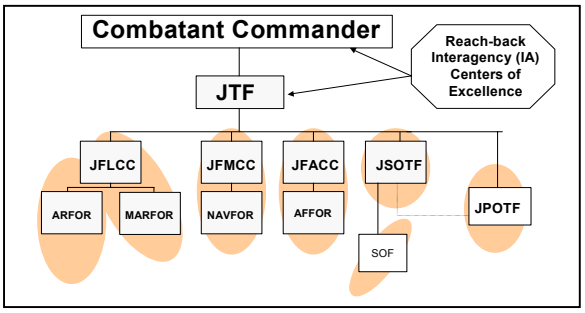


Figure 5: JTF Organization Chart

The CROP and the continually updated ONA provide the force planners with information superiority. This insight shapes the planning process by focusing it on effects and tasks vice just tasks. Planners are also able to expand their analysis of adversary centers of gravity (COG) by study of adversarial PMESII.

During the EBP process, operational-level planners and commanders focus not only on the desired outcomes of planned actions including 2nd and 3rd order effects, but also other potential consequences (i.e., undesired effects). Examination of the hierarchy and relationships between anticipated effects maximizes the impact of actions and develops the most effective Course of Action (COA) options. Additionally, military planners benefit from interagency participation in planning. Those interagency contributors, including scientists, educators, and engineers, working in the collaborative environment with access to the ONA and analysis tools, provide multiple alternatives for action. EBP provides commanders an increased ability to have a far-reaching impact in areas not traditionally within the military scope of operations.

The Effects Assessment (EA) process starts during the COA development step and runs throughout the EBP cycle. Since the goal is to achieve effects on a complex adaptive adversary, the process must include the ability to adapt the plan to deal with: 1) the adversary's actions that are based on his own initiative; 2) action taken in response to previous friendly efforts; and 3) undesired or inefficient effects, and defeated actions. It is assessment planning that identifies measures for desired and supporting effects. The evaluation and comparison of Measures of Performance (MOP) and Measures of Effectiveness (MOE) provides effects assessment. MOP is the objective metric of the "outcome" of a "tactical action." Normally the component level of command provides the MOP. It is the result of the tactical actions performed to achieve a desired effect (e.g., was the target hit and what level of damage was achieved). More than one MOP can be associated with each MOE, as many tactical actions may be required to bring about a desired effect. MOE are most often "subjective indicators" that allow identification of the resulting effects of actions or applied capabilities. MOE articulate where to look and what to measure in order to determine if the desired effect has been achieved. In short, MOE must be able to show incremental progress in achieving desired effects.

Measures used in assessment become meaningful when they are tied to theater objectives, reliable when they can be validated by collection disciplines, and observable when allocated traditional and non-traditional means of observing, and reporting data can be tasked before, during, and after the application of capabilities. Developing MOE start with the clear articulation of the desired effect and should encompass parameters describing such things as the levels of change (disruption, denial, neutralization), the distribution (geographic, organizational, political, cultural), and duration of the effect.

Robust collection is integral to comprehensive EA. Collection planning must incorporate all-source collection requirements in support of the overall EA process and at the same time be responsive to the dynamic environment inherent in RDO. A Joint Intelligence, Surveillance, and Reconnaissance (JISR) process is required to ensure collection assets are effectively tasked. To this end, the JTF or the Combatant Commander should state collection requirements early. During MC02 execution, all employers of DIME elements of national power performed EA. A JTF EA Cell was responsible for coordinating all levels of military EA. The EA Cell and component staff elements continually assessed the impact that tactical actions achieved and provided that information to the Joint Planning Center and the Joint Operations Center. In roughly the same way, the effects analysts worked in the collaborative environment with the IAC to ensure that the effects achieved by other agencies' actions were available to joint planners and operators. The effort was a dynamic process that drove planners and operators to closely consider specific aspects of the plan to determine what, if any, modification had to be made to improve the pace of achieving the JTF Commander's desired effects.

Collaborative Information Environment (CIE)

The CIE provides the JTF the ability to share information, facilitates reduced planning timelines, and enhances organizational effectiveness. This environment, enabled by high-speed communications links, fed through large bandwidth pipelines, and using electronic collaborative tools, improves the exchange of information among members of the Joint Force and those organizations supporting or being supported by the Joint Force. Within the CIE there are three major components; the COP, the CROP, and an on-line collaborative tool suite. The design goal for CIE is to increase shared information, use shared information to improve shared awareness, and, with shared awareness, extend and enrich collaboration both vertically and horizontally throughout the force. Additionally, the CIE should enrich collaboration to improve the synchronization of tactical, operational, and strategic actions by the Joint Force. The CROP is the primary repository and means of access for most information products necessary for the Joint Force. Access to the right information, at the right place, at the right time, in the right presentation format to accelerate the commander's decision-to-action time is fundamental to information-age warfare. To support this need, the CROP presents timely, fused, accurate, assured, and relevant information that can be tailored to meet the requirements of the Joint Force. The information will be available to every properly equipped organization and individual involved in a joint operation. The CROP enables the Joint Force to achieve the high level of knowledge necessary to support RDO. Essential to the CROP is the construct of a virtual warehouse of information – friendly, neutral and enemy force dispositions (aerospace, land, sea); intelligence; maps and imagery; logistics data; planning data; weather; socio-economic data; and cultural information. Users access this virtual warehouse to extract the information they need to accomplish their mission. Access to the information residing in the CROP, combined with the ability to collaborate quickly with domain experts in the CIE, should enable commanders and their staffs to achieve an exceptionally high degree of shared battlespace awareness.

Information Superiority is a byproduct of effective CIE. It is a state of imbalance in one's favor (relative advantage) in the information domain that is achieved by being able to get the right information to the right people at the right time in the right form, while denying an adversary the ability to do the same. This way of thinking about Information Superiority combines a specific outcome associated with Information Superiority and the method that is used to achieve it.

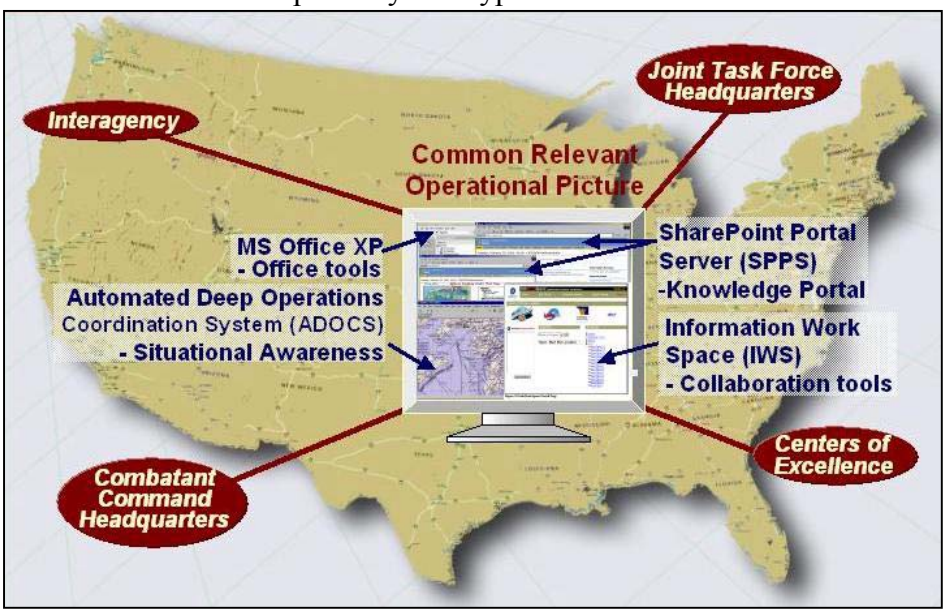


Figure 6: Experimental Command, Control, Communications, and Intelligence (XC4I) apparatus, allowed a coherently joint, reach-back, collaborative information environment

Information Superiority derives from the ability to create a relative information advantage vis-à-vis an adversary. The concept of an information advantage is not new. Commanders have always sought a decisive information advantage over their adversaries. Indeed surprise, one of the immutable principles of war, can be viewed as a type of information advantage that one force is able to establish over another.

Information advantage is not exclusively about collection, analysis, and dissemination, but it is also about a force's ability to meet its information needs with available resources more effectively than its adversary is able to. In fact, the degree to which the force can meet its information needs, compared to its counterpart, determines in large part the degree of success of the particular operation. The key to gaining the information advantage is to match information-related capabilities with the right concept of operations, organization, approach to command and control, and the capabilities of the people and the weapons systems involved.

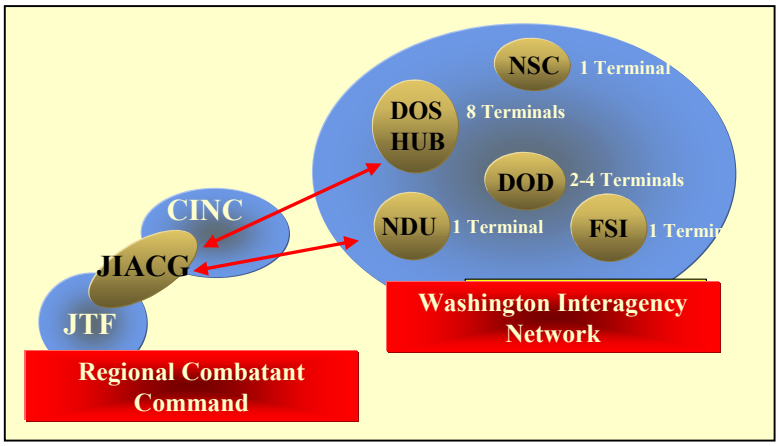


Figure 7: JIACG Relationships

Interagency

MC02 explored methodologies to facilitate U.S. Government interagency planning and execution in support of EBO in RDO. Two significant components to the experiment relate to interagency activity.

First, the CINC's staff was augmented with an experimental staff element, referred to as the JIACG. The JIACG represented the IAC at the operational-level. Their mission was to facilitate information sharing across the IAC to include the Embassy/Country Team. Second, a common, secure collaborative network linked selected members of the U.S. Interagency to facilitate planning and coordination. The desired result was an effective political-military plan and a Combatant Commander's operational plan, developed to effectively and efficiently employ all elements of national power in support of national and regional policy aims, as well as the CINC's theater engagement plan.

With shared equities in the management of national security and its transformation, interagency representatives collaborated during a series of discreet events to produce the strategic documentation required to support MC02 experiment objectives. IAC participation varied as issues changed. The intent was to include as many IAC representatives as appropriate. However, real-world commitments prevented some IAC representatives from participating throughout the entire experiment. The requisite knowledge and expertise remained constant as substitutes came in to pick up the load when necessary.

The goal of interagency experimentation in MC02 was to develop organizational relationships, tools, and processes to optimize civilian and military interoperability within the IAC and to accomplish operational-level coordination. This enhanced coordination was employed to support: deliberate, crisis, and transition planning; national-level net assessment

(ONA) synchronization of actions to achieve desired effects and strategic objectives; and conducting effects-based operations.

The Interagency Concept of Operations for MC02 included four significant engagements with the wider interagency, beginning in January 2002 and concluding with the execution of MC02 in July and August 2002. The three events scheduled prior to MC02 established the national strategic and regional approach for the experiment, resulted in a Political-Military Plan, and allowed personnel training on the use of the collaborative tools employed during MC02.

The JIACG intentions were to:

- Establish regular, timely, collaborative working relationships among military and civilian operational planners.
- Form, train, and exercise a new staff element JIACG composed largely of U.S. civilian personnel with strong agency expertise and connections.
- Create opportunities for realistic and accelerated operational planning upon approval of a political-military plan.
- Build on initial efforts to integrate military and civilian planning issues using a deliberate planning process.

Joint Theater Logistics Management

Joint Theater Logistics Management (JTLM) is a process that provides the Combatant Commander the ability to synchronize, prioritize, direct, integrate, and coordinate common-user and cross-Service logistics functions, optimizing support to the joint force. The process allows centralized management of the most critical supply areas such as in-theater logistics, inter- and intra-theater transportation, in-theater contracting, host nation support, and critical supply items such as precision guided munitions, and common ground munitions and fuel. Key elements of JTLM provide for efficient common-user logistics support, ensuring a smaller logistics footprint by reducing redundancy, and most importantly integrating component logistics forces.

JTLM relies heavily on an improved, robust communications system. Today's advanced information systems, and the CIE allows JTLM to provide a centralized location to track the Services' support to any one facet of a mission. JTLM ensures that the corresponding Service logistics demands have the right priority and emphasis. Using the CIE, the theater staff has the capability to reach back and harness a vast array of technical expertise, and resolve complex issues in a timely manner.

The MC02 JTLM organization was two-tiered. At the upper level, the Joint Logistics Management Center (JLMC), which is made up of the theater commander's J4 staff, and staff from US Transportation Command (TRANSCOM), Defense Logistics Agency (DLA), the Services, and the Joint Chiefs, plans, coordinates, and deconflicts logistics support for the theater. The second level of logistics planning concentration is at the JTF level. Logisticians are embedded within each of the JTF Plans and Operations Cells, providing those planning staffs with organic logistics planning capability. The Logistics Action Review Board (LARB) ties the two halves of the logistics planning effort together, using the communications tools inherent in the CIE. The LARB is a concurrent virtual, collaborative board. Members of the JLMC, the JTF, and Service logistics staffs meet to synchronize plans and operations in support of Effects-based operations.

The functions, roles and responsibilities of each of the JTF logistics positions, after the SJFHQ was absorbed into the JTF, are described in the SJFHQ Concept of Employment, the Deployment and Sustainment CONOPS and TTP, and the Joint Standard Operating Procedure (JSOP) manual.

The LARB was the principal forum for overall collaboration of logistics support to the operation. It augmented, but did not replace normal staff procedures and was intended to resolve complex, sophisticated issues. It facilitated the coordination of logistics and transportation support for Effects-based planning and current operations by :

- Bringing the strategic, operational, and tactical levels together

Figure 8: NELLIS AIR FORCE BASE, Nev. (AFIE) -- Tech. Sgt. Tommy Mazzone, a loadmaster from the 8th Special Operations Squadron at Hurlburt Field, Fla., loads a palette aboard a MC-130E Combat Talon on July 29 for an air drop during Millennium Challenge 2002.

- Enabling rapid response to short-fused logistics problems
- Helping to ensure the ETOs were resourced.
- The LARB convened daily, after Joint Planning Center (JPC) collaborative sessions in support of ETO development and as required to resolve specific logistics issues.

The Logistics CROP and the Joint Logistics (JL) Tools

The Logistics CROP and the JL Tools facilitated the functions. The Log CROP was built in the Share Point Portal Server (SPPS). The Log Watchboard provided a commander and his staff a stoplight chart on the status of JTF Component Commanders' critical warfighting resources. For example, if the JFMCC is reported ammunition stores as critically low, below 60 percent of the wartime requirement, he colored the appropriate block Red. At a glance, other commanders and logisticians were alerted to a problem and they then have the ability to drill down and find the cause for the low inventories, which could then be corrected.

Figure 9: Click on the frame above to review slides on the JTLM concept ideas as discussed in this section.

Logistics functional areas are shown on the left of the Log CROP. The area acts as a library for various reports and plans. The ADOCS COP provides situational awareness. However, the ADOCS presentation available in the Log CROP was not a real-time presentation.

On the right of the Log CROP display, access to more information and the JL Tools and systems was available. All of those tools and systems were accessible through the Log CROP, including data marts containing large amounts of reference

information, such as Defense Management Data Center (DMDC), Automated Air Facilities Information File (AAFIF), Weapon Preload Software (WPS) and Java Enabled Browser (JEB).

During MC02 EBP, the Logistics Plans Officer, the Logistics Coordinator, and most of the JTF's Log PLANS section personnel participated in the Joint Planning Center (JPC) planning sessions. The Log OPS Sustainment Officer and other selected Log OPS personnel monitored the JPC. The relationship between COA development and deployment planning starts with the assignment of Effects-Based missions from a Prioritized Effects List (PEL) given to the Components. The Components conducted their COA development by selecting capabilities to accomplish the assigned tasks. The JTF synchronized and sequenced the force flow based on the PEL and Time-Phased Force and Deployment Data (TPFDD) development began.

As EBP continued, the normal logistics planning functions required in support of COA development, such as the construction of a logistics staff estimate, the assessment COAs for logistics and transportation feasibility were accomplished based on the desired effects. The products were provided to the Plans Director and included in the logistics portion of the Effects Tasking Order (ETO). After the first ETO was published and execution began, the ETO process became iterative. The process repeated itself in a somewhat abbreviated manner, based on the assessment of the success of the planned effects, and in response to new missions and/or requirements. The Logistics Operations Director with the Logistics Coordinator convened the LARB to ensure a smooth and complete exchange of sustainment information, achieve synchronization of sustainment, employment, and transportation and other resources, and to address issues that exceeded the ability of routine staff work to resolve. A Deployment Planning Cell was convened as necessary to ensure the smooth and complete exchange of deployment information, achieve synchronization of deployment, employment, and transportation and other resources. MC02 hosted approximately 176 logisticians involved in MC02.

Joint Initiatives

The MC02 Joint Initiatives process provided a systematic, objective review of proposed joint initiatives. The process provided a multi-level review of initiatives with command-wide involvement supplemented by interagency and service representation. The initiative approval process objectively compared each proposed initiative to the overall experiment objectives as well as applicability to the joint environment. Additionally, the process provided continual tracking and addressing of associated issues throughout preparation for the event. The Joint Initiatives process provided a two-way communication between the individual initiative sponsors and the MC02 experiment planning and integration teams. The review process provided for three examination sessions. Each session was progressively more detailed and required higher-levels of endorsement than its predecessor. Phase I was the initial review by subject matter experts from the functional and experimentation community that screened submissions against RDO objectives and MC02 joint experiment objectives. As part of Phase II, a "Council of Colonels" was formed to review the recommendation of the operational/technical panels and forward its findings to the third phase, a General Officer/Flag Officer panel. Many Service proposed initiatives were not approved for joint integration because the initiatives lacked a Joint application or perspective. The Services evaluated some of these initiatives on their own. This prototype initiative process is planned for use in future major experiments to ensure a standard and formal procedure exists for vetting new ideas and technologies into the Joint Experimentation process.

Joint Intelligence, Surveillance, and Reconnaissance (JISR)

JISR is a network-centric approach to the management of ISR platforms and sensors to better support the quick-paced demands of EBO. JISR, as employed in MC02, emphasized collaboration between producers and users to provide rapid and responsive mission focused ISR, essential to future joint operations. Planners and operators shared information rather than working through and around cumbersome, single-intelligence "stovepipe" tactics, techniques, and procedures.

JISR thrives in an environment characterized by rapid-fire information exchange, and integration of sensors at the national, theater, and tactical levels. This concept streamlines ISR management by use of new integrated, OPS/INTEL capabilities, allowing dynamic re-tasking of sensors to ensure ISR optimization. In addition, multiple sensor cross-cueing becomes routine, and the synchronization of ISR assets with operations, the norm.

As our understanding of the key tenets of EBO and the EBP processes matures, JISR will assume an ever more critical role. The ability to effectively manage multiple collection sensors, spanning several levels of operational control, within the compressed decision timelines associated with RDO will be key. JISR will enable the JFC to smartly couple ISR assets to specific effects, thereby optimizing the employment of high demand/low density assets.

Chapter 4 — Experiment Scenario

Blue Forces

Commander, Blue Forces/Commander Joint Task Force (CJTF) led a U.S. land, sea, air and special operations expeditionary force in support of a theater component commander. The task force consisted of units from the four Services, Supporting Commanders, and a Special Operations Command task force. An Army Corps headquarters unit composed the JTF staff and an Army Lieutenant General led the Joint Task Force, reporting directly to the Combatant Commander. Members of a Standing Joint Forces Headquarters (SJFHQ) augmented the JTF. The SJFHQ, itself a new warfare concept under review, was a detachment of the theater Combatant Commander assigned to speed the JTF's learning/acclimation process. The JTF Commander's functional component support was provided as follows:

Figure 10: Click on the MC02 logo for a display of forces available to the Blue force commander at the commencement of the experiment

A JFLCC, a Marine Corps Major General and the staff of a Marine Expeditionary Force, a JFACC, an Air Force Lieutenant General from a numbered Air Force element and his staff, and a JFMCC– a Vice Admiral from a numbered fleet command. The Service components were joined by a JSOTF led by an Army Colonel and a JPOTF led by an Army Lieutenant Colonel. The commander was provided assistance through various means by elements of the Interagency (civilian departments and agencies of the U.S. Government).

Navy Order of Battle

The Joint Maritime Forces Component Commander had two Carrier Battle Groups. Each Battle Group included the aircraft carrier and its accompanying air wing, AEGIS Cruisers (2), AEGIS Guided Missile Destroyers (2), a Destroyer, close support submarine, and supporting Fleet Oiler. In addition, two Amphibious Ready Groups made up of three amphibious ships each (an LHD, LHA, LSD), were carrying the Marine Expeditionary Units (MEU). Mine Countermeasure forces included both MCM (2) and MHC (1) class ships and H-53 helicopter support. The naval force commander, who broke his flag in a Navy Command ship, also had at his disposal the three ships of a standing naval theater force (already in the theater when the conflict began), consisting of a Cruiser and two Guided Missile Destroyers. Various supply, cargo, military prepositioning ships, and auxiliary craft of the service fleet were assigned. Four Special Boat Units were available to support two Navy SEAL teams. The SEALS and their support craft were under the Tactical Control of the Special Operations Force Commander. For MC02, the fleet also had at its disposal the currently experimental High Speed Vessels (4), providing rapid insertion capabilities for Marine and Special Operations Forces missions. The Carrier Air Wings each consisted of 48 F/A 18's (C and F models), four EA6B's, four E2C's; eight S-3B's; six SH-60R's, two MH-60's and two C2A's.

Marine Corps Order of Battle

The Marine Corps was selected to stand up the JFLCC. The JFLCC was assigned both Army Forces (ARFOR) and Marine Forces (MARFOR). The ARMY Order of Battle is described below. MARFOR consisted of a Marine Expeditionary Brigade (MEB) and two MEUs. The MEB brought with it a Command Element, including a headquarters group with a Radio Battalion, a Communications Battalion and an Intelligence Battalion; a Force Reconnaissance Detachment; a Civil Affairs Detachment; a Marine Liaison Element Company, and a Marine Air-Ground Task Force Command and Control Detachment. The MEB's Ground Combat Element (MEB GCE) consisted of a Regimental Headquarters; three Infantry Battalions; three Infantry Battalion Headquarters with Divisional Headquarters Detachment support; a Reconnaissance Company; and a reinforced Artillery Battalion that had a chemical, biological and radiological (CBR) detachment and a High Mobility Artillery Rocket System (HIMARS) battery. Additionally, the MEB GCE had an Advanced Amphibious Assault Vehicle Battalion (AAAV); a Light Armored Reconnaissance Battalion made up of 32 Light Armored Vehicles (LAV-25's); one Tank Battalion consisting of 58 M1A1 tanks, and a Construction Engineer Battalion (CEB) assigned. The MEB Air Combat Element (MEB ACE) included a Marine Wing Headquarters Squadron and a Marine Air Control Group with its various support squadrons, a reinforced Low Altitude Air Defense (LAAD) Battalion with a detachment of Avengers and Claws and a detachment of five vehicle-mounted UAV's (VMUAV) and vertically launched UAV (VTUAV) (Dragon Eye and Dragon Warrior). The Marine Air Group was reinforced and included two squadrons of F/A-18C's (24), a squadron of F/A-18D's (12), a squadron of AV-8B's (12), a squadron of C-130's (12), and as previously mentioned an EA-6B squadron (5) under JFACC control. Rotary wing assets included four squadrons of V-22's (48), a squadron of 12 CH-53E's, and a squadron of light attack helicopters AH-1Z's (18) and UH-1Y's (9). The group was supported by a Marine Wing Support Group (two squadrons) and a Marine Air Logistics Squadron. The MEB Service Support Group included a Headquarters and Support Battalion and Supply, Maintenance, Engineering, Transportation Support, and Medical Battalions. The JFLCC was also able to draw on two Marine Expeditionary Units (MEU). Each MEU consisted of a Battalion Landing Team (BLT), 12 V-22's, four CH-53E's, six AH-1Z's, three UH-1Y's, six AV-8B's, and necessary support group detachments. Unlike the MEB, the MEU is a component of the Navy's Aircraft Carrier Battle Group (CVBG)/Amphibious Ready Group (ARG) force. The MEU embarks in the three-ship ARG and deploys with the battle group.

Air Force Order of Battle

The Air Force, acting as the functional air-warfare commander, was set up as the Joint Forces Air Component Commander and operated out of the Combined Air Operations Center (CAOC) at Nellis AFB, NV. The staff of a numbered Air Force commander manned the JFACC. Those forces were augmented by other agencies and organizations to include U.S. Space Command, U.S. Transportation Command, and U.S. Strategic Command. The JFACC was responsible for a deployable Global Strike Task Force (GSTF), an ISR/JAOC FDO, in-theater air defense units, and various support elements. The GSTF consisted of 10 B-2's, 10 B-52's, 10 B-1's, 48 F-22's, and two squadrons of KC-135 and KC-10 air refueling aircraft. Also available to the JFACC were four E-8 JSTARS, four E-3A AWACS, four RC-135J's, four Global Hawks, two ABL's, four U-2's, 3 EC-130H (Compass Call), 24 C-130's, 18 C-130H's, and five EA-6B's (USMC assets TACON to the JFACC). The JFACC also controlled in-theater forces consisting of 18 F-15C and 18 F-15E aircraft, 12 RQ1 Predators, 18 Joint Strike Fighters, 18 F-16CJ's, 18 F-16CL's, 12 F-117's, 18 A-10's, three EC-130H's (Compass Call), six HH-60's, 54 KC-135

and KC-10 tankers, and necessary C-130, C-17 and C-5 lift support aircraft. Also on scene were Combat Service Support units (Tanker Airlift Control, Mission Support Teams, Air Mobility Elements).

Special Operations Force Order of Battle (SOF)

The SOF provided a significant piece to the puzzle. Headquartered with the JTF commander and functioning as a JTF Component – JSOTF - was a Theater Special Operations Command, consisting of two support battalions and a Special Operations Task Force. The Task Force was made up of three Special Forces Battalions, two Ranger Battalions, and a Ranger Regimental Headquarters Staff. In addition, there was a Special Operations Aviation Regiment, providing 10 MH-47E's, four MHJ-60L's, and eight AH-6/MELB aircraft. The Navy added a Naval Special Warfare Task Group to include a headquarters unit, two SEAL teams, two Special Boat Units and an Explosive Ordnance Detachment. An Air Force Special Operations Wing was also attached to the JSOTF. The Wing was made up of an 11-team Special Tactics Squadron and a six-team Special Operations Squadron Air Force Foreign Internal Defense Unit. Additionally, there were six AC-130's, 16 MC-130 H/P's, 12 CV-22's and 2 EC-130J aircraft assigned in support. Operating with the JSOTF was the JPOTF, consisting of one Army PYSOP Group. The Group was made up of one Regimental Support Battalion, one Dissemination Battalion, two Tactical Battalions, and one Enemy Prisoner of War (EPW) Battalion.

Figure 11: **Click on the image above for a powerpoint slide show briefing on US Army participation in MC02. The embedded slide presentation includes note pages for additional insights. Note pages are accessible by right clicking image above; highlighting "presentation object" and left clicking on "open".**

Army Order of Battle

The ARFOR was task-organized under an airborne division headquarters, comprised of a Stryker Brigade Combat Team (SBCT), an Airborne Division Ready Brigade, a deep strike/mobile strike aviation task force package, and associated division and corps units that were necessary for force protection, sustainment, and C4ISR functions. The Brigade included a Headquarters element, three airborne Infantry Battalions, a 105mm Field Artillery Battalion (towed), a Forward Support Battalion, a Reconnaissance Battalion, an Air Defense Artillery Battalion, a Military Intelligence Company, a Communications and Signal Platoon, a Military Police Platoon, and a Nuclear, Biological and Chemical Platoon. The Interim Brigade Combat Team included a Headquarters element, three Mechanized Infantry Battalions, a Mechanized Reconnaissance, Surveillance, and Target Acquisition Squadron, an Anti-Tank Company, a 155mm Field Artillery Battalion (towed), a Combat Engineer Company (wheeled), a Military Intelligence Battalion, a Communications and Signals Battalion, a Brigade Support Battalion and an Air Defense Artillery Battery (Avenger). The ARFOR aviation brigade included a Medium Attack Helicopter Squadron of AH-64's and RAH-66's, an Multiple-Launch Rocket System (MLRS) Battalion with a Target Acquisition Company, three Support Battalions, Military Intelligence Battalion, a Communications and Signals Battalion, a Civil Affairs unit, and a Psychological Operations unit.

Army forces were equipped with the Army Battle Command Systems (ABCS), which includes the Army Tactical Command and Control System (ATCCS) suite of systems at Brigade

through Corps levels. The Maneuver Control System (MCS), Maneuver Control System - Light (MCS-L), All-Source Analysis System (ASAS), All-Source Analysis System - Light, (ASAS-L), Advanced Field Artillery Tactical Data System (AFATDS), Air and Missile Defense Workstation (AMDW/S), and the Combat Service Support Control System (CSSCS) make up the ABCS. The Global Command and Control System-Army (GCCS-A) was positioned at the ARFOR, U.S. Army Special Operations Command (USASOC), and the JFLCC to allow joint connectivity during the planning and execution of MC02. The Integrated Meteorological Systems (IMETS), the Digital Topographical Support System (DTSS), and the Tactical Airspace Integration System (TAIS) were also employed.

Adaptive Adversary

The MC02 Opposing Forces' (OPFOR) mission was to be a credible adversary for the BLUE force. This required an OPFOR that was aggressive and adaptive, capable of achieving its own objectives through diplomatic, information, military, and economic influences. The overall objective of the MC02 OPFOR was to provide a 2007-based, realistic, adaptive opponent that would test the vulnerabilities of the RDO concept. In concert with the MC02 scenario, the multifaceted adversary portrayed to the Blue JTF provided a realistic test opponent. The confrontation that developed created an excellent environment in which the RDO concept could be explored. It allowed examination of the ONA, EBO, Interagency, SJFHQ, and other supporting concepts and objectives. The JFCOM J7 Joint Warfighting Center Support Team (JST) in coordination with the J9 World Class Adversary (WCA) Team provided the OPFOR.

Analysts from the J9 Analysis Division and Subject Matter Experts (SMEs) from J7 assessed the OPFOR organization and campaign during MC02. This allowed for an in-depth understanding of the success and failure of Blue effects-based operations. The assessment team met with OPFOR senior leaders daily to review their operations, how they planned to respond to BLUE efforts, and collect DIME/PMESII self-assessment data.

The senior leadership team for the OPFOR included a retired Lt Gen (USMC), who played the JTF-South commander and a former U.S. Ambassador, who served as the Supreme Leader for the Government of Red.

The MC02 scenario called for an upper level, small-scale contingency (SSC). As such, the OPFOR organized into a multi-faceted group that included government, military, terrorist, pirate, subversive, militant, and criminal elements. These elements each had their own objectives and did not always work cooperatively. As such, they posed a considerable challenge for the Blue JTF.

Scenario

The MC02 scenario postulated a year 2007 regional power, Red, situated within an area of critical world strategic and economic importance (see figure 12). Red suffered a natural disaster (earthquake) and the subsequent chain of events resulted in the separation of a rogue military commander. Identified as CJTF-South, he and his subordinate military commanders spun away from national (Government of Red) control. A renegade element within the Red leadership, CJTF-S conducted broad actions, including conventional military, asymmetric, diplomatic, information, economic, and terrorist applications, with the goal of establishing regional power and control. A dispute over national ownership of local Islands led to CJTF-S's seizure of the disputed islands, the launch of a CJTF-S sponsored military escort service to

ensure safe passage, and a related toll for use of that service. Blue ordered the execution of decisive operations that led to the initiation of hostilities.

Blue goals were to secure the strait for international commerce; neutralize Red's WME capability; establish sovereign control of the disputed islands in accordance with a World Court decision, and compel JTC-S to abandon its political agenda in pursuit of regional hegemony.

Adversary goals were as varied as the factions that challenged the Blue forces. The OPFOR consisted of three primary elements: JTF-S military forces, the Government of Red (GOR) national leadership, and a terrorist organization that included (pirates, private company, and criminal elements). The JTF-South objectives were to preserve the regime, deter Blue military deployment, limit Blue war aims, and restore internal cohesion. In addition, JTF-S aimed to reduce Blue presence in the region, develop regional influence, speed economic recovery (earthquake aftermath), champion ideals in Red, control western access to oil, and gain Red stature. The objectives of the Government of Red were to preserve the regime, reduce Blue presence in the region, develop regional influence, and speed economic recovery. The terrorists' objectives were to deny Blue access to the region, attack opposing political and religious organizations, and disrupt Blue operations.

Threat forces organization and systems.

The adversary ground forces consisted of an army with approximately 55,000 personnel. The army was comprised of four divisions, (one armor, two infantry, and one mechanized), two airborne brigades; two separate armored brigades; a marine brigade; a separate artillery brigade; and various special operations forces (SOF). SOF/militia numbered 5,000 personnel for unconventional warfare. Theater ballistic missiles (TBM) forces included 200 launchers and 1,800 missiles with chemical/biological capable cruise missiles.

Air forces numbered 158 aircraft, including 14 MIG-29's, 4 SU-27's, 20 F5E's, and various other fighter, bomber, auxiliary, and support aircraft.

Naval forces included five diesel and four midget submarines; 6 guided missile frigates; 32 patrol gun boats - most with surface-to-surface missile capability; 13 amphibious class ships; 10 auxiliaries; 105 small craft armed with recoilless rifles or rocket launchers, and shore based anti-ship fixed and truck mounted missile launchers.

Figure 12: MC02 Scenario Highlights

Scenario data points include:

- Though disavowed by the Government of Red, country Red was a major state sponsor of terrorism and provided sanctuary to large terrorist groups within its sovereign borders and conventional force umbrella.

- The Red leader employed these global-reach groups to create incidents and threats throughout the region and world, while maintaining official deniability.
- Regional access was politically constrained and logistically challenging.
- JTF-S's campaign plan was characterized by asymmetric attacks, ambiguity, anti-access, threat of WME, economic leverage and upheaval prepared for a large conventional set-piece battle, local and exported terrorism against adversary forces, and timing of their choosing.
- A single-dimensional response (military) would not easily neutralize Red's coordinated political, military, economic, social, and informational campaign.
- Threats to friendly forces and assets were worldwide.
- Friendly conventional forces had to create selective periods of multidimensional supremacy and decisively apply military power to achieve desired effects, not necessarily conquer the country, or escalate the conflict.

Knowledge, and not mass was the decisive force enabler for friendly forces.

Figure 13: CHINA LAKE, Calif. (AFIE) -- Inside the integrated battlespace arena at Michelson Laboratory here, warfighters keep a close eye on screens showing a real-time picture of theater air assets and a live feed from a Predator surveillance aircraft July 30 during Millennium Challenge 2002. MC02 incorporates elements of all military services using the largest computer simulation federation ever constructed for an experiment of its kind. (U.S. Air Force photo by Staff Sgt. John Houghton) (VIRIN: 020730-F-0981H-104)

Chapter 5 — Experiment Execution - The Spirals

MC02 Test Campaign Plan

Eight focused technical and training events referred to as Spirals preceded MC02. The Spirals wrung out the technical infrastructure that permitted conduct of the experiment from coast to coast and intra-Service. The Spirals also provided the participants an opportunity to become acquainted with the new concept tools and the philosophy and technology of their applications.

The Spirals, which began with Spiral 0 in early December 2001, had a dedicated test plan and concept of operations embedded in the overall MC02 Campaign Plan. This section describes the concept, scope, activities, schedules, manning, and format for developing the specific MC02 tests. It provides the guidance for the development of the individual test plans that USJFCOM and the Service participants used for pre-execution technical tests. The goal of the test program was also to provide sufficient information on the MC02 technical architecture to recommend USJFCOM accreditation for its use in MC02.

There were three scheduled Integration Milestones (IM's) and four additional integration events that were added to address specific issues encountered in the IM's. The goal of the IM's was to integrate the service simulations into a federation that would support MC02. Particular focus was placed on simulation interoperability, federation scalability, and federation reliability.

IM-1 was held 4-8 June 2001. The event brought together the MC02 core simulations for the first time. The objectives of the event were:

- Federate simulations via the RTI or Gateways
- Verify that simulations reflect each other's entities
- Verify that entities in different sims detect and shoot each other
- Examine terrain correlation
- Run a limited scale federation scenario

IM-1 proved that the MC02 federation was viable. It showed that the degree of terrain correlation was unacceptable would have to be improved. It also provided our first experience with using multicast addressing over the WAN, which required special router setting.

Figure 14: Suffolk, Va., July 29, 2002 — "What I've seen is the future," said Adm. Vern Clark after his tour of the Joint Training and Simulation Center (JTASC). The Chief of Naval Operations toured the U.S. Joint Forces Command during exercise Millenium Challenge 2002 (MC02). U.S. Navy photo by Chief Photographer's Mate Johnny Bivera. [020729-N-2383B-566] July 29, 2002

IM-1A was held 18-22 June. This event investigated the use of Data Distribution Management (DDM) as a scaling tool. It was a limited event to examine RTI scalability. Only JSAF and clutter were used. The objective was to gain experience with DDM and the RTI prior to using them in the full federation. The results showed that DDM did support scaling but that getting a display to monitor all the entities would require further optimization.

IM-2 was held 30 July – 3 August. This event started to look at that ability of the MC02 federation to scale. The objectives of the event were

- Start the process of standardizing enumerations

- Start the process of standardizing munitions
- Investigate issues associated in simulating large numbers of entities

A number of automated and manual techniques for enumeration and munitions standardization were tested. We achieved successful operation across the WAN. We were able to identify a number of potential problems that were preventing the federation from scaling to 30,000 entities.

IM-2A was held from 20 – 24 August. This event was added to improve the federation's ability to scale. Many scaling tests were held with both RTI's and many problems were debugged. The federation was able to scale to 35,000 entities but issues with delayed discovery of new entities remained. Clamping was eliminated as a solution for terrain correlation and work on true correlation was initiated.

IM-3 was held from 17 – 27 September. The objectives of the event were:

- Continue to debug and implement DDM and scalability issues
- Continue verification of enumerations and munition detonation interactions.
- Continue the integration of aggregates
- Begin the investigation of fault tolerance and recovery
- Begin the investigation of minefield interactions
- Begin integration of additional federates
- Begin integration of C4I interfaces and equipment
- Begin investigation of WAN issues
- Begin investigation of IFF
- Investigate electronic warfare issues

Progress was made on all issues except electronic warfare, which it was decided would be entirely handled by DICE and CATT. It was demonstrated that the federation could handle the required number of entities and slow discovery was improved although not eliminated. Many new simulations were integrated into the federation.

IM-3A was held from 22 – 25 October. The primary purpose of IM-3A was to investigate the performance of a new RTI version. This version was modified to support MC02 scalability requirements, primarily turning off perfect filtering. Additional goals were to:

- Verify a single DIS/HLA gateway can support over 30,000 entities,
- Investigate settings and performance of multicast in the CISCO network switch
- Integrate new federates into the federations

We verified that the gateway could handle adequate number of entities. RTI performance was improved but still required optimization for multicast handling. Four new federates were added.

IM-3B was held from 26 – 30 November. This event was held to test RTI modifications to support fault tolerance. These modifications were very successful and solved most issues related to federation fault tolerance. This event concluded the IM process, however significant technical work remained to create the fully functional MC02 federation. This work continued into the Spiral testing process.

Primary objectives of the tests were to:

- Ensure the successful accomplishment of MC02 from a technical standpoint.

Ensure that the modeling and simulation (M&S) architecture supported the accomplishment of the MC02 objectives.

- Ensure that the C^4I architecture supported the accomplishment of the MC02 objectives.

- Perform event specific validation of the models and demonstrate that the federation could provide an accurate representation of the real world (circa 2007) within the context of MC02.
- Validate control procedures.
- Validate operational requirements and the supporting technical architecture.
- Ensure users understood the capabilities and limitations of the technical architecture to support their objectives.
- Ensure that the network architecture supported the accomplishment of the MC02 objectives.

Scope of the tests

JFCOM employed Blue C^4I architecture, a simulation federation, and a White C^4I architecture networked together to support MC02. The MC02 testing program used a requirements-based approach to ensure the completeness of testing and the validity of the event architecture. Preparation included two phases: Phase I was a developmental phase involving three integration milestones events; and Phase II was an accreditation phase involving four Spiral events, an End-to-End Test, and an Experiment Synchronization Drill. This document pertains to the accreditation phase (Phase II). The purpose of those tests was to provide sufficient data on the technical and functional characteristics of the MC02 Federation to allow its accreditation by JFCOM and for its use during MC02 execution. The design of the test plan was incremental in nature. Progressively complex technical and organizational systems were interconnected so that faults could be identified and fixed, and personnel trained. These testing and preparation events had either a 'technical' or an 'operational' focus and that focus determined what activities were more critical at any given time. The JFCOM Test Director determined the focus and tempo of technical events. The JFCOM Exercise Director determined the focus and tempo of operationally focused events.

The tests were held at the following times:

- Spiral 0 (3-14 December, 2001) (Technical Focus)
- Spiral 1 (28 January-8 February, 2002) (Technical Focus)
- Spiral 2 Testing (11-22 March, 2002) (Technical Focus)
- Spiral 2 Training Support (25-29 March, 2002) (Operational Focus)
- Spiral 3 Testing (27 May-7 June, 2002) (Technical Focus)
- Spiral 3 End-to-End Testing and Training Support (10-14 June, 2002) (Operational Focus)

- End-to-End Test (10-20 July, 2002 Ensure that the network architecture supported the accomplishment of the MC02 objectives) (Technical Focus, transition to Operational Focus)
- Experiment Synchronization Drill (21-23 July, 2002) (Operational Focus)

Spiral 0 (3-14 December)

Setup for the test occurred 26-30 November, 2001, followed by data review and technical integration 3-14 December, 2001 and functional testing of simulation interactions and C^4I linkages, 10-14 December, 2001. Spiral 0 was a transitional event between Phase I (Development) and Phase II (Accreditation). If success during Spiral 0 permitted, transition from a development-focused event to a functional-focused event was planned.

Figure 15: **San Diego, Calif., Jul. 26, 2002** — The Chairman of the Joint Chiefs of Staff, Air Force Gen. Richard Myers (center) and aide Navy Capt. Richard W. Hunt are briefed by Capt. Ken Ginader, a Director of Operations in the Joint Air Operation Center aboard *USS Coronado* (AGF 11), the U.S. Third Fleet command ship. *Coronado* was the headquarters for the command of maritime and joint forces during *Millennium Challenge 2002*, one of the largest U.S. joint military training experiments developed by the JFCOM. U.S. Navy photo by Photographer's Mate 2nd Class Michael R. McCormick. [020730-N-3931M-008] Jul. 26, 2002

Transition out of Phase I occurred as expected during Spiral 0, test activities included M&S — C^4I interface testing, database verification, terrain verification, and functional testing in the following areas: air, land, sea, logistics, and intelligence. Based on the functional testing, USJFCOM identified and categorized non-existent or inadequate simulation functionality that needed to be fixed by coding changes to simulations/ federation, addressed by work-arounds, or relegated to scripting. Additionally, this test allowed for familiarization of federation capabilities and initial review of control and collection procedures for JECG personnel involved with data analysis, logistics, intelligence, and targeting.

Specific objectives for Spiral 0 were:

- Establish federation
- Perform federation diagnostics
- Verify federates generate and receive interactions
- Perform object ownership tasks - add/delete/modify
- Verify object ghosting across federates
- Verify terrain
- Verify hybrid geography representations in C^4I systems

- Perform functional testing of ISR, Air, Sea and Ground entities
- Assess federation scalability through load test
- Conduct latency testing
- Determine operational intervention (save, restore, "recock") requirements
- Perform network performance monitoring
- Verify simulation data flow to available C^4I systems
- Verify targeting requirements
- Verify data collection and analysis requirements
- Verify intel sensors/collectors
- Verify logistics level of play/requirements

Participants in Spiral 0 were simulation owners and technical controllers, network analysts, database builders, JECG POC, USJFCOM C^4I operators, remote site model operators, USJFCOM OPFOR model operators, USJFCOM intelligence integrators, and USJFCOM logistics integrators. The database to support the test was ready on 26 November 2001 and was projected at the following levels: Terrain, 100%; Blue Order of Battle (OB) 75%; Red OB 50%; and Targets limited.

Spiral 1 (28 January-8 February)

Setup for the test occurred 22-25 January, 2002, followed by data review, technical integration, and functionality testing 28 January- 8 February, 2002.

Spiral 1 was the first test to fully focus on the functional capabilities of the federation. A technical test, it expanded the distributed nature of the federation, included more C^4I and XC^4I systems, and allowed more end-user participation. The first week of testing was focused on mapping and enumerations, database QC, and testing of individual systems tests to include ensuring full network connectivity with C^4I/XC^4I in order to ensure the functional testing of the second week could be supported. Initial test activities were M&S - C^4I interface testing and functional testing in the following areas: air, land, sea, logistics, and intelligence. Following functional testing, the test plan expanded into thread testing and a build up to larger scenarios, which would reflect expected activities during MC02. USJFCOM also conducted a load test, which was less concerned with operational or tactical accuracy, but which stressed the systems above expected exercise loads. As in Spiral 0, the results of the testing caused USJFCOM to identify and categorize non-existent or inadequate system functionalities that were then fixed by coding changes to simulations/federation/C^4I systems, redesigned, or (3) relegated to scripting. Additionally, this test allowed the JECG and service personnel to assess the capabilities of the federation so that more detailed operational and technical control and collection procedures could be developed.

Specific objectives for Spiral 1 were:

- Establish Federation
- Perform Federation diagnostics
- Verify enumerations
- Verify federation save and restore procedures
- Verify federates generate and receive interactions

- Perform object ownership tasks - add/delete/modify
- Verify object ghosting across federates
- Verify database
- Verify C^4I links and e-mail procedures
- Verify cell workstation/layout requirements
- Verify simulation data flow to available C^4I systems
- Assess BDA requirements/capabilities
- Develop Event Tech Control (ETC) procedures
- Develop System Control (SYSCON) procedures
- Define intel level of play, reports, formats, and C^4I compatibility
- Determine simulation rules and workarounds
- Verify unit terrain movement capabilities
- Functionality testing (air, land, sea, log, intel)
- Test ATO procedures
- Establish xC^4I
- Verify communications connectivity
- Verify C^4I connectivity
- Verify target database
- MSEL scrub
- Load testing
- Latency testing
- Perform network performance monitoring
- Define deployment procedures
- Install/test Spiral event control communications (VTC, chat rooms, web page, shutdown, STU)
- Verify "clutter" patterns and capabilities
- Verify weather/night time capabilities
- Verify hybrid geography representations in C^4I systems
- Determine Rules and Workarounds (Simulation, C^4I, xC^4I, Initiatives)
- Exercise distributed Help Desk procedures
- Test change over from Federation to AJCOM based experiment driver
- Test data analysis functions

Key participants included Service representatives and technical support personnel, simulation owners and technical controllers, network analysts, database builders, JECG WG personnel, USJFCOM and Service C^4I operators, Service remote site model operators, USJFCOM OPFOR and supporting Service model operators, USJFCOM intelligence integrators, USJFCOM logistics integrators, and data collectors/analysts.

The database to support this test was ready on 24 January, 2002 at the following levels: Terrain 100%; Blue Order of Battle (OB) 100%; Red OB 100%; and Targets 100%. The Federation operated continuously for the duration of the test to simulate extended use.

Spiral 2 (4-29 March)

Setup for the test occurred 4-8 March, 2002, followed by data review, technical integration, and functionality testing 11-22 March, 2002. Training was conducted from 25-29, March 2002.

Spiral 2 testing was designed to test the functions and requirements of the entire MC02 architecture, including response cells, communications networks, C^4I systems, and initiatives. The overarching concept was to operate the federation from distributed sites with additional models and C^2 system to establish "near-exercise" conditions, to evaluate our ability to support MC02 and to validate control procedures. As in Spiral 1, the test started with data review and technical integration to ensure week two functional objectives could be supported. The second week of Spiral 2 focused on tactical and operational vignettes after any remaining (hold-overs from Spiral 1) functional tests were completed. The vignettes focused on expected MC02 activities and incorporated known rules and redesigns where possible. SPIRAL 2 required extensive interaction with C^4I systems and an assessment of the data flows through those systems. Test activities completed included any remaining M&S- C^4I interface testing and functional testing in the following areas: air, land, sea, logistics, and intelligence. Following functional testing the focus shifted to thread testing and larger scenarios, which reflected expected activities during MC02. As in the previous test, load tests were conducted which were less concerned with operational or tactical accuracy, but with stressing the systems above expected exercise loads. As in Spirals 0 and 1, the results of the testing caused USJFCOM to identify and categorize non-existent or inadequate system functionalities that were fixed by coding changes to simulations/federation/C^4I systems, redesigned, or relegated to scripting. Additionally, this test allowed JECG and Service personnel to test their operational and technical control and collection procedures.

Figure 16: Raptor 4002 passed its 300th flight-hour mark, the first F-22 to do so at the Air Force's Flight Test Center, recently. While this Raptor is real, the F-22's in MC02 were all simulated Blue Force assets as the exercise portion of the experiment featured forces from FY 2007. (U.S. Air Force photo by Judson Brohmer)

Specific objectives for Spiral 2 were:

- Establish Federation
- Perform Federation diagnostics
- Verify database
- Verify C^4I links and e-mail procedures
- Verify cell workstation/layout requirements
- Verify model message output types/formats for C^4I feeds
- Verify BDA procedures (manual/automatic)
- Verify Control procedures
- Thread Test intel sensors/collectors data flow
- Validate attrition/usage rates
- MSEL scrub
- Load testing
- Functionality testing (air, land, sea, log, intel)
- Verify simulation data flow to C^4I systems

- Test ATO procedures
- Test x C^4I
- Verify communications connectivity
- Verify C^4I connectivity
- Perform network performance monitoring
- Install/test Spiral event control communications (i.e., VTC, chat rooms, web page, shutdown, STU) (administrative)
- Verify readiness to support Service Spiral objectives
- Verify weather/night time capabilities
- Verify hybrid geography representations in C^4I systems
- Determine Rules and Workarounds (Simulation, C^4I, xC^4I, Initiatives)
- Exercise distributed Help Desk procedures
- Test change over from Federation to AJCOM based experiment driver
- Test severability of non-essential systems (Degradation Plan)
- Test data analysis functions
- Live-Sim procedures (TBD)

Key participants included Service representatives and technical support personnel, simulation owners and technical controllers, network analysts, database builders, JECG WG personnel, USJFCOM and Service C^4I operators, Service remote site model operators, USJFCOM OPFOR and supporting Service model operators, USJFCOM intelligence integrators, USJFCOM logistics integrators, and data collectors/analysts.

The database to support this test was ready on 14 March, 2002 at the following levels: Terrain 100%; Blue Order of Battle (OB) 100%; Red OB 100%; and Targets 100%.

Spiral 3 (20 May-14 June)

Spiral 3 featured the complete execution architecture. Setup for the test occurred 20-24 May, 2002, followed by data review, technical integration, and functionality testing 27 May – 7 June, 2002. End-to-End test and support training was conducted from 10-14 June, 2002.

Spiral 3 tested and validated the entire simulation architecture, including alternate response cells, communication nodes, headquarters, and C^4I systems. The overarching objective was to operate the federation from distributed sites with all known simulation and C^4I systems to replicate the actual exercise load in terms of data, operational requirements, and networks. Test activities essentially mirrored SPIRAL 2.

Specific objectives for Spiral 3 were :

- Establish Federation
- Perform Federation diagnostics
- Validate database
- Validate C^4I links and e-mail procedures
- Verify critical C^4I interfaces and output displays
- Validate cell workstation/layout requirements
- Validate model message output types/formats for C^4I feeds
- Validate BDA procedures (manual/automatic)
- Validate ETC procedures

- Refine simulation rules and workarounds
- Verify attrition/usage rates
- MSEL scrub
- Load testing
- Functionality testing (air, land, sea, log, intel)
- Verify simulation data flow to available C^4I systems
- Test ATO procedures (administrative)
- Verify functional interfaces between models (air, land, sea, log, intel)
- Verify intel reporting procedures and report content
- Test XC^4I (technical)
- Verify communications connectivity
- Verify C^4I connectivity
- Verify intelligence collection matrix/results
- Deconfliction of live and simulation feeds
- Response cell training
- Perform network performance monitoring
- Verify supportability of and readiness to support Service Spiral objectives
- Verify hybrid geography representations in C^4I systems
- Determine Rules and Workarounds (Simulation, C^4I, XC^4I, Initiatives)
- Exercise distributed Help Desk procedures
- Test change over from Federation to AJCOM based experiment driver
- Test severability of non-essential systems (Degradation Plan)
- Test data analysis functions
- Live-Sim procedures

Participants and processes were the same as SPIRAL 2 with more robust manning to replicate the exercise load.

End-to-End Test

The End-to-End Test validated the "as built" architecture with the system in the final experiment configuration. The objective was to operate the federation from distributed sites with all known simulation and C^4I systems online to replicate the exercise load in terms of data and operational requirements. Emphasis was on simulation to C^4I interfaces and messages. Time was allocated during this period to support final training requirements.

Specific objectives of the end-to-end test included:

- Verify simulation data flow to available C4I systems
- Test ATO procedures
- Perform network performance monitoring (technical)
- Load test entire event architecture
- Live-Sim procedures testing (TBD)

Test Activities

All five tests (Spirals 0-3 and the End-to-End Test), to varying degrees, incorporated the areas described below and the appropriate test concepts. If remote sites were manned and

communications available, the lines and equipment that support remote site communications were tested prior to each of the tests during the Set Up period. Specific test activities are described in the following paragraphs.

Federation Infrastructure Testing

Federation infrastructure testing was comparable to JTC Technical Testing. The test examined the functional interfaces of the federation and provided sufficient data to determine the technical, functional, and operational ability of the federation to support the training objectives of the experiment. The federation technical, functional and operational testing executed during this phase established the event functional baseline and verified that the models in the federation demonstrated sufficient interoperability to support MC02.

Data Review Testing

Data review and technical integration testing were conducted at the start of each Spiral event to ensure the data and technical interfaces were operating properly to support functional and operational testing. Data reviews included simulation database evaluation, enumerations checks, terrain and targeting database assessments, and verification of forces and locations. Database testing validated current databases against requirements, current model version, and, where applicable, verified corrections to previously reported deficiencies. Using the database list provided by the Database Manager (DBM), the functional test cell leads and site hosts verified the current database. The Trouble Report (TR) Form was used to report database discrepancies.

Technical Integration Testing

Technical integration testing was a follow-on to federation infrastructure testing and was designed to ensure the federation was operating sufficiently well to meet event testing objectives. Technical integration testing included technical control procedures, network testing, and initial COP testing.

Functional and Operational Testing

The functional and operational testing performed during the MC02 test program validated specific databases, current model versions, and operations unique to the objectives of MC02. Operational activities were tested based on their criticality to the execution of MC02. Each individual test specified the task, conditions of concern, data to be gathered, and format for the respective test. Functional model managers developed those tasks based on knowledge of model functionality and event requirements. A MSEL scrub was conducted concurrently with individual functional tests so that any redesign work could be retested.

Experiment Control

Experiment Control was concerned with the procedures and means that the JECG used to control the joint experiment. From this testing, control procedures were developed, refined, and tested to prepare for joint experiment execution.

Data Collection/Analysis

Data Collection/Analysis testing deals with the procedures and means by which data was collected and analyzed during the experiment. From this testing, the collection management plan was developed, tested, and refined to prepare for joint experiment execution.

Scenario/MSEL

The objective of scenario/MSEL testing was to determine which events the simulations could adequately replicate. Functional test cell leads extracted items from the MSEL relating to their respective functional area and performed the associated tasks. Redesign work was tested for those events that could not be replicated satisfactorily in the simulations.

Load Test

The Load Test parameters were developed using the following methodology. The primary factors influencing the load were identified for each simulation. The maximum value of each factor, as constrained by the database, was used to define a target load condition. This approach created a target load condition that was entirely artificial. It produced a federation state under which each simulation was simultaneously in a condition of maximum load within the constraints of the event database. The artificial condition placed a computational burden on the infrastructure software that exceeded the anticipated load of MC 02 and therefore, could support the federation the actual event, even during peak periods.

M&S/ C^4I Interface Testing

In most instances, C^4I and peripheral equipment installation was staggered requiring that additional C^4I interfaces be tested and data throughput verified throughout the MC02 preparation period. If available, critical C^4I interfaces were tested during all Spiral events to provide early identification of problems associated with their use. Selected C^4I interfaces were primarily tested and data throughput verified during Spirals 2, Spiral 3, and the End-to-End Test. The End-to-End Test fully examined the connectivity and readiness of the C^4I systems participating in MC02. Connectivity testing involved testing the communications networks for the M&S and C^4I architecture that included remote sites. The MC02 architecture included operational C^4I systems, authentic intelligence systems, and related simulation feeds that provided the operational headquarters with a realistic view of the battlefield.

Trouble Reporting

The Test Manager (TM) was responsible for the collection and tracking of Trouble Reports (TR) for each test phase. Data was collected via the TR Form. Any discrepancy or deviation in the execution of the test was noted. Model and/or database discrepancies found were discussed at a daily hot wash and TRs were generated as necessary. Discrepancies found that were not directly related to the execution of a documented task were also written-up on a TR and submitted daily to the TM. The TM cataloged and assigned priorities to the TRs with the input of the Service and functional area representatives. The Test Director then approved or re-prioritized the TRs and directed action. The priority was assigned in accordance with the definitions in MIL-STD-498 as shown in the table below. The TM held the daily hotwash via VTC during Spiral 2 and Spiral 3 and the End-to-End Test. The site or assistant site managers represented the remote sites.

Priority	Applies if the problem could:
1	(a) Prevent the accomplishment of an operational or mission essential capability. (b) Jeopardize safety, security, or other requirement designated "critical".
2	(a) Adversely affect the accomplishment of an operational or mission essential

Priority	Applies if the problem could:
	capability and no work around solution was known. (b) Adversely affect technical, cost, or schedule risks to the project or to life cycle support of the system, and no work around exists.
3	(a) Adversely affect the accomplishment of an operational or mission essential capability but a work around solution was known. (b) Adversely affect technical, cost, or schedule risks to the project or to life cycle support of the system, but a work around solution was known.
4	(a) Result in user/operator inconvenience or annoyance but does not affect a required operational or mission essential capability. (b) Result in inconvenience or annoyance for development or support personnel but does not prevent the accomplishment of those responsibilities.
5	Any other effect.

Test Execution

A Test Readiness review was conducted seven-10 days prior to the start of each test to review the progress of test preparations and make adjustments as necessary. Each test starts with a kickoff meeting the morning of the first day to get participants oriented to the test schedule and objectives, and to identify any issues. At the conclusion of each test day, a hotwash was conducted to review what had been accomplished that day and to coordinate each functional area's plan for testing the following day.

Tech Control was the focal point for all test activities. It was the location for federation tech control, simulation tech control suites, and network/systems personnel. Trouble Reports were turned in to Tech Control as problems were identified. Database personnel maintained the Trouble Report Log while Tech Control personnel maintained the Tech Control Daily Log.

JFCOM published a test report, summarizing major accomplishments, issues, decisions, and milestones resulting from the Spiral event, at the conclusion of each Spiral test event. Additionally, this report provided a plan of action that addressed test issues and items not tested.

Test Plan Development

The test plan for each of the Spiral events will follow a standardized format, depicted below. Also shown in the table are the individuals or organizations responsible for providing each portion of the test plan. Where particular tests cut across functional or organizational areas, the designated responsible individual or organization did the coordination and integration required before submitting the test plan input.

Test Plan Input

A specific test step governed any test of the simulations and C^4I system. The test step described the **task**, the **conditions** under which that task was to be performed, and the **standards** for successful accomplishment of the test. The table below provides a sample land functional task.

TASK	TEST PUPOSE/STEPS (CONDITIONS)	TEST VERIFICATION (STANDARDS)	RESULTS/REMARKS (OPTIONAL)
Event 10 Conduct indirect	a. Execute indirect fire missions in MTWS against bde-sized ground	Verify that different type ground units	

fire missions.	units. Use HE, DPICM, and CPHD (PGM) munitions for these missions.	suffer realistic attrition and damage reports are generated. Check spot reports for damage and verify supply levels are decremented in the attacked units.	
	b. Execute indirect fire missions in MTWS against ground targets (road intersection, fixed and tactical bridges). Use HE, RAP, and CPHD for these missions.	Verify that different type ground targets sustain realistic damage and spot reports are generated. Check spot reports for damage and verify supply levels are decremented in the attacked units.	

C4I System Testing

For C4I system testing, which often involved multiple simulations and C^4I systems in a single task, testers needed to consider an accompanying test description, as well as a diagram (if available) in order to provide the necessary information and understanding of the relevance of the task and how it supported the exercise. Note the sample description below in italics and in the accompanying table containing the specific tasks. These are examples only and do not necessarily reflect the actual MC02 architecture.

AWSIM to JWFC ADSI Simulation Data Flow Test (Red, White, and Blue Fixed-Wing and Rotary-Wing Air)

Opposing force (OPFOR), neutral, and Blue USAF, USA, and SOF fixed-wing and USAF rotary-wing aircraft tracks were created in the Air Warfare Simulation (AWSIM) and passed via the ALSP to the Joint Operations Information Simulation (JOISIM). JOISIM converted all simulation air tracks into a TADIL-J message format and forwarded them via serial interface to the JWFC Air Defense Systems Integrator (ADSI) in Test Bay 7 (JTASC). The ADSI correlated the incoming track information with existing database information and updated track status for local display. Testing verified the correct receipt and parsing of each different track type by comparing model ground truth on the Marine Air-Ground Task Force (MAGTF) Tactical Warfare Simulation (MTWS) Advanced User Interface (MAUI) workstation with JWFC ADSI displayed track data.

RESA to JWFC ADSI Simulation Data Flow Test (Blue Fixed-Wing and Rotary-Wing Air)

Blue USN and USMC fixed-wing and USN rotary-wing aircraft tracks were created in the Navy Research, Evaluation and Systems Analysis (RESA) model, passed via the ALSP to JOISIM, converted to TADIL-J format, and forwarded to the JWFC ADSI. Testing verified the correct receipt and parsing of each different track type by comparing model ground truth on the MAUI workstation with JWFC ADSI displayed track data.

MTWS to JWFC ADSI Simulation Data Flow Test (Red and Blue Air)

OPFOR rotary-wing and USMC, USA, and SOF rotary-wing aircraft tracks were created in the MTWS model, passed via the ALSP to JOISIM, converted to TADIL-J format, and forwarded to the JWFC ADSI. Testing verified the correct receipt and parsing of each different track type by comparing model ground truth on the MAUI workstation with JWFC ADSI displayed track data.

TASK #	REQUIREMENT	SYSTEM	PROCEDURE	RESULTS
D1.3.1.1	Provide AWSIM-generated air tracks in TADIL-J format to the JWFC ADSI. This includes all AWSIM generated fixed-wing aircraft and Blue helicopters.	AWSIM RTI JOISIM JWFC ADSI	Send AWSIM red, white, and Blue air tracks via RTI to JOISIM. JOISIM converts data to TADIL-J message format. Verify the correct receipt and parsing of each different track type by comparing model ground truth on the MAUI workstation with JWFC ADSI displayed track data.	RED FW_____ WHITE FW_____ USAF FW _____ USA FW_____ SOF FW_____ USAF RW_____
D1.3.1.2	Provide RESA-generated Blue maritime air tracks in TADIL-J format to the JWFC ADSI. This includes embarked Marine and Allied Forces helicopters.	RESA RTI JOISIM JWFC ADSI	Send RESA red and Blue maritime air tracks via RTI and JOISIM to the JWFC ADSI. JOISIM converts data to TADIL-J message format. Verify the correct receipt and parsing of each different track type by comparing model ground truth on the MAUI workstation with JWFC ADSI displayed track data.	USN FW_____ USMC FW_____ USN RW_____
D1.3.1.3	Provide MTWS-generated Blue and red helicopter tracks in TADIL-J format to the JWFC ADSI.	MTWS RTI JOISIM JWFC ADSI	Send red and Blue helicopter tracks from MTWS via RTI and JOISIM to the JWFC ADSI. JOISIM converts data to TADIL-J message format. Verify the correct receipt and parsing of each different track type by comparing model ground truth on the MAUI workstation with JWFC ADSI displayed track data.	RED RW_____ USMC RW_____ USA RW_____ SOF RW_____
D1.3.1.4	Transfer all red, white, and Blue air tracks from the JWFC ADSI to TOP COP via JFACC ADSI and TBMCS SAA.	JWFC ADSI JFACC ADSI TBMCS SAA TOP COP	Send air tracks from JWFC ADSI to AFFOR TBMCS SAA via JFACC ADSI. AFFOR verifies track data and forwards to TOP COP. Verify correct receipt at TOP COP by comparing JWFC ADSI air track data with TOP COP air track data.	RED FW_____ RED RW_____ WHITE FW_____ USAF FW_____ USN FW _____ USA FW _____ SOF FW_____ USAF RW_____ USN RW _____ USA RW _____ SOF RW_____

JWFC ADSI to JFACC ADSI Simulation Data Flow Test (All Air)

Simulation TADIL-J air tracks from the JWFC ADSI were forwarded to the Joint Forces Air Component Commander (JFACC) ADSI for correlation via dial-up STU-III (model 1910) modem. The tracks were then forwarded to the AFFOR Theater Battle Management Core System (TBMCS) Situation Awareness and Assessment (SAA) module. From there, they were forwarded via Secret Internet Protocol Router Network (SIPRNET) to the Global Command and Control System (GCCS) Tactical Database Master Server, on which the Common Operating Picture (COP) resided. This server was referred to as the TOP COP. Air tracks were then distributed from the TOP COP to the component's tactical display systems. Testing verified the correct receipt of each different type of track by comparing model ground truth on the MAUI workstation with TOP COP displayed track data. The TOP COP was located at JWFC for this test.

Experiment Execution - Simulation Federation

The Millennium Challenge 2002 (MC 02) modeling and simulation (M&S) federation was the largest, most complex High Level Architecture (HLA) federation ever attempted. Nineteen Core, 24 Service, and 16 Stand Alone models or simulations made up the Joint Experimental Federation (JEF). Core simulations comprised the minimum essential set of simulations required to support the USJFCOM experimental objectives. Annex H of this report provides a detailed review of the M&S Federation. Service simulations consisted of the tactical and operational simulations necessary for the services to satisfy their unique experimental requirements while still participating in the MC02 overall M&S architecture. Stand-alone simulations, simulators, tools, and models fulfilled a variety of necessary supporting roles, for both joint and Service experimentation. This virtual environment supported over 30,000 battlespace entities distributed over eight operating locations throughout the United States. The federation provided excellent battlespace functionality based upon predicted 2007 Joint and Service capabilities with similarly enhanced supporting environments for terrain, JISR, communications and jamming, logistics, theater ballistic missiles (TBM), and infrastructure.

This Joint Federation created in April 2001 and operated, in close coordination with the Services, and tied to a requirements development and testing process. The resulting Federation used Service-nominated simulations to represent Service-unique capabilities, with USJFCOM providing funding for improvements and integration necessary to form the HLA federation. The Johns Hopkins University Applied Physics Laboratory conducted all validation and verification (V & V) testing on the JEF in accordance with Department of Defense Instruction 5000.61 (final draft); the V&V report was completed 19 July 2002. The Director for Joint Experimentation, United States Joint Forces Command accredited the JEF for use in MC02 on 24 July, 2002.

Experiment Execution – Hybrid Terrain

Exercise requirements dictated a combination of simulation activities following the

Constructive/Virtual/Live approach to accomplishing the experiment goals as demanded by the scenario. In that the experiment represented activities commencing in Southwest Asia, but the live training ranges are in the Southwest United States (SWUS), a series of modifications were made to the set of available SWUS data. While certain components of the J9 SWUS Modified terrain database effort were conventional in nature, the terrain database tailoring and other specific requirements increased the complexity of this effort. In particular, M&S tools required a correlated playbox that allowed for a shared common view of the constructive battlespace. This playbox became known as the hybrid-terrain.

Figure 17: Click on the brief above to view a presentation on the MC02 assessment methodology and strategy.

The hybrid-terrain was required to exhibit the following characteristics in order to be consistent with the scenario. First, present the scenario on one geography to ensure one Common Operational Picture shared from Strategic to Tactical levels. Second, create an environment that supports live and virtual actions integration on our Western Ranges. Third, create a world that is potentially NATO disclosable . Finally, use data from real-world databases/sources.

Several special MC02 products were created to supplement the real world map and terrain products to support use of the hybrid-terrain. These products included several types of terrain, elevation, bathymetric and map data.

Experiment Execution - Data Collection and Assessment

The data collection and assessment plan for MC02 was developed to support the concepts and objectives investigated in MC02. To see an overview of the assessment strategy, select the "MC02 Assessment Strategy" icon. A more detailed summary is presented in Annex C. The comprehensive JFCOM Experiment Analysis Plan (JEAP) <link to JEAP> documents the plan for assessing MC02 and provides an overview of the intent, scope, concept, and methodology for the assessment.

A key element of the data collection and assessment plan was the breadth and depth of the available data sources. A significant amount of quantitative data was collected from the experimental C4I systems, the modeling and simulation federation, and the CIE. This data has provided a basis for the in-depth analysis presented in Chapter 6. This analysis is further supported by robust qualitative data. As reflected in the figure below, this data came from several sources: Senior Mentors, trained Subject Matter Experts (SME), and Joint warfighters. An advantage of this method of data collection is that when similar findings emerge from these independent sources, the credibility of the finding is strengthened.

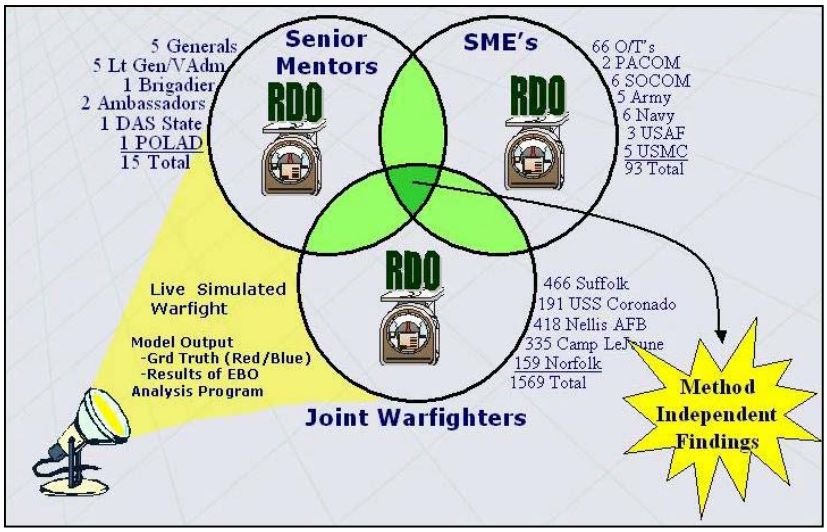


Figure 18: MC02 assessment methodology

Senior Mentor's provided input in three primary ways: at daily, warfighting challenge-focused seminars, through direct participation in three facilitated after action reviews during the experiment, and by submission of a comprehensive, consolidated report at the end of the experiment. SMEs, who were located in each headquarters from the JTF down to the live Brigade, provided structured observations and responded to analyst-developed surveys. Joint warfighters responded to targeted surveys and submitted unsolicited comments and observations that allowed them to discuss experiment concepts and objectives from the perspective of their position and experience.

Chapter 6 — The Findings

Assessment Area 1 -- Establish and Maintain Information Superiority

Overall Assessment Results

"Know your enemy and know yourself and you can fight a hundred battles without disaster." Sun Tzu

Establishing and maintaining information superiority was one of the five MC02 objectives. Achievement of this objective was identified as being necessary for the JTF to conduct rapid decisive operations.

Experiment results indicate that the Joint Task Force (JTF) established and maintained information superiority in the form of superior information reach and richness during MC02. This finding, while in-part subjective, can be substantially validated. This conclusion is further supported by the JTF's demonstrated ability to conduct continuous operations. Achievement of this objective is viewed as a requirement for RDO.

The ability to disseminate timely and accurate information, such as the Commander's intent, through a collaborative information environment was a primary factor in advantageously positioning the JTF with respect to information. The figure below is illustrative of the perceived relative informational positions of the JTF and opposing forces, JTF-S. This advantageous position supported the execution of RDO. Rapidity of operations was derived from the ability to execute rapid planning in response to a changing operational environment. Decisiveness was fostered through the use of shared awareness and shared understanding to the degree that synchronization of forces could occur. These capabilities were most visible during the JTF's island operations. In that instance, the planning process was initiated when the CJTF disseminated his intent to the JTF staff and components during a collaborative session. This session, which was supported by the collaborative tool, produced shared awareness and understanding with respect to CJTF intent. This session formed the foundation for the subsequent rapid planning. This foundation consisted primarily of accurate and dispersed information. Leveraging the same collaboration tool, the JTF and component planners were able to execute a planning process for a relatively complex Joint Operation in twenty-four hours. The plan consisted of synchronized use of force and was successfully executed in the simulated environment.

Overall Assessment Results

- **JTF established and maintained IS…**
- **RDO requirements met in full…**
- **CIE primary factor in successful IS distribution..**
- **Collaborative sessions produced shared awareness…**
- **Provided the CJTF with appropriate information at a very high confidence level…**
- **CIE contributed the most to achieving and maintaining Information**

Of specific and special value was the ability of the JTF staff to provide the CJTF with appropriate information and a very high confidence level that he understood "the situation". A high level of confidence is considered to be a prerequisite for rapid, timely, and sound decision making.

Across the participants, SMEs, and SCDs, there was unanimous consensus that, of the experimental concepts, the Collaborative Information Environment (CIE) contributed the most to achieving and maintaining Information Superiority. This is consistent with the above finding. A

JTF perspective on the contribution of the CIE to achieving information superiority is depicted in the Figure (2) below. Additional supporting evidence is contained within the findings.

Both warfighting challenges associated with the information superiority objective were sufficiently addressed and achieved. Of note was the demonstrated ability to provide a high level of situational awareness with respect to own force intent in a changing operational environment.

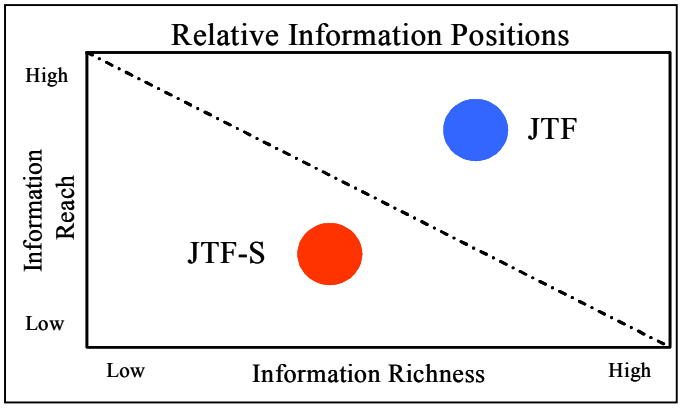


Figure 19: Relative information position

Methodology

No specific conceptual process was intended to be a panacea for the achievement of information superiority. Instead, the concepts as a whole, their supporting surrogate systems, and a set of standard processes would contribute synergistically to the result. The collaborative information environment, operational net assessment, standing joint force headquarters and joint intelligence surveillance and reconnaissance concepts were recognized as probable contributors to achieving information superiority.

To assess the achievement of information superiority, analysts working with concept developers identified two Warfighting Challenges. Each addressed basic functionalities that were relevant to the concepts and surrogate tools. These functionalities were developed from the USJFCOM concepts of CIE; Joint Interactive Planning (JIP); and Common Relevant Operational Picture (CROP); existing information superiority definitions; and, later from the concepts described in the DoD Command and Control Research Program (CCRP) publication, Understanding Information Age Warfare, published in September, 2001. A central theme in the assessment of this objective became the paradigm that shared information leads to shared awareness, which contributes to collaboration leading to synchronization of forces on the battlefield. This theme would be used to mitigate problems associated with evaluating the quality of JTF-S information and still retain a disciplined assessment process.

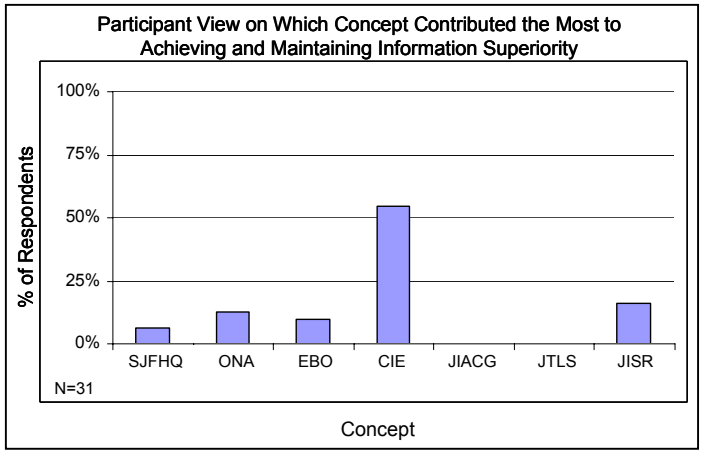


Figure 20: Participant View on Concept Contribution

Analysts, working with the concept developers, then dendritically decomposed the Warfighting Challenges into supporting tasks and subtasks. At the task and subtask levels, appropriate data requirements were developed against which experimental data could be collected. This effort was finalized in the form of a data collection matrix that contained all the necessary information to support the data collection plan.

Data was collected from five primary sources. These were participant surveys, subject matter expert surveys, senior concept developer input, post experiment interviews with participants, and electronic data captured from IWS logs, email logs, results from the data collection analysis and review systems (DCARS) and web trend results. The above figure depicts the flow of information into the JTF during the experiment. This flow was part of the experimental design. It should be noted that the Joint Exercise Control Group (JECG) was instrumental, and active, in determining the quantity and quality of information reaching the JTF.

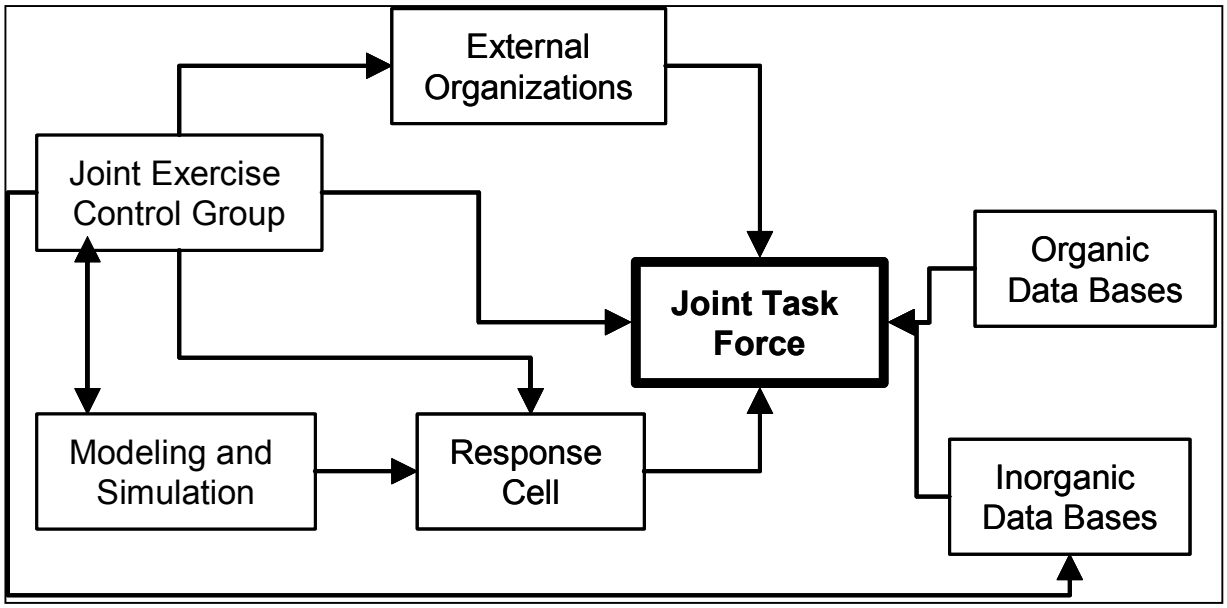


Figure 21: Experimentation Information Flow into the Joint Task Force

An equivalent information flow path existed for the opposition forces, JTF-S. The JECG was also active in restricting or directing participant actions as part of its control function. Other assessment constraints included actual JECG capabilities and modeling and simulation limitations. These constraints caused periodic artificialities in the quantity and quality of information provided. A final constraint was JTF-S did not use real world systems for command and control. This was monitored and compensated for by JECG. Compensation methods included built in delays between receipt of orders and actual CJTF-S force movements. It was within this context that the achievement of information superiority was assessed.

Due to the above constraints, it was not feasible to assess the quality, attributes, of CJTF-S information. Consequently, a direct comparison of JTF information levels to CJTF-S information levels or their respective informational needs was not feasible. In place of this, a focus was placed on assessing JTF information and the JTF's ability to use information to support operations. The resultant information superiority assessment process is shown in the figure (4) below.

Consequently, an operative and critical assumption relevant to the validity of this assessment is that if the JTF is conducting uninterrupted and synchronized operations, then it has achieved de facto information superiority. This parallels Joint Pub 1-02 and *Understanding Information Age Warfare* definitions of information superiority.

Finally, selected data was extracted from the baseline and compared to MC02 results. The purpose of this comparison was to identify gains and losses in JTF capabilities. These

selections highlight traditional JTF problem areas relevant to the achievement of information superiority.

The information superiority objective was broken down into two warfighting challenges. These were viewed as being relevant to demonstrating the potential of the experimental concepts and their importance in achieving and maintaining information superiority.

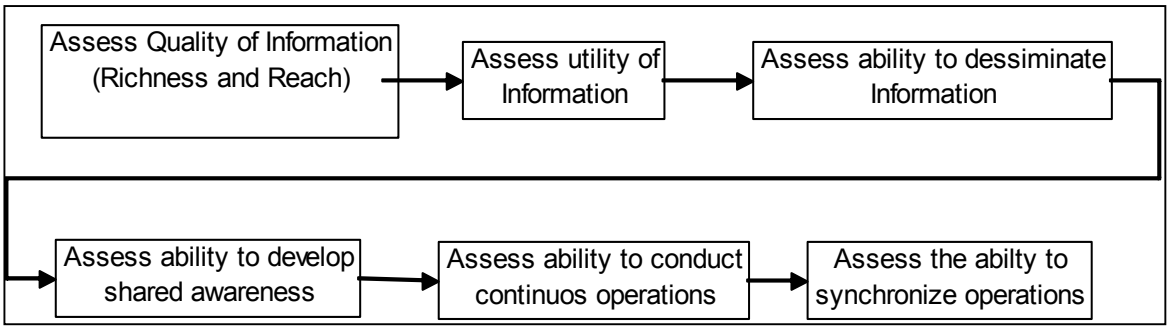


Figure 22: Information Superiority assessment process

Warfighting Challenge:

Ability to provide Situational Awareness of JOA throughout the JTF

Warfighting Challenge:

Ability to use the CROP and collaboration to enhance JTF operations

The first warfighting challenge involved the achievement of situational awareness, a product of information richness and reach. This challenge's associated tasks and corresponding findings are listed below.

Task: Maintain and distribute a timely and accurate relevant integrated picture of JTF units, locations, status and actions

Task: Determine and disseminate timely and accurate information on relevant adversary's operational capabilities, location, courses of action, and intentions

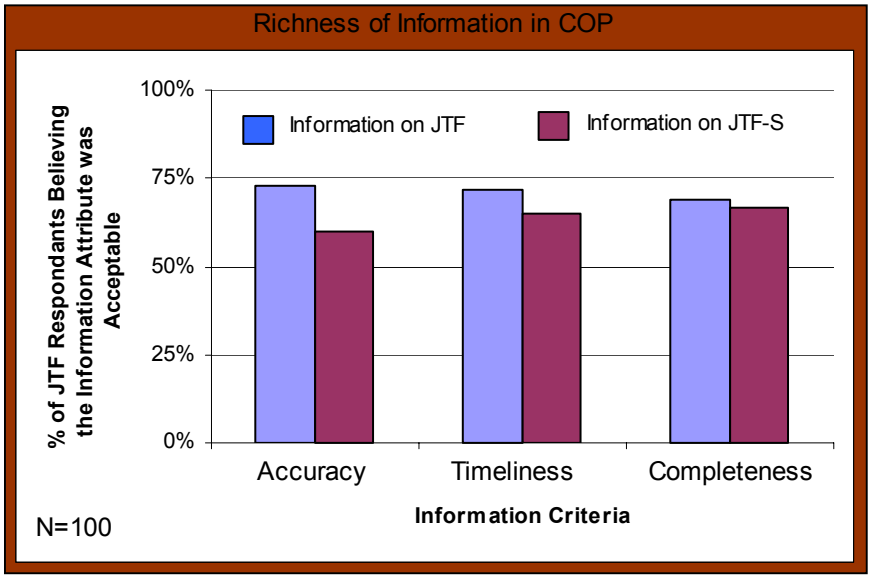


Figure 23: Richness of Information in the COP

Finding 1:

Information provided to the JTF through surrogate systems used in the experiment was of sufficient richness to maintain an accurate and relevant integrated picture.

The richness of the JTF's information was assessed using four primary criteria: accuracy, precision, timeliness and relevancy. The primary information repositories examined were the experimental COP and CROP systems. The richness

of the information available within these systems was highly dependant on the quality of the data provided by originating sources such as JISR. The primary information dissemination system examined was InfoWorkSpace (IWS) 2.5, the surrogate collaborative system.

With respect to information accuracy, timeliness and completeness, participant views on the richness of JTF and JTF-S information contained within the COP were characterized as acceptable across the board by more than 60% of the respondents. This is shown in the figure to the right. The implication is that the COP, even with surrogate capabilities, has the capability to present information at an acceptable level.

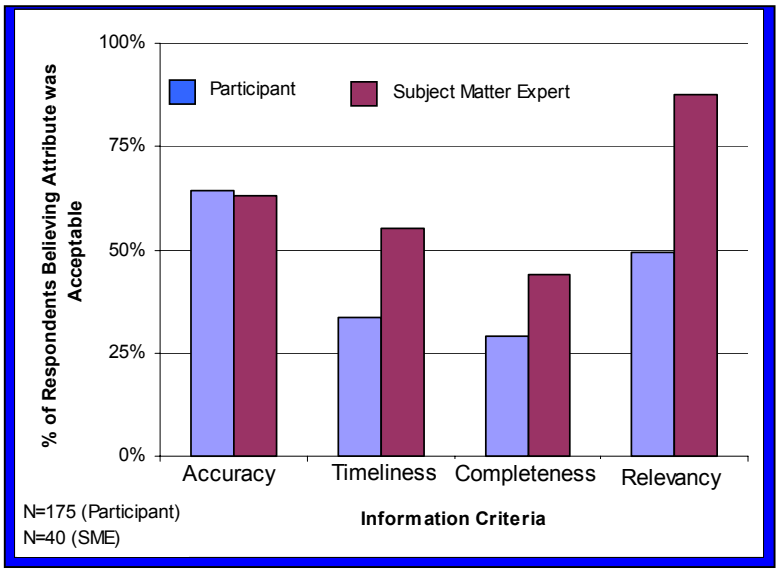


Figure 24: Richness of information in the CROP

Using similar criteria, JTF information contained within the CROP, using as its surrogate SPPS, was characterized as being slightly less acceptable. On average 44% found the information to be acceptable. The participant data revealed that the CROP information was not as timely or complete as information contained within COP. However, as shown in the same figure, the SME perception of CROP information was higher on average: 62% found it acceptable with respect to the criteria.

The combined information richness data for the COP and CROP reveals that the JTF did not have all the information it desired when it desired it. However, the surrogate systems did have the capability to satisfy some of the JTF's informational needs.

Figure 8 indicates that the participants believed that the quality and quantity of information contained in the CROP improved as the experiment proceeded. That trend suggests improvements in information quality are achievable.

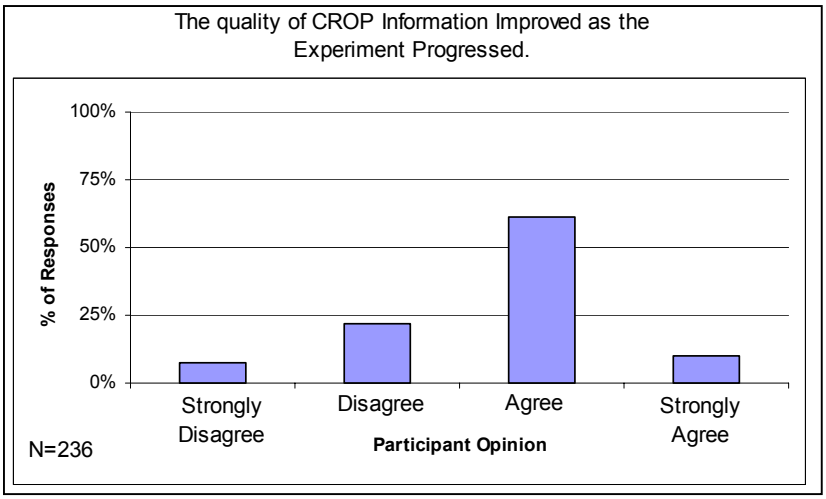


Figure 25: Quality of the CROP improved

To further assess the quality of the information, subject matter experts were asked to qualify the utility of the information, Figure 9, with respect to the JTF's planning and command and control functions. Seventy-five percent of the SME's believed that friendly force information in the CROP was adequate for planning and command and control, and 55% believed that opposing force information was adequate for planning and command and control.

In summary, information contained in the CROP and the COP, while not perfect, was rich enough for the JTF to perform its funtions.

Finding 2:

Information provided to the JTF through the surrogate systems had sufficient reach to distribute an integrated picture.

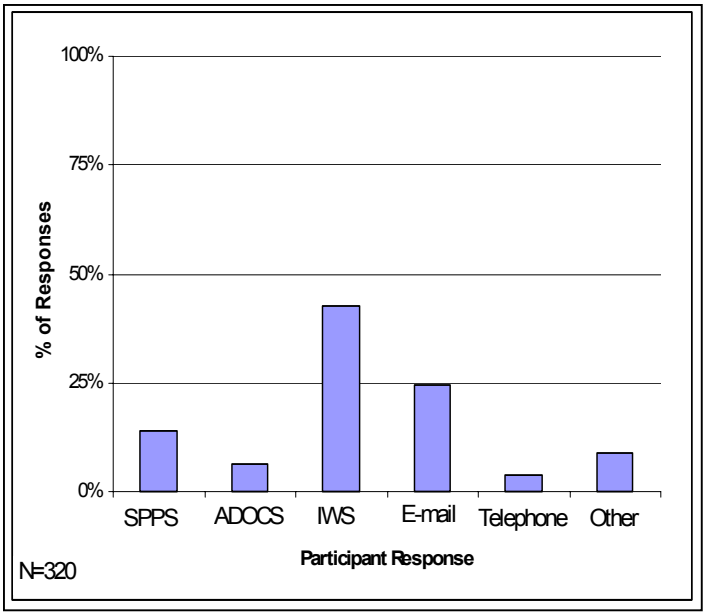


Figure 26: Tools which provided the most useful information

The CIE and supporting surrogate systems used to dissemination information were designed to maximize information accessibility. Figure 9 shows that the primary sources of information for the participants were IWS and e-mail.

IWS provided synchronous information dissemination and access capabilities. E-mail provided the equivalent capabilities asynchronously. Both of these systems provided virtually unconstrained connectivity between JTF personnel and organizations. System reliability rates for both were high. Reachback, communications outside of the JTF, was constrained by experimental design.

Use rates of the two systems are depicted in the two figures (10 and 11) below. The graphs demonstrate steady continuous use of and reliance on both systems. A 53 percent increase in IWS usage occurred on days Day+10 and D+11, which corresponds to the planning time frame for the island operations. A 20 percent spike in email usage was recorded. This suggests IWS was the primary planning tool for this operation. This data is consistent with SME observations.

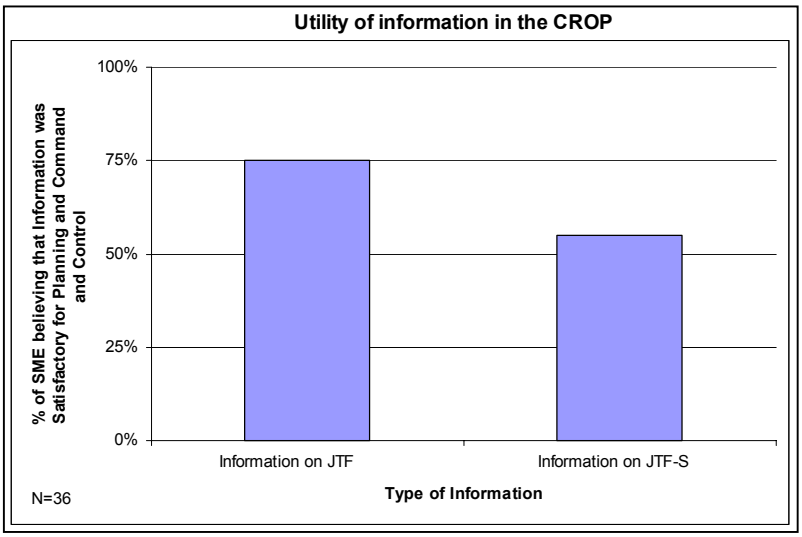


Figure 27: Utility of information in the CROP

The utilization data and the inherent capabilities of the two systems supports the finding that the JTF was able to and did disseminate needed information widely and readily across the JTF.

Finding 3:

The increased visibility of information within the JTF produced an informal but active information error detection and correction capability.

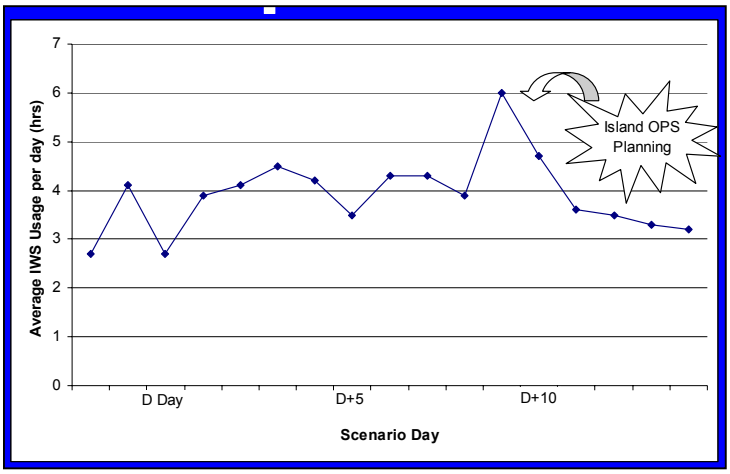


Figure 28: Participants use of -email

By design, information contained in and originating in the CIE was accessible to all members of the JTF. Additionally, JTF personnel were not procedurally constrained from accessing information. JTF personnel listened in to collaborative sessions not only when directed but also on their own accord. The viewing of CROP information outside of their immediate organization was similarly unconstrained. Consequently, information was extremely visible, and large quantities of information were scrutinized by many individuals from different perspectives. This had the effect of creating an informal, but potentially robust, information assurance process.

JTFCOLLECTIONSOFF (4) (2:09:55 PM): JFMC: ADM "DELETED" just briefed that you all have indications of an "DELETED" radar on "LOCATION DELETED" Is this correct??

JFMOpsIntel (2:10:19 PM): THAT IS CORRECT.

JTFCOLLECTIONSOFF (4) (2:10:50 PM): What kind of report (INT)?

JFMOpsIntel (2:11:09 PM): ELINT

JTFCOLLECTIONSOFF (4) (2:12:00 PM): Did you cue a IMINT asset to confirm presence of any other forces?

JFMOpsIntel (2:12:34 PM): YES. A TST HAS ALSO BEEN SUBMITTED.

JISE Room Chat Text

JTFCOLLECTIONSOFF (2:08:54 PM): JFMC: ADM "DELETED" just briefed that you all have indications of an "DELETED" radar on "LOCATION DELETED". Is this correct??
2:11:59 PM: ANLISDEP is now in the chat session.
IJTFRFIMAN (2:13:44 PM): JTFCOLLECTIONSOFF--I know we received a ELINT hit from a "RADER" from the islands
JTFCOLLECTIONSOFF (2:14:56 PM): Roger, I already confirmed with JFMC. They have established a TST there as well

Intell Room Chat Text

An example of this occurred during a Commander's Daily Update Briefing that focused on the status of CJTF-S forces on several islands and is provided below (figures 12 and 13). The text in each figure is copied from different IWS virtual locations, the JISC and the INTEL rooms. The meetings in these rooms were being held concurrent with, but independent of the Commander's Daily Update briefing. The text reveals that the JTF Collections Officer was able to use to validate the JFMCC's information by communicating with the JFM Ops-Intel and IJTFRFIMAN within 59 seconds. This information was then added to his database. All this was done by the JTF Collections Officer while in attendance of the Commander's Brief. Prior to this,

the JTF Collections Officer's "database" did not include this information. The collections officer was able to validate the information from two sources within six minutes.

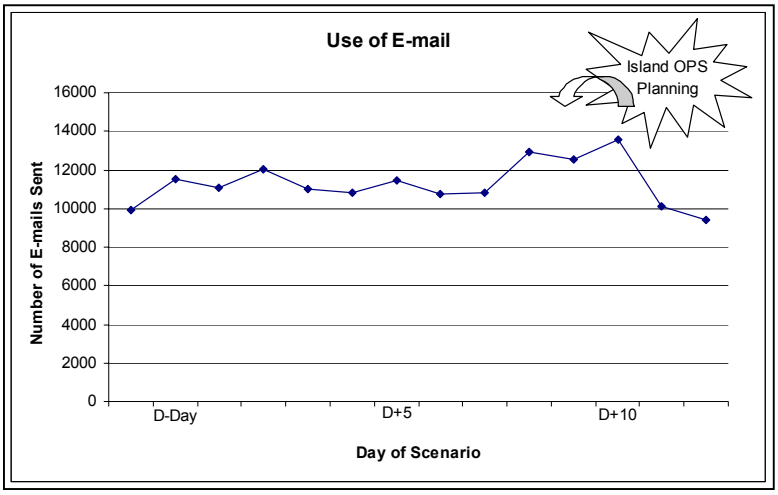


Figure 29: Number of e-mails sent highest late in the exercise

Finding 4:

The JTF did not use the formal information validation process as described in the Knowledge Information Management Plan (KIMP).

Analysis. The KIMP detailed a process that was to be used to qualify the reliability, currency, and completeness of information. This process was called the Information Confidence Convention.

The observation was that this convention was not used to any degree that can be considered satisfactory. Knowledge managers confirmed the observation and described the proposed convention as impractical and too time consuming to implement. This highlights the importance of the previous finding. In the absence of a viable information error detection process, the participants created one.

Senior concept developers noted that there were instances when bad information had been dispersed throughout the JTF. The potential for this to affect operations caused legitimate concern among the SCDs. The logic behind their concern was that bad information was worse than no information. The JTF was not able to rectify the problem.

Warfighting Challenge:

Ability to use the CROP and collaboration to enhance JTF operations

Task: Use information to prevent surprises by the adversary.
Task: Use shared awareness and collaboration to maintain operational tempo.
Task: Use shared awareness and collaboration to facilitate synchronization of forces.

Finding 1:

The JTF minimized the probability of being surprised.

In the experiment, CJTF-S desired to and did execute a preemptive attack against JTF forces. This action became a primary source of controversy. Background on this event includes both the CJTF and the JFMCC stating they thought the CJTF-S forces would conduct a preemptive attack. JFMCC identified this JTF-S course of action in Spiral 3 and the CJTF on the morning of the attack. After receiving the CJTF recognition of a high probability of attack, the JTF staff failed to validate the JTF-S intentions in the short time frame, three hours, it had available. Contributing to this failure were experiment design problems that caused a lag in ISR information being forwarded to the JTF by the JECG. Following the JTF-S attack, JECG intervened based on perceived simulation deficiencies and unrealistic response cell actions. The final JECG adjudication validated the JTF-S preemptive attack, but minimized its impact. All of

this, the ISR deficiency, the response cell actions, and the JECG control were experimental anomalies. Because of the nature of these anomalies, little can be gained by including these events as part of the analysis of this finding.

However, the result does warrant further comment. CJTF-S stated that he chose to conduct the preemptive attack because he was (situational) aware of the JTF's ability to conduct rapid and decisive operations. He calculated the preemptive attack as being his best course of action. This was the CJTF-S's dominant strategy, in that it produced his perceived highest probability of success. The concern is that a RDO capability will force the same result in other scenarios. Consequently, rather than having "Achieving and Maintaining Information Superiority" as a stated objective for RDO, the objective "Maintain Information Superiority" may better serve the concept. In short, achievement of information superiority should be accomplished prior to establishing the JTF if an RDO capability is likely to drive opposing forces to conduct preemptive attacks.

Following the events associated with the preemptive attack, the JTF was able to quickly adapt to its plans. This is the best indicator that the JTF had reduced its probability of being surprised. Of the 35 FRAGOs issued by the JTF, only one was the result of a "surprise", that being the previously discussed preemptive attack.

Furthermore, potential CJTF-S actions were always included as part of the Joint Coordination Board. A specific section of the brief was dedicated to this. The presentation methodology used had the presenter role-playing the CJTF-S. During the briefs, the CJTF provided his view of what JTF-S's next actions would be. Predictions of JTF-S actions became Commander-centric, which was facilitated by the CIE.

In total, the JTF continually attempted to prevent surprise by collaborating on potential future JTF-S actions. The CJTF was part of this collaboration process. The impact was a lack of reactive, JTF-S-induced, FRAGOs. It supports the finding that the JTF minimized the probability of being surprised.

Finding 2:

The CJTF attained a high state of situational awareness.

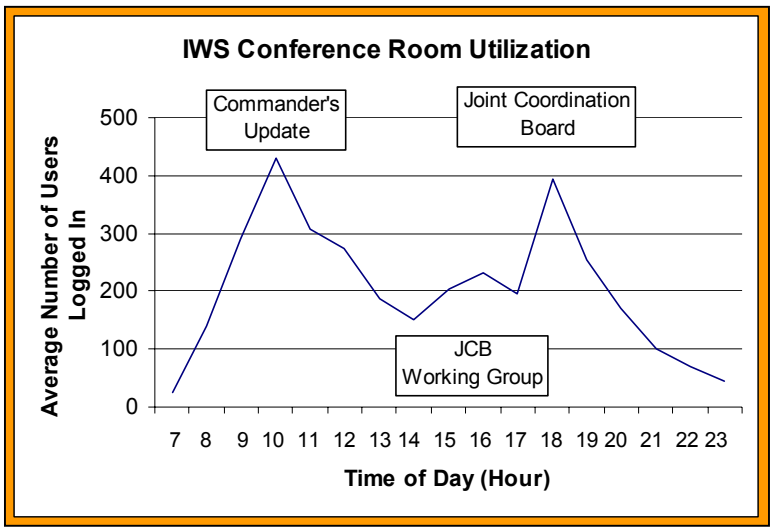


Figure 30: IWS Conference Rooom use described

This finding results directly from specific CJTF comments indicating his level of awareness and corroborating evidence. The CJTF's firmly stated opinion was that the collaborative system ensured that his Commander's Intent, in his own words, "was distributed to his forces." Feedback from the same system provided the CJTF with assurance that his intent was understood, and that follow-up actions, consistent with his intent, were occurring. The result was that the CJTF, irrespective of any existing intelligence deficiencies

and unknowns, was extremely confidant that he understood the current state of his own forces and the direction that they were heading. This knowledge gave him the high level of confidence that is considered to be a prerequisite for sound and timely decision making. The two primary vehicles for the accurate dissemination of the CJTF's intent and guidance were the daily Commander's Update Briefing and the Joint Coordination Board. Each was a battle rhythm scheduled event, heavily attended by JTF members in the virtual environment created by IWS, the surrogate collaboration tool. JTF attendance for these events is shown in figure 14, IWS Conference Room Use. Also of note, this capability was maintained when CJTF physically departed the headquarters through the use of the Joint En route Mission Planning Rehearsal System – Near Term (JEMPRS-NT).

This investment in man-days was the source of discussion among senior concept developers and participants. Two concerns were that people needed time to think, and they needed time to work. Given the priceless nature of CJTF's situational awareness and understanding, the cost may be considered acceptable. The CJTF thought the value gained outweighed the cost of the lost man-hours incurred by the staff.

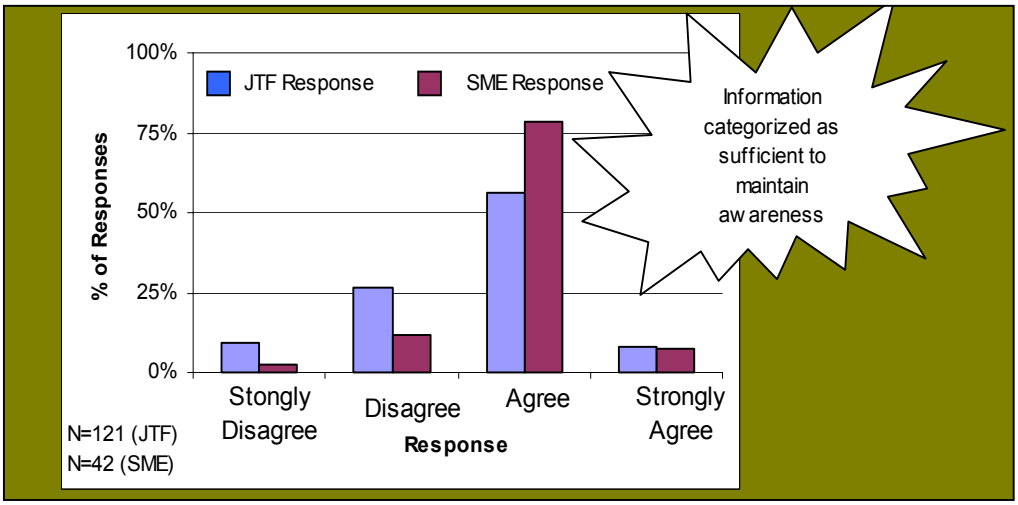


Figure 31: The information available in the CIE was sufficient to maintain a high level of awareness regarding both the friendly and enemy situations at all times.

A visible, representative cost in achieving the Commander's high state of situational awareness can be calculated in the form of JTF manhours expended in these briefings. A conservative application of the data, in which 50% of the users are considered to be non-JTF, indicates a minimum of 50 eight-hour man-days per day, or using 12 hour days, 33 man-days per day were invested in these meetings. This level of effort was spread across the JTF HQ and Component commands. It should be recognized that significantly more than just achievement of the CJTF's situational awareness was accomplished during these events.

Finding 3:

A high state of situational awareness was achieved by the JTFHQ and Component HQ staffs.

A critical element of this finding is that if the JTF Staff has an accurate, complete, and timely picture of the Commander's Intent, as indicated in the previous finding, then it has have achieved a significant degree of situational awareness. The evidence that this occurred is included as part of the preceding finding.

As shown in figure 15, both the JTF (64 percent) and the Subject Matter Experts (85 percent) agreed that the information available in the CIE was sufficient to maintain a high level of awareness for both the friendly and enemy situations.

To substantiate that the data was sufficient to maintain situational awareness, the contents of the JCB and Commanders Update briefs were periodically examined by analysts for accuracy. Individual JTF members were also periodically queried on the situation during the experiment. The results indicated that the contents of the JCB and Commanders briefs, shown as the group in the figure 16, accurately reflected ground truth and that the JTF had achieved and maintained a high state (>.75) of situational awareness. The group results are relevant to the finding. The situational awareness scores for individuals are included because of what they might suggest. Individual situational awareness scores remained constant and were considerably lower than the group scores. Partial rational for this is that JTF members focused their awareness on their specific functional areas and group situational awareness was achieved through the addition and integration of individual awareness levels.

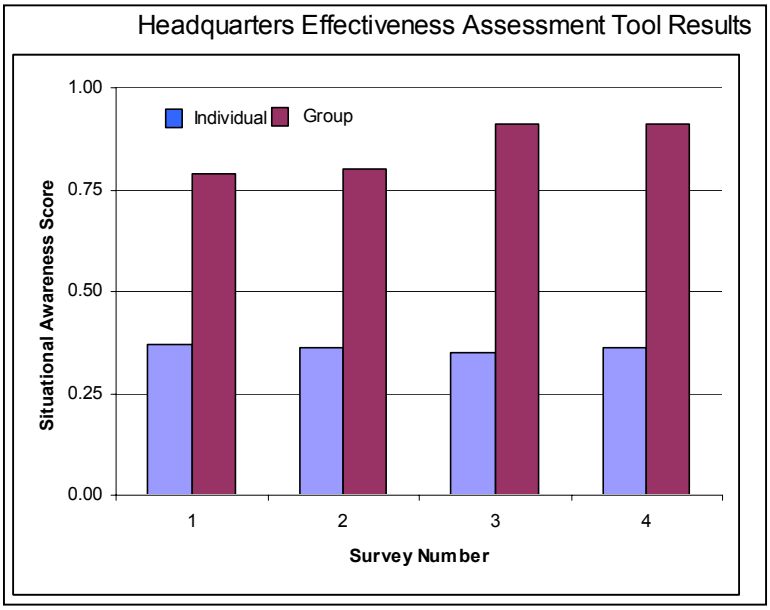


Figure 32: HQs effectiveness assessment tool results

Continuing, the evidence suggests that the CJTF is in the best position and the one most likely, to achieve the maximum level of situation awareness. This afterthought supports the concept of Commander-centric operations. For it is the Commander who is in the best position to integrate the available information and achieve the highest awareness level. It is also the Commander, who in all probability has the greatest experience. It is the experience that will support accurate decision making.

Finding 4:

The CJTF was able to use shared awareness and collaboration to maintain operational tempo.

During the experiment the JTF was required to plan and execute operations that would generate seven different effects. In addition, the Combatant Commander increased the scope of the JTF mission associated

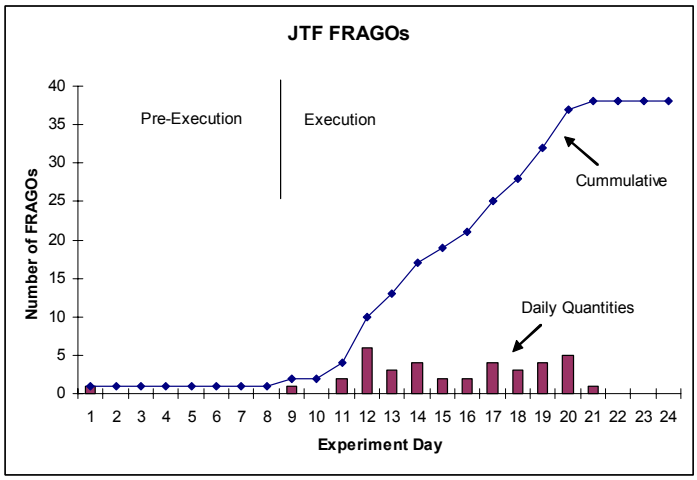


Figure 33: JTF FRAGO

with the weapons of mass effect threat. Senior concept developers considered the size and complexity of the resulting operations to be high relative to previous exercises.

In order to maintain operational tempo, the JTF used FRAGOs to direct forces and cause effects. Figure 17 shows the rate at which FRAGOs were issued and implicity the responsiveness of the JTF. During operations the JTF issued a total of 37 FRAGOs. Each attempted to maintain operational tempo in light of the changing operational environment. The need for a FRAGO was identified during the daily, CIE enabled, meetings with the CJTF. Each FRAGO was then produced and disseminated within the CIE. An example of this was the reprioritization of the effects listed in the Prioritized Effects List (PEL), in order to eliminate JTF-S's command and control capability. This action was done in response to indications that JTF-S was successfully commanding and controling his forces.

Finding 5:

The JTF was able to use shared awareness and collaboration to synchronize its forces.

The strongest evidence supporting the JTF ability to synchronize its forces was the Joint offensive operation against the islands on 9 August. In his summary, JFLCC, the supported Commander for the operation, described the air portion of the operation as follows: "We had a USMC air operations cell directing USAF and USN aircraft in support of USA ground operations." This accomplishment was achieved as a result of a plan derived from a 12-hour collaborative planning session.

In addition to the specific incident cited above, participants and SMEs also acknowledged that operations were synchronized. Additionally, perspectives on the degree to which synchronization was achieved were obtained using surveys. The data is presented in a quantified format in the above figure. The direct method queried participants and SMEs as to what degree they believed synchronization occurred. These results are indicated by the lines in the figure 18. Using participant and SME results that referenced individual component synchronization levels,

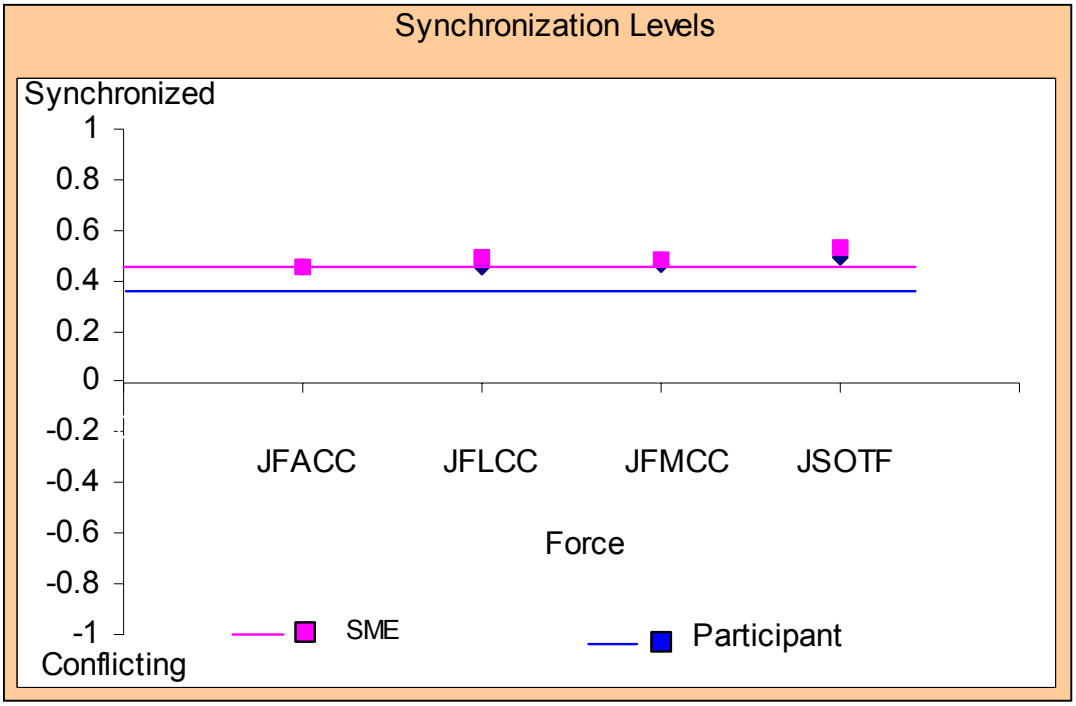


Figure 34: Synchronization levels

a pair-wise comparison analysis was completed to quantify overall JTF synchronization. These results are shown as the dots in the figure. The results show that synchronization occurred (value greater than 0), and that the level can be characterized as approximately 40 percent (.4 of 1.0) of maximum synchronization. In direct questioning the SME synchronization level (.45) was to be slightly higher than the participant's (.38) viewed level of force synchronization. These results are indicated by the line. Both methods produced similar results, synchronization occurred.

In summary, the findings support the conclusion that the tasks associated with the two Warfighting Challenges were accomplished. The findings were derived from a mix of qualitative and quantitative data. The data suggests, that with less than perfect information, the JTF was able to aggressively share information, collaborate, maintain operational tempo and synchronize its forces. The JTF successes were identifiable with the CIE.

In turn, the Warfighting Challenges and the achievement and maintenance of the Information Superiority objective were met.

Other Observations and Finding

Finding 1:

Information requirements are likely to grow with the adoption of EBO.

Rationale: The effects based operations concept requires the JTF to assess the achievement of effects. In performing this assessment function information requirements not normally associated with traditional ISR operations and capabilities are likely to be encountered. This function is additive to existing battle damage assessment requirements. These positions were voiced by both senior concept developers.

Finding 2:

There were not a significant number of complaints addressing information overload.

Rationale: This finding can be defended only to the extent that it derived from an absence of positive information. However, the following theories are proposed as to why this occurred:

- The collaborative information environment readily identified the relevant information requirements, and enabled JTF participants to dismiss irrelevant information,
- Mandatory attendance at the information intensive boards, centers, and cell meetings efficiently pushed information to the participants or
- Other issues, such as required attendance at collaborative sessions, created a larger dissatisfaction

Finding 3:

JTF members could have benefited from additional time to digest information in order to achieve greater knowledge and understanding.

Rationale: This finding was derived from senior concept developer comments. The rationale was that the maximum benefit of an abundance of relevant information could only be attained through deep reflective thought, which requires time. The staff production and meeting tempo did not permit this.

This finding recognizes the physical limitations of the human mind. Implied within this finding is that the CIE was successful to the degree that it outpaced the thinking capabilities of the JTF. This is indicative of a need for decision support tools. A suggested workaround for this problem was maximum use of reach back capabilities. It should be recognized that "permitting" time for reflective thought is potentially counterproductive in rapid operations.

The long sought balance between speed and accuracy is the traditional solution. It is not clear if this solution is the best solution in a knowledge centric organization. Potentially the balance shifts more towards speed. Speed brought about through greater awareness.

This suggests pattern recognition as a preferred decision making process. Pattern recognition requires experience and, in turn, this supports the concept for Commander Centric operations. The assumption is that the Commander will have the most experience and be best able to recognize patterns.

Finding 4:

Achievement and maintenance of Information Superiority in support of RDO is manpower intensive.

Rationale: There was considerable evidence that selected JTF members were "over worked" as a result of the combined requirements to participate in collaboration sessions and support planning and execution of operations. This cannot be overstated. However, survey results indicated that time spent in collaboration sessions favorably supported the completion of planning and operational tasks. It must be noted that "over worked" personnel are not conducive to knowledge-centric operations. This is a legitimate dilemma.

As suggested in the previous finding, some of this effect could be mitigated through the use of extensive reach back capabilities. Additional solutions may reside in battle rhythm, staffing, and process changes. Resolution of this problem will be necessary to reliably execute rapid decisive operations in a knowledge centric organization.

Relationship to Other Objectives

The four other objectives associated with RDO were Setting Conditions; Assured Access, Effects Based Operations, and Agile Sustainment. Joint Vision 2020 identifies those qualities associated with information superiority as precursors to and enablers of the desired capabilities of force protection, maneuver, fires and logistics. A parallel relationship existed in the experiment between the Information Superiority objective and the four other experiment objectives. Information, preferably information superiority, was necessary to achieve the other objectives.

A controversial event in the experiment was the preemptive attack by JTF-S on the JTF. In spite of the controversy, this event provides insight into the relationship between information superiority and the objectives of setting conditions and assured access. Accurate information about the intent of CJTF-S was required to prevent or avoid the preemptive attack. Conversely, JTF-S did know that the JTF had a rapid and decisive operational capability. As stated by the CJTF-S, this was sufficient to influence his decision making process. His resultant decision was to conduct a preemptive attack. That attack occurred during the condition setting phase and placed access at risk. The preceding description of events is a brief but relevant portrayal of events of non-trivial events.

The CJTF-S decision to conduct a preemptive attack is interesting in its own right with respect to information superiority and rapid decisive operations. The implication is that a rapid and decisive operational capability provides the enemy with knowledge that he is currently vulnerable to eminent attack and defeat. This knowledge dictates that his dominant strategy will be to attack first. This provides him with the greatest, and perhaps only, possibiltiy of winning.

Relationship to Concepts

As previously shown, achievement of the Information Superiority objective was perceived to be attributable to the impact of multiple concepts. These concepts were the Collaborative Information Environment, which has been addressed; the Standing Joint Force Headquarters; Operational Net Assessment; Effects Based Operations; and Joint Intelligence, Surveillance, and Reconnaissance. Although not identified by the participants in the survey used, other data sources identified the Joint Inter-Agency Coordination Group as an information source and consequently contributes to the achievement of information superiority.

Standing Joint Force Headquarters (SJFHQ): The Standing Joint Force Headquarters supported objective achievement through the general military knowledge and regional specific knowledge of its members. A SJFHQ ability to rapidly recognize threat patterns would also support the achievement of information superiority by theoretically reducing information requirements. Evidence of each is provided in the Assessment Area 9 section.

Operational Net Assessment (ONA): The ONA Concept was visible in the information domain primarily as the ONA tool. This tool resided in the collaborative information environment as a section of the JTF's CROP. The ONA information added to the overall quantity and quality of information. Ideally, this information would be highly valued because of its integration. However, during the experiment, the ONA information was predetermined to be accurate in order to facilitate experimentation of the ONA process. This created an "input equaled output" result. The true impact of the ONA on establishing information superiority would be heavily dependent on the ability to accurately identify the cause and effect relationships contained in the database.

A senior concept developer stated that, "ONA-like processes have an insatiable appetite for information." This observation is consistent with existing literature that describes building data bases for complex, nonlinear problems such as determining cause and effect relationships as being extremely resource intensive. While it is envisioned that the ONA database would be developed prior to JTF operations and maintained at the Combatant Commander level, there is potential for the ONA to generate additional information requirements on the JTF. The difficulty experienced during the experiment in maintaining the database may be evidence of this. Some of these requirements, potentially legitimate, may have to be resourced by JTF assets.

Effects-Based Operations (EBO): EBO was identified as a contributor to objective achievement, based on its ability to facilitate integration of information operations with kinetic operations. It is a very desirable capability, and one that is very relevant to achieving information superiority. However, the most visible insight into the impact of EBO was the probable increase in the level of required information necessary to assess effects. During the experiment sufficient numbers and types of ISR assets existed to meet stated surveillance requirements. Consequently, JISR capabilities were not stressed. The impact of effects assessment on information requirements could not be determined. As was the case with ONA, any additional information requirements have a legitimate likelihood of being valid requirements. The determination of their validity will be proportional to the importance placed on effects assessment.

Joint Intelligence Surveillance and Reconnaissance (JISR): JISR is an integral part of the achievement of information superiority. It is a primary source of information pertaining to the threat. Any improvements in JISR operations would favorably affect objective achievement. During the experiment, JISR operations were conducted under multiple experiment design and JECG induced constraints. The JISR concept is discussed in Assessment area 10.

Joint Inter-Agency Coordination Group (JIACG): The JIACG operated within the collaborative environment. It provided required information to the JTF and a different perspective on existing information. Each had value in objective achievement.

The JIACG provided additional information in support of planning for transition operations. This was significant because it filled a recognized information void. The void exists because little emphasis has been placed on transition operations in joint training programs. This is true even though problems associated with transition are well documented. The result was a transition plan that was judged to be of higher quality than plans previously produced during joint exercises.

Joint Theater Logistics System (JTLS): Participants did not identify JTLS as a contributor to achievement of this objective. Logistics operations benefited from unconstrained access to planning and operational information. In turn, this supported JTF flexibility and readiness.

Relationship to Baseline Analysis

Baseline findings that are relevant to the information superiority objective were extracted from the information management and command and control sections of the baseline annex, Annex B. In general, experimental observations compared favorably to the baseline findings.

High profile difference between the baseline findings and the experiment observations are that the emergence of Knowledge Management as a more effective information dissemination capability was achieved in the experiment. Also, a greater reliance was placed on individual skills and initiative in the experiment.

The following table contains selected baseline findings and corresponding observations that occurred during the conduct of the experiment.

Baseline Finding	Experiment Observation
IM is a critical element of successful JTF headquarters operations. That success depends on a well developed IMP and a capable IMO. The inverse is also indicated; JTF staffs struggle when the IMP and/or the IMO are weak or lacking.	Knowledge Management has been added as a critical element for successful JTF headquarters operations. Success is probably related to a well developed KIMP and dependent upon skilled KMOs and skills and initiative of individual JTF members.
Having all commanders at a single meeting for back-briefs facilitated cross-component understanding of each other's plans, and identified cross-component coordination and interoperability issues.	This was done routinely with Commanders at distributed HQs using IWS, with the same result.
"The extraordinary success that the JTF experienced in handling, analyzing, and providing critical information to the commander can be attributed to four key factors: commonly understood IM processes, employment of a JTF Homepage, accessibility of the commander, and a manageable RFI process."	Of the four key factors, three of them were improved or expanded upon: the JTF homepage in the form of the SPPS portals, accessibility to the commander, and the RFI process. The contents and process described in the KIMP were not commonly understood. The processes associated with the CIE were commonly understood.
The task of disseminating information is difficult even when all conditions are met. Rapid advances in, and unfamiliarity with, available technology often cause information to be misrouted or inaccessible, which may result in required actions not being taken. When using web-based technology	The task of disseminating information was not difficult. In general, technology did not cause information to become inaccessible; the opposite was true. In cases where it was inaccessible, it was due to

Baseline Finding	Experiment Observation
for disseminating information, it is necessary to ensure that the data is not buried too deeply in the system.	a lack of a discipline in storing information. It was still necessary to ensure data was not buried to deeply. The search functions did not overcome this.
"Initially, information was difficult to locate on the Homepage. Many documents were filed within the file structure of the originating staff, rather than under a topical label. For instance, the exercise IMP was filed on the exercise Homepage under J3 Current Operations, instead of under IMP. For staff members who did not know the origin of documents, it took considerable time to locate them."	No change, the same basic problem was observed.
"Worthy of specific note was the command emphasis on IM. At the outset, the commander emphasized his concern for accessing critical decision-making information from the anticipated vast accumulation of general information and data. His guidance was clear - the Homepage should not become a huge and cumbersome electronic filing cabinet.	No equivalent command emphasis was placed on KM; it was placed on collaboration. No worries were observed with regard to a "vast collection of data".
JTF information managers had to constantly review, evaluate, and prioritize information on the web pages to ensure that information was current and not buried under layers of directories.	No change. In addition, the JTF KM organization was heavily burdened with maintaining the systems. This interfered with the ability to execute the described process. Individual JTF members were responsible for these actions as well. The JTF KM organizations were not resourced with standard tools to execute the review, evaluate, and prioritize process.
Web-based technology does not replace active command and control (C2).	No change with respect to Web-based technology. The collaboration system did effectively support and supplement command and control.
Access and security issues also hinder execution of a good IMP. In exercises and operations that include allies and coalition partners, problems often arise with gaining access to U.S. systems.	This problem was not encountered in the experiment because allies and coalition partners were not part of the experiment. There was no indication that this challenge would be overcome by adoption of the concepts.
IW activities were accomplished in the J3Command and Control Warfare (C2W) cell. As course of action (COA) development proceeded, the Commander decided to form another organization to address IW. He had several options: 1) form a J3IW element as part of the Operations Directorate; 2) create a joint (J) (IW) Directorate on a par with the other "J" codes; 3) form functional component Joint Information Warfare Centers (JIWC); 4) create a Joint Information Warfare Center (JIWC).	The JTF experienced similar problems in developing and integrating information warfare operations.
Boards, centers, cells, and agencies placed a heavy time demand on the JTF staff, in some cases	No change.

Baseline Finding	Experiment Observation
becoming counterproductive.	

DOTMLPF Linkage

Findings in this section support DOTMLPF recommendations found in the CIE assessment area.

Recommendations

Begin experimentation to examine the requirements for Commander Centric operations.

Rationale: " …the fact remains that the basic concept of a campaign plan should be born in the mind of the man who has to direct that campaign." Field Marshall Eric von Manstein The preceding quote provides an anchor for the rationale supporting Commander-centric operations. Discussions associated with commander centric operations are common within military circles and are frequently associated with transformation. However, no specific tasking exists at JFCOM to identify requirements for Commander-centric operations.

Findings one and three recognize the emergence of qualities and CJTF actions that are consistent with commander centric operations. The cited qualities and actions can be summarized with the high level of CJTF situational awareness and confidence and the dominant, CIE induced, CJTF role in identifying enemy courses of action. The evidence suggests that movement towards Commander-centric operations occurred and can be best attributed to the utilization of a CIE. In total though, we do not know how distant we are from achieving Commander-centric operations because the requirements have not been defined. If Commander-centric operations for a JTF is a desired end state for transformation there is a need to know what specific requirements beyond a CIE exist. Furthermore, the hierarchy of and relationships between Commander-centric operations, a knowledge-centric organization and network-centric operations need to be understood, validated and shaped in order to maximize the efficiency and effectiveness of JTFs.

Recommendation: Identify and eliminate the cause of excessive time demands placed on the JTF staff that was created by overlaying a CIE on existing JTF processes.

Rationale: Finding 2 highlighted the large quantity of time that was spent by the JTF Staff utilizing the collaborative system. This quantity was periodically identified as being excessive and the cause of overworking personnel. In MC02 the CIE was overlaid on existing JTF processes without elimination of existing tasks. The appearance was that additional work had been added without additional resources. While the notion "greater knowledge created by the CIE would enable faster task accomplishment and a balance would be achieved" has merit, time management difficulties emerged. At times, personnel choose between attending collaborative sessions and performing another task. One would think time demands can be reduced by eliminating some existing tasks. This is often the case during process improvement efforts. An example could be the modification of the development of three courses of action to the development of one course of action.

Another perspective is opportunities to create strategic corporals were missed because collaboration sessions went unattended by individuals who were directed to perform other "urgent" tasks. This perspective argues for maximum attendance in collaboration sessions. The correct use of CJTF's Staff members time needs to be identified.

Assessment Area 2 — Rapidly Set Conditions for Decisive Operations

Overall Assessment Results

The joint force deployment planning procedures and tools developed to support the task: *Position combat-configured forces for joint operations,* were not as effective as might have been anticipated. The Joint Force Capabilities Register (JFCR), a planning tool, was not used as envisioned for a couple of reasons. First, due to the nature of the experiment, the force list was already determined so the Components saw little utility in using the JFCR to select capabilities to accomplish an effect. Secondly, the JFCR is still in development and participants felt it did not have sufficient detail for some areas.

No one envisioned the impact that the Collaborative Information Environment (CIE) has on the Course of Action (COA) development and the impact that Effects-Based planning and operations has on the Deployment Planning Process. In some cases it streamlined planning because of concurrent collaborative capability. In other cases concurrent collaboration hampered planning because of a misunderstanding of what could be curtailed. Also, collaboration seemed to blur some of the deployment planning roles, responsibilities and functions.

In Effects-Based planning the relationship between COA Development and Deployment Planning was not fully understood. It was envisioned that as Effects-Based missions (task, purpose, and effects) were assigned to Components they would select a capability to accomplish the task. Once the capabilities were selected by the Components, the JTF, using the Joint Force Capabilities Register (JFCR), would begin sequencing the force flow with the priority of effects desired.

During the experiment the JTF developed its operating concept based on the Commander's intent and guidance and the Priority Effects List (PEL). The JTF issued Effects-Based missions (task, purpose, and effects) to components and they developed COAs for their effects-based missions based on supported and supporting relationships. There was good component horizontal collaboration within each Effects-Based mission. The components developed their COAs in the absence of an integrating JTF COA, which should have included a JTF concept of deployment that supported a JTF concept of employment. Consequently, the components plans used unconstrained forces and force flow for their COAs. The JTF (influenced by non effects-producing capabilities, the desire to show off their true capabilities, and efforts to attain Service exercise objectives which did not match MC 02 objectives) began COA analysis without an integrated JTF COA, and because of the lack of force flow sequencing, it was not possible to determine what resources were to flow where and when. After the COA wargaming was complete, and the JTF put all the component force flow requirements together and they discovered they were beyond their force flow capability. The JTF adjusted the forces and the flow and once it was integrated, the JTF had a feasible COA from a deployment perspective.

Prepositioned (PREPO) material was used to offset deployment requirements. Intermediate Staging and Support Bases (ISB) were used to streamline deployment and to minimize the logistics footprint in the JOA. Where possible, Host Nation support was used extensively to minimize the logistics footprint.

The effects of Joint Reception, Staging, Onward movement, and Integration (JRSOI) could not be assessed because no actual JRSOI was conducted or simulated, and that is the only way to accurately assess the process.

The Logistics Common Relevant Operating Picture (Log CROP), although a great information source, was not seen as effective in synchronizing deployment flow.

Methodology

Rapidly Setting Conditions for Decisive operations was evaluated by more than 215 experiment participants and observers during MC02. A series of 32 questions were given to the Warfighters, 34 questions were submitted to the SMEs, five command, control, communication, computers and intelligence inputs were gathered, and two modeling and simulation inputs were gathered throughout the experiment to address this objective. The questions were directed to the specific person or group that was responsible for the desired information or subject area. Specific information was sought from the C4I systems and the M&S systems during and at the conclusion of the experiment. Data from the modeling and simulation areas were gathered via DCARS; the C4I information was gathered from the Shared Point Portal Server (SPPS). JDCAT captured the Warfighters' and SMEs' information. All of these sources provided the information that was reviewed and analyzed for this objective. In addition to the above-mentioned data, after action reviews from various working groups and comments and recommendations that were captured via JDCAT were used to supplement the programmed data capture. The responses were screened, sorted, analyzed, and tabulated. The data was rolled up through the element, data requirement, measure, subtask, task, and the Warfighting Challenge levels to answer the Objective. Azimuth Check papers for this objective were written in which the key points of the Objective were listed and brought to the attention of the SMEs, analysts and the SCDs. The papers were available through the SPPS system, and they were the focal points during the 26th and 27th of July for the SMEs, analysts, and SCDs.

The Rapidly Set Conditions for Decisive Operations Objective was broken into the two war fighting challenges: 1) Ability to establish advantageous positions for decisive operations, and 2) Ability to decrease Joint force vulnerability to disruption. The first war fighting challenge was broken into two tasks, and ten sub tasks. The second war fighting challenge was broken into one task and six measures. The data for this objective was split between logistics and effects based functions. Therefore, the logistical analysis team concentrated on the first task of the first War Fighting Challenge, and the effects analysis team concentrated on the second task of the first War Fighting Challenge and on the entire second War Fighting Challenge.

Due to experimental guidance, enemy forces were restricted from attacking Blue forces for 16 days prior to the start of hostilities. This period of conflict inactivity should be considered one in which many asymmetric and some kinetic enemy actions might have been directed against Blue forces flowing into the region. If the enemy had attacked Blue forces earlier, the pre-emptive strike may have had a smaller effect or not occurred at all. However, earlier enemy activity may have had a greater impact on Blue at the operational level, and affected Blue's ability to gain entry into the JOA.To analyze the primary sub task, Use joint force deployment planning procedures, six key areas were reviewed to determine the effectiveness of the joint force planning process:

- Use of the Joint Deployment Process Initiatives Joint Force Capability Register (JFCR) and collaboration during the joint deployment planning process)
- The tactics, techniques, and procedures (TTP) and Standing Operating Procedures (SOP) that comprise the Joint SOP (JSOP) on deployment planning procedures
- Number of deployment flow changes made in the first seven days and why they were made

- Tailoring of initial and follow-on logistics packages to reduce lift requirements and minimize logistics footprint in theater
- Procedures to develop and approve Courses of Action (COA) quicker for logistics supportability
- Procedures and systems for sourcing, tailoring, and validating the Time-Phased Force and Deployment Data (TPFDD)

Supporting Subtasks were addressed as follows:

- Impact of various Prepositioning (Prepo) alternatives on the ability to rapidly close a force
- Reduce Joint Reception, Staging, Onward Movement, and Integration (JRSOI) processing time
- Assess deployment distribution structure
- Determine the information, communications and systems and tools that are required to synchronize the deployment flow
- Determine the amount of asset visibility required to divert assets
- Determine the utility of the High Speed Vessel (HSV) for positioning/supporting combat-configured forces for decisive operations.

Data was collected, primarily, from the logistics participant's and Subject Matter Experts (SMEs) using automated questionnaires and from the Comments and Recommendations provided by all participants, various After Action Reviews (AARs) and In–Focus Sessions. The locations and number of the Logisticians follows: PLANS Group, 14; OPS Group, 12; SMEs, 12; Functional Component, 5; Joint Logistics Management Center (JLMC), 16; and the Joint Exercise Control Group (JECG) Deployment Sustainment Support Cell (DSSC), 17.

Warfighting Challenge:

Ability to establish advantageous positions for decisive operations

The Deployment portion of the Warfighting Challenge, Rapidly Set Conditions for Decisive Operations, was postulated because of reliance on infrastructure dependent deployment methods that prevents joint forces from direct deployment into the Joint Operations Area (JOA); therefore, the delivery of highly mobile forces in non-continuous operations cannot be accomplished efficiently. From this Warfighting Challenge, metrics (tasks, subtasks, questions and data elements) were developed based on information from several sources, most notable are:

- Concept Experimentation Strategy (CES) to Deploy and Sustain the Force in Rapid Decisive Operations (RDO, 2/14/01)
- Focused Logistics: Enabling Early Decisive Operations (FLEEDO, 10/10/99), Strategic Deployment (SD, 5/10/00) and RDO (3/1/02) Whitepapers
- Standing joint Force Headquarters (SJFHQ) Concept of Employment for MC02 (8/17/01)
- Deployment & Sustainment in MC02 Concept of Operations (CONOPS, 3/18/02)
- Deployment & Sustainment in MC02 Tactics, Techniques and Procedures (TTPs, 1/9/02)
- MC02 Joint Standing Operating Procedure (JSOP).

These sources were used to generate the metrics and formed the basis for data collection plan development. The data collection plan was vetted with the Logistics Concept Developers and other members of the Analysis Division. The high order metrics follow:

- Task: Position Combat-configured Joint Forces for Decisive Operations
  - SubTask: Use joint force deployment planning procedures
  - SubTask: Determine the impact of various Prepo alternatives on the ability to rapidly close a force
  - SubTask: Reduce JRSOI processing time
  - SubTask: Assess deployment distribution structure
  - SubTask: Determine the information, communications and systems and tools that are required to synchronize the deployment flow
  - SubTask: Determine the amount of asset visibility required to divert assets
  - SubTask: Determine the utility of the High Speed Vessel (HSV) for positioning/supporting combat-configured forces for decisive operations.

Findings

Finding 1:

The MC02 joint force deployment planning procedures were not as effective in improving joint force planning or in developing the JTF Time-Phased Force and Deployment Data (TPFDD) as anticipated. The Collaborative Information Environment (CIE) became extremely important in streamlining deployment planning coordination.

The JFCR was not used as anticipated. It was expected that JTF and component planners and operators would use the JFCR to identify potential forces for use and then conduct transportation feasibility analyses to identify constraints. As it turned out, the JTF assigned missions to Components and asked for a deployment force list.

Components did not use the JFCR for two reasons:

- Because they were familiar with their forces capabilities and didn't need to search the JFCR
- Because the force list for use in MC02 was already identified and tied to Service Experiments, and rather than going through the exercise of looking up forces with particular capabilities, those forces identified for MC02 were used.

Those that attempted to use the JFCR found it lacking because they were either inadequately trained on how to use it, or because they felt it lacking sufficient detail. Some comments from participants are:

- "Although partial engineering data is included in the register, the force modules populating the register are too large and too generic to aid as an effective search tool to meet the objectives of MC02"
- "The JFCR does not provide the level of detail that the medical planners need. The medical community needs information on what each unit brings with it and how it is configured"

Sustainment details had not been rolled into the JFCR for some components, causing planners to use other sources for planning details. Most participants felt that with additional development it would be useful tool for CINC-level or SJFHQ Core planners in identifying capabilities available for use against effects, and determining rough-order transportation requirements, as they develop their CONOPS.

The impact the CIE had on deployment planning was not clearly envisioned. While it had some very obvious benefits in reducing planning time by enabling concurrent planning by the JTF, Components and Subordinate Commands, there was a misunderstanding about what

concurrent planning could and could not do. An intent of the MC02 Experiment was to attempt to reduce the planning time needed to begin operations—read that to mean reduce or eliminate the 1/3 – 2/3 time allocation rule for mission planning—by bringing the JTF Components in early on the planning to attempt to conduct concurrent planning. However, this was apparently not portrayed clearly to the JTF and Components. As a result, Components and Subordinate Commands felt pressured for deployment information in the absence of a JTF COA, and when a COA and force list had not been finalized.

The JSOP caused some problems for deployment planning because the Deployment Planner was located in the LogPlans portion of the Plans Group. As a result, the JTF Planners looked to the Log Planners to develop the TPFDD without operational planning involvement. This created some unproductive deployment planning sessions, as the deployment planners had no employment plan for force flow from which to work.

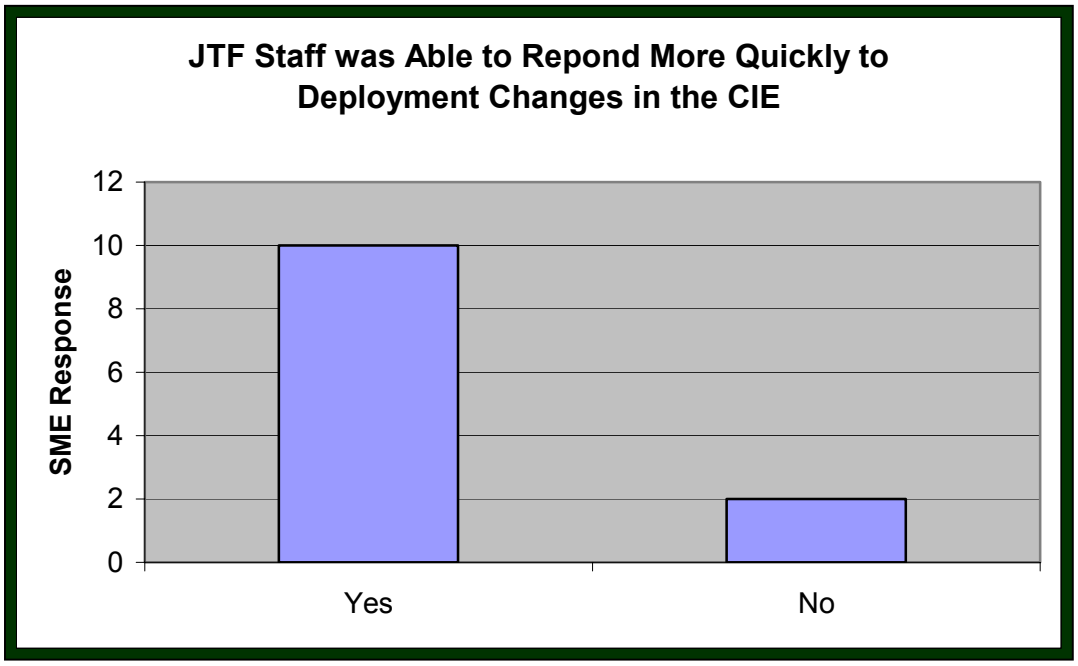


Figure 35: SME's thought the JTF staff was able to respond more quickly to deployment changes in the CIE

Significant adjustments were made to the initial deployment flow in the first week of the experiment execution because the TPFDD had not been finalized before the end of Spiral 3. Changes were made at the direction of the JTF Commander and, on request, from the Components. As depicted in the chart below, the Collaborative Information Environment (CIE) made these requests and the coordination process much easier.

Finding 2:

Using pre-positioned (PREPO) materiel as an alternative to deploying materiel from CONUS was seen generally to be beneficial to rapidly closing a force. The chart below shows participants comments on use of PREPO.

Reducing materiel transportation times and requirements benefited force closure rates. The key is having the correct equipment and sustainment in sufficient quantities located near the crisis area where it can be used. This is important because as Services begin to transform and modernize their forces, they will need to ensure acquisition of sufficient "spares" and sustainment to place into PREPO. During MC02, participants were limited to using real world

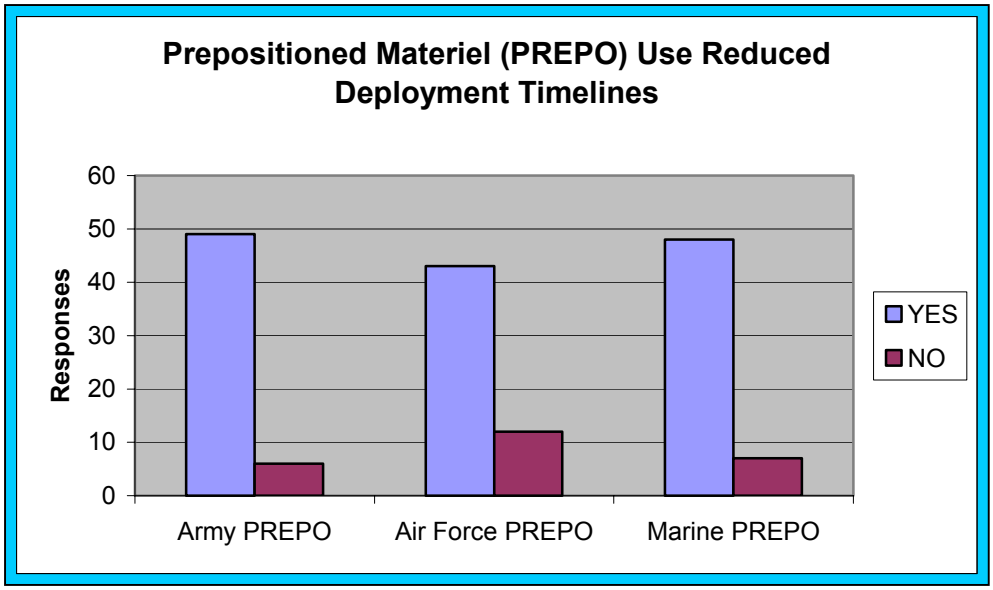


Figure 36: Services thought PREPO reduced deployment timelines

PREPO. This became apparent to the JTF planners because there were no Stryker Brigade Combat Team (SBCT) or Apache materiel in PREPO to affect deployment or replacement.

PREPO was beneficial in reducing deploying sustainment, as planners were able to take advantage of what was available as common items of support, such as water and fuel, and ammunition. It is imperative that all planners know what is available in PREPO and know how to find it. The medical planner did not have any information about medical materiel available in PREPO because it wasn't clear to him what medical units and equipment were available. He, therefore, could not make any recommendations that might have reduced transportation requirements or support footprint in the JOA.

Finding 3:

An assessment of the Joint Reception Staging, Onward Movement and Integration (JRSOI) process could not be made during MC02 because the JRSOI process was not visible in the experiment. JRSOI occurred only in the simulation and was limited to 48 hours. Real-world constraints were not experienced or imposed.

Finding 4:

Intermediate Support and Staging Bases (ISBs) were suited to rapidly moving forces and equipment and instrumental in reducing the Logistics footprint in the JOA.

As depicted in the chart below, the majority of participants understood that the ISBs described in the Deployment & Sustainment in MC02 Concept of Operations were suited to rapidly moving and integrating forces.

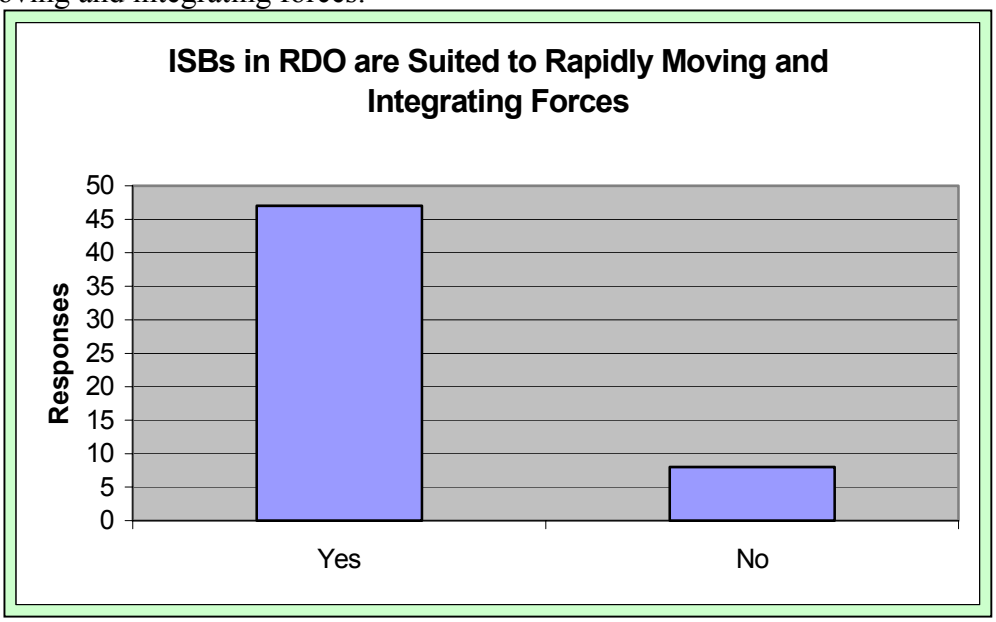


Figure 37: Most thought ISB's well suited to rapidly moving forces

However, the experiment was not able to actually measure the reduction in JRSOI time as it was not conducted in simulation and unit RSOI was assumed completed 48 hours after arrival. ISB locations were seen as being effective in extending operational reach and were selected based on facility availability, and dispersed to provide maximum force protection and reduce vulnerability. The JTF maximized the use of host nation support and civil augmentation program support to minimize the logistics footprint in the JOA.

Finding 5:

The Collaborative Information Environment (CIE) was effective for synchronizing deployment flow.

Participants saw the CIE as very effective for synchronizing deployment flow. The CIE provided them the opportunity to address issues with all concerned and to coordinate necessary changes. Some participants' comments were:

- "Collaboration was the only way I can see this would have happened in the time it was accomplished"
- "The JTF Surgeon and the Service Components used [the] collaborative environment to deconflict issues for medical units"
- "Thus far in the exercise, it appears that [the] CIE was the key factor that achieved synchronization for deployment and sustainment"

The chart below depicts participant evaluation of the CIE effectiveness on deployment synchronization.

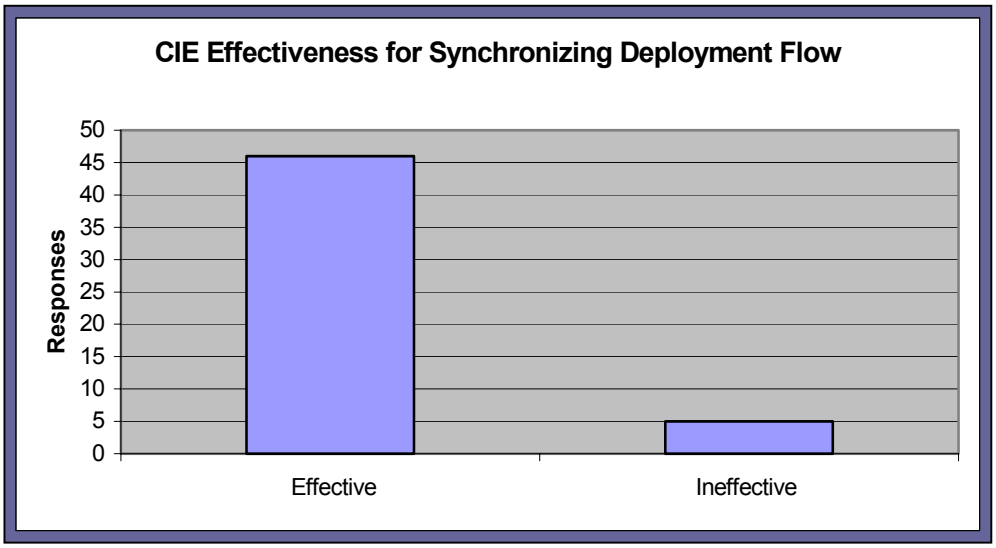


Figure 38: CIE was effective in synchronizing deployment force flow

The Log CROP was useful as an information source but reportedly added little to synchronizing flow. Initially, participants had difficulty finding the deployment flow status on the Log CROP; then it became an issue of information currency and accuracy. What finally evolved were discussions in the Logistics Action Response Board (LARB) to resolve deployment related issues. Participants provided the following comments on the utility of the Log CROP in deployment flow tracking:

- "The Log CROP was a great tool however [it] had little relevance to synchronizing deployment flow"
- "Force flow charts were compiled from information from GTN/GES and posted on the Log CROP which gave visibility on the deployment"
- "The Log CROP is looked at more as a source of general information than a planning tool"

Participants saw the logistics decision support tools as somewhat effective—meaning not all that great—in synchronizing deployment flow primarily because of the significant amount of training necessary for operators to effectively use them. Some comments are:

- "JL Tools is ok but all the systems take a lot of training, need to be user friendly"
- "Better than manually reviewing Service planning docs but not fully utilized by planners"
- "The DST were only somewhat effective because of the lack of training provided to the users"

Finding 6:

The Log CROP provided sufficient information to allow the CJTF to divert PREPO materiel or inbound supplies to satisfy needs elsewhere in the JOA.

Forty-four of 58 respondents felt the Log CROP provided sufficient information to allow the CJTF to divert PREPO materiel or inbound supplies to satisfy needs elsewhere in the JOA. See chart below. However, it was also felt that the JTF Commander would coordinate with his Component Commanders before redirecting materiel.

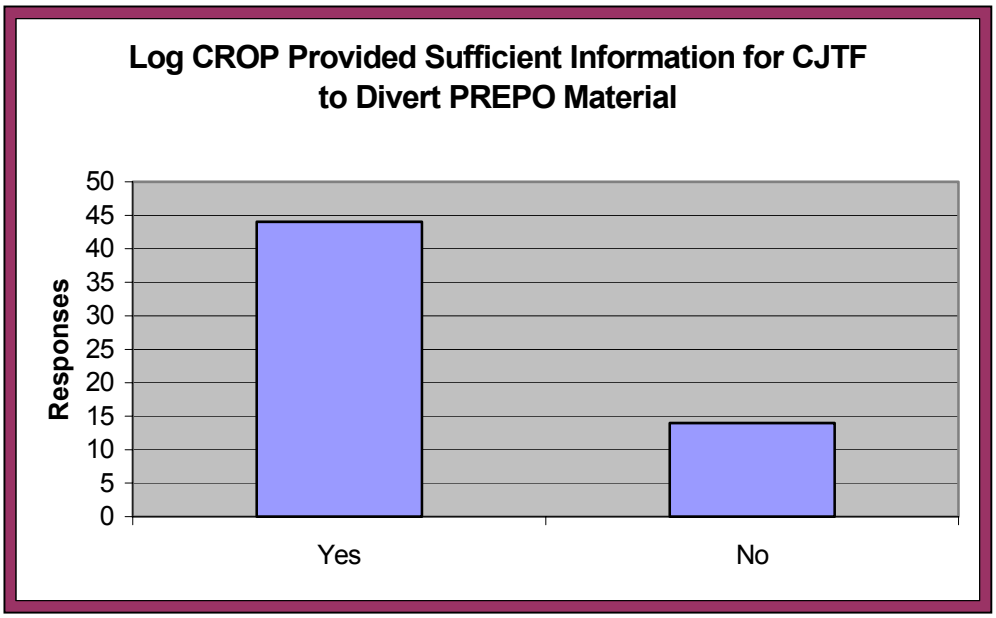


Figure 39: Majority thought Log CROP provided sufficient information to divert PREPO material

Subtask: Position Joint forces for operational formations

Finding 7:

It appears that all of the forces allocated to the JTF for planning purposes were actually deployed into the theater. The majority of these forces arrived ahead of schedule. MC02 did not provide enough resolution of the sixteen days preceding the start of the execution phase of the experiment to determine the actual TPFDD deployment status. During this pre-execution period, the OPFOR was not allowed to attack force deployment efforts. As such, Blue was able to deploy to theater unimpaired. Blue positioned its Joint forces for operational formations with some concern for terrorist or other enemy actions. All necessary forces and support elements were positioned to ensure freedom of navigation through the Straits, neutralization of weapons of mass effects, and subsequent transitioning of the JOA to follow-on forces and agencies. Blue positioned its forces so operational formations could form and operate, but there could have been better coordination and synchronization between the components and JTF and between logistics personnel and operators. Better use of the ONA, better information sharing, and better operations to logistics planning would have aided effects accomplishments.

Subtask: Assemble forces in the Joint operations area (JOA)

Finding 8:

Blue was able to assemble its forces in the JOA in a timely but uncontested manner and in sufficient quantity to begin effects operations by C+17, in accordance with planning timelines. There were numerous instances of the JTF Commander using “effects packages” in specific actions and engagements to help to achieve effects. These “effects packages” were not built until the component elements were deployed to their designated assembly areas in the JOA. In each of

these actions, however, there were supporting/supported relationships, which caused these collective units to be somewhat different than units incorporated in Joint Tactical Action (JTA) elements where all elements in the JTA fall under the command of a Joint force commander. The identification for operations requiring "Joint tactical operations" occurred early on in the planning process due to the collaborative construct. Operations as small as Direct Action efforts to seize specified locations ranging to the seizure of the islands, and defense against swarm boat attacks, required frequent use of "Joint tactical actions". The ability to collaborate allowed the JTF and components to quickly determine requirements and rapidly de-conflict resources. Subsequent to the arrival of Blue forces in the JOA, OPFOR detected and attacked both air and maritime elements causing damages and losses. These attacks did not have a large enough effect to stop Blue from setting conditions for decisive operations.

Subtask: Provide operational mobility

Finding 9:

Blue was able to exercise operational mobility into and through the JOA. The OPFOR, however, did delay, disrupt, and modify Blue operational mobility, by mining the Straits of Hondo and waters in the area of operations, conducting pre-emptive strikes on Blue forces in the JOA, and conducting terrorist attacks on Blue lines of communications, and APODs and SPODs. In spite of the obstacles encountered, Blue retained operational level mobility. Operational mobility may have been affected to a greater degree if the OPFOR had been allowed to disrupt the TPFDL flow before execution. At the tactical level, Blue maritime forces were slowed by up to 12 hours due to OPFOR maritime mining efforts. Blue was forced to conduct mine clearing operations to open sea lanes through these mined areas. APODs and SPODs were closed for greater durations due to potential chemical/biological contamination, physical damages to infrastructure, and from environmental damage to port facilities. These enemy actions forced disruption and delays on Blue's planned timelines, and were effective distracters at the tactical level.

Subtask: Provide operational counter-mobility

Finding 10:

Instances of enemy major operations no longer feasible due to friendly counter-mobility operations include Blue's interdiction of the counterattack at Objective Pioneer. Through situational awareness and superior mobility and firepower, Blue was able to monitor enemy movements and choose the time and location for counter-mobility operations. Blue was able to constrain CJTF-S's movement of forces through aerial targeting of mobile forces. The adversary did not retain freedom of movement to conduct major operations. At other times, Blue could maintain situational awareness for EBO through just monitoring enemy movements. Yet, the OPFOR was able to move two reserve, armored brigades over 200KMs without being attacked. These brigades were subsequently attrited when they were moved into direct action. Blue was very successful in conducting counter-mobility operations against enemy forces whenever necessary or as needed in support of EBO and RDO.

Task: Conduct operational maneuver

Finding 11:

Blue was able to conduct operational maneuver. OPFOR's pre-emptive strike had a major short-term effect on Blue's operational freedom of maritime maneuver, but the initiative passed back to Blue upon the completion of that attack. Operationally, the OPFOR had very limited conventional military options after launching pre-emptive strikes on Blue forces moving into the JOA. The primary reasons appear that the OPFOR spent the vast majority of its air, missile, and maritime attack capability in these initial attacks. Thereafter, operational maneuver was conducted successfully by the JTF. The JTF was able to deploy, position, assemble and use the desired forces/capabilities within the JOA. The enemy forces were able to delay, disrupt, and modify the flow of forces by maritime mining activities and terrorist activities at APODs and SPODs, but not to a degree that placed significant operational limitations on Blue forces. In some instances, the OPFOR was able to severely limit Blue's operational maneuver. One such case was the Blue STOM that landed before the battlefield was properly prepared. This resulted in significant Blue losses and an JECG controlled administrative withdrawal, to continue the experiment after that lesson was noted. Blue was able to assemble the necessary personnel, equipment, and supplies by D-1 to begin effects operations, in support of operational maneuvers.

Warfighting Challenge:

Ability to establish advantageous positions for decisive operations

Finding 1:

The JTF was able to establish advantageous positions for decisive operations. Although enemy actions negatively impacted the force's operational mobility, specifically through the use of missiles, mines, swarm boats and terrorist activity, these detractions were not enough to stop the JTF from establishing advantageous positions during some operations in time and space. Blue was able to position its forces and create combat-configured packages for decisive operations. Effects planning procedures showed continual improvement as the experiment progressed, though more work is required. At times when Blue achieved advantageous positioning, it was not always able to successfully execute the planned operation; additional preparation of the battlefield was required.

Blue achieved a high level of logistical build-up flexibility. Force tailoring could have been better as the components erred on the side of retaining in-house capabilities versus leaving those capabilities behind, even though another component had the same capability. One war fighter mentioned, "The logistics Plans-Ops transition worked better than the JTF Plans-Ops transition." Additionally, node-action-resource level of planning proficiency was not attained from an effects planning perspective during MC02. Footprint minimization could also improve with the streamlining of JTF capabilities. Logistical planning seemed on par with legacy methods, but there is much more room for improvement through the use of CIE in conjunction with effects planners and operators. TPFDD measurements were not meaningful due to the lack of fidelity in the experiment. Another war fighter observed "MC02 never got advanced enough to allow or drive the TPFDD refinement process." PREPO supplies and equipment were a success for the flexibility and timeliness of the JTF and effects operations. JRSOI was not an area that could be properly measured during MC02 due to the lack of fidelity in RSOI areas. ISBs show promise, but numerous comments agreed that other systems are necessary for the success and implementation of the ISB concept. The information, communications and systems and tools that are required to synchronize the deployment flow were generally available to the experimental audience during MC02. Most respondents felt that the CIE with collaboration

allowed the movement of JTF forces in a much more condensed time frame. The visibility required for the diversion of assets in support of RDO was met during MC02.

Warfighting Challenge:

Ability to decrease Joint force vulnerability to disruption.

Task: Prevent hostile observation and disruption to operational forces

Finding 1:

Blue was not able to prevent OPFOR observation of its operational forces, due to sympathizers, commercial satellite photos, and terrorist cells providing information. However, through positioning of forces within the JOA, minimizing Blue forces in the JOA, and maximizing aircraft operational ranges and weapon standoff ranges, Blue was able to minimize any impact enemy forces might have on the disruption of Blue operational forces. These types of Blue actions, added to the force protection measures in place to safeguard friendly assets. Of note, Red was able to disrupt Blue's logistical elements by mining and terrorist activities, but not to the degree where Blue operational forces noticeably affected. Some of the potential impacts due to OPFOR operations were adjudicated out by the JECG, to keep the experiment on track. Fourteen warfighters reported daily on the number of enemy or terrorist activities observed at APODs and SPODs. Most daily enemy and terrorist activities at APODs and SPODs were very limited in number. This type of activity was limited at times by the JECG. Seventeen war fighters reported on the JTF's ability to reduce its vulnerability due to disruption. The majority of responses received (26 of 32) felt that the JTF was able to reduce its vulnerability to disruption to varying degrees. This was contrary to the OPFOR terrorist view that it initially had relatively free access to Blue targets throughout the JOA. This access was degraded over time by counter-terrorism efforts and by JECG controllers. OPFOR was able to inflict damage on Blue causing tactical level disruption, but through counter-measures, and flexibility, Blue was able to overcome enemy efforts.

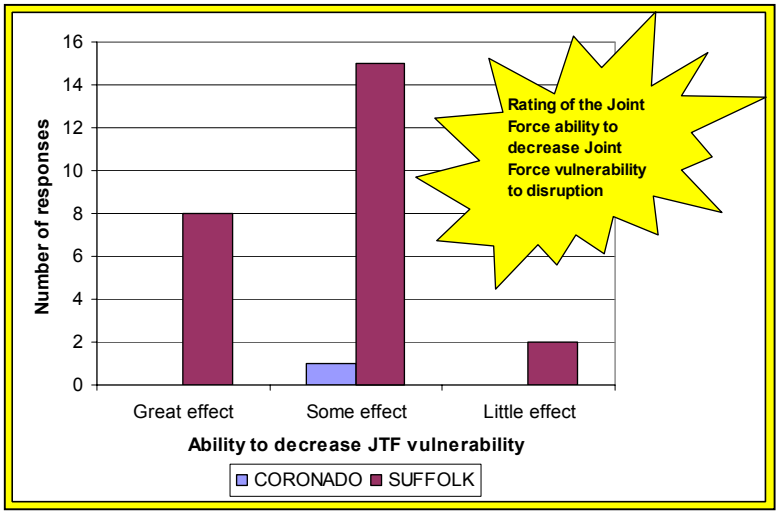


Figure 40: Ability to decrease JTF vulnerability

Above the operational level, CJTF-S forces or sympathizers were able to interrupt the flow of maritime forces through one LOC to the JOA. Terrorist and enemy activity did play a noticeable part in SPOD and APOD operations. A C-5 and a cargo version of a 767 were shot down by an terrorist MANPADs, light aircraft with high explosives and possible chemical/biological materials crashed into friendly piers and runways, car and truck bombs were used against APODs and SPODs, and rear area Blue personnel were killed and wounded by terrorist/enemy attacks. Additionally, Blue logistical operations were degraded when an SPOD was closed due to the grounding of a hazardous materials laden ship. Attempts by OPFOR forces

to attack APODs with TBMs were thwarted by Blue defenses. APOD and SPOD operations were modified to accommodate temporary closures due to OPFOR actions. Operationally, Blue forces were not forced to delay, disrupt, cancel, or modify operations due to enemy or terrorist operations at APODs or SPODs. Though no CRAF aircraft were allowed to be targeted by the OFPOR it was noted that such an operation would have severely constrained the use of commercial aircraft in the JOA.

Warfighting Challenge:

Ability to decrease Joint force vulnerability to disruption.

Finding 1:

Blue displayed some ability to decrease Joint force vulnerability to disruption. Blue achieved this through tailoring forces to meet requirements for specific effects, minimizing the footprint within the JOA, reducing adversary access to satellite and other open source intelligence data, using weapon system range and standoff range of delivery systems, establishing rear area security operations, diverting airflow to APODs with lower risk levels, damaging adversary electronic communications capabilities, using the capabilities of the HSV, the OV-22, C-17 etc, the use of PREPO supplies outside of the JOA, use of HNS, and through diplomatic and informational means. Additionally, much of the senior terrorist leadership was targeted and destroyed through a scripted event. Despite the OPFOR's ability to use both regular and terrorist forces to disrupt Blue air, naval and land forces and facilities, Blue was able to establish some advantageous positions for decisive operations.

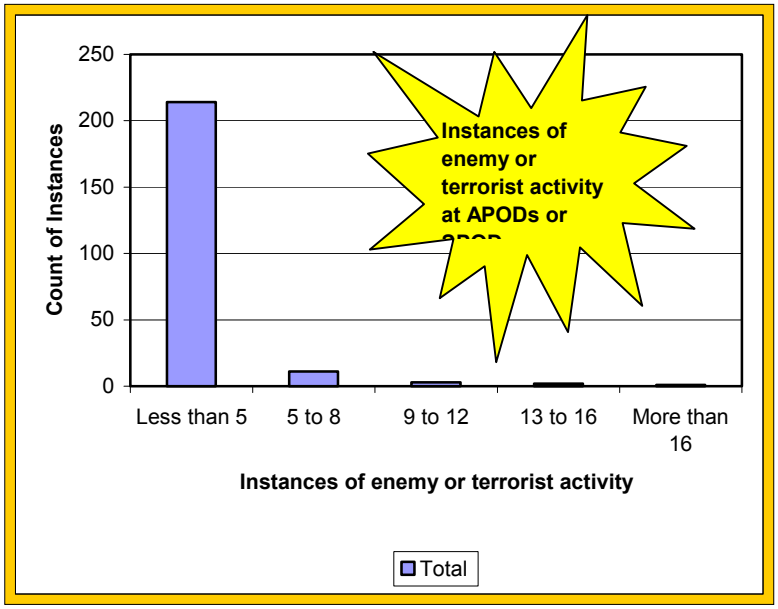


Figure 41: Instances of enemy or terrorist activity

Other Observations and Findings

The roles, responsibilities and functions for deployment planning seemed to be blurred as a result of the JTF organization. One of the important aspects of effects-based planning is the matching of capabilities - somewhat without regard to Service - to the effects required to do the job. Force flow must be sequenced with the desired priority of effects considered, or the force flow will not support the desired actions. There was little to no input from the operational / planning communities in the development of the initial force flow and requirements. It is critical to the success of deployment planning to have operators involved in the decision processes that will intimately decide on force employment. Some Senior Mentor comments on deployment bring out some key points:

"*When we talk about deployment, we have to talk about employment. The adversaries have learned that the way to deal with us is to disrupt power projection through asymmetric attacks. They can slime bases in the U.S. so force protection goes far below the operational level of war in the JOA. Force integration will have to be done in the U.S. We will no longer have secure bases overseas, and SPOE/APOE will be vulnerable to attacks with WMD. …"* Senior Concept Developer

"Force deployment tools are inadequate. They are labor intensive and are not user friendly. Single keystrokes can delete masses of painfully constructed data. The Joint Force Capabilities Register is a step in the right direction insofar as tool development is concerned. Additional improvements are needed." Senior Concept Developer

Relationship to Other Objectives

Concept/Obj	SJFHQ	ONA	EBO	JTLM	CIE	IA	JISR	Init	IS	AA	EBO	SF
Objective 2	X	X	X	X	X			X		X	X	X

SJFHQ
Force Deployment and Sustainment planning functions of personnel in Log Ops and Log Plans positions in SJFHQ

ONA
Database research for facilities and infrastructure to support deployment and logistics operations in JOA

Effects Base Operations (EBO) [Planning]
Develop deployment concepts and logistics concept of support for Effects Based Operation(s) and future branches and sequels

Sustainment
Plan and provide logistics sustainment for the JTF

Collaborative Information Environment (CIE)
Environment for collaborative planning and coordinating logistics operations, force deployment and Sustainment, horizontally and vertically; i.e. Logistics Coordination Board (LCB)

Interagency Agency (IA)
Interaction for coordinating Host Nation Support (food, facilities, equipment) and Humanitarian Assistance

Joint Intelligence, Surveillance, and Reconnaissance (JISR)
Intelligence on the JOA and adversary activities therein that would adversely impact force deployment and logistics operations

Initiatives
Introduction and experimentation of new joint logistics tools (JL Tools)

Assured Access (AA)
Ensuring access into the JOA and facilities therein to support force deployment

Effects Based Operations (EBO) [Conduct]
Support Force deployment and execute logistics operations to sustain forces conducting effects based operations

Sustain the Force
Joint Theater Logistics Management

DOTMLPF Linkage

Doctrine

- Linkage of logistics support concepts effects

Organization

- Greater emphasis on integrating logisticians in planning and operations cells

Training

- Deployment and sustainment planners should be fully integrated into the collaborative information environment (CIE)
- Consider developing training programs for multi-functional joint logistics planners, knowledgeable in all Service capabilities
- Reassess time allocation for subordinate command mission planning time in a CIE
- Consider training programs to develop and maintain proficiency in logistics decision support tools

Material

- Formalize the Log CROP

Leadership

- Train leaders on the importance of logistics integration in EBO
- Reinforce adequate allocation of time for subordinate's mission planning requirements

Personnel

Facilities

- Facilities to support deployment

Recommendations

The Joint Logistics Transformation Center (JLTC), assisted by USJFCOM J9, should, in the near term, host Seminars, Work Shops or Limited Objective Experiments (LOEs) to respond to the following questions:

- What changes have to take place to the effects based planning and execution process that fully integrates force deployment, employment and sustainment?

- What decision support tools are needed by the SJFHQ to rapidly assess the transportation feasibility of force deployment and employment in the same time line that effects-based planning takes place?

JFCR development should continue. The Services should continue to populate the JFCR with warfighting capabilities and usage that supports units aligned with their capabilities.

Decision Support Tools (DSTs) should be developed to support deployment planning.

All Service users should be required to participate in training planned for systems supporting future experiments.

The rating of the effectiveness of the JTF's ability to shorten the JRSOI process by rapidly moving and integrating the force compared to current RSOI process.

The rating of the effectiveness of tools (DSTs) to synchronize the deployment and redeployment flow:

- Further refinement and experimentation should be done on the tailoring of forces from the components for integration into the JTF. The JTA concept may need revision or refinement as the supported-supporting relationship seemed to be more than sufficient for all the Joint missions executed by the JTF. The tailoring of forces should help reduce the JTF footprint in the JOA, reduce the redundancy of capabilities brought into the JOA by each of the components, reduce the transportation asset requirements for the JTF, and indirectly force the logistics-to-planner/operations relations to become more synchronized.

Assessment Area 3 -- ASSURE ACCESS INTO AND THROUGH THE BATTLESPACE

Overall Assessment Results

Friendly forces successfully assured access into and through the battlespace; however, exercise constraints prevented enemy anti-access play for the 16-day period prior to the start of hostilities. This 16-day window covered the period where Blue soldiers were not on hand to participate.

This objective was successful due to two of the three warfighting chalenges being clearly achieved and the third warfighting chanllenge was nearly achieved. Blue forces were not consistently able to provide selective dimensional superiority, however Blue was successful in providing sufficient operational reach and in enhancing force protection.

Overall Assessment Results

- **Friendly forces successfully assured access into and through the battlespace…**
- **But, exercise constraints prevented enemy anti-access play for the 16-day period prior to the start of hostilities…**
- **Blue did not accomplish this objective unscathed, and there are several caveats to Blue's ability to successfully achieve this objective…**

Blue did not accomplish this objective unscathed, and there are several caveats to Blue's ability to successfully achieve this objective. First, Blue forces sustained significant damage, especially on its maritime component assets, when the enemy commander launched a successful pre-emptive strike using a mass aircraft and missile attack to overwhelm Blue's air defense capability. The pre-emptive strike had a tactical and almost an operational level effect on Blue forces. Blue was able to accomplish ETO1 with its remaining assets within the JTF Commander's parameters. Second, terrorist forces were able to successfully attack Blue aircraft flying near APODS and mine shipping lanes, thus affecting friendly lines of communication. Again, this type of attack had a tactical effect, but was not severe enough to initiate a friendly force change in operations. Third, Blue forces were not able to defend against enemy air attacks seemingly because the adversary used civilian aircraft. These enemy attacks used civilian aircraft to deceive friendly air defenses, but they did not affect friendly actions at the operational level. The bottom line is that Blue forces were able to enter and transit the battlespace in support of RDO.

In summary, Warfighting Challenge 1 (WEAK NO), Blue was not able to consistently provide selective dimensional superiority, while in Warfighting Challenge 2 (MODERATE YES) Blue was able to provide sufficient operational reach. In Warfighting Challenge 3, (WEAK YES) Blue had moderate success in enhancing force protection. In Objective 3: [WEAK YES] Blue did assure access into and through the battlespace.

Methodology

Assure access into and through the battlespace was evaluated by numerous subject matter experts, experimental participants and observers during MC02. A series of 12 questions were submitted to the Subject Matter Experts, one question was given to the Warfighters, 19 command, control, communication, computers and intelligence inputs were gathered, and 27

modeling and simulations inputs were collected throughout the experiment to address this objective. The questions were directed to the specific person or group that was responsible for the desired information or subject area. Specific information was gathered from the C4I systems and the M&S systems during and at the conclusion of the experiment. Data from the modeling and simulation areas were gathered via DCARS, the C4I information was gathered from the Shared Point Portal Server (SPPS). JDCAT captured the Warfighters and SME's information. All of these sources provided the information that was reviewed and analyzed for this objective. In addition to the above mentioned data, after action reviews from various working groups and comments and recommendations which were captured via JDCAT were used to supplement the programmed data capture. The responses were screened, sorted, analyzed, and tabulated. The data was rolled up through the element, data requirement, measure, subtask, task, and the Warfighting Challenge levels to answer the Objective. Azimuth Check papers for this objective were written and key points of the objective were listed and brought to the attention of the SMEs, analysts and the SCDs. These papers were available through the SPPS system, and they were the focal points during the 29th of July and the 3rd of August for the SME, analysts, and SCDs.

The Assure Access into and through the battlespace objective was broken into the three war fighting challenges:

- First, the ability to provide selective dimensional superiority. Secondly, show the ability to provide sufficient operational reach, and lastly, show the ability to enhance force protection. The first war fighting challenge was broken into three tasks, with six measures, three measures, and two measures respectively.
- The second war fighting challenge was broken into one task, and three subtasks, with three, two and four measures respectively.
- The third warfighting challenge was broken into three tasks with four measures, one measure, and four subtasks with two, five, two and two measures.

During MC02 the following methods were used to collect data on the Ability to provide selective dimensional superiority:

- Use of the COP/CROP to maintain situational awareness of the attack of adversarial systems during specific periods of time and throughout designated areas in the JOA
- Use of the CIE and the ONA to identify and control the attacks on the enemy's key Political, Military, Economic, Social, Infrastructure, and Information (PMESII) nodes and associated linkages
- Use of JISR for surveillance and assessment of PMESII nodes
- Use of the Effects-Based Planning (EBP), and Effects Assessment (EA) processes to maximize Joint force effectiveness and efficiency

The following methods were used to collect data on the Ability to provide sufficient operational reach:

- Use of the COP/CROP to maintain situational awareness of operations to, in and from the JOA
- Use of the CIE to control Joint Forces from their home bases to the target area and back
- Use of JISR to position Joint Forces so that mission accomplishment is minimally impacted by adversarial system positioning
- Use of the Joint Forces systems capabilities, such as stealth and standoff ability, in the JIP process to mitigate adversarial system capabilities

Concepts which are associated with providing sufficient operational reach include: CIE, JISR, JIP, EBP, EA, and the COP/CROP.

And the following methods were used to collect data on the Ability to enhance force protection:

- Use of the COP/CROP to maintain situational awareness of operations in the JOA
- Use of the CIE for coordination of force protection measures
- Use of the ONA to assist in identifying potential threats
- Use of JISR for surveillance and assessment of potential and actual threats
- Use of the EBO/EBA and Effects Assessment (EA) to position defensive forces and systems

Concepts which are associated with enhancing force protection include: CIE, JIACG, ONA, EBP, EBO, EA, JISR, and the COP/CROP.

Warfighting Challenge:

Ability to provide selective dimensional superiority

This warfighting challenge addresses the ability of the Joint Force to dominate the adversary during specific periods of time and in specific locations during RDO. This challenge is oriented towards the military aspect of the DIME/PMESII domains. The Joint Force must be able to dominate the adversary in specific locations and for set periods of time to provide an acceptable environment for RDO. By maximizing the use of intelligence, communications capabilities and weapons employment techniques and abilities, the Joint Force can selectively attack targets in a fashion that provides the Combatant Commander the ability to create the desired effects in the adversary's systems while minimizing collateral damage, and friendly forces losses.

Task: Isolate and suppress adversary anti-access capabilities.

Finding 1:

Blue gained access to the AOR, however strategic deployment was not part of this experiment. Additionally, Information Operations above the JTF level may play a large part in the success of Blue's ability to suppress adversarial anti-access capabilities. IO play may contribute to the constraining of terrorist or other asymmetrical threats to friendly forces, prior to and during hostilities. There were no indications of higher level IO play above the JTF echelon.

Although numerous Warfighters felt that Blue adequately assessed the enemy's anti-access strategy (see Figure), Blue did not properly assess or prepare for CJTF-S's Pre-emptive Attack. The JTF identified and considered the possibility of an enemy pre-emptive strike as part of the base planning during Spiral 3, but countering the CJTF-S's anti-access plan at the JTF level was not further pursued prior to the start of hostilities. The failure of Blue to counter the enemy's pre-emptive strike resulted in the loss of many Blue assets, primarily from the JFMCC, thus reducing Blue's near term capabilities and flexibility. Tactically, measures were considered and emplaced at component level for entry into the JOA. Operationally, there was an apparent failure at the JTF level to assimilate/integrate the component's JOA entry plans into a coherent JTF level entry plan. A mitigating factor in this oversight may be that the heavy mission

planning load which occurred during that timeframe precluded preparations for just such a pre-emptive attack. There were no reported instances of enemy forces receiving supplies from sources external to the JOA. CJTF-S did receive DIME support in the form of terrorist activities in other Gulf Partnership countries, by apathetic or sympathetic feelings in some other countries, and by passive attitudes and some slow Gulf Partnership governmental reactions to these activities against Blue forces and facilities.

The key engagement of the enemy strategy to counter Blue access to the theater was an enemy pre-emptive strike which used a simultaneous aircraft, missile and seaborne attack in a manner which swamped Blue's defensive capabilities and inflicted a great deal of damage and destruction on Blue Forces before Blue could isolate and destroy CJTF-S's anti-access systems and capabilities. Additional asymmetrical operations were aimed at undermining support for Blue throughout the GCC countries with both kinetic and non-kinetic means.

From the completion of the Blue planning phase until Blue's entry in the JOA, OPFOR forces took no kinetic actions against friendly forces. This period of conflict inactivity should be considered one in which many asymmetric and some kinetic enemy actions might have been

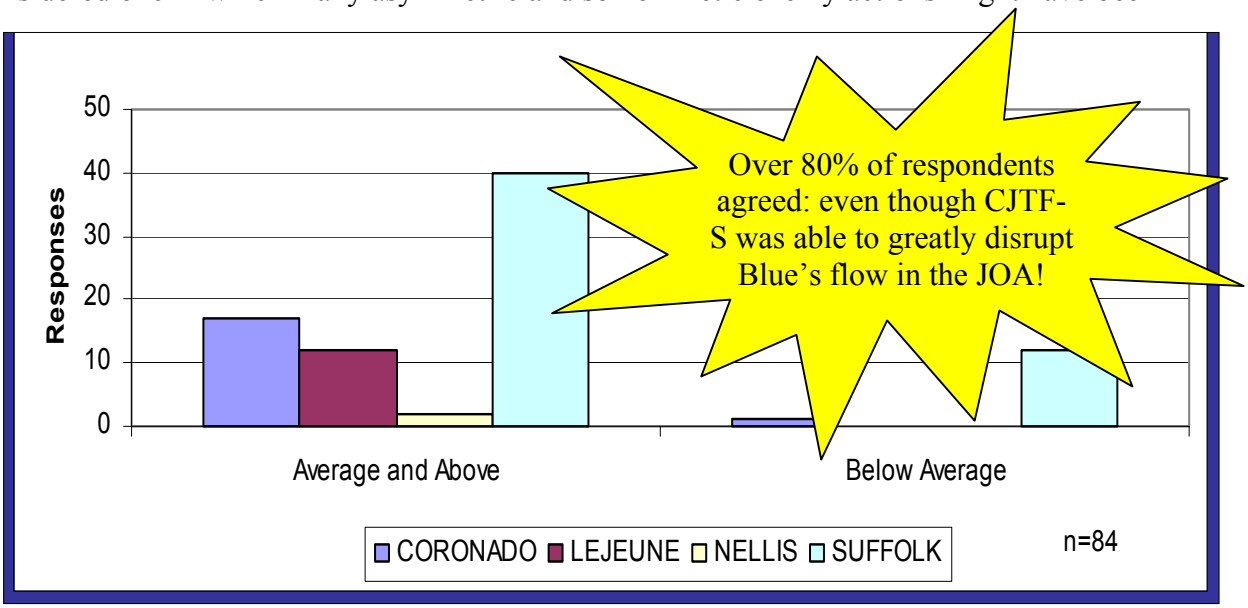


Figure 42: Rating of adequacy of friendly strategy to counter enemy anti-access strategy

directed against Blue forces flowing into the region. If the enemy had attacked Blue forces earlier, the pre-emptive strike may have had a smaller effect or not occurred at all. However, earlier enemy activity may have had a greater impact on Blue at the operational level, and impacted on Blue's ability to gain entry into the JOA.

Although the majority of respondents felt that the friendly strategy to counter the enemy anti-access strategy was adequate (see Figure), it was not felt to be adequate at the operational level. If CJTF-S had a few more assets, his strategy probably would have had an operational affect on Blue forces. As the experiment demonstrated, CJTF-S was able to disrupt Blue's flow in the JOA. A key comment was that the "Enemy strategy has not significantly degraded the ability of BLUE to access or move within the theater. I do not perceive that the enemy (CJTF-S) intended to restrict access. Most of the focus was to disrupt the ability and garner world sympathy to his plight. Estimating that he (CJTF-S) could not totally prevent access to RED, his

use of forces to attack and degrade capabilities seems to be more effective than trying to totally prevent access."

Blue assessed but was not fully prepared for the CJTF-S's Pre-emptive Attack. Blue apparently identified and considered the possibility of an enemy pre-emptive attack as part of the base plan during Spiral 3, but countering that possible CJTF-S option was not further pursued at the JTF level during the execution phase of the experiment. Possible contributing factors to Blue's moderately unsuccessful handling of the enemy's anti-access strategy may be due to inexperienced personnel, the lack of familiarity with Blue staffing structure and processes, and information overload. These contributing factors impacted on the staff's ability to distill the important information from the tremendous amount of data available to the JTF and process it through the proper sections in a timely, orderly fashion.

Comments included, "Friendly Blue commanders were able to anticipate enemy activity, but not pre-empt (it)." "Blue has done a good job of collecting information on Red units and disposition." "Assessment was dead on. Information gathered enabled Blue forces to assess, plan and execute their operation to fruition."

At the component level, measures were considered and emplaced for their entries into the JOA. Operationally, there was an apparent failure at the JTF level to assimilate/integrate the component's JOA entry plans into a coherent JTF level entry plan, potentially due to the heavy mission planning load which occurred during that timeframe. Apparently there is no conceptual linkage for the components to JTF for joint entry operations. The JRAC appeared to have the majority of the security and protection assets in place prior to hostilities. On the 29th of July, a JFACC Observer/trainer indicated that the isolation and suppression of CJTF-S's anti-access capabilities were a primary objective for the JFACC. Specific JFACC actions for freedom of navigation operations were to fly CAP to support JFMCC efforts to restore FON in the Straits, support JFMCC efforts to neutralize CJTF-S threat to FON in the Gulf and Strait, support the JFMCC to neutralize CJTF-S mine-laying capabilities, and find and deny/destroy CJTF-S CDCM capabilities in support of JFMCC. The JFMCC appeared prepared for most enemy contingencies, unfortunately the enemy's pre-emptive strike overwhelmed Blue's air defense capabilities. Friendly force flow into the JOA appeared well thought out and executed. The TPFDD process received a few comments indicating that a closer relationship between logisticians, planners, and operators would improve RDO operations.

Senior Concept Developer comments indicated that the CIE environment helped with both the isolation and suppression of adversary anti-access capabilities and with Blue's ability to achieve operational sanctuaries of space and time necessary to execute RDO. The clear delineation of the supporting supported relationships between the components also contributed to the success of both of these Warfighting Challenges. Although numerous ISR assets were available to Blue forces, the limited feedback from these systems (through modeling and simulations), hindered planning and operations. Prior deliberate planning must occur and force protection must continue when Blue executes missions to achieve operational sanctuaries.

There were no apparent re-supplying actions of enemy forces once hostilities began from external sources. There were internal enemy re-supply operations within the JOA between CJTF-S forces, in particular supply runs to the disputed islands where military supplies were hidden amongst civilian supplies. There was also an unconfirmed report of an attempted shipment of military equipment from Santa Barara to one of CJTF-S's residences on the 29th of July.

Comments included, "At 030937Z Merchant vessels seen making continuous re-supply runs to the islands." "A military element in Santa Barbara was preparing to deliver unidentified

military equipment to CJTF-S during the late Zulu hours of 28 July 07. The equipment was to be delivered to one of the CJTF-S's residences during the early hours of 29 July."

There was no evidence of active DIME support for CJTF-S from outside the JOA. However, passive assistance in the diplomatic arena came through sympathy to CJTF-S, with examples of foot-dragging by some Gulf Partnership officials on investigations and actions for incidents in which blue forces were targeted by terrorists in Gulf Partnership countries, and intermittent support from the government of Red. Protests occurred in neutral countries not for the OPFOR, but against Blue's actions in the Gulf Partnership region. The enemy was receiving open source information from some countries, until that flow of information was shut down in response to a Blue request. There was no noted military assistance flowing to the enemy. Additionally, there was no indication of economic support assisting the enemy.

Task Conclusion:

Blue was not able to isolate and suppress enemy anti-access capabilities consistently during the experiment. Numerous enemy anti-access targets were identified and destroyed, but CJTF-S retained an anti-access capability throughout most of the experiment. CJTF-S used the majority of his anti-access capabilities during the pre-emptive strike on Blue forces entering the JOA. Additionally, he used deception and concealment to retain some of these assets. CJTF-S's use of asymmetric assets such as civilian aircraft, terrorist MANPADS and naval mining aided the enemy's anti-access capabilities. CJTF-S could not stop Blue forces entering the area, but he definitely disrupted Blue forces entering the JOA.

Task: Achieve operational sanctuaries of space and time necessary to execute RDO

Finding 2:

Although Blue suffered land, air and sea forces losses to Red, Blue was able to achieve local superiority at the time and location of it's choosing with a great deal of consistency. Blue was able to achieve operational sanctuaries of time and space necessary to conduct RDO with two notable exceptions. The enemy pre-emptive strike on Blue forces in the JOA, and the Marine Raid were instances where Blue forces did not achieve operational sanctuaries necessary for the proper conduct of decisive operations. Red was still able to pose threats in the air, land and sea environments, but generally they could not fend off Blue military attacks against their PMESII nodes. Blue's aircraft losses are shown in Table 1. Blue ship losses are shown in Table 2. Blue personnel losses are shown in Table 3 and Blue ground system losses are shown in Table 4. The majority of air and naval losses were due to air and missile attacks during the OPFOR pre-emptive strike. Naval mines also contributed to Blue losses. Further analysis is necessary to determine the specific systems causing the damage to personnel and equipment.

The majority of Blue aircraft losses were due to enemy SAM activity. 74 UAVs were reported via DCARS as destroyed. (DCARS lists 349 Manned Blue aircraft losses and 74 UAV losses). These losses did not stop Blue from achieving operational sanctions except during the pre-emptive strike and the Marine raid.

Table 1: Aircraft losses by type and component

Aircraft					
Component	Equipment	Authorized	Loss	Replacement	Available
JFACC	Fixed Wing	448	32	5	421
	Helo	6	0	0	6

JFLCC					
82D	Fixed Wing	12	0	0	12
	Helo	42	4	0	38
MARFOR	Fixed Wing	75	7	4	72
	Helo	123	24	9	108
JFMCC	Fixed Wing	143	11	0	132
	Helo	55	11	0	44
	MPA	10	0	0	10
	UAV	30	4	0	26
	Logistics	4	0	0	4
JSOTF	Fixed Wing	26	1	0	25
	Helo	35	0	0	35
JPOTF	N/A				

Blue reported 13 ships lost to CJTF-S action, with other ships sustaining varying degrees of damage (See Table 2). Enemy forces inflicted this maritime damage and destruction through a combination of CDCMs, surface to surface, SWARM attacks, mines, and mini-sub/mine activities. Except for the pre-emptive strike, Blue naval forces were able to provide sanctuaries in time and space.

Table 2: Ship losses by type and component

Ships					
Component	Equipment	Authorized	Loss	NMC/PMC	Available
JFMCC	CVN	2	0	0	2
	CRUDES	13	3	0	10
	AMPHIB	6	0	0	6
	Support/Mine	19	6	0	13
	HSV/HSS	9	4	2	2
	Submarines	4	0	0	4
JFLCC	N/A				
JFACC	N/A				
JSOTF	Various	20	0	0	20
JPOTF	N/A				

Blue land forces were able to establish sanctuaries in time and space, except during the Marine Raid. The majority of land component losses accrued during this raid.. Further analysis is necessary to determine the specific enemy systems causing these Blue losses.

Blue personnel losses were concentrated during the pre-emptive strike period and during the Marine Raid. Again, with these two exceptions, Blue personnel forces were able to establish sanctuaries in time and space. A small but significant incident where Blue lost the sanctuary was

when the Special Force Reconnaissance Team was compromised and five of their personnel were captured.

Table 3: Personnel Killed, Wounded and Missing

Unit	KIA	WIA	MIA	% Available
X MEB	151	330	1	92%
82D	794	224	0	91%
26th MEU	23	117	0	90%
JRAC	0	0	0	100%
JFLCC	968	671	1	91%

Table 4: Friendly ground system losses

Ground Systems					
Component	Equipment	Authorized	Loss	NMC/PMC	Available
JFLCC					
	MLRS	18	0	0	18
	HMMWV	69	4	7	58
	Stryker	274	2	0	272
MARFOR	M1A1	68	0		68
	AAAV	153	0		153
	IAV	274	3		271
	LAV	53	8		45
JFACC	-	861	0	29	803
JFMCC	N/A				
JSOTF	N/A				
JPOTF	Various	69	0	0	69
JTF		1839	17	36	1757

Task Conclusion:

Blue was not totally successful in achieving operational sanctuaries in time and space. The OPFOR pre-emptive strike, the Marine Raid and to a lesser degree, the Special Forces Reconnaissance which became compromised are examples of Blue's inability to achieve and or maintain operational sanctuaries in time and space. However, Blue was able to overcome each of these events and successfully accomplish their assigned missions.

Task: Deny adversary sanctuary through persistent targeting and rapid engagement (TST task)

Finding 3:

Blue's persistent targeting and rapid engagement of OPFOR forces did not appear to deny sanctuary to the enemy. Additionally, the OPFOR was able to regroup between Blue's strikes, which indicates that Blue's efforts were not persistent. The ONA provided a good starting point in conjunction with the JIPB to target key enemy locations, equipment and forces. The JFE provided good responsive actions to information received. A problem was the time it took the JISR process to feed new and updated information to the other elements in the system. The time delay reduced the effectiveness of Blue's ability to counter enemy PMESII nodes. JFACC comments indicated that the CJTF-S's pre-emptive strike pushed Blue air power off balance somewhat, and that a high degree of effort was necessary to keep Blue air corridors open. Additionally, the lack of M&S ISR fidelity caused frustration amongst the JFACC staff. JFMCC comments indicated that the definition for rapidly setting conditions for decisive operations needs to be adjusted for them to be comfortable with it. The Marine STOM raid was initially unsuccessful and is an indicator that Blue could not consistently set the conditions and successfully execute all operations necessary to achieve the desired effects against enemy PMESII nodes.

To counter enemy anti-access strategies, Blue used a combined component effort with the JFMCC targeting, C2, TBMs, CDCMs, IADS, surface and sub-surface maritime targets, terrorists and as available, pirates. The JFACC targeted C2, TBMs, enemy air and provided support to the JFMCC. The JSOTF targeted terrorists, enemy leadership, communications nodes, and assisted the JFMCC with anti-surface attack against enemy vessels.

Blue reported that 24 percent (12 of 49 node groups for freedom of navigation operations during ETO1) were effectively struck during ETO1 operations, prior to the start of ETO1A on D+4. Additional Freedom of Navigation nodes were struck, but were not degraded sufficiently to meet the desired effects levels at that point in time. For ETO 1, the node groups with partially achieved results totaled 43 percent (21 of 49), and the remaining 16 node groups (33 percent) were rated as not meeting the desired effects levels. During ETO 1A, the percentage of effectively struck node groups rose to 78 percent (38 of 49 node groups for effect 823 during ETO1A) prior to the start of ETO2 operations on D+10. Partially achieved effects were 20 percent (10 of 49 node groups), and unachieved effects node groups totaled 2 percent (1 of 49 node groups). Many of the anti-access PMESII nodes were similar for both ETO 1 and ETO 1A, this redundancy allowed the ETO 1 effects achieved to contribute to the ETO 1A effects. This cumulative achievement of effects directly reflects in the increased percentage of effectively struck node groups for ETO 1A versus ETO 1.

Task Conclusion:

Blue was not able to deny the enemy sanctuary through persistent targeting and rapid engagement. Enemy forces were able to re-group during lulls in Blue attacks. CJFT-S used a pre-emptive strike to deny Blue the targets which his anti-access assets would have presented had they not been used first. CJTF-S forces also used dispersion, cover, concealment and deception to preserve their assets.

Ability to provide selective dimensional superiority -- blue was not able to provide selective dimensional superiority for all operations. Blue capabilities were degraded by an apparent lack of M&S ISR fidelity and timeliness, and did not consistently achieve dimensional superiority. The less than optimal M&S ISR process contributed to the unsuccessful Blue Raid executed by the Marine component. Significantly, Blue forces were not able to successfully counter the enemy's pre-emptive strike. Comments from both the Blue air and land components

indicate that further refinement in the definition, criteria, and processes are necessary for properly executing this Warfighting Challenge.

For the Isolate and suppress enemy anti-access capabilities task, the enemy strategy to counter Blue access to the theater appeared sound. The strategy included the following: naval surface and sub surface attacks including swarm, and mini-submarines, Coastal Defense Cruise Missiles, air threats including aircraft, missile, and terrorists with MANPADS, in a simultaneous manner to swamp Blue's defensive capabilities and inflict a great deal of punishment on Blue Forces, before Blue could isolate and destroy those CJTF-S's systems and capabilities. Additionally, operations were aimed at undermining support for Blue throughout the Gulf Partnership countries. Blue did not properly assess or prepare for CJTF-S's Pre-emptive Attack at the JTF level. Blue identified and considered the possibility as part of the base plan, but countering the CJTF-S's anti access plan was apparently not further pursued prior to the enemy's pre-emptive attack.

At the component level, measures were considered and emplaced for their entries into the JOA. Operationally, there was an apparent failure at the JTF level to assimilate/integrate the component's JOA entry plans into a coherent JTF level entry plan, due to the heavy mission planning load which occurred during that timeframe. On the 29th of July, a JFACC Observer/trainer indicated that the isolation and suppression of CJTF-S's anti-access capabilities were a massive objective for the JFACC.

Senior Concept Developer comments indicated that the CIE environment helped with both the isolation and suppression of adversary anti-access capabilities and with Blue's ability to achieve operational sanctuaries of space and time necessary to execute RDO. "All this ability to assess our battlespace access challenge depends on our situational awareness (SA), so we can monitor and influence our actions. CIE helps a great deal …". "The collaborative tools also greatly facilitated execution while a mission was ongoing, permitting commanders to discuss branches, modifications, etc. in a quick outstanding manner." The clear delineation of the supporting supported relationships between the components also contributed to the success of both of these Warfighting Challenges. Although numerous ISR assets were available to Blue forces, the limited feedback from M&S hindered planning and operations. Warfighters commented on the lack of ISR feedback detail and the long duration from request until receipt of IR information. Prior deliberate planning must occur and force protection must continue when Blue executes missions to achieve operational sanctuaries.

Additional information contributing to status of this warfighting challenge includes: There were no apparent re-supplying actions of enemy forces once hostilities began. There were enemy re-supply operations within the JOA internal to CJTF-S forces, in particular supply runs to the disputed islands. Instances of enemy DIME support from outside the JOA included: Passive assistance from diplomatic sympathy to CJTF-S, such as foot-dragging on investigations and actions for incidents in which Blue forces were targeted by terrorists in GCC countries.

Blue forces had only moderate success in initially achieving dimensional superiority due to the enemy's successful pre-emptive attack. The RDO entry operation requirement of assuring access into and through the battlespace was only partially met. Blue components had apparently both planned for and prepared for opposed entry into the JOA. At the JTF level, planning for opposed entry had progressed somewhat, however, upon actual JTF entry into the JOA, there was no apparent Joint level effort to counter opposition during this portion of the operation. Although friendly forces suffered losses from the pre-emptive strike, Blue could have reduced those losses through a better prepared Joint entry into the JOA. A contributing factor to the low

degree of JTF preparedness for movement into the JOA might have been the overwhelming workload placed upon some key JTF individuals at the beginning of the execution portion of the experiment. The situational awareness level of the JTF was just being established when the pre-emptive enemy attack occurred. The success of the enemy's pre-emptive strike is a key point to consider in the evaluation to Blue's ability of provides selective dimensional superiority.

Warfighting Challenge:

Ability to provide sufficient operational reach

This warfighting challenge addresses the ability of the Joint Force to provide sufficient operational reach in support of RDO. This challenge is oriented towards the military aspect of the DIME/PMESII domains. Blue power projection philosophy rests upon our ability to deploy from present locations into the JOA. Blue forces are susceptible to numerous operational detractors, both military and otherwise. This warfighting challenge is designed to test the Joint Force's ability to operate while minimizing any negative effects the adversary may direct towards it.

Task: Provide sufficient forces, capabilities, and sensor positioning mix to maximize operational reach

An Observer/trainer comment indicated that Blue's numerous redundant capabilities provided incentive to ensure that friendly weapon systems were positioned to take advantage of their operational reach. Additionally, most observers felt Blue positioning was good and accommodated constraints imposed by OPFOR Systems and Blue concerns such as pre-hostilities. "Planners are moving JIACG constraining ISR platform tracks to optimize coverage for the current desired effects(S). The limitation was IADS and for HA threat." "Again, from what I can tell, and with the limitations, place(d) on the JTF from the JIACG, they were deployed to exploit the maximum capabilities." Had the JTF been tailored (reduced in size) to a greater extent, the components would have placed much more emphasis on weapon system placement. Additional inputs into the positioning of Blue forces include the adversary's air, IADS, CDCMs, and TBM range capabilities and political considerations constraining Blue force deployment, basing, and employment. A Senior Concept Developer opined that MC02 may not provide the proper venue to properly test Blue's ability to provide sufficient operational reach. Blue was successful in providing sufficient forces, capabilities, and sensor positioning mix to maximize operational range, given the diplomatic and enemy system constraints during operations. When the Blue system couldn't be optimally placed, other Blue assets were looked at to fill the void.

Subtask: Optimize positioning to maximize operational reach (i.e., finding the adversary)

Finding 1:

The positioning of Blue forces was sufficient but not optimal for the maximization of operational reach. Initial friendly force positioning somewhat limited Blue's ability to find and monitor enemy assets. Diplomatic and geographical issues were the primary causes of JTF equipment being used from non-optimal locations. Prior to hostilities, friendly ISR devices were positioned away from enemy territory such that optimal systems coverage was not possible for numerous assets. Friendly maritime assets were positioned and transited through waters which could and did fall under the enemy's ability to monitor and attack. Some Blue warfighters

defended this use of friendly maritime assets as very doable, within an acceptable risk range, and because this COA would allow more flexibility for the follow-on mission of capturing the disputed islands.

Blue used assets based both in and out of the JOA. Approximately seven percent of fixed wing air power was based outside the JOA, and Blue forces took advantage of these system's operational reach. 93 percent of the component's primary equipment used by the JTF was staged inside the JOA. 7 percent of the component's primary equipment (aircraft) used by the JTF was employed from staging locations outside the JOA. The primary systems operating from outside the JOA were the Air Force's B-52s, KC-10s, B-1s, and B-2s. Additionally, various higher echelon ISR assets were based outside the JOA, although, much of their collection efforts went to the JTF.

Given the initial diplomatic and geographical constraints, the early designation of component ownership of rear area control responsibilities (JRAC) may have eased de-confliction issues, and resulted in a more optimal positioning of assets. As fuel was supplied through Host Nation Support, Blue systems again, may not have been optimally positioned to take advantage of their inherent operational reach. Organization and planning, such as that done for the 82D Airborne Division assets, could have resulted in better use of operational reach. In the 82D's case, a smaller rear area footprint, a reduced TPFDD requirement, and a smaller force flow may have resulted from a better use of the unit's operational reach capabilities if deployed without intermediate staging in the rear area. If the airborne forces flow straight from their home base to their combat mission, there would be a reduced requirement for a logistics toll at ISBS and a corresponding reduction in the overall number of support personnel.

Other key points which impact on the force positioning to take advantage of unit's operational reach include the need to have more and better Joint training, highly capable command and control capability, especially for the Joint Tactical Actions (JTAs) which may be an integral component of future JTFs, and an ability to dynamically re-task components. Strategic choke points, such as the Suez and Panama Canals, and various straits may be rendered impassible to traffic, which in turn could render force positioning at a non-optimal level. Terrorist activities at APODs and SPODs will also contribute heavily on the non-optimal positioning of friendly forces. A balance between the safety of forces and the ability to use asset's capabilities to the fullest, may shift positioning criteria. A C-17 full of paratroopers may be safer and more effective dropping over an enemy objective than landing in the theater rear area with MANPADs equipped terrorists near the APODs. As a senior concept developer indicated, US forces may have to consider the boundaries of the continental US as the Line of Departure/Line of Contact. Although not noticed in this experiment, the positioning of forces for a deception plan may be reason enough not to optimally position forces.

Subtask: Employ stealth capabilities (i.e., extending operational reach)

Finding 2:

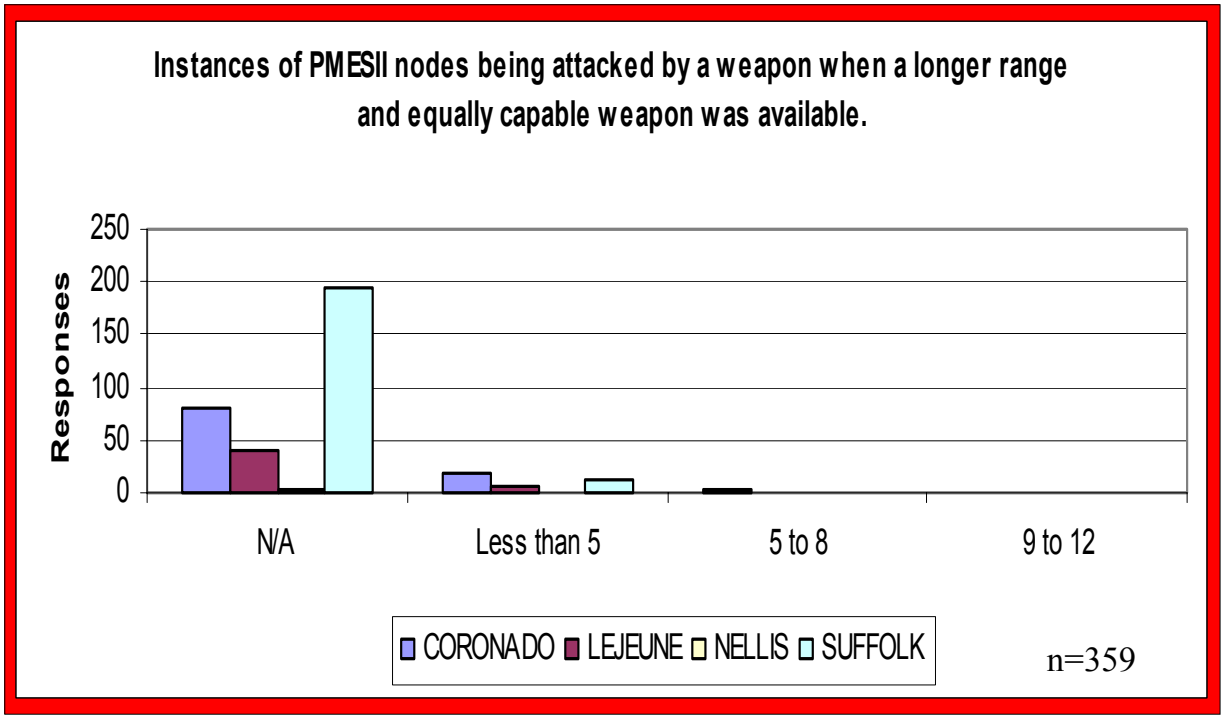
Blue was able to successfully employ stealth assets against numerous enemy nodes. Friendly stealth aircraft conducted a disproportionate percentage of the mission strikes than non-stealth aircraft. Stealth aircraft constituted only 10 percent of the friendly attacking fixed winged assets, yet they conducted 16 percent of the strike missions. Additionally, stealth losses were only 5 percent of overall attack aircraft losses. Blue sustained stealth aircraft battle losses of one B-2. Time constraints precluded an assessment of data to determine which types of targets were

serviced by stealth assets. Blue successfully employed stealth capabilities against the OPFOR in a more effective manner than conventional assets.

Subtask: Maximize sensor and weapon ranges (i.e. use of space)

Finding 3:

Prior to hostilities, diplomatic constraints resulted in some friendly ISR assets being placed in constrained locations. These non-optimal locations prevented friendly assets from performing the best ISR coverage against enemy assets and capabilities. Additionally, Blue apparently did not want to upset the government of Red.



Once hostilities began, Blue repositioned its sensor systems to provide coverage of the enemy's assets. Tactically, some airborne sensors had modifications to their tracks to accommodate potential enemy SAM locations. One SME stated, "'In looking at other possible target areas, it was determined that intelligence coverage was desired. When analyzing the available coverage, the UAVs did not have the required range. Re-evaluation of BLUE SOF elements was conducted and it was determined that it was not economical (man-power or material-wise) to retask currently employed forces. Coordination to gain national assets to cover the intelligence gap was surfaced." When certain Blue assets lacked the capacity to fulfill a specific mission, the JFT used other assets to perform that mission, or a request for higher echelon assistance was forwarded to the Combatant Commander.

Figure 43: Instances of less than optimum weapon selection

Other comments indicated that there were sufficient Blue ISR assets to cover the PMESII nodes. Space assets were used in general support, but there was no indication of specific PMESII nodes covered by space assets. Airborne sensor positions were limited by pre-hostilities diplomatic constraints and by enemy anti-aircraft defensive systems once hostilities began. These

non-optimal locations prevented friendly assets from performing the best ISR coverage against enemy assets and capabilities.

Some instances of Blue stand off weapons include: air and sea launched cruise missiles, guided anti-tank weapons, directed bombs, surface to surface missiles, etc.

The level of detail available for analysis precludes the ability to distinguish specific PMESII nodes covered by space assets via JTF briefings. However, Blue briefings indicated that general coverage of the JOA was provided by space assets.

There were no specific instances mentioned where enemy PMESII nodes were attacked by a weapon when a longer range and equally capable weapon was available. However, generalities such as the "Weapons used were appropriate", and "ATACMS vs. B-2 for soft targets (sic)? pick one" were mentioned by SMEs. These SME comments indicated that Blue had sufficient capabilities to choose among various types of ordinances to accomplish a mission. Therefore, Blue was not forced into using inappropriate weapons during operations.

Comments included using the appropriate assets to target PMESII nodes and concern of not being able to reach certain targets with the range of the UAV has surfaced. Additional assets are being investigated to cover the holes in the coverage. The limited range of some aerial assets precluded them from accomplishing some long range missions. The asymmetrical nature of RDO pushed the need for lower echelon unites to have longer range ISR capabilities. This may be solved through a materiel solution.

Instances of attacks on PMESII nodes have occurred, but by conscious decision to do so. Range is only a small portion of the equation. We have collateral damage concerns, which may require precision guided munitions or non-lethal platform and other issues.

Warfighting Challenge:

Ability to provide sufficient operational reach

Blue was able to provide sufficient operational reach, however, not all systems were optimally placed.

Sufficient friendly forces with their accompanying capabilities, and sensor positioning provided Blue with a sufficient ability to reach enemy targets. Blue components had some redundant capabilities which in turn reduced the incentive to optimally place certain systems. In some instances, Blue weapon and sensor systems were sufficiently, but not necessarily optimally, placed. Redundant capabilities allowed Blue forces more flexibility in positioning systems than might otherwise be feasible with single source capabilities. Should future JTAs be packaged in CONUS and used in distant theaters, there may be an associated capabilities limitation placed upon the JTF Commander which was not the case during this experiment.

Diplomatic constraints on the positioning of friendly systems were inherent prior to and during hostilities and can be expected during any future conflict. Other friendly assets may be used to supplement or replace constrained or ineffective assets thereby ensuring friendly capabilities remain in place, however, benefit analysis may preclude the implementation of those options.

The vast majority of friendly assets used by the JTF were staged inside the JOA. The physical presence of Blue forces in areas under the influence of the enemy provided somewhat easy targets for terrorist and partisan activities. Populations of sympathetic or apathetic individuals provide the terrorists many opportunities which may be precluded if friendly assets were staged in low threat areas.

Stealth capabilities were successfully employed during the experiment. They provided more capabilities to the JTF commander than comparable non-stealth assets, and did so with a lower loss rate. Caution is necessary in this area as the fidelity of the experimental data analyzed thus far can not distinguish what type of targets, or what level of danger the different airframes were subject to during their attacks.

ISR system positioning was initially constrained by diplomatic issues, causing non-optimal coverage of some of the enemy's capabilities. As hostilities commenced, those assets moved to more favorable orbits and routes. There were numerous ISR assets available to the JTF, but the processing of ISR information, through modeling and simulation systems, was such that many aspects of EBP, EBO and EA were not optimal.

Blue weapons ranges were not maximized in all instances. The redundant capabilities between the components provided flexibility in the choice of weapon to employ on the enemy's nodes. This flexibility may not be available with a more tailored JTA package.

An interesting after action review comment was made concerning the fact that two fights were occurring. The first fight was in the traditional realm. An example of a fight in the traditional realm could be the destruction or neutralization of coastal defense systems. The second fight was against the asymmetrical threats. Asymmetrical examples might include deep Land Component Commander operations with no land lines of communication, Special Forces reconnaissance, or HUMINT gathering of the enemy population's response to the Blue IO campaign. Operational reach in the traditional fight was addressed more-so than in the asymmetrical fight. As fighting progressed, Blue's use of its IO assets improved, specifically in the use of press coverage, press conferences, pushing broadcasts, leaflets etc. Operational reach in the asymmetrical fight has different meaning and parameters than in the traditional sense, and should be researched further.

Warfighting Challenge:

Ability to enhance force protection

This warfighting challenge addresses the JTF's ability to enhance force protection in support of RDO. This challenge is oriented towards the military aspect of the DIME/PMESII domains. Enhanced protection of the Joint Forces provides the Combatant Commander greater flexibility in the employment of effects packages. Force protection encompasses not only military elements, but also the non-combatants and systems of all DIME domains in the JOA. Adversarial political, military, terrorist, and criminal elements as well as adversary-sympathetic entities are potential threats to the Combatant Commander's Joint Force.

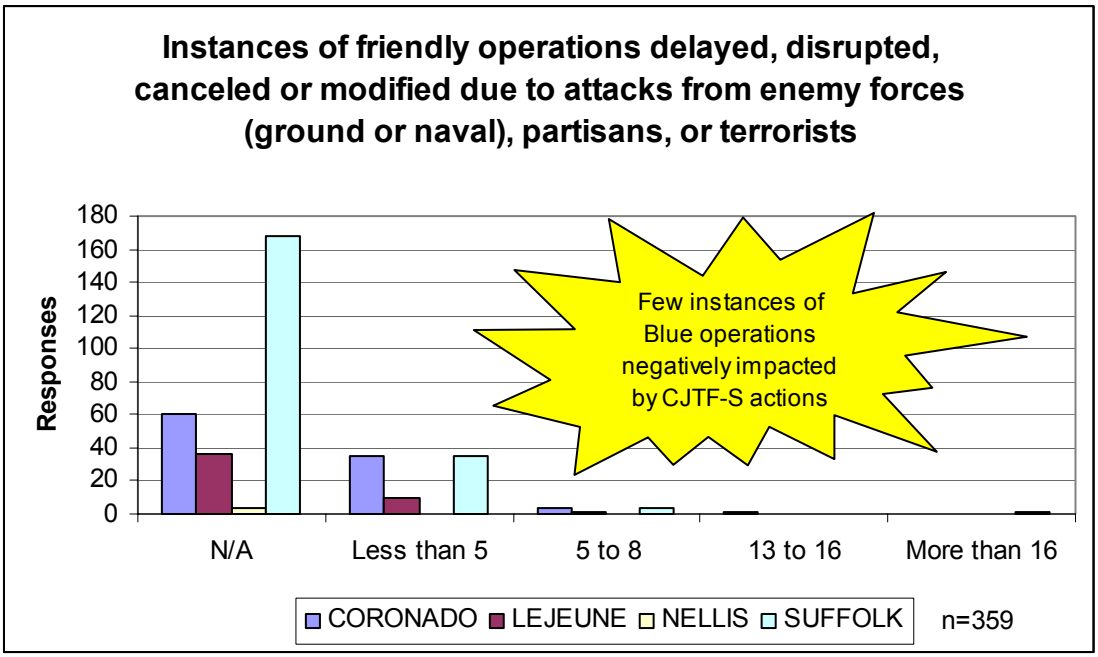


Figure 44: Instances of friendly operations delayed, disrupted and canceled as a result of the actions of an enemy force

Task: Provide protection for operational forces, means, and noncombatants in the JOA

Finding 1:

At the operational level, Blue was successful in protecting the personnel and assets necessary to conduct RDO. Blue was very successful in protecting civilians from friendly nations supporting Blue operations as well as minimized enemy civilian casualties due to Blue operations. As Figure 4 shows, warfighters felt that there were few instances where friendly operations were delayed, disrupted, canceled or modified due to attacks from enemy forces, partisans or terrorists. Of note, the respondents appeared to be referring solely to tactical operations in their comments for this question. SCD's, SMEs, and OPFOR observers felt that the enemy did inflict operational level damage on Blue assets specifically during the preemptive strike, with the loss of Blue combatant vessels.

Blue was able to provide protection against enemy missile and air attacks in the rear areas. The enemy was able to conduct successful attacks using civilian airplanes and vessels, primarily to impede APOD and SPOD operations. Additionally, through the use of terrorists, enemy forces were able to attack supporting host nation infrastructure and personnel along with any key leadership whom they thought were aiding the Blue effort.

Operationally, Blue was able to continue with its planned missions throughout the exercise without delay, disruption, cancellation or modification. Blue had redundancies in capabilities which could make up the shortfall caused by enemy actions. Although the enemy was able to delay, disrupt, and modify Blue actions at the tactical level, including Blue ships sinking and Blue aircraft destruction, they were not able to cause the cancellation of Blue operational actions.

There were a few comments from senior warfighters and concept developers that the rear area commander needs to be identified early on in the JTF process. This would allow the command and control and working relationships sufficient time to jell between the elements from the participating components, and the host nations. A possible solution is the designation of a Rear Component Commander to fulfill both the JRHC and the component synchronization of supporting functions duties.

Although the enemy was able to inflict personnel losses and equipment damages and losses on Blue, the OPFOR was not able to force Blue to change its operational goals.

Enemy and terrorist actions were able to inflict damage on friendly infrastructure. The port of Mina Jebel Ali was closed due to the grounding of the ship Warm Seas Kadabas with hazardous materials aboard. The ship spilled fuel oil into the harbor, and it was carrying a cargo of chlorine and ammonia. The airfield at Sheik Issa was closed due to an enemy attack with a civilian plane loaded with toxic chemicals. The plane crashed mid field and eight personnel were killed by the bio/chemical substance. There was an explosion at the Camp Snoopy Ammunition Storage Facility with the loss of three soldiers. Three of the 89 ships in a southbound convoy in the Suez Canal were sunk by mine strikes. A truck bomb attack at Camp Doha was thwarted when security personnel shot the driver of the approaching vehicle.

Operationally, Blue was able to continue with its planned missions throughout the exercise without delay, disruption, cancellation or modification. Blue had redundancies in capabilities that could make up the shortfall caused by enemy actions. Although the enemy was able to delay, disrupt, and modify Blue actions at the tactical level, they were not able to cause the cancellation of Blue tactical actions.

Table 5: Forces OPCON to the JRAC by Phase are in Table 5:

	Phase I	Phase II	Phase III
Inf Bn (XMEB)	1		
MV-22 (XMEB)	2		
MP CO (XMEB)	1	1	
F-18s (XMEB)	2		
Inf BN (82D)		2	1
UH-60 CO (82D)		1	1
AH-64 CO (82D)		1	1

Approximately 3.8 percent of Blue ground forces were assigned to rear area security. That number nearly tripled depending of the phase of Rear Area Operation if OPCON forces are included in the JRAC ground personnel count. Force Protection security assets included six MP Companies, for a total of 774 personnel, one rifle company of roughly 150 personnel, three USCG Port Security detachments, twelve USAF SFS units and three MIUWs in addition to the eight officers assigned to the JRAC. 24,387 personnel were assigned to the JFLCC. Nine Patriot Batteries, two THAAD Batteries, and four CI/HET Teams were also assigned to the JRAC.

Task: Protect systems and capabilities in the JOA

Finding 2:

There were apparently some minor Blue OPSEC breaches; however, these incidences had no apparent effect on Blue operations (See Figure X).

Special Forces Team SR 411 was compromised, but there was no noticeable impact on Joint operations resulting in delay, disruption, cancellation or modification. One SME stated, "Friendly intentions were not compromised due to a team being discovered. Though the team was discovered, no changes to missions were made due to compartmentalization." Had the experiment lasted longer, Blue would most likely have added further missions to rescue the five captured SF personnel from SR411.

Blue forces were able to protect systems and capabilities in the JOA. There were no reported Operations and Security (OPSEC) violations. There were no reported incidences of any Blue action or inaction that conveyed friendly intent to the enemy, such that Blue Joint operations were delayed, disrupted, canceled, or modified.

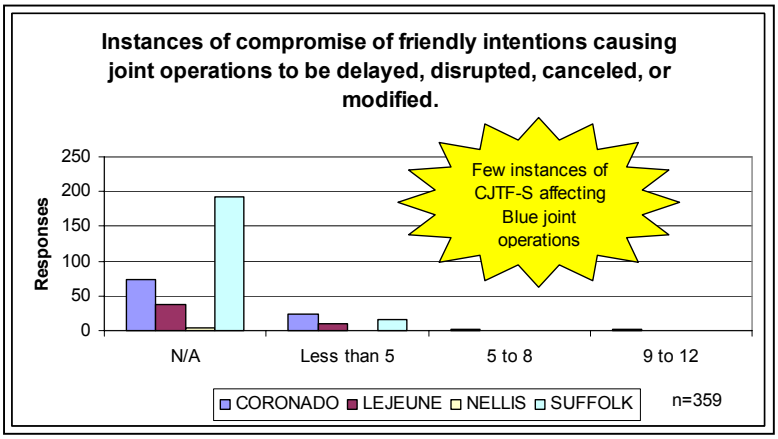


Figure 45: Instances of compromised intentions

Task: Provide operational air, space, and missile defense.

Finding 3:

For the task to provide operational air, space, and missile defense, Blue was mostly successful with three shortcomings. One shortcoming is glaring, while the other two are significant enough to warrant further study. The major shortcoming for Blue to provide successful air, space and missile defense, was found when enemy forces conducted their pre-emptive attack on Blue forces in the JOA with a combined aircraft and massive missile attack.

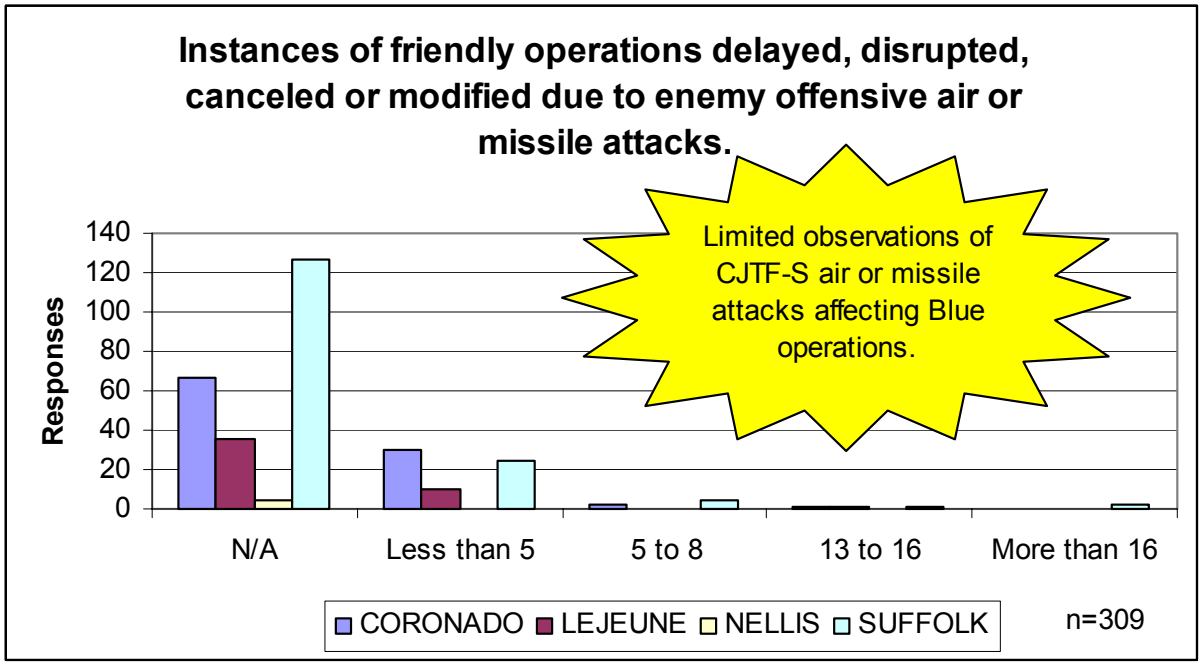
The Blue Maritime component sustained a tremendous strike which damaged and sunk numerous vessels. Blue forces could handle a limited number of attacking aircraft and missiles. However, during this experiment, enemy forces were able to concentrate their missile fires and offensive airpower to overwhelm Blue's anti-air capabilities. A second shortcoming is in Blue's apparent inability to counter MANPADS, especially in the rear areas. Terrorists were able to successfully attack and destroy Blue aircraft in low level flight near APODS. The attackers were able to fire their missiles unhindered and then leave the area before being counter-attacked or caught. The third shortcoming is Blue's inability to control or contain civilian aircraft which enemy forces used to penetrate, through deception, friendly airspace and then target friendly assets. Blue forces were aware of the aircraft, but could not ascertain the intentions of the pilot. On occasion, these aircraft would veer off their flight paths at the last moment to attack Blue facilities before initiation of effective friendly counter measures.

Some possible reasons for these three shortcomings include:

- Blue planned for most likely enemy COA versus most dangerous COA
- JTF linkage between component entry capabilities left vulnerabilities open for enemy attack

- Maximum operational reach may not have been used due to positioning for successive missions
- Vulnerability to terrorist deception and tactics when defending APODs, SPODs, aircraft, and personnell

Subtask: Provide integrated missile defense



Finding 4:

Blue was successful in providing integrated air and missile defense to the degree that the only Blue operational modification was a disrupted entry into the JOA at the beginning of Operation Sovereign Passage. Blue's air and missile defense system was largely in place prior to the commencement of hostilities. Blue prevented all enemy military air and missile attacks from causing damage to the JROAC areas. Enemy civilian (terrorist) airplanes caused tactical level damage due to the IADS's inability to determine the intent of the civilian plane's operators.

The JTF took 19 days, from the movement to the SPODs beginning on the C-5 until the assumption of the JOA responsibilities on the C+14, with a further 7 days for RSO to get the CONUS based missile defense systems operational. A Patriot Battery flown into theater was in place by C+5 for an establishment time of four days. Six Patriot Batteries were reported as up and protecting 10 CAL sites by the C+16. Four CAL sites were covered by Aegis systems, and three Host Nations CAL sites were covered by HN Patriots. Limited THAAD coverage was also in place.

The sole instance where Blue operational level actions were affected by enemy offensive air or missile attacks was during the CJTF-S's Pre-emptive strike. JFMCC sustained significant damage which disrupted Blue's Freedom of Navigation goal. Other enemy missile attacks became tactically significant, especially when Blue or merchant vessels were struck, damaged, and on occasion, sunk. These tactical actions, however, did not cause Blue operational delay, disruption, modification, or cancellation (See Figure).

Subtask: Process/allocate operational aerospace targets

Finding 5:

Friendly forces were highly successful in identifying, attacking and destroying, or neutralizing enemy offensive military air assets. Blue identified all enemy military aircraft. Enemy forces were, however, able to use civilian aircraft to inflict damage on Blue forces and infrastructure. The enemy crashed civilian airplanes into friendly APODs causing damage to aircraft and killing or wounding personnel. Some of these aircraft were suspected of carrying chemical or biological weapons. Overall, nearly 87 percent of all enemy aircraft were destroyed by Blue forces. Enemy aircraft were shot down, destroyed on their airfields and rendered ineffective by their facilities support being neutralized by Blue actions. The weakest link in the friendly ability to process and allocate operational aerospace targets was the friendly inability to control or contain the use of civilian aircraft against Blue assets.

Blue forces engaged nearly all of the enemy offensive threat aircraft. To date, there are no indications that there were any lapses in Blue's monitoring of enemy aircraft and missile usage against Blue forces. The level of model and simulation detail and the supplemental scripting levels did not provide detailed information specific enough to obtain a definitive answer.

Blue dedicated approximately 28 percent of its sorties to air defense (Air Dominance). Blue destroyed or neutralized nearly 90 percent of enemy fixed wing and over 80 percent of rotary-winged assets. Blue effectively neutralized OPFOR military air assets and contained, through ROE change, OPFOR civilian aircraft.

Subtask: Conduct JOA missile defense

Finding 6:

Approximately 76 percent of offensive enemy missiles were destroyed in flight. Of 251 missiles, 189 were destroyed inflight against vessels and 12 of 12 against Blue, rear area targets. MANPADS, however, were apparently very effective in terrorist's hands in Blue rear areas. Man portable anti-aircraft missiles used by terrorists were employed and successfully evaded the Blue anti-missile defensive systems. There were three Blue aircraft brought down by apparent Terrorist MANPAD attacks.

Blue lost the following 11 vessels to enemy missile attacks: 1 AOR, 2 DDGs, 1 DDX, 3 HSVs, 1 MCM, 1 MHC, 1 T-AGOS, and 1 MPS. Damaged ships included CAMDEN, ANTIETAM, LINCOLN, TARAWA, and CLEVELAND. Blue lost three large support aircraft, including a C-5, a 767, and a KC-135, to apparent terrorist MANPAD attacks. Additionally, reports received in the JTF JOC indicated that some of the residue from a successful interception of enemy missiles actually fell on the target which Blue was protecting. There was no indication of damage to the Blue forces from the falling missile residue.

Blue forces had mixed results in conducting JOA missile defense. The friendly rear area was very well defended against TBM missile attacks, with no reported destruction or damage due to those enemy missile systems. Blue maritime assets were successfully attacked by enemy missiles, causing extensive damage and destruction. One of the enemy's plans for missile attack was to shoot some missiles through high altitude, intending to cause Blue to direct its attention on those enemy systems, then volley fire a very large number of missiles at low level in an

attempt to swamp Blue missile defensive systems. The enemy missile attack plan was successful in overcoming the Blue missile defense of maritime assets.

Subtask: Conduct tactical warning and attack assessment in the JOA

Finding 7:

Blue was very successful in identifying enemy missile and air attacks, except during the enemy's pre-emptive strike. The enemy's plan to distract then overwhelm Blue anti-air and anti-missile assets produced a great deal of damage and destruction on maritime assets resulting in the sinkings of various Blue vessels. The number of missiles fired at Blue turned out to be more than Blue defenses could handle. The Blue assessment of the number of enemy missiles occurred too late for the limited Blue anti-missile systems to counter or for Blue to implement successful evasive maneuvers.

Analysis to date indicates that there are no indications that there were any lapses in Blue's monitoring of enemy aircraft and missile usage against Blue forces. The level of model and simulation detail and the supplemental scripting levels did not provide detailed information specific enough to obtain a definitive answer.

Warfighting Challenge Conclusions: Ability to enhance force protection

Operationally, Blue was able to provide limited protection for systems and capabilities and non-combatants in the JOA, forces in the rear area, and with few exceptions, forces in the combatant areas. Systems and capabilities were very well protected, again with the exception of the pre-emptive attack on the JFMCC forces. Operational air, space, and missile defense were well executed with the previously mentioned exceptions of the Pre-emptive attack, successful terrorist MANPAD attacks near Blue APODS, and the enemy's successful use of civilian aircraft in attacking Blue infrastructure.

Blue forces suffered personnel and materiel losses from enemy forces and terrorists, but friendly force protection measures provided sufficient security levels to allow the JTF commander flexibility in his range of options. The damages and losses Blue forces sustained did not cause any alterations at the operational level, and few tactical changes.

With the assets available to the JTF during this exercise, TBM Defense was 100 percent effective in protecting the JTF's rear areas, security measures assisted in the protection of Blue personnel, material and facilities and contributed to relatively low material losses and limited casualties in the rear areas. The integrated friendly air and missile defense was operational prior to the start of hostilities, and no enemy military aircraft successfully struck the JTF's rear areas. Consideration should be given to change guidance on pre-hostility ROE to preclude civilian aircraft from being used as enemy weapons.

Blue intentions were sufficiently shaded from enemy forces so that conditions were set for successful Blue RDO with the exception of the Marine Raid. Additionally, Blue had one special reconnaissance operation compromised and 5 Blue personnel were captured. However, Blue operational actions were not affected.

Other Observations and Finding:

The training level of the Warfighters, Observer/Trainers, and Analysts on the various computer software systems used during MC02 had an adverse effect on the quality and quantity of experimental play and associated reporting in support of the MC02 Analysis Plan.

Relationship to Other Objectives:

Objective 3 (Assure Access into and Through the Battlespace) is also related to Objectives 2 (Rapidly Set Conditions for Decisive Operations), 4 (Conduct Decisive Effects-Based Operations), 5 (Sustain the Force), 8 (Effects Based Operations (Planning and Assessment)), and 11 (Ability to plan for Agile Sustainment). Assured Access depends upon the conditions set for decisive operations and the conduct of decisive effects-based operations is an integral part of this objective. Assured Access helps set the stage for sustainment operations. EBO planning and assessment and the ability to plan for agile sustainment are prerequisites for the successful Assured Access actions.

DOTMLPF Linkage:

None

Recommendations:

All aspects of the DIME elements of national power should be considered collaboratively while dealing with an enemy nation. Collaboration between the D and M aspects of the national elements of power is a pre-requisite for a successful counter to enemy anti-access strategies. For example, on the diplomatic to military linkage, a demarche's likely effects on the enemy need to be considered prior to the commitment of friendly military elements. A specific set of ROE for implementation with the issuance of the demarche may increase Blue's ability to successfully counter enemy anti-access strategies. If an enemy is diplomatically backed into a corner where his best and really only viable alternative is a pre-emptive attack, the friendly forces in the area should be aware and prepared for that possibility before the enemy attacks.

A consolidation of tools for C4I in the JTF is a recurring theme amongst warfighters, SMEs, and SCDs. Organization, training, leadership, and materiel are key DOTMLPF areas which would benefit tremendously from the consolidation of C4I equipment used by JTFs. In this case, the reduction in the number of systems used to conduct PE would directly contribute to increases in JTF effectiveness and efficiency. CJFACC mentioned that we need business rules to impose discipline and ensure we minimize time spent in collaborative sessions. A single DoD collaborative system is required.

Further refinement and experimentation should be done on the tailoring of forces from the components for integration into the JTF. The JTA concept may need revision or refinement as the supported-supporting relationships seemed to be more than sufficient for all the Joint missions executed by the JTF. The tailoring of forces should help reduce the JTF footprint in the JOA, reduce the redundancy of capabilities brought into the JOA by each of the components, reduce the transportation asset requirements for the JTF, and indirectly force the logistics to planner/operations relationships to become more intertwined and streamlined.

Conduct further work and analysis on the possible reduction in the RSOI timelines in conjunction with RDO.

Improve the effectiveness of decision support tools for the deployment and redeployment of JTF resources.

Consider a closer working relationship between the logistics experts and the planners for RDO logistical feasibility and relevancy. Logistical integration may be much more important in EBO and RDO than in legacy operations. Therefore, a closer and timelier link between the traditional planning and logistics functions is needed.

Consider committing more assets towards the IO campaign. Asymmetrical warfare depends to a large degree upon the effects the IO arena can bring to the JTF Commander's arsenal.

Operational reach in the asymmetrical fight has different meaning and parameters than in the traditional sense, and should be researched further.

Consideration should be given to change guidance on pre-hostility ROE to preclude civilian aircraft from being used as enemy weapons.

Further research and analysis may be needed to better integrate the DIE aspects of DIME into the functioning of JTFs, including intelligence, effects assessment, and geographical options.

Assessment Area 4 -- Conduct Decisive Effects-Based Operations (EBO)

Overall Assessment Results

The ability to Conduct Decisive Effects-Based Operations demonstrated future potential as a defense application during the conduct of this experiment. The JTF demonstrated the ability to coordinate the actions of a diverse force over a large geographic area against a determined and diverse adversary using EBO concepts, processes, and tools. This objective was comprised of three warfighting challenges. The first challenge was to demonstrate the ability to synchronize the application of the full range of joint capabilities in order to engage decisive points in time and space. The second challenge was to demonstrate the ability to integrate full joint capabilities against tactical level objectives. The third challenge was to demonstrate the ability to integrate execution of information operations into Effects Based Operations.

The ability to synchronize the application of the full range of joint capabilities in order to engage decisive points in time and space was successfully demonstrated during this experiment. The ability to synchronize joint capabilities was greatly enhanced by the use of Effects-based Planning. The use of CIE tools gave the JTF and Functional Components the ability to plan simultaneously both vertically and horizontally allowing better developed responses to the adversary's actions. The availability of the ONA (Link to ONA Assessment Area) and the ability to access non-military resources through the JIACG (Link to JIACG Assessment Area) and reach-back will enable the JTF to access and better understand the application of all facets of National Power (D-I-M-E) to achieve desired effects and to respond in a more comprehensive manner to changes in the political and economic scenario. The Joint Fires Initiative (JFI) and Time Sensitive Target (TST) concepts (LINK to JFI /TST DOTMLPF report), in conjunction with CIE tools, greatly enhanced the JTF's ability to identify, locate and prosecute actions to achieve desired effects. However, the ability to conduct Operational Combat Assessment was not successfully demonstrated during the experiment. The ability to conduct combat assessment was hindered by a variety of reasons including experiment constraints, M&S fidelity, and manning of the assessment cells. There are also indications that some of the EBO concepts were not fully utilized or understood by the participants.

Overall Assessment Results

- **The JTF demonstrated the ability to coordinate the actions of a diverse force over a large geographic area…**
- **The ability to synchronize joint capabilities was greatly enhanced…**
- **… plan simultaneously both vertically and horizontally allowing better developed responses to the adversary's actions…**
- **The ability to conduct Operational Combat Assessment was not successfully demonstrated…**
- **The ability to integrate full Joint capabilities against tactical level objectives was demonstrated…**

The ability to integrate full joint capabilities against tactical level objectives was demonstrated during this experiment. However, although JTF successfully met this challenge there was ample evidence that JTF did not adhere to all of the concepts of Effects-Based Planning. There is evidence that JTF planners did not develop branches and sequels based on effects assessment and predictive

analysis as required by the concept. Wargaming was conducted only sporadically during the experiment by JTF and Component planners, and then only at the tactical level, leading to an overall inability to anticipate OPFOR's moves and plan proper responses to counter them. The use of collaboration and CIE tools enabled the JTF to overcome some of the problems that could have been caused by not following the concept methods. The result of not following concept guidelines was that the JTF was unable to get inside OPFOR's decision cycle and anticipate his moves. The JTF was, as a result, more reactive than proactive in the prosecution of the conflict. Despite this, JTF was able to quickly assemble, synchronize and employ joint forces against key tactical and operational objectives to achieve his desired effects, and for the most part was able to maintain the initiative and dictate the tempo of operations throughout the experiment. Most of the problems observed with the warfighting challenge can be corrected through training and experience.

The ability to integrate execution of information operations into effects based operations was not successfully demonstrated during the experiment. Although IO capabilities (Link to IO assessment area) were considered during operational planning, and some were executed, all IO capabilities were not utilized and integrated into JTF operations. During the experiment the assessment of the contribution of IO actions was not fully considered nor used to modify or initiate future plans and actions. Whether this was a process problem or limitations due to M&S, assessment of the contribution of IO actions was not considered. The JTFs IO campaign plan, for the most part, was ineffective and failed to win over the hearts and minds of the adversary or have a significant impact on the JTFs ability to achieve his desired effects. During the experiment it became apparent that there were no procedures in place for coordinating STO/SAP actions and integrating STO/SAP information into the JTF IO campaign. This led to some cases of IO targets being struck by JTF assets even though the target had already been neutralized by STO actions. IO was planned, coordinated, and executed at the JTF and Component levels, but it was not integrated across the force. Due to poor BDA, the effects of the IO campaign were not always recognized by either the JTF or components; this led to allocation of resources against IO targets that may have already been neutralized. This concept needs to be re-evaluated in future experiments.

Methodology

The Assessment Area "Conduct Decisive, Effects-Based Operations" was evaluated by more than 215 experiment participants and observers during MC02. A series of 50 questions were given to the Warfighters, 68 questions were submitted to the Subject Matter Experts, 49 command, control, communication, computers and intelligence (C4I) inputs were gathered, and 40 modeling and simulations (M&S) inputs were gathered throughout the experiment to address this objective. The questions were directed to the specific person or group that was responsible for the desired information or subject area. Specific information was sought from the C4I systems and the M&S systems during and at the conclusion of the experiment. Data from the modeling and simulation areas were gathered via DCARS, the C4I information was gathered from the Shared Point Portal Server (SPPS). JDCAT captured the Warfighters and SME's information. All of these sources provided the information that was reviewed and analyzed for this objective. In addition, After Action Reviews (AARs) from various working groups boildown sessions conducted at the conclusion of the experiment with senior JTF-HQ and component participants, comments, and recommendations (captured via JDCAT) were used to supplement the programmed data capture. The responses were screened, sorted, analyzed, and tabulated. The

data was rolled up through the element, data requirement, measure, subtask, task, and the Warfighting Challenge levels to answer the Objective. Azimuth Check papers for this objective were written in which the key points of the Objective were listed and brought to the attention of the SMEs, analysts and the SCDs. The papers were available through the SPPS system, and they were the focal points during the 2nd, 4th and 5th of August for the SME, analysts, and SCDs.

Warfighting Challenge:

Ability to synchronize the application of the full range of Joint capabilities in order to engage decisive points in time and space

This warfighting challenge addresses the ability of the Joint Force to identify, target, attack disrupt, and destroy an adversary's PMESII key nodes, linkages and Time Sensitive Targets (TSTs) in support of EBO.

The ability to synchronize the application of the full range of Joint DIME capabilities in order to engage decisive points in time and space depends on the ability to rapidly identify potential targets. Also, sought is the ability to engage TST targets, assigning the appropriate DIME capability to engage the target, and the ability to accurately assess the success or failure of the engagement to determine if the desired effects have been achieved. The Tasks and Subtasks used to assess this warfighting challenge are listed below:

Task: Conduct Joint force targeting to support EBO
Subtask: Use reachback capabilities to enhance the targeting process

Finding 1:

The Prioritized Effects List (PEL) is that portion of the Effects Tasking Order (ETO) that the CJTF uses to establish the effects he wants to achieve in order to meet the Combatant Commander's objectives for the crisis/conflict; the PEL is modified or changed only when there is a major change in the course of the conflict. The Joint Integrated Priority Target List (JIPTL) is used by the JFACC to identify his allocation of airpower, to meet the requirements identified in the PEL; the JIPTL is published daily. Component Operations SMEs were surveyed during the course of the experiment to determine if there were any issues concerning the relationship of the PEL to the JIPTL. Based on 36 surveys returned as shown in Figure 4.1.1.1 below, 91 percent of the respondents indicated that they found that there where no issues concerning the relationship of the PEL to the JIPTL. The JIPTL, as presented during the JCB meetings, paralleled and addressed all items listed in the PEL and indicated the allocation of air resources to each PEL item. The JIPTL complimented and amplified the PEL and ETO very effectively.

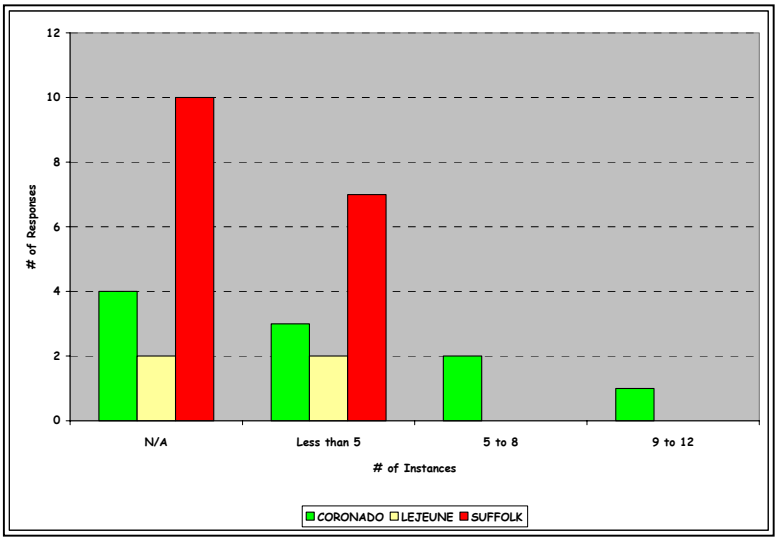


Figure 47: Instances of issues concerning relationship of PEL to JIPTL

Comments received from some of the SMEs are included below:

- "Components were very good about deleting target nominations which no longer reflected the priorities established in the PEL. Frequently, they nominated new targets as a result of PEL changes."
- "The PEL was definitely used for planning; the maritime target list was consolidated in the MTO and passed to the JFACC as a part of the MTO/ATO integration."

On the negative side, these comments were noted:

- "The JIPTL has seemed to jump around from WME, to islands, to maritime superiority with accompanying shifts of main effort from JFMCC to JFLCC and back."
- "Focus changes a lot after 1-3 days and the JIPTL may conflict with PEL of the day (that the JIPTL is in effect.)"

The JIPTL proved to be an effective tool for turning the PEL desired effects into a plan for allocation of assets via the ATO/MTO to achieve those effects.

The ETO is the document published by the JTF to impart his guidance and intent, force allocations, ROE, PEL, Target restrictions, and other vital information to his subordinates. The ETO, once published was usually modified by issuance of FRAGOs, as needed during the course of hostilities. New ETOs were issued when there was a major change in the emphasis of the conflict and to direct Branches and Sequels to the ETO. The Air Tasking Order (ATO) and the Maritime Tasking Order (MTO) are developed and published daily by the JFACC and JFMCC to assign forces to specific missions and targets. Survey responses obtained during the exercise and anecdotal evidence obtained from Senior Concept Developers, OT's and Warfighters during Azimuth, Infocus sessions and AAR briefings all indicate that there were no significant issues concerning the cyclical targeting cycle and the non-cyclical ETO process. Component Operations SMEs were surveyed daily to determine if there were any issues, 94 percent of the respondents (based on 36 surveys returned) indicated that no significant issues (less than 5 instances noted) concerning the cyclical targeting cycle and the non-cyclical ETO process were noted during the exercise. The ETO was modified by FRAGOs as incidents occurred and the conflict changed scope and direction, the ATO/MTO was modified daily, as required, in response to the FRAGOs, JTF guidance and to meet the requirements specified in the FRAGOs. In this experiment, the targeting cycle as represented in the ATO/MTO was unaffected by the ETO cycle, and was able to respond quickly and efficiently to changes in the ETO targeting requirements as promulgated in the FRAGOS. However, the need to rework ATO/MTOs in response to the issuance of the FRAGO could lead to problems developing future ATO/MTOs, possibly a shorter ATO/MTO cycle or the development of a cycle within the cycle needs to be developed.

Of those that identified instances of issues, the following comments were submitted:

- "… The added issue of the indirect link between non-cyclic ETO process and targeting cycle is amplified. When in a responsive mode (as in after the enemy preemptive strike), the change in the desired effects in the ETO process will directly affect the targeting cycle. It may be a significant issue as in drastically changing the targeting priorities due to a major shift in effects-based operational planning. Or it may result in a small change in the target priorities due to the lack of expected results from the first effects-based operational assessment."

- "…planning on the "fly" for multiple ATO/MTOs. ATO "C" required significant rework. Rework of both ATO K, L slowed down ATO M. A shorter ATO cycle might be considered to support RDO or create a cycle within a cycle." (JFMCC SME)
- " There were some issues revolving around the need to match the MTO to the ATO. The internal maritime planning process imposed constraints on the IO cell in an attempt to coordinate a deception plan. The MSR deadline precluded flexibility in developing the plan."
- "In this exercise PEL equaled tasks not effects." (JFMCC Ops Chief)
- "ETO process was off concept. New ETOs should have been issued in place of some FRAGOs that were issued when changes to the situation required a change in tactics or emphasis. TST priorities where changed via FRAGO when the concept called for a new ETO to be issued." (a Component Operations Chief)

Senior concept developers held that the future belonged to a new generation of automated orders. The ATO and MTO are excellent tools in their domains; however, they are insufficient to integrate the action of all components including JFLCC and JSOTF/JATF necessary to create joint effects. Said one developer, "I believe we should move from the ETO to a JTO and eventually replace all the Service orders (with a FRAGO or a JTO). That we should move toward a Joint integrated tasking order (JTO or JITO) to complement the ETO. The ETO itself should continue to focus at the operational level, and should not itself substitute for a tactical execution order like the ATO."

The CJTF made the following observation, "All the battle rhythm went out the window to seize the islands within 48 hours' said the JTF Commander. "The capability of the ETO, empowered by the ATO-MTO, coupled with commanders' understanding of my guidance and intent could turn the entire force within two days, this is phenomenal. We turned it physically and mentally, with diplomatic support as well. Everything we needed was there. Rapid and decisive actions were empowered without orders." (See Assessment Area 10 for further discussion of the JIACG)

High Payoff Target List (HPTL) was developed during MC02 Spiral 3 (regarding OPFOR Targets) and MARFOR and JFACC addressed the use of the HPTL in their CONPLANS. However, based on the responses from 36 of 40 surveys sent to Component Operations SMEs during the execution phase of the exercise, there was no indication that an HPTL was either developed, or promulgated, and the HPTL developed during Spiral 3 was neither modified nor referenced. For JFMCC there was a list of non-TSTs that were high priority and the ATO/MTO was modified to accommodate them. Those targets were directly related to the PEL/JIPTL. High Payoff Targets were addressed as part of the JCB brief to CJTF and identified in the PEL/JIPTL/TST target lists. There were no known issues of its relationship to the PEL/JIPTL and TST Priority List.

The following comments were received from some of the SMEs:

- "TST list has remained relatively stable. High payoff targets have shifted with the changing priorities of the main effort/JIPTL."
- "For JFMCC there is a list of non-TSTs that are high priority and the ATO/MTO may be modified to accommodate them. Those targets are directly related to the PEL/JIPTL."
- "The TST is being used extensively in the JSOTF. All executions of missions are listed and prioritized on the TST priority listing."

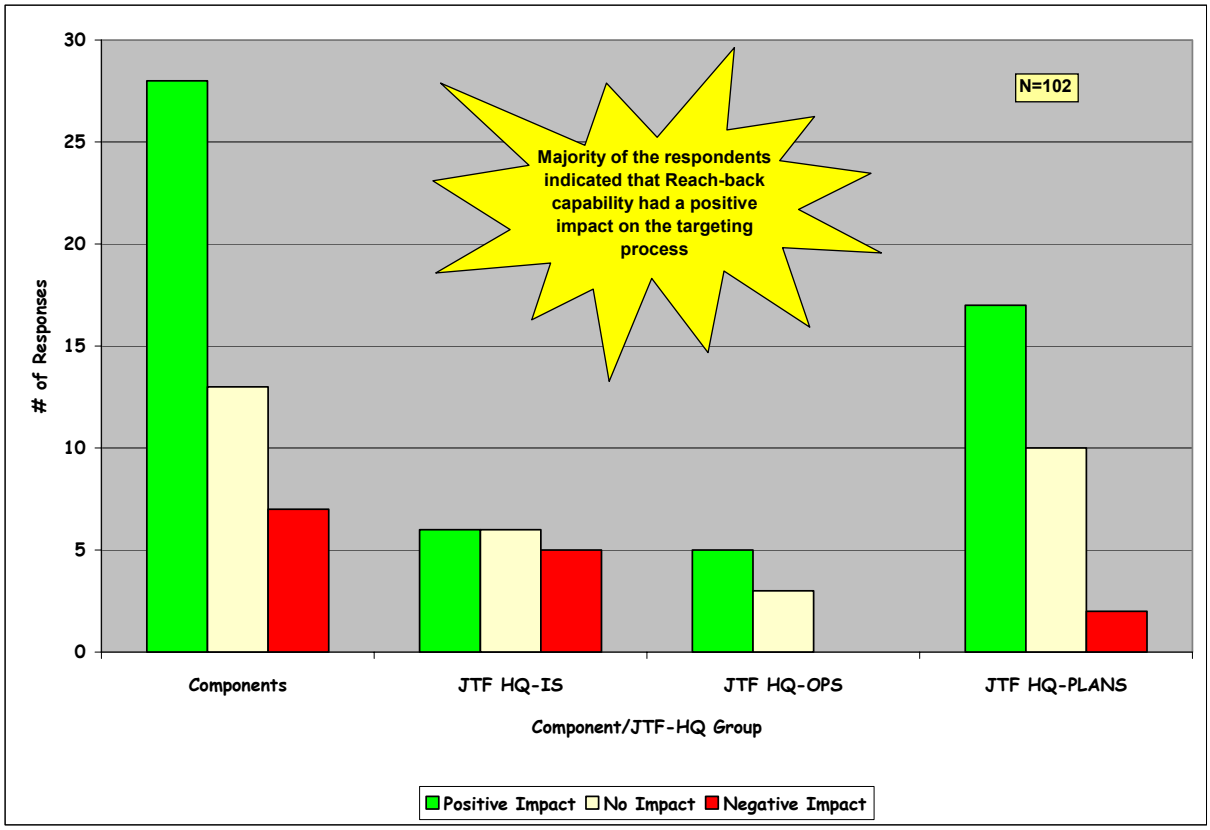


Figure 48: Reach-back capability had a positive impact on the targeting process

The Reachback concept was envisioned as a method for the warfighters to gain access to Centers of Excellence (CoE), Academia, Service Colleges, etc. directly, as needed, to garner pertinent information that could help the warfighter choose the target and the appropriate weapon and platform to inflict the most damage on an adversary's capabilities while inflicting a minimum of collateral damage on the civilian population. Although a robust reachback capability was not replicated during this exercise due to experiment constraints, there is anecdotal evidence that reachback was successfully used to augment the ONA (See Assessment Area 7 for a more detailed discussion of ONA) when researching targets for prosecution. The biggest use of reachback was to assess collateral damage probabilities on selected targets. Of 102 survey responses from SMEs (see Figure 23), 55 percent indicated that the reachback capability provided a positive impact on the targeting process. Forty-five percent indicated "No Impact" (31 percent) or "Negative Impact" (14 percent); however, there were very few comments provided from the SMEs as to why they indicated that the impact of reachback in support of the targeting process was negative. Said one SME, "IWPC/IWS provides great reach back to national level agencies to support targeting," he said. "Reachback to FIWC: helped targeting IO targets". In regards to the robustness of the capability, a JTF HQ-IS and Plans SME said, "Simulated reachback did not replicate requirements", and "...could not exercise full capabilities due to the artificiality of the current ONA database".

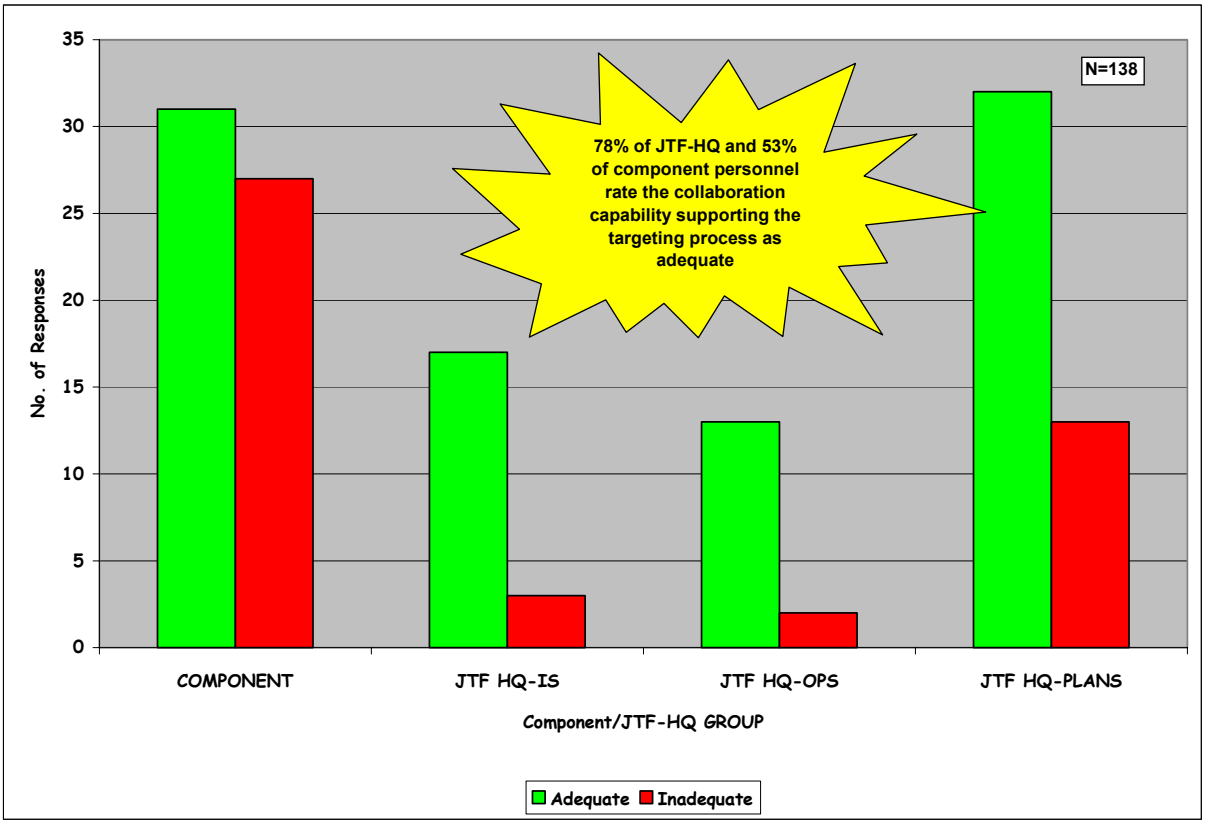


Figure 24: Collaboration capability is adequate

Collaboration allows a significant amount of information to be delivered to a lot of people quickly; however this information still must be processed and put into action. Too many CIE meetings can lead to too little time for turning the information into knowledge and into coherent actions. With the number of people that can access a collaborative session, rules need to be in place to avoid lengthy and complicated sessions that could slow down the targeting process rather than help speed it up. In addition some participants felt that the meetings were more informational than decisional in nature, the meetings should have provided information that would lead to discussions of options that could lead to decisions. Some warfighters indicated that the CIE tools needed a better balance of push/pull; they felt more information needed to be pushed to the users.

Overall, collaboration enabled the rapid flow of information both horizontally and vertically between components and the JTF staff. Pop-up and emerging targets were able to be identified, located, assigned, and prosecuted quickly using the appropriate weapons and platforms for the task. Collaboration gave the force the ability to deconflict the battlespace, and resolve attendant collateral damage issues in an open forum allowing for efficient use of assets against these targets. However, there were some problem areas, an over use of CIR can lead to wasted time in virtual meetings, the ability for anyone to attend a CIE meeting can lead to too many people in meetings and not enough people doing real work. Good business rules need to be in place to streamline the CIE process. The graph above shows the breakdown of survey responses by both JTF and Component SMEs. Based on 138 responses, 63 percent of the respondents agreed that the Collaboration Capability Supporting the Targeting Process was adequate.

The following comments supporting the process were made by various SMEs in the surveys, “The potential capability these collaborative systems afford us in the targeting process is very good,” said one. “It was helpful to have instant feedback from the coordination component during the TST fire missions. IWS and ADOCS were helpful in clearing targets and airspace to ensure fratricide incidents were minimized.” Another officer noted, “There seemed to be enough interaction among key players. All participants were encouraged to add their opinions and no decisions were made without hearing from everyone -- well done --wonderful concept, collaboration is a great tool.” The JTF Deputy Director of Plans said, “the ability to collaborate with higher and adjacent commands in CIE gave us the opportunity to work efficiently through issues that previously would have taken hours or days of man-hours.”

But not all comments were approving. There is an “inability to automatically track between ONA nodes and BE numbers, which essentially stopped the JTF IO Cell from tracking and redirecting the IO fight in any meaningful way. It was too slow. Targeting is a dynamic process. Collaboration gives everyone an opportunity to contribute to the process. **That is not a good thing** -- people with nothing to contribute can waste the time of those attempting to do actual targeting. In theory, collaboration should speed everything up, but in MC02, it slowed things to a crawl, while people spent enormous amounts of wasted time in chat rooms and briefings and got nothing out of it.” Said another, It was “too complicated and took too much time. From what I observed in passing TSTs from JFACC-JFLCC-JFMCC there needs to be a standard method of gathering imagery, mensurating coordinates, and a common reference point for the TST cell's to be truly effective. Simply put, I need to be completely sure that the target JFACC is passing off to JFMCC is accurately targeted for a GPS weapon. Too much time was spent determining the credibility of a TSTs position.”

A JTF Planner said, “We can only do one thing at a time, especially in a collaborative environment’” he said. “We must decide when to use collaboration. It’s not always necessary. We must be disciplined – who really needs to play?” And from a Component Operations Chief, "CIE and its tools made situational awareness better but it tied the commanders to many meetings. There was little discipline in the CIE meetings, too much meandering, no real time for planning, CIE can lead to virtual creep, and CIE can adversely affect both JTF and Component Battle Rhythms."

The Senior Mentors thought collaboration worked exceptionally well. "The collaborative tools greatly facilitated execution,” said one of the mentors, “while a mission was ongoing, permitting commanders to discuss branches, modifications, in a quick and outstanding manner”.” IWS helped the JCB to achieve overall synchronization." A second mentor said, “The components collaborated on the CIE quickly, developed a common SOP, and used the ADOCS and other tools. It improved TST cross-cueing component to component."

The following responses were received during the Infocus session: “….key enabler, huge impact horizontally and vertically, allowed the commanders to command.” “Process allows you to build your own "CROP" – once you have the CROP, you do not need to drill down to the tactical level." "Command enabled because everyone understood the commander's intent, provided ultimate in "mission type orders".

In summary, the ability to rapidly locate, identify and prosecute targets, within in the JOA, can be enhanced by the use of reachback and collaborative tools such as IWS and ADOCS. The improved prosecution of TSTs was especially successful during the experiment, due to the use of Collaborative tools. The use of reachback to augment the information in the ONA allowed the planners to asses the probable unintended consequences of an attack on the target more

thoroughly, enabling them to choose the appropriate weapon for use while minimizing collateral damage. The ability to reachback to Centers of Excellence to assist in determining target priorities and to help identify the possible unintended consequences (i.e. collateral damage) of

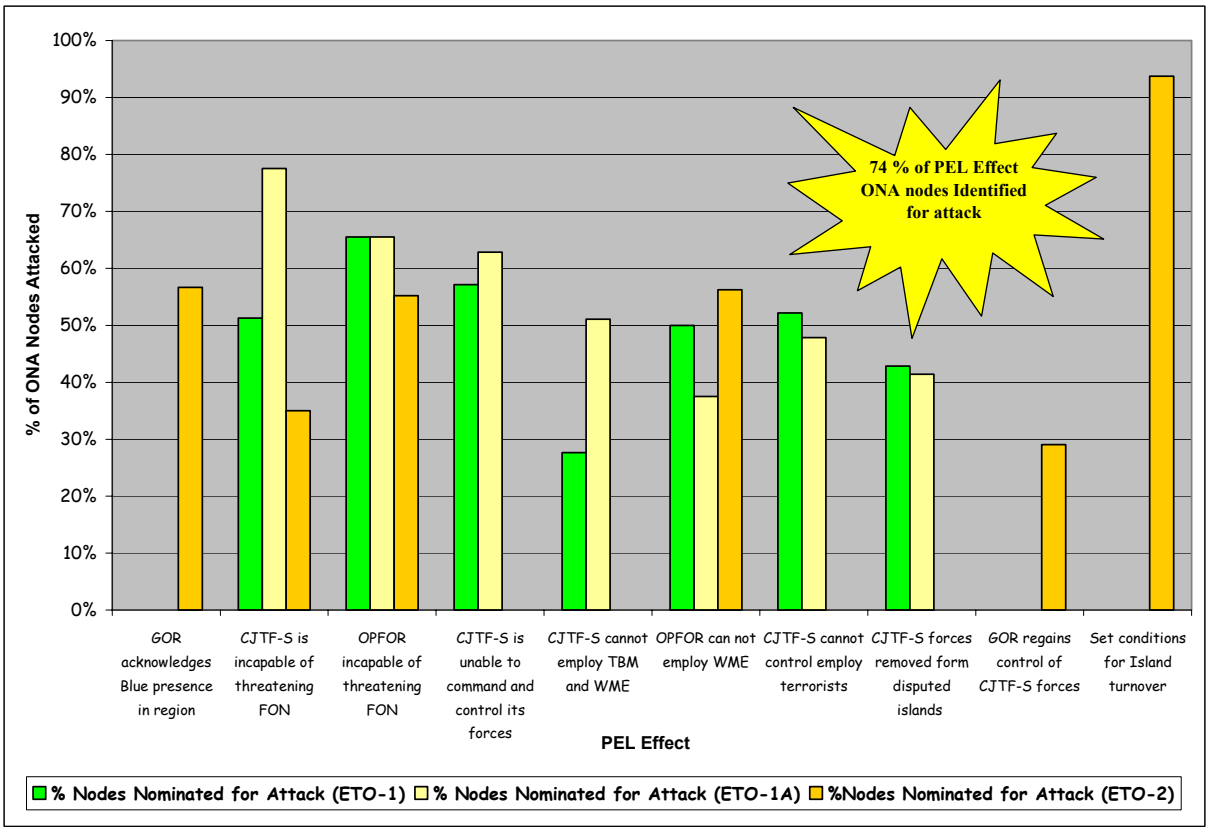


Figure 49: percent of ONA nodes identified for attack

striking particular targets can be a powerful tool in the targeting process.

Reachback in support of targeting can be a very effective tool. However, there were only limited reach back resources available during the experiment. DTRA, FIWC, JFWC, INPC and JWAC were available periodically during the experiment. The ability to directly contact Centers of Excellence, Academia, Industry, Service Colleges, etc., gives the JTF sources of information to help select the appropriate resources to achieve the desired effects. These sources can help the planners and operators choose the appropriate targets, and the appropriate weapon to minimize collateral damage while creating the desired effect. It is recommended that the reachback concept be evaluated in future exercises and experiments using more robust resources to further test the usefulness of the concept and to refine the rules necessary to streamline the reachback process.

The Collaboration process and CIE tools (specifically IWS and ADOCS), as used in this exercise, are powerful tools that can speed up the targeting process and improve the transfer of targets between components for prosecution, by linking all the players in a common collaborative network. However, unless rules are in place to keep these collaborative sessions on focus, the collaborative process could actually slow down the targeting process by allowing too many inputs and distractions to take place in the sessions. It is recommended that the collaborative process and collaborative tools be further exercised in future LOEs in order to refine the business rules and processes required maximizing the usefulness of these tools.

Subtask: Establish Joint force targeting guidance

Finding 2:
The prioritized desired effects identified in ETO-1, ETO-1A, and ETO-2 and their associated PELs (PEL 001, PEL 001A and PEL 002) were compared with the nodes associated with those effects in the ONA. Figure 25 above graphically shows the comparison of the percent of ONA nodes, nominated for attack, for each promulgated ETO by effect. Based on this comparison ETO-1 (Operation Sovereign Passage), as identified in PEL 001 promulgated on 7/25/02, and the ONA; 48 percent of the nodes identified in the ONA were nominated for attack; 58 percent of the ONA nodes, linked to the desired effects for ETO-1A (Operation Joint Strike), as identified in PEL 001A promulgated on 7/29/02; were nominated for attack; and 47 percent of the ONA nodes, linked to the desired effects for ETO-2 (Operation Joint Stability), as identified in PEL 002 promulgated on 8/13/02; were nominated for attack. Figure 25 graphically shows the comparison of the percent of ONA nodes nominated for attack for each promulgated ETO by effect. A review of the ONA identified a total of 377 nodes associated with the Ten (10) prioritized effects identified in ETO-1 (7 effects/300 nodes), ETO-1A (7 effects/300 nodes), and ETO-2 (6 effects/202 nodes). ETO-1 identified 143 nodes, ETO-1A identified 173 nodes, and ETO-2 identified 94 nodes for attack.

In summary, during this experiment a robust ONA was not fully developed and all attendant nodes and key linkages were not identified or available for this exercise. However, ONA demonstrated its potential to have a major impact on future JTF operations. With a fully developed ONA, the JTF will be able to select target nodes and linkages for disruption, neutralization, or destruction that have the greatest impact on an adversary's capabilities while minimizing the impact on the civilian population by minimizing collateral damage. The information contained in the ONA will help the JTF select the appropriate level of force and resources to accomplish his goals quickly and efficiently, and will help put the JTF inside the adversary's decision cycle. ONA has the potential to be a force multiplier and is an essential tool for successful EBO. However, at this stage of its development ONA is not very user friendly trying to track the effects to node linkages is not very intuitive. New tools need to be developed to help users access the data contained in the ONA more efficiently and quickly. A more robust ONA incorporating better search engines and tools needs to be further evaluated in future exercises and experiments. Due to the nature of the experiment most of the play concentrated on the military aspects of PMESII. Therefore, targeting guidance was heavily weighted towards the military effects without much thought being given to other components of PMESII that, if attacked, may have achieved the JTF's objectives more quickly with fewer casualties and losses on both sides.

Subtask 4.1.1.3: Develop operational targets.

Finding 3:
The need to re-task assets in response to the discovery of enemy critical nodes can have a negative affect on the overall campaign if not managed to minimize the impact on preplanned and ongoing missions. Surveys were sent to Component and Joint Fires Cells SMEs; Based on the results of these surveys, it was noted that throughout the exercise numerous critical targets were discovered and attacked during ETO execution. In all cases, appropriate air, sea or ground

assets were assigned to prosecute the new targets. Examples of this occurrence include, during the execution of ETO-1, it was discovered that CJTF-S was using a regional radio station to transmit orders and information to his forces making this a critical node in his C^2 system. The CJTF immediately made the neutralization/destruction of the radio station a top priority in the PEL and ordered the force to take the radio station off the air. The ATO was adjusted to allocate increased ISR and other air and land assets to the problem. Throughout the exercise, numerous Red missile sites were attacked by Blue air, sea, ground, and SOF forces (in particular the medium range ballistic missile site destroyed by TST assets in the vicinity of Limaville). In addition, during execution of ETO-1, WME sites were located and attacked (WME site on Objective A prosecuted by 26th MEU found a cache of WME munitions. GOPLATS were secured by SOF). In order to preserve his WME assets, CJTF-S moved part of his WME assets to predetermined hide sites. These sites were located and attacked as they were found. Providing assets for these attacks required the dynamic re-tasking of air and land assets and changes in the ATO/MTO "on-the-fly". In all cases, prosecution of these emerging targets was handled efficiently with minimal impact on the overall ETO targeting plan. In each of these cases and others not listed here, collaboration and CIE tools enabled CJTF the ability to issue guidance and intent to the components quickly, formulate a plan, and coordinate all phases of the operation rapidly and efficiently. CIE tools, especially IWS, allowed the components to resolve resource allocation, collateral damage, and unintended consequences issues associated with the missions in a highly effective and decisive manner.

As a result of the re-tasking of assets to prosecute critical targets of opportunity or emerging TSTs, other operations could be delayed, disrupted, or even canceled causing a negative impact on the JTF's overall campaign. Surveys were sent out to Component and JTF HQ operations SMEs throughout the exercise. Based on the results of these surveys, it was determined that there were no operations delayed, disrupted, canceled, or modified awaiting operational firepower support. This was the opinion of the majority of the responses (92 percent). Of the 8 percent of responses indicating that operations were delayed or disrupted, one JFMCC SME indicated that approximately eight operations were affected by the lack of operational firepower as follows: "Three operations were delayed due to fire support. Five canceled awaiting fire support that was destroyed or damaged in initial enemy attack." Other than the observation from the JFMCC SME above, no other incidents of delays or disruptions were noted by the other SMEs surveyed.

In summary, During ETO execution a number of critical operational targets and targets of opportunity were discovered that had not been previously identified for investigation or prosecution. As these new targets were identified, the JTF was able to rapidly re-task surveillance and attack assets, using CIE tools, to investigate and prosecute them, with minimal impact on ATO/MTO operations. This exercise demonstrated that the use of collaborative tools in a CIE greatly enhances the ability of the JTF to rapidly identify and attack critical enemy nodes and key linkages found during ETO execution. This exercise demonstrated the ability of the JTF, using collaboration and CIE tools, to develop operational targets during ETO execution.

Subtask: Conduct operational combat assessment.

Finding 4:

Combat assessment is an essential part of EBO. Poor, or inadequate BDA, can lead to a misallocation of resources, and an underestimation of the adversary's true capabilities and intent.

Surveys were sent to 57 Component and JTF HQ Plans SMEs on a daily basis, throughout the exercise, to try to determine the percent of targets for which combat assessment was available, 36 SMEs responded with comments. Based on the responses received, the majority of the respondents stated that they could not accurately arrive at an answer for this question. Others indicated a range of, as few as 20 to more than 100, targets that could be assessed. Of those SMEs that responded, the following comments were received:

This observation came from a Component Operations Chiefs, "assessment is the key to EBO. EAC is supposed to fuse information into usable data. The EAC degraded efforts from effects to BDA as the exercise progressed. Multiple attacks on the same targets were conducted due to poor BDA – a lot of infrastructure was damaged chasing CJTF-S in disregard to PEL (minimize damage to infrastructure). EAC was not really looking at effects."

Other SMEs indicated:

- "Most targets can be combat assessed, many are time late".
- "…difficult to tell. A number of targets were "nommed" for strike but feedback from the effort was inconsistent. Much of the "BDA" that was received was in the form of level 2 rollup reports".
- "… unsure at this time. We are trying to resolve discrepancies with COP display and BDA from response to enemy action".
- "…Had difficulty receiving BDA for component MOPs which impacted ability to make judgments on MOE by the EAC. Suspect overall problem was a modeling simulation problem but it caused us to put greater emphasis on certain effects, (i.e. take more action with air strikes) and ISR collection efforts on enemy C^2".
- "Getting BDA for C^2 was very difficult. ISR did not seem to be coordinated to confirm this high priority from CJTF. JTF ISR planners' believed the problem was at the JFACC level in that they were not coordinating TOT windows to effect ISR collection. MJIC provided phase III BDA assessment of C^2 (believe White cell input) which allowed the EAC to change assessment from red to amber - this was a go-no-go area for 30 Jul AM airborne drop".

Poor BDA can lead to the unnecessary assignment of assets and resources to prosecute targets that are already destroyed or out of action. On the other hand, poor BDA can lead to overlooking targets that were previously attacked unsuccessfully with the target still remaining combat effective. Surveys were sent to Component Effects Assessment (CEA) SMEs over the course of the exercise to determine what percent of targets assessed as "Killed" were actually still combat effective. Most of the surveys were returned with comments. Most indicated that there was very little BDA available to confirm kills, EAC had to use secondary methods to determine effects (e.g. media reports, tactical intercept, enemy actions of movement etc. EAC received poor BDA during the exercise mostly due to a lack of M&S fidelity and exercise/experiment constraints and limitations.

A JCB participant came to the following conclusion during a daily briefing, "failure of I&W/ISR to provide adequate assessment of Red's C^2 status, allowed Red to launch a full scale coordinated attack on Blue 82nd Airborne and XMEB force insertion into Objective areas #1 & 2".

Anecdotal evidence brought up by Component Commanders and briefers at various JTF update sessions during the exercise, indicated that the percentage of unnecessary target re-attacks was higher than expected. The reason given was poor BDA, due to exercise

constraints/limitations and M&S ISR fidelity, was being given to the assessment cells. BDA information being given was often inaccurate, insufficient, and late, leading to an inordinately high percentage of targets being nominated for re-attack. From a Component Planner the following observation was made, “lack of BDA was a factor. We probably got good effects, but didn’t always know, so we had to go back and re-attack.”

Full combat assessment was not always readily available in a timely manner to the JTF HQ due to a variety of problems including M&S fidelity, exercise constraints and limitations, and insufficient manning in the EAC.

In summary, this exercise showed that Joint Force Targeting in support of EBO can be greatly enhanced through the use of Collaborative tools (IWS, ADOCS, SPPS, etc.), in a CIE, reachback and effective combat assessment. Collaboration, using IWS, helped clear away the "Fog of War", and gave all the players a forum to interact closely to resolve resource allocation, battlespace deconfliction, target allocation/prioritization, and command relationship issues quickly. CIE tools, such as SPPS and ADOCS, provided the force with access to the information required to achieve greater situational awareness within the JOA. Emerging targets were identified, located, and assigned for prosecution quickly and efficiently, using ADOCS and IWS to facilitate cross-cueing and asset allocation. Dynamic re-tasking of assets, to meet emerging threats and operations, was handled smoothly through the use of IWS, ensuring that the appropriate weapon and platform was assigned to the mission with minimal impact on other operations. Collaboration and CIE tools (ADOCS, IWS, and SPPS) were the big winners in this exercise. Throughout the exercise, as users became more comfortable with the tools and procedures, their usefulness became more pronounced. The basic concepts are sound; however more work is necessary on TTPs and development of business rules for more efficient use of the tools. Recommend new TTPs and business rules be developed for use of IWS, SPPS and ADOCS using lessons learned from this exercise and tested in future exercises and experiments.

This experiment demonstrated the JTF’s ability to develop operational targets during ETO execution. Using IWS and ADOCS the JTF was able to identify, locate, and prosecute emerging targets while minimizing the impact on other operations. IWS enabled the force to quickly prioritize targets, allocate resources, and deconflict the battlespace as necessary to prosecute the targets quickly and efficiently.

Assessment is the key to EBO. The ability to conduct Operational Combat Assessment in the real world depends on the assets the JTF and Components have to dedicate to BDA. In this exercise, there were no asset limitations. However, due to limitations in M&S fidelity and exercise constraints, accurate BDA, and Combat assessments were not always available to the JTF HQ or components.

Over the course of the exercise, the EAC regressed from assessing effects to assessing Battle Damage. As stated by one Component Operations Chief, “Overall, Effects Assessment didn’t work. There were some success stories (Island Campaign), but overall it missed the boat.”

"BDA looks through a ‘Blue lens’,’” said one senior officer. “Effects Assessment, done properly, looks through a "red lens". Effects assessment should examine the state of Red through Red's perspective."

During this exercise, the performance of the EAC was marginal at best. Anecdotal evidence indicates that the EAC’s problems were caused by inaccurate, inadequate, and late BDA provided by M&S, and a lack of adequate personnel assigned to the cell. Correction of the M&S problems will require the development of new or modification of current models to more accurately provide the specificity needed for this type of experimentation. In addition, ISR tools

need to be developed to assist the assessment cell with the analysis of the, sometimes, overwhelming data that comes into the cell from ISR and other sources. On the personnel issue, the opinion of a number of SMEs, Senior Mentors, and OTs was that the EAC was undermanned, not organized efficiently, and not manned with the correct mix of specialties.

The following recommendations were made by Senior Mentors, IS SMEs, and other Component and JTF personnel during Azimuth, Infocus and AAR briefings:

- The EAC needs to be removed from control of the ISG and placed in either OPS or PLANS. The EAC is currently manned with IS personnel, this is effective in interpreting BDA data, but this information needs to be turned into knowledge that can be used by the operators.
- Manning in the EAC should be balanced with IS personnel, to process BDA information, and OPS personnel to conduct predictive analysis and turn the intelligence information into knowledge of the adversary's capabilities and intentions that OPS and PLANS cells can use to develop Future Operations.
- The EAC be organized into three functional groups -- Intelligence and BDA data collection and analysis (IS personnel), Effects Assessment (IS/OPS personnel), and Predictive Analysis (OPS personnel).

Under this organization Operations Personnel would be responsible for predictive analysis. During the experiment, indications were that Predictive Analysis was never conducted, as a result very little "What if" planning was done by the JTF, Branches and Sequels where not developed looking at what Red might do, but were based more on what was happening at the moment. As a result JTF was more reactive than proactive in prosecution of the war. It is recommended that EA be re-evaluated and reassessed in future experiments with an emphasis on organization, manning, and tools.(See Assessment Area 8 for further details)

Task: Attack operational targets to achieve desired effects.

Finding 5:

One area of EBO that was investigated during this exercise was the JTFs ability to attack operational targets to achieve desired effects. In order to assess the JTF's success or failure in accomplishing this mission, we reviewed documents and displays obtained from ADOCS, SPPS, OPFOR status reports, JIPTL, and the JFACC ATO/MTO briefings to the JCB. In addition, surveys were sent out to EA SMEs throughout the exercise.

In order to establish the success or failure of the JTF to attack operational targets, it is necessary to first determine what nodes are available for attack and then determine the percentage of enemy PMESII nodes that were successfully attacked. The ONA used during the exercise contained 706 unique PMESII nodes. A further review of the ONA identified 189 unique nodes (377 total nodes) associated with the effects identified in the published ETOs. Reviewing the PELs for each ETO identified 140 unique PMESII nodes that were selected for attack (it should be noted that many of the nominated nodes consisted of multiple targets and aim points, (i.e. N4094*- Mini-Submarines and UUVs, represents multiple targets). Based on BDA information contained in the ONA, a total of 214 enemy PMESII nodes were successfully attacked, of those nodes attacked, 70 nodes were directly linked to ETO effects with the remaining 144 nodes being mostly targets of opportunity or emerging TST Targets selected to support ongoing operations. It should be noted however, that after assessment of available data, it was determined that most of the collected attrition data did not identify the specific PMESII

nodes attacked. The disparity between the number of ETO-designated nodes attacked and the total nodes attacked could be related to the lack of a robust ONA, poor deficiency analysis within the EAC, or poor nodal analysis by the planners.

A thorough nodal analysis within the planning cells should be able to isolate those nodes that would have the greatest impact on achieving the desired effect, thus limiting the target list to only those nodes. This would reduce the resources required to achieve the effect and allow the desired effect to be achieved more quickly. Deficiency analysis is used to determine why kinetic and non-kinetic attacks are not achieving the desired effects. If properly done, deficiency analysis can quickly determine if the correct nodes were selected for attack or if additional nodes need to be attacked to achieve the goal. There is evidence that Deficiency Analysis was not being conducted in the Effects Assessment Cells during the experiment due to a variety of reason including, inaccurate time line BDA (M&S problem), insufficient manning, wrong mix of specialties within the cell, and the commander centric mindset that developed as the experiment progressed. It is uncertain, based on the available data, whether any nodal analysis was done in the planning cells.

One of the key concepts of EBO is to use only the minimal level of force necessary to achieve a desired effect, thus minimizing collateral damage and maximizing the use of available resources. In order to achieve this goal it is necessary to understand the intended and unintended consequences of the actions being taken to achieve the desired effects. Surveys were sent to Effects Assessment Cell SMEs at the Components and JTF-HQ daily over the course of the exercise to determine if instances of friendly actions having unintended effects were noted.

The results of these surveys indicated that from what was observed by the SMEs, there were no instances noted of friendly actions having unintended affects that violated ROE or NCA guidance. However, anecdotal evidence of one incident was brought up at an Azimuth Check Briefing, an attack on a WME storage facility, in order to keep it out of the hands of the enemy, resulted in the potential release of poisonous gas, violating NCA guidance to prevent and avoid the release of poisonous gas during operations to secure the WME sites. A second instance was the issuing of the Gulf Partnership Ultimatum, which had the unintended consequence of causing CJTF-S initiation of hostilities. And another instance was disruption of a major power grid which OPFOR attempted to turn into a PR disaster for Blue by claiming that the power disruption caused a major chemical/gas leak at an aluminum factory that caused thousand of casualties. Blue did not have sufficient information about the factory to refute OPFOR claims, an unintended consequence due to lack of information. Other than these incidents, JTF was fairly successful in mitigating the unintended consequences of its action during the experiment.

Another issue in successfully attacking operational targets is minimizing collateral damage and fratricide. Based on responses to surveys sent to Component and JTF HQ Effects Assessment Cell SMEs, there were no instances of collateral damage and fratricide noted. However, at two Azimuth Check briefings, Senior Mentors noted one instance of unintended collateral damage and two potential fratricide incidents. The instance of collateral damage that was noted was a JFACC attack on the power grid of a major Red city that led to a loss of electrical power at a large number of hospitals in Red. Due to a lack of back up electrical generators a large number of unintended civilian casualties occurred. The two instances of potential fratricide that were noted included: a B-52 strike in an identified RFA area and an ATACMS attack in a 2nd RFA area. Each of these had the potential to injure SOF forces working within those RFAs. After investigation, it was discovered that in the handoff of RFA information between ADOCS and AFATDS, AFATDS did not recognize the RFA passed to it because there

was no definition of the type of restriction noted in ADOCS, AFATDS was unable to identify the type of restriction, and there was no hold on the type of munitions to be fired, so the strike went ahead. Procedures were put in place by the participants to avoid a recurrence of this problem. Over all, the use of EBO & EBP procedures to attach operational targets was successful.

Due to the importance of neutralizing or destroying OPFOR's WME and TBM sites, in order to protect JTF forces and Gulf Coalition Partners from attack, JFACC apportioned air assets to these threats at an equal level of importance. JFACC air allocationt for attacks on TBM and WME sites were combined in the PEL and in the JIPTL into one grouping. Based on data obtained from JFACC ATO/MTO and JIPTLs submitted daily to the JCB, on average JFACC apportioned 43 percent of its available airpower to the TBM/WME threat. Figure 26 shows JFACC's daily allocation of airpower to the TBM/WME problem.

CJTF used air and SOF assets to neutralize or destroy 133 enemy TBMs and 33 TBM launchers during the campaign. The destruction of 83 percent of OPFOR's TBM launchers effectively eliminated the TBM threat to Blue forces and Coalition partners in the JOA. Use of procedures developed as part of the Joint Fires Initiative and TST tools developed during the exercise were the key to Blue's success against OPFOR's TBM threat. Use of Collaboration and CIE tools between components enabled the JFACC to assign air assets rapidly to counter the TBM threat, as the location of OPFOR's TBM assets became known. JSOTF assets were used to locate TBM sites and destroy the TBMs and their launchers or relay target information back to JFACC for air prosecution. Naval surface and air forces in conjunction with JFACC air assets were very successful in destroying TBMs in flight during attacks on naval surface forces and APODS and SPODS in the JOA. Table 1 shows the status of OPFOR's TBM assets at the secession of hostilities.

The ONA provided the JTF with the location of all of OPFOR's WME sites prior to the start of hostilities. When Hostilities commenced, the Combatant Commander determined that there was an immediate need to secure Red's WME sites before they could become a threat to JTF Forces and coalition partners within the JOA.

Table 1 OPFOR TBM Forces Neutralized or Destroyed

Enemy Theater Missile Forces Neutralized/Destroyed					
Type TBM	Order of Battle	Destroyed	Remaining	percent TBM Destroyed	percent TBM Launchers Destroyed
MRBM (1300km)	1	1	0	100 percent	
SRBM (500km)	120	44	76	37 percent	
SRBM (250km)	40	8	32	20 percent	
SRBM (200km)	50	50	0	100 percent	
SRBM (150km)	100	30	70	30 percent	
TBM Totals	311	133	178	43 percent	
Launcher Totals	40	33	7		83 percent

Using collaboration and CIE tools, JTF formulated a plan to take control of OPFOR's WME sites rapidly and decisively. JFLCC was assigned the task to capture and neutralize the WME sites. Using a Joint force comprised of JFLCC, JFACC and JSOTF assets, all of CJTF-Ss

WME facilities were captured or neutralized by Blue MARFOR/ARFOR/SOF forces. However, prior to Blue's attack on the WME sites, CJTF-S attempted to move WME material and assets to pre-designated "Hide Sites". Blue forces were able to locate and capture these sites, using the ONA and CIE tools (IWS, ADOCS, and SPPS) to coordinate assets and mission assignments. It should be noted that all WME warheads were not secured by Blue. Some warheads were being held by CJTFS in a stadium in a largely city. However, these warheads had no method of being launched by CJTF-S forces. This comment was received from the JTF Deputy Director of Plans: "The ability to collaborate with higher and adjacent commands in a CIE gave us the opportunity to work efficiently through issues that previously would have taken hours or days."

At the beginning of the conflict CJTF-S had over 1800 pieces of major ground equipment including heavy and light tanks, APCs, MRLs, large and small caliber howitzers, and recoilless rifles at his disposal. CJTF employed the full breadth of his forces to neutralize OPFOR's ground capabilities. The use of ADOCS, IWS, and SPPS to provide a visual display of OPFOR's force movements and disposition to the entire force gave CJTF the ability to rapidly redeploy forces to counter OPFOR's moves quickly and decisively. Collaboration both horizontally and vertically using IWS enabled the rapid resolution of potential targeting and battlespace deconfliction issues between components. It also allowed JTF to assign the appropriate force for the task. Table 2 below shows the breakdown of OPFOR's major ground equipment, by type, neutralized, or destroyed by Blue forces.

Table 2 Major Ground Equipment Neutralized or Destroyed

Enemy Major Ground Equipment Neutralized/Destroyed			
Category	Order of Battle	Destroyed/ Neutralized	percent Destroyed/ Neutralized
Tanks	315	238	76 percent
TOW	111	86	77 percent
APCs	9	7	78 percent
MRLs	129	110	85 percent
Artillery	442	374	85 percent
Mortars	775	388	50 percent
CDCMs	32	29	91 percent
Total Equipment	1813	1232	68 percent

Based on an examination of DCARS, ADOCS data, and ground unit end strengths reported by OPFOR during the course of the exercise, Blue forces neutralized or destroyed 45 percent of OPFOR's ground forces. Coupled with Blue's destruction of 68 percent of his major equipment, listed above, OPFOR's ground forces were effectively rendered "Combat Ineffective".

At the onset of hostilities, the adversary had a fairly robust naval force consisting of large diesel and mini submarines, medium surface combatants, amphibious and logistics ships and a large inventory of small boats, including Bog Hammers, minelayers, and Boston Whaler type boats.

Table 3: OPFOR ground unit combat effectiveness as of the end of the exercise.

Enemy Ground Unit Combat Effectiveness (Personnel)		
Headquarters	**Unit**	**Combat Effectiveness (Personnel) @ ENDEX**
Ground Force HQ	Division Strength	63 percent
	2nd Mech BDE/8th DIV	100 percent
	3rd Armor BDE/8th DIV	100 percent
	1st Armor BDE/88th Armor DIV	100 percent
	300th ARTY BN	100 percent
	2nd Armor BDE/88th Armor DIV	100 percent
	381st ARTY BN	100 percent
	1st Marine BDE	3 percent
	2nd Marine BDE	3 percent
	34th Marine BDE	89 percent
	91st SAR Flight	15 percent
	41st ATK/ASSLT BN	25 percent
	3rd ATK BN	26 percent
	4th ASSLT BN	25 percent
19th INF DIV	Division Strength	68 percent
	1st INF BDE	95 percent
	2nd INF BDE	96 percent
	3rd INF BDE	100 percent
	4th Mech BDE	22 percent
	19th DIV ARTY	38 percent
	48th INF BDE	75 percent
	33rd Airborne BDE	81 percent
	37th Armor BDE	39 percent
41st MECH DIV	Division Strength	29 percent
	1st INF BDE	56 percent
	2nd Mech BDE	2 percent
	3rd Armor BDE	46 percent
	4th INF BDE	79 percent
	55th Airborne BDE	33 percent
	28th Armor BDE	26 percent
	56th ARTY Group	7 percent
	1st CAV SQDN	5 percent

	Enemy Ground Unit Combat Effectiveness (Personnel)	
Headquarters	**Unit**	**Combat Effectiveness (Personnel) @ ENDEX**
	41st DIVARTY	3 percent

All small craft were equipped with machineguns and RPGs. Using collaborative tools to deconflict the battlespace and coordinate forces, Blue naval surface, subsurface and air forces successfully neutralized or destroyed 53 percent of OPFOR's naval forces one SSN defected to GOR prior to ceasing of hostilities.(80 percent of OPFOR's major combatants and 40 percent of the small boats). Table 4 below shows a breakdown of OPFOR's naval forces neutralized or destroyed by Blue during hostilities.

Table 4 Enemy Naval Vessels Neutralized or Destroyed

Enemy Naval vessels Neutralized/Destroyed			
Ship Type	Order of Battle	Destroyed/ Neutralized	percent Destroyed/ Neutralized
Submarines	8	8	100 percent
Surface Ships	30	28	93 percent
Small boats	133	53	40 percent
Amphibious/Logistics	23	13	57 percent
Totals	194	102	53 percent

Blue was very successful in targeting, neutralizing and/or destroying OPFOR aircraft, SAMs, and radar systems. JFACC, through the use of an integrated ATO/MTO, was able to effectively use all available Blue assets to locate, target and attack OPFOR's SEAD and IADS. Use of collaborative tools, specifically IWS and ADOCS, enabled JFACC to assign the appropriate assets and deconflict the airspace to effectively prosecute air, SEAD, and IADS targets. Table 5 below shows the breakdown of OPFOR's systems destroyed or neutralized by Blue forces.

Table 5 Enemy Aircraft/SAMS/Radars Neutralized or Destroyed

Enemy Aircraft/SAMS Neutralized/Destroyed			
Type Aircraft	Order of Battle	Destroyed	percent Destroyed/ Neutralized
Fighters	76	65	86 percent
Recon/SAR	1	1	100 percent
C2/ECW	10	10	100 percent
Support	12	10	83 percent
Misc	60	52	87 percent

Enemy Aircraft/SAMS Neutralized/Destroyed			
Type Aircraft	Order of Battle	Destroyed	percent Destroyed/ Neutralized
IADS Radars	14	14	100 percent
SAMS	19	19	100 percent
Totals	192	171	89 percent

After a review of the enemy nodes selected by JTF for attack, it was determined that 53 ETO designated nodes and 39 non-ETO designated nodes could be attacked with non-kinetic weapons. Of the nodes that could be attacked using non-kinetic weapons, only five nodes were identified as being attacked non-kinetically. The non-kinetic attacks on the five selected nodes were successful and helped the JTF achieve its desired effects. Due to exercise construct and constraints JTF did not have the time or resources to employ non-kinetic weapons against targets capable of being affected by these weapons. As a result JTF went to the kinetic option quickly to achieve his goals. A more robust JIACG and reachback capability would have allowed the JTF more latitude in the use of non-kinetic weapons to achieve some of the effects identified in the ETOs.

In summary, based on an analysis of the data collected over the course of the experiment, the ability of the JTF to attack operational targets to achieve desired effects appears to have been successful. Using the ONA, the JTF chose the PMESII nodes for attack that would most quickly achieve the desired effects promulgated in the ETOs in effect. The JTF also, chose additional nodes, not necessarily associated with a designated ETO effect, to be attacked that were thought to be needed to support his operations within the JOA. Based on BDA data contained in the ONA, a total of 214 enemy PMESII nodes were successfully attacked. Of the 214 nodes attacked 70 nodes were directly associated with an ETO designated effect. The disparity between the total number of nodes selected for attack and the number of nodes directly associated with an ETO effect, points to the possibility that nodal analysis was not being done by the planners. It also indicates deficiency analysis that could determine if the correct nodes were being selected for attacks were the right ones, was also not being accomplished in the assessment cells. Survey data indicates that no deficiency analysis was being conducted in the EAC. This leads to the question of whether all the nodes attacked needed to be attacked to achieve JTF's desired effects. The nodes selected for attack have a major impact on resources, one of the key tenets of EBO is to minimize resources required to achieve the desired effects. Attacking unnecessary targets reduces the resources that could better be used elsewhere. Nodal and Deficiency Analysis are key components of the EBO concept, more training needs to be conducted on their use and these processes needed to re-tested during future exercises and experiments.

Based on the minimal level of collateral damage noted during the campaign (three instances noted) that the planners and targeteers effectively used the ONA, and available reachback capabilities to assess the unintended consequences and the probable collateral damage associated with the targets selected for attack. They were then able choose the appropriate weapons and platforms to cause maximum damage to the target while minimizing damage to the surrounding areas. Using CIE, specifically IWS and ADOCS, JTF was able to quickly deconflict the battlespace, minimizing the risk of fratricide within the target areas. There were two incidents of potential fratricide noted during the exercise. Both of these incidents were caused by software

problems associated with ADOCS and AFATDS. During the course of the exercise, procedures were developed to correct this problem and make ADOCS more effective and useful as a targeting tool. These new procedures need to be re-tested in future experiments and exercises and incorporated in the TTP.

Based on attrition data obtained from the ONA, OPFOR status reports, ADOCS and DCARS, JTF's campaign against OPFOR operational targets was very successful. Using the ONA to locate key targets and WME sites, and CIE tools to maintain situational awareness throughout the force, JTF was able to assemble the right mix of forces and deploy them rapidly to counter OPFOR's movements. OPFOR's primary WME sites were located and secured quickly. OPFOR's naval (80 percent of major combatants destroyed), and air forces (89 percent of force, including SAMS were destroyed) were decimated and most units of his ground forces were rendered combat ineffective. OPFOR's TBM threat was rendered useless with the destruction of over 80 percent of his TBM launchers. In addition, JTF's use of CIE in conjunction with established TBMD procedures and equipment (post 2007 technology) enabled the force to destroy 100 percent of the TBMs launched against the force. .OPFOR's combat forces represented a significant portion of GOR's armed forces. The massive destruction of OPFOR's equipment by Blue, could have an unintended consequence of destabilizing the military balance of power within the region. Due to the inadequate use of nodal and deficiency analysis by JTF and components during the experiment, it is uncertain whether the level of destruction of OPFOR's forces and equipment by Blue was really necessary to achieve JFT desired effects.

The EBO concept is intended to give the JTF the tools to achieve desired effects using the minimal amount of force. The JTF was given a wide array of both kinetic and non-kinetic weapons to choose from to use against his selected targets during the experiment. Use of non-kinetic weapons to achieve a desired effect usually results in minimal damage to the target and minimal use of available resources. However, non-kinetic weapons can take a long time to achieve a desired effect. Due to the construct and time limitations of the experiment and the lack of a robust JIACG and reachback capability, non-kinetic weapons were not the first choice of the JTF for use against selected targets. In addition, detecting the effects a non-kinetic weapon has on a target may be difficult to assess. In some instances, only the adversary will know that the non-kinetic weapon is having an effect. In this experiment, BDA information was inconsistent, incomplete, and often times, late. The M&S used during the experiment did not have the fidelity to assess non-kinetic effects and it was left up to the JECG to validate the results. The success of EBO depends on the use of all DIME assets to achieve desired effects. Due to exercise limitations, non-kinetic weapons and the use of DIE components of national power were not emphasized during the experiment. It is recommended that the use of non-kinetic weapons with a more robust ONA, JIACG and reachback capabilities be examined in future exercises and experiments. In addition, M&S needs to be improved and new models developed to better replicate non-kinetic weapon capabilities and effects.

Subtask: Conduct precision engagement against time sensitive targets

Finding 6:

Based on a review of available target data, approximately 927 targets, within the JOA, were identified as potential TST targets meeting the TST requirements and priorities established by CJTF in ETO-1, 1A & 2. The TST priorities established in the ETOs, by CJTF, included CJTF-S TBM sites, CDCM sites, IADS/SEAD sites, WME facilities, C^2 sites, CJTF-S leadership, submarines, and Communications/Headquarters facilities. Of these available targets, 444 (48 percent) were located, identified, and nominated for attack by friendly forces. Of the 444 targets identified and nominated for attack, 327 (78 percent) targets were prosecuted and 122 (27 percent) of these were assessed as destroyed or neutralized. Figure 5 below shows the breakdown of targets nominated, prosecuted, and neutralized by each Functional Component during the course of the experiment.

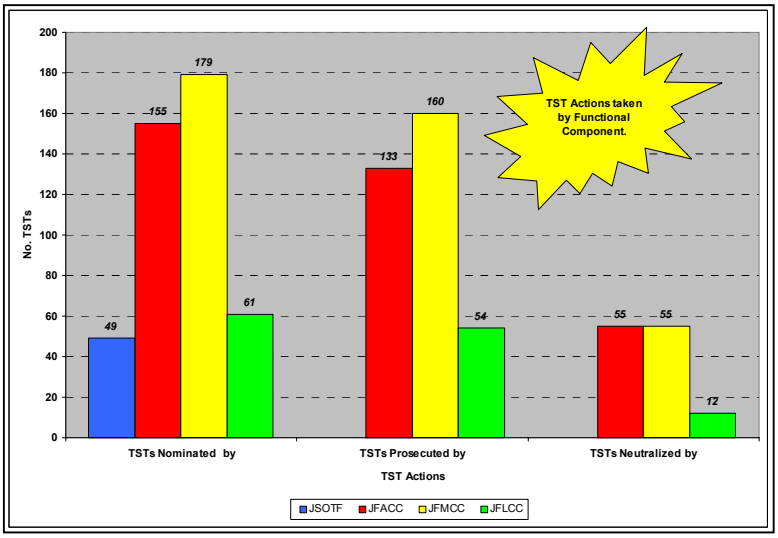


Figure 50:

Seventy-eight percent of identified and nominated TST targets were engaged by friendly assets. The percentage breakdown of TST targets engaged by friendly forces follows: 38percent were engaged by JFACC assets, 46percent were engaged by JFMCC assets, and 16percent were engaged by JFLCC assets. Table 6 below describes the breakdown of TST attacks by Functional Commander. It is significant to note that SOF assets were not used to attack TST targets; they were however used to locate, identify, and spot TST targets.

Table 6 TSTs attacked by Functional Component

		TST Attacking Component				
TST Nominating Component	**# Targets Nominated**	**TSTs Attacked by JSOTF**	**TSTs Attacked by JFACC**	**TSTs Attacked by JFMCC**	**TSTs Attacked by JFLCC**	**Totals**
JSOTF	49	0	15	21	2	38
JFACC	155	0	81	36	13	130
JFMCC	179	0	27	92	23	142
JFLCC	61	0	10	11	16	37
Totals	**444**	**0**	**133**	**160**	**54**	**347**

Twenty-seven percent (122) of the identified TSTs engaged by friendly assets were successfully neutralized or destroyed. 45percent were neutralized by JFACC assets, 45percent were neutralized by JFMCC assets, and 10percent were neutralized by JFLCC assets.

Based on an analysis of the TST target data available to date, once a TST target was located and identified by a JTF asset, it took an average, of 51 minutes from nomination to target prosecution, for all target priorities. It should be noted that this average is skewed by 10 targets that took more than 10 hours to prosecute after being nominated for attack. Removing these 10 targets from the database reduces the average time, from nomination to attack, to 34 minutes. Table 7 below shows a breakdown of the average time from target nomination to attack by target priority.

Table 1 Average time from TST target nomination to attack

TST Target Priority	No. Targets Attacked	Average Time (mins.)
1	101	65
2	54	80
3	6	13
4	60	48
5	96	100
6	8	23
7	2	15
8	4	79
None	16	34
Totals	347	51

In summary, during this experiment, JTF was able to demonstrate the ability to conduct precision engagement against time sensitive targets (TST). Potential TST targets were identified and prioritized by CJTF, in his ETOs, based on their impact on JTF operations and desired effects. Components located and identified TSTs IAW JTF ETO guidance and nominated targets for attack. JTF used CIE tools to coordinate and assign resources to attack the nominated TSTs. The functional components used the CIE tools to provide cross-cueing of targets and to provide an almost seamless handoff of TST responsibility between the Functional Commanders during TST prosecution. Based on the ONA and JOA target folders, there were approximately 927 potential TST targets within the JOA, based on JTF TST guidance. Of these, 444 TST targets were located and identified by the components and nominated for attack. JFMCC nominated 40percent of the TST targets for attack, with JFACC nominating 35percent, JFLCC 14percent, and JSOTF 11percent. Of the 347 TST targets actually attacked, JFMCC was responsible for attacking 46percent of the TST targets with JFACC attacking 38percent and JFLCC 16percent. It should be noted that although JSOTF nominated 11percent of the TST targets, they were not responsible for attacking any TST targets. Data to calculate the average time from detection to neutralization is still being analyzed to the amount of data that needs to be reviewed, however, with the data currently available it was determined that the average time from TST nomination for attack to the actual attack was 51 minutes. Of the 347 targets attacked 10 TST targets took longer then 10 hours to attack after nomination. Removing these outliers from the database reduces the average time to 34 minutes. There are indications that during the course of the experiment as the participants became more familiar with procedures and use of the CIE tools the average time from TST detection to attack was reduced. The TST process as demonstrated during this experiment appears to be ready for implementation as a joint procedure. Recommend

updating the TTP to incorporate lessons learned and new procedures implemented for CIE tools during the experiment, continue to refine TST procedures and tools in future experiments and exercises and field the TST tools and procedures as soon as practical.

Finding 7:

During the course of the experiment SOF assets were responsible for locating and identifying 49 TST targets (11percent). However, SOF assets were not used to either neutralize or destroy any TST targets. There was no data available on whether or not SOF provided BDA data on any TST targets, but it should be assumed that since they were being used to locate, identify, and provide targeting data to the attacking platforms, that they were able to provide some level of BDA to the components and the JTF assessment cells.

Component and JTF-HQ operations SMEs were surveyed periodically throughout the course of the exercise to determine if there were any TST missions canceled by the JTF-HQ. Based on their responses, there were no instances of TST missions being canceled by the JTF HQ noted. During the experiment, adequate assets were available for all TST missions. TST targets with a potential for unacceptable levels of collateral damage were discussed during JCB briefings and mitigated as to whether they should remain on the target list or be removed. Based on this, JTF did not have to cancel any TST missions.

Surveys were sent to Component and JTF-HQ Operations SMEs periodically during the exercise to determine if there were any instances of TST resource allocation that required JTF-HQ adjudication. Based on the responses received, there were a few instances noted when TST resource issues needed to be adjudicated by JTF HQ. Most of the instances concerned weapons selection to reduce or minimize collateral damage. The JFMCC SME noted, “JTF weighed in on approx. 10 instances in resource allocation.”

Although JFACC and JFMCC attempted to mitigate the probability of disruption, cancellation, or modification of operations due to emerging TST missions, by pre-designating resources to the TST mission in the ATO/MTO, there were still instances where the ATO/MTO had to be modified on the fly to accommodate emerging TST missions. However, in general, overall operations were not delayed, disrupted, canceled, or modified due to TST missions. One instance was noted by a Senior Mentor, "most targets were nominated above the line, except on one occasion when 48 JFLCC targets were nominated below the line. This happened because JFMCC had set aside an air package for TST purposes, and therefore, the JFLCC targets were not hit. JFLCC was supposed to be the "Main Effort".

Initial TST guidance was issued by the JTF Commander under ETO-1 (Operation Sovereign Passage) and modified by FRAGO #s 015, 018, 021, 023, and 027. Initial TST targets were identified by priority and included: TBM sites, WME sites, OPFOR leadership, SA-20 systems, CDCM sites, submarines and midget submarines, OPFOR massed formations, mining activity and vessels, and swarming boats. In addition to prioritization, amplifying information on each target type was provided. Each FRAGO was issued to reprioritize targets, and to add or delete target types as the scenario progressed. No TST guidance was issued in either ETO-1A or ETO-2.

Surveys were sent to component and JTF-HQ operations SMEs to identify instances of TST priority categories and their impact on TST operations. The results of the surveys indicated that instances of the usage of TST priority categories were identified, but none had any significant impact on TST operations. “TST priority categories were used with the TST targets,’ said one SME observer. “All targets were tracked and passed to the JFACC in a timely manner

and acted upon." (JSOTF SME). TST priority categories had no negative impact on targets being struck." Moreover, he said, "priorities on TSTs did not hamper them being struck."

Based on surveys sent to Component Operations SMEs and JTF HQ TST Cell SMEs and other anecdotal evidence; throughout the experiment there was no degradation of TST capability during transfers of TST responsibility from one functional component to another noted. In fact, due to IWS, the JFE/TST process and ADOCS/TBMCS protocols developed during the exercise, TST transfers were virtually flawless and seamless from one functional component to another. "Great coordination by JFMCC and JFACC operations groups in execution of TSTs," said one expert. "Smooth handoffs generally between functional components thanks to good collaboration using IWS, ADOCS, and TBMCS." Another SME noted, "IWS and ADOCS have been excellent tools in supporting collaboration and prosecution. All TST missions were transferred without degraded capabilities."

In summary, based on the information received from the surveys submitted from various Component and JTF HQ SMEs as shown above, it appears that the TST process, linked to the Joint Fires Initiative (JFI), worked extremely well. "The TST process worked – need more ISR M&S to accurately represent TSTs – need to differentiate between TSTs and TCTs and how they should be attacked and screened for collateral damage," said a component Operations Chief. And according to one senior officer, "The JFI and TST are bullet proof. We got good response. The JFI is one of the success stories and so far is focused on TST."

Anecdotal evidence indicates that the driving factors for the success of the TST/JFI process were CIE (especially IWS) and ADOCS procedures developed during the exercise. Over 200 TSTs were prosecuted during the exercise. "The CIE has been essential," said a Senior Mentor. "The JTF has executed over 200+ TSTs, an amazing feat. However, there is a tradeoff because those assets have been planned to hit other targets. However, all components requirements were filled." The time to process TSTs from nomination to prosecution initially was slow to develop, however, as familiarity with the procedures and tools increased, the time delay between nomination and prosecution decreased dramatically. The use of ADOCS with IWS enabled the smooth flow of information as TST responsibility was passed from one functional commander to another for prosecution.

"The process for TST collaboration was mature within the Air Force," said the Commander of the JFACC. "JFI and ADOCS helped component collaboration." The ability to identify TST targets and post them in ADOCS enabled all components to maintain good situational awareness of the TST threats.

There were some shortfalls. During a number of 'Azimuth Check' briefings, Senior Mentors observed that although the TST process apparently worked very successfully, some of the targets assigned as TST targets probably did not qualify as TST targets. In their opinion, some components were using the TST process solely to improve the priority of targets they wanted prosecuted, even if those targets didn't meet TST requirements. "We had many TSTs that were not truly TSTs," said Plans Chief. "The term TST still has a confusing dysfunctional definition because it covers to broad a range of eventualities," according to a Senior Concept Developer. "We need to distinguish between very threatening targets that need to be killed immediately when identified, and those that are fleeting, highly lucrative targets. One definitional term cannot adequately cover both eventualities without confusion in planning and execution. There are differences that need to be sorted out between TST, HPT, and HVT because there is still much confusion."

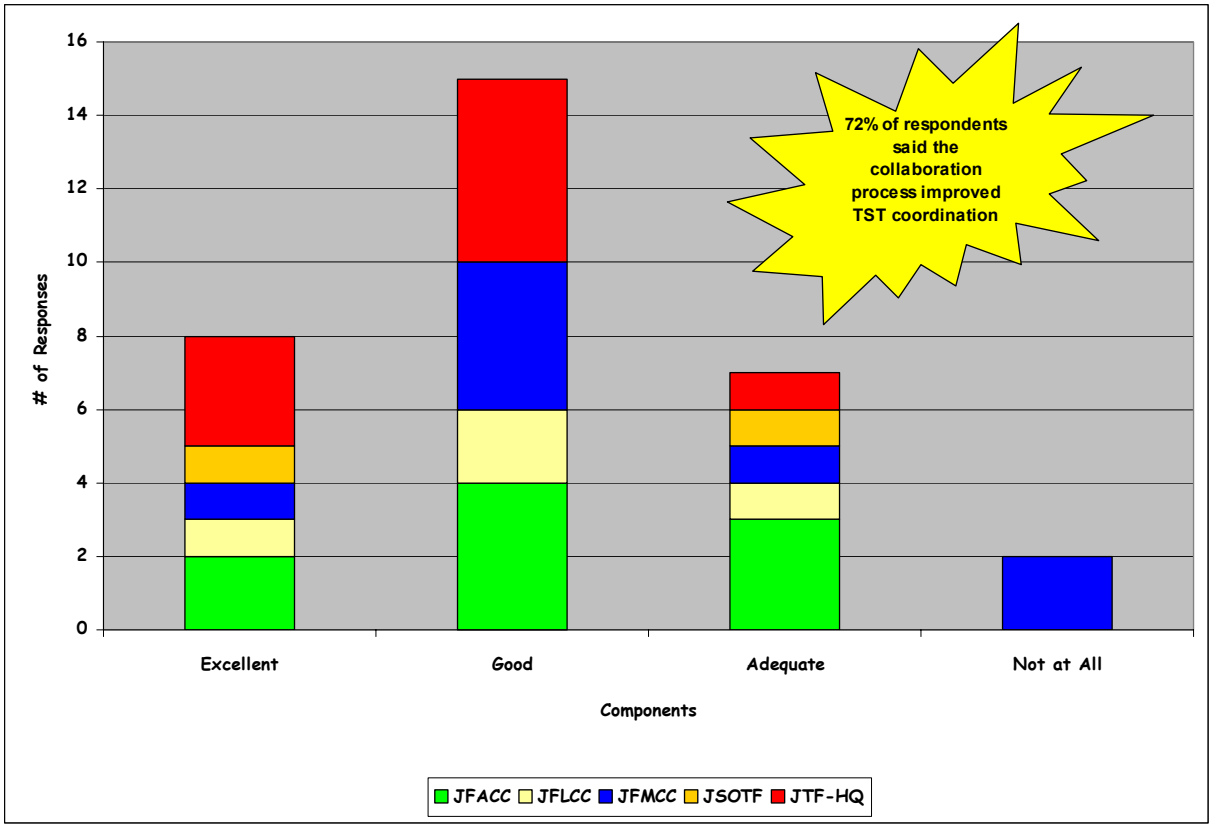


Figure 51: Participants say collaboration improved TST coordination

The TST process as utilized during the experiment showed great promise. However, the definition of a TST, as used in the experiment, was very broad and led to a number of targets being designated as TSTs simply to improve their priority in the ATO/MTO even though they did not qualify as a TST. A better definition of a TST needs to be developed highlighting the differences between a target that needs to be prosecuted immediately (TBM, CDCM, etc.) and one that can wait until an asset is available to prosecute it.

The procedures for using CIE tools for consolidating and coordinating TST information and prosecution were refined and improved during the experiment. These revised procedures need to be verified during future exercises and codified in the TTP.

The TST process/concept, incorporating lessons learned and the revised procedures developed during the experiment, needs to be further verified and tested during future exercise and experiments and implemented as a joint procedure as soon as possible..

Subtask: Document emerging Joint collaborative planning lessons and requirements for future TST operations

Finding 8:

Surveys were sent out to 32 Component and JTF-HQ SMEs asking them to rate the collaboration processes for JTF and Component planning TSTs. The overwhelming response to this question was that the collaboration process greatly enhanced the process for JTF and component planning TST identification and prosecution. Seventy-two percent of the respondents rated the process as “Good” or “Excellent”, 22percent rated the process as “Adequate” and only

6percent rated the process as "Not Effective at All". The figure below shows the breakdown of responses.

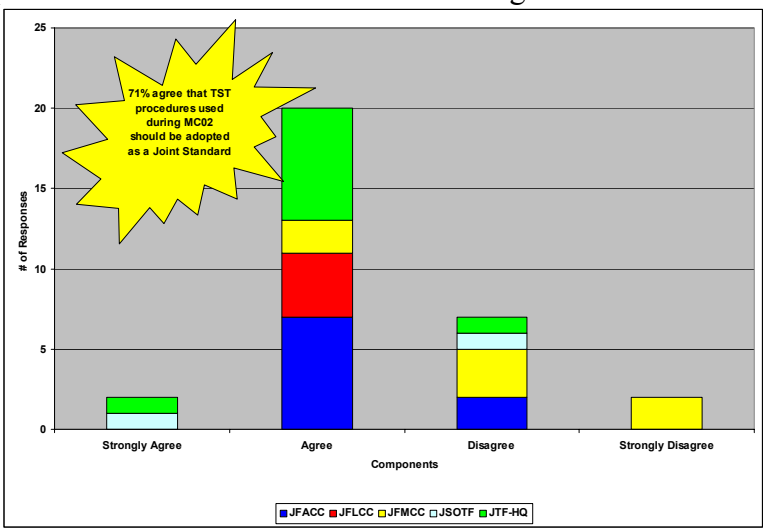
Collaboration and standardization were the most appreciated attributes of the tools brought to the experiment, according to Subject Matter Experts. "The tool really supported getting everyone on the same page, and worked towards standardization of reporting," said one expert. "More emphasis needs to be placed on business rules enforcement, and each component needs to put more thought into their doctrine behind TST." Said another, "Without chat, the immediacy of TCT might have been lost. WTP[sic: Weapon to Platform] was coordinated quickly, as opposed to entering data into a target card, having it fully understood, and perhaps not knowing who was going to engage." And lastly, "The tool is good right now with the potential to be great. Keep pressing."

On the negative side, one user noted, "With multiple users using multiple tools, there were numerous opportunities for human error, such as multiple conversations in several rooms, information being dropped or acted on by multiple parties. The process needs to be more automated with better error data." Another's remarks were more tempered, "The only problem was that the components weren't updating the TST info in the DTL," he said. "If the components don't support the system, the process and/or info in the system is corrupt."

It is apparent that the collaboration process in support of TST planning and execution was a winner; further testing to refine CIE procedures and processes should be conducted as soon as possible in order to have the process and tools implemented quickly.

32 survey responses were received from Component and JTF-HQ SMEs asking if the TST procedures used during MC02 should be adopted as a Joint Standard. Seventy-one percent indicated that the TST procedures used during the experiment were well prepared and with some changes, identified and implemented during the exercise, were more than adequate and should be adopted as a Joint standard. 29 percent of the respondents felt that the procedures were not ready for implementation as a Joint Standard. The Figure 28 below shows the breakdown of responses received with the surveys.

Figure 52: Should TST procedures used in MC02 be adopted as a



One SME favors adoption of the procedure, "It needs to be fielded and manned down to MSCs as it is at the components." But others thought the system had some maturing to do before it is fielded, "This system has a long way to go before it is ready for fleet use," a participant said, "it has integration and human factors issues. CONOPS also need to be refined and improved especially in the area of CM and BDA." Said another, "Almost there. There is a good baseline to work with, but not quite ready to go prime time. That's not the purpose anyway. The purpose is to experiment and learn -- then refine and go to prime time. I think details need to be provided, especially in terms of reporting processes, and

access to reports. As one of the folks in charge of BDA analysis, I had extreme difficulty in obtaining timely reporting from other components."

32 Component and JTF-HQ SMEs responded to this survey. 72percent of the respondents rated the use of ADOCS as a common targeting toolset as adequate to excellent. 18percent of those surveyed felt that ADOCS was not adequate to use as a common targeting toolset. The Figure 29 below shows the breakdown of responses by JTF and Component SMEs:

Some favored ADOCS, "...works as long as components are disciplined and close the loop with the TST in the Target Card," said one expert, "System has the right blocks but hard to get them filled in".

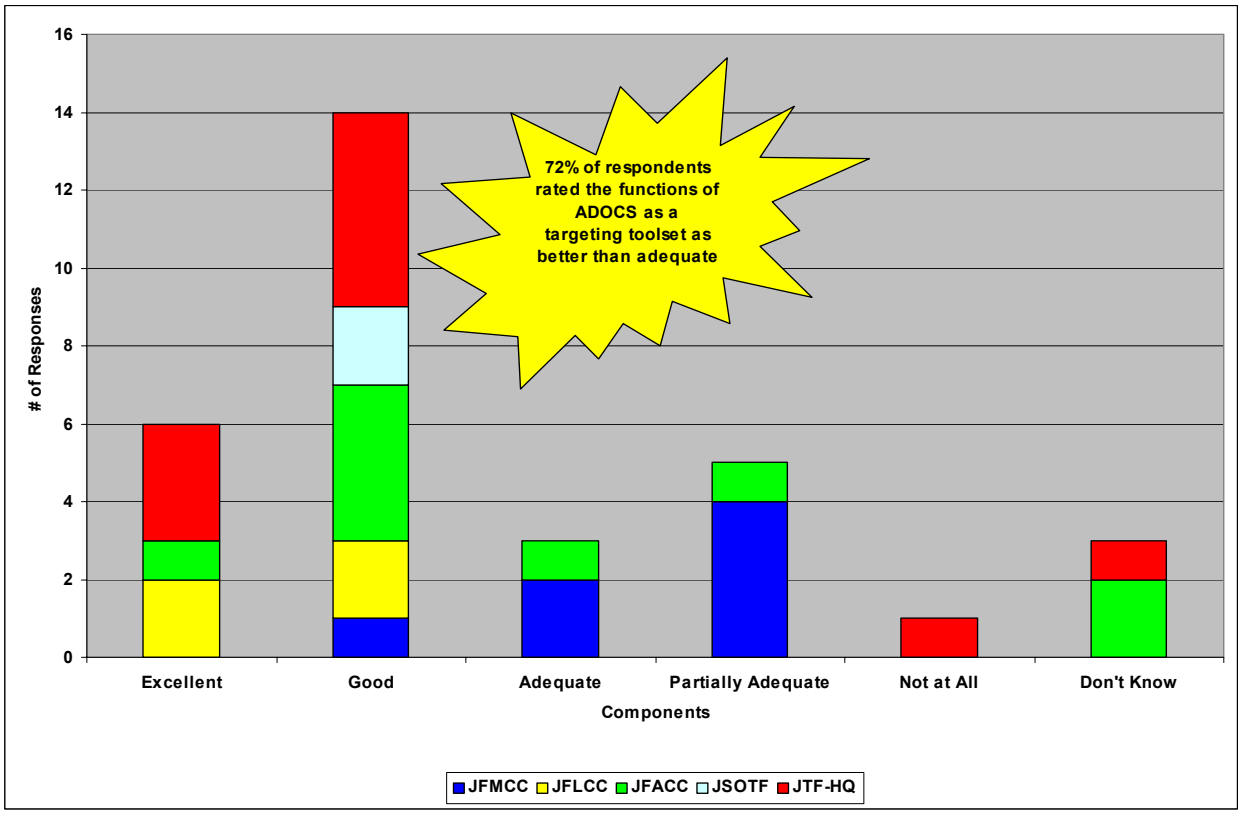
However, not all agreed, "There is support, but I don't think we Components within the JTF have come to a common understanding of what information to put in the blocks, when, and when to turn colors," said one participant, "It appears there are coordination issues there as well. Our BDA assessment person had to manually monitor and follow up on everything".

Overall the majority of respondents indicated that the use of ADOCS as a common targeting toolset has great potential. More fidelity may be required to identify TST targets and some procedures need to be modified and added. However, evidence indicates that ADOCS or a similar tool greatly enhances TST prosecution. Due to the potential ADOCS showed during this experiment, it should be fielded as a TST targeting tool.

In summary, the JTF was able to attack operational targets to achieve desired effects. Analyzing attrition data obtained during the experiment, and reported above, JTF was successful in neutralizing or destroying OPFOR's ability to conduct war. Over 80percent of OPFOR's air and naval forces were destroyed, his WME primary facilities and equipment were captured and neutralized, and most units of his ground forces were rendered combat ineffective due to the destruction of over 60percent of his equipment and 40percent of his troops. JTFs use of the ONA, to establish the key nodes and linkages that would most greatly affect OPFOR's ability to conduct his operations, and the use of CIE tools and collaboration to coordinate his forces enabled JTF to counter OPFOR's force movements quickly and efficiently. Although the ONA used during this exercise was not very robust and reachback capabilities were limited, the information contained in the ONA coupled with reachback capability and collaboration gave the JTF the tools needed to select the appropriate weapons and platforms to achieve the desired effects, while minimizing collateral damage while also minimizing the risks of fratricide. The process linkages between the ONA, ETO, and PEL need to be examined further. Some of the nodes that were attacked during the exercise where not identified as critical nodes for the effects contained in either the ETO or PEL. If these nodes were essential to achieve CJTFs desired effects, why weren't they identified in either ETO or the PEL? If they were not essential to achieve CJTF desired effects, why were they attacked? If the nodes served no purpose, resources allocated to attack the nodes could have been better used on other missions. EBO's main objectives are minimizing resources used and unnecessary collateral damage while achieving CJTF goals.

Due to the poor BDA received during the experiment, and the lack of good ISR models, there were higher incidents of targets already neutralized being re-attacked and targets still combat effective not being attacked than should have been expected. This led to some potential resource allocation problems such as using a lesser desirable weapon or platform being used to attack some of the other targets. The Joint Fires Initiative Concept coupled with TST procedures was very successful. The ability of the force to use collaboration and CIE tools for cross-cueing of TST and other targets, and the coordination of forces within the battlespace to minimize mutual interference and battlespace deconfliction issues improved target prosecution significantly. Collaboration enhanced the ability of the components to coordinate the handoff of TST targets from one component to another almost seamlessly.

Basic procedures are in place for using collaboration for TST operations. In addition, new and revised procedures and processes are being developed for implementation in the TTP documents to correct some of the problems incurred during the experiment. Collaboration as part of the TST process greatly changes the dynamics of the process, coordination at all levels (horizontally and vertically) is enhanced, and time from target nomination to prosecution is improved. Although some ADOCS problems were experienced during the experiment, when used properly, ADOCS can provide a good visual display of the battlefield, thus providing operators and planners, at all levels, improved common Situational Awareness, combat assessment of the TST mission, and the quick decisions to re-strike targets. ADOCS, when used in coordination with other CIE tools (specifically IWS) simplifies the airspace and operations deconfliction process and makes the assignment of assets to prosecute TST targets more efficient. The handoff of TST responsibility from one functional component to another becomes less complicated and quicker ensuring that the appropriate weapon and platform are assigned to



the target (83percent of SMEs surveyed thought that ADOCS ability to hand off TST

responsibility to another component was excellent). During early portions of the exercise ADOCS information was not getting into JFACC's TBMCS tool. As the exercise progressed, workarounds were put in place to ensure that the correct target information could be found in both tools. The ADOCS interface with TBMCS needs some improvement to ensure that accurate and complete information is being passed between the tools. IWS is a powerful tool that provides amplifying information quickly to all participants in the TST process (perfectly compliments ADOCS/TBMCS). However, use of this tool can become excessive and burdensome and business rules need to be put in place and enforced to limit the time spent in lengthy chat room sessions. Recommended changes to the current TTP, for using CIE tools in TST operations, and incorporating lessons learned during the experiment will be submitted as part of the DOTMLPF package. Recommend the TST process with incorporation of revised procedures and opportunity. In addition, recommend that ADOCS be fielded as an interim TST targeting toolset.

Task: Coordinate and integrate Joint, multinational, and interagency support for EBO

Finding 9:

After reviewing the ONA, ETO-1, ETO-1A, ETO-2 and their associated PELs, a total of 140 nodes were selected for attack in the PELs, of these 53 nodes were identified as being able to be attacked using DIE actions (38percent). Thirty nine additional nodes, not associated with an ETO desired effect, were also selected for attack. Only five of the selected nodes were attacked using DIE actions and these actions were all successful. This exercise was heavily weighted for the use of the "M" military portion of national power with minimal consideration of DIE actions. This was driven by the construct of the exercise and the lack of a robust JIACG component and reachback capability.

Surveys were sent to Effects Assessment Cell SMEs on a daily basis to determine if attacks using DIE actions had the desired effects. The preponderance of effort during this exercise was on the "M" portion of DIME. Expert observers noted, "Have not observed any DIE means from the EAC. EAC is focused on "M" only, although they constantly get ONA/SOSA inputs from Pol/Mil and ONA effects in their assessment decisions," he said, "we do not see much DIE activity from this point of view." Another saw some activity, "We started to factor economic aspects into the plan, but no attacks resulted", "…discussed using economic, PA means to influence enemy leadership".

As one observer noted, "The 'M' portion of DIME can be rapid and decisive, DIE portions take time to implement and effect the situation." The lack of a robust JIACG contingent and reachback capabilities to key Centers of Excellence may have been the reason for the short shrift given to DIE components of national power. Another limitation to the implementation of DIE alternatives was the construct of the scenario.

As noted by a Component Operations Chief, "The role of DIE was underplayed in the scenario. More emphasis on the non-kinetic aspects of DIME could have preempted the outbreak of hostilities." Additional observations from Component and JTF Planners in regards to interagency support and the use of DIE components of national power included, "We didn't have much IA input. Centers of Excellence are useful for day-to-day operations. However, when planning RDO, they don't have much utility because things move too fast. They can help in the planning process, especially with infrastructure. They are useful in providing resources to fill the gaps in our knowledge." "We must have good IA input into the ONA process."

As in other aspects of the MC02, exercise/experiments constraints had some negative impact on the results in IA. Said one participant, “IA visibility was limited by the experiment constraints. We need live contact for it to be effective.” Yet one former Dep. Asst. Secretary of State had seen enough to make up his mind with regard to the usefulness of the JIACG, "The concept is validated. Future operational planning must be an Interagency Enterprise."

In summary, the ability to coordinate and integrate Joint, multinational, and interagency support for EBO was effectively demonstrated during the experiment. However, the use of DIE elements of National power to produce the JTFs desired effects was not effectively demonstrated during this exercise. The use of DIE actions to achieve desired effects is a concept that needs further examination in future experiments and exercises. This concept needs to be reexamined using as close to a full up JIACG as possible with a robust reachback capability included. The potential for this concept is enormous and could become the cornerstone of a Combatant Commanders CONPLAN. The downside to the use of DIE actions is they are sometimes very slow moving and not very conducive to RDO. However, the ability of these types of actions to achieve CJTF goals with a minimum loss of life and resources cannot be overstated. With the potential impact of DIE actions on the battlespace and the diverse organizations and individuals needed to implement DIE actions, who should be responsible for coordinating DIE actions and where should the JIACG be located? Should the JIACG be a "JX" function at the Combatant Commander level or a Component/Cell at the JTF level? A problem with DIE actions is how do you measure success or failure, many DIE effects can only be sensed by the adversary, others are so subtle as to be immeasurable, due to this, it is sometimes difficult to determine which actions are working and which ones need to be terminated. Recommend a dedicated JIACG exercise be conducted to further evaluate the process. Tools need to be developed to properly assess DIE actions.

Warfighting Challenge Conclusion: The ability to synchronize the application of the full range of Joint capabilities in order to engage decisive points in time and space, as demonstrated in this exercise, was enhanced by the use of EBO and Planning. The use of CIE tools gave the JTF and Functional Components the ability to plan simultaneously both horizontally and vertically allowing quicker and better-developed responses to an adversary’s actions. The ability to access and understand the application of all facets of national power (DIME) to achieve desired effects enabled the JTF to respond in a more comprehensive manner to choices in the political and economic scenario. The ability to develop operational targets was successfully demonstrated and the ability of the JTF to prosecute TST targets using JFI/TST procedures was a significant success. Collaboration enabled the functional components to quickly identify, and prosecute TSTs, as they were found, enabled cross-cueing of targets and provided a nearly flawless transfer of target responsibility from one functional component to another.

The ability of the JTF to conduct Operational Combat Assessment was not demonstrated successfully. The ability to obtain accurate and timely BDA to assess the success or failure of JTF target prosecution was hindered by poor M&S fidelity and ISR models inability to accurately replicate ISR assets. Without accurate and timely BDA, some JTF assets were tasked to re-attack targets already destroyed, and some targets that required re-attack were not placed back on the target list.

JTF demonstrated the ability to successfully attack operational targets, using the ONA and reachback capabilities to determine weapon and target selection to attain the desired effects promulgated in the ETO. The consensus of opinion indicates the TST procedures used during MC02 are very close to being ready to use as a Joint Standard. Some of the procedures and

techniques were modified during the exercise and these changes need to be incorporated in the TTP. ADOCS proved to be a viable targeting tool, especially for TST prosecution. However, most users indicated that ADOCS needs further development to become more user friendly. Recommend further development and testing of ADOCS in future experiments and exercises. The ADOCS interface with other software systems needs to be upgraded to ensure compatibility with other systems used throughout the JTF.

The ability to integrate joint, multinational, and interagency support for EBO is a concept that showed great potential during the exercise. The use of DIE pillars of national power can have a powerful effect on the battlefield. However, who should control and coordinate these assets. The JIACG, as used in this exercise, was constituted as a cell/board within the JTF, this may not be the appropriate place for it. Most DIE assets are not controlled by CJTF and the effects they generate are most associated with COMBATANT COMMANDER/National goals (nation building, regime change, coalition building, humanitarian aid, etc.) as opposed to CJTF desired effects; and in some instances can work against CJTF's plans. A comment from a Senior Concept Developer: "The CJTF doesn't have the horsepower or authority to access all aspects of DIME." One Recommendation for the JIACG, proposed by some Senior Mentors and Players, constitutes the JIACG as a liaison cell/group on the JTF staff. The group should apprise the JTF on what DIE actions are being conducted or contemplated and to solicit inputs on how these actions are affecting or will affect CJTFs overall campaign plan. The JIACG places the main emphasis on a "JX" component on the Combatant Commanders staff to direct and coordinate DIE actions. In this exercise DIE actions were discussed and contemplated by the JTF, but for the most part they were not implemented. Due to the construct of the experiment, the major emphasis of the JTF's campaign was focused on the military aspects of DIME.

Warfighting Challenge:

Ability to integrate full joint capabilities against tactical level objectives

This warfighting challenge addresses the ability of the Joint Force to assemble and deploy forces to take advantage of a rapidly changing scenario. The change in situation may be caused by disruption or destruction of the adversary's capabilities, in which case the force is required to dynamically re-task effects packages. Re-tasking is used for follow-on actions or in response to an adversary's surprise attack or when an operational branch is no longer available, suitable, or acceptable for the mission.

Execution of this warfighting challenge depends on the ability of the Joint Force to respond to a rapidly changing scenario, rapidly assessing an adversary's actions and assembling the appropriate effects packages to take advantage of the changes in the adversary's capabilities or actions. The Tasks and Subtasks used to assess this warfighting challenge are listed below:

Task: Synchronize and employ Joint capabilities against key tactical objectives

Finding 1:

Surveys were sent to Component and JTF-HQ Operations and Plans SMEs, asking if there were any instances of operational branches formerly closed to Blue as options became feasible and acceptable due to disruptions to OPFOR operations. Based on survey responses, it appears that Blue did not use formerly closed operational branches made available due to a disrupted adversary. The preponderance of observations indicated that branch plans weren't

developed at either the JTF or Component level. Sequels were being developed for transition and emerging operations (WME), but the development of branch plans was not evident.

"The JTF has not developed any 'what if' branch plans," said one observer. "They are currently focused on sequel transition planning." "From the JSOTF perspective, I have not seen any operational branches that have opened to BLUE due to current operations disrupting the adversary."

A JFMCC observer noted, "I did not see evidence of any branch plans developed by JFMCC, although there were such plans at CJTF. Re-planning by JFMCC planning cell was always reactive. They seemed to be driven to provide supporting plans to the JTF as they developed alternatives (FRAGOs)."

One Plans Chief observed, "JTF micromanaged planning and focused on tactical vice operational details. RDO does not translate to rapid decisive planning and until the Commander and staff turn the Commander's decision into COAs, the components can't plan completely."

"There was no wargaming at the JTF looking beyond what effects-based missions planning the Components were doing," said another plans officer. "The JTF should look beyond the current operations," said a senior mentor. "No one is looking to see what else the enemy could be doing. No one is operationalizing the plan, so there is no branch plan to be active and exploit sudden advantages. They are focused on FRAGOs vice branch plans."

There was some evidence that branches formerly open to OPFOR became unfeasible, suitable, or acceptable due to disruption of Red's C^2 and infrastructure. Due to the destruction of his C^2 systems, OPFOR became unable to communicate electronically with terrorists and degraded their control over pirate operations, making his campaign strategy more one dimensional and predictable. As Blue attrited Red naval assets, Red was forced to abandon its White shipping escort program (a ploy to look magnanimous to regional governments).

Based on the results of surveys submitted to OPFOR and JECG SMEs, it was observed that disruption of OPFOR's capability allowed Blue to control the timing and tempo of the campaign and major operations. The following comments were received and provide anecdotal evidence in regards to this: "RED intention to harass mine-sweeping operations by use of small craft was cut short by dispatch of USS JOHN PAUL JONES.", "JTF-S forces O/A OBJ 1 Pioneer WME site degraded through military actions, allowing CJTF to secure OBJ Funk, expand the lodgment, receive follow-on forces, and initiate neutralization actions against the Pioneer WME site.", and "Staging and flow of Blue forces into theater, Deployment of ARFOR into OBJ Funk, Movement of ARFOR to seize OBJ Pioneer, Retrograde of ARFOR from Pioneer to OBJ Funk and continued retrograde to ISB, ARFOR assault on Santa Catalina". Except for two incidents, initial mass attack on the BLUE ARG and mining operations in the Gulf of Hondo, both of which disrupted Blue's campaign plans, Blue was able to control the tempo of operations and was able to mount major operations against OPFOR's WME sites on their timetable.

Surveys were sent to Component and JTF-HQ EA SMEs throughout the exercise, and 88percent of those surveyed indicated that they knew of no instances of operational branches formerly open to Blue no longer feasible, suitable, or acceptable. As stated above, the preponderance of observations from the SMEs indicated that little or no thought went into the preparation of branch plans at either the JTF or Component level. Anecdotal evidence points to a lack of war-gaming at the JTF level as the major cause of this. If alternative courses of action were being investigated at either the JTF or Component level, they were not made available to all levels of planning.

In summary, although there is little indication that branch plans were being developed by planners at either the JTF or Component level, JTF and the Components were able to take advantage of tactical opportunities presented to them by changes in the adversary's capabilities and disruption of his operations. On the other hand, even though Blue was forced to delay or modify some of its operations due to OPFOR's actions, such as mining of the Straits of Hondo and mass attack against JFMCC assets, and OPFOR's decision to defend the islands, Blue was able to dictate the tempo of operations throughout the JOA. All other Blue tactical operations where executed without delay or disruption.

Neither the JTF-HQ nor the Component staffs completely understood that EBO planning process. That finding is based on the JTF's lack of wargaming and the apparent lack of development of branch plans. Equally telling was the lack of sequels observed based on the use of effects assessment and predictive analysis. The concept itself appears to be sound, however, based on this exercise more in-depth training is needed to insure that all members of the JTF and component staffs follow the planning principles of EBO.

Subtask: Conduct operations in the Joint Operations Area (JOA)

Finding 2:

For the most part, at the operational level it did not appear that OPFOR was surprised by Blue's tactics or operations; however, at the tactical level Blue conducted actions that did catch OPFOR off guard. One OPFOR SME made the following observation, "Blue achieved tactical surprise by picking time and place of attacks, but never achieved operational surprise." One action by Blue did completely surprise OPFOR. The method in which Blue issued the Gulf Partnership Ultimatum to CJTF-S, just prior to the start of hostilities caught him completely off guard. The following comment was provided by an OPFOR SME, "JTF-S was surprised by the tone, timeline, and manner of delivery of the Gulf Partnership demand of 25 July. Delivery to CJTF-S without routing through national capital was seen as a pre-cursor to Blue combat operations." As stated by the JFMCC Operations Chief "The SOF raid on a location of significant importance was probably an unpredictable move that caught Red by surprise." Anecdotal evidence indicates that OPFOR knew what Blue wanted to do in advance of Blue's actions; however, they were unable to capitalize on this information due to Blue's overwhelming force. "We used known and practiced tactics which made us predictable," said an Operations Chief.

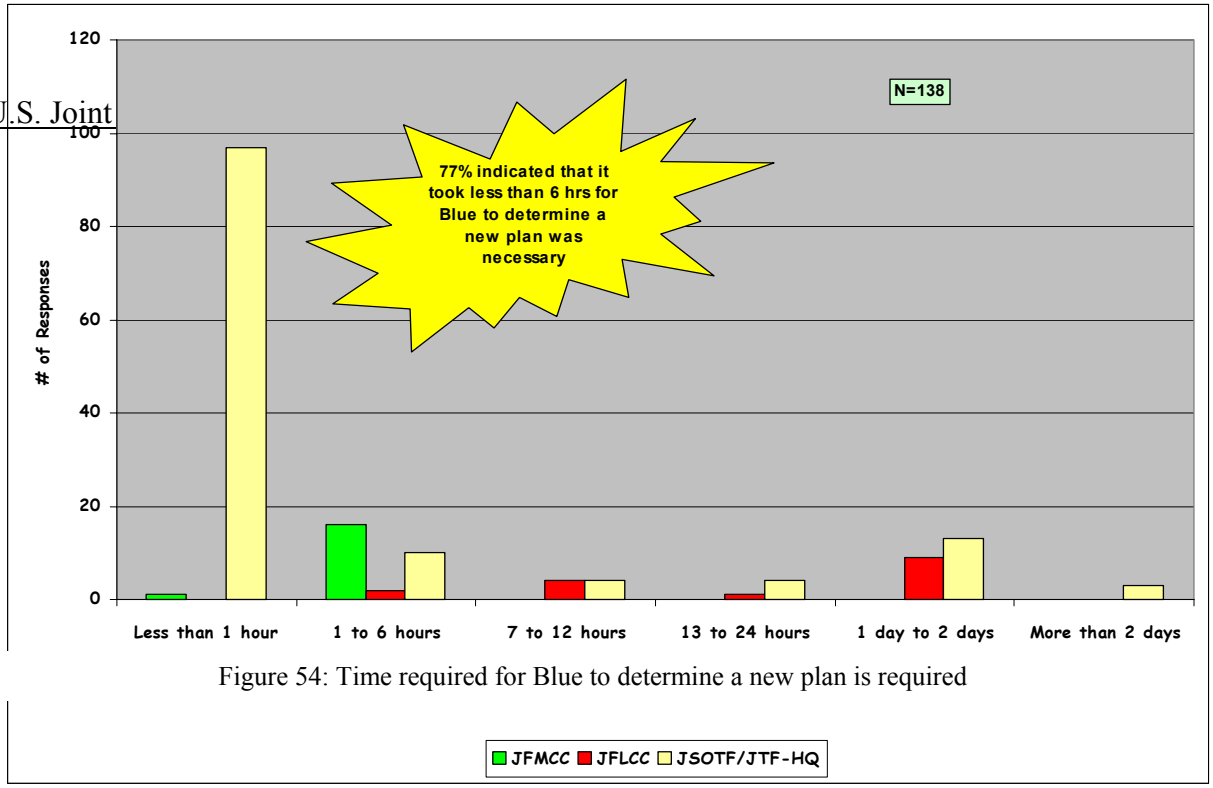


Figure 54: Time required for Blue to determine a new plan is required

Blue was caught by surprise when OPFOR initiated hostilities by launching a massed coordinated attack on Blue as the ARG attempted to transit the Straits of Hondo. "Operational surprise was achieved by OPFOR conducting pre-emptive strikes against Blue naval forces and ISBs," said a headquarters observer. "The enemy achieved tactical (not operational) surprise when they initiated hostilities." "Blue was surprised at the two major naval attacks despite anticipating them and being prepared," noted another observer.

OPFOR's attempt to close an important international maritime restricted passage using mines also caught Blue by surprise. "The two big attacks, the restricted passage closing, and the terrorist attacks were surprising despite anticipating them." In addition, Blue did not anticipate the ferocity and determination of either the pirates or the terrorists in their drive to undermine Blue's influence and disrupt Blue's re-supply efforts. The ability and intensity of the terrorist attacks on Blue APODS and SPODS caught Blue by surprise. Additionally, Blue did not fully anticipate the breadth and depth of the terrorist activity against coalition partners used as a means to breakup the Gulf Partnership Coalition.

Based on the results of surveys received from Component and JTF Operations SMEs, the preponderance of the responses (91percent) indicated that it took less than one hour after initiation of Red's actions for Blue to detect OPFOR's attack. One JTF SME made the following comment, "Blue's detection of a OIPFOR TBM launch was immediate."

Based on the results of surveys sent out to Component and JTF Plans SMEs, 77percent indicated that it took less than six hours for Blue to determine that a new plan was required following detection of OPFOR's actions. However, 15percent of the respondents felt that it took more than 24 hours for Blue to determine a new plan was required, especially after the initial attack. The figure below shows the breakout of responses received:

Survey participants noted:

- "On notification that SR 411 was compromised, the JSOTF immediately initiated contingency plans and began working additional branches".
- "Plans looking at options based on today's events. Truly working 48 to 96 hours out and heavily discussing viable options. Planning is in progress, nothing hard".

- "The JTF received an order from the Combatant Commander to take the islands within 48 hours after an ultimatum was issued. The CJTF, within a few hours, met the Commanders and their staffs in the CIE and developed and issued a FRAGO in about 1.5 hours".
- "RED attack drove the JTF to execute combat operations approximately 20 hours earlier than planned. Decision to execute early took about 3 minutes from RED attack".
- "After initial attack, JFMCC plans realized right away plans would be modified as priorities changed".

When indications that CJTF-S intended to move WME weapons and material to other sites, a plan to secure the WME sites was formulated within 24 hrs. Based on the survey results, it is apparent that Blue was quick to grasp the need for new or revised plans in response to OPFOR's actions. Surveys were sent to Component and JTF HQ Operations SMEs to determine how long it took Blue to prepare and disseminate a new plan following a decision to act on OPFOR's movements. Based on the results of these surveys, 87percent of the respondents indicated that the time to prepare and disseminate a new plan following CJTF's decision to act was less than 6 hours. The planning cells were able to react quickly once guidance was received from CJTF, in regards to how he wanted to respond to emerging scenarios driven by OPFOR actions. The ability to rapidly prepare and disseminate new plans in response to OPFOR actions may have been due to the planning cells proactive approach to the planning cycle, and explicit guidance given by the CJTF, to the components and JTF planning staff at the daily JCB briefings as to how he expected the operation to flow. Although, little branch planning was evident in the planning cells, the planners were kept cognizant of OPFOR actions and the possible effects they had on Blue operations and they were prepared to issue FRAGOs (36 FRAGOs were issued for ETO-1 and 13 FRAGOs were issued for ETO-1A and 3 FRAGOs were issued for ETO-2 during the course of the exercise) quickly in response to changes in OPFOR's operations or tactics. Use of collaboration and CIE tools greatly enhanced the ability of JTF to develop and implement new plans to counter OPFOR actions.

Surveys were sent to Component and JTF HQ Operations SMEs, of these 85percent of the respondents indicated that Blue required less than 6 hours repositioning forces to counter an adversary's attack from plan dissemination. Figure 30 shows the breakdown of responses from the SMEs.

In summary, Blue was able to conduct operations in the JOA, virtually at will. Although data indicates that OPFOR anticipated Blue operations, most of the time, Blue's overwhelming and superior capabilities made this knowledge moot to OPFOR. The JTF and components were able to act quickly in response to OPFOR's actions through the extensive use of collaboration and CIE tools such as IWS and ADOCS. The CIE concept and tools allowed the flow of information to move swiftly throughout the force, both vertically and horizontally, and provided a coherent operational picture to the entire force.

Situational Awareness was improved at all levels, and the ability to communicate directly through IWS eliminated deconfliction problems inherent in the majority of past exercises and operations. Collaboration enabled rapid resolution of targeting problems and asset allocation to maximize effects on the battlefield. With CIE, prioritization of targets between components could be resolved quickly and efficiently. Although Blue was initially caught off guard by the intensity of OPFOR's response to the Gulf Partnership Ultimatum, JTF was quickly able to regain the initiative and follow through with its operational plans.

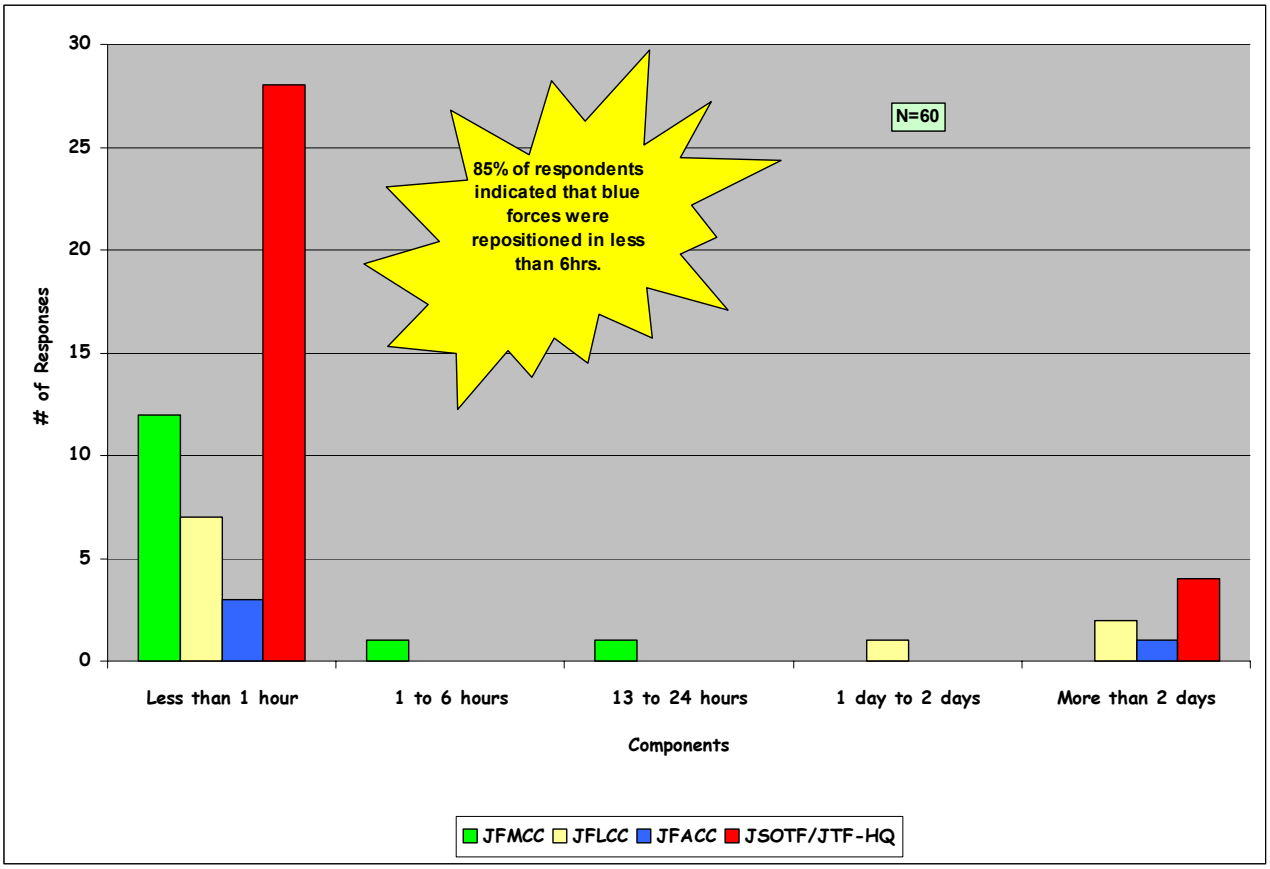


Figure 55: Time Blue forces are in position to counter adversary's attack

As the scenario progressed and Blue determined that new plans were required to counter Red's movements, the CIE concept in conjunction with ADOCS, IWS and SPPS enabled the components and JTF HQ to rapidly formulate new strategies, assign tasks and allocate resources to carry out the new plan. Collaboration allowed all participants to voice their opinions and presents their case in regards to resources and target priorities as required to carry out CJTF's plan. Using IWS and SPPS, the new plan was rapidly disseminated to the force for implementation. ADOCS provided a COP to the entire force, displaying OPFOR and Blue force positional data and force strength as obtained from intelligence sources positioned throughout the JOA. This improved situational awareness enabled Blue to react quickly to OPFOR's movements and rapidly shift forces in response to OPFOR's moves.

Subtask: Conduct Joint Tactical Actions (JTAs)

Finding 3:

Surveys were sent out to JTF-HQ and Component Operations, JECG, and OPFOR SMEs to assess the JTFs ability to conduct Joint Tactical Actions (JTAs). The majority of the responses to all of the questions regarding JTAs indicated that they could not accurately answer the questions because they were unsure of the difference between a JTA and an effects package. However, Senior Concept Developers and Senior Mentors also had differing opinions about JTAs.

"By giving out effects-based missions, I had a lot of flexibility to accomplish the mission," said the Commander of the JSOTF. "It allowed me to look at numerous ways to do a mission rather than being given a solution."

"When JTAs are assigned to the functional components and are required to be conducted simultaneously, who will synchronize the actions in time and space, resources, and outcome?" asked a concept developer. "Will the ability to conduct JTAs require functional component staffs to be joint?" "There is no concept for JTA, but even if we have a force that has embraced all four concepts successfully, how do these new opportunities manifest themselves? In the past we have not been full, networked, or effects-based. We couldn't successfully optimize Joint Tactical Actions."

In summary, the concept of JTA packages were played as a loosely undefined concept during the experiment execution. Neither Warfighters nor SMEs were given adequate information to accurately assess this concept. The concept developers intended for the effects packages to be single Service/component actions designed to achieve an effect for this analysis, JTA packages were taken to be joint Service/component actions designed to achieve an effect outside the normal supporting /supported command structure. A Component Operations Chief, who was able to infer the difference between a JTA and an effects package made this comment: "JTAs are high risk and they presuppose that a problem exists with the supporting/supported command concept". This concept needs to be re-evaluated in future exercises and experiments. The concept needs clearer definitions of what a JTA is intended to be as opposed to an effects package, how to employ it, and who has OPCON and TACON of the forces assigned? This concept is not ready for prime time.

During the experiment, the JTF demonstrated the ability to synchronize and employ Joint capabilities against key tactical objectives. JTF and the Components were consistently able to take advantage of tactical opportunities presented to them by changes in OPFOR's capabilities and disruption of his operations, thus enabling Blue control of the timing and tempo of the campaign. Using the supported/supporting command structure, Blue was able to assemble and employ the appropriate forces needed to rapidly respond to changes in OPFOR's operations. Using collaboration and the CIE tools (ADOCS, SPPS, IWS, etc.), Blue was able to maintain good situational awareness within the JOA. This enabled Blue to assemble the correct mix of forces to counter OPFOR actions and carry out operations in support of the CJTF's objectives.

There is evidence that OPFOR was able to anticipate Blue's actions (Blue used practiced and tested tactics); however, OPFOR was unable to capitalize on this knowledge due to Blue's superior capabilities and ability to rapidly counter OPFOR's actions. The use of collaboration, in conjunction with collaborative tools, enabled the JTF and components to rapidly plan actions in response to the changing scenario, resolve target priorities and command issues, issues regarding the deconfliction of the battlespace, identify, allocate, and deploy the resources needed for the accomplishment of the mission. Given Blue's ability to maintain SA in the JOA, they were still surprised by OPFOR's reaction to the Gulf Partnership Ultimatum (which initiated the start of hostilities), the intensity of terrorist attacks on APODS, SPODS, and terrorist attacks within the member countries of the coalition. Blue on the other hand, was able to achieve tactical surprise when they launched a SOF mission against the important fisheries, crippling CJTF-S's main source of income and control over the pirates and terrorists.

The two key actions that demonstrated Blue's ability to synchronize and employ Joint capabilities was the campaigns against OPFOR's primary WME sites and the Island campaign.

Both of these actions required the use of multiple Service forces, coordinating their actions under a supported command structure to accomplish the mission.

Task: Dynamically re-task effects packages for follow-on actions

Finding 4:

Surveys were sent out to JTF-HQ and Component Operations SMEs to assess the JTF's ability to dynamically re-task effects packages for follow-on actions. The majority of the responses to all of the questions regarding effects packages indicated that they could not accurately answer the questions because they were unsure of the difference between a JTA and an effects package. However, regardless of whether or not they knew the difference between a JTA and an effects package, they could comment on whether the JTF could successfully re-task assets as required to meet emerging mission requirements. During the course of the exercise, four missions were conducted that could be considered either JTA or Effects Package missions, Neutralization of OPFOR's WME storage facilities, the raid on the fisheries to capture Black Star leaders, the raids to secure WME weapons/material at OPFOR's WME "hide sites", and the operation to capture CJTF-S.

Surveys were sent to component operations SMEs to determine if there were any instances of effects packages, previously committed to action, not being redeployed in response to newly developing situation. The response from the majority of the SMEs indicated that there was no need to redeploy the assets of any of the effects packages/JTAs in response to emerging situations, because there were adequate assets in theater to handle all missions assigned.

Component and JTF-HQ Operations SMEs were asked if JTF assets were double tasked during the exercise. The response from all of the respondents indicated that no unusual double tasking of units occurred. They did note that many JTF assets are multitasked as part of normal operations. A good example of this is most naval surface ships are routinely multitasked and it is not uncommon to have a naval unit conducting a gunfire support mission in support of JFLCC while also conducting an ASW mission in support of JFMCC and a strike mission in support of JFACC.

To be effective, effects/JTA packages may require additional support from assets not directly allocated as part of the Effect/JTA package. A review of the data, to date, indicates that neither CONUS AOR assets, nor assets transiting the AOR were used to support effects/JTA packages. Forward presence forces were assigned to the JTF and these assets may have been used in support of effects/JTA packages on or after C-Day.

Effects/JTA packages can either be under the direct control of the JTF or assigned to another commander within the JTF for control. During this exercise all of the missions identified above were under the control and supervision of Commanders assigned to the task by the JTF, none of the missions were under JTF direct supervision.

In summary, the participants were not given an adequate definition of the differences between a JTA and an effects package. In view of the fact that there was no real definition of a JTA or Effects Package presented to the players prior to the start of the exercise, analysis of this subtask concentrated on how JTF organized and controlled forces to conduct limited or special operations/missions. Special JTA/Effects packages were organized and used in the fisheries raid, the raids on the WME primary storage facilities, and the raids on the WME "Hide Sites". Review of the data to date indicates that these packages were supported by JTF assigned forces and

neither CONUS AOR long range units nor forces transiting the AOR were used in support of these operations.

Forward presence units were fully integrated into the JTF as part of his assigned forces. Therefore, some of these units did participant in support of these actions. As the need for these missions became apparent, CJTF assigned a commander to plan, organize, and execute the mission. The resources were drawn from JTF assigned forces as needed to complete the mission. When the mission was completed, these forces were returned to the control of their Component Commanders for reassignment. None of these missions was under direct JTF HQ supervision; all were under the control of a component commander. Other than multiple tasking normally assigned to some JTF assets (i.e. naval surface units are multitasked platforms that could be tasked to supply Fire Support to JFLCC, while simultaneously conducting ASW Ops in Support of JFMCC and Strike Ops in support of JFACC), double tasking of JTF assets was not noted during the exercise. JTF was assigned sufficient assets to conduct all the experiment, the JTF exhibited the ability to dynamically re-task assets for follow-on actions and emerging tasks.

Warfighting Challenge Conclusion: During the experiment, JTF successfully demonstrated the ability to integrate full Joint capabilities against tactical level objectives. However, although JTF successfully met this challenge, there is ample evidence that JTF did not adhere to all of the concepts of EBP and EBO. There is evidence that JTF planners did not develop branches and sequels based on Effects Assessment and Predictive analysis, as required by the EBO concept. FRAGOs were issued when issuing a new ETO would have been required by the concept. Wargaming was conducted sporadically at the JTF and Component level leading to an inability to anticipate OPFOR's moves and have plans in place to counter them. The use of collaboration and CIE tools enabled the JTF to overcome most of the problems that could have been caused by not following the concept methods. The result of not following concept guidelines was that JTF was not able to get inside OPFOR's decision cycle nor anticipate what he would try to do next. JTF was reactive instead of being proactive throughout the exercise. Anecdotal evidence indicates that the planning process during the experiment was Commander Centric, not allowing time for plans to be developed at the component and JTF-HQ level, utilizing JTF guidance, to develop several COAs which could then be wargammed to identify the best plan with full knowledge of the intended and unintended consequences for each COA. Instead, it appears that ideas expressed by CJTF during the JCB were taken as gospel by the staff, and then, they developed plans IAW with those ideas. This comment was received from one of the senior component planners: "I had no CONPLAN to counter enemy acts. …no one looked to see if the PIRs were being answered…and if they were, no one had a branch plan to respond."

Horizontal and vertical collaboration allowed the JTF to quickly assemble, synchronize, and employ joint forces against key tactical objectives. When tasked by the Combatant Commander to secure OPFOR's WME sites, the JTF was quickly able to assemble the required forces, assign a Commander to develop a sound plan for implementation, deploy the forces, and conduct RDO all in less than 48 hours. Under current procedures and doctrine, an operation of this scale could have taken much longer to develop and carryout. Using collaboration, the correct level of leadership was able to interact directly to resolve all the inherent problems associated with a task of this magnitude rapidly and efficiently.

OPFOR's reaction to the Gulf Partnership Ultimatum surprised Blue Commanders. But after an initial setback coming in the wake of OPFOR's opening attack, Blue quickly regained the initiative and was able to dictate the tempo of operations throughout the JOA. With few

exceptions, JTF was able to conduct operations in the JOA with a minimum of disruption and delays. Moreover, due to overwhelming force than the use of EBO concepts, the JTF was able to take advantage of disruptions to OPFOR's operations and changes in relative strength and position on the battlefield to achieve his desired effects.

The concepts concerning Joint Tactical Actions and Effects Packages need to be redefined. There is no universally accepted definition of what a JTA or Effects Package is nor is there documentation to explain how to employ, control, and sustain them. JTAs and Effects Packages as defined in this experiment, were successfully conducted during the exercise. JTF was able to assemble forces, assign a commander to plan and execute a specific mission, and then after the mission was completed, reintegrate the forces back into the JTF command structure. There was no apparent double-tasking of assets assigned to JTA/Effects Packages, except as would normally be assigned to the units. This concept needs further evaluation in future exercises and experiments. Based on the available data, this is a concept that is not ready for "Primetime."

Other than as noted above, analysis indicates that JTF successfully met the warfighting challenge to integrate full joint capabilities against tactical level targets.

Warfighting Challenge:

Ability to integrate execution of IO into EBO

EBO uses the cohesive, rational, timely, and synergistic application of the DIME elements of national power to affect the coherence of an adversary's war making potential. EBO focuses on the adversary's PMESII centers of gravity. The foundation of IO within EBO is to create desired effects or outcomes that influence an adversary's behavior and will.

This warfighting challenge will use IO to provide the commander a flexible means to manipulate or influence an adversary's societal coherence and to affect that which is cherished by the society, regardless of technical competency. If planned and executed properly IO can defuse crises, reduce periods of friction and confrontation, and enhance other DIME elements of U.S. National power. The Tasks and Subtasks used to asses this warfighting challenge are listed below:

Task: Execute offensive Information Operations, to include PSYOP and military deception

Finding 1:

57 JTFHQ and component IS SMEs were surveyed over the course of the exercise. Thirty-four SMEs provided comments with 85 percent of those indicating that appropriate IO resources and capabilities were factored into operational plans and actions. "IO resources have been an integral part of the planning process," said one expert. "JFMCC IO cell did a good job of incorporating IO aspects into the planning. Believe they are ahead of the game in timing and capability analysis. The only weakness noted was OP level deception. JFMCC was planning and conducting tactical deception in conjunction with transit. CND conditions were upgraded."

Another observer noted that the IO rep was present at all GAT and MAAP sessions to direct and suggest non-kinetic actions to support the effects planning. "Absolutely! At the JFLCC, the Commander was very straightforward on what his desires were in terms of IO integration and maximizing the capabilities of IO within their mission."

But, there are always improvements that can be made. "JFMCC IO capabilities were not clearly defined for the CJFMCC," one observer noted. "IO was underused during the initial surge operations. Also, a lack of guidance for the Theater Deception Plan significantly hindered IO efforts. PAO, EW and PSYOP planning was progressing well."

Said one observer during the experiment, "the I/O cell is integrating into all of the planning meetings held at the JTF and JFLCC levels. Their awareness of the Commander's intent is high. However, awareness of the I/O objectives is not universal across the staff, yet, primarily because the planning is in early stages at this point. Expect awareness of I/O objectives and planning will increase dramatically after JTF/JFLCC holds an I/O working group to develop fidelity on these issues."

57 JTF and Component IS SMEs were surveyed daily over the course of the exercise. 26 SMEs provided comments with the majority of respondents indicating that all available resources and capabilities were factored into operational plans and actions. Many provided comments to include:

- "Utilization of IO resources was maximized".
- "IO plans appeared to be well planned and used available resources".
- "Did not see where resources and capabilities failed to be factored into operational plans".
- "Members of the JIACG could have more effect in getting the message to the adversary through national media instead of the IO cell writing local articles. More effective collaboration at all levels should resolve this issue".
- "Some resources are used more than others in their planning efforts, but nothing has been left out of the planning efforts at this point".
- "Not enough leaflets being dropped due to problems getting this worked into the ATO".
- "PSYOPS and Civil Military Operations. CMO also plays a major role in D, I, E and it is not being used in this experiment".
- "In concert with JIACG, need to make better use of PAO to convey message through CNN and other national media".

Fifty seven JTF and Component IS SMEs were surveyed daily over the course of the exercise. Eighty-seven percent of the responses indicated that the SMEs felt that failure to factor all IO resources and capabilities into operational plans and actions would not have a significant impact on operations. One dissenting SME noted, "Failure to achieve IO objectives during Joint Strike will have significant negative impact on the operation," said one of the expert observers. "No measurable impact thus far, however, this is a primary conduit for reaching the population of RED with our message," they said.

The preponderance of the responses by SMEs to daily surveys conducted during the course of the exercise indicates that all available IO resources and capabilities were considered and factored into operational plans and actions. Additionally, a majority of the SMEs surveyed indicated that even if not all IO resources and capabilities had been factored, there would have been minimal impact on operations. However, some warfighters had a different opinion of the effects of the IO plan. JFMCC's Operations Chief said, "The IO plan was not seen as effective. IO was considered and planned, however, kinetic options were quicker and more visible. Certainty of success of the IO campaign was not visible, therefore; efforts went to kinetic options, which were quicker." "Big effect on operations, especially Commando Solo," said another Operations Officer. "Leaflet drop operations and TARBS broadcasts made the island campaign easier."

Component and JTF-HQ planners had the following significant comments in regards to IO use and exploitation efforts:

- "IO should not become another functional component stovepipe. Doing so hampers integration".
- "We do not have visibility at the JPC of how we are incorporating IO into our plan".
- "IO needs to be embedded in the planning process. It does not help to have IO as part of the IS folks".
- "If the JTF commander does not understand what IO is or what he wants from it, the Plans cannot incorporate IO in a useful manner".

During this experiment, combat assessment of IO actions was inadequate due to a lack M&S fidelity and exercise constraints. Assessing the effects of the IO campaign can be very difficult. Some actions can only be perceived by Red, and others may take a long time to develop the desired effect. However, failure to assess the success or failure of the IO campaign can lead to the misallocation of resources and an underestimation of the adversary's resources and capabilities. In this experiment, there were sufficient ISR assets available to assess IO actions, and, based on the daily ISR allocation plan they were positioned adequately to monitor the IO targets. However, M&S could not provide the fidelity necessary to provide the EAC with adequate information to properly assess the effects of the IO actions.

There is insufficient information to determine when the initial and modified IO plans were completed and submitted for approval. However, the JTF IO plan was approved for implementation on 12 June 2002 (MC02 Spiral 3) and modified on 4 August 2002 (MC02 Execution.)

Based on the responses received from daily surveys given to Effects Assessment Cell SMEs, there were no instances of unintended IO actions causing disruption or delay of operational plans and objectives noted. However, the destruction of a major raid station may have deprived Blue of a vital method for gauging public sentiment and the effects of their actions on OPFOR.

Due to OPFOR known and suspected IADS/SEAD positions and movements, some IO mission air resources and tracks were modified. However, there were no known disruptions in IO actions due to adversary IO actions. There were only a few instances of operational IO actions discarded due to timeliness of approval concerns. One SME indicated, "Deception plan coordination could not be accomplished within the established timelines to support MTO development." Another SME observed that, "some delays were noted due the rigid nature of the JFMCC planning process and its reliance on MSRs. Current Ops responses to activity were timely."

A JFMCC SME reported that a planned attack on a radio site was denied due to a disconnect in the desired effect. The IO cell cited a 'deny/damage' level, but the item was changed to 'destroy' by plans/MTO. IO intended a non-lethal means, but the brief did not match the request. The JFACC Senior Mentor observed, "The process to get IO targets approved up thru the NCA level is slow." As a result of these delays, a number of IO targets nominated for prosecution had to be dropped or delayed because of the delays in the approval process.

Finding: 2

Full combat assessment of attacks on IO targets was never achieved. M&S was unable to provide the level of BDA required to assess the IO campaign adequately, could not be provided

due to lack of M&S fidelity and ability to accurately replicate ISA assets, and because of this, an average time to provide full combat assessment of attacks on IO targets couldn't be calculated. Although sufficient ISR assets were available and allocated to evaluate IO targets, M&S lacked the fidelity to interpret the results. And, due to the lack of adequate and timely BDA a significant number of IO targets were restruck before combat assessment was available.

Findings:

The IO plan identified 20 individual effects and 88 key nodes/targets from the ONA for prosecution during the IO campaign. 57 Component and JTF-HQ IS SMEs were surveyed daily during the experiment to determine whether all nominated targets were prosecuted and how successful the IO Campaign was. Of those that responded, the majority was unsure of the success or failure of the IO campaign. 16 respondents rated the success of the campaign as indicated below.

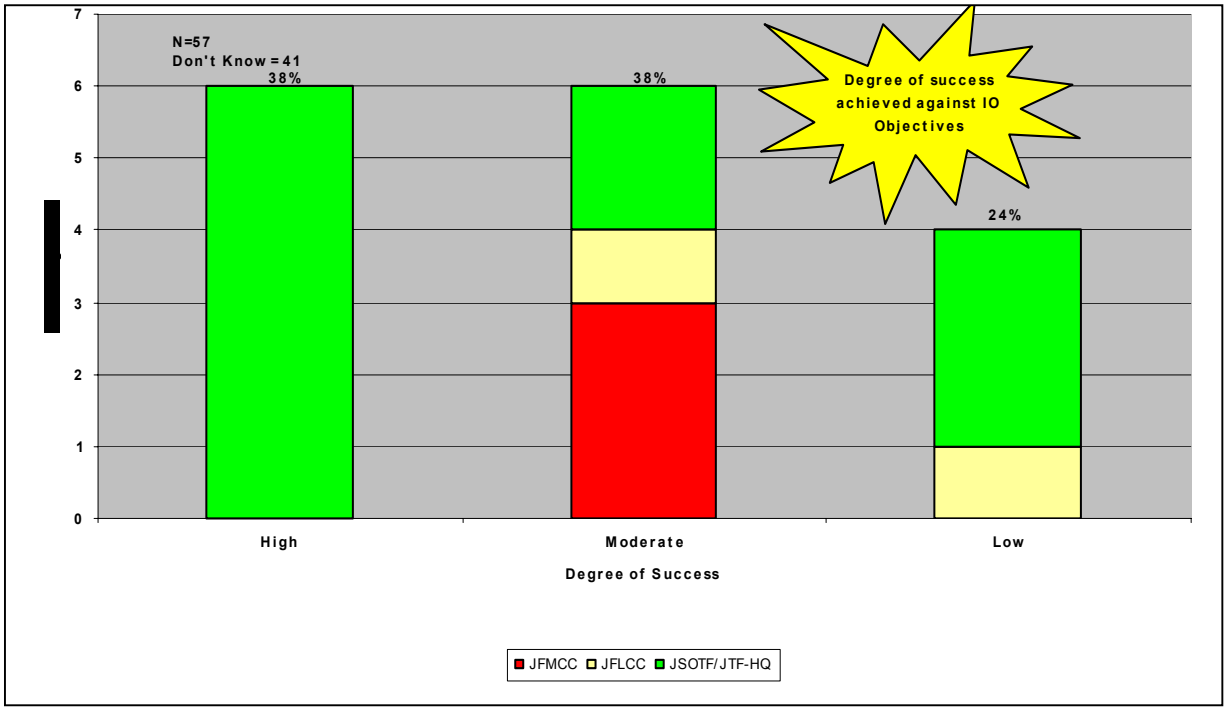


Figure 56: Degree of success achieved against IO objectives

Some comments received from the IS SMEs follow: "Indications, thus far, show that IO is having some of the desired effects. However, developing and collecting on indicators is relatively new and still being worked on." "There were no IO indicators developed for the Intel collection plan. Development of these indicators is the responsibility of the IO cell. Subsequent to this, IO indicators have been developed, are being refined, and should be included in subsequent collection plans." "Believe the overall campaign had good measure of success. The JFMCC staff was very proactive in their approach. In fact, that may be to a fault - some actions not fully coordinated across the naval force or with the JTF. Collaboration helped identify most of these (since they were mentioned during briefings, updates, or meetings) and resulted in a better overall product." "Everything was considered, having some success. Some targets are hard to evaluate." A comment from an OPFOR SME paints a different picture, "IO campaign is not winning the war over the Hearts and Minds of Red", and "IO program is not reaching the

people". This comment was received from a JTF IS Mentor, "JTF has been unable to use IO to get into Red's decision loop". One of the biggest problems associated with trying to assess the success or failure of the IO campaign was the lack of credible BDA. There were no apparent MOPs or MOEs established to be used to evaluate the effects on the campaign on the selected targets. There were sufficient ISR assets to be used to assess. the IO campaign but there is little evidence that the information was getting back to the Effects Assessment Cell for evaluation. In addition, HUMINT assets were not considered in the IO plan either to carry out or provide BDA assessment of IO actions. One reason may have been the lack of fidelity in the M&S models to interpret the ISR data properly for IO actions or timely and lack of adequate JECG injects to the assessment cells regarding BDA. Another reason may have been due to exercise constraints.

Warfighting Challenge Conclusion: The challenge integrate execution of Information Operations into EBO, was neither successfully executed, nor successfully answered. Although IO capabilities were considered and applied during JTF operational planning and execution, all IO capabilities were not used and integrated into JTF operations. Integrate IO personnel into the JTF Plans and JTF Ops cells in order to maximize the benefits of IO capabilities. Assessment of IO actions was not fully considered or used to modify or initiate future plans and operations. Whether as a process problem or limitations due to M&S, a valid assessment of the success or failure of IO could not be made.

The following comments were received from Senior Mentors, Subject Matter Experts, and Warfighters on the IO campaign for MC02 execution:

- "It is ugly."
- "Need to build a functional and JTF level IO structure."
- "IO redefines "Broke" and the problem goes well beyond the JTF and Combatant Commander levels."
- "Need organization to bring the 5 pillars of IO together at the Combatant Commander level."
- "IO integration component wide needed a lot of work."
- "JTF slow to integrate IO into plans."
- "Full time IO person needed in Plans Cell."
- "Special IO tools need to be developed, and IO needs to be defined and integrated into all facets of operations."

During the experiment, it became apparent that there was no currently acceptable method of coordinating SAP/STO actions and integrating SAP/STO program information into the JTF IO campaign. This problem all too often led to multiple assets being assigned to the same IO target for prosecution. In most cases, the only way IO planners knew a SAP/STO action had been taken on a target was after it was determined that the target had been incapacitated or destroyed.

IO was planned, coordinated, and conducted at the JTF and Component levels, but it was not integrated across the force. Due to poor BDA, the effects of the IO campaign were never really recognized by either the JTF or Components. The IO campaign against the Islands in the Gulf of Hondo was a notable IO success. Use of Commando Solo, and Leaflet drops, in the successful attempt to convince OPFOR's forces to surrender on two of the three Islands, minimized casualties, and the time and resources needed to liberate the whole chain Anecdotal evidence from OPFOR SMEs and analysts indicate that OPFOR felt Blue's IO campaign was ineffective, disorganized and uncoordinated. OPFOR believed that it had won the IO war and Blue failed to win over the hearts and minds of OPFOR's supporters.

This warfighting challenge needs to be further examined in future experiments. One recommendation suggested by a Senior Mentor and an Operations Chief is to constitute a Joint Information Operations Task Force as a functional component at the Combatant Commander or JTF level. The task force would coordinate all phases of IO, incorporating PAO and PSYOPS functions under it's control. Additionally, M&S needs to be refined in order to provide better simulation of IO with higher fidelity then is currently available. ISR tools need to be developed to recognize the effects of IO actions.

Other Observations and Finding:

None.

Relationship to Other Objectives:

The following assessment areas or concepts are either directly linked to the Conduct of Effects–Based Operations or provide a necessary function in support of EBO.

Assessment Area	1	2	3	4	5	6	7	8	9	10	11	12	13
Concept/ Objective	Information Superiority	Set Conditions	Assured Access	Effects Based Operations	Sustain the Force	SJFHQ	ONA	EBO Planning & Assessment	CIE	JIACG	Joint Theater Logistics Management	Joint Initiatives	JISR
Linkage	X	X	X	N/A			X	X	X	X		X	

Establish and Maintain Information Superiority (IO)

The ability to establish and maintain Information Superiority, enables the JTF to operate his forces with a full knowledge of the adversary's capabilities and intentions, and enables him to deny the adversary knowledge of his own capabilities and intentions. In addition, Information Operations can help the JTF shape the battlespace to facilitate the conduct of effects-based operations.

Rapidly Set Conditions for Decisive Operations

For EBO to be effective, all JTF forces must be available in theater, with the equipment needed to conduct the operations, and be in position to conduct RDO. In addition, JTF must be able to shape the battlespace to maximize the effectiveness of his forces while reducing the enemy's capability to react to his actions.

Assure Access into and through the Battlespace

JTF forces must be able to enter the JOA and transit to assigned areas of operations with minimal interruption and loss in order to conduct EBO.

Operational Net Assessment (ONA)

EBO requires an enormous amount information and knowledge to be effective. ONA incorporates an information database on the adversary's PMESII nodes and linkages with a reach-back capability, allowing planners and targeteers access to Centers of Excellence, Academia, Industry, Government Labs, etc. to determine what targets should be neutralized or destroyed, to ensure that the JTF's desired effects can be achieved with a minimum of collateral damage and loss.

Effects-Based Planning and Assessment

EBO cannot be successfully accomplished without effects-based planning and assessment. EBO must be planned to achieve JTF's desired effects using ONA and reach-back to

help identify the targets to be neutralized and destroyed to achieve the desired effects, the allocation of the assets to accomplish the tasks and the timing and sequencing of force deployment to accomplish the assigned tasks, ISR assets must be positioned to assess the success or failure of the individual actions, and the intended and unintended consequences of conducting the actions must be understood. Planning must also take into account and understand how the adversary will react and what actions he may take in response to JTF actions and how this will impact on the JTF's ability to achieve his goals. Assessment must be conducted to evaluate how the success or failure of JTF actions is contributing to his desired effects. Poor assessment can result in under or over estimating an adversary's strengths and weaknesses and can lead to inefficient use of resources to attack targets already destroyed/neutralized or not required to achieve the desired effects, or can result in the failure to re-attack important targets that have not been previously neutralized or destroyed.

Collaborative Information Environment (CIE)

Provides the tools and environment to integrate planning functions vertically and horizontally and provides the tools (ADOCS/SPPS) used to provide Situational Awareness across the force.

Joint Interagency Coordinating Group (JIACG)

Coordinates and integrates the DIE portions of national power to support and/or supplement EBO actions.

Joint Initiatives

Introduction and experimentation of new tools to support EBO. Specifically in this experiment the Joint Fires Initiative (JFI), Time Sensitive Targets concept, IWS, ADOCS tools, and ONA tools were fully implemented and utilized to support EBO.

DOTMLPF Linkage:

The JFCOM DOTMLPF Change Recommendations for Effects-based Operations are based on the following findings garnered by JFCOM J-9 analysts during MC02 Spiral 3 and execution and presented in the preceding paragraphs (Add Link here to EBO DOTMLPF Submission document):

- Effects-based thinking has the potential to become the joint operational concept for the information age.
- Effects-based planning necessitates change to the military decision-making thought process.
- Developing an effects-based mindset and applying that mindset will require focused education programs.
- Effects-based Operations have the potential to be the future doctrinal centerpiece for planning, execution, and assessing joint military actions.
- The combatant commander's staff, including the SJFHQ, supported by ONA and the Joint Interagency Coordination Group (JIACG) plays an essential role in effects-based planning, execution, and assessment.
- Continued EBO concept refinement will improve national abilities to orchestrate political and military activities in support of future joint operations.

Based on the above findings the joint DOTMLPF Change Recommendations are as presented follows:

DOCTRINE:

- Incorporate EBO in the Joint Capstone Concept as a central element of the concept, and to inform subordinate conceptual efforts. Recommend to the Secretary of Defense that the next DPG promote the EBO concept as an idea critical to the transformation process as described in the Transformation Planning Guidance.
- Analyze the impact of the EBO concept and MC02 results on the joint publication assessment and publication schedule.
- Document doctrinal-analysis results and present a plan for changing joint doctrine. This plan will include a recommendation schedule that synchronizes validated EBO doctrinal changes with the established doctrine-review schedule.
- Identify and analyze the impact on joint doctrine of the results of future joint and service experiments and Chairman Exercise Program venues that are designed to refine the EBO concept.
- Revise joint doctrine publications and CJCS Manuals as required.
- Provide an information briefing to the Joint Doctrine Working Party (JDWP) on the requirements of EBO implementation on joint doctrine development.
- Doctrinal recommendations require funding one-half man-year of effort in FY03 and FY04.

ORGANIZATION:

USJFCOM may propose changes to joint organizations after further concept development

TRAINING:

USJFCOM may propose changes to joint training after further concept development.

MATERIEL:

USJFCOM may propose changes to materiel after further concept development.

LEADERSHIP AND EDUCATION:

Establish, through the Military Education Coordination Council (MECC) the requirement for joint and Service professional military education institutions to incorporate the effects-based operations concept into their curricula.

Provide the material to support changes to professional military education curricula for EBO and how it relates to the operational art and the joint war fight.

Develop and present a briefing on the elements of EBO and related concepts to joint and Service professional military education institutions beginning in FY03 as an interim measure until professional military education institutions incorporate the EBO concept into their curricula.

Leadership and education recommendations require funding travel and on man-year of effort in FY03 and FY04.

PERSONNEL:

USJFCOM may propose changes to joint personnel after further concept development.

FACILITIES:

USJFCOM may propose changes to joint facilities after further concept development.

Recommendations

Based on the analysis of the data obtained during MC02 Execution, the following recommendations are made.

Effects Based Operations (EBO): The EBO concept showed great potential during this experiment and has the potential to be our future doctrinal centerpiece for planning, executing and assessing joint military actions. However, due to the limited training received by the participants prior to the start of the experiment, not all EBO concepts were adequately understood or practiced during this experiment. However, most of the problems observed during the experiment can easily be overcome with training and practice.

Recommend that the EBO concept be incorporated in the training curricula of Joint and Service warfare colleges and other senior officer training curriculums.

Recommend that the EBO concept and procedures be further examined in future exercises and experiments.

Reachback Concept: Recommend the Reach-Back Concept be further tested and examined as part of future exercises and experiments, utilizing a more robust ONA and more dedicated reach-back resources, in order to further verify its usefulness and to refine the business rules necessary to streamline the process.

Collaboration/CIE Tools: Business rules need to be implemented to avoid lengthy and complicated sessions that can slow down the targeting process rather than help speed it up.

Recommend that the collaborative process and collaborative tools be further exercised in future LOEs in order to refine the business rules and processes required to maximize the usefulness of these tools.

CIE tools need a better balance of push/pull to bring information to the users.

Recommend new TTPs and business rules be developed for use of CIE tools such as IWS, SPPS and ADOCS using lessons learned during MC02 and tested in future exercises and experiments

ADOCS as a common targeting toolset showed good potential during MC02, however more fidelity may be required to identify TST targets, and procedures need to be modified or added to make the process and toolset more user-friendly.

If chosen as the primary JTF tool for use as the graphical link to GCCS to provide SA of the battlespace, the ADOCS interface with the Air Forces TBMCS tool needs improvements to ensure that accurate and complete information is being passed between the tools. In addition the ADOCS interface with other software systems will need to be upgraded to ensure compatibility with other systems used throughout the JTF.

IWS is a powerful tool that provides clear and direct communication between participants; however, use of this tool can become excessive and burdensome, especially for decision makers. During MC02, meetings in IWS often became more briefing sessions than decision-making forums, and all too often senior staff was tied up excessively in IWS chat room meetings. To alleviate some of these problems, business rules need to be put in place to limit the time spent in lengthy chat room sessions, who should attend what IWS sessions, and how should these sessions be conducted. Recommend that changes to the current TTP, for using CIE tools,

incorporating lessons learned during MC02 be submitted as part of the DOTMLPF submission package.

ONA: New tools need to be developed to help users access the data contained in the ONA more efficiently and quickly. A more robust ONA incorporating better search engines and tools needs to be developed and evaluated in future exercises and experiments.

Process linkages between ONA, ETO, and PEL need to be examined further in future exercises and experiments.

M&S: tools need to be developed to assist assessment cell personnel with the analysis of the sometimes-overwhelming data that comes into the cell from ISR and other resources. In addition, current models and simulations need to be upgraded/modified to better replicate ISR assets in order to provide accurate and timely BDA to the assessment cells.

ISR systems should be developed to better assess results of EBO effects on PMESII nodes and links. There is currently no method of obtaining this information in current ISR architecture.

Current Models and simulations need to be modified or new models need to be developed to more accurately provide the specificity needed for the type of experiment conducted in MC02.

Effects Assessment Cell: Senior Mentors, SMEs and Component and JTF personnel for improvement of EAC operations have made the following recommendations:

- The EAC needs to be removed from the control of the ISG and placed in either the OPS or Plans cells.
- Manning in the EAC should be balanced with IS personnel, to process BDA Data, and OPS personnel to conduct Predictive Analysis to turn the data into information that can be used to predict an adversary's capabilities and intentions that OPS and Plans cells can use to develop Future Operations.
- The EAC should be organized into three (3) functional groups:
  - Intelligence and BDA data collection and analysis (IS personnel)
  - Effects Assessment (IS/OPS personnel)
  - Predictive/Deficiency Analysis (OPS personnel)

Recommend that Effects Assessment be re-evaluated and reassessed in future experiments with an emphasis on organization, manning, tools, and doctrine (TTP). In addition, recommend that the Effects Assessment process be refined and stressed in upcoming LOEs and experiments.

Nodal & Deficiency Analysis: Analysis supports the contention that very little Nodal and Deficiency Analysis was being conducted by either the EAC or the Planners, more training needs to be conducted to reinforce the EBO concept and the need to conduct these analyses for EBO to be successful.

Kinetic Weapons: It is recommended that the use of non-kinetic/lethal weapons supported by a more robust ONA, JIACG and Reach-back capabilities be examined in future exercises and experiments. In addition M&S in support of this effort needs to be developed to better replicate non-kinetic/lethal weapon capabilities and effects.

TST Process: The TST process as utilized during MC02 showed great promise. However, the definition of a TST, as used in MC02, was very broad and led to a number of targets being designated as TSTs simply to improve their priority in the ATO/MTO even though they did not qualify as a TST. A better definition of a TST needs to be developed highlighting the differences between a target that needs to be prosecuted immediately (TBM, CDCM, etc.) and one that can wait until an asset is available to prosecute it.

The procedures for using CIE tools for consolidating and coordinating TST information and prosecution were refined and improved during MC02. These revised procedures need to be verified during future exercises and codified in the TTP.

The TST process/concept, incorporating lessons learned and the revised procedures developed during MC02, needs to be further verified and tested during future exercises and experiments and implemented as a joint procedure as soon as possible.

Joint Interagency Coordination Group (JIACG): The ability to integrate joint, multinational, and interagency support for EBO is a concept that showed great potential during the exercise. The use of D-I-E pillars of national power can have a powerful effect on the battlefield. However, who should control and coordinate these assets. The JIACG, as used in this exercise, was constituted as a cell within the JECG white cell working as a part of the Combatant Commanders staff; this appears to be where the JIACG needs to be located. However, how does this group need to interface with the JTF staff? Most D-I-E assets are not controlled by CJTF and the effects they generate are most associated with Combatant Commander/National goals (nation building, regime change, coalition building, humanitarian aid, etc.) as opposed to CJTF desired effects; and in some instances can work against CJTFs plans.

A recommendation for the JIACG, proposed by some Senior Mentors and Players, constitutes a JIACG forward element as a liaison cell/group on the JTF staff, to apprise the JTF on what D-I-E actions are being conducted or contemplated, and to solicit inputs on how these actions are effecting or will effect CJTFs overall campaign plan. This places the main emphasis on a "JX" component on the Combatant Commanders staff to harmonize D-I-E actions.

Determining the contribution of D-I-E actions is a difficult process in the exercise world and in reality. Recommend that M&S tools be developed to assist with the assessment of D-I-E actions in the real world and for exercises.

Experiments need to be built incorporating interagency and multinational partners in effects based planning.

The use of the JIACG to harmonize D-I-E actions to achieve desired effects is a concept that needs further examination in future experiments and exercises. This concept needs to be fully examined using as close to a full up JIACG as possible with a robust reach-back capability included. It is recommended that a dedicated JIACG exercise be conducted to fully evaluate the concept properly.

Effects Based Planning: Effects based Planning necessitates a change in the military decision making thought process. The lack of wargaming at the JTF level and the apparent lack of development of branch plans and sequels based on the use of effects assessment and predictive analysis indicates that EBO planning process as described by the EBO concept developers was not completely adhered to by the JTF-HQ staff. The concept itself appears to be

sound, however, based on this exercise more in-depth training is needed to insure that all members of the JTF and component staffs follow the planning principles of EBO. Recommend continued development of the effects-based planning process, and

Joint Tactical Action (JTA) Packages: The concepts concerning Joint Tactical Actions and Effects Packages need to be redefined. There is no universally accepted definition of what a JTA or effects package is nor is their documentation to explain how to employ, control, and sustain them.

The integrated air tasking order (ATO) and maritime tasking order (MTO) are excellent tools in their domains; however they are insufficient to integrate all other actions necessary to create joint effects. Recommend a JTF-level integration tasking order (JTO) be designed incorporating lessons learned during this experiment and integrating JFLCC and JSOTF requirements into the construct.

The joint integration matrix (JIM) was not effectively used during this experiment. Most participants felt it was difficult to use and update and the data it provided could be more readily accessed by other means. There were some participants, however that felt JIM could be a very useful tool if it could be made more user friendly. Recommend that tools be developed to automatically update JIM and make data retrieval easier, considering a correct balance of push/pull for data mining.

Recommend the continuation of the development and refinement of the CONOPS and TTPs necessary to build an Effects Tasking Order (ETO) and that this concept be re-evaluated in future exercises and experiments.

Information Operations (IO): IO in support of EBO is a concept that needs a complete overhaul. The IO campaign, for the most part was unsuccessful and uncoordinated. The following recommendations were provided by Senior Mentors, SMEs and OT's to improve the problems observed during MC02 with IO in support of EBO:

- Integrate IO personnel into JTF Plans and Operations Groups in order to maximize the benefits of IO capabilities.
- Develop an acceptable mechanism for coordinating SAP/STO actions and integrating SAP/STO program information into the JTF IO campaign.
- Develop M&S to provide better simulation of IO effects with higher fidelity than is currently available.
- Develop tools to assist assessment cell personnel to recognize and assess the success or failure of IO actions from ISR reported data.
- Constitute a Joint Information Operations Task Force (JIOTF) as a functional component at the Combatant Commander or JTF staff level to coordinate all phases of IO (incorporating PAO and PSYOPS under its control).

This concept needs to be re-evaluated in future exercises and experiments.

Assessment Area 5 — Sustain the Force

Overall Assessment Results

The procedures developed to satisfy the Warfighting Challenge "Ability to Provide Agile Sustainment for Joint Forces in Rapid Decisive Operations" could not be completely validated because of the Experiment construct. As defined below, some of the procedures require further experimentation either by more detailed modeling or by live execution.

Overall Assessment Results

- **The Log CROP proved to be a powerful and well-received tool...**
- **The Experiment construct did not enable an accurate assessment…**
- **The Theater Medical Information Program (TMIP) was not mature enough to provide situational awareness…**
- **The assessment of Provide Medical Care was inconclusive…**

The Logistics Common Relevant Operational Picture (Log CROP) proved to be a powerful and well-received tool, enabling the JTF to rapidly process data and generate logistics knowledge by integrating sustainment as an integral part of effects-based operations. The Watchboard was the most commented on and used part of the Log CROP. However, it did not provide an actionable or predictive logistics capability.

The experiment construct did not enable an accurate assessment of the ability to 'Employ a Networked Sustainment Distribution Structure to Satisfy the JFC Sustainment Requirements for RDO'. However, insights gained from participants showed that while the Log CROP provided sufficient information to be able to tailor logistics forces, sufficient planning time was not allocated to arrive at a tailored solution in either force structure or sustainment packaging. ISBs and host nation support were used efficiently to minimize the logistics footprint in the JOA. JRSOI procedures and networked distribution, however, could not be evaluated without benefit of live execution or more detailed modeling, because of all the factors that affect those procedures. The JTF successfully used a combination of delivery platforms for sustainment distribution, including using strategic lift assets. However, the High Speed Vessel (HSV) was never used for sustainment distribution during the experiment due to differing view between the JIF and JFMCC on HSV implementation.

In the area of 'Gain and Maintain Knowledge of Force Health Status', the Theater Medical Information Program (TMIP) was not mature enough to provide situational awareness to the JTF Surgeon Staff or to assist in their planning, coordinating, and decision-making process.

The assessment of 'Provide Medical Care' was inconclusive. The Joint Medical Semi-Automated Forces (JMedSAF) simulation did not portray movement of casualties from point of injury, to Level 1, and to Level 2. In addition, Level 1 units were not played and not all Level 2 units were played in JMedSAF. Whether those units were capable of providing adequate medical care in the JOA was undeterminable.

Methodology

In analyzing the task, 'Rapidly Process Data and Generate Logistics Knowledge by Integrating Sustainment as an Integral Part of Effects Based Operations', the Log CROP and logistics Decision Support Tools (DST), which were seen as the key areas to review, were broken down as follows:

- Collecting, processing, and displaying full visibility of operations and logistics information

- Log CROP ability to display complex logistics information
- Log CROP ability to ensure a "predictive" capability for logistics
- How DSTs assisted in synchronizing the deployment flow in accordance with the directions of the supported commander
- Ability to acquire critical logistics information from the Log CROP for planning and analysis and dissemination to subordinate logistics commanders

The second task, 'Employ a Networked Sustainment Distribution Structure to Satisfy the JFC Sustainment Requirements for RDO' addressed the following:

- Tailor sustainment for synchronization with deploying forces
- Shape the logistics footprint in JOA to extend operational reach
- Procedures and practices to ensure time-definite delivery and support for agile mobile forces
- Use strategic lift to augment theater distribution
- Employ a combination of delivery platforms to ensure time-definite delivery, improve throughput, and support agile mobile forces

The last tasks, 'Gain and Maintain Knowledge of Force Health Status and Provide Medical Care', were assessed by:

- Track patients throughout the theater of operations and to CONUS
- Monitor DNBI/combat casualty rates as related to force readiness
- Determine the tools required to provide the JFC and subordinates the knowledge needed to assess the medical feasibility of operational activities
- Determine patient data trending

Data was collected primarily from the logistics participant's and SMEs using automated questionnaires and from the written comments and recommendations provided by all participants, various after action reviews, and In–Focus Sessions. The locations and number of the Logisticians follows: PLANS Group, 14; OPS Group, 12; SMEs, 12; Functional Component, 5; Joint Logistics Management Center (JLMC), 16; and the Joint Exercise Control Group (JECG) Deployment Sustainment Support Cell (DSSC), 17.

The Warfighting Challenge, 'Ability to Provide Agile Sustainment', was developed because the current force sustainment methodology requires establishing a large vulnerable infrastructure to collect equipment, personnel and consumables and to perform employment and sustainment functions. Because of its size and its nature, it is challenged to provide agile sustainment to highly mobile forces in non-contiguous operations. The tasks, subtasks, questions, and data elements constituting this study were developed based on information from several sources, most notable being:

- Concept Experimentation Strategy (CES) to Deploy and Sustain the Force in Rapid Decisive Operations (RDO, 2/14/01) Focused Logistics: Enabling Early Decisive Operations (FLEEDO, 10/10/99)
- Strategic Deployment (SD, 5/10/00)
- RDO (3/1/02) White papers
- Standing Joint Force Headquarters (SJFHQ) Concept of Employment for MC02 (8/17/01)
- Deployment & Sustainment in MC02 Concept of Operations (CONOPS, 3/18/02)

- Deployment & Sustainment in MC02 Tactics, Techniques and Procedures (TTPs, 1/9/02)
- MC02 Joint Standing Operating Procedure (JSOP).

These sources were used to generate the metrics and form the basis for data collection plan development. The Logistics Concept Developers and members of the JFCOM/J9 Analysis Division vetted the data collection plan.

The high order metrics:

- Task: Rapidly process data and generate logistics knowledge by integrating sustainment as an integral part of effects based operations
- Task: Employ a networked sustainment distribution structure to satisfy the JFC sustainment requirements for RDO
  - Subtask: Tailor sustainment for synchronization with deploying forces
  - Subtask: Shape the logistics footprint in JOA to extend operational reach
  - Subtask: Employ a combination of delivery platforms to ensure time-definite delivery, improve throughput and support agile mobile forces
  - Subtask: Determine the impact of using strategic lift to augment theater distribution
- Task: Gain and maintain knowledge of force health status
  - Subtask: Track patients throughout the theater of operations and to CONUS
  - Subtask: Determine the tools required to provide the JFC and subordinates the knowledge needed to assess the medical feasibility of operational activities
- Task: Provide medical care
  - Subtask: Determine the impact of using lifts of opportunity vs. dedicated air evacuation to move patients from the battlefield
  - Subtask: Determine the means of reducing the medical footprint in the JOA

Finding 1:

> The ability to rapidly process data and generate logistics knowledge by integrating sustainment as an integral part of effects-based operations was best accomplished by using the Log CROP. The Log CROP became the key tool for displaying logistics information and providing logistics situational awareness.

As depicted in the chart below, most participants, logisticians and operators alike, saw the Log CROP as the most effective tool in the experiment for capturing and displaying logistics information. From it, Commanders and Staff could select areas of information relevant to them. The most widely used part of the Log CROP was the Watchboard, which was a "stoplight chart" that provided a near real time view of component status of critical classes of supply and flow capacity across critical nodes and lines of communication. MC02 effectiveness notwithstanding, the Log CROP needs continued refinement to ensure the links to information sources are kept current. JTF Component and MSC elements, with information posted on the Watchboard piece of the Log CROP, or available via links on the Watchboard, must also keep

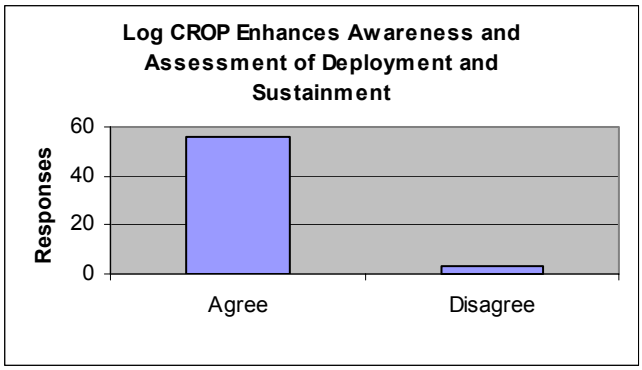


Figure 57: Log CROP enhances awareness

those links current. Business or knowledge management rules also need to be developed, as an SOP, to standardize Log CROP use and update procedures.

In some instances, participants recommended deleting some links and recommended adding others. Of significance was the lack of Engineer and Medical information sources linked to the Log CROP.

The Log CROP was not seen as a "predictive logistics" tool by the JTF Log Ops Director. To become such a tool would require adding a forecasting capability, enabling forecasting out to 96 hours, or adding links to Component or Service forecasting tools.

"JTF/Corps-level logisticians don't live 24-48 hours out; they live 72-96 hours out; otherwise, they can't affect anything in time to make a difference," said one participant. "Some means of building projections, some kind of predictive capability into the data on the Log Watchboard would be highly desirable."

Information on the Log Watchboard was not necessarily seen as actionable. The Log Watchboard served more as a location to place Component and Subordinate Command status. Having the Log Watchboard serve as a source for actionable information should come over time, as it is refined, as JTF elements become more familiar with it, and as SOPs are developed.

Some participants felt there was too much information on the Log CROP, and desired the ability to tailor the display to their needs. "We should have the ability to individually sculpt the page when it opens up, based on the person's log in," said one participant. "We should have some ability to tailor what's seen on the page so people can put what's most important to them, where they can find it easiest."

Finding 2:

> An assessment of the networked distribution structure could not be made during MC02 because the structure was not simulated and was not visible to the participants. Tailoring sustainment packages for deploying units was not executed well. ISBs were used well to shape the logistics footprint. The JTF made good use of a combination of delivery platforms for sustainment distribution.

Logistics Decision Support Tools (DSTs), Global Transportation Network (GTN), Global Status of Resources and Training (GSORTS), Joint Operations Planning and Execution System (JOPES), Joint Total Asset Visibility System (JTAV), National Imagery and Mapping Agency (NIMA), and Port and Airfield Collaborative Environment (PACE) all received mixed reviews. Whether a tool received a positive or negative review often depended on the reviewer's level of training and his or her proficiency with the tool. In some instances, users were not able to access the tools because they did not have a Service-provided Public Key Infrastructure (PKI) Certification (experiment artificiality). Some of those who were able to access the tools used them extensively. One major DST criticism was the lack of data or fidelity behind some of the tools for this experiment.

Tailoring sustainment packages for deploying units was not executed well. Participants noted that there was insufficient time to allow for the detailed planning necessary to develop tailored sustainment. Said one player, "The planning timeline developed by the JTF did not allow our MSCs, the XMEB, and the 82nd (Airborne Division) to do the planning necessary to come up with a task organized sustainment package."

As shown in the next chart, the Log CROP provided the JTF sufficient visibility over logistical assets to be able to tailor logistics for deployed forces; however, as stated previously there was insufficient planning time to go through the process to arrive at a tailored solution. While the tool exists, appropriate time must still be made available for planning.

With respect to the use of ISB to support sustainment distribution, the JTF positioned ISBs to reduce the logistics footprint in the JOA and extend operational reach, while considering force protection (i.e., locating them out of weapons of mass effects (WME) range.) One concern raised was that by reducing the footprint in the JOA, the JTF was limiting its in-theater support options, while at the same time downsizing facilities outside the JOA would cause difficulties for follow-on forces. This was an essential constraint on operator appetite in MC02 and a meaningful one. The real key was the desire for large effects in the JOA but realized via effects-based planning that large forces were not required there to do it. Maintaining sustainment aboard ship served as well to minimize the logistics footprint in the JOA. Even with the intent of minimizing the log footprint, the JTF ended up with two sizeable ISB in the JOA. There were also a number of forward operating bases (FOB) that had to expand because of the number of components operating from them. While not directly stated, this would indicate insufficient coordination among Components to minimize supply stockage and duplicate forces. Extensive use of host nation resources helped to offset the log footprint somewhat, but only in the number of U.S. forces personnel required.

The JTF used a combination of delivery platforms for sustainment distribution, including using strategic lift assets to resupply the JFLCC MSCs, the 82nd Airborne Division elements, and the Stryker Brigade. However, the High Speed Vessel (HSV) was never used for sustainment distribution during the experiment. The JFMCC viewed and used the HSV as one of its operational assets rather than as a theater common-use transportation asset. To that end, it was used to technically to move forces in the JOA and not made available for transporting sustainment.

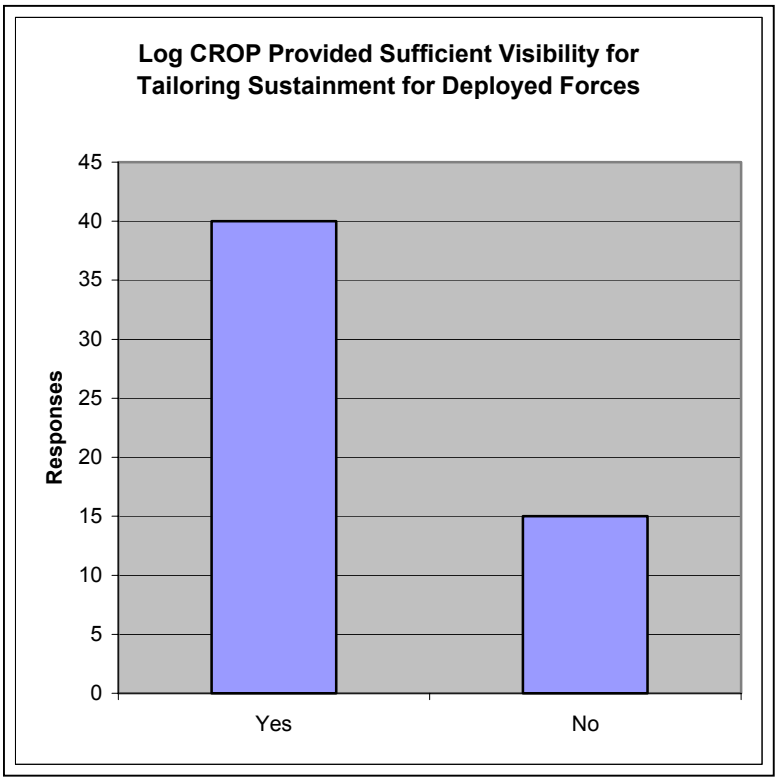


Figure 58: Log CROP provides visibility tailoring sustainment of deployed forces

The JTF successfully coordinated with TRANSCOM to retain strategic lift in the JOA to support aerial transportation requirements following the airborne insertion. Twenty C-17s were retained for this mission, which included air landing the SBCT and follow-on sustainment for both the SBCT and the 82nd Div (ABN). This reallocation of strategic lift proved to be essential for accomplishing the mission in Red, and showed the degree of increased airlift resources that might

be required to support Army operations on this scale.

Finding 3:

> Immature development of the Theater Medical Information Program (TMIP) had a negative impact on the ability of the JTF Staff to gain and maintain knowledge of force health status. TMIP was not mature enough to provide ttional awareness to the JTF Surgeon Staff or to assist in their planning, coordinating, and decision-making process.

The lack of early planning and knowledge of what assets were already in theater slowed the delivery of focused medical support services. No assessment can be made regarding the subtask, 'Determine the Impact of Using 'Lifts Of Opportunity vs. Dedicated Air Evacuation' to move patients from the battlefield; or the subtask 'Determine the Means Of Reducing The Medical Footprint In The JOA'. The lack of medical planning for MC02 and the poor integration of the experimental systems with Service reporting prevents any meaningful review of these subtasks. Some medical operator and SME participants noted the experiment limitations saying, "Since medical play was never designed into the MC02 exercise and experimental construct, the flow of information between the response cells to the functional components to the JTF, because of the numerous work-a-rounds, was cumbersome, confusing, and the ROE changed almost daily." Another noted, "…for this experiment, TMIP did not have the capability to track patients. NavMedWatch was better at this [tracking patients] than TMIP. We would have needed additional information scripted, to put into TMIP in order to show the evacuation, additional visits, and patient encounters."

The Joint Medical Semi-Automated Forces (JMedSAF) simulation did not portray movement of casualties from point of injury, to Level 1, to Level 2. JMedSAF automatically placed casualties into Level 2 medical facilities. Also, Level 1 units were not played, and not all Level 2 units were played in JMedSAF. Whether those units were capable of providing adequate medical care in the JOA was undeterminable. As such, the JTF medical staff had no capability to make a decision regarding whether their medical footprint in the JOA was effective. Because lifts of opportunity were not simulated, no assessment can be made as to whether they were effective, or whether casualties were dying due to no dedicated air evacuation assets in the JOA. The concept of using 'lifts of opportunity' to evacuate casualties elicited a strong response from one experiment participant: " …here is current medical doctrine: PT (patient) evacuation "lifts of opportunity" should be used as and [sic] exception, NOT as the rule … In RDO, with a minimal (or nonexistent) medical footprint in the JOA, dedicated medical lift, with skilled medical personnel to monitor and treat STABILIZED patients, as they are evac'd from stabilization platforms like an FST, EMEDS, or CRTS, to definitive care. Lift of opportunity is for STABLE patients that require little or less medical expertise during evac. If we make opportunity lift our primary means of evac, soldiers, sailors, airmen and marines will die en-route."

Other Observations and Finding

According to one of the retained Senior Mentors observing MC02, Joint Interactive Planning (JIP) should apply to functions as well as forces. "Deployment and sustainment planners should be fully integrated into the collaborative information environment (CIE)," he

said. "They should be participants, not observers, as courses of action are developed, evaluated, and selected. Transportation feasibility and sustainment supportability assessments should be considered during COA development, and not during comparison and selection."

Relationship to Other Objectives

SJFHQ -- Functions of personnel in Log Ops and Log Plans positions in SJFHQ

ONA -- Database research for facilities and infrastructure to support logistics operations in JOA

EBO -- Develop logistics concept of support for Effects Based Operation(s) and future branches and sequels

Sustainment -- Plan and provide logistics sustainment for the JTF

Collaborative Information Environment (CIE) -- Environment for collaborative planning and coordinating logistics operations, force deployment and sustainment, horizontally and vertically ; i.e. Logistics Coordination Board (LCB)

Interagency Agency (IA) -- Interaction for coordinating Host Nation Support (food, facilities, equipment) and Humanitarian Assistance

JISR -- Intelligence on the JOA and adversary activities therein that would adversely impact force deployment and logistics operations

Initiatives -- Introduction and experimentation of new joint logistics tools (JL Tools)

Assured Access (AA) -- Ensuring access into the JOA and facilities therein to support force deployment

Effects Based Operations (EBO) -- Execute logistics operations to sustain forces conducting effects based operations

Joint Theater Logistics Management

Concept/Obj	SJFHQ	ONA	EBO	JTLM	CIE	IA	JISR	Init	IS	AA	DO	EBO	SF
Obj 5	X	X	X	X	X	X		X				X	X

DOTMLPF Linkage

Doctrine

- TTP/SOP are needed for Log CROP Knowledge Management: keeping the Log CROP current
- TTP/SOP are needed for employment of new systems (TMIP)

Organization

- Improve reachback capability for CONOPS medical planning

Training

- Deployment and sustainment planners should be fully integrated into the collaborative information environment (CIE)
- Consider developing training programs for multi-functional joint log planners, knowledgeable in all Service capabilities

- Reinforce adequate allocation of time for subordinate's mission planning requirements
- Consider training programs to develop and maintain proficiency in logistics decision support tools

Materiel
- Formalize the Log CROP
- TMIP needs to be refined before employment

Leadership
- Reinforce adequate allocation of time for subordinate's mission planning requirements

Personnel
None

Facilities
None

Recommendations:
- Theater Medical Information Program (TMIP) should undergo field-testing to validate Service data integration prior to acceptance. Examine Networked Distribution Structure as part of an LOE.
- The concept of Log CROP and its functionality should continue to be refined, based on user comments and the availability of new or advanced technologies.

Assessment Area 6 -- Standing Joint Force Headquarters (SJFHQ)

Overall Assessment Results

The SJFHQ assisted the Joint Task Force (JTF) Headquarters in quickly achieving command and control (C2) of the JTF formed to resolve the crisis presented by the Millennium Challenge 2002 (MC02) experiment scenario. The value-added by the SJFHQ was unquestionable and prevalent throughout the experiment. The SJFHQ members reduced the ad hoc characteristics normally associated with the activation of a JTF, helped surmount the JTF standup learning curve, and provided continuity in planning and operations from pre-crisis through execution to transition—invaluable contributors to the JTF staff according to participants, SMEs, and Senior Mentors.

Overall Assessment Results

- **The value-added by the SJFHQ was unquestionable…**
- **The SJFHQ members reduced the ad hoc characteristics…**
- **provided continuity in planning and operations…**
- **refinement of its organization and composition is warranted…**
- **Most BCCWGs are organized about right and**

Although the SJFHQ added value to the JTF, refinement of its organization and composition is warranted. The organization and composition need minor refinement not a major overhaul. The assessment of the SJFHQ organization recommends the addition of one person, an interagency community (IAC) representative, to be incorporated in the Command Group. Additional expertise in the areas of Fires, Personnel, Medical, and Engineering should be a part of the Operations Group or Plans Group. This assessment pertains to the specific SJFHQ structure. At the JTF level, this analysis suggests the Information Superiority (IS) Group and Knowledge Management (KM) Group be eliminated, their members distributed throughout the other groups, and points of contact for IS and KM should be added to the Command Group. Also at the JTF level, the analysis suggests a Support Group should be added.

The Boards, Centers, Cells, and Working Groups (BCCWG) envisioned by the SJFHQ concept provided a suitable structure to the JTF staff for C2 of the joint force. Most BCCWGs are organized about right and met the needs of the JTF. The BCCWG structure enhanced JTF operations and enhanced interaction between the JTF Headquarters and the Component and Combatant Commander staffs. The BCCWGs used during MC02 and discussed below are the same organizations that the SJFHQ uses when it operates as a stand alone JTF and are only a starting point from which the CJTF and his staff can add, delete, or adjust based on the requirements of the situation.

Review of the MC02 UJTL Baseline Report, dated 11 July 2002, indicates the SJFHQ and its concept of employment provide a means to alleviate major difficulties in accomplishing Universal Joint Task List (UJTL) task OP5, Provide Command and Control; directly addresses root causes of some cross-task performance issues; and provides a means to overcome some aspects of five of the ten JTF Challenges as stated in the Baseline Report.

Methodology

The data gathered to support this portion of the MC02 analysis effort was predominantly qualitative. Three primary groups of participants provided data that addressed the value added by the SJFHQ, the SJFHQ organization, and its composition. These groups were experiment

participants, and included members of the JTF Headquarters including the SJFHQ, Component Commander Headquarters staffs, and control cell participants. These personnel emulated the Combatant Commander's staff; Subject Matter Experts (SME), predominantly JTF observer-trainers and joint support team members assigned to the USJFCOM J7 Directorate augmented by service experts; and Senior Concept Developers, consisting of retired General and Flag Officers with significant personal experience leading and commanding major combatant commands and Joint task forces. The SMEs were positioned at key nodes within the JTF Headquarters established at Suffolk, VA, and also at the locations of the five functional Component Commander Headquarters located throughout the United States. Two SMEs also accompanied the selected members of the JTF Headquarters (Forward), who deployed to the USS CORONADO 30 July to 02 August. Experiment participants and SMEs were asked to complete surveys at selected points throughout the experiment to gather data regarding the use of the SJFHQ. The surveys were administered electronically using the web-based Joint Data Collection and Analysis Tool (JDCAT). A total of 52 participant surveys and 33 SME surveys were issued during MC02 Spiral 3, conducted 3-14 June 2002, and during MC02 Execution, conducted 24 July to 14 August 2002. These resulted in approximately 8000 individual surveys completed and submitted by the SMEs and participants. The survey completion rate was approximately 80% overall. Experiment participants and SMEs were also asked to submit observations, on occurrence, concerning any strengths or weaknesses of the organizations, processes, procedures, and tools used in the experiment. These observations were narrative in nature and were collected using an electronic format persistently available at every computer workstation throughout the experiment. This capability allowed for rapid compilation and daily roll-ups to experiment analyst personnel. This was a rich source of experiment data and generated approximately 360 observations related to the SJFHQ. Participant and SME representatives also participated in a post-execution SJFHQ Working Group session that discussed all aspects of the SJFHQ. This session developed additional data used in this analysis. Senior Concept Developer input was gathered during daily In-Focus and Azimuth Check sessions and weekly After Action Reviews. A compilation of the Senior Concept Developer comments made in these venues was used as source data for this analysis. Analysts also interviewed selected Senior Concept Developers and key JTF Headquarters staff members, to include the Chief of Staff and the Group Directors to further develop data used for this analysis.

The organizational structures, functions, and products of the SJFHQ concept were the focus of this evaluation. The analysis process consisted of a daily, preliminary review of the incoming data from the sources described above and the daily production of emerging insights for presentation to the senior experiment analysts. These emerging insights became the basis for the development of the findings presented in this analysis. Logical groupings of survey and comment data from the experiment participants, SMEs, and Senior Concept Developers, from Spiral 3 and Execution, were then distilled to the information presented herein. The analysis for this section was performed by members of the Joint Futures Lab, Experimentation Department, Analysis Division assisted by a representative from the U.S. Army TRADOC Analysis Center.

Warfighting Challenge:

Ability to quickly achieve cohesive C2 of a Joint Force

This challenge was postulated because it facilitates RDO. RDO is intended as a rapid means to achieve decisive results against an adversary. A JTF, enhanced with a SJFHQ, should be able to more quickly achieve cohesive C2 of a joint force than it would if it did not have a

SJFHQ. The SJFHQ should provide the ability to rapidly integrate precise knowledge and understanding of the adversary and effects-based orientation into early planning and execution by the JTF Headquarters, providing the degree of continuity in planning and operations that enables execution of RDO. The SJFHQ should be a key component to quickly achieve cohesive C2 of a joint force, which facilitates RDO.

RDO require a greater coherence of operational level advanced planning and command and control than current ad hoc or augmented Service core headquarters can generate. Successful, rapid response in future operations requires a headquarters that has a detailed understanding of the area of operations and is immediately responsive to the geographical CINC for crisis response planning and execution. (RDO Concept Paper, 16 01 01)

The SJFHQ is intended to provide each war fighting joint theater Commander in Chief (CINC) with a trained and equipped standing, joint Command and Control (C2) capability specifically organized to reduce lag time involved in setting up a JTF headquarters ready to rapidly and decisively conduct contingency operations. (SJFHQ Concept of Employment, 17 08 01)

Given this Warfighting Challenge, metrics (tasks, subtasks, questions and data elements) were developed based on information from the various sources listed below:

- Rapid Decisive Operations Concept Paper (RDO, 16 01 01)
- Rapid Decisive Operations Concept Paper (RDO, 26 01 01)Rapid Decisive Operations Concept Paper (RDO, 09 08 01)USJFCOM Adaptive Joint Command and Control (AJC2) White Paper
- USJFCOM Adaptive Joint Command & Control (AJC2) Concept Baseline Collective Assessment (BCA)Standing Joint Force Headquarters (SJFHQ) Concept of Employment for MC02 (17 08 01)
- MC02 Joint Standing Operating Procedure (JSOP)
- Ideas extracted from works by RAND; Institute for Defense Analysis; Defense Group, Inc; and Service concepts for future operations.

These sources were used to generate the metrics and formed the basis for data collection plan development. Data collection was aimed at the goal of determining if each of the developed tasks and sub-tasks was performed or achieved. Successful task accomplishment is the basis for a determination that the warfighting challenge was overcome. The data collection plan was vetted with the SJFHQ Concept Developers and other members of the Analysis Division.

The high order task and sub-task architecture follows:

- TASK: Quickly establish a JTF Headquarters ready to conduct RDO.
- Subtask: Establish a standing element of a joint force headquarters (SJFHQ).
- Subtask: Employ the SJFHQ to conduct pre-crisis planning.
- Subtask: Integrate the SJFHQ into the JTF Headquarters to perform RDO planning and execution.
- TASK: Provide continuity in planning and operations from pre-crisis through execution and transition.
- Subtask: Establish cell-organized JTF Headquarters around the SJFHQ structure and processes.
- Subtask: Use SJFHQ architecture to establish a Joint Force C2 structure.
- Subtask: Employ the SJFHQ to assist with deployment of the forward headquarters.
- Subtask: Employ the SJFHQ to assist in the conduct of staff operations.

- Subtask: Employ the SJFHQ to assist in coordination and integration of Joint and Interagency support.

Finding 1: The SJFHQ provided value added to JTF staff for C2 of the joint force—reduced the ad hoc nature of activating a JTF, helped surmount the JTF standup learning curve, and provided continuity in planning and operations from pre-crisis through execution to transition

Finding 1:

The SJFHQ provided value added to JTF staff for C2 of the joint force—reduced the ad hoc nature of activating a JTF, helped surmount the JTF standup learning curve, and provided continuity in planning and operations from pre-crisis through execution to transition.

This finding is supported by the following detailed Sub-Findings:

- The SJFHQ completed expected pre-crisis activities.
- The SJFHQ provided the pre-crisis products necessary for the JTF to more rapidly surmount the learning curve.
- The MC02 JTF performed expected JTF functions.
- The SJFHQ reduced the ad hoc nature of JTF Headquarters activation.
- The SJFHQ enhanced JTF performance of EBO and UJTL tasks.
- SJFHQ contributed to the continuity demonstrated by the MC02 JTF.
- The presence of the SJFHQ provided value-added to the JTF's accomplishment of the MC02 experiment objectives.
- The organizational structures described by the SJFHQ concept and used in MC02 enhanced the function of the JTF.
- The function of the Forward Headquarters was enhanced by the presence of a portion of the SJFHQ.
- The SJFHQ presence and effectiveness altered the role of component command LNOs at the JTF. The new roles included preparing for back-up role in the event the CIE failed and to facilitate attendance at collaborative sessions.

Sub-Finding: The SJFHQ completed expected pre-crisis activities.

Interviews with key SJFHQ personnel provided the data for this Sub-Finding. Analysis was performed comparing the actual activities and products that the SJFHQ provided with the activities and products required by the reference documents, specifically, the Concept for Employment (CONEMP) and the JTF Standard Operating Procedures (JSOP).

Background -- Based upon lessons learned from Joint Experiment Unified Vision 2001 and from subsequent limited objective experiments, a 55 billet structure was established for the SJFHQ in MC02. The SJFHQ was formally established on 19 February 2002, with 59 personnel. The four additional personnel were available for training and were added to the existing billet structure with no billet additions. There were nine membership changes to the SJFHQ between the date of establishment and the start of MC02. Two membership changes were due to experiment artificialities - the Operations Director and the Information Superiority Coordinator became concept mentors at the start of Millennium Challenge; three membership changes were due to contractor reassignment within the SJFHQ; three membership changes were due to

military personnel permanent change of station orders; and one membership change was due to a contractor finding other work. The SJFHQ remained in a stable organizational environment from pre-crisis through execution.

Pre-crisis Activities -- From the CONEMP, the SJFHQ concentrates on three primary tasks: Combatant Commander engagement, planning, and training. The duties involved in Combatant Commander engagement include identifying the mission essential roles for allied and regional partners by collaborating with those partners and developing situational awareness and understanding. Planning duties focus on identifying and characterizing key nodes and vulnerabilities of potential adversaries within the framework of Operational Net Assessment (ONA) parameters. This information is integrated into a focused area ONA and used to develop effects-based options. In developing the ONA and contingency plans, the SJFHQ produces and ensures that a coherent, understandable Joint Standard Operating Procedures (JSOP) document exists. Training duties, both internal and external to the SJFHQ, include training in use of collaboration and decision support tools, understanding command relationships, improving lines of communication between headquarters and external support, participation in exercises with component headquarters and combatant commander staffs, and training the augmentees and liaisons who will participate with the SJFHQ in contingency operations.

Interviews were conducted with key SJFHQ personnel to determine whether or not the SJFHQ was conducting pre-crisis activities in accordance with the CONEMP. These key personnel included the Deputy Chief of Staff, the Joint Operations Center Chief, the Plans Director, the Operations Director, the Lead Knowledge Management Officer, and the Information Superiority Coordinator. Results of these interviews indicated that the SJFHQ engaged in the following pre-crisis activities: JSOP development, building the ONA, developing the political-military (POLMIL) plan, coordination with component headquarters, concept of operations (CONOPS) development, training (both internal and external), Knowledge and Information Management Plan (KIMP) development, and technical testing of computer networks. All respondents indicated that building the ONA and developing the JSOP were the activities that required the majority of their time. Concerning the development of the ONA, one participant commented, “There is not enough time to put together a good/comprehensive ONA.” He then went on to state that the System of Systems Analysis (SoSA) cell helped the SJFHQ to develop the ONA. The SoSA cell is not a part of the SJFHQ; however, one participant stated that they should be members of the SJFHQ, while another participant said that the SoSA cell should reside in the combatant commander’s Joint Intelligence Center (JIC). The planning activities prescribed by the CONEMP but not accomplished by the SJFHQ were due to experiment artificialities. The SJFHQ was unable to exercise reachback or relationship building with the combatant commander staff or the centers of excellence due to non-participation by these groups.

The SJFHQ completed intensive training on a variety of subjects in preparation for Millennium Challenge. SJFHQ personnel attended the following training:

- JTF Doctrinal Review (5 days)
- RDO Concept (2 days)
- EBO Concept (1 day)
- SJFHQ Concept (2 days)
- XC4I (3 days)
- ONA Refinement
- CONPLAN Development
- SOP Refinement

- ONA, ADOCS, IWS, SPPS, JISR (Tool Suite, CINC Collection Plan, Requirements, Allocation, Matrix, Targets, Tasks, JCMC Agenda, Re-tasking)
- IO, ATO/MTO, TOP COP, EA Concept, LOG (Collaboration, Command and Control, PA, JFCR, GTN EX System, Sustainment Overview, Reports, AMMO, Fuel, Intra-theater Transportation Operations, HSV, C-130, Rotary Wing, Casualty Management, Evacuation Procedures, Medical Reports, MED CROP, Medical Practical Applications, Patient Tracking, Casualty Evacuation).

The SJFHQ provided training to III Corps participants in various venues. Key personnel from the III Corps staff attended a SJFHQ led Joint Concept Seminar at Fort Hood, TX. Topics of the seminar included SJFHQ Concept of Operations, Rapid Decisive Operations, Effects Based Operations, Forming a JTF Headquarters, Operational Net Assessment, Knowledge Management, Inter-Agency CONOPS, Joint Information Operations, Effects Based Planning, Effects Assessment, Joint Fires and Targeting, Hybrid Terrain, Joint Experimentation Operational Environment, and Joint Logistics/Sustainment Planning. This four-day seminar was necessitated by the original JTF Headquarters slated for MC02, XVIII Airborne Corps, being replaced by III Corps because of mission requirements. This change was announced in late April 2002 with the seminar conducted only two weeks later. This unplanned situation, and not a formal part of the MC02 assessment strategy, may be the most poignant example of SJFHQ value-added and its ability to maintain continuity from pre-crisis planning through execution to transition.

Additionally, all participants were provided training immediately prior to Spiral 3 and during Spiral 3. All participants were required to complete five modules of Web Based Training. The training topics included Joint Experimentation, Rapid Decisive Operations, SJFHQ, ONA, and EBP. Additional training provided during Spiral 3 included XC4I Systems, ADOCS, IWS, SPPS, JISR (Tool Suite, CINC Collection Plan), ONA, IO (NA, PSYOP), ATO/MTO, TOP COP, EA, and LOG (LOG Overview, LOG Collaboration, Allocation, Matrix, JFCR, GTN EX System, Sustainment Overview, Reports, AMMO, Fuel, Intra-theater Transportation Operations, Movement Practical Applications, HSV, C-130, Rotary Wing, Casualty Management, Evacuation Procedures, Medical Reports, MED CROP, Medical Practical Applications, Patient Tracking, Casualty Evacuation).

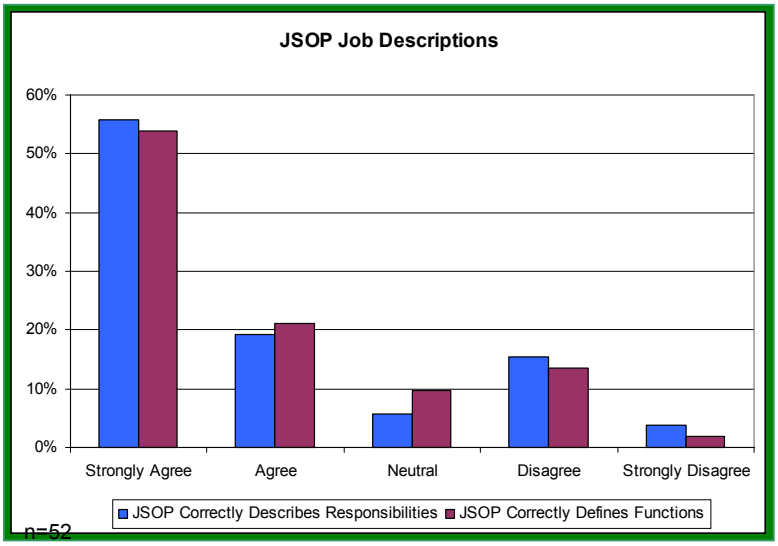


Figure 59: JSOP job descriptions

In summary, the SJFHQ completed all pre-crisis activities as described in the CONEMP, with the exception of activities that could not be performed due to experiment artificialities. The SJFHQ was aware of these exceptions and would have performed them had the Centers of Excellence and a combatant commander staff participated.

As part of the analysis of the SJFHQ pre-crisis activity a survey was given to the SJFHQ concerning the job descriptions

and billet functions as described in the JSOP. Three fourths of the SJFHQ members surveyed either strongly agree or agree that the JSOP correctly describes their specific job responsibilities and functions that they actually performed. In terms of responsibilities only 19% and in terms of functions only 15% disagree or strongly disagree that the JSOP is off the mark in these two areas.

Results of responses from exercise participants and SMEs indicate that additional details concerning job descriptions of billets other than those of the SJFHQ are necessary and should be included in the JSOP.

Sub-Finding: The SJFHQ provided the pre-crisis products necessary for the JTF to more rapidly surmount the learning curve.

In accordance with the CONEMP, the SJFHQ arrives at the JTF with a JSOP, a comprehensive and focused ONA, and a CONPLAN. During pre-MC02 forming, research, and training, the SJFHQ determined that two additional products, a KIMP and a POLMIL Plan, were necessary for the rapid standup of a JTF. All of these products were completed and provided to the JTF at the start of MC02. Interviews with key SJFHQ personnel indicated that the ONA is never really finished; it is a continual work in progress and requires constant updating. As stated earlier, some of the key participants stated that there was not enough time to develop a comprehensive ONA, and the ability to provide a detailed ONA was exacerbated by exercise artificialities and information access limitations which hindered in-depth analysis of the area. Analysis of the value of the ONA is provided elsewhere in the MC02 Final Report.

SME responses to five surveys along with participant responses to four surveys regarding SJFHQ-provided pre-crisis products, five in Spiral 3 and four in Execution, provided the data for this Sub-Finding. The survey respondents were asked to consider the usefulness of the JSOP, whether or not modifications to the JSOP were required, participant adherence to the JSOP, and whether the JTF desired additional pre-crisis products to be provided by the SJFHQ.

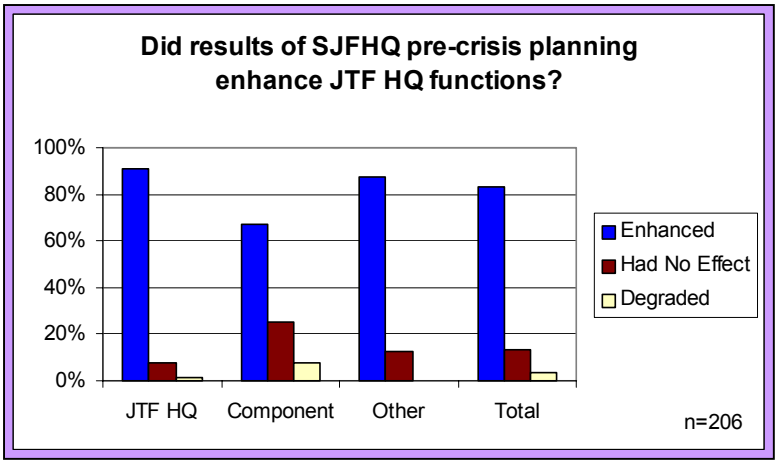


Figure 60: Did results of SJFHQ pre-crisis planning enhance JTF HQ functions

A key element in the realm of SJFHQ pre-crisis products was the pre-crisis planning it performed. During Spiral 3, JTF Headquarters, Component, and other participants with visibility on JTF activity were asked if the results of SJFHQ pre-crisis planning enhanced the function of the JTF Headquarters. Of the 206 respondents, the vast overall majority, 83%, felt the results of SJFHQ pre-crisis planning enhanced the function of the JTF Headquarters.

Participants was also asked if the SJFHQ provided the pre-crisis planning products they thought it would provide. By an overall margin of two to one, the 372 respondents felt the SJFHQ provided the pre-crisis products they expected.

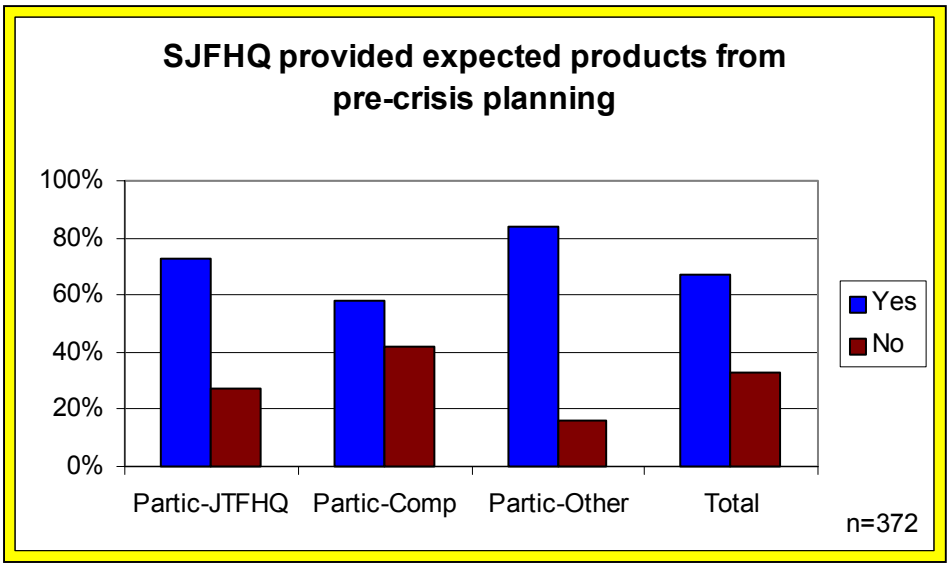


Figure 36: SJFHQ provided expected products from pre-crisis planning

The need for additional skills, knowledge, or products to be brought to JTF activation by the SJFHQ was explored with both SMEs and participants. During MC02 Spiral 3 and again in Execution the SMEs were asked if they felt there were additional skills, knowledge, or products the SJFHQ should bring to the activation of a JTF. If they answered yes, they were asked to identify what was needed. Of the 56 SMEs who formulated a position on this question, approximately two-thirds answered that additional skills, knowledge, or products were needed from the SJFHQ.

Because this question asked about the need for additional skills and knowledge, in addition to additional products, further examination of the accompanying comments is required to determine the magnitude of the need for additional products, which is the focus of this portion of the analysis. Analysis of the additional skills and knowledge required is presented under the SJFHQ organization and composition finding found later in this report. Nearly every respondent who answered yes to the question, 35 of 36, complied with the survey directions and provided a comment indicating what additional skill, knowledge, or product needed to be provided by the SJFHQ. Of these 35 comments, only 8 dealt with the need for additional products. SMEs confirmed the participant view that the SJFHQ did provide the products expected of it.

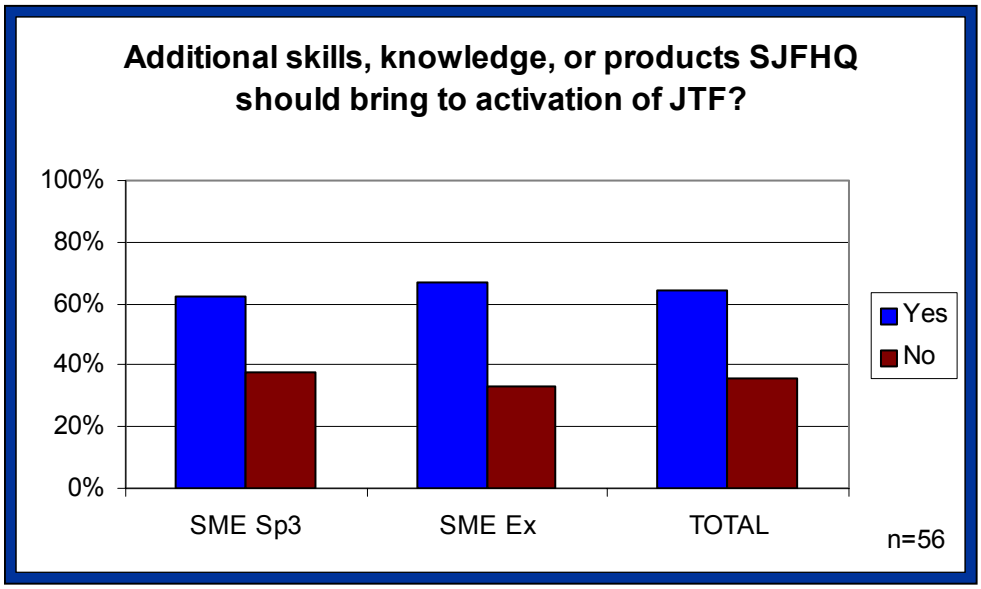


Figure 37: Skills, knowledge, or products SJFHQ should bring to JTF activation

JTF Headquarters participants were asked the same question as the SMEs, however they were not given a yes or no answer choice; they were just given the opportunity to comment on what additional skills, knowledge, or products the SJFHQ should bring to the activation of the JTF. 192 participants responded to this question in Spiral 3 and 201 responded during Execution. Of these 393 respondents, 69 in Spiral 3, or 36%, and 84 in Execution, or 42%, felt additional skills, knowledge, or products were required from the SJFHQ. Although not as high as the nearly two-thirds of SMEs who felt additional items were required, this is a substantial figure. However, as was discussed in the previous paragraph, further examination of the comment data was required to more accurately determine what portion of this perceived need is directed at the requirement for additional products. Of the 153 comments related to a desire for something additional, approximately one-fourth, or 39, were focused on the need for additional product from the SJFHQ. The majority of these participant comments called for the SJFHQ to bring a refined SOP and canned formats for recurring briefings and products to the activation of the JTF.

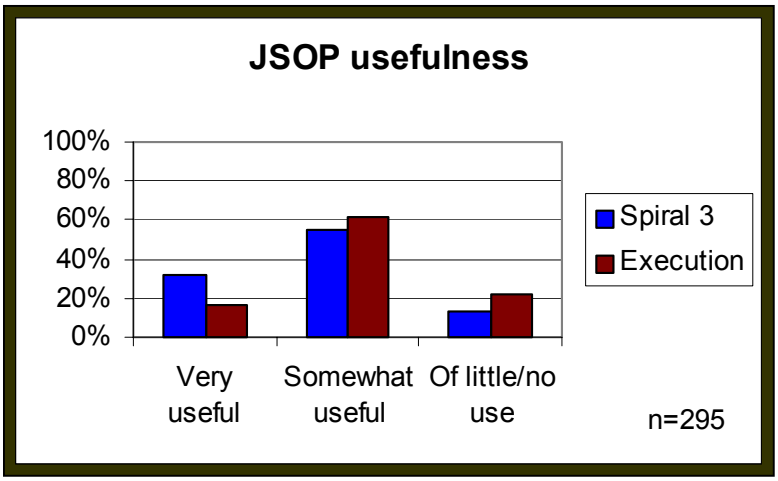


Figure 61 JSOP usefulness

SMEs and JTF Headquarters participants were asked during Spiral 3 and Execution about the usefulness of the JSOP developed by the SJFHQ as part of its pre-event activities. Answer choices of very useful, somewhat useful, of little use, of no use, and don't know/did not use were available. Of the 295 respondents who made a usefulness determination, over three-fourths felt the JSOP was at least somewhat useful. The percentage of usefulness reported between SMEs and participants in both Spiral 3 and Execution was similar. A slight decrease in the usefulness of the JSOP was detected between Spiral 3 and Execution. This can likely be attributed to the fact that the JTF Headquarters was more mature and familiar with its roles in Execution and that the pace of activity in Execution was much higher, which provided less opportunity to access the JSOP.

SME and participant comment responses indicated that the JSOP developed for MC02 is a good baseline document from which to get the JTF up to speed and that it provides the detailed information on the processes and procedures that are required to make operations and planning in the collaborative environment possible. The majority of respondents that rated the JSOP as 'of little use' or 'of no use' indicated that the JSOP is too long a document (greater than 600 pages) and that they had no time to read it. Further evidence of the usefulness of the SOP was indicated when SMEs were asked to comment on whether the JTF appeared to adhere to the JSOP. Three fourths (n=81) of the SMEs indicated that the JTF followed and referred to the JSOP on a regular basis.

While the JSOP was rated as useful, a high percentage of the respondents indicated that the JSOP needed modification. This was explored by asking SMEs and JTF Headquarters participants during Spiral 3 and Execution if the JSOP required modification. The high

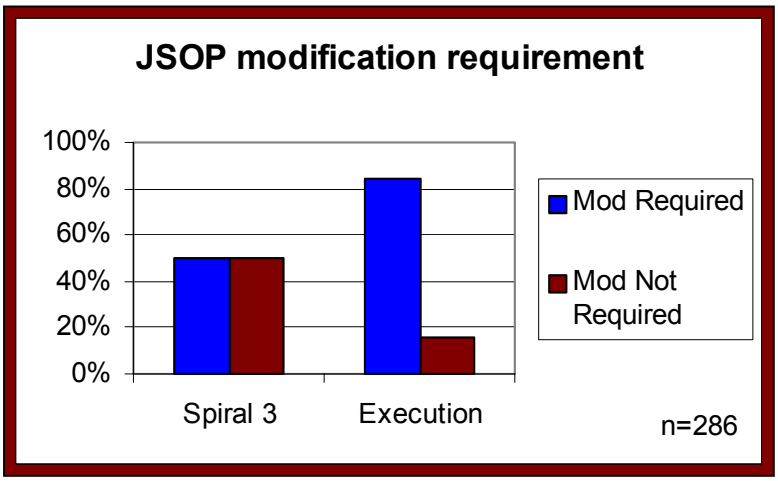


Figure 62: JSOP needed modification

percentage of affirmative responses was particularly pronounced in Execution where over 80% of SMEs and participants felt modifications were required. In Spiral 3 over 80% of SMEs also felt the JSOP required modifications, however JTF participants were nearly evenly split. The evenly split JTF participant response in Spiral 3 should be tempered because those participants were given the option of answering yes, no, or don't know in Execution, but were only given a yes or no choice in Spiral 3. Since over half of the total number of JTF Headquarters respondents answered don't know during Execution, it is reasonable to believe many of those who answered no in Spiral 3 would have chosen don't know if it had been available.

Multiple respondents stated that SOPs are living documents and, as such, modifications should be expected to ensure that the JSOP remains a current and useful document. Most of the calls for modification concerned the lack of detail in the descriptions of duties and responsibilities for various JTF positions. One participant stated, "Duties and responsibilities for each position need to be more clearly defined," while another participant said, "Very descriptive duties must be outlined." While a significant number of respondents indicated that the JSOP was too long, a call for more details vice general information was evident, specifically in the areas of the reports annex and the sample briefings.

The analysis regarding the JTF Challenge, **Common C/JTF Standing Operating Procedure (SOP); Tactics, Techniques, and Procedures (TTP), and Collaborative Tools,** provided in the MC02 Baseline Report states, "It is imperative that an information management plan that clearly defines guidelines on how information is to be handled is essential… Hardware, software, and processes that solve this problem must be identified. Additionally, the database tells us that the battle rhythm of the JTF must serve the process of delivering products and the information needs of higher and lower headquarters and the timing of product delivery to both. An information manager within every major division of the JTF staff is a requirement for efficient operations." The SJFHQ and its concept of employment directly address this challenge. As described above the SJFHQ comes with a JSOP, which includes a Knowledge Information Management Plan (KIMP) that provides the guidelines for knowledge management, business rules for the CIE, and a Battle Rhythm to meet the JTF's needs. The SJFHQ also brings to the fight TTP and expertise with the collaborative tools. The structure of the SJFHQ includes a Knowledge Management Officer (KMO/IMO) in each group.

Sub-Finding: The MC02 JTF performed expected JTF functions.

The data for this Sub-Finding is presented not as an assessment of the performance of the JTF; instead it indicates the MC02 experimental JTF was not dissimilar from actual JTFs in the necessity to perform a wide range of tasks related to the command and control of the joint force.

This builds context for the finding that the SJFHQ provided value-added to the MC02 JTF; therefore similar value-added could be expected if the SJFHQ were to be used with other JTFs in an experiment, exercise, or real-world situation.

Two survey questions to SMEs during MC02 Spiral 3 and two during Execution explored the JTF's accomplishment of a group of EBO tasks and a selected group of operational level UJTL tasks. Five additional questions to SMEs at approximately three-day intervals throughout MC02 Execution explored if the battle rhythm or virtual board, center, cell organization used by this JTF was causing any expected JTF functions to fall through the cracks.

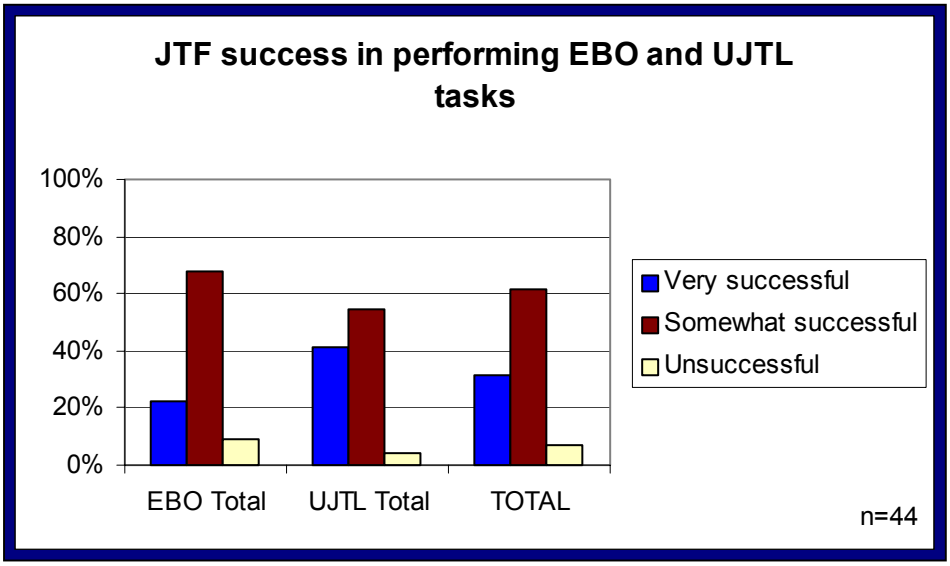


Figure 63: JTF successful in performing EBO and UJTL task

SME responses indicated this JTF achieved a moderate level of success in performing both EBO tasks and operational level UJTL tasks. A higher reported level of success in accomplishing UJTL tasks was noted. The high percentage of SME selection of "somewhat" and "very successful" task accomplishment was reported in both Spiral 3 and Execution.

A number of the SME comments were associated with the selection of the "very successful" choice on these survey questions. Two of these SME comments were, "The JTF was very successful in performing Information Operations, Joint Force Targeting, Directing Operational Intel, Assessing Operational Situation, preparing plans and orders, Commanding subordinate forces. The use of the CIE and CROP enabled the JTF to rapidly and effectively perform the above tasks," and "Overall the JTF was successful in coordinating munitions, fuel supply, and other support for forces. The Logistics Watchboard was used very effectively at JTF and combatant command Joint Logistics Management Center (JLMC) levels to monitor and manage support to the operations."

The majority of SME comments were associated with the selection of the "somewhat successful" choice on these survey questions. Representative comments were, "In my opinion, the JTF did a fair job in all of these areas [EBO tasks]. I think that progress was initially hindered as they struggled using IWS and knowing which rooms to collaborate in," and "Overall, I think the JTF was successful [in performing UJTL tasks]. I think that getting used to the new organizational structure and concepts initially hampered task performance." During Spiral 3, one SME who judged UJTL task performance to be "somewhat successful" felt that participant focus on learning and using the collaborative tool may have hampered the accomplishment of normal JTF management processes (e.g. journal keeping). A theme noted by several SMEs dealt with the lack of wargaming and course of action (COA) analysis by this JTF. A SME, knowledgeable in

the conduct of the JTF planning function observed, "The JTF executed Effects Based Planning well. The one area they need work on is COA Analysis or wargaming. The Joint Planning Center (JPC) tends to synch COAs rather than wargame. There is very little discussion of enemy actions when they synch plans." Another SME noted, "[Regarding] preparing plans and orders. The JTF in fact produced plans and orders well for the most part. The JTF failed to really understand and employ effects based operations. Furthermore they never fully understood or demonstrated an ability to plan current ops, future ops and future plans simultaneously."

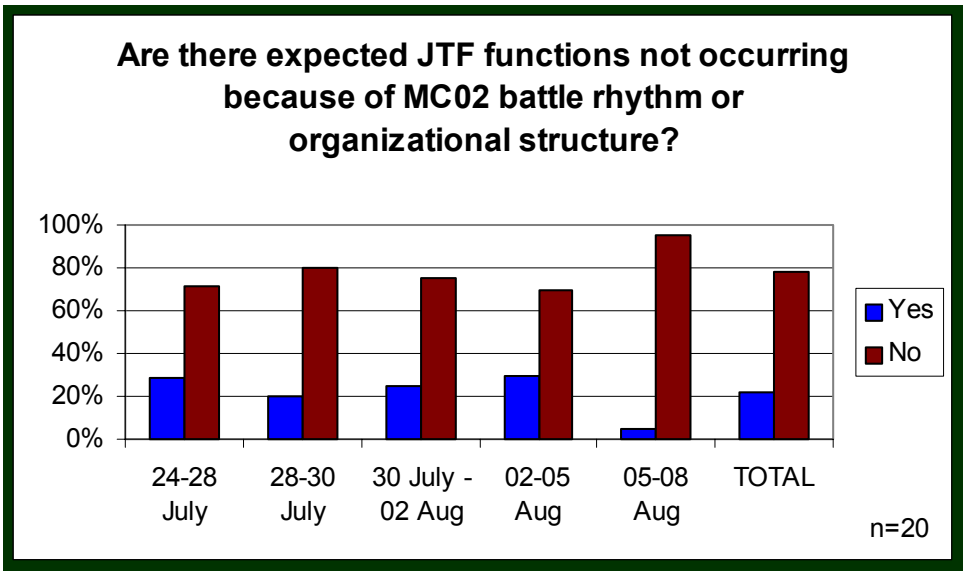


Figure 64: JTF functions not affected by battle rhythm rigor or structure

The number of SME responses reporting that expected JTF functions were falling through the cracks because of the battle rhythm or virtual board, center, cell organization used by this JTF averaged 26% for the four measurements taken over the first 12 days of the MC02 Execution. This fell to 5% for the last measurement covering the period 5-8 August. 20 SMEs responded to each occurrence of this survey.

Over all five applications of this survey, 23 individual functions were commented on by SMEs as falling through the cracks. These seemed to fall into three groups: four occurrences were related to Information Operations (IO), four were related to deployment planning, and five had to do with JTF planning focus and branch planning. With respect to IO, SME responses indicated the power of this discipline was not being fully realized because of a lack of organizational integration into the JTF; however, another SME indicated the level of IO observed was greater than a traditional JTF. This indicates the need for further experimentation regarding the use and organizational placement of the IO function within the JTF.

Regarding deployment planning two SMEs provided a number of indications the JTF did not conduct sufficient monitoring of the deployment process. Their comments illustrate this point; the first stating, "The current concept does not have a Joint Movements Center, nor a joint transportation board at the JTF level. Rather, these functions are conducted at the CINC's JLMC. Lack of these two functions, in my opinion, contributes to a lack of awareness amongst the JTF as to force flow and closure." The second comment reported, "The status of the deployment does not appear to be followed in detail. Effects of enemy actions and other constraints to strategic movements do not appear to be fully considered." Their comments indicated the 12-13 hour experiment day with limited night-shift activity may have exacerbated this situation.

The comments related to branch planning and the close-in focus of this JTF are similar to those mentioned above concerning wargaming and COA analysis. Several SME comments

illustrate this point. The first reported, "No one is doing branch planning for the JTF. Consequently, the JTF is reactive and not proactive." Another SME comment stated, "There is no planning for events in the 48-96 hour window. This should be branch plans and what ifs.....the current ops should be executing the plans and planning 24-48. The Future plans needs to be linked with the Combatant Commander for plans 96+." A third comment stated, "What is falling through the cracks is the long term planning guidance. Focus is on 72 hours max." Further discussion of this with key SMEs during the event indicated this phenomenon was likely due to participant focus on the experimental concepts, and not a disregard or lack of recognition of the importance of branch planning.

Sub-Finding: SJFHQ reduced the ad hoc nature of JTF Headquarters activation.

Data for this Sub-Finding was developed by a number of surveys that asked participants and SMEs to rate the value added by the SJFHQ in getting the JTF Headquarters up to speed, to indicate the contribution of the SJFHQ's attributes to this, and to indicate how critical the SJFHQ was to the overall JTF operation.

A SME and a participant survey in Spiral 3 and a SME survey in Execution explored the value provided by the SJFHQ in getting the JTF Headquarters up to speed. Of 369 respondents, approximately 90% indicated the SJFHQ was either somewhat valuable or very valuable in getting the JTF Headquarters up to speed. The percentage of SMEs indicating very or somewhat valuable responses was nearly identical between Spiral 3 and Execution.

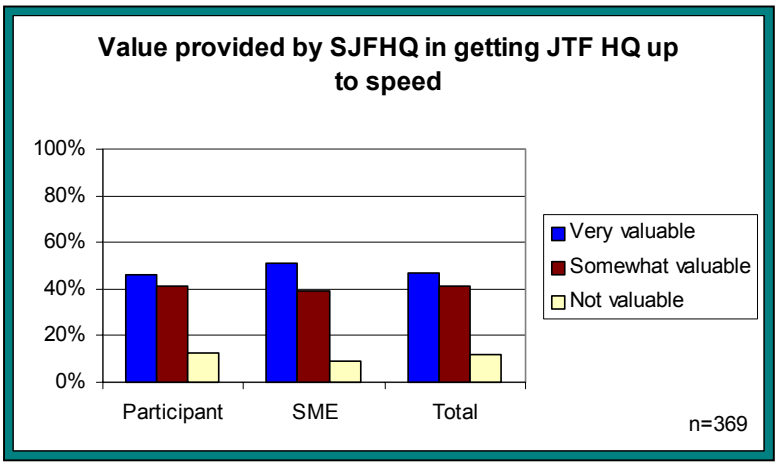


Figure 65: Value provided by SJFHQ

Two senior participant comments were related to the very valuable response, "There is a lot of value to the SJFHQ. They brought tremendous situational awareness to the fight," and "It is truly the way to do joint business. It has allowed the staff to focus on the warfighting piece without having to build the database." Two other participants, key members of the JTF Plans Group indicated, "The JTF could not be at this level this soon without the plug in of the SJFHQ," and, "SJFHQ is a great plug to bring an ad-hoc staff together." As shown by the graph, there was not universal perception of SJFHQ value added; approximately 10% of responses did not perceive SJFHQ value. Some respondents concluded there was no value from the SJFHQ because it did not provide an individual to their particular functional area within the JTF. This comment was seen in a number of surveys where little or no SJFHQ value was indicated. Other participant comments where little value was seen seemed to center on the exchange of information between the SJFHQ and JTF Headquarters staff. One participant stated, "We were and still are missing a lot of pertinent information and knowledge on some of the databases that we are supposed to use and military issues with regards to specific info in the exercise." Another stated, "We still have the same requirements for information gathering. If every time you submit an RFI, the SJFHQ folks just tell you to go to

the ONA and find the answer, I'm not really sure there is any value added." Some of this may have been due to the nature of the experiment where much of the rest of the world was scripted and there was a desire to fully explore the experimental concepts; however, they are important indicators of the personality factor that will influence the amount of value the SJFHQ can provide. Interviews with senior participants during Execution illustrated that the members of the SJFHQ must be perceived as experienced by the receiving JTF, and they must have the personality and maturity to recognize when they should act as leaders within the JTFHQ and when they should transition to a support and/or mentor role as the JTF Headquarters comes up to speed.

Further indication that the SJFHQ quickened the learning curve of the JTF is found in insights developed in the Army Transformation Experiment (ATEX) conducted in parallel with MC02. One of the ATEX focus areas was to explore how a Corps Commander and his staff took on the role of a JTF Commander. The ATEX data collection and analysis effort indicated the knowledge base provided by the SJFHQ staff and the ONA enabled earlier situational awareness in the JOA and facilitated more rapid transition of a Corps into a JTF than previously possible. Insights developed in ATEX indicated the SJFHQ brought about the situational awareness through the integration of its members into the key JTF cells. While serving as members of the JTF Commander's staff, the SJFHQ personnel also trained and mentored other members of the staff and served as the "go to" guys when additional information was required. The time normally used to develop an understanding of the opposition, critical nodes within the AOR, the political, economic, information, infrastructure, military, and social strengths and weaknesses of the opposing forces was greatly reduced when the information was readily available upon initiation of the JTF. The knowledge base provided by the SJFHQ was key to achieving this objective. The JTF Commander during an AAR stated he was provided "...about an "80 percent" solution going in." The SJFHQ and the ONA concept provided this 80 percent.

During Spiral 3 the SMEs were asked to judge whether or not the attributes possessed by the SJFHQ quickened the JTF Headquarters learning curve. Their responses indicated to a high degree that the SJFHQ did quicken the learning curve. This is consistent with the data on the previous graph where over 80% of the respondents felt there was at least some value provided by the SJFHQ in getting the JTF Headquarters up to speed.

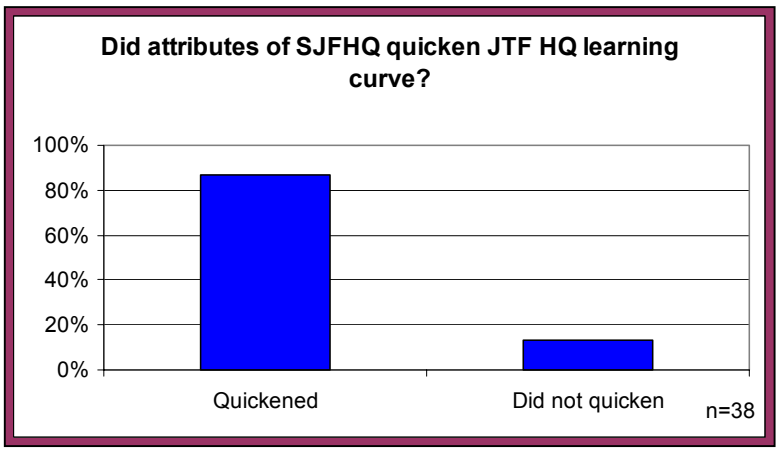


Figure 66: Did attributes of SJFHQ quicken JTF HQ learning curve

SME comments from this survey provided several examples of how the SJFHQ attributes helped the JTF Headquarters with the learning curve. One SME stated, "The ability of the JTF Headquarters to leverage the corporate knowledge and gain insights from the Combatant Commander's staff is a significant plus to beginning the planning process. Numerous questions and research which would normally have to be done is already completed." Another SME stated, "In MC02, the SJFHQ's familiarity with the collaborative tool

set and their development of the CONPLAN made them a go to asset for the JTF as they rolled into the building and began planning in earnest." A senior SME concluded the prior experience of the core of the JTF to which the SJFHQ is providing its attributes will be a factor in the amount of perceived SJFHQ value-added. He reported, "The SJFHQ understanding of the EBO processes, and concepts and to some degree joint operations quickened the learning curve of the core staff and service augmentation; especially in the implementation of the SOP. This is especially the case with a core headquarters that does not normally have or train to a JTF mission." He concluded his remarks by indicating some resistance to the SJFHQ was seen during MC02 Spiral 2, which was played with an experienced, contingency trained JTF staff. In the few instances where SMEs indicated no value added by the SJFHQ to quicken the JTF learning curve, one reason stated was that the SJFHQ did not contain certain functional specialty representatives, such as combat engineer or medical plans. The SJFHQ concept envisions the expertise in these specialties would come as plugs from or through reachback to the Combatant Commander's staff.

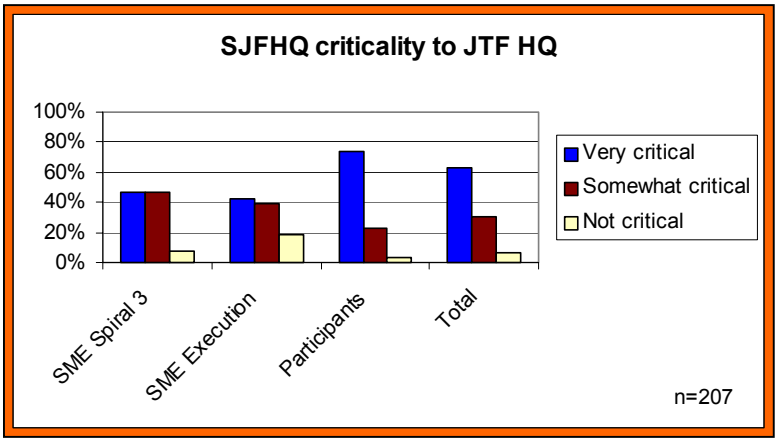


Figure 67: SJFHQ considered very critical to JTF HQ

Another indicator of the value provided by the SJFHQ to getting the JTF Headquarters up to speed was explored by asking SMEs and participants to rate the criticality of the SJFHQ to the JTF Headquarters. This was done with two SME surveys, one in Spiral 3 and one in execution, and one participant survey near the end of the experiment. Of 207 respondents, approximately 93% indicated the SJFHQ was either somewhat or very critical to the JTF Headquarters, with 63% of these indicating very critical.

Within the participant respondents, the perception of SJFHQ criticality was stronger than among the SMEs. One respondent who selected "very critical" stated, "They are part of the CINC Staff. They have already worked the plan for the AO and can bring us up to speed far quicker than starting from the beginning to prevent confusion." Another reinforced his selection of "very critical" by stating, "Beyond a doubt. Need a standing force of knowledgeable personnel to incorporate the JTF in the theater." In a participant response where only "somewhat critical" was selected, the relationship of time to SJFHQ criticality was noted. As indicated by this and other comments, SJFHQ criticality was more notable at the outset of the event, "JTF personnel had earned their water wings in Spiral 3, and were able to work without constant direction from SJFHQ during MC02, unlike Spiral 3, where JTF personnel leaned hard on SJFHQ." This also influenced the roughly 10% increase in the 'not critical' response by SMEs during execution. The SJFHQ concept should be further developed to address the continuing role of the SJFHQ with the JTF as a crisis matures. Specific areas for development include greater specificity as to the duration of SJFHQ involvement, the role of the SJFHQ in the transition to the post-conflict environment, and provisions for the SJFHQ should a second crisis situation erupt within the Combatant Commander's area of responsibility.

The few participants who indicated the SJFHQ was not critical came from the JTF Headquarters Operations Group. A senior participant who selected "not critical" remarked on the time relationship to SJFHQ criticality, but also noted there was a personality dynamic that affected his assessment. He stated, "They were very critical during the "spin-up" phase of Spiral 3 but became non critical during execution. In some cases, they were actually counterproductive because as conditions and processes changed a few held to their opinions and old processes rather then evolve with the JTF." This indicates that expertise and situational understanding alone do not determine the value of the SJFHQ, but that maturity and the ability to recognize the transition of the SJFHQ role as the JTF comes up to speed are also important virtues.

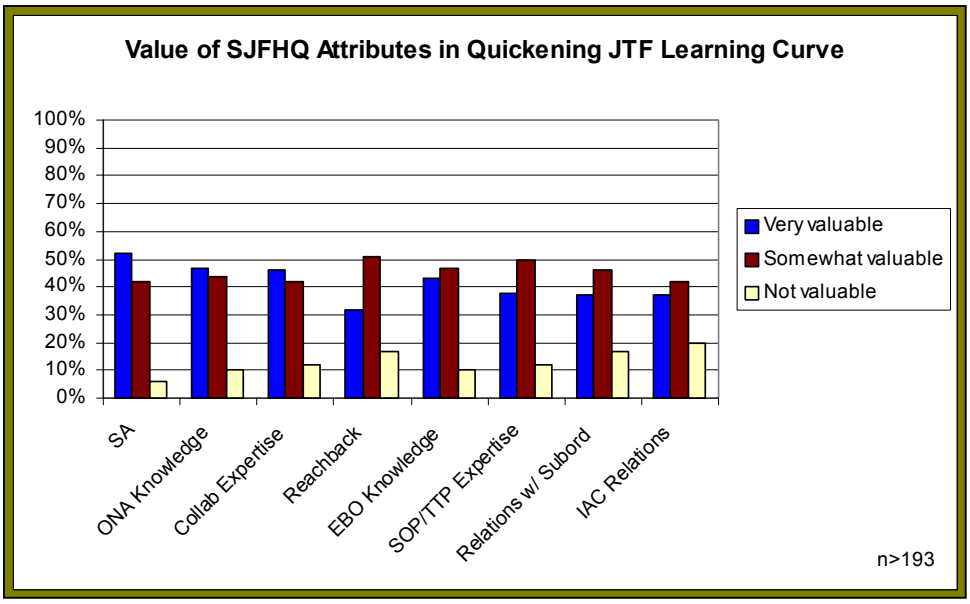


Figure 68: Value of SJFHQ attributes in quickening JTF learning curve

A participant survey near the end of the experiment further explored which SJFHQ attributes might be more valuable than others to the JTF in surmounting the learning curve. The highest level of value was seen in the situational awareness brought to the JTF by the SJFHQ. The attributes dealing with reachback and habitual relations to the IAC and with subordinate commander staffs garnered the lower levels of value. This can be attributed in part to the fact that SJFHQ was not part of a real Combatant Commander staff prior to the experiment from which habitual relationships would have been established and to the fact that reachback was difficult to demonstrate since most of the rest of the world was simulated by the control cell. This is especially pertinent to the IAC relations attribute, which was difficult to demonstrate because of interagency participation occurred primarily in Execution, with little in Spiral 3, and the primary interface with the interagency participants was through the Joint Interagency Coordinating Group participants operating in the experiment control cell. Other indicators of SJFHQ criticality, such as the high degree of reliance by the JTF on the SJFHQ for task performance, are described elsewhere in the supporting analysis for this finding.

The analysis regarding the JTF Challenge, **Combined/Joint Task Force (C/JTF) Headquarters Activation and Augmentation,** provided in the MC02 Baseline Report states, "Most of the challenges we face in training at the JTF headquarters level stem from the "Ad Hoc" manner in which we organize the headquarters. The lack of a "center of excellence" for exercising the organizations, processes, and technologies necessary to carry out operational level headquarters functions lead to inefficiencies in almost every aspect of headquarters operations. Without a truly joint group that trains together with familiar processes the amount of time that

any augmented headquarters will need to get traction on the myriad tasks that have to be performed will be relatively long. In order to achieve the efficiencies desired (not to mention what will be required to carry out the rapid decisive operations [RDO] concept) the standing JTF headquarters is a required component." The SJFHQ and its concept of employment directly address this challenge. As described above the SJFHQ is the command and control element that reduced the ad hoc manner in which the JTF was activated and augmented.

Sub-Finding: The SJFHQ enhanced JTF performance of EBO and UJTL tasks.

SME responses to four surveys regarding task accomplishment, two in Spiral 3 and two in Execution, provided the data for this Sub-Finding. The survey respondents were asked to consider SJFHQ enhancement to overall JTF performance of a group of EBO tasks and similarly overall JTF performance of a group of OP level UJTL tasks.

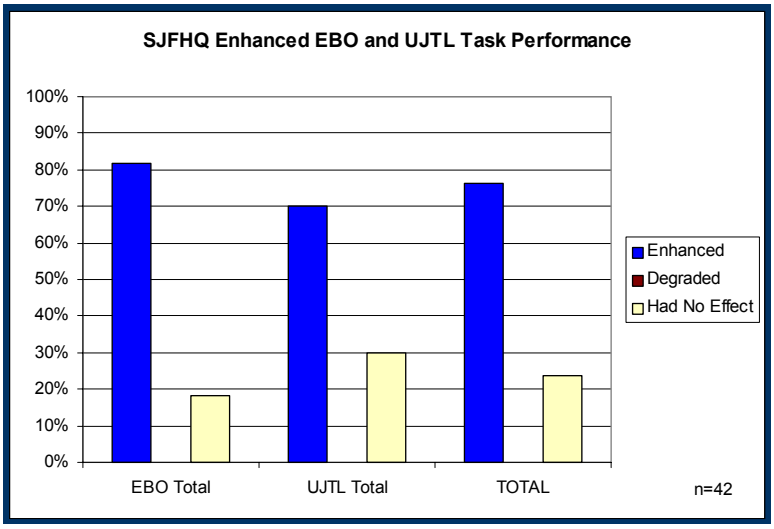


Figure 69: SJFHQ Enhanced Task Perfomance

A high degree of SJFHQ enhancement to task performance was reported, with SJFHQ enhancement to the performance of the EBO tasks slightly exceeding the enhancement to the UJTL tasks. The high degree of enhancement was noted both in Spiral 3 and Execution.

SME comment responses indicated the SJFHQ enhancement was particularly beneficial in bringing the JTF up to speed at the early phases of JTF planning and execution. One respondent reported, "I believe the SJFHQ is what got the EBO tasks moving. Without them, valuable time would have been lost trying to perform these tasks; especially ONA and ETO update, ETO production and employing collaborative tools." Another indicated the SJFHQ was "invaluable in initially getting the JTF going the right direction and providing CINC direction and knowledge of the situation." Comment responses indicated that as the JTF Headquarters confidence level rose, the SJFHQ became an integral and indistinguishable part of the JTF Headquarters.

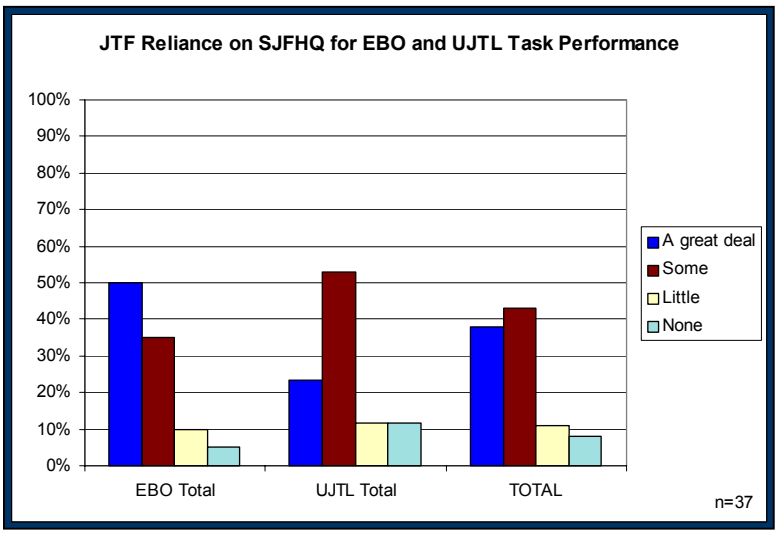


Figure 70: JTF Reliance on SJFHQ for Task Performance

A high degree of JTF reliance on the SJFHQ for task performance was also reported by the SME survey respondents, with approximately 80% reporting some or a great deal of reliance on the

SJFHQ. JTF reliance on the SJFHQ for the performance of the EBO tasks was stronger than for the UJTL tasks.

Similar to the responses to the question about SJFHQ enhancement of task performance, reliance on the SJFHQ by the JTF appeared to be strongest at the outset of JTF activity. One SME reported, "I observed the JTF relied a great deal initially on the SJFHQ to get their SA on the situation, after about day 4-5 the SJFHQ is more in a supporting role." Another SME responded, "JTF relied on the SJFHQ to perform these tasks initially, but quickly gained experience and expertise so that shortly after hostilities commenced, the JTF and the SJFHQ were functioning as a completely integrated team."

The personality of the JTF Headquarters staff may have a significant impact on the amount of reliance on the SJFHQ. One SME reported, "Frankly, the SJFHQ successfully integrated into the III Corps JTF organization far more successfully than it had with XVIII Airborne Corps, who with more traditional JTF experience than the Shadow Warriors [III Corps], had more corporate memory of 'this is how we handled this before.'" This point was also evident to analysts who observed MC02 Spiral 2, Spiral 3 and Execution. This seems to further demonstrate the importance of the training role with potential JTF Headquarters staffs the SJFHQ could fulfill when in-garrison as an element of the Combatant Commander staff. It also seems to indicate the SJFHQ could enable a larger of pool of potential JTF staffs.

Sub-Finding: The SJFHQ contributed to the continuity demonstrated by the MC02 JTF.

Data for this Sub-Finding was developed by a question concerning the amount of continuity observed in planning and operations posed to SMEs once during MC02 Spiral 3 and once during Execution. It was possible to explore continuity because approximately five weeks elapsed between the end of MC02 Spiral 3 and the start of MC02 Execution. The SMEs were also asked to estimate how much the SJFHQ presence contributed to the amount of continuity observed. The vast majority of responses indicated at least a moderate level of observed continuity in the JTF planning and operations. Of those responses reporting a moderate or high level of continuity in Spiral 3, one-third indicated a high level while two-thirds indicated a moderate level. During Execution the reports of moderate and high levels were nearly even, indicating continuity seemed to improve as the JTF Headquarters obtained more experience in the experiment.

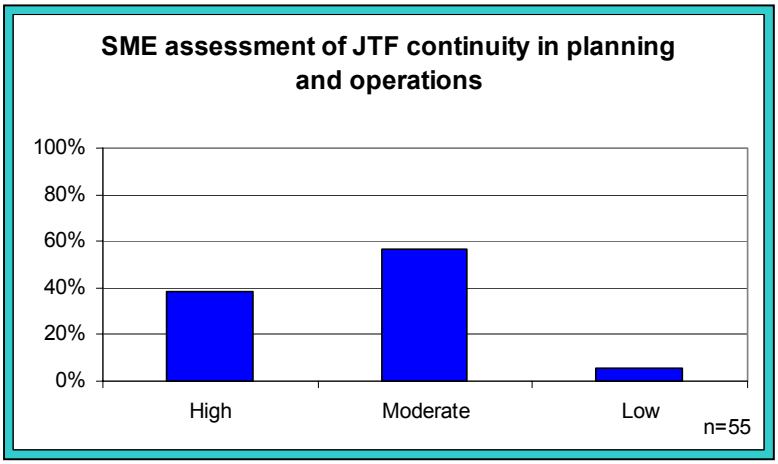


Figure 71: SME assessment of JTF continuity in planning and operations

SME comment responses to this question indicated the SJFHQ played a significant role in the amount of continuity demonstrated by this JTF Headquarters. One typical SME observation was, "The SJFHQ was relied on heavily throughout. They were well integrated and were used to provide the continuity. Even when the SA was up on the staff, the SJFHQ experts were still used as integral staff members."

Another SME responded, "[The] SJFHQ provided the backbone for

the continuity." A key factor in this was the familiarity held by the SJFHQ with the experimental concepts in MC02. This was specifically mentioned in this response, "Continuity was pretty good because the SJFHQ understood the experimental processes/products and because they were using (as a loose guide) an SOP that they wrote. Therefore, they had an idea of what 'right looked like' and continued on the path that would get them there."

Several comments indicated the SJFHQ contribution to continuity was most beneficial early in the experiment, which tracks with other indicators of SJFHQ value-added to the JTF. The amount of SJFHQ contribution to continuity was also likely increased because of the split nature of the MC02 experiment. A senior SME recognized this and reported, "SJFHQ continued to plan 'keep their head in the game' during the break between Spiral 3 and Execution. III Corps had to go back to their service staff responsibilities. SJFHQ very effective." While this time-split may not be typical in actual JTF operations, it does point to the value of the SJFHQ in bridging any potential gaps or transitions in JTF command and control activities.

The comment responses indicated there was another factor to the amount of continuity observed in this JTF. Comments concerning the importance to continuity of the use of a collaborative information environment (CIE) appeared in the MC02 Execution responses to the continuity question. Two SME comments in this regard were, "The CIE enhanced the ability of the JTF to ensure continuity of plans. SJFHQ ensured that initial plans were adapted to operational considerations, rather than reinventing the wheel," and "The CIE allowed for a very high level of continuity. There was initially some confusion with regard to exactly who was to receive information, but that was quickly worked out." It appears that the attributes brought to the JTF by the SJFHQ plus the attributes of the CIE were instrumental to the attainment of a significant degree of continuity in the planning and operations of this JTF.

Sub-Finding: The presence of the SJFHQ provided value-added to the JTF's accomplishment of the MC02 experiment objectives.

The presence of the SJFHQ in the MC02 JTF and the resultant access to the knowledge, expertise and other attributes possessed by the SJFHQ had a beneficial impact on the JTF's ability to accomplish the five MC02 experiment objectives. These objectives were:

- Establish and maintain information superiority.
- Rapidly set conditions for decisive operations.
- Execute assured access.
- Conduct EBO.
- Sustain the force.

Data for this Sub-Finding is based on the results of two SME surveys and two participant surveys conducted during MC02 execution. Two of the surveys asked JTF Headquarters participants and SMEs to rate the value-added by each of four primary attributes of the SJFHQ concept to each of the five experiment objectives. The four SJFHQ attributes respondents assessed were situational awareness and knowledge of ONA, expertise in collaborative processes, habitual reachback relationships, and knowledge of effects based operations. The other two surveys asked Component participants and SMEs to rate the value added by the three primary MC02 JTF enhancements, SJFHQ, ONA, and EBO to each of the five experiment objectives. The data relating to the SJFHQ value to each of the objectives was used for the analysis supporting this Sub-Finding..

For each of the five objective areas examined, moderate to high levels of value-added by the SJFHQ were indicated. The first MC02 objective was for the JTF to establish and maintain

information superiority. The following graphs illustrate the reported SJFHQ value to this objective.

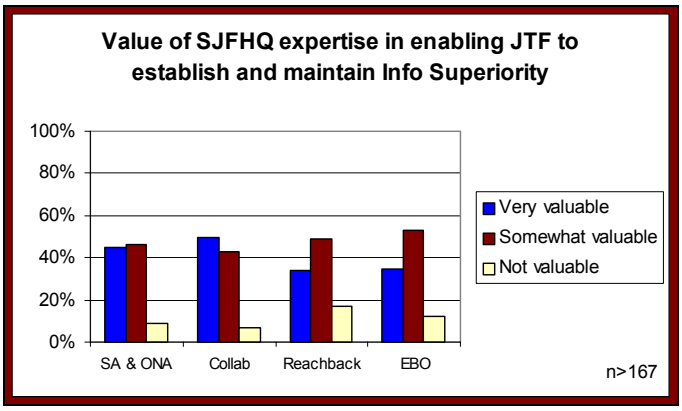


Figure 72: SJFHQ expertise that enabled info superiority

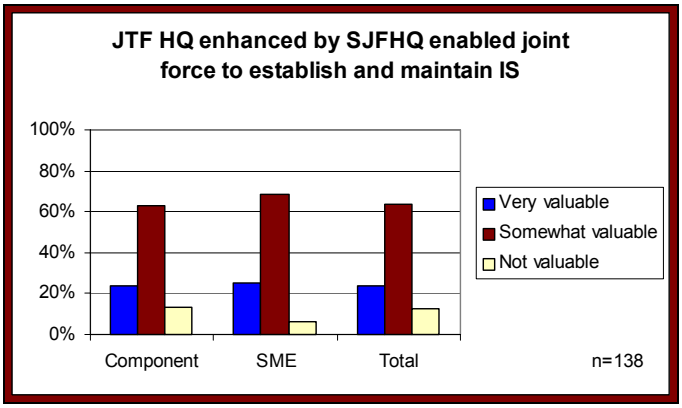


Figure 73: JTF HQ enhanced by SJFHQ enabled info superiority

The second MC02 objective was for the JTF to rapidly set the conditions for decisive operations. The following graphs illustrate the reported SJFHQ value to this objective.

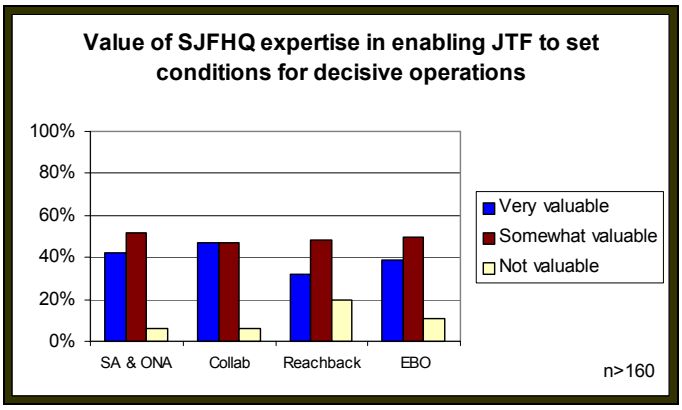


Figure 74: SJFHQ expertise that enabled setting conditions for decisive operations

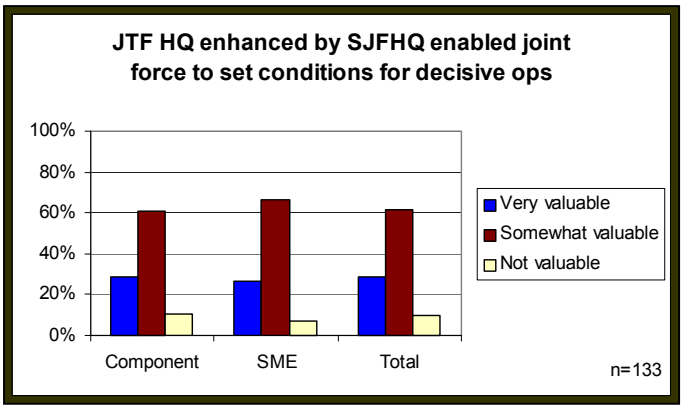


Figure 75: JTF HQ enhanced by SJFHQ enabled setting conditions

The third MC02 objective was for the JTF to execute assured access. The following graphs illustrate the reported SJFHQ value to this objective.

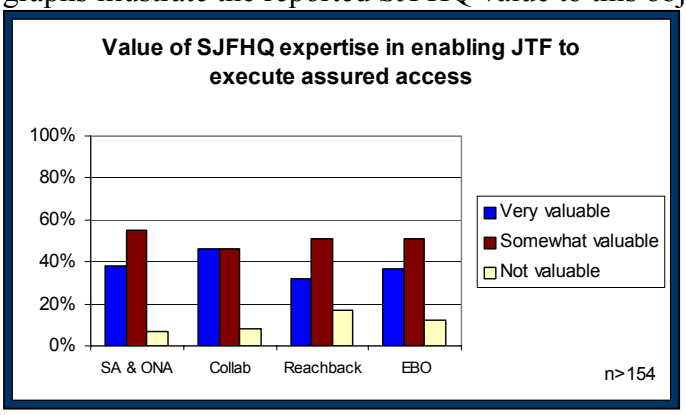


Figure 76: SJFHQ expertise that enabled assured access

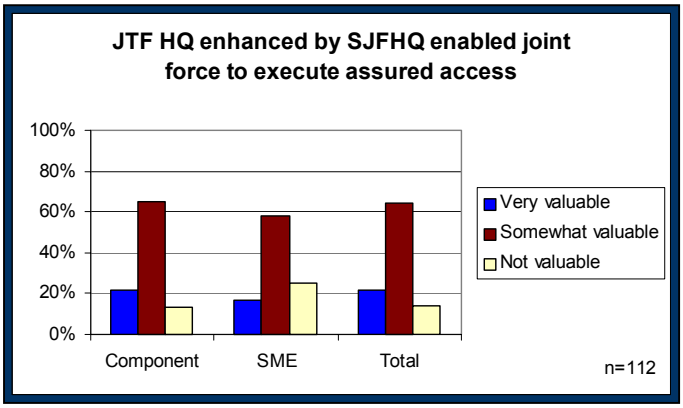


Figure 77: JTF HQ enhanced by SJFHQ enabled assured access

The fourth MC02 objective was for the JTF to conduct effects based operations. The following graphs illustrate the reported SJFHQ value to this objective.

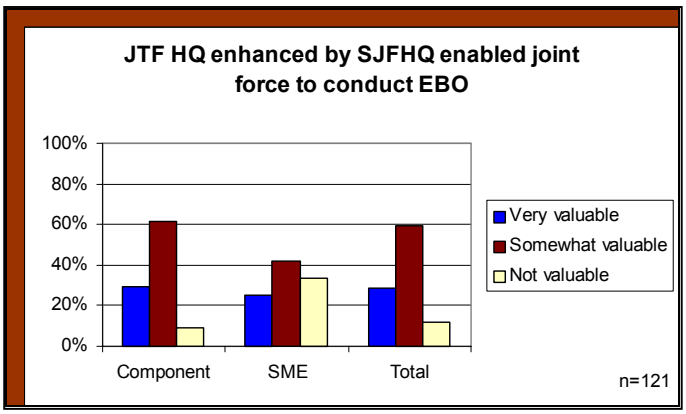


Figure 79: JTF HQ enhanced by SJFHQ enabled EBO

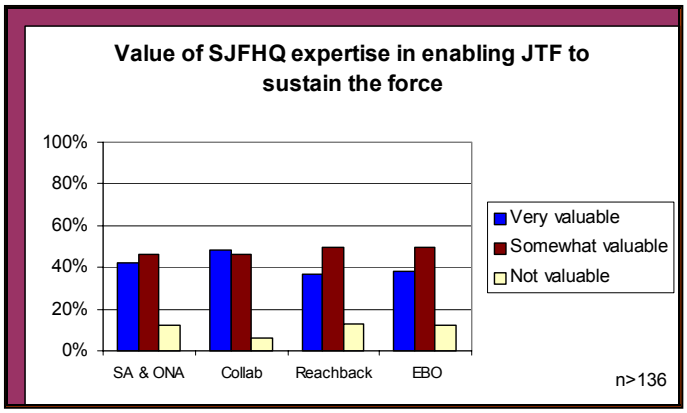


Figure 78: SJFHQ expertise that enabled sustain the force

The fifth and final MC02 objective was for the JTF to sustain the force. The following graphs illustrate the reported SJFHQ value to this objective.

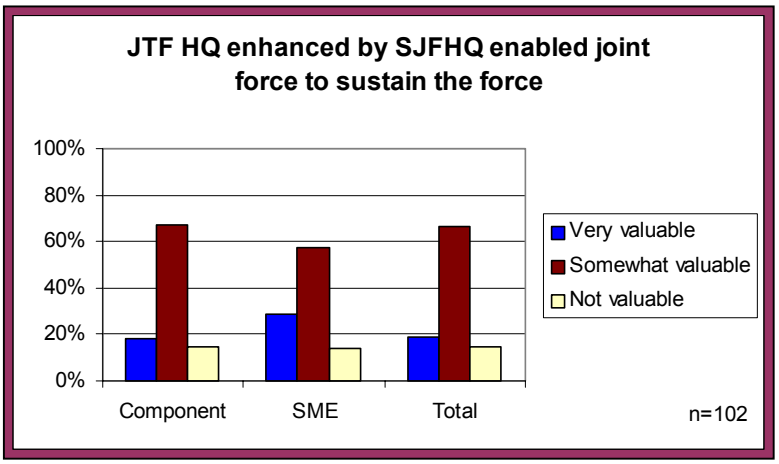


Figure 80: SJFHQ expertise that enabled sustain the force

For each objective, the percentage of respondents who felt the SJFHQ was not valuable to objective accomplishment was similar between the response group made up of Component participant and SMEs and the group made up of JTF Headquarters participants and SMEs. This indicates value-added by the SJFHQ appeared to be recognized not just within the JTF Headquarters, but throughout the JTF. However, these groups differed somewhat in their assessment of the strength of the value-added provided by the SJFHQ. Of the respondents perceiving value, the percentage indicating the SJFHQ was very valuable to objective accomplishment was consistently higher across the five objectives within the group made up of JTF Headquarters participants and SMEs than it was in the group consisting of Component

participants and SMEs. This can somewhat be attributed to the fact that the SJFHQ was fully integrated into the JTF Headquarters early during Spiral 3 and their presence was often indistinguishable to participants external to the JTF Headquarters. This is regarded as "good news" since it indicates the integration of the SJFHQ into the JTF Headquarters was complete and transparent to those outside the JTF Headquarters.

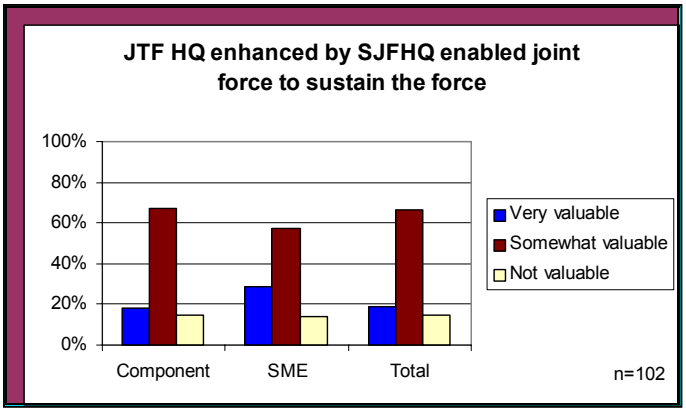


Figure 81: JTF HQ enhanced by SJFHQ enabled sustain the force

Considering the four primary SJFHQ attributes in totality across the five experiment objectives revealed the respondents felt certain SJFHQ attributes were more valuable than others. The average percentage of response across all objectives for each attribute and each level of value is indicated below.

The data indicates the SJFHQ expertise with the collaborative process employed in MC02 was most valued, followed closely by the situational awareness and knowledge of ONA the SJFHQ brought to the JTF. On the other hand, the SJFHQ reachback relationships were deemed to have somewhat less value to overall objective accomplishment. This was likely because there was minimal opportunity for the SJFHQ to demonstrate this attribute since the Combatant Commander staff and the rest of the external world were simulated by the experiment control cell.

Review of the comments accompanying these survey responses provided numerous examples of SJFHQ value-added to objective accomplishment. Representative comments included this from a Component participant, "SJFHQ knowledge of the collaborative process and ONA database was instrumental in rapidly building a JTF team and in keeping them on task and purpose," and these from SMEs, "SJFHQ were the experts on knowledge and understanding of ONA, EBO" and "SJFHQ was very valuable in rapidly bringing the JTF up-to-speed, after which, the SJFHQ functioned as a fully integrated part of the JTF."

	SA and ONA Knowledge	Collaborative Expertise	Reachback Relationships	EBO Knowledge
Very valuable	42%	48%	33%	39%
Somewhat valuable	50%	45%	50%	50%
Not valuable	8%	7%	17%	11%

There were a number of comments that indicated the benefit of the examined SJFHQ attributes was most perceived in the earlier stages of the event. Comments such as these appeared in each of the five objective areas, "The usefulness of the SJFHQ diminished as the experiment progressed and the JTF became as familiar with the systems and the adversary as the SJFHQ was," and "Initial planning was relevant, and provided the backbone of the eventual operation. However, as the operation progressed, ONA data became dated, and thus SA degraded."

In cases where "somewhat valuable" or "of no value" were seen, some of the associated comments seemed to indicate the reason was because of respondent perception that the JTF did not achieve the objective against which the SJFHQ attribute was examined or the experiment condition did not sufficiently exist to demonstrate the value of the examined SJFHQ attribute. To illustrate this point, one participant in assessing the value of SJFHQ situational awareness and knowledge of ONA in enabling the joint force to conduct EBO stated, "The value should have been there, but experiment construct and scenario did not allow us to fully explore it! We had the initial piece, but never really got back to it or continued it once action started. We hit all around it, and got some insights, but missed the full mark on this objective."

As shown above, the lowest perceived value added of the SJFHQ was in the area of reachback relationships. This was due in large part to a lack of opportunity to demonstrate this attribute. A comment that keenly illustrates this was, "The lonely reason this is not a "very valuable" response is that the reachback organizations were a little thin." Another comment echoed this by stating, "There was not reachback to all organizations that could have contributed, probably more due to experiment constraints."

Sub-Finding: The organizational structures described by the SJFHQ concept and used in MC02 enhanced the function of the JTF.

The SJFHQ concept calls for the SJFHQ to be organized on a functional basis, as opposed to a traditional numbered staff basis (e.g. J1, J3, J5). The SJFHQ as used for MC02 was organized into the following five groups: Command; Operations; Plans; Information Superiority; and Knowledge Management. Even though the SJFHQ is capable of merging into a traditionally organized JTF Headquarters, for MC02 the JTF Headquarters was organized using this group-based structure. The only component staff to similarly organize was the JFLCC. The use of the group-based structure allowed an opportunity to explore if this structure had an effect on the function of the JTF.

Similarly, the SJFHQ concept envisions the use of 13 boards, centers, cells, and work groups by which the JTF would conduct its business. Current doctrine describes 35 boards, centers, cells and work groups for potential use by a JTF. Even though it is unlikely all 35 of these boards, centers, cells, and work groups would be used, experience indicates somewhat more than 13 are generally convened. The MC02 JTF used the board, center, cell and work group structure as described by the SJFHQ concept. This also allowed the opportunity to examine what effect this had on the function of the JTF.

The following diagrams illustrate this discussion by comparing the traditional JTF Headquarters organizational construct to that used for MC02.

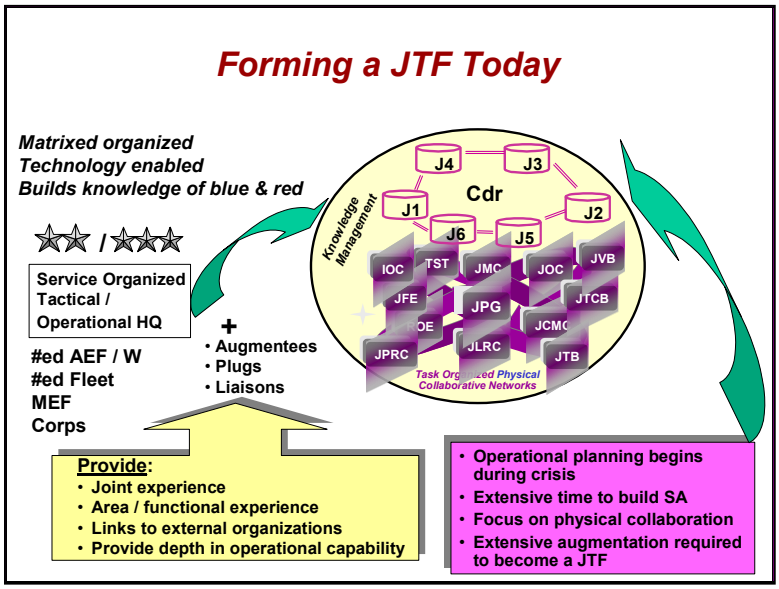


Figure 59: Forming a JTF today

These issues were explored in MC02 Spiral 3 and Execution, utilizing survey gathered input from Subject Matter Experts (SMEs) who were asked if effects based planning seemed to falter due to organizational problems and if the group-board-center-cell-work group structure enhanced JTF Headquarters operations. Each of these questions is explored in the following paragraphs..

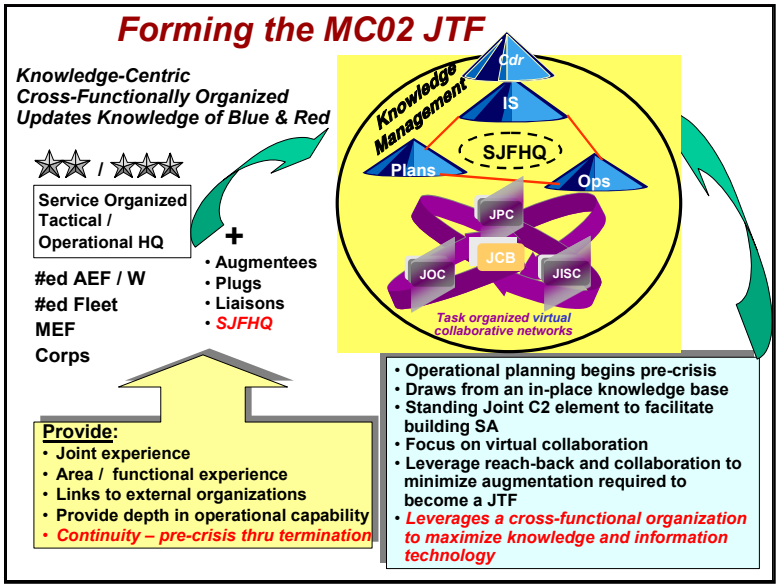


Figure 60: Forming the MC02 JTF

SMEs were asked during Spiral 3 and Execution if effects-based planning seemed to falter due to organizational problems.

The overall result by nearly a 3 to 1 margin was that effects-based planning did not falter due to organizational problems.

Over half of the responses from the SMEs to this question included comments. Most of these dealt with the impact of the organization on effects based planning. Two SMEs who felt the organization did not cause effects based planning to falter responded, "My perception is that organizational problems have not adversely impacted EBP," and "I did not observe any real problems based upon the organization. Most difficulties were based on the use of the tools themselves." A SME who felt the planning faltered indicated that even though logisticians were imbedded in the Plans and Operations groups, true synchronization of those efforts was not evident. Another stated, "There was not adequate representation of information operations in the JPC planning efforts. The JPC core plans cell needs an IO planner."

Other SME comments on this question seemed to point to higher-level issues impacting on the conduct of effects based planning. Two examples are, "Problems I observed with EBO were related to the lack of cultural acceptance of IO as a potent warfighting area. IO was not integrated into the planning/execution of EBO until later in the event, when CJTF identified IO as a major focus area," and "I think the problems came up because the staff was focused in the present, vice in the future. The battle rhythm was brought over from a Napoleonic way of doing things, and no one (me included) realized the impact of doing that was to force a production oriented process on

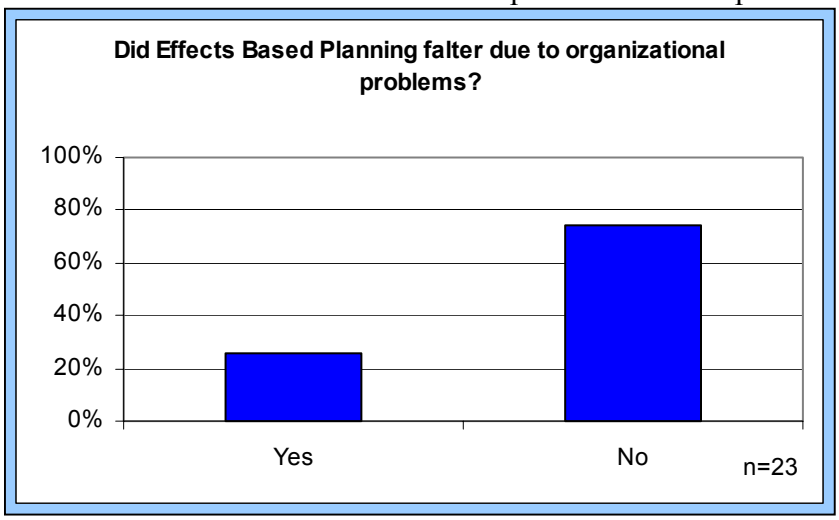


Figure 61: Organizational problem impact on Effects Based Planning

an organization that needed to be knowledge based." Another SME reported, "Cultural norms and a rigid component structure inhibited the full spectrum application of EBO. The current component system is designed primarily to provide deconfliction of tasking and coordinated command and control. The JTF has not yet evolved into a truly synergistic organization capable of integrating all aspects of combat power. EBO promises to bridge this gap, by providing commanders with a framework for cooperation and integration, and a focus for joint efforts. In the early planning stages of the operation, most individuals, cells, etc. truly attempted to use the EBO framework. However, upon execution, the emphasis shifted from experimentation with the new system, to achieving assigned tasks."

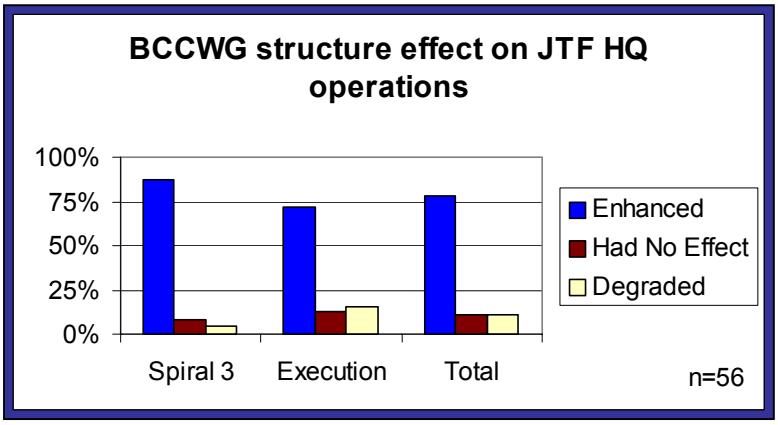


Figure 62: BCCWG structure effect on JTF HQ operations

SMEs were also asked during Spiral 3 and Execution to assess if the group-board-center-cell-work group (BCCWG) structure utilized in MC02 enhanced JTF Headquarters operations. Of 56 SME responses, an overall 79% majority felt the group-board-center-cell-work group structure enhanced JTF Headquarters operations. of enhanced. A senior SME reported that the board-center-cell-work group structure used in MC02 ensured good cross staff integration and helped to prevent stove piping. A number of the SMEs who felt the structure enhanced JTF Headquarters operations also credited the collaboration and collaborative environment as having a significant enhancement on the JTF Headquarters. Only 5 comments were associated with the selection of had no effect and six with the degraded choice. Some of these seemed to indicate that the amount of time spent in the meetings associated with these structural entities degraded JTF Headquarters functions, while several other responses felt the focus on producing products within these entities degraded the attainment of a knowledge-based state within the JTF Headquarters.

Sub-Finding: The function of the Forward Headquarters was enhanced by the presence of a portion of the SJFHQ.

The Forward Headquarters during MC02 seemed to be fully engaged in the command and control of the Joint Force during the entire time of its deployment, which occurred 30 July to 2 August 2002. Data gathered through the administration of SME and participant surveys during MC02 Execution indicates the SJFHQ provided benefit to both the function of the Forward Headquarters and the amount of time needed for its establishment. Since deployment to the Forward Headquarters site aboard USS CORONADO only occurred during Execution, these surveys were not administered during Spiral 3. From these surveys, two questions formed the basis for this Sub-Finding. One asked if the presence of SJFHQ members enhanced the function of the Forward Headquarters; the second asked if the presence of the SJFHQ helped to reduce the time involved in setting up the Forward Headquarters.

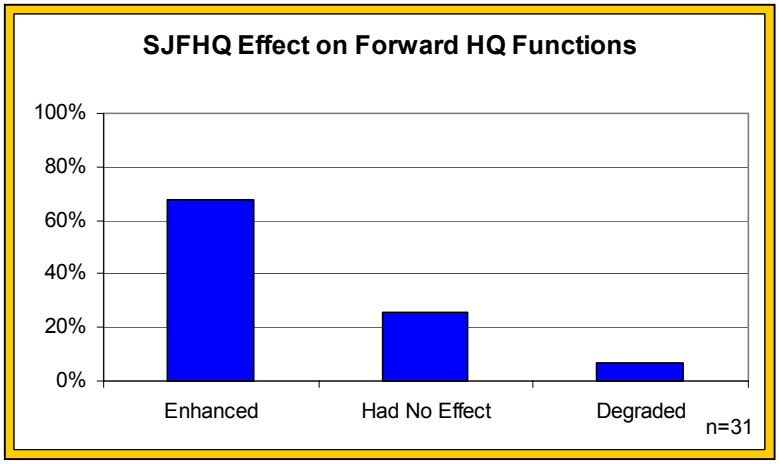


Figure 63: SJFHQ effect on Forward Headquarters

A total of 31 individuals responded to the question, "Did SJFHQ presence at the JTF Headquarters Forward enhance the function of the Forward Headquarters?" A strong majority felt the presence of the SJFHQ enhanced the function of the Forward Headquarters while a very small percentage felt the SJFHQ presence was a detriment. Approximately one-quarter of the respondents felt there was no effect on the Forward Headquarters function from the SJFHQ. Our two SME responses were split between "Enhanced" and "Had No Effect"; neither felt SJFHQ presence degraded the Forward Headquarters function.

There were 26 comments received in the responses to this question. The majority of these were associated with the response indicating the SJFHQ enhanced the function of the Forward Headquarters. The reasons indicated by the respondents as to why the SJFHQ enhanced the function of the forward Headquarters were similar to those seen elsewhere in this analysis. The amount of knowledge, situational awareness and understanding of the experimental concepts possessed by the SJFHQ were cited. The SJFHQ contribution to the resolution of technical reachback issues and its mentoring were also cited and are consistent with the overall experience possessed by this SJFHQ. Even in the cases were no effect was reported, there did not seem to be an pejorative view of the SJFHQ, rather it appeared that SJFHQ contribution was indistinguishable because it was already fully integrated into the JTF Headquarters staff, and also because the non-SJFHQ members of the JTF Headquarters Forward possessed a greater amount of situational awareness by the time the deployment occurred. This too is consistent with other portions of the analysis that indicate the SJFHQ value is most felt in the early stages of JTF Headquarters operation. The key comment coming from a respondent who thought the SJFHQ presence degraded the Forward Headquarters function was that the SJFHQ could have been used to maintain the battle rhythm at the JTF Main. Only certain SJFHQ members were part of the forward deployment, which means SJFHQ knowledge and experience was available at the Main Headquarters. Also there was no indication that the battle rhythm at the Main Headquarters faltered during the forward deployment. Therefore, little emphasis should be placed on this concern.

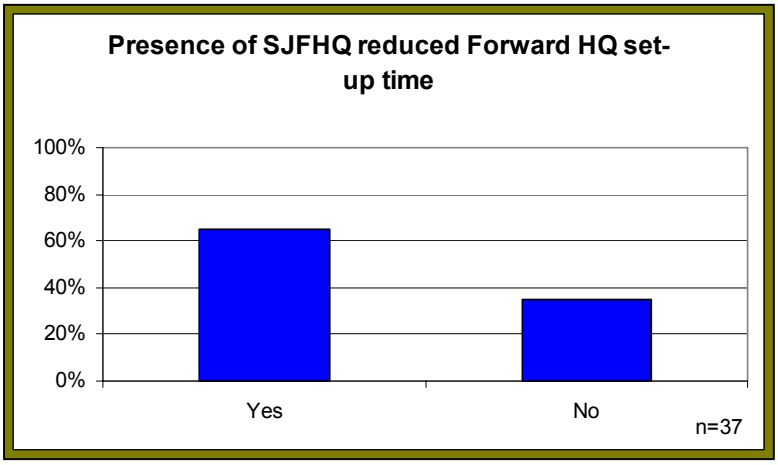


Figure 64: SJFHQ presence reduced Forward HQ set-up time

Responses from 35 participants and 2 SMEs were recorded when asked if the presence of the SJFHQ members on the deployment team helped to reduce the time involved in setting up the Forward Headquarters. Respondents indicated SJFHQ presence did help reduce the Forward Headquarters set-up time by a margin of approximately 2 to 1. Both SMEs indicated SJFHQ presence helped to reduce the set-up time.

An examination of the comment data associated with this question indicates the amount of benefit to reducing the time to establish the Forward Headquarters from the SJFHQ may be less than that indicated by considering only the distribution of the Yes/No responses. 32 of the 37 survey respondents provided comments with their selection, 19 associated with the selection of "Yes" and 13 associated with "No. Many of those who responded that the SJFHQ reduced the time needed did not credit the usual SJFHQ virtues seen elsewhere in this analysis, instead they felt the SJFHQ value was in helping resolve software and hardware issues and in making the collaborative tool functional. Likewise, the "No" responses were characterized by a number of comments that the contribution was in the technical arena, that the JTF Headquarters staff was becoming mature in its ability to function, and that the SJFHQ was fully integrated into the SJFHQ instead of a separate but accompanying entity.

At the time of deployment to the Forward Headquarters, the SJFHQ and the JTF Headquarters had been together for several weeks of experiment play, counting Spiral 3 and the first week of Execution. The non-SJFHQ members were becoming more savvy on the experiment situation and the experimental processes being used to resolve it. Other data in this report indicates the impact of SJFHQ value softens as the JTF Headquarters becomes more established. Additionally, this Forward Headquarters was established aboard the USS

to prepare for the arrival of the Forward Headquarters element. The Forward element also maintained situational awareness and executed Joint Force command and control during transit to and from the ship because of the use of the Joint Enroute Mission Planning and Rehearsal System Near Term (JEMPRS NT). These elements likely had the most impact on the time required to establish the Forward Headquarters. It is believed that while the presence of SJFHQ members was of some value, it was not a critical factor to reducing the set-up time of the Forward Headquarters.

Sub-Finding: The SJFHQ presence and effectiveness altered the role of component command LNOs at the JTF.

Traditionally, Liaison Officers (LNO) facilitate the communication maintained between elements of a JTF to ensure mutual understanding and unity of purpose and action. LNOs doctrinally perform several critical functions that are consistent across the full range of military operations. The LNO has four traditional functions: monitor, coordinate, advise, and assist. The SJFHQ presence utilizing the collaborative information environment (CIE), when operational, alleviated the need for LNOs to continuously establish and maintain close, continuous, physical communications between component commands.

SME and participant responses to survey questions regarding roles and value-added of LNOs provided the data for this sub-finding. The survey respondents were asked to contrast the use of LNOs in MC02 to previous exercises and experiments and similarly, LNO impact on JTF performance.

Respondents reported two primary differences in LNO roles in MC02 as compared to previous exercises and experiments. These differences were LNO facilitation of JTF and component command members attending collaborative sessions and LNO readiness to revert to

the traditional liaison role only as a backup in the event the CIE failed. One SME reported "Traditional representative of subordinate or higher command, but diminished activity due to immediate vertical and horizontal access through collaboration." Another SME responded "LNOs have been used to act as the conduit between the JTF and the component commanders in the absence of, or as a result of a failure in the CIE." Regarding the collaborative environment facilitation role, one SME stated, "Far from being redundant, I would argue the LNO is even more critical, although not as often as in a traditional JTF, where he is the 'go to' for JTF component collaboration."

The high degree of change in the traditional roles of the LNO was noted both in Spiral 3 and Execution. The traditional role of component command LNOs at the JTF was altered to some degree by the presence of the SJFHQ. It is clear from comments that other factors, including the CIE and CROP, also contributed to the change in LNO roles during MC02. SME comment responses indicated the "back-up" role was particularly necessary to synchronize the actions of their commands with those of the entire force and improving staff-to-staff communication channels during times of CIE outage/failure. Comment responses indicated that with the SJFHQ present and as the reliability of the CIE rose, the LNOs became less essential as part of the JTF HQ. Most of those commenting on enhancement of JTF operations mentioned or inferred a new back-up and CIE facilitation role. Similar to the responses to the question about roles of the LNO, reliance on the LNOs by the JTF appeared to be strongest at the times when the CIE was not fully operational. One SME reported, "LNO duties became less and less

important as the staff stood up and were linked with the JAOC staff in IWS". Another SME responded, "They provided the face-to-face coordination that will always be required. They provided physical back-up when servers went down, which is critical to their duties and responsibilities for parent organization to JTF".

Unlike previous exercises, liaison activities did not enhance the Joint Force Commander's ability to orchestrate the activities of the JTF. Effective physical liaison was not needed to facilitate the synchronization of the warfighting functions within the JTF. The CIE itself enabled the coordination of efforts with adjacent units, the component, or Joint Force Headquarters. Liaison normally needed to provide situational awareness to focus combat power, ensuring mutual cooperation and understanding between echelons of command, became less important. However, when the CIE failed, LNOs enabled detailed planning, information management, and understanding of implied or inferred coordination measures. During MC02, rather than liaison, it was principally the SJFHQ involvement, CIE, and CROP that insured that commanders remained aware of the tactical situation by providing them with information, verification of information, standing operating procedures, TTPs, and clarification of operational questions. Additionally, the personality of the LNO was no longer cited as a key factor in his/her value-added to the Joint Force Commander.

MC02 LNOs were needed less frequently than in past experiments and exercises to provide the critical link to effectively coordinate and execute JTF operations. The MC02 LNO, empowered with the CIE, was able to keep informed of the situation of his own unit and make that information available to the commander and staff of the unit to which he was sent. The LNO was able to use the CIE to find out the JTF mission, unit locations, future locations, and commander's intent. The unobtrusive CIE allowed the MC02 LNO to accomplish his mission without interfering with the operations of the headquarters to which he was sent. The LNOs used the CIE to report to his parent command on those matters within the scope of his mission; inform the appropriate supported JTF staff officer or commander about significant problems

being experienced by his parent unit that could affect operations of other commands and vice versa; and make suggestions to enhance the effective employment of his parent unit.

During MC02, the SJFHQ and CIE facilitated a reduction in the workload for the traditional coordination and advise roles. The CIE served as a substitute for face-to-face communications and the SJFHQ provided an in-place understanding and experience in joint operations. However, the demands of working within the CIE generated process- related work and demanded unprecedented time for the LNO to attend battle updates, decision briefings, mission analysis and to participate in board, center and cell meetings to gather and provide information. The use of LNOs in MC02 was clearly different from past exercises, experiments or operations. Unlike previous exercises with sequential physical meetings one at a time and the use of secure phone or face-to-face coordination, the MC02 collaboration tools required LNOs to be in planning sessions, monitor current operations, and push/pull data from the Share Point Portal Server (SPPS) near simultaneously. When the CIE was down, Component LNOs were used in their traditional roles as the primary conduit for RFIs and as the direct representative of their commander and became a critical piece of the planning process when communications to components went down. This on-off role for the LNO made it even more important that the LNOs were experienced with the full confidence of his commander and a solid understanding of their command's plan.

During MC02, LNOs acted as CIE facilitators to ensure functional staff members were in the right virtual meeting place at the right time. In this new role, LNOs were expected to run

collaborative meetings and get them into the appropriate CIE building and room. LNOs routed emails from JTF staff members that could not collaborate with their functional component, worked tool problems, and made sure all key briefings, meetings, and calendar events had component representation. The CIE and presence of the SJFHQ enabled the LNOs to perform tasks more quickly, speeding up the planning and execution process. One example being that LNOs were able to provide detailed weapons system capabilities during JTF planning sessions allowing the JTF planners to to quickly rule out use of certain systems for a particular target set. Assimilation of the complex collaborative cyber-information environment placed a premium on the LNO's capability to obtain, correlate, and discriminate relevant data.

The UJTL baseline report information regarding the subtask, **Develop Joint Force Liaison Structure (OP 5.5.2)**, indicates LNO personnel within the JTF were not effectively used. During MC02 respondents noted that the activity level of the LNO was reduced by the CIE but the role of the LNO was more critical. LNOs were engaged throughout the JTF staff and ensured their respective headquarters maintained SA outside of the CIE. It is imperative that LNOs are properly resourced—adequate number with the right credentials to represent and speak for their commands.

In conclusion, the increased tempo, brought on by faster, better, and more accurate data validated the importance of well-trained LNOs with analytical skills necessary to process the data and discern what was important and when actions needed to be taken. This coupled with the necessity for the LNO to perform his traditional roles when the CIE went down, showed a potential increase in the importance of the LNO and the absolute necessity of the LNO being the commander's representative with his full trust and confidence

Finding 2:

Finding 2: Although the SJFHQ provided value added to the JTF, continued refinement of its organization and composition is warranted.

Although the SJFHQ provided value added to the JTF, continued refinement of its organization and composition is warranted.

Organization.

SJFHQ vs. JTF Organization. All respondents—SMEs, JTF staff, SJFHQ members—were asked, "Are there changes or improvements that should be made to the SJFHQ organization or positions?" The question was intended to specifically address the SJFHQ organization. However, after reviewing the data, some (60 of 461) of the responses were more relevant to the JTF organization, which mirrored that of the SJFHQ during the experiment. All respondents who indicated that changes or improvements were needed provided comments. The responses were mapped to either the SJFHQ or JTF organizations based on the comments provided with each response. Only the SJFHQ organization is discussed below. The CJTF organizes the JTF based on requirements.

SJFHQ: Refinement--No Major Overhaul. The SJFHQ organization needs refinement but not a major overhaul. The SJFHQ is organized into five groups—Command (CmdGrp), Plans (PG), Operations (OpsGrp), Information Superiority (ISG), and Information/Knowledge Management (KMG). Results of analysis indicate that the SJFHQ is about right. Eighty-five (85%) of respondents, combined participants and SMEs, indicated minor changes and

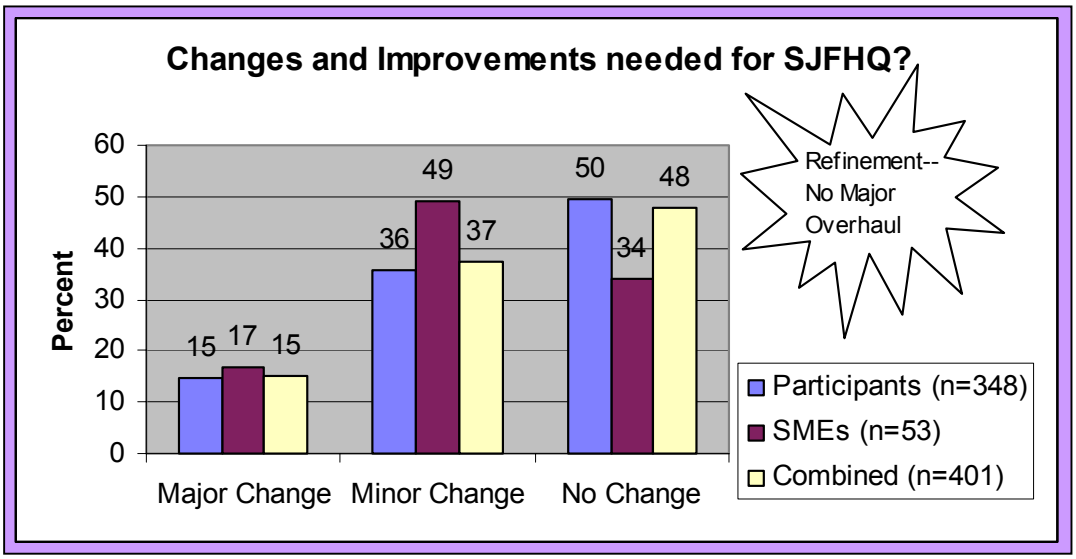


Figure 65: Changes and improvements needed for SJFHQ

improvements are needed or no changes and improvements are required. There are no issues with the Command, Plans, and Operations groups. However, some concerns are present regarding the ISG and KMG, and establishing a Support Group. These concerns are discussed below in the "Major Changes" paragraph. Minor changes and improvements include the following:

- Adding expertise not currently available
- Adding or deleting some currently available expertise

- Relocating expertise from one group to another
- Changing the mix of military and civilians
- Ensuring SJFHQ members have certain attributes
- Ensuring the SJFHQ come with certain products

The make-up of the SJFHQ as stated in the SJFHQ concept is generalist-centric. Something to note here is that some of the changes and improvements suggested in the experiment data are more expertise-centric. Specific minor changes and improvements, by respondent group, are discussed below.

SMEs. SMEs noted that the SJFHQ needs expertise in additional areas and more of some currently available expertise. They also emphasized the importance of habitual relationships and being able to reachback to the Combatant Commander's staff and COEs. Forty-nine percent (49%) recommended minor changes and improvements, and thirty-four percent (34%) indicated that no changes are required.

The recurring comments from SMEs recommend the following minor changes:

- Add Personnel Planner
- Add Engineer
- Add Medical Planner
- Add Joint Fires expertise
- Add SOF expertise
- Add Deployment Planner
- Add Log Director and Planner

A participant stated, "If I had only one additional position, I would add a Joint Fires person, if I had two additional slots, I would add two Joint Fires people." Another SME remarked, "It looks like it is about right as long as there is good collaboration with the rest of the CINC staff during pre-crises and effective reachback during the crisis." And finally, a senior SME noted, "The SJFHQ will and never should be the be-all end-all organization. The resources required to achieve an all capable SJFHQ are too high for the value added. The 80-90% solution is the key. Each mission and JTF will be different.....there will never be a standard."

Senior Mentors/Concept Developers. Comments from the Senior Mentor/Concept Developer notes indicate that the SJFHQ concept is good and proven, that the SJFHQ is an essential feature of DoD transformation, and that Combatant Commanders need a SJFHQ. But they are not sure about the organization. They indicate that the organization needs minor refinement and recommend that the Combatant Commanders have the latitude to organize the SJFHQ as his theater requires. The one recurring comment from Senior Mentors is the need for IAC personnel resident on the SJFHQ. "SJFHQ is good and must be standing—concept proven; not sure about the structure," said one Senior Mentor. Another Senior Mentor stated, "SJFHQ needs an interagency person or two. There is too much below Combatant Commander Blue that needs political-military sensitivity." A Concept Developer added, "As the JIACG concept is refined, a JIACG staffer should be identified to be part of the SJFHQ, and usually to deploy with it."

The UJTL baseline report information regarding the subtask, **Coordinate and Integrate Joint/Multinational and Interagency Support (OP 5.7)**, indicates identifying the agencies available to support the JTF is difficult. The SJFHQ directly addresses this issue with its

habitual relationships with and reach-back to the IAC, COEs, and other external agencies. Also respondents and Senior Mentors noted the need for an IAC representative in the SJFHQ and a JIACG at the Combatant Command level. These relationships and capabilities were not well exercised during MC02 because of lack of participation. But if implemented as defined in the SJFHQ concept this will not be an issue.

Participants. Approximately 50% of participants indicated that no changes are required to the SJFHQ organization. Thirty-six percent (36%) noted that the SJFHQ needs minor changes. Their input included all extremes and everything between. Participants indicated that the SJFHQ needs to add expertise not currently available, to add more of and to delete some currently-available expertise, to relocate expertise from one group to another, to change the mix of military and civilians, to ensure SJFHQ members have certain attributes, and to ensure the SJFHQ come with certain products. The recurring comments from participants recommend the following changes:

- Add Communications expertise—J6 types
- Add Medical Planner
- Add Personnel Planner
- Add Engineer expertise
- Add Fires expertise
- Add more military—less civilians
- Add KMOs—managers not IT people
- Add a Future Operations Cell—mix of people from Plans and OPS

Participants emphasized that SJFHQ members should have certain traits, specifically joint experience, experts in functional area, collaboration tools expertise, and coaching and mentoring skills. During Spiral 3, participants needed better definitions of positions and skills required. Also, there is a noticeable concern about the mix of military and civilians, and who is in charge or directing whom. A participant stated, “The number of personnel should be greatly reduced. Many SJFHQ members had very little to do during the buildup to MC02. Additionally, military SJFHQ should be organized to eliminate situations so military and government personnel are not subordinate to civilian contractors.” Other participant comments regarding the mix include, “More military/uniform personnel,” and “Less civilians more military.” Another participant remarked, “The concept for the SJFHQ is absolutely right on target. I would definitely add an operations officer to assist the SJFHQ KMO with centers, boards, and cells to include managing the JTF Operations page and archives. Stick to the concept and let the SJFHQ perform.” “I don't know if more KMO or better procedures were necessary… I think the SPPS folders and methods should have been set. I would have liked to see standard data reports files set up by the SJFHQ team. For example: items of high interests to the JTF Commander should be in clearly identified folders that can be updated by those who have the right knowledge,” said a JTF staff member. Regarding reducing the SJFHQ, one JTF staff member stated, “Scale down the size of the SJFHQ. There is no need for a RW [Rotary Wing] planner, and many other planners. If the function is a Component function and you do not own the assets at the JTF level you do not need a planner at this level for it.”

Major Changes. Again, only 15% of participant and SME respondents noted the need for major changes. Major changes ranged from deleting and adding groups, to disbanding groups and returning to J-staff organization, to allowing the Combatant Commanders to organize the SJFHQ based upon requirements. The preponderance of suggested major changes provided by

all respondents, discussed the ISG, KMG, IO, and a Logistics/Support group. Regarding the ISG and KMG, questions addressing these concerns include, "Should these groups remain or be eliminated and group members distributed to the PG and OpsGrp?"; "What are the roles and functions of these groups?"; and "Who commands and controls the members distributed to other groups?" Also, respondents indicated support for a Support/Logistics Group, transfer of IO people to the PG, and an Information Operations organization at some level, either at group level within the SJFHQ organization or at task force level, i.e., Joint Information Operations Task Force (JIOTF). Each group is addressed separately below.

ISG. Those that recommended major SJFHQ organizational changes suggest elimination of the ISG. The group experienced problems synchronizing and integrating intelligence assets and providing the necessary support for operations and planning. According to these respondents, the ISG did not meet the needs of the JTF or fulfill its roles and responsibilities. The group became two groups, Intel and IO when the CJTF pulled the IO Supervisor to be his spokesman. The group split and it never came together again during the experiment. This adds credence to the suggestions that IO should not be in the ISG and that IO should be its own entity—more to follow in the IO paragraph below. Also, JTF ISG participants indicated that the limitations of the experiment negatively affected the group's effectiveness. One SME summed the major changes regarding the ISG very well. He stated, "There are significant problems with the organization of intelligence elements within the SJFHQ/JTF. The change from the original SJFHQ concept to take intelligence support assets from both the Operations and Plans Groups--along with Information Operations (IO) assets -- to form a new Information Superiority Group (ISG) was not exactly a resounding success in MC02, and was in some ways a real failure… The lack of a complete SOP that ensured the various ISG entities knew what support they needed to provide to the Plans or Ops groups created conditions where insufficient information was provided, often in the wrong format or at the wrong time. Even worse, some critical intelligence support was not provided at all… Recommendation: Eliminate the ISG. All personnel associated with current intelligence support, Effects Assessment & coordination of collection should be shifted to the Ops Group. All ISG personnel associated with planning, such as the ISR Planner, the EA Planner, etc., would join the Plans Group. The ONA analysts positions – [not sure] if they should even be physically [located] at the JTF-level -- remains a topic for debate. I would say they would be more effective at the Combatant Commander's level and thus other current ISG members such as the ONA supervisor, etc., become unnecessary." A SJFHQ member in the ISG recommended, "The SJFHQ should consist of two groups: Ops and Plans. Re-integrate the personnel in the IS and KM groups back into Plans and Ops. There will be "support" personnel (E.G. Logistics Officers) in each group - place one officer in charge of all similar personnel in both groups. This will simplify the problems of synchronizing efforts across the groups. Other participants indicated that they were not sure of the value of the ISG because it did not provide the synchronization it was envisioned providing, it failed in the area of IO, and it was out of touch with the needs of the OpsGrp and PG—they recommended disestablishment of the group.

Conversely, a few participants supported the ISG. They indicated that the ISG should remain a group with command and control of all ISG assets across the JTF staff. To be effective, the ISG must control its assets and receive information from higher headquarters elements. One JTF staff member stated, "First of all, resist any attempts to disband the ISG. Initial problems were due to no command and control. The Director, ISG must have C2 of all ISG members distributed across the staff to ensure SA, integration, and synchronization. This will result in better products, better orchestration, better integration, better synchronization, and reduce

duplication. For this to work, Director must have control. Not sure about IO, not sure of the plan to elevate or stay in ISG. The IO lead was an O6—we were pulled apart early by the CJTF and never came back together. CJTF wanted to talk directly with the IO lead and he wanted a spokesman, i.e., PAO. If IO stays with ISG, the lead should probably be a LTC/MAJ to better facilitate C2." Another JTF staff member remarked, "The ISG is a valid group and should not be disbanded. ISG was hurt by no C2 of assets and the experiment—lack of products from higher (JECG). The ISG Lead must control all assets to synchronize and appropriately integrate throughout the staff, and must receive or be able to acquire info from higher elements. There are no problems with ISG—the problems were with the experiment.

KMG. KMG was another group that, according to those who suggested major SJFHQ changes, had problems and should be eliminated. The focus or understanding from many of the participants and the KMG was on technology—knowledge was not managed. The KIMP stated that knowledge management is the responsibility of each Warfighter, which assumed Warfighters understand knowledge management to include the business rules, know what knowledge should be managed, and know how to use the management tools. This proved to be a bad assumption because Warfighters did not understand knowledge management and because the business rules were dynamic. The expertise of the KMOs was in the area of information technology. The group needs more operators who understand the needs of the JTF to manage the knowledge and to ensure knowledge is available to all staffs. Group status is not necessary if KMOs are distributed throughout the staff with a POC (Belly-Button) in the CmdGrp. A SJFHQ KM member stated, "[We need] Better understanding and organization in the KM/IS area, at least better alignment of organization's expectations. As a KM, nearly everyone had a different expectation of my role. It led to disappointment in many and frustration on my part." Another participant remarked, "KM is weak—we had no managed knowledge. Either disband group and distribute throughout remaining groups or give the KM Lead C2 of all KM people so he can focus efforts. The KM Lead should probably be an operator with a strong tech person as his deputy." A SME provided the following comments: "…Document control is problematic. The number of broken links and dead subscriptions continues to rise. Document naming conventions and storage locations are slowly shifting. Procedures are changing...sometimes dramatically...and SOPs are not being updated… Without adequate KM embedded in each cell, it is difficult to sustain adherence to the KM plan...and it is even more difficult to capture and analyze the unique new processes, procedures and conventions operators are developing to meet their needs. Suggest additional KM be added to the manning document and embedded in each cell. These individuals would be able to "ride herd", keeping the operators inside the range, but permitting them enough leeway to experiment with processes, procedures, and conventions. More importantly, these individuals could capture the best of these new ideas and share them across the organization, creating new and improved SOPs." Another SME stated, "…The KMO needs to be operationally savvy, with the ability to talk to technicians, and must have superb computer skills to translate the needs of the commander into useful web pages, Outlook organization, and functional collaboration nets."

IO. Another point raised in the comments of those who felt major SJFHQ changes were in order was that IO should be separated from the ISG and elevated to group or component level. Comments regarding IO indicate that IO was not well understood by many players. And those who understand opined that IO was displaced under ISG and not well integrated throughout the staff—IO Planners are definitely needed in the PG. Respondents stated that to facilitate IO success:

- Define IO and educate DoD and external agencies
- Refine IO responsibilities and provide appropriate authorities and resources
- Establish IO as a group if not a component
- Add IO experts throughout the staff, especially in the PG

There is no agreed upon definition of IO within DoD. The IO spectrum is very broad and inconsistent across military agencies. One SME indicated, "A major Joint Forces Command recommendation coming out of MC02 should be that the SecDef should commission and approve a DoD wide definition of IO and fix responsibility for it within DoD." Another SME stated, "IO should be its own entity, not part of ISG. IO should have the clout to make things happen prior to hostilities." The CJTF agreed with this statement, as he elevated his IO to group level early during the experiment to meet JTF needs. He split the ISG group into intel and IO cells, which enhanced the effectiveness of IO. A participant remarked, "If gaining and maintaining info superiority is a primary objective - it will never be reached by burying IO under IS. IO if it is to be successful has to have its responsibilities refined, appropriate authorities and resources assigned." The recommendation from those who understand is to separate IO from ISG and elevate to group or component level. The SJFHQ Chief stated, "We should improve the IO focus by creating a significant functional stand alone area vice treating IO as a briefing item. It is already almost a functional component." On this same subject, a participant indicated that IO integration was inadequate and he recommended creating an IO command—full component status. Senior Mentors also support component status and more IO personnel to effectively leverage the IO spectrum. A succinct summary, provided by a JTF Staff participant, states, "First, move IO out from under IS. Second dedicate an IO planner to the plans group. Third clearly identify the skills in IO."

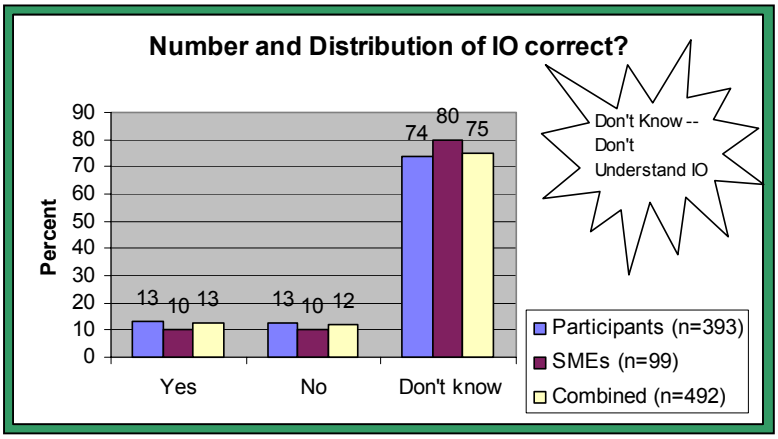


Figure 66: Correctness of number and distribution of IO planners

The chart below reiterates the lack of IO understanding. Participants and SMEs were asked during Spiral 3 and Execution, "Is the number and distribution of IO Planners across the JTF Headquarters correct?" Only 25% of respondents (Combined) indicated a "Yes" or "No" answer, or understood IO well enough to answer the question. The chart doesn't depict a need for more or a better distribution of IO. However, comments from "No" respondents, participants and SMEs, indicate a need for more IO, specifically in the PG. Some "Yes" respondents also noted that the PG needs IO Planners.

The percentage of "Yes" and "No" responses for both, participants and SMEs, increased from Spiral 3 to Execution, 10% and 5%, respectively. This indicates some IO understanding was gained as the experiment progressed.

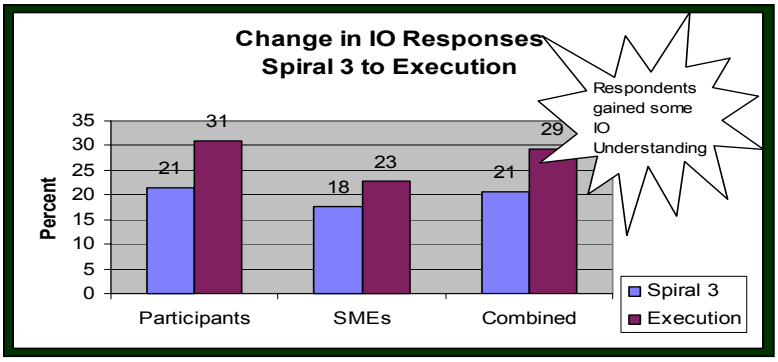


Figure 67: Change in IO responses

The analysis regarding the JTF Challenge, **Underdeveloped Information Operations (IO)**, provided in the MC02 Baseline Report states, **"**While many JTF staffs attempt to optimize IO, they are confronted with the reality that the high impact IO actions are usually not the discretion of the JTF commander. Those decisions and actions are at the combatant command level and higher. There is a training issue that centers around taking personnel that have focused on tactical level IO and placing them at the operational level and asking them to orchestrate a coherent IO plan at the operational level of war. Very seldom is that done effectively. Additionally, the lack of simulations that reward IO play makes it difficult to effectively integrate it into training events." The SJFHQ attempted to address this challenge by including five IO Planners in the ISG and one IO OPS member in the OpsGrp. However, IO had similar problems during MC02—not enough knowledge and experience, not well integrated in the right places, and not synchronized across the spectrum, especially in the special access areas. The CJTF elevated IO from under ISG and gave it needed command emphasis, which enhanced effectiveness.

Logistics/Support Group. A point noted in the comments of those who suggested major changes and from other respondents was to add a Logistics/Support Group (SptGrp) to the SJFHQ organization. The absence of a SptGrp proved to be significant and problematic, as reported by respondents. Participants noticed confusion and duplication of effort between logistic planners and operators. Logisticians were not in the core/main planning cell and their absence was reflected in COA development. A SME noted that some COA development was logistically deficient, that is it was missing an assessment of logistic feasibility. Logisticians were left out and not consulted on some operations; however, this seemed to have minimal impact on the progress of the experiment. And one participant indicated that some logistic problems did not receive the necessary visibility to get resolved; a Logistics Director is needed to coordinate, synchronize, and maintain visibility of logistic functions. A SME stated that a J4 would have helped coordinate/oversee logistical requirements between the OpsGrp and PG. Another SME provided the following comment. "While the embedding of logisticians in the Plans and Operations Groups has shown great potential, the Logistics Operations Director (LogOpsDir) in the Operations Group spent a great deal of time within the Plans Group Logistics Plans (LogPlans) Section during Spiral 3. This individual's ability to provide logistics planning oversight will be greatly diminished once deployment and operations begin and, as his focus shifts. To create better oversight of logistics planning and operations as well as more logistics visibility across the JTF staff, recommend creation of an O-6 Logistics Director position at the special staff level." A Senior Mentor stated, "The ETO did not have sufficient granularity and resolution for the logistics problems, so I could not link forces, etc. The G-3/G-4 personalities fit, but personalities should not determine how we operated. For a lot of the log sustainment things I'd normally deal with the COSCOM Commander. But, I couldn't because there was no joint

logistics commander…" Another Senior Mentor indicated that we need more logistics integration.

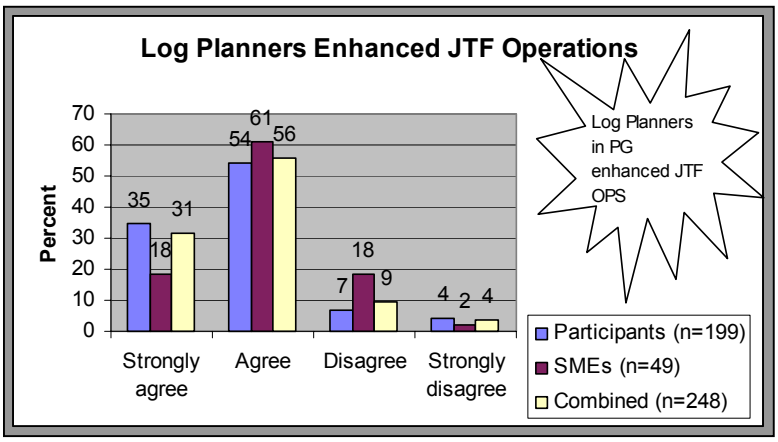


Figure 68: Logisticians in Plans enhanced JTF

All respondent types, participants, SMEs, and Senior Concept Developers, support adding a group to oversee logistics planning and operations, to increase logistics visibility across the JTF, and to house other support functions as required. Many respondents made comments such as, "Bring back the J4," "Create a separate logistics element," "I would add a log directorate," and "Give logistics equal-footing with other groups." A support/logistics group should be developed that has parity with the other groups, but not at the expense of removing all logistics personnel from the OpsGrp and PG. Logistics representatives should remain in these groups—maybe not as many. A participant remarked, "Logistics is too important not to be an entity in itself. There most definitely need to be Logistics participation in planning and operations and it needs to be more than a simple LNO representation." "The vertical staff processes in the logistics arena lacked sufficient definition given that there was no true logistics staff to coordinate with. The JTF needs a dedicated logistics cell, even as logisticians remain embedded in both ops and plans directorates. The ability to flow forces, coordinate sustainment, and manage host nation requirements necessitate a dedicated logistics cell," added a CC Staff member. If added the SptGrp can include logistics, personnel, medical, SJA, PAO, contracting, and other support functions representatives.

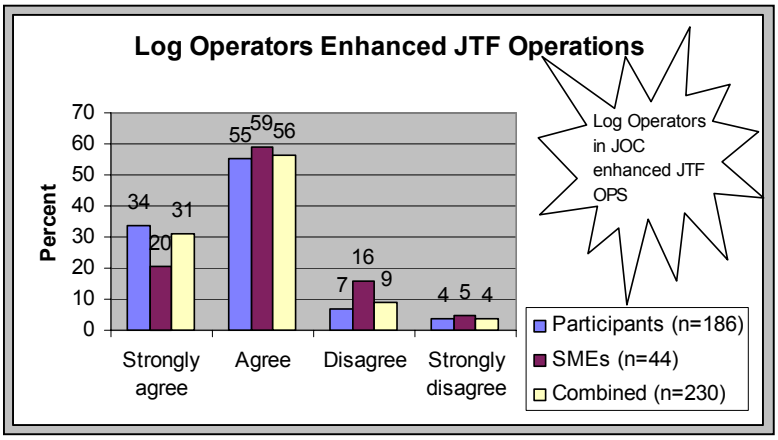


Figure 69: Logisticians in Operations enhanced JTF

During Execution, participants and SMEs were asked to rate if logistic personnel, embedded in the PG and OpsGrp, enhanced JTF Operations. The charts below indicate that Log Planners and Log Operators enhanced JTF Operations. In all cases, over 79 percent of respondents agreed that logistic personnel located in Ops and Plans enhanced operations. This suggests logistic personnel should remain embedded in the PG and OpsGrp.

The analysis regarding the JTF Challenge, **Contingency Contracting and Host Nation Support (HNS)**, provided in the MC02 Baseline Report states that a limited number of events have been conducted, centered on J-4 specific training in this area. The SJFHQ assists with this challenge by providing the

situational awareness and understanding of the JOA, the ONA knowledge, and habitual relationships and reach-back to COE and other external agencies. During MC02 respondents indicated the need for an IAC representative in the SJFHQ and the need for a Support Group, including contracting, SJA, and PAO expertise. If the group is added with the recommended expertise, the SJFHQ will provide a means to overcome this challenge.

Structure Enhanced JTF Operations. Although the SJFHQ organization needs refinement, and not rebuilding, its structure as used in MC02 enhanced JTF Operations. During Spiral 3 and Execution, SMEs were asked if the group structure enhanced JTF Operations. Throughout the experiment, SMEs indicated that the SJFHQ group structure enhanced JTF Operations—88% during Spiral 3 and 72% during Execution. The cross-functional group structure facilitated good staff integration and helped alleviate stovepipes. It allowed planning to occur rapidly and formed the framework for collaboration. The MC02 experience showed that CIE and the SJFHQ are inextricably linked and have a synergistic effect to enhance JTF Operations. Another important aspect to note is that the JTF staff embraced the structure which allowed the benefits to be realized. The difference in SMEs saying "Degraded" during Spiral 3 (4% = 1 SME) and those giving the same response during Execution (16% = 5 SMEs) is noted. Their comments are more relevant to BCCWGs than the group structure and were considered in the BCCWG finding below.

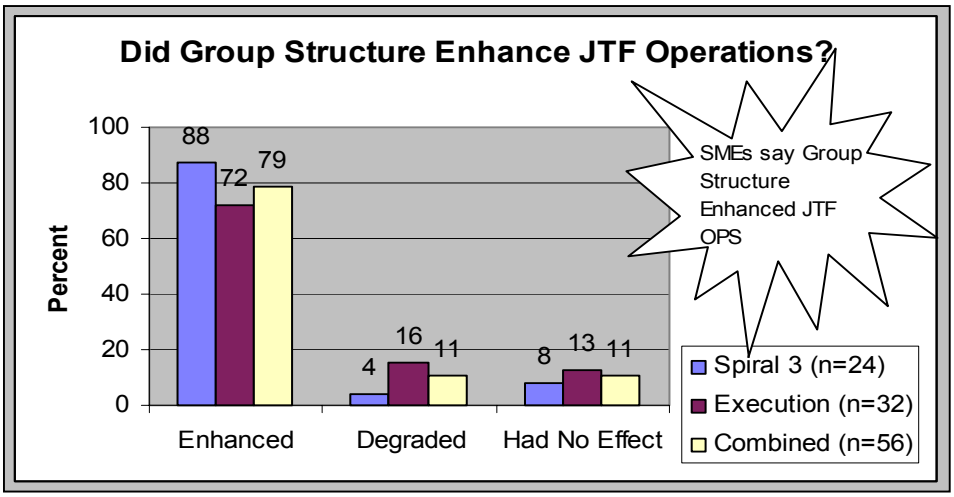


Figure 70: Group structure effect on JTF operations

To address structure enhancement from a different perspective, during Spiral 3 and Execution SMEs were asked also if Effects-Based Planning/Operations (EBP/O) faltered due to organizational problems. Seventy-four percent (74%) of respondents indicated that the organization did not cause the EBP/O to falter. Only two of the six SMEs who responded "Yes," provided comments regarding the structure. One SME indicated that logistics was not well integrated and synchronized. He noted also that logisticians were in the PG but not embedded in the core planning cell. The other SME stated, "There was not adequate representation of information operations in the JPC

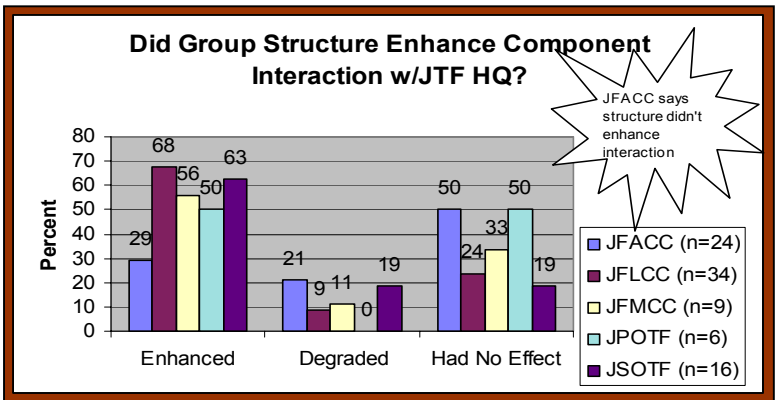


Figure 72: Component view of Group structure effect on Component interaction

planning efforts. The JPC core plans cell needs an IO planner." Theses concerns are a repeat of information presented in the IO and Logistics/Support Group sections above.

Structure Enhanced Component Interaction. The JTF staff including SJFHQ members, Component staffs, and SMEs were asked if the group structure enhanced Component interaction with the JTF Headquarters. The JTF staff and SMEs, 76% and 75% respectively, indicated that the organizational structure enhanced Component interaction with the JTF Headquarters. The Component staffs as a whole were not so impressed. Only 52% of these respondents indicated the structure enhanced Component interaction. However, interesting to note is that the JFLCC staff, which was the only component organized similar to the JTF, was much more positive. Sixty-eight percent (68%) of JFLCC staff indicated the structure enhanced Component interaction. JFLCC respondents credited the similar structures as the reason for enhanced effectiveness and interaction. One JFLCC respondent remarked, "The identical structure of the JFLCC and JTF enhanced our effectiveness because there was a clearly identified source that we could coordinate and collaborate with to resolve problems and ensure situational awareness was maintained." At the other extreme are the JFACC respondents. Over 70% of the JFACC staff provided "Degraded" and "Had No Effect" responses. Why? JFACC respondents noted that the structure was confusing, that the JTF staff was too involved in tactical planning, that the number and length of collaboration sessions were detrimental to Component planning, and that the location of information was not logical based on expectations. A JFACC respondent stated, "RFIs were sent to KM vice IS resulting in answers delayed for days. Structure [is] confusing and cumbersome for those brought up under j1, j2...--did not understand who was doing the traditional J staff roles. Structure did not seem well defined as KM seemed to be tasked with things that IS should be doing. Structure breaks traditional expertise roles and waters them down into functional areas not requiring that expertise or underutilizing it." A JSOTF staff member indicated that the IS structure just added layers of complexity to the intel process.

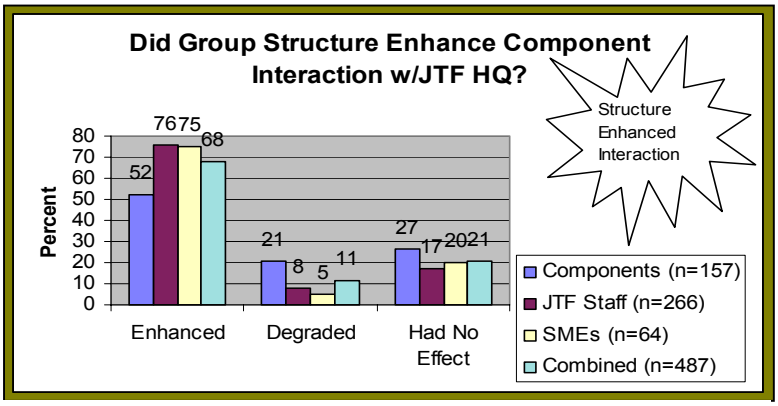


Figure 82: Group structure effect on Component interaction

Over 80 percent of Component respondents indicated that the interaction between the JTF Headquarters and Components was effective. Respondents stated

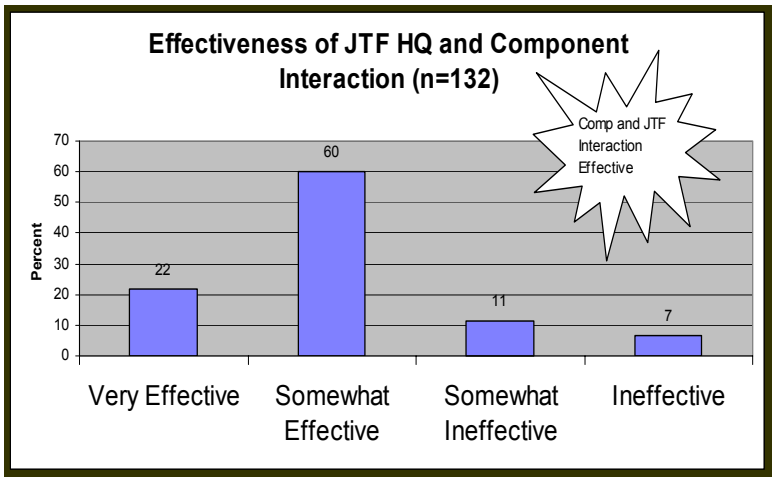


Figure 73: Effectiveness of JTFHQ-Component interaction

that the CIE played a major role, that SA was always high, and that collaboration enabled unfiltered communications—there was immediate access vertically and horizontally.

Structure Enhanced Combatant Interaction. Combatant Commander staff interaction with JTF Headquarters was also enhanced by the organizational structure, according to the JTF staff and SJFHQ. However, three of the six Combatant Commander staff respondents indicated that the SJFHQ organization degraded their interaction with the JTF Headquarters and one indicated the organization had no effect. The small sample size of Combatant Commander staff negates significance but responses and comments are noted and listed below.

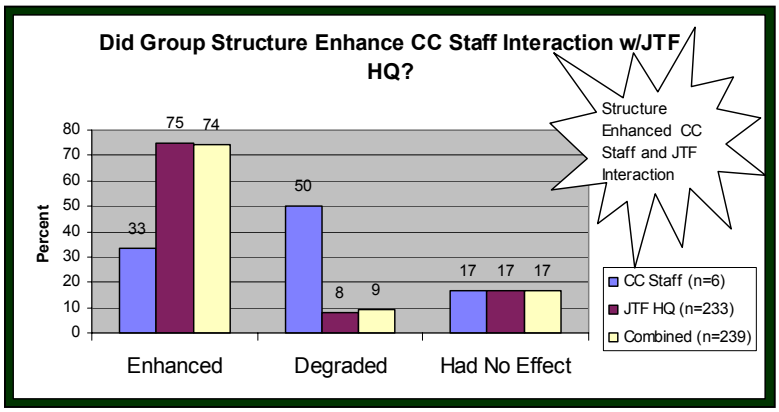


Figure 83: Group structure effect on Combatant Commander interaction

Combatant Commander comments associated with the selection of the degraded answer included, "The CINC J3 and J5 did not mirror the SJFHQ structure and at times this caused confusion," and "Just talked to CINC J2 rep; info is taking longer to get to right people because intel folks at JTF have been divested to Info Superiority cells, etc." Another of these was, "This is an area that merits additional research. The experimental staff structure varied by component (i.e. JFLCC mirrored JTF) and this caused some vertigo at the CINC and component level. This lack of consistency may just be a training issue, but I believe that the complexities of staff interactions at the operational and strategic level, mandate simplistic organizations with very defined TTPs." A Combatant Commander participant who felt there was no effect stated, "Because of the CC Staff experiment design - J3 one person, J5 one person, etc., the effect was minimal. However, a robust CC Staff ready to go to war would have presented a different interaction picture."

Composition -- **General Comments.** Group composition is defined as the number of members, mix of skills and knowledge, and products brought to the activation of the JTF. All respondents were asked, "Are there additional skills, knowledge, or products you believe the SJFHQ should bring to the activation of the JTF?" Sixty-four (64) percent of responding SMEs answered "Yes" and provided comments regarding additional skills, knowledge, and products needed. Only 41% of 393 participants (JTF Staff and SJFHQ) provided comments. Also Group directors were interviewed by analysts and asked specific questions regarding the composition of their group. Key individual attributes and each group will be discussed separately. Additions, which are relevant across all groups are discussed in the "Others" paragraph below. The name "Headquarters" is deceiving because the SJFHQ is a command and control element not a headquarters. For that reason, many comments are not relevant to the SJFHQ organization and are more pertinent to a headquarters (JTF). The CJTF will organize the JTF based upon requirements. The comments below are specific to the SJFHQ full-time organization, not the JTF as a whole. There is some overlap with the "Organization" section above, which emphasizes some importance. A good lead-in comment to this section as stated by an SJFHQ member is, "We need to be very careful about adding more positions to the SJFHQ. The SJFHQ manning is

already a huge bill for the CINC to pay for a "peacetime" planning organization. The SJFHQ is part of the CINC's HQ and derives much assistance from the CINC's staff for skills not resident in the SJFHQ. Remember the concept calls for augments, plugs, and liaisons before we go to war."

Individual Attributes and Knowledge. Significant to mention at this point is a recurring comment from respondents throughout all phases of MC02. Respondents are adamant that the keys to SJFHQ effectiveness and success are the personal attributes, knowledge, and experience of the SJFHQ members—traits needed to establish credibility. Attributes, knowledge, and experience, which should make-up the SJFHQ member model are listed below:

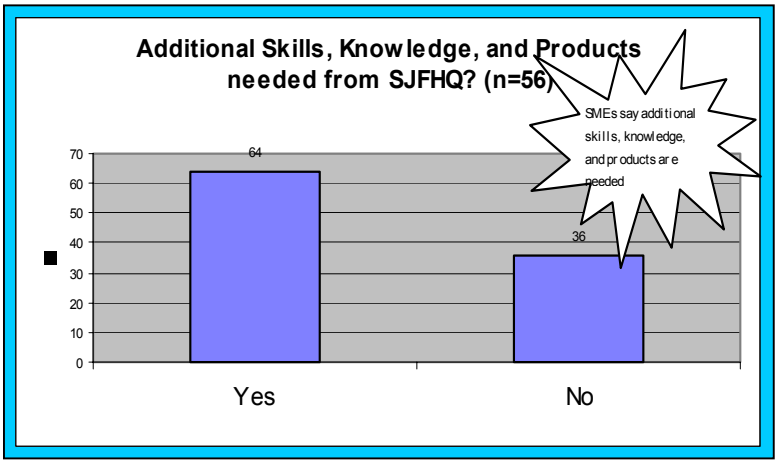


Figure 84: Additional skills, knowledge, and products needed from SJFHQ

- Mature, professional—SME in assigned area
- Experience in joint and service operations, and crisis action planning
- Trainer, mentor, coach with interpersonal skills
- Understand group dynamics
- Understand concepts and Combatant Commander's Intent and Perspectives
- Knowledge of CONPLANs, CONOPS, SOPs, and TTPs
- Situational awareness and understanding
- Knowledge of the ONA and the adversary
- Knowledge of Effects-based Planning/Operations
- Expertise with collaborative tools
- Habitual relationships with Combatant Commander's staff, component staffs and other external agencies.

One JTF participant stated, "The SJFHQ's credentials are very important keys to the success of the JTF staff. The SJFHQ billets should be reserved for retirees with substantial joint experience, and very experienced, highly competitive military with some longevity and stability. They must be mature, professionals with human dynamics. The MC02 SJFHQ had situational awareness, expertise in joint operations and the collaborative tools, knowledge of ONA, knowledge of the theater, knowledge of effects-based planning, relationships with IAC and COE, and understood the Combatant Commander and his intent. LTCs/MAJs, out of service/joint schools will not work—no experience and no credibility." Another JTF participant remarked, "The SJFHQ members must bring with them situational awareness and understanding, knowledge of ONA, proficiency with collaborative tools, Combatant Commander's intent and perspectives, joint operations experience, and most importantly maturity and group dynamics."

SMEs agreed with this, as noted in this comment, "For the long-term, for SJFHQ to remain a viable entity, I recommend that the personnel assigned to SJFHQ have operational experience at the combatant command and the JTF Level. Contractors need to maintain currency or over-time their operational experience may become dated. There is a lingering perception

(right or wrong) that Staff College graduates, in organizations such as this lack the credibility and experience of working/teaching at the combatant and JTF level. They are going to have a tough time "plugging in" into a HQ without the requisite "hands on" time. Likewise, you will need quality guys with initiative, who can produce products, and are willing to handle multi-tasks. Currency and credibility will be key. Otherwise, over time, the SJFHQ will be marginalized. Bottom line, you will need quality people that understand how planning is done throughout the JTF – from the HQ to the components to the MSC. Then SJFHQ must have enough hardware to deploy with to support the entire JTF staff (to include components), a technician staff to support it, and an instruction package with instructors to train the rest of the JTF."

And finally a participant provided a relevant comment regarding stabilization of SJFHQ members, "SJFHQ positions should be stabilized for a period of about six years (no less). But we OPS should also have that core staff of members rotate through different CINCs so that they get a broadening of experiences and perspectives that will cross pollinate other CINCs. Rotations should be staggered so that we can retain the functions that have been working well."

The UJTL baseline report information regarding the subtask, **Assess Operational Situation (OP 5.2)**, indicates assessments completed by the JTF staff tended to be compartmented and were not updated to incorporate operational updates, which made it difficult for the staff to maintain SA. This was not a problem during MC02. The SJFHQ members joined the JTF HQ with SA and situational understanding. They understood the Combatant Commander's TEP and all approved plans related to the JTF mission. Integrated throughout the JTF staff, the SJFHQ members passed this knowledge and understanding to other JTF staff members. And the JTF staff continually updated assessments and made them available on the collaborative tools.

Command Group (CmdGrp) Composition.

Current Functions and Composition. The CmdGrp provides the JTF with four (4) personnel providing traditional C2 functions. Specific duties assigned to these billets may change depending on whether performing peacetime responsibilities, crisis planning, deployed during hostilities, or transition operations. Also resident in this group are the CJTF's personal staff (SJA, Chaplain, Surgeon, PAO, etc.) and support personnel (Aide, Driver, Security, Senior Enlisted Advisor). The size of the elements comprising the SJFHQ can be expanded through augmentation to match the intensity of operations. The full-time positions are Deputy Chief of Staff, Joint Operations Center (JOC) Chief, and two SJFHQ Administrative Support Coordinators.

Additional Skills, Knowledge, and Products. Respondents did not specifically indicate additions or deletions to this group. However, if ISG and/or KMG are eliminated and members are distributed to other groups, POCs for Intel and Knowledge Management can reside in this group. Additionally, there are numerous comments regarding the need for a Logistics Director and an IAC representative on the SJFHQ full-time staff. These persons also can be members of this group. The CmdGrp's mix and number of members are adequate and the group met the needs of the JTF.

Plans Group (PG) Composition.

Current Functions and Composition. The PG consists of seventeen (17) personnel. The purpose of the group is to provide the CJTF with a more integrated approach to the effects-based planning focused in future operations. It also forms the basis for an expanded, interactive Joint Planning Center (JPC), linked through the collaboration network to conduct operational

planning. The PG informs and advises the commander, and plans, directs, and integrates intelligence. It extracts meaningful information from the intelligence, leads the collaborative development of operational plans based on that information, and directs the execution of the commander's decision through an Effects Task Order (ETO). The PG can be used as augmentation to a Service or other headquarters designated to perform the JTF functions, during crisis response planning and execution to provide continuity in pre-crisis planning, situational understanding, and effects-based planning.

The 17 full-time Plans positions:

- **Plans Director**
- **Intel Analysts (2)**
- **Planners (5)**
- **Logistics Coordinator**
- **Logistics Deployment Planner**
- **Logistics Sustainment Planner**
- **Blue/Red Planner (2)**
- **Political/Military Planner**
- **Civil Affairs Planner**

Additional Skills, Knowledge, and Products. The mix and number of members in the PG need minor refinement. Noted comments calling for additions and deletions to the SJFHQ are listed below:

[SME/SJFHQ/Participant] Add Personnel Planner

[Participant] The group structure is about right; add Provost Marshal (PM) expertise—EPW planning/movement; add some IO planners; add Fires planners

[SME/SJFHQ/Participant] Add Medical Planner

[SME/participant/SJFHQ] Add Engineer Planner

[SME/SJFHQ/Participant] Add IO (remove from ISG)

[SJFHQ] Add ONA and SOSA (delete from ISG)

[SME] Add Force Protection Planner or TMD Planner (need one of each not one dual-hatted)

[SME/SJFHQ/Participant] Add deployment JOPES planner with sealift and airlift expertise

[SJFHQ/Senior Mentor] Add civilian POL/MIL with IAC experience

[SME] Add a coordinated (with National level agencies) POL/MIL Plan

[SJFHQ] Add a virtual (no personnel additions) J35 cell to handle the PG hand-off to OpsGrp

[Participant] Add more Future Ops capability

[SJFHQ] Add second STO Planner

[SJFHQ] Add Comms Planner

The analysis regarding the JTF Challenge, **Time-Phased Force Deployment Data (TPFDD), Plan Forecasting, and Scheduling Strategic Airlift (STRATLIFT),** provided in the MC02 Baseline Report states, "This is a constant theme. Primarily it is a training and leadership development issue. There is a lack of understanding by senior leaders that the prioritization of the flowing of assets into the joint operations area (JOA) must be accomplished by operations personnel to ensure that the right things show up at the right time. Without the prioritization, accomplishing the commander's intent and supporting the sequencing of the operation may be impossible. Lack of understanding of the Joint Operations Planning and Execution System (JOPES) leads senior personnel to shy away from total involvement in the process." The SJFHQ attempted to address this challenge by including deployment and sustainment members in the PG and transportation and sustainment members in the OpsGrp. However, deployment had similar problems during MC02—not enough deployment planners, with JOPES/TPFDD knowledge and experience; not enough involvement from planners and operators in the deployment process; and

not enough integration of deployment planners in the COA development. Also, the UJTL baseline report information regarding the subtask, **Project Future Campaigns and Major Operations (OP 5.2.3)**, indicates some past JTFs did not elect to form a J-35 future operations section, and JTF SOPs did not specify how functions associated with future operations were to be accomplished or what staff section was responsible. The MC02 JSOP clarifies the methodology to be used to accomplish these functions and establishes responsibility for future operations. However, the JTF did not establish a future operations cell until late in the experiment, after the noticeable disconnects with the PG's handoff to the OpsGrp. JTF future operations was identified as a problem during MC02.

Operations Group (OpsGrp) Composition.

Current Functions and Composition. The OpsGrp consists of fourteen (14) assigned personnel who support current operations activities for the CJTF. Additionally, the OpsGrp assists the ISG to develop the ONA of Combatant Commander-designated areas as part of their day-to-day 'in garrison" or pre-crisis activities. Once a contingency or crisis begins to develop, the OpsGrp, as part of the SJFHQ, focuses their efforts on the crisis. As an augmentation to an exiting operational headquarters, that forms the JTF, the OpsGrp provides continuity in pre-crisis planning and situational understanding, and effects-based planning. Within the JTF, the OpsGrp's primary responsibilities in the Joint Operations Center (JOC) are to distribute the Commander's guidance and intent, and monitor the execution of the current operations. When necessary, the OpsGrp revises or directs changes to an existing ETO based on the situation, through issuance of changes to that ETO.

The 14 full-time OPS positions:

- **Operations Director**
- **Current Intel Integrator**
- **Intel, Surveillance, and Reconnaissance (ISR) Operations**
- **Land Operations (2)**
- **Maritime Operations (2)**
- **Aerospace Operations (2)**
- **Special Operations Force (SOF) Operations (2)**
- **Information Operations Officer**
- **Deployment**

Additional Skills, Knowledge, and Products. The mix and number of members in the OpsGrp are about right—need minor refinement. Noted comments calling for additions and deletions to the SJFHQ are listed below:

[SME/SJFHQ/Participant] Add Fires

[SJFHQ/Participant] Add a virtual (no personnel additions) J35 cell to handle the PG hand-off to OpsGrp

[SJFHQ] Add second ISR OPS

[SME/SJFHQ] Add IO [from ISG]

[Participant] Add NBC expertise

[Participant] Add Space OPS expertise

[SME] Add METOC Officer (Weather Officer)

[SJFHQ] Add SOF LNOs during pre-hostilities

[SME] Delete Air Ops and Ground Ops (wasted talent in these less demanding positions)

The 13 full-time ISG positions:

- **Info Superiority Coordinator**
- **ISR Collection Planner**
- **Intel Supervisor**
- **Situational Awareness Analyst**
- **Assessment Analyst**
- **Assessment Planner**
- **IO Supervisor**

Information Superiority Group (ISG) Composition.

Current Functions and Composition. The ISG consists of thirteen (13) personnel and is responsible for the coordination of activities that contribute to building

information and knowledge superiority within the JTF, enabling decision-making superiority. The ISG conducts an initial assessment of the information environment and our ability to achieve and maintain information superiority. Based on this assessment, the ISG designs an information superiority campaign plan in collaboration with the JTF staff. The desired outcome of the IS campaign is to create an imbalance of knowledge in our favor, in order to understand the adversary while denying him the ability to gather and exploit information on friendly forces. The ISG consists of an intel cell and an IO cell. The intel cell maintains situational awareness for the CJTF, conducts effects assessment, prepares and maintains the ONA, and determines collection requirements. The IO cell prepares the overall IO plan and integrates IO capabilities into the ETO process. The ISG will normally be used as a plug into a service or other headquarters designed to form a JTF, as well as, augment the J2 staff with the ISG pre-crisis understanding of the crisis area.

Additional Skills, Knowledge, and Products. As noted above there is much support to eliminate the ISG and distribute members to the PG and OpsGrp. However, if the ISG is maintained in the SJFHQ organization several additions and deletions were noted by respondents. Noted comments calling for additions and deletions to the SJFHQ are listed below:

--[SME/Participant/SJFHQ] Delete IO—IO should be its own entity, not part of the ISG

--[SME] Delete IO (to OpsGrp); Delete EA (to JISE)

--[SME/] Add IO expertise in EW, PSYOP, OPSEC and deception

--[Participant] Add 2 for ISR Collection—total of 3 people—OIC, Planner, OPS; Delete SA Analyst; Change "Intel Supervisor" to "ISG Executive Officer (XO)"; Change "Info Superiority Concept Mentor" to "Deputy Director ISG"; Delete 3 of 5 IO Planners—only need 2 in ISG

--[SJFHQ] Add one ISR; all IS personnel should be put in ISG

--[SME/SJFHQ] Add EA

--[Participant] Delete EA Assessment Analyst

--[SJFHQ] Add SOSA billets

--[SJFHQ] Delete ONA and SOSA (add to PG)

--[SJFHQ] Add all of KM (if ISG remains)

--[Participant] Consolidate all intel functions under ISG

--[Participant] Enhance understanding of IO

Information/Knowledge Management Group (KMG) Composition.

Current Functions and Composition. The KMG consists of seven (7) personnel who provide knowledge management and technical support to JTF planning and execution. Three (3) of the 7 are technically oriented and serve as both the network planning/control section and the technical support section, ensuring that the SJFHQ has the connectivity and systems availability necessary to support operations. The remaining four (4) are Knowledge Management Officers (KMOs) who support the SJFHQ by facilitating the dynamic creation, discovery, manipulation, and provision of the right information, to the right people, at the right time, in the right format. This group may be used as either augmentees or as a plug to an existing operational headquarters.

The 7 full-time KMG positions:
- **Knowledge Mgmt Coordinator**
- **Knowledge Mgmt Officer (3)**
- **Joint Network Control Officer**
- **Support Technicians (2)**

Additional Skills, Knowledge, and Products. The mix and number of members in the KMG need refinement. As structured the group did not meet the needs of the JTF in the area of

knowledge management—need more KMOs (operator types not IT) to manage knowledge. Noted comments calling for additions and deletions to the SJFHQ are listed below:

--[SJFHQ] Delete KM and merge with ISG

--[SME/SJFHQ] Add KMOs

--[SJFHQ/Participant] Add more technical/comms/automation support positions

--[SME] Need in-depth Knowledge Information Management Plan (KIMP) in JSOP and KM TTPs

The UJTL baseline report information regarding the subtask, **Communicate Operational Information (OP 5.1.1)**, indicates the joint forces experience some difficulty managing information. The SJFHQ's KMOs and support technicians placed across the JTF staff, directly address this issue. Also the KIMP, located in the JSOP, should provide the who, what, when, where, why, and how to manage information. The keys to this solution are ensuring the right mix of operators and technicians are available, the number of operators and technicians is sufficient for each staff group, and the KIMP is incorporated in the JSOP with sufficient details.

Others. This paragraph includes noted skills, knowledge, and products that are relevant across all groups or relevant to a SptGrp, if a SptGrp is added to the SJFHQ organization.

--[Participant] Change name—should not be called a headquarters

--[Participant] Ensure Senior SJFHQ member is the Joint CoS or Deputy CJTF

--[SME/Participant] Ensure SOP clearly defines the roles, functions, membership, leadership and POCs, and relationships of each group and each BCCWG; provides a KIMP and the CIE structure with business rules; and establishes TTPs

--[SME/Participant/SJFHQ] Add Logistics Director (SptGrp)

--[SME/Participant/SJFHQ] Ensure all SJFHQ members have reachback to CC staff, IAC, COE, and other external agencies

--[Participant] Provide SJFHQ LNOs to Components

--[SME] Create government positions (GS) to provide continuity and to affect habitual relationships

--[Participant] Include fewer civilians and more military

--[Participant] Ensure the COP has current Blue and Red ground, air, naval graphics in near real time

--[Participant] Create format for products, database for managing data, and processes/agenda for BCCWGs—put on CD

--[Participant] Replace or upgrade ADOCS

--[SJFHQ] Include a deployable set of communications equipment

OTHER OBSERVATIONS AND FINDINGS

- Change the name of SJFHQ from "Standing Joint Force Headquarters" to "Standing Joint Force Command and Control Element."

- Maintain the current SJFHQ organization—Command Group, Plans Group, Operations Group, Information Superiority Group, and Knowledge Management Group.

- Further study to investigate the substantial concerns that suggest dissolving the ISG and KMG into the PG and OpsGrp. Clearly define IS and KM responsibilities, and refine the SOP/TTP to reflect revisions.

- Further study to investigate the establishment of a Logistics/Support Group to coordinate, synchronize, and integrate logistics and other support functions in pre-crisis activities, planning, and operations. Keep logistics personnel in the PG and OpsGrp.

- Further study to investigate the establishment of an IO group or task force—Joint Information Operations Task Force at the Combatant Command level. Clearly define IO in the SOP, and educate DoD and external agencies.

- Add Fires Officer to OpsGrp—officer also provides fires expertise during planning.

- Add STRATLIFT, Personnel, and Engineer expertise to PG. Augmentees or LNOs, with expertise in other functional areas not resident in the SJFHQ, should be available no later than the beginning of the planning process—make extensive use of reach-back capabilities for pre-planning activities.

- Add, at least, an IAC LNO to the SJFHQ. The POL/MIL Planner in PG could perform this role if directly linked to JIACG at Combatant Command.

- Identify a virtual J35-like, Future Operations cell to coordinate and synchronize the PG hand-off to OpsGrp. Assign members from PG and OpsGrp.

- Add Senior SJFHQ member, flag officer, to command SJFHQ (CmdGrp). GO/FO can also fulfill Deputy CJTF or JTF CoS billet.

Finding 3:

The Boards, Cells, Centers, and Working Groups, envisioned by the SJFHQ concept, provided a suitable structure to JTF staff for C2 of the joint force.

The SJFHQ Concept defines BCCWGs as listed below:

Boards. Formal, non-standing organizations with designated membership that meet as required to conduct their business. Boards provide input to Centers and the CJTF.

Cells. Formal, non-standing, functionally oriented organizations that meet on a regular basis to provide input to Boards and Centers.

Centers. Formal, standing organizations that meet and conduct major planning or operations business with the JTF Headquarters on a regular basis. Once established, Centers normally operate on a 24-hour basis.

Working Groups. Informal, non-standing, mission-tailored organizations for a specific event or action. Working Groups provide input to Centers, Boards and Cells.

The JTF staff, SJFHQ members, Component Commanders' staffs, SMEs, and Senior Mentors/Concept Developers provided data that addressed the BCCWGs. Members of individual BCCWGs were asked to rate "Adequacy of the Interval at which that BCCWG convened," "Adequacy of the Mix of experiences and competencies possessed by the members of that BCCWG," and "Sufficiency of the Number of persons assigned to that BCCWGs." Participants throughout the JTF were asked to rate each BCCWG as to how it met the needs of the JTF. Respondents were asked also to provide changes to BCCWGs, to note if any BCCWGs should be added or deleted, and to rate the effect of BCCWGs on JTF Operations and JTF Headquarters interaction with Component and Combatant Commander staffs. Respondents completed survey

questions posed during Spiral 3 and Execution, and representatives from all, except Senior Mentors, participated in a Post-Execution Working Group session. Analysts interviewed Senior Mentors and key JTF staff members, to include the Group Directors, during and post Execution. Analysts also observed all After-Action Reviews and In-Focus sessions, and reviewed Senior Mentor Notes for relevant comments.

General Statement. The BCCWGs used during MC02 and discussed below are the same organizations which the SJFHQ uses when it operates as a JTF. These BCCWGs provide a starting point for JTF Headquarters mission-tailoring based on actual requirements and CJTF desires. The actual membership and mission of the BCCWGs are determined by JTF Headquarters. Each BCCWG is discussed separately. Those BCCWGs, recommended to be added to or deleted from the SJFHQ structure are discussed in the "BCCWG Additions and Deletions" paragraph near the end of the analysis for this finding. Before discussing the BCCWGs individually, the questions to be answered are "Did the BCCWGs enhance JTF Operations?" and "Did the BCCWGs enhance JTF Headquarters interaction with Component and Combatant Commander staffs?"

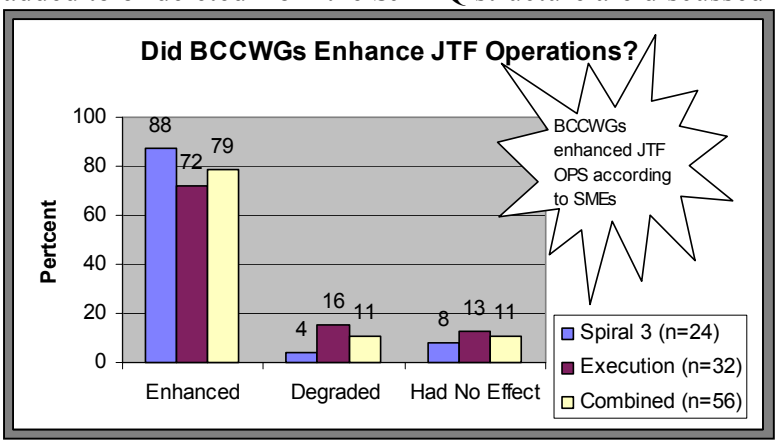


Figure 76: BCCWG effect on JTF operations

Did BCCWGs enhance JTF Operations? According to SMEs (79%) BCCWGs enhanced JTF Operations. SMEs indicated that BCCWGs facilitated improved SA and understanding for all participants, helped to prevent staff section stovepipes, and enhanced horizontal and vertical communications for Combatant Commander, JTF, and Component staffs. BCCWGs ensured good cross-staff integration. One SME stated, "Definitely enhanced [JTF OPS] but a majority of time there were constant meetings that could have taken away from ability to conducting detailed analysis by planners (especially in the EAC)." Another SME added, "Much higher SA than normal, faster flow of information and knowledge throughout the force. This of course was greatly aided by the CIE." However, one SME indicated that the lack of structure and length of time of BCCWG virtual sessions degraded the process.

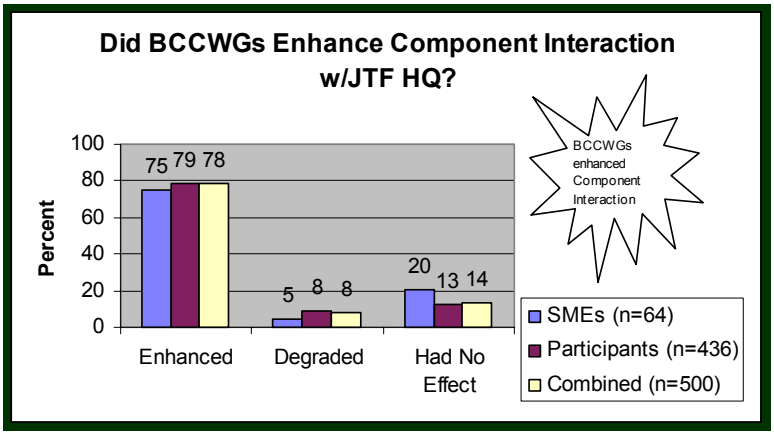


Figure 77: BCCWG effect on Component interaction

Did BCCWGs enhance Component Staff interaction with JTF Headquarters? SMEs and participants (78%) indicated that the BCCWGs enhanced

Component interaction with the JTF Headquarters. Several SMEs stated that the BCCWGs were beneficial and greatly enhanced Component SA; however, they affected the battle rhythm of the Components by not allowing them enough time to conduct internal planning. One SME added, "Great horizontal and vertical collaboration. Components were involved in all elements SIMULTANEOUSLY." Participants stated that the BCCWGs are great and necessary to effectively execute, and they allowed a better understanding of the CJTF's priorities—no guessing required. One participant indicated, "Future chiefs of staff will need to regulate who goes to meetings in a more rigid fashion; while it's all well and good to have 500 guys listening to the CO, you have to have somebody minding the store." Another participant stated, "Due to the ability to collaborate and get near real time data to all levels of command (everyone sees the same picture), JTF was repeatedly involved in fighting at the tactical level. As a result, component planning was stifled, to some extent, based on JTF directed COAs."

The UJTL baseline report information regarding the subtask, **Acquire and Communicate Operational Level Information and Maintain Status (OP 5.1)**, indicates that BCCWGs place a heavy time demand on the JTF staff, in some cases becoming counterproductive and attendance at BCCWG sessions overwhelmed the staff in some cases. As described above similar problems were experienced during MC02. The JTF CoS needs to establish control measures and business rules for BCCWG sessions.

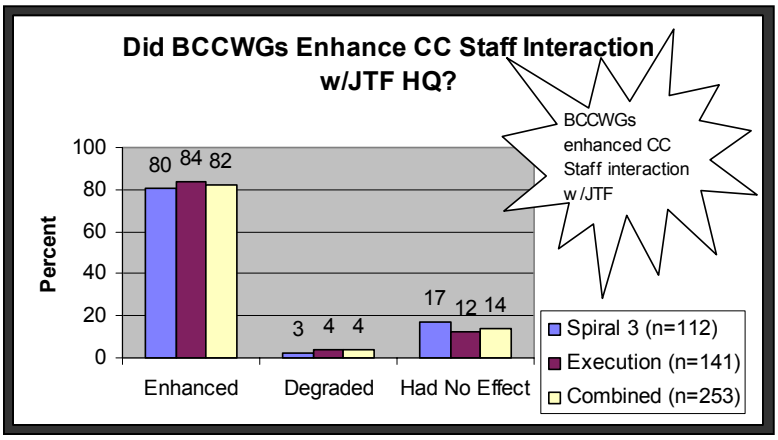


Figure 78: BCCWG effect on Combatant Commander interaction

Did BCCWGs enhance Combatant Commander Staff interaction with JTF Headquarters? Eighty-two percent (82%) of responding participants indicated that the BCCWGs enhanced Combatant Commander (CC) Staff interaction with the JTF Headquarters. Participants did not provide many comments because of the CC Staff experimental design. They noted that the concept has great potential but it was not fully explored because the experiment lacked full participation from the CC Staff. Only 7 of the 253 respondents were CC Staff members. A participant stated, "[BCCWGs] Allowed for concurrent and horizontal planning and rapid decisions." Another participant added, "Because of the CC staff design and the number of BCCWGs, some just had to be uncovered. While you can virtually be in multiple sessions, the ability to keep track is degraded."

The following sections provide analysis for each of the BCCWG prescribed by the SJFHQ concept. The format is the same for each and begins with a statement of that BCCWG's purpose, followed by the results for the interval, mix, number, and met JTF needs questions.

Blue/Red Cell (BRC).

Purpose. The BRC provides insight into the adversary's political and military objectives, and potential COA in response to real or perceived Blue actions or intentions. During execution of Blue COAs and effects, the cell helps assess the adversary's response to applied effects and tasks. Additionally, it identifies critical Blue vulnerabilities and potential operational miscues

that an adversary may exploit, and thus, use to ultimately frustrate the objectives and tenets of RDO.

Results.

Interval. The interval at which the cell convened was adequate. The BRC convened often internally and participated in numerous daily collaboration sessions. Participants and SMEs stated that the BRC met as required and because of the JTF OPTEMPO several members were continuously working inside larger boards, cells, and centers.

Mix. The mix of experiences and competencies was inadequate. The cell consisted of two SJFHQ members and two augmentees. The augmentees were an Army captain and Marine lieutenant with no experience. A SME stated, "The SJFHQ folks were ok, the two augmentees were not--junior officers with no experience....not the right folks." The two of the three participants who responded "Adequate," remarked that the augmentees had no experience and that more experience is better.

Number. There are questions regarding the number of people assigned to the cell. Four of the six respondents indicated that the number of BRC members was sufficient. One participant

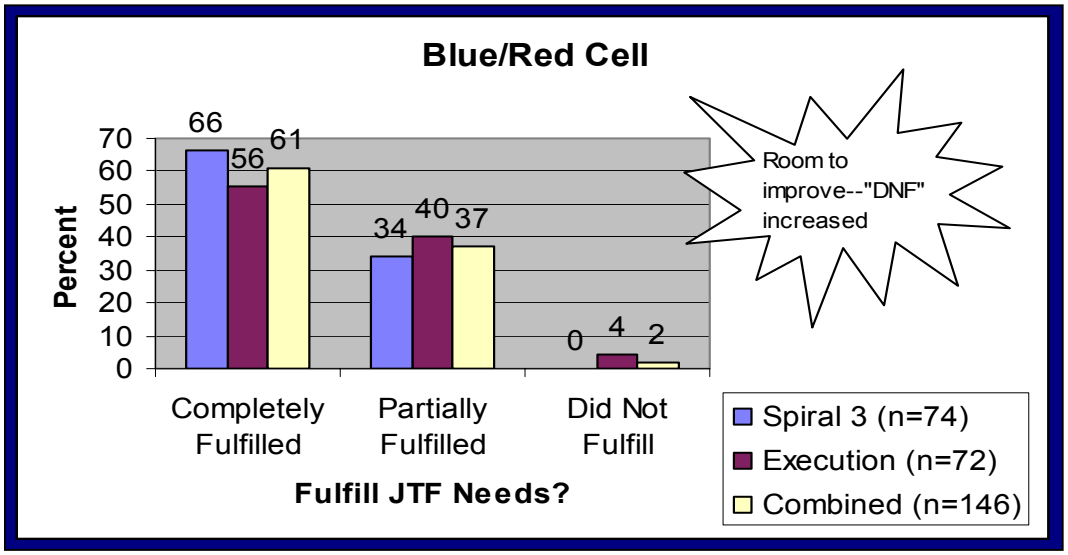


Figure 85: Blue/Red Cell met JTF needs

stated that the four members performed well and were able to cover the working groups, but only four might become a problem during 24-hour operations. Another participant remarked, "Four might be enough for short term, assuming the two augmentees have broad and significant experiences. Two company grade officers however motivated are a limiter to the potential this cell could have brought to this experiment."

Fulfilled JTF needs? Respondents indicated that the BRC fulfilled the JTF's needs better during Spiral 3 than during Execution. Four percent (4%) of responses during Execution were "Did Not Fulfill," whereas during Spiral 3 there were zero "Did Not Fulfill" responses. JTF OPTEMPO and the number and length of collaboration sessions are potential causes for the difference. Comments made during Spiral 3 include, "This is a critical cell and they did a great job," "Great job of representing an alternative view and making all think," and "One of the best things about the SJFHQ." During Execution, one participant stated, "This group seems to be duplicating the traditional intelligence function of providing possible Enemy Courses of Action. They may have fulfilled their mission, but I'm not sure that is a good thing." Another participant

remarked, "This cell (or the portion that relates to intel) needs to be under ISG. The dissection of this organization from the ISG caused disconnects." The right mix of experiences and competencies will improve the effectiveness of the BRC.

Effects Assessment Cell (EAC).

Purpose. The EAC conducts a fully integrated assessment process to effectively and in a timely manner assess critical effects at the strategic, operational, and tactical levels. The cell conducts an on-going assessment to determine if the desired effects occurred, their overall impact to the joint effort, and why the tactical action and/or applied capabilities fully achieved, partially achieved, or failed to achieve the desired effect.

Results.

Interval. The interval at which the cell convened was adequate. The EAC met formally twice a day—a morning session and an afternoon session. All respondents indicated that the interval at which the cell convened was adequate.

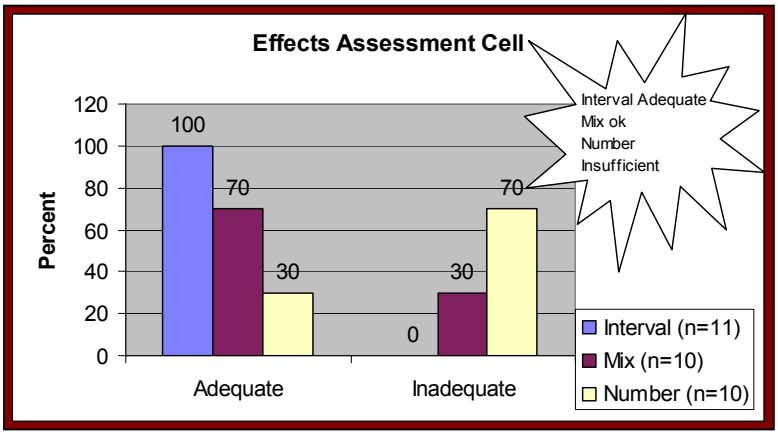


Figure 86: Effects Assessment Cell attributes

Mix. The mix of experiences and competencies was okay but not the best. The two SMEs and five of the eight participants indicated that there was a good mix of experiences and competencies. However, the SJFHQ members (participants) of the EAC indicated that the mix was inadequate. One SJFHQ member stated, "Need more ops/plans representation. Current cell membership is composed almost entirely of INTEL personnel, which limits the ability to determine operational impacts of assessment." Another SJFHQ member remarked, "We knew that this was going to be a problem. Component selection of EAC representatives was driven in part by their perspective that the EAC was an "intel thing." This perspective was in part based on the fact that the EAC was buried within the intel structure. In addition, given the complexities and operational significance associated with EAC decision-making and recommendations, the experience level of EAC representatives from the components and JTF JISE were frequently unable to provide operationally relevant perspectives within the construct of the EAC formal sessions. Efforts to improve this situation were basically unsuccessful."

Number. The number of EAC members was insufficient. Seven of the ten respondents indicated that the five members assigned to the EAC were insufficient to do the job correctly. Their comments include, "Double," "Probably could use two more personnel," and "Needed 2-3 more bodies—did not have time to coordinate much." A SME stated, "EAC's 5 members are insufficient in relation to the amount of SA needed and all the meetings they take part in. The two main players were from SJFHQ and they, non stop, attended one meeting after another on EA."

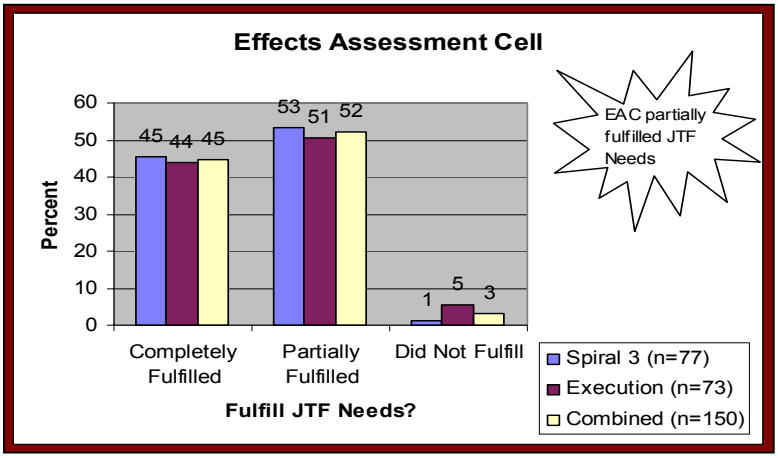


Figure 87: Effects Assessment Cell met JTF needs

Fulfilled JTF needs? The EAC partially fulfilled the JTF needs. Over 94% of respondents indicated that the EAC at least partially fulfilled the needs of the JTF. A SME stated, "Excellent job given the information they have to deal with. Components have passed little information during the EAC WG meetings… Lack of timely BDA inputs was a weak link in the EAC process. Never the less the EAC has been very proactive in pulling assessment from components, SOSA cell, and JISE. EAC has been very open to different perspectives and have held their ground even if their assessment would lead to a no-go for major operations." A participant remarked, "EAC was able to assess effects each day prior to the kickoff of the JPG and long before the JCB. This allowed daily planning efforts to reflect current assessments. The process was only hindered by the inaccuracy of CINC DISUM [Daily Intel Summary], which was necessary for assessment purposes." The EAC was not without problems, as noted by two participants: "My responsibilities as FUTURE planner were to look out 96 hours and beyond... effects assessment never got out that far," and "[EAC] Needs better BDA or we needlessly re-shoot targets." Additional people, more participation from Operators and Planners, and better BDA will improve the effectiveness of the EAC.

Information Operations Cell (IOC).

Purpose. The IO Cell is primarily responsible for the development of an IO plan and associated IO synchronization matrix, IO inputs to the ETO, and execution monitoring.

Results.

Interval. The interval at which the cell convened was adequate. Eighty-three percent (83%) of respondents indicated that the interval at which the IOC convened was adequate. The cell met formally once daily. It was constantly manned and provided immediate adequate coverage.

Mix. The mix of experiences and competencies was inadequate. Over 40% of respondents indicated that the mix was inadequate and only "Inadequate" comments were provided. The requested mix of people was not provided. The cell needed more specialists and generalists, according to a SJFHQ member of the cell. A participant stated, "We had one EW expert and one Psyop expert, one junior Navy crypto type - the two SJFHQ personnel had a good mixture of background but the rest of the team had little experience in the general field of IO -- a larger problem than the experiment." Another SJFHQ member of the cell remarked, "Mix is good. Unfortunately, the mix was not provided by the people providing OPS personnel. Most people placed into the IO cell had no, I say again, NO IO experience."

Number. The number of members in the IOC was insufficient. Fifty percent (50%) of the respondents indicated that the number of members in the cell was inadequate. The IOC needs more people with IO expertise to meet the demands of the cell. A SME stated, "Due to the heavy

tasking of this cell, I recommend increasing its size. Key areas needed are MMIC team leader (now filled by PSYOP Planner), PA (now on loan from PAO), Deception, and an additional IW planner. Also suggest an imbedded intel analyst and a KM person with IO experience."

Fulfilled JTF needs? The IOC partially fulfilled the JTF needs. Problem areas identified are:

- IO was not well integrated in planning
- IO was not integrated with special technical operations
- IO lacked the necessary tools to track Component actions
- IO needed more trained and experienced IO planners
- IO was not able to determine assessment of IO effects on nodes due to ISR and/or white cell limitations.

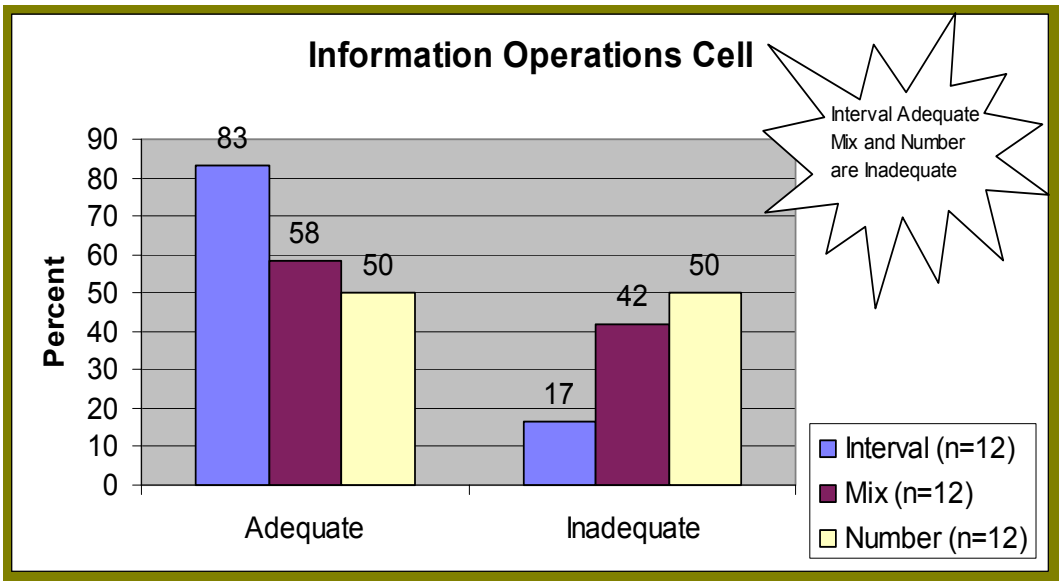


Figure 88: Information Operations Cell attributes

A participant made the following comment. "A cell that worked unto itself and did not have visibility with the JPC where it should be integrating their process, a particular area that needs to continue to be integrated into the planning process - it's not there yet." There was noticeable improvement as the experiment progressed from Spiral 3 through Execution. Fulfillment of JTF needs (combined Completely and Partially) increased from 85% during Spiral 3 to 94% during Execution.

The UJTL baseline report information regarding the subtask, **Coordinate Operational Information Operations (OP 5.6)**, indicates the ability of the JTF IOC to support operational planning is impaired. There were not enough trained and experienced IO personnel. As described above the IOC had similar problems plus others during MC02. IO needs more definition, refinement, resources, and command emphasis to enhance effectiveness.

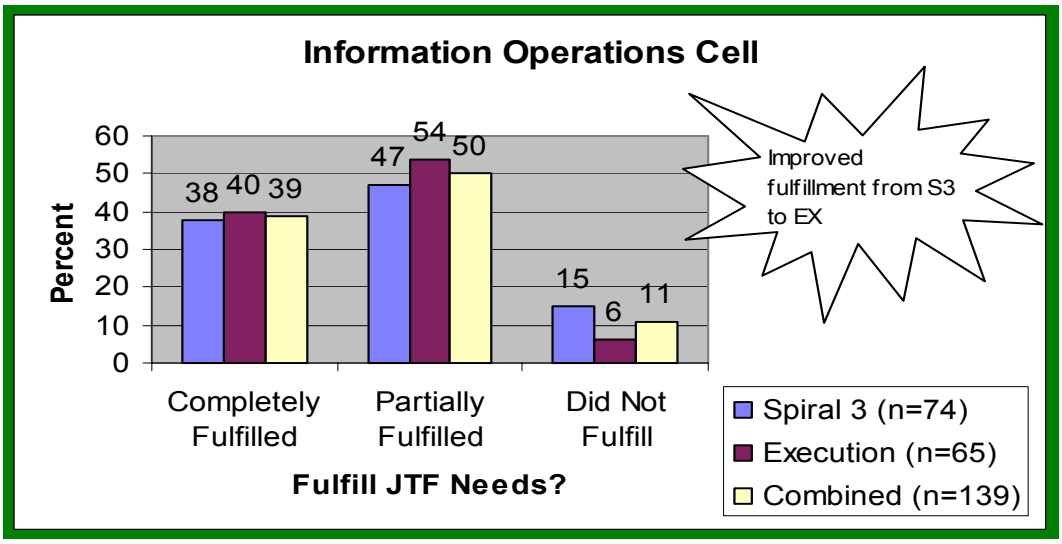


Figure 89: Information Operations Cell met JTF needs

Joint Coordination Board (JCB).

Purpose. The JCB is established at the discretion of the commander using internal assets and is tasked to perform broad oversight functions. It is a joint virtual decision support network composed of subordinate commanders and principal staff from the JTF Headquarters, Combatant Commander's staff, IAC/COE, components, and other agencies designated by the commander. The board ensures that the commander's intent is accurately translated into desired effects to meet the commander's concept of operations. It links effects to the overall objectives. The JCB's oversight encompasses all component operations and on-going joint operations. The board provides the commander's guidance and priorities to the JPC for future operations planning and to the JOC for current operations execution. Products include COA recommendations, Joint Prioritized Effects List, Guidance and Apportionment Priorities, and Battlespace Coordination Measures as required.

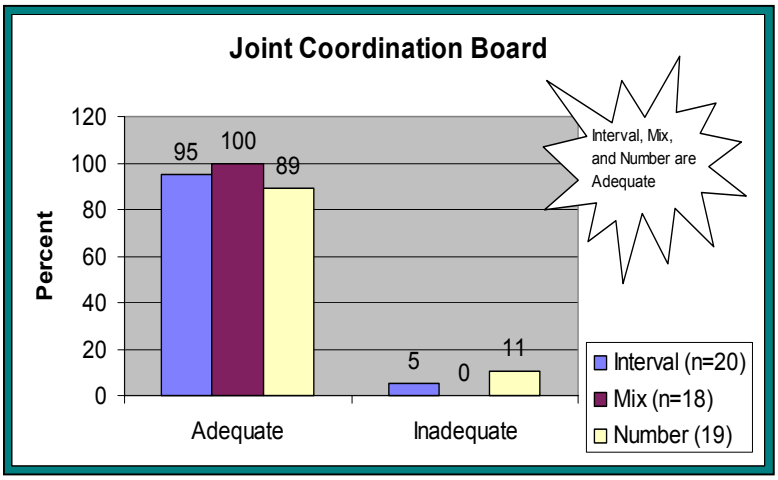


Figure 90: JCB attributes

Results.

Interval. The interval at which the board convened was adequate. Ninety-five percent (95%) of respondents indicated that the interval at which the JCB convened was adequate. The board met once daily and additionally at the direction of the CJTF.

Mix. The mix of experiences and competencies was adequate. All respondents indicated that the mix was adequate. A participant noted that in fact the mix and number are unlimited when the board is conducted on IWS and most staff members are listening. Expertise can be added for any session from any location if IWS is available.

Number. The number of members was sufficient. Eighty-nine percent (89%) of respondents indicated that the number of JCB members was sufficient. Again, on IWS the number is unlimited. The number of members can increase or decrease as the situation dictates. A SME noted that the number of Component members was insufficient.

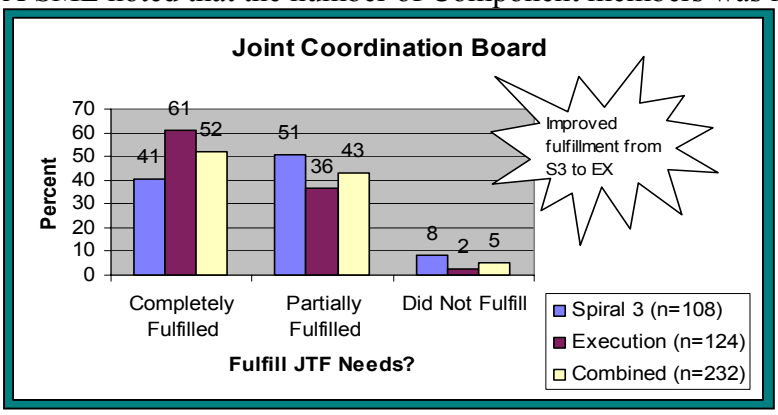


Figure 86: JCB met JTF needs

Fulfilled JTF needs? The JCB fulfilled the needs of the JTF. Fulfillment of JTF needs increased from Spiral 3 through Execution. Ninety-two percent (98%) of Execution respondents indicated that the JCB at least "Partially Fulfilled" the JTF needs, up from 92% during Spiral 3. "Completely Fulfilled" responses jumped 20% from Spiral 3 through Execution. Most comments were attached to "Partially Fulfilled" responses and were not so glowing. Recurring comments from respondents were that the JCB was useful but too long and that it never seemed to proceed as designed—most often turned into a second Commander's Update. A participant stated, "The JCB was an evolving process and was directly related to the comfort level of the Operation. As the JTF Commander became more comfortable with the different aspects of the operations the JCB began to become much more effects focused. The JCB was definitely necessary, serving as both a great collaborative tool as well as a course check for the JTF." Another participant noted, "[I] Never saw the synchronization of JISR assets with Attack assets as they related to the Effects and Effects Assessment." A SJFHQ member indicted that it seemed to satisfy the commander; however, it did not accomplish the intended purpose regarding the fires and targeting portions of the operation. And finally, a SME remarked, "[JCB] Could have been better if they had some predictive analysis of what the enemy would be doing beyond 72 hours. I [am] not sure cutting out the J2 and J4 is a good thing. IWS is great."

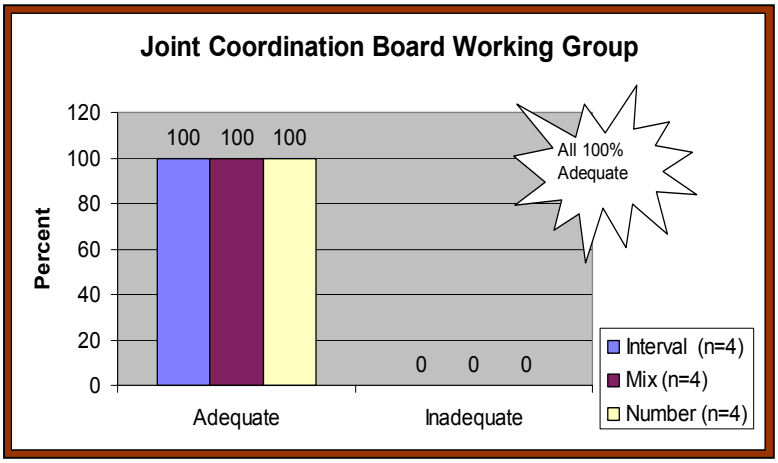


Figure 87: JCB Working Group attributes

Joint Coordination Board Working Group (JCBWG).

Purpose. The JCBWG provides the input to support the JCB. It coordinates activities of JTF cells and working groups, and reviews staff and component products and presentations for integration. This working group resolves or documents conflicts for JCB presentation.

Results.

Interval. The interval at which the working group convened was adequate. All respondents indicated that the interval at which the JCBWG convened was adequate. The working group met once daily to prepare for the JCB during which the group was able to synchronize products and react to emerging issues before they reached the CJTF level.

Mix. The mix of experiences and competencies was adequate. All respondents indicated that the JCBWG's mix of experiences and competencies was adequate. The core and supporting members provided the necessary expertise for the group to fulfill its responsibilities. IWS allowed the group director to tailor the mix as the situation required.

Number. The number of members was sufficient. One hundred percent (100%) of responses are "Sufficient." The number of core and supporting members was sufficient for the group to meet the JTF's needs.

Fulfilled JTF's needs? The JCBWG fulfilled the needs of the JTF. Fulfillment of JTF needs increased from Spiral 3 to Execution. There was a significant improvement in "Completely Fulfilled" responses from Spiral 3 through Execution, from 42% to 61%. Only three percent (3%) of the respondents, during Execution, indicated that the JCBWG "Did Not Fulfill" the JTF needs—down from 8% during Spiral 3. The prevalent comment regarding the JCBWG was that it was a slide rehearsal for the JCB and a huge time drain for many people—not really a working group. One participant noted, "[The JCBWG] Spent too many sessions fine-tuning presentation format and not synchronizing the combat power being discussed. Need to get into warfighting issues here to better prepare for the JCB." Another participant stated, "This group needs greater authority to make decisions and streamline the extremely long briefs to the CG. Too many people watch the JCB to permit the tremendous amount of excess time spent on less than essential issues in the JCB."

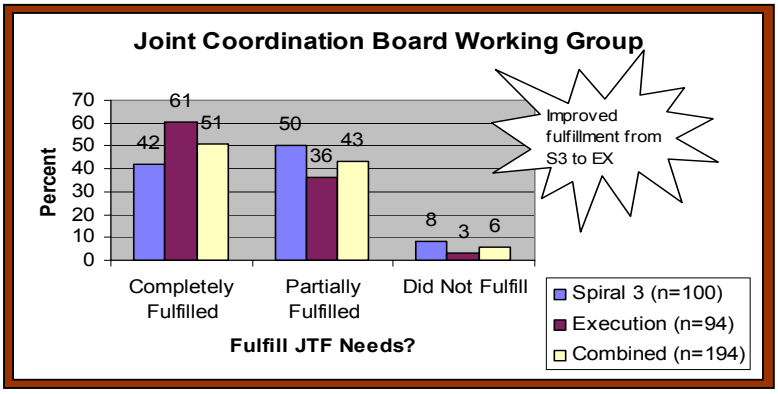


Figure 88: JCB Working Group met JTF needs

Joint Collection Management Cell (JCMC).

Purpose. The JCMC identifies, prioritizes, and coordinates collection requirements to support ONA, Effects Assessment and Effects-based Planning and Operations. The JCMC assigns responsibilities and synchronizes collection tasking to efficiently and effectively support all aspects of Effects-based Planning and Operations, including the ETO.

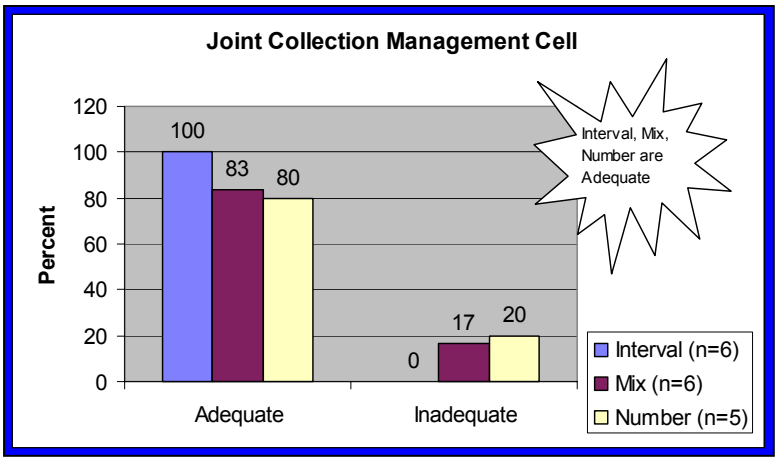
Results.

Interval. The interval at which the cell convened was adequate. All respondents indicated that the interval at which the JCMC convened was adequate. The cell met formally once per 12-hour shift. Internal meetings occurred three times per 12-hour shift.

Mix. The mix of experiences and competencies was adequate. Eighty-three percent (83%) of respondents indicated that the JCMC's mix of experiences and competencies was adequate. The cell had a good mix of Army and Air Force skill sets and required full-time collection managers. A participant noted, "Good range of experiences...I think an argument could be made to have the cell headed by an O-5. This would be generally senior to most

Figure 89: Joint Collection Management Cell attributes

component ISR reps (and ensure cooperation, responsiveness), but junior to their "2" rep to the ISG. Additionally, would suggest thought be given to providing an O-4 rep from each service to help inform/guide the JCMC and its JTF leadership regarding JTF collection planning efforts." A SME stated that some of the Component collection managers were not full-time collection managers but were assisted by the JISE and other members of the cell. Another participant indicated, "A lead/supervisor, a planner (w/plans) and a JTF collection manager fielding collection management issues are absolutely required."



Number. The number of members was sufficient. Eighty percent (80%) of respondents indicated that the numbers of members in the JCMC was sufficient. Again, respondents emphasized the requirement for full-time collection managers to ensure sufficient people are available to fulfill the cell's responsibilities.

Fulfilled JTF needs? The JCMC fulfilled the JTF needs much better during Execution than during Spiral 3. There was a significant increase in the percent of "Completely Fulfilled" and "Partially Fulfilled" responses from Spiral 3 through Execution, from 77% to 96%. A SME stated, "[The] JTF was provided with continuous, timely intelligence collection that met the standing requirements and quickly adjusted to emergent requirements levied by the CJTF." However, participants noted integration problems. One participant remarked, "Not completely integrated into what JTF and components needed based on the ETO." And another participant stated that the cell was not integrated well with Plans. After a rough start the JCMC improved effectiveness to meet the needs of the JTF.

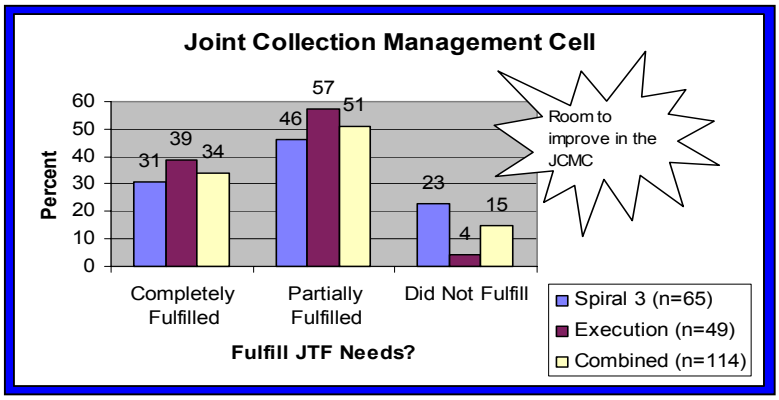


Figure 90: Joint Collection Mgmt cell met JTF needs

Joint Fires Element Working Group (JFEWG).

Purpose. The JFEWG provides the input to support the Joint Fires Element. It is a virtual network of JTF, Component, and reach-back SMEs responsible for developing priority effects list targeting guidance, selecting ONA-derived critical nodes and vulnerabilities, and priority target list oversight.

Results.

Interval. The interval at which the JFEWG convened was adequate. Eighty-two percent (82%) of respondents indicated that the interval at which the JFEWG convened was adequate. The JFEWG convened twice a day, after the Commander's Update and after the JCB. The interval was adequate but the timing affected participation by the Components. Because of lengthy Commander's Updates and JCBs, the JFEWG rarely started on time. A SME stated that the JFEWG could be conducted once a day, which will allow more time for staff to work.

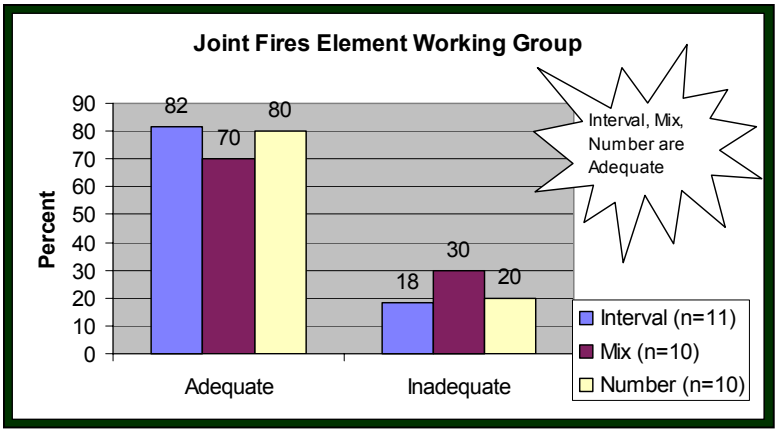


Figure 91: Joint Fires Element Working Group attributes

Mix. The mix of experiences and competencies was okay but not the best. Seventy percent (70%) of respondents indicated that the mix of experiences and competencies was adequate. The requested mix was about right but the JFEWG experienced attendance problems and lacked adequate representation from Components. One participant stated, "The mix of experiences was about right, unfortunately ensuring all those folks showed up for the session was "hit and miss."" Another participant remarked, "[The JFEWG] Often did not have the proper representation from the components. Members from the components MUST be able to discuss strategy, targeting, and ops issues. If a single element from a component cannot provide views and positions for the component, then other reps must also participate in all sessions."

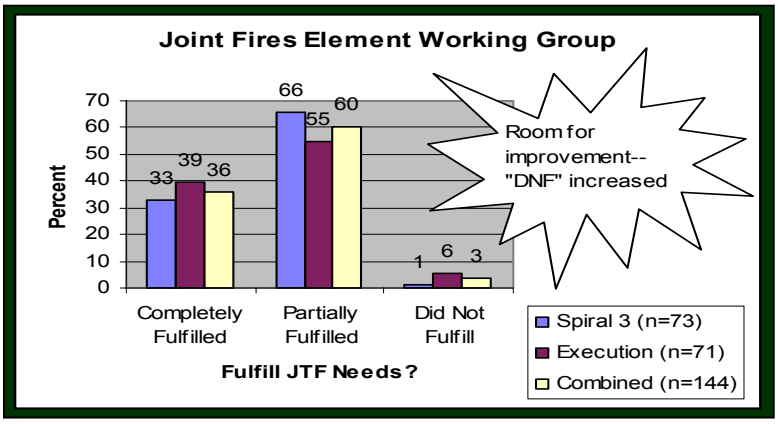


Figure 92: Joint Fires Element WG met JTF needs

Number. The number of members was sufficient. Eighty percent (80%) of respondents indicated that the number of JFEWG members was sufficient. The number of participants was sufficient despite competing requirements. It also was dependent on the issues being worked and how many people the Components could afford to attend. A participant noted that the number was not as important as the ability to contribute and represent Component or organization.

Fulfilled JTF needs? Fulfillment of JTF needs decreased from Spiral 3 to Execution. Six percent (6%) of the respondents, during Execution, indicated that the JFEWG "Did Not Fulfill" the JTF needs—up from 1% during Spiral 3. The recurring comment was that the JFEWG spent too much time collaborating and not enough time on products. A SJFHQ member (participant) stated, "JFEWG was supposed to reorganize nodes based on changes in effects priorities and nodes that had been hit and issue a new 3 paragraph PEL daily. The WG turned into a target organizer and never issued another PEL that updated node priorities." Component representation

also hindered the effectiveness of the JFEWG. Another participant noted, "The JFE at the JTF headquarters was well balanced with the right mix of military experience. However, component membership in the JFE working group was inadequate. JFACC was represented primarily by targeteers. JFACC Strategists eventually began to sit in periodically, but not every session. Also, they rarely had an operations rep. This frequently prevented the group from coordinating or resolving a variety of issues. We repeatedly requested that the Components ensured that there was a lead representative present who could either work the issues or quickly bring in the person who could." With the right mix and participants from Components and better synchronization of sessions, the JFEWG could improve its ability to meet the needs of the JTF.

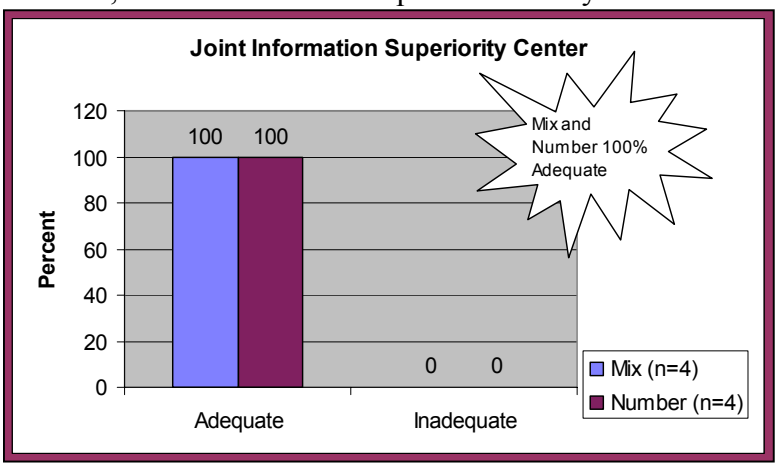


Figure 93: Joint Info Superiority Center attributes

Joint Information Superiority Cell (JISC).

Purpose. The JISC integrates intelligence, information operations, and information systems activities and deconflicts competing requirements. It identifies and synchronizes information superiority tasks for the ETO.

Results.

Interval. The JISC is a center, which means that once it is established it normally operates on a 24-hour basis—hence there is no reference to the interval at which it was convened.

Mix. The mix of experiences and competencies was adequate according to the four respondents. The mix of core and supporting members is adequate to fulfill the JISC responsibilities.

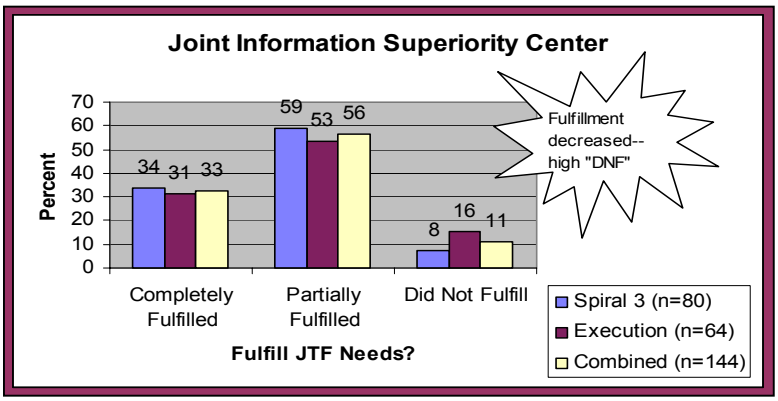


Figure 94: Joint Info Superiority Center met JTF needs

Number. The number of members was sufficient. The four respondents—three participants and one SME—indicated that the number of JISC members was sufficient. The core and supporting members provide a sufficient number of members to meet the needs of the JTF.

Fulfilled JTF needs? The JISC did not fulfill the needs of the JTF. Not only did the fulfillment of JTF needs decrease from Spiral 3 (93%) to Execution (84%), sixteen percent (16%) of respondents indicated that the JISC "Did Not Fulfill" JTF needs. This is the highest "Did Not Fulfill" rating, during Execution, across all BCCWGs. There were problems with IO issues, synchronization, integration, and unity of effort for the intelligence functional area. One participant stated, "This venue was wholly inadequate for IO. In general, IO RFIs were ignored, not understood and never actioned in my experience

until I prodded the JISC for action. This venue was almost exclusively ISR focused." Another participant noted, "[JISC] Not integrated with IO and Intel. Maybe these shouldn't be grouped together. They really have enough different in their basic functions to require IO and Intel as separate groups, or work to find a way to better integrate all of IO and Intel into the same group." "This group failed to ensure unity of command/effort for the intelligence functional area vice the J2," remarked another participant. The one positive comment, regarding the JISC, provided by respondents during Execution states, "The Intel Watch was created to fulfill the OPS Intel function - and it was a huge success story. The JISC became the detailed research and analysis forum. Our experience strongly suggests you need to separate these two functions based on the volume of information being shared and the differences in timeliness of the information." No "Completely Fulfilled" comments were provided. The synthesis of the responses and comments is similar to that of the ISG—respondents suggest that the JISC should be eliminated.

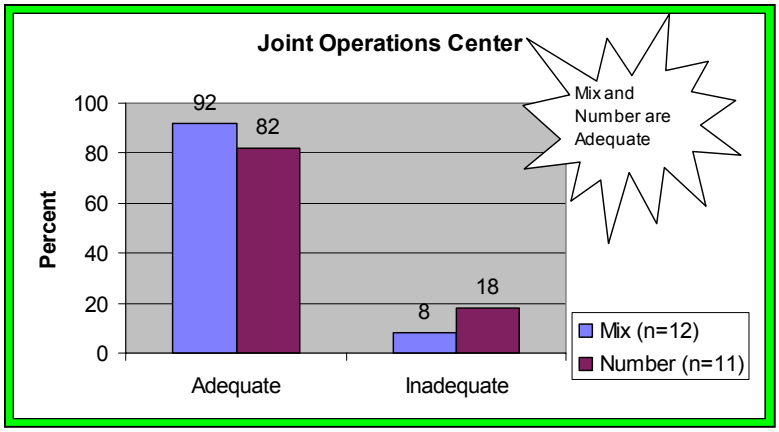


Figure 95: Joint Operations Center attributes

A good summary provided by a participant is, "The JISC was a poorly executed concept. It never pulled in all the various pieces or spoke with one voice—needs to be reworked."

Joint Operations Center (JOC).

Purpose. The JOC monitors the operations of the JTF. The JOC is the focal point for coordination and synchronization of the current operational matters, to include intelligence, assessment, execution, integration, and logistics. It is responsible for current status updates, dissemination of CJTF's guidance, assessments, ROE, and AARs. The JOC releases all ETOs for the JTF, and monitors and synchronizes the execution of all ETOs. The JOC is both a physical and virtual collaborative organization composed of operations representatives from the JTF Headquarters, Combatant Commander's staff, Component staffs, and other agencies functionally oriented to the JTF mission.

Results.

Interval. The JOC is a center, which means that once it is established it normally operates on a 24-hour basis—hence there is no reference to the interval at which it was convened.

Mix. The mix of experiences and competencies was adequate. Ninety-two percent (92%) of respondents indicated that the mix of experiences and competencies of the JOC was adequate. One participant suggested that a Medical Logistician and Preventive Medicine Officer be assigned to the Medical Section of the JOC. The mix of core and supporting members is adequate to fulfill the JOC's responsibilities.

Number. The number of members was sufficient. Eighty-two percent (82%) of respondents indicated that the number of JOC members is sufficient. Several respondents noted that there were too many members in some areas—Watch Officers, OPS Officers, LNOs, Lawyers. One participant stated, "Actually, functions should be handled by 50% fewer people—

exploiting collaborative tools and reachback should be able to achieve the same result." Considering 24-hour operations, the number of core and supporting members is about right. JTF will add and delete based on requirements.

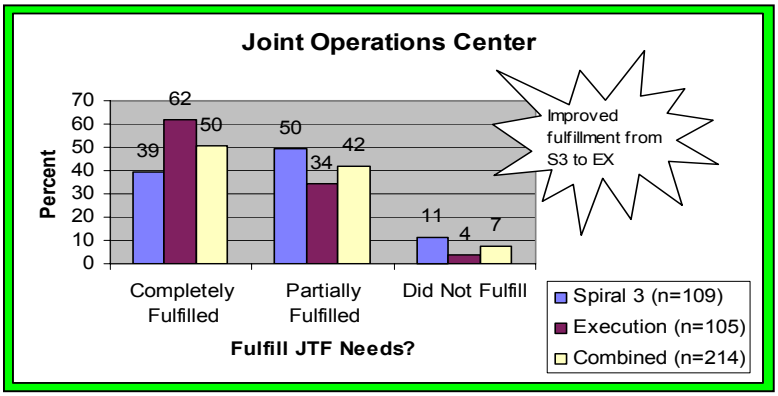


Figure 96: Joint Operations Center met JTF needs

Fulfilled JTF needs? There was a significant improvement in fulfillment of JTF needs ("Completely Fulfilled") from Spiral 3 (39%) to Execution (62%). Only four percent (4%) of the respondents, during Execution, indicated that the JOC "Did Not Fulfill" the JTF needs—down from 11% during Spiral 3. The JOC executed well. It synchronized, maintained visibility, and provided good SA on current operations across the area of operations. A SME stated, "JOC is doing a good job providing current awareness but is not providing the "so what" analysis" And a participant noted, "I think the JOC often became a TOC demanding almost instantaneous information from the components. This was very counterproductive because the information was almost never refined and it made it very difficult to paint an accurate picture." The JOC was effective and its effectiveness will improve with the addition of a Future Operations section between the OpsGrp and PG.

The UJTL baseline report information regarding the subtask, **Synchronize and Integrate Operations (OP 5.4.4)**, indicates JTF JOCs have difficulty planning for requirements associated with integrating and synchronizing JTF operations. As described above the JOC did not have this problem during MC02. The JOC met the needs of the JTF and was quite effective. Its ability to gain knowledge of, integrate, and synchronize component operations was enhanced by the collaborative tools. Also, the UJTL baseline report information regarding the subtask, **Establish, Organize, and Operate a Joint Force Headquarters (OP 5.5)**, indicates that JOCs have difficulty maintaining SA. This was not a problem during MC02. As described above the JOC synchronized, maintained visibility, and provided SA on operations across the area of operations. Again the JOC met the needs of the JTF and was effective.

Joint Planning Center (JPC).

Purpose. The JPC conducts JTF crisis action planning (CAP) and performs future operations planning. During pre-crisis and contingency operations, the JPC supports the development of CONPLANs. It is the focal point for ETO development, mission refinement, planning guidance, COA development/analysis, and ETO/OPORD coordination. The JPC makes recommendations to JCB and provides input to the CROP. It is composed of planning representatives from the JTF Headquarters, Combatant Commander's staff, Component staffs, and other agencies functionally oriented to the JTF mission. The JPC employs a collaborative network on a continuous basis to develop ETOs as required to meet the CJTF's desired effects and objectives.

Results.

Interval. The JPC is a center, which means that once it is established it normally operates on a 24-hour basis—hence there is no reference to the interval at which it was convened.

Mix. The mix of experiences and competencies was adequate. Ninety-one percent (91%) of respondents indicated that the mix of experiences and competencies of JPC members was adequate. However, some members lacked joint operations and planning experience. A participant stated, "We had all of the correct competencies except too few people with experience in Joint operations, staff operations, and collaborative skills." A SME remarked, "Core planners were outstanding. We were a little light in the log, TPFDD, IO and intelligence expertise. I know they were available, but not being embedded."

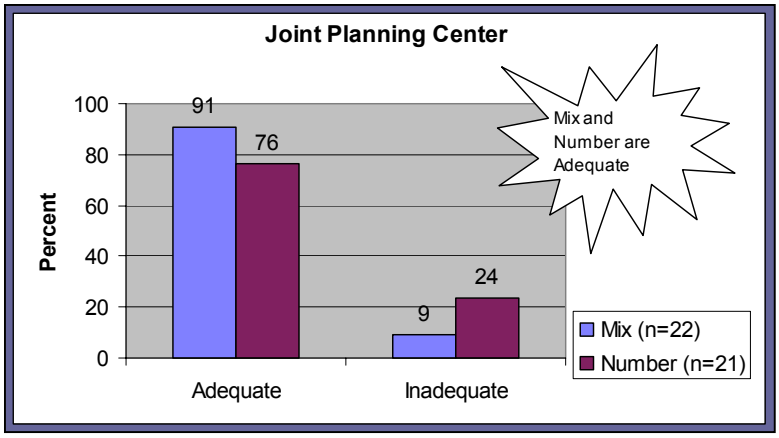


Figure 97: Joint Planning Center attributes

Number. The number of members was sufficient but not the best. Seventy-six percent (76%) of respondents indicated that the number of JPC members was sufficient. In fact some respondents noted that the JPC had more people than needed and could scale back. Others indicated that the JPC members could not sustain in a more robust 24-hour operation, including a Future Operation cell and more involvement from the Combatant Commander's staff. A participant noted, "As the exercise progressed and we became more competent with the tools we needed fewer people and could do more. We learned who got things done and made things happen and others were marginalized, as in real life. Clearly, there are economies of personnel as a beneficial side effect of these processes and technologies."

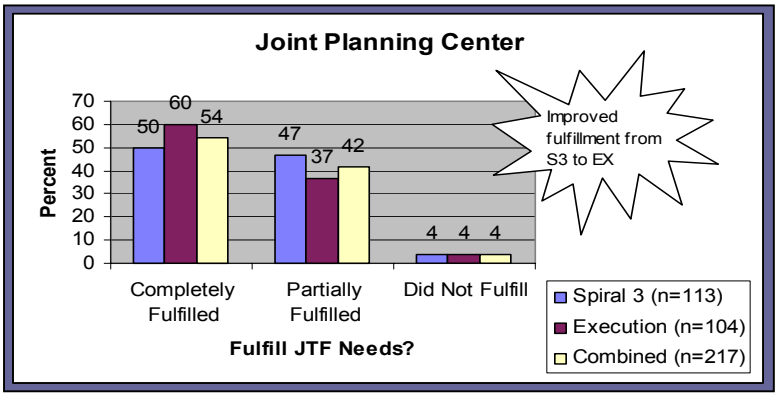


Figure 98: Joint Planning Center met JTF needs

A SJFHQ member of the JPC stated, "More staff is needed to attend all of the planning groups and cells. Multiple sessions meeting simultaneously stretches the limits."

Fulfilled JTF needs? Fulfillment of JTF needs ("Completely Fulfilled") increased from Spiral 3 to Execution. During Execution, sixty percent (60%) of respondents indicated that the JPC "Completely Fulfilled" JTF needs, while only 50% gave that response during Spiral 3. As the JPC matured and became more skilled with the tools, its effectiveness improved. "Early in the experiment the JPC seemed outdistanced by the CJTF and mired in ways and means of decade old methodology," noted one participant. The Plans to OPS handover was weak and the JPC needs to more effectively integrate other members, especially IS and IO. Another participant stated that the IO and IS relationship with Plans was dysfunctional. The JPC's effectiveness will improve with the addition of a Future Operations cell and better integration of other staff members.

The UJTL baseline report information regarding the subtask, **Prepare Plans and Orders (OP 5.3)**, indicates JTF branch planning did not completely meet the needs of the JTF, specifically parallel planning was degraded and planning sessions were conducted without representation from other key staff entities. During MC02 the CIE and LNOs facilitated parallel planning—not a problem. However, as described above, respondents noted that the JPC needs to more effectively integrate other staff members in the planning process. Also, the UJTL baseline report information regarding the subtask, **Compare Courses of Action (OP 5.3.6)**, indicates also that COA teams lacked the capability to develop COAs because they did not possess requisite expertise in such functions as Fires, IO, and CMO. Again during MC02 similar problems were evident. Respondents identified the need for fires, IO, logistics, deployment, medical, personnel, engineer, and POL/MIL expertise.

Rules of Engagement Working Group (ROEWG).

Purpose. The ROEWG is a virtual, web-based network of SMEs responsible for developing ROE recommendations as input to the ETO to support current and future operations/plans.

Results.

Interval. The interval at which the cell convened was adequate. All respondents indicated that the interval at which the ROEWG convened was adequate. The group met only once during the experiment. Most ROE issues were coordinated and resolved by the Legal Working Group, which met daily. The Legal Working Group consisted of legal planners from each of the components and the Combatant Commander staffs; POL/MIL planners, and representatives from CJCS legal office and DoD Office of General Counsel. In addition, ROE issues were common topics in the JPCs.

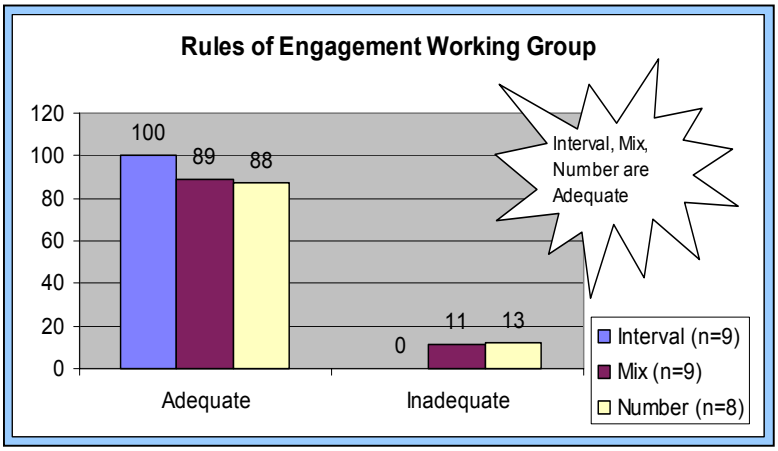


Figure 99: ROE Working Group attributes

Mix. The mix of experiences and competencies was adequate. Eighty-nine percent (89%) of respondents indicated that the ROEWG's mix of experiences and competencies was adequate. The mix of core and supporting members was adequate to fulfill the ROEWG's responsibilities.

Number. The number of members was sufficient. Eighty-eight percent (88%) of respondents indicated that the number of ROEWG members was sufficient. The number of core and supporting members was sufficient to meet the needs of the JTF.

Fulfilled JTF needs? More than 95% of respondents indicated that the ROEWG at least "Partially Fulfilled" the JTF needs. There was a small increase, 1% to 4%, in "Did Not Fulfill" from Spiral 3 to Execution. One participant noted, "This was an excellent tool and I thought ROE development and implementation was a strong point during this experiment." Another participant stated, "This is a great group!!" Conversely, another participant indicated, "[The] Group's leadership style prevented discussion of issues by all members, and resulted in lack of

consideration of Civil Military Operations." And finally, a SME remarked, "Especially impressive is the ownership of this organ by the operators vice the judge advocates. The deputy JOC chief ran this pup from beginning to end, with a clear agenda, and input from all appropriate players." The ROEWG was effective and met the needs of the JTF.

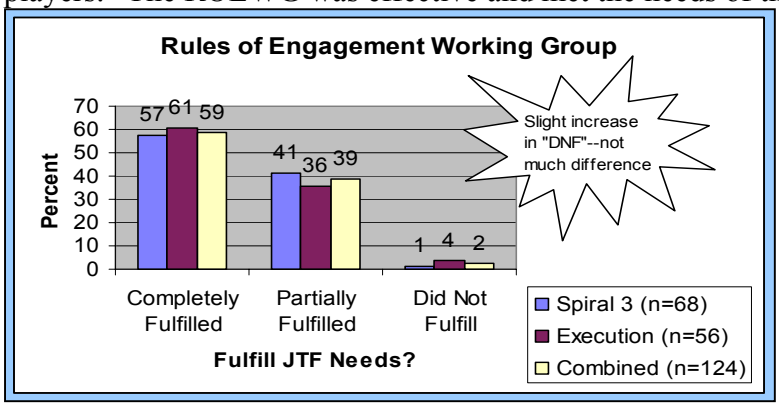


Figure 100: ROE Working Group met JTF needs

The UJTL baseline report information regarding the subtask, **Provide Rules of Engagement (OP 5.4.3)**, indicates the ROE process did not adequately support JTF operations. It states also that mission specific ROE were developed by the SJA staff that did not include operational expertise. This was not a problem during MC02. The SJFHQ BCCWGs include a ROEWG, which is responsible for developing ROE recommendations as input to the ETO to support current and future operations and plans. As described above the MC02 ROEWG was led by the Operations Director, was effective, and met the needs of the JTF

Time Sensitive Targeting Cell (TST Cell).

Purpose. The TST Cell is a virtual network linking the JTF, Components, and appropriate reach-back departments/agencies. Time Sensitive Targets are those that pose a present or near-future danger to friendly forces, or are highly lucrative fleeting "targets of opportunity." The cell recommends engagement planning guidance and priorities to the JCB and is activated when the JTF is notified of the existence of a TST.

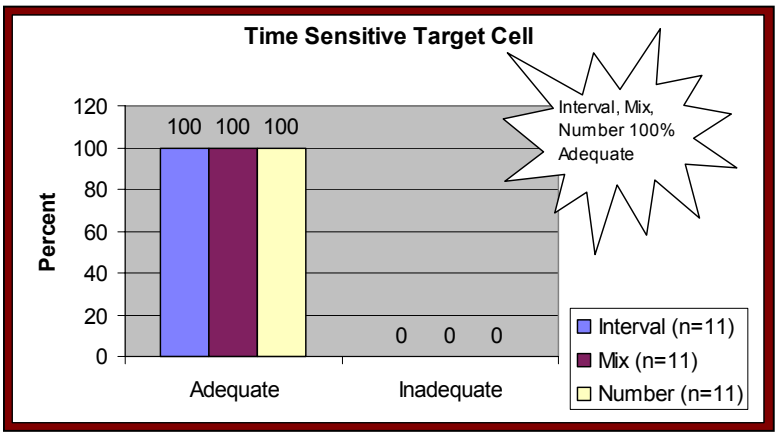


Figure 101: Time Sensitive Target Cell attributes

Results.

Interval. The interval at which the board convened was adequate. All respondents indicated that the interval at which the TST Cell convened was adequate. The TST Cell met as needed to address issues and changes to the TST list. A participant stated, "The cell was "up" all the time working TSTs... if a special need for a session occurred, the Fires Watch would convene a meeting."

Mix. The mix of experiences and competencies was adequate. One hundred percent (100%) of respondents indicated that the TST Cell's mix of experiences and competencies was adequate. The cell had the correct mix to fulfill its responsibilities. A participant noted that the JTF SOP should be refined to include all participants.

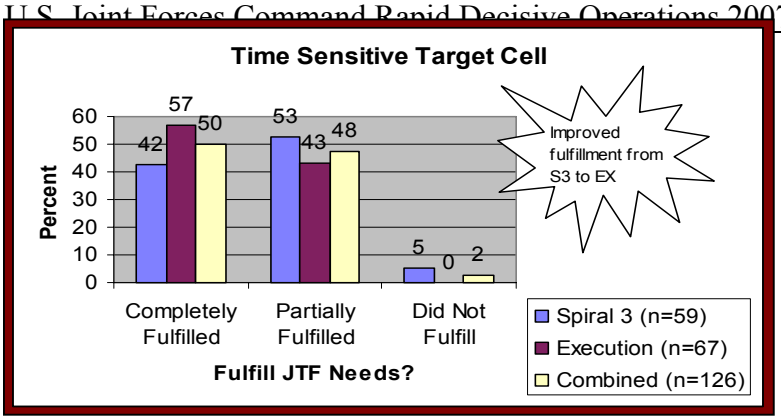


Figure 102: Time Sensitive Target Cell met JTF needs

Number. The number of members was sufficient. Again, all respondents indicated that the number of TST Cell members was sufficient. A participant noted that the number was more than sufficient and that supporting members and others should be invited as required.

Fulfilled JTF needs? The TST Cell fulfilled the needs of the JTF. Fulfillment of JTF needs increased from Spiral 3 to Execution. All (100%) of Execution respondents indicated that the TST Cell at least "Partially Fulfilled" the JTF needs. The cell effectively identified and nominated new targets, confirmed old targets, and reorganized the priorities of targets on the list. However, one participant stated, "The TST cell did not react well to targets identified by the JTF staff. It essentially required components to nominate targets.

Logistics Action Response Board (LARB).

Purpose. The LARB coordinates all logistics, transportation, and deployment-related requirements at the operational level. The LARB acts as the log action clearinghouse and information hub in support of joint forces. It matches logistics support requirements with capabilities; identifies and coordinates action for medical, civil engineering, and Host Nation support issues; and provides advice and recommendations to the Joint Theater Logistics Manager.

Results.

Interval. This portion of the analysis is under development.

Mix. A SME stated, "The board was attended primarily by logisticians and transporters. The board was looking at changes to the deployment flow which had direct impact on current and future operations. There were virtually no operators in attendance at these meetings." Another participant remarked, "More membership from the ops side would have provided a good ongoing check and balance to keep the LARB decisions optimal. Need a LARB very nicely, but would have benefited by more Ops invitees."

Number. This portion of the analysis is under development.

Fulfilled JTF needs? The LARB fulfilled the needs of the JTF. More than 90% of respondents indicated that the LARB at least "Partially Fulfilled" the JTF needs—"Completely Fulfilled" increased from 45% during Spiral 3 to 57% during Execution. There was a small increase, 3% to 7%, in "Did Not Fulfill" from Spiral 3 to Execution. According to respondents the LARB concept was validated. The board was informative and a great vehicle to exchange logistical information. SMEs noted that LARB spent valuable time on routine staff work. They (SMEs) indicated that a working group should be established for action officers to work these actions and to allow the LARB to focus on critical and complex issues as designed. The LARB was effective; however, a participant stated, "The only reason the logistics planning and coordination worked was because of the personal capabilities of the III(US) Corps G4...not the organizational setup...in fact...it does not appear the LOGPLANNER actually conducted ANY logistical planning...instead, he was immediately identified to reassume his role as the J4."

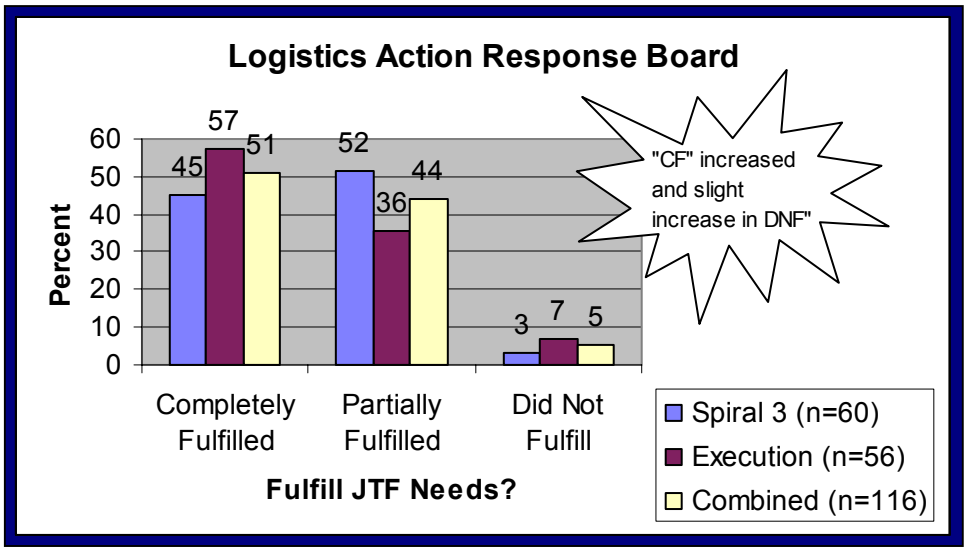


Figure 103: Logistics Action Response Board met JTF needs

BCCWG Additions and Deletions. The BCCWGs used during MC02 and discussed above are the same organizations which the SJFHQ uses when it operates as a JTF. They are only a starting point for the JTF. The CJTF and his staff add and delete BCCWGs based on requirements. This paragraph provides a list of BCCWGs recommended by respondents to be added or deleted from the SJFHQ structure. The list indicates those BCCWGs added by the JTF during the experiment. Based on the percent of respondents who recommended additions and/or deletions, the BCCWGs are about right. Less than 30% of respondents recommended additions and or deletions, Spiral 3 and Execution combined. Noted additions and deletions are listed below:

Recommended Additions.

- [SME/Participant] Deployment /strategic lift Working Group (was added)
- [SME/Participant] Engineer Working Group (was added)
- [SME/Participant] Force Protection Working Group (was added)
- [SME] Civil/Military Cell
- [SME] Transition Cell
- [SME] Host Nation Support Working Group
- [SME] Medical Working Group
- [SME] Joint Personnel Reception Center
- [SME] Joint Intelligence Support Element (was added)
- [Participant] Military Media Information Cell (was added)
- [Participant] Weapons of Mass Effects Working Group (was added)
- [Participant] Joint Knowledge Information Management Board (was added)

Recommended Deletions.

- [Participant] Delete JISC
- [SME] Delete BRC (integrate into JISE)
- [SME] Delete EAC (integrate into JISE)

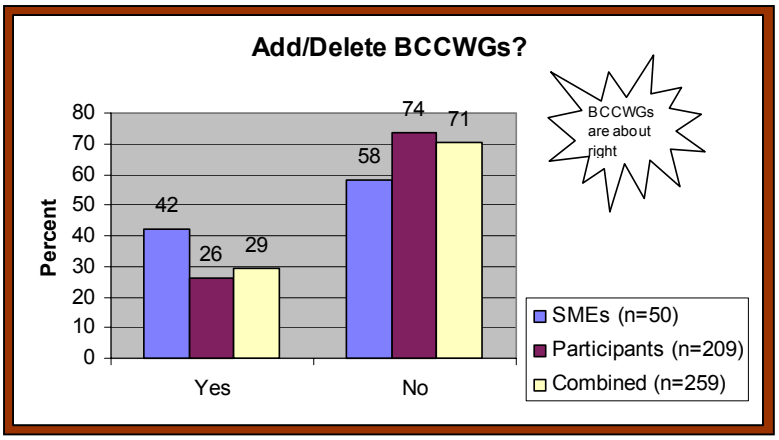


Figure 104: Add or delete Boards, Centers, Cells, or Working Groups

The UJTL baseline report information regarding the subtask, **Acquire and Communicate Operational Level Information and Maintain Status (OP 5.1)**, indicates there is confusion within the JTF staff as to what information should be communicated between staff sections. The SJFHQ groups and BCCWGs structure ensures activation of the organizations required to effectively control JTF operations. Each organization has a designated purpose, members, and products. The SJFHQ organizations use collaborative tools, with virtual communication capabilities, to communicate across the JTF, Component, and Combatant Commander staffs. As described above the SJFHQ organizations met the needs of the JTF during MC02, enhanced JTF operations, and enhanced the JTF's staff interaction with Component and Combatant Commander staffs.

Table BCCWG Summary. The table below provides a summary of the BCCWG analysis.

BCCWG	Interval	Mix	Number	Met JTF Needs
BRC	A	IA	S-	Y
EAC	A	A-	IS	Y
IOC	A	IA	IS	Y
JCB	A	A	S	Y
JCBWG	A	A	S	Y
JCMC	A	A	S	Y
JFEWG	A	A-	S	Y
JISC	N/A	A	S	N
JOC	N/A	A	S	Y
JPC	N/A	A	S-	Y
ROE	A	A	S	Y
TST	A	A	S	Y
LARB	IA	A-	S	Y

A = Adequate S = Sufficient Y = Yes
A- = Adequate w/concerns S- = Sufficient w/concerns N = No
IA = Inadequate IS = Inadequate N/A = Not Applicable
Red filled box = recommendation to delete BCCWG

RECOMMENDATIONS:

1. Maintain SJFHQ BCCWG structure—let JTF add and delete BCCWGs as required. Ensure SJFHQ members have subject matter expertise relevant to the recommended additional BCCWGs.

2. Rework the JISC to improve effectiveness.

3. Let JTF make minor refinements to the interval at which BCCWGs convene, the mix of experiences and competencies, and the numbers of members in each BCCWG.

Bottom Line: BCCWGs are about right—JISC needs to be reworked. Most met the needs of the JTF, however, there is room for improvement—JTF will make minor refinements, and add and delete as required. BCCWGs enhanced JTF OPS and JTF HQ interaction with Combatant Cdr and Component staffs.

OTHER OBSERVATIONS AND FINDINGS

Relationship to Other Objectives

The SJFHQ concept interacts with and impacts all other concepts and objectives. SJFHQ members were directly involved with each concept and objective. Initially, the SJFHQ members were considered the SMEs and were the "go to" people. In many areas, the SJFHQ maintained this title throughout the exercise.

Concept/Obj	ONA	EBO	CIE	JIACG	JTLS	JISR	IS	DO	AA	EBO	SF
Concept: SJFHQ	X	X	X	X	X	X	X	X	X	X	X

DOTMLPF Linkage

An overall observation based on MC02 is the development of SJFHQ and CIE capabilities must coincide. The CIE and the SJFHQ are inextricably linked and together they enhanced JTF Operations; the benefit of one without the other is unclear. Also, participation in SJFHQ training and education programs by the interagency community external to DOD is critical. An on-going relationship is required to foster, encourage, and coordinate participation, and ensure policies do not inhibit IAC participation. Specific DOTMLPF recommendations include:

Doctrine

Develop SJFHQ doctrine—establish SOPs for the organization and all employment options, which clearly define the roles, functions, membership, leadership and POCs, and relationships of each group, each BCCWG, and each SJFHQ member; provide a CIE structure with business rules; define the relationship and integration with IAC; define the SJFHQ's role in ONA development; establish TTPs; and include document formats.

Develop Joint doctrine and SOPs/TTPs for employment of new systems to support SJFHQ and JTF, specifically ONA, JIACG, and CIE systems and tools.

Revise Joint doctrine to incorporate SJFHQ concept.

Organization

Adjust the organization of Combatant Command staffs to include SJFHQ structure, tailored to regional requirements.

Adjust the organization of Combatant Command staffs to include a JIACG.

Adjust the organization of Combatant Command staffs to include an element responsible for the ONA.

Incorporate the linkage with IAC, COE, and other external agencies to facilitate SJFHQ reachback to/habitual relationships with these agencies.

Training

Develop/conduct periodic joint training at Combatant Command, JTF, and Component Command level to exercise employment of SJFHQ and enabling concepts (CIE, ONA, EBO, JISR, JIACG).

Develop/conduct development training necessary to prepare leaders for joint duty, particularly as a member of a combatant command SJFHQ—leaders must be SMEs on the enabling concepts (CIE, EBO, ONA, JISR, JIACG).

Establish SJFHQ Mobile Training Teams—conduct periodic training at JTF and Component levels.

Facilitate integration of IAC, COE, ONA Developers, and other appropriate external agencies in SJFHQ training with all levels.

Develop an Individual and Collective training curriculum for SJFHQ to develop and maintain proficiency with concepts and tools.

Material

Provide Combatant Commands the necessary materiel and resources to establish, and sustain a SJFHQ and enabling concepts (CIE, EBO, ONA, JISR, JIACG).

Provide Combatant Commands the necessary materiel and resources to employ all utilization options of a SJFHQ,. Noteworthy is the self-contained SJFHQ employment option because of its materiel requirements.

Provide designated Components Commands—land, air, and sea—the necessary materiel and resources to receive, integrate, and sustain a SJFHQ on all respective platforms.

Leadership and Education.

Assign GO/FO (O-8) for each SJFHQ

Establish Leadership Development Programs, which will provide the necessary experience, training, knowledge and understanding, and expertise for leaders to feed the SJFHQ organization.

Revise joint and service school curricula to include SJFHQ, CIE, EBO, ONA, JISR, and JIACG concepts.

Educate DoD and non-DoD communities on the key elements of the SJFHQ, CIE, EBO, ONA, JISR, and JIACG concepts.

Personnel

Add 55 (+/-) personnel (military, civilians, contractors) to all Combatant Command staffs. Adhere to the SJHFQ member model listed below:

- Mature, professional—SME in assigned area
- Experience in joint and service operations, and crisis action planning

- Trainer, mentor, coach with interpersonal skills
- Understand group dynamics
- Understand concepts and Combatant Cdr's Intent and Perspectives
- Knowledge of CONPLANs, CONOPS, SOPs, and TTPs
- Situational awareness and understanding
- Knowledge of the ONA and the adversary
- Knowledge of Effects-based Planning/Operations
- Expertise with collaborative tools
- Habitual relationships with Combatant Cdr's staff, component staffs and other external agencies.
- Conduct a manpower study to validate skills, to identify sourcing (military—Officers, NCOs, Reservist; civilian; contractor) and to identify unique requirements for each designated combatant command.
- Examine current joint personnel policies that impact SJFHQ manning, including those governing minimum tour lengths for SJFHQ assignments.

Facilities

Attempt to use existing facilities at Combatant Command locations. If not available Combatant Commanders should determine requirements for military construction. The SJFHQ personnel and equipment must be collocated as a unit and if feasible physically separated from the Combatant Command HQ elements to focus efforts on developing crisis areas.

The SJFHQ facility must be a SCI environment.

Recommendations:

Underdevelopment

Assessment Area 7 -- Operational Net Assessment (ONA)

Overall Assessment Results

The ONA concept demonstrated very strong potential in MC02. Benefit for military operations was recognized by the experiment participants. ONA made a positive contribution to the Blue force during the experiment and demonstrated that with further definition and focus, it can be a valuable component of effects based operations. There was not a common understanding of, or expectation for, ONA among experiment participants. Pre-event concept descriptions outpaced the reality of the ONA incarnation that was produced for MC02. As a result there was a grand expectation of what it was to offer for the experiment. Training conducted before the event failed to adequately prepare all participants; the result was inhibited use of ONA data and information. Also, the tools developed to access and use ONA were not intuitive; they were difficult for most participants to use. Intended to be relevant and useful from strategic to tactical levels, the experiment indicated there were different ONA requirements for each level. The supporting ONA database had common utility but its use and products should be varied for each command level. ONA database up-date did not satisfy experiment participants. It was expected to be difficult and was. Finally, the term *visualization* was used frequently during the experiment with regard to understanding ONA; it should also have relevance for the other experiment concepts as well.

The ONA concept did not lend itself to direct comparison with current military plans and operations activities. A concentrated ONA repository of analyzed and unanalyzed information focused on a specific topic or geographical area did not exist. Cost benefit trade-offs between the way planning and operations are conducted versus the way they could be conducted with an ONA available was not possible. Instead, measured value judgments made by senior concept developers (SCDs) and experienced subject matter experts (SMEs) provided perspective for the new conceptual support ONA might offer. These judgments and estimates as well as experiment participant survey responses provided the indicated measure of improvement.

Based on review of task accomplishments that supported the concept's 2 warfighting challenges, the challenges were felt to have been met. The first challenge was to construct and use an ONA knowledge base to develop an effects based strategy; the second was to use ONA to enhance decision making. An ONA knowledge base was constructed and used to support development of an effects-based strategy. ONA was used and it enhanced decision making.

Methodology

The ONA concept was felt to have 2 major objectives or warfighting challenges. A dendritic dissection of ONA and its challenges was made based on concept development documents. (The dendritic matrix for ONA is included at Appendix A to this assessment area [ONA Data Collection Matrix]) The resulting matrix of warfighting challenge elements was used as the data generator for ONA analysis. This layered depiction of the tasks, measures of these tasks, data requirements needed to examine the measures, and the individual data elements that were part of the measures served as the map for consideration and analysis of the concept. The review and analysis of this data produced ONA findings.

The experiment offered 3 sources of data. They were: 1) Likert scale response results and supporting comments from participant surveys 2) discussion and comment from structured In-

Focus, Azimuth Check and After Action Review sessions and 3) access counts and activity levels from participant use of the ONA Knowledge Base.

Participant surveys and review of ONA database access were the primary sources of data. Individuals from the JTF headquarters, the components, and the interagency group were selected for survey receipt based on their expected involvement with ONA during the experiment. Subject matter experts (SMEs) data collectors from JFCOM J7 were also presented surveys. Generally, all surveys presented questions with Likert scale answers. They also offered the opportunity for comments. There were some questions presented that asked only for a comment response. The Likert responses were reviewed using graphed depiction of the replies. Comment responses were grouped by topic for consideration of their impact on ONA.

Of the data collected, only survey Likert scale responses and knowledge base access counts and time intervals had analysis potential. Comments and observations offered by the SCDs, SMEs and JTF participants were anecdotal and stood alone. Both Execution and Spiral #3 survey results were analyzed. Spiral #3 was primarily a JTF planning event and ONA was used in support of that phase.

Analysis of the warfighting challenge matrix centered on questions that were developed and targeted against the specific warfighting challenge tasks. To ensure thorough consideration, all survey question results were reviewed in relation to each challenge for assessment of task accomplishment. If a question applied to more than one task it was aligned with each of them. This process provided a data pool for assessing tasks and identifying findings. If all data supported task accomplishment or a finding, two or three representative questions and their results were charted and used to depict task accomplishment.

When support was not unanimous, conflicting question results were used to present the dissenting view and the differences weighed. Histogram charts were used for better understanding and perspective. For some questions extreme and moderate Likert scale replies were grouped and the “don’t know” or “N/A” replies dropped from the chart. This was done to show the focus of the response when accompanying comments supported this approach.

The second source of data that could be analyzed was the ONA knowledge base activity recorders. An audit log of the ADSQL server that housed the ONA database was used to collect participant access of the stand alone ONA database. This log identified who used the database and, if changes (updates) were made, what parts of the database were changed. WebTrends software was used to review participant access of the other ONA Knowledge Base components; ONA Today, Database Login, ONA Matrix, ONA References, and ONA Products. This capability revealed who accessed what and for how long.

All of these collected data were matched against the tasks that supported the warfighting challenges to see if the challenges were achieved. They were also used to clarify findings as they emerged.

Additional supporting data that emerged from discussions conducted during In-Focus and Azimuth Check sessions were the primary instigators for findings not closely connected with the warfighting challenge matrix. These facilitated discussion sessions were monitored and the SCD as well as other participant observations and comments captured. The three Facilitated After Action Reviews held during the experiment were also sources of supporting data and were used to collect SCD and participant ONA concept perspective.

Warfighting Challenge

The ONA concept depicted two very discrete challenges for ONA. The first was the ability to build and use an ONA database to support development of an effects-based strategy

and the second was the ability to use the database to enhance decision making. Simply, the concept said construct a database and use it to design effects based operations and make improved decisions.

Structure of the MC02 experiment caused Spiral 3 to be the primary opportunity to collect data on the first ONA challenge. Description of the MC02 data base development process in included at Annex X**.** Experiment execution did offer some opportunities for the developmental challenge but it was better suited for collecting data on the second challenge.

ONA viewed an adversary as a system of systems; that is, a number of related systems that together formed potential capability that an adversary could use. These systems of systems were represented by political, military, economic, social, infrastructure and information (PMESII) categories. Capabilities to counter these systems were identified as diplomatic, information, military, and economic (DIME) potential. Analysis of both PMESII and DIME and their interrelationships were depicted in the database. Once included, this analyzed information had to be kept current. To allow the extensive amount of information to be manipulated and used, automated tools needed to be included as a part of the database capability.

According to warfighting challenge 2 use of the ONA database should have complimented the JTF staff's normal functions; identified adversary vulnerabilities; pointed out primary, secondary, tertiary, and potential unintended effects that could result from proposed actions; supported course of action prioritization and selection; and allowed operation within the adversary's decision cycle. Data associated with these tasks were collected primarily during experiment execution.

One of the four tasks that supported warfighting challenge 1 was not met conclusively. Even so, the preponderance of data supported successfully accomplishment of both ONA warfighting challenges.

Finding:

Analysis of MC02 ONA data produced 8 findings listed below. Each is discussed, analyzed, and supported in the sections that follow.

1. ONA needs to be defined and focused … there is not a common understanding of what to expect … for implementation.
2. Command levels have different requirements for ONA … one size does not fit all.
3. Training impacted understanding and use of ONA.
4. Better tools are needed to manipulate the data and information.
5. Visualization is a major consideration for the ONA concept and its components.
6. ONA was useful for Blue during the experiment and it shows great potential for military operations. The potential benefits of ONA were recognized.
7. The ONA data base was not updated to the users' satisfaction.
8. Both ONA Warfighting Challenges were met.

Analysis of Findings

1. ONA needs to be defined and focused … there is not a common understanding of what to expect … for implementation.

The ONA concept came into MC02 with - - possibly - - more expected of it than any of the other concepts addressed in the experiment. It wasn't necessarily known by all but for those who had heard about it, there were great expectations. At the conclusion of Spiral 2 when 18th

ABC was serving as the JTF their J2 stated that he needed to rethink his understanding of ONA. He found that it did not present the intelligence planning answers as he expected. When III Corps was named as the JTF for the experiment they completed the self-training modules available via the web and received briefings and training sessions from JFCOM. Their expectations for ONA were part of the decision process that determined an (J)IPB wasn't needed for the event. The ONA was expected to supplant it. Components as well as III Corps "understood" what the concept was to do; unfortunately, not many really understood the concept. All knew what it was and no one knew what it was. And, they were not aware of what ONA would be able to offer in the experiment. There were almost as many understandings as there were participants. A common thread among them seemed to be that there would be a database of information - - a key stroke away - - that would provide whatever specific information was needed. Spiral 3 and Execution survey results and comments reflected these perceptions. A detailed description of the ONA Knowledge Base is available at annex ___ (**ONA Knowledge Base Information for Spiral #3**). There were no significant changes made to the Knowledge Base between Spiral 3 and execution.

This lack of common understanding; for some, ignorance of the concept altogether; and the "freshman" version of ONA all contributed to mixed MC02 ONA concept appreciation. But the lack of a common understanding of what the concept was to provide was the pacing issue that mandated better ONA concept definition and design.

For any chance of ONA concept implementation by the military in the near to mid term, survey results and overall participant comments said ONA needed to be narrowed and focused; it should be concentrated on a central theme for a command level and a process established for keeping it relevant in a demanding environment. ONA's menu of advertised capability needed to be limited.

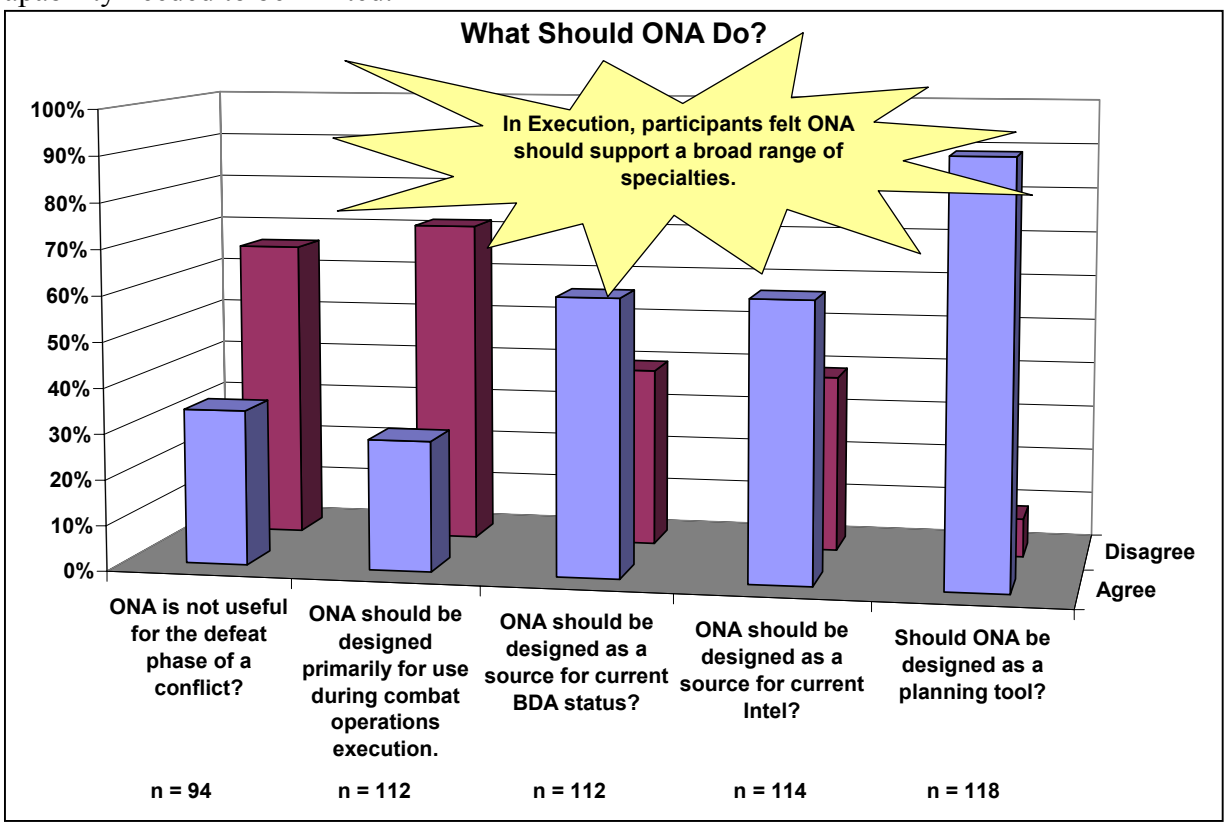


Figure 91: Majority say ONA should be designed as a planning tool

The process of addressing an adversary as a system of PMESII systems with DIME capabilities to counter them and their pre-conflict analysis relationship was embraced by participants. It was the factors bearing on these relationships that the various specialties expected to have available that caused expectations to exceed reality. ONA was criticized for being a planning tool and not an employment tool; not having current intelligence information available; not having data available for targeting specific nodes; not having data available for attacking specific targets; not having data on current effect results (BDA); for containing "old" information; and other specialty requirements. At some point in the future technology and bureaucracy relationships may permit all of these and more knowledge centers and capabilities to be included in an "ONA". In the near to mid term though, a database of focused and pre-analyzed adversary information that looks to an area of combatant commander concern offers tremendous potential. It needs to be pursued and grown to support this primary user.

Shown here are Execution participant survey replies intended to identify participant thoughts on a primary focus for ONA. The focus areas were presented as statements and the respondents asked to agree or disagree with them. Note that the question concerning defeat phase use was presented in a negative sense. This was done to stimulate the respondents' attention and ensure they were reading survey questions.

Looking at results of the two graphed questions to the left, participants said ONA was useful for the defeat phase of conflict and also for "non-combat" phases. Essentially, they said it was useful for the entire conflict spectrum. Results showed respondents felt ONA should be a source for current BDA status as well as intelligence information. There was almost unanimous support (92 percent to 8 percent) for ONA to be used as a planning tool shown by the results of the fifth question in the graph. These replies exposed the broad range of MC02 participant expectations for ONA.

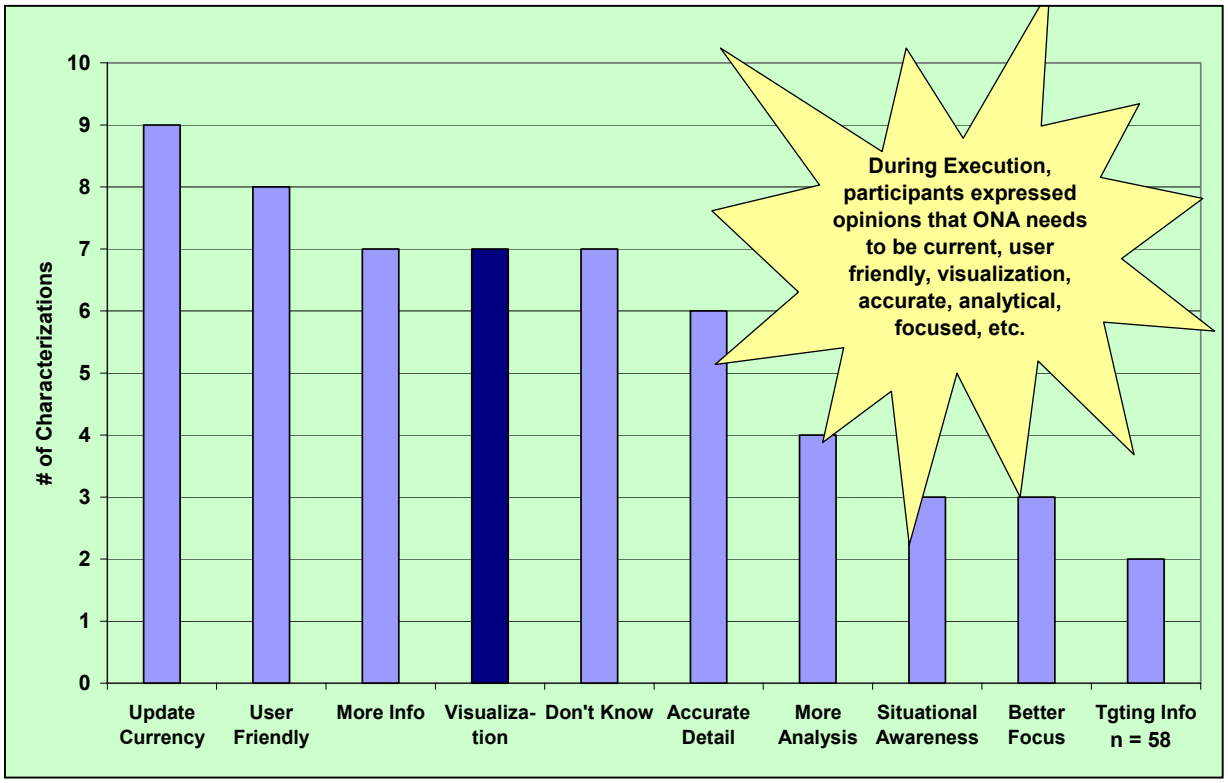


Figure 92: Desired ONA Characteristics

This chart depicts additional participant thought on proposed ONA characteristics. During the final week of the experiment participants were asked what they would like ONA to provide. The question did not specify a selection, rather it was open-ended. Shown in the chart above are the desired categories the survey respondents identified. Their replies were grouped into these "buckets". Information currency was the leading characteristic desired. As with many of the experiment survey responses, the "Don't know" replies were a major response category. For these responses, those with comments included usually referenced some level of training inadequacy as the reason for the response. This training issue is addressed in Finding 3. The column highlighted "Visualization" is addressed in further detail in Finding 5.

Results of this survey showed respondents felt information currency should be a primary capability for ONA. Design of the ONA process/product that emerges for implementation should respect this currency characteristic and, if current up-date of imbedded information can't be assured, then results of this survey question suggest the process/product should be redesigned to address topics that are less perishable.

Comments from Spiral 3 and Execution surveys provided a variety of expectations for ONA. Sometimes the words pointed out failures for the MC02 ONA; at other times they offered new variations for ONA concept development. The comments that follow point-out the wide range of participant thoughts. They convincingly said ONA's role needed to be succinctly defined. The first observation frames this finding quickly. There are further comments that are just as convincing included at annex ___ (**Additional Observations and Comments Concerning Finding 1**).

SCD Observation: "Make a deliberate decision whether ONA is designed only to support planning or whether it is intended as an Execution tool as well."

SCD Comment: "I believe ONA to be a "tool" to be used by the commanders and their staffs to aid in the decision making process. As such, it requires a great deal more development."

Participant Comment: "ONA needs to be everything. It needs to include all the critical nodes for the enemy, the predicted enemy COAs, etc. It needs to be updated continuously so asking a question about whether or not I should be informed when the ONA is updated is very wrong. BDA and combat assessment should change the ONA in that it changes the COAs still open to the enemy and changes his perception of the battlespace."

Participant Comment: "The ONA provides great SA (situation awareness) during the early phases of a crisis when planners interact to create the effects, node and action linkages. It helps in the ETO build to develop plans to accomplish effects. Without prior knowledge of the ONA however, the learning curve is very steep and it would certainly help, but it would be a blind help without good SA of what you are doing. Once hostilities commence, the ONA usefulness decreases."

Participant Comment: "ONA was quite useful in (concurrent) strategic-level analysis and foundational targeting."

Participant Comment: "The ONA concept should be redesigned in accordance with some organizing principle which is less grand than a desire to know everything about the world."

Participant Comment: "ONA should not, repeat not, be used as a source for current Intel. You could not possibly plan (as proven here) for the possibilities for current Intel as an Intel guy, this is a bad idea."

2. Command levels have different requirements for ONA … one size does not fit all.

The ONA concept was described in development documents as being applicable from strategic to tactical levels of command. A positive consideration for this broad relevancy was the opportunity to have a common reference source for all; a negative consideration was the multi-level information requirements that had to be created and satisfied. For any and all levels of applicability, once created and instantiated in a command level activity process, ONA needed continuous "care and feeding".

Senior Concept Developer comments and participant survey comments suggested this breadth of applicability from strategic to tactical was inappropriate. Results from two survey questions also took exception to the "one size fits all" conceptual approach. The chart below and the one that follows provide an indication of the difference of opinion on information requirements for just the JTF and component command levels. The replies show there are differing views for unique requirements at these two levels. The experiment did not offer an opportunity for data collection above the JTF level or down to the tactical level.

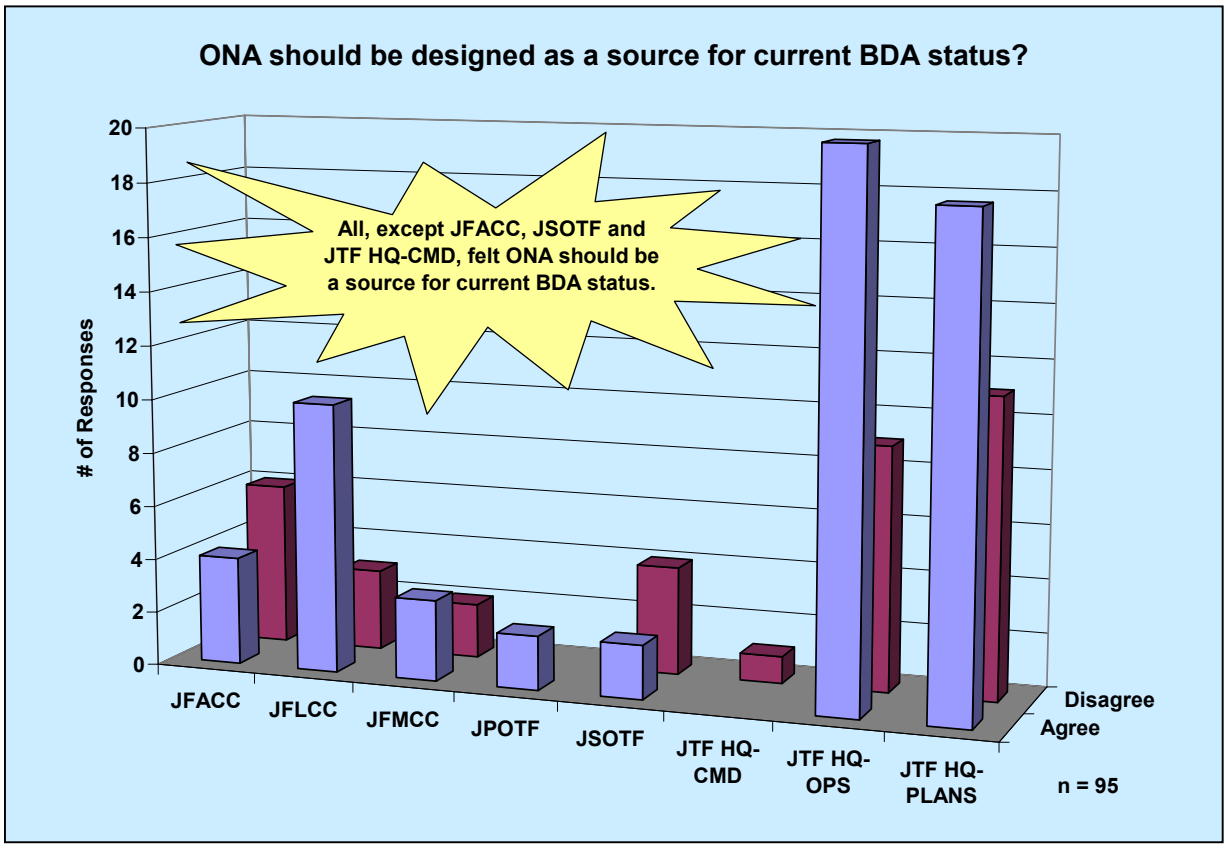


Figure 93: ONA should be designed as a source for current BDA status?

Shown above are results of a survey question that asked if ONA should be a source for current BDA status. At the component level the JFACC and JSOTF had more respondents that felt ONA should not be a source for BDA status. The majority of JTF headquarters respondents felt ONA should be a source of BDA status. Overall, 62 per cent (59 of 95) agreed that ONA should be designed as a source for current BDA status; 38 percent (36 of 95) disagreed. The significance of this chart is the difference of opinion on ONA design between just two levels of command.

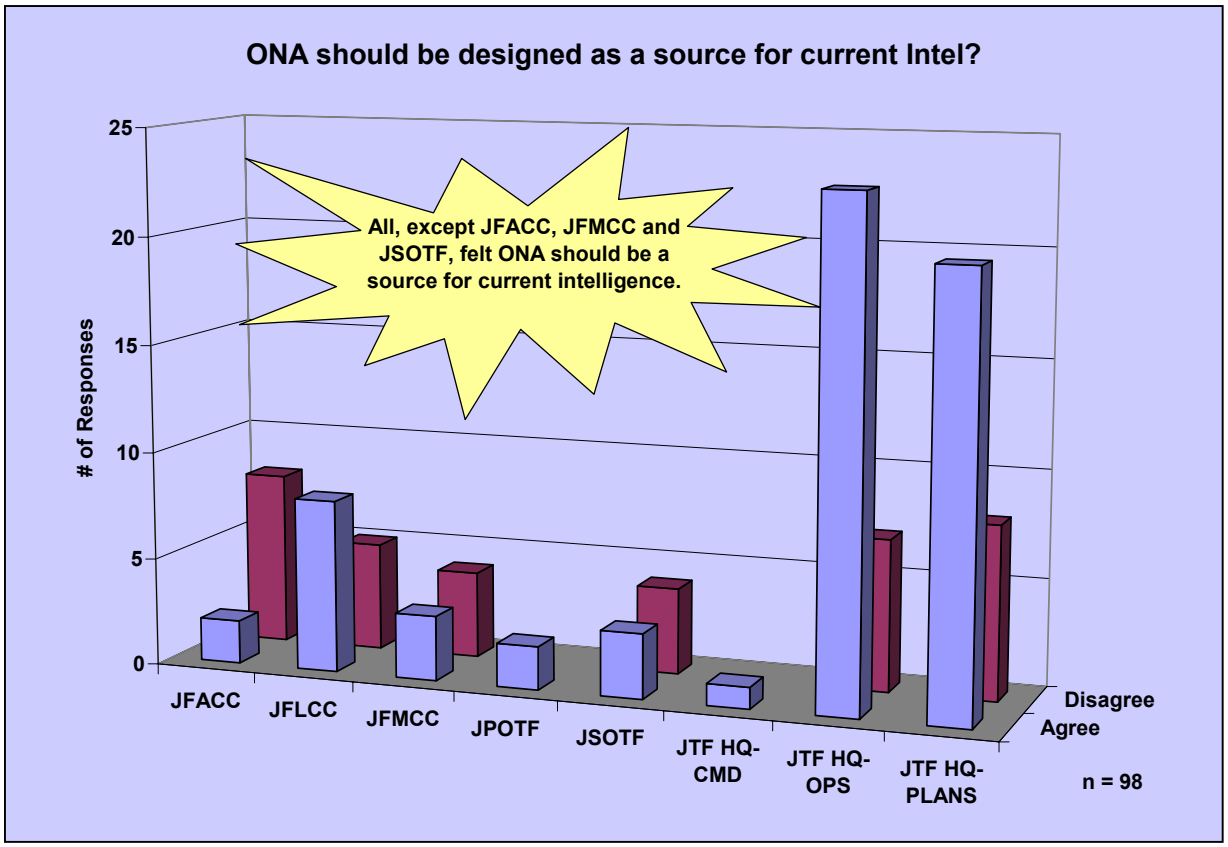


Figure 94: ONA should be designed as a source for current intel?

In response to the survey question as to whether or not ONA should be a source for current intelligence information, this chart shows that at the component level JFACC, JFMCC, and JSOTF did not believe current Intel should be included within ONA. The JTF headquarters respondents felt it was appropriate for their level.

Again, the message of these two charts was not so much the specific survey question responses, rather it was to state that there were at least perceived different information requirements between the JTF and component command level respondents.

The following observations and comments address the allegation that a single ONA is appropriate for all levels of command; that is that a single ONA can accommodate all command levels. The preponderance supported the finding that command levels have singular ONA information requirements. Additional comments are available at annex ___ (**Additional Observations and Comments Concerning Finding 2**).

SCD Observation: "One limitation of the experiment ONA, even during planning phase, was that it was more useful to the JTF staff than it was to the components."

SCD Observation: "Continue to refine the concept in future exercises and experiments. In particular, improve its pertinence to component commanders."

SCD Observation: "The JTF HQ consumer (ONA) requirements are different than the JIACG requirements."

Component Comment: "ONA was not very useful at the component levels. We need hot links to target folders. We also need better visualization and diagrams to help us interpret data and information."

SME Comment: "A component will want more fidelity in the ONA than a regional commander."

Participant Comment: "If you refer to 'ownership' of the database, believe ONA management is better suited at the 'CINC' level ..."

Participant Comment: "The only concern with this (*the same version of an ONA*) is that certain information is more important to one level than it is to another. The intent of the ONA is to provide information to the Common Relevant Operational Picture development. Each level will glean from the data, that which is important to it. Therefore, more emphasis must be placed on correctly populating a database where a 'one size fits all'".

3. Training impacted understanding and use of ONA.

The difficult challenge of training MC 02 participants was evident during Spiral 3. Details of this training are included at annex **(ONA Training).** Many participants indicated during that event they were not prepared to use ONA. Day-to-day activities, late notification for participation, and incomplete training were some of the causes cited for this problem of not being prepared. For Execution these same challenges existed although they were mitigated somewhat with the experience gained by some participants during Spiral 3. Participant comments indicated "self help" and "trial and error" also allowed some Execution participants to access and use ONA. Details of pre-experiment training are covered in annex. Even those exposed to the ONA training did not have consistent understanding of what was included in the ONA concept. Many had inflated expectations for the concept; it was thought to offer "solutions for all problems".

Tools for using the ONA database were not as simple, effective, or intuitive as desired. This was acknowledged prior to experiment start. Experiment participant comments indicated effective tool training needed to include "hands-on" opportunities. None-the-less, for those who were trained and exposed to them, ONA tools did allow productive application of database information. Difficulty using these tools engendered an intimidation factor that probably tended to steer participants away from ONA.

There was a larger training issue that influenced the experiment and was addressed by senior mentors during In- Focus and Azimuth Check sessions. Their comments stressed the need for future leader development and training on the use of the new concepts included in the experiment. In their view, a different manor of leader thinking will be needed. They felt these

future leaders will have to be trained to ask the right questions within the context of EBO and ONA. That is, their questions will need to be triggered within the context of the future concepts. Essentially a new culture will be created that will "underpin" their thinking.

Survey training question responses indicated this new broad aspect for training impacted MC02. There were some deficiencies in the training for the experiment that were mentioned in survey comments. Given the pre-event environment for participants of on-going daily responsibilities; last minute personnel actions; and other mitigating circumstances, these training difficulties were not surprising. The overarching training topic of "new think" was not included in the MC02 training program. Therefore participants had no new level of understanding or an ingrained experience base of ONA or EBO concept operations to draw upon. The frustration of trying to use and apply the new concepts that really weren't understood was woven within the participant comments. The philosophical application and relationship training of just these two concepts probably could not have been accomplished in the time available for pre-experiment training. Participants simply did not have the training or experience tools to use with the new concepts they were asked to employ. The experiment was "bitten" by the very concern the SCDs raised.

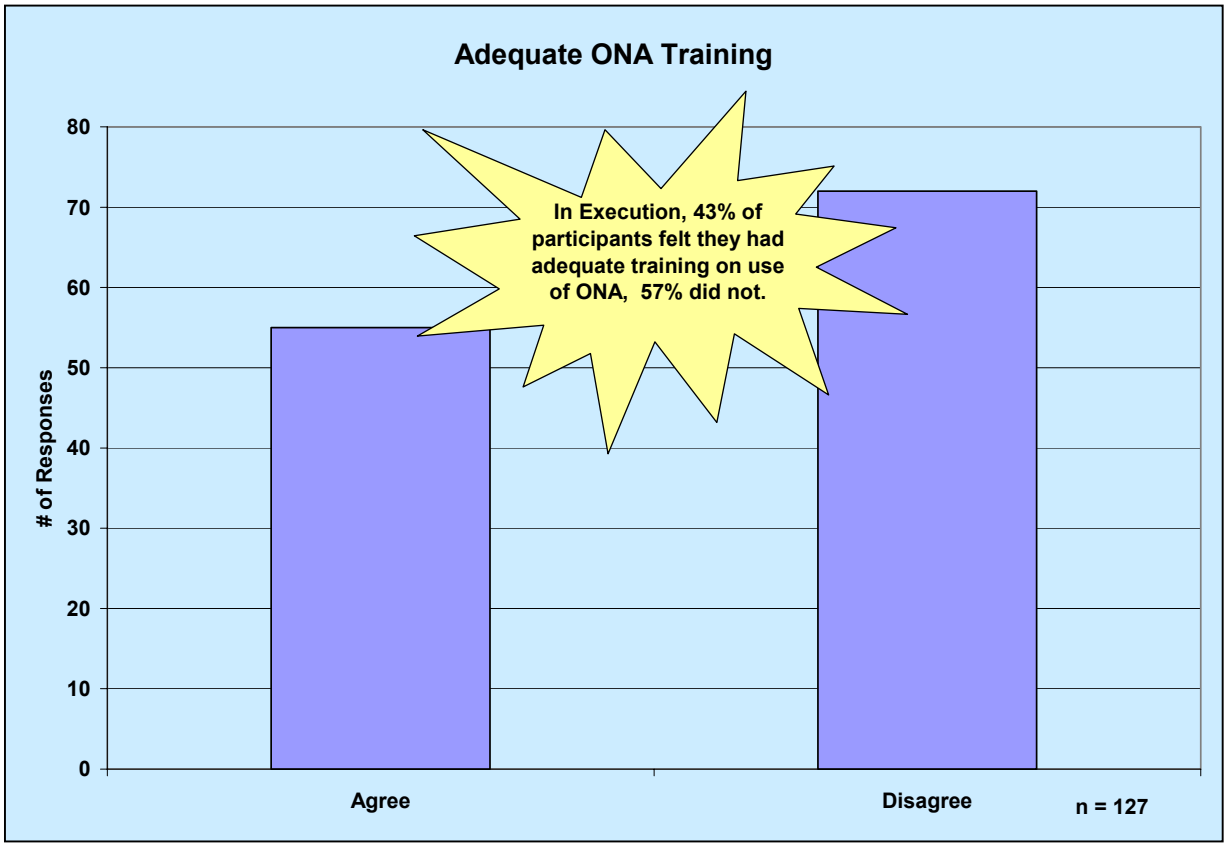


Figure 95: Adequate ONA Training

Shown here are the results of an Execution survey question about ONA training. It asked for agreement or disagreement with the statement, "I was trained adequately to use ONA for this experiment." The Likert scale responses offered for response to the statement included two levels of agreement and two for disagreement; there was also a "Don't know" option. For this depiction the 10 "Don't know" responses were included with the "Disagree" replies as it was assumed if

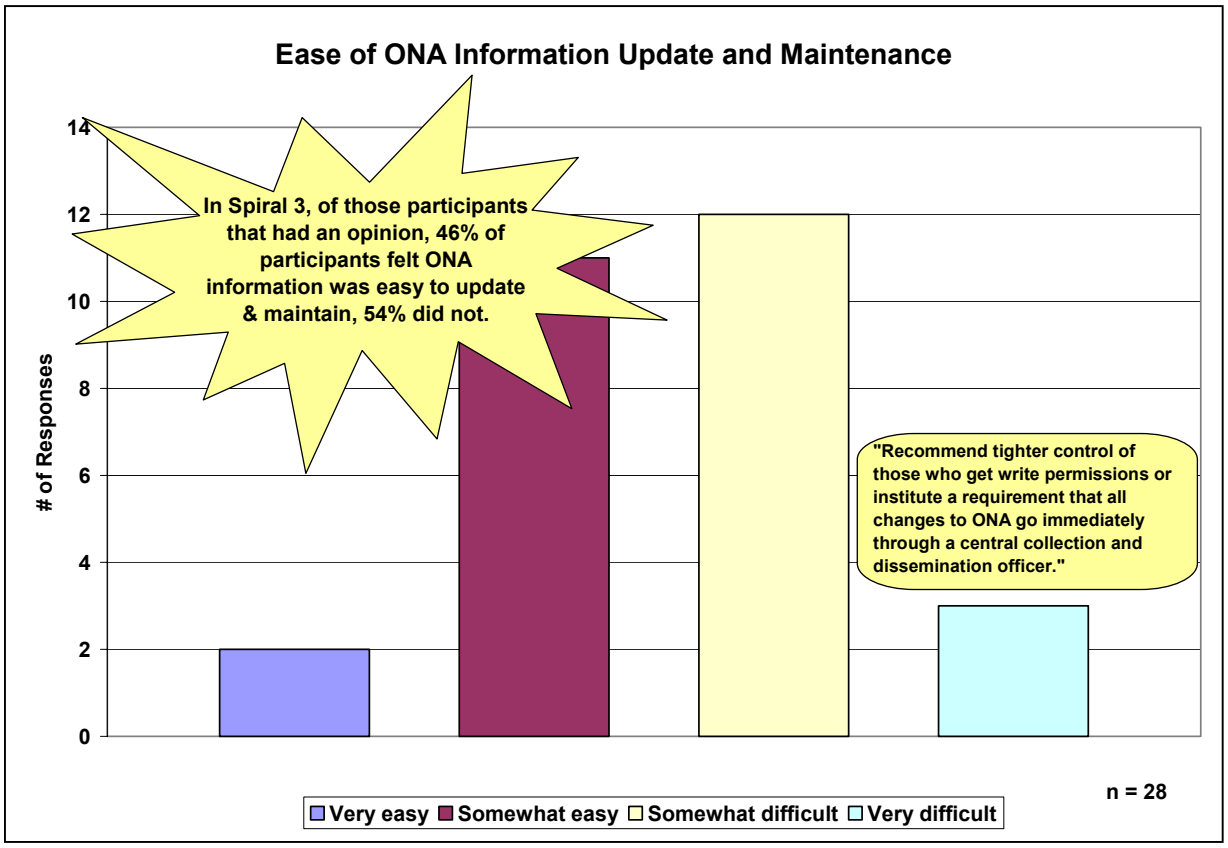


Figure 96: Respondents were split on how easy ONA was to update

respondents were adequately trained they would have know it. As shown, more participants felt they were not adequately trained than those that felt they were.

This chart and the one that follows present the difficulty ONA tools offered experiment participants. In a Spiral 3 survey participants were asked to rate the ease of ONA information update and maintenance if they had "write permission". There were not many who had this authority. Of the 28 who responded 54 percent (15 of 28) indicated it was difficult. To add further context to this response, participants with authorized write permission in this phase of the experiment had been using the ONA database prior to Spiral 3 (i.e. they were experienced).

During Execution participants were asked to rate the ease of information retrieval from the ONA database. That is, "How well did the ONA tools allow you to obtain information from the database?" Respondents with an opinion were about evenly divided between "Easy" and "Difficult". Even so the 49 percent responding with "Difficult" translated into 59 of the 120 survey group participants who possibly lost the use of ONA and the perspective it presented.

The following observations and comments discuss SCD, SME and senior participant thoughts' about participant ONA training and the challenge of using tools provided to build and exploit the ONA. The discussion above about training for a new "culture" and a requirement for military members to develop a new way to think when using MC02 type concepts and tools needs to be considered when reviewing the comments. Between the lines of the participants' comments was their frustration of not being culturally prepared to employ the concepts. Additional observations and comments concerning training are included at annex ___ (**Additional Observations and Comments Concerning Finding 3)**

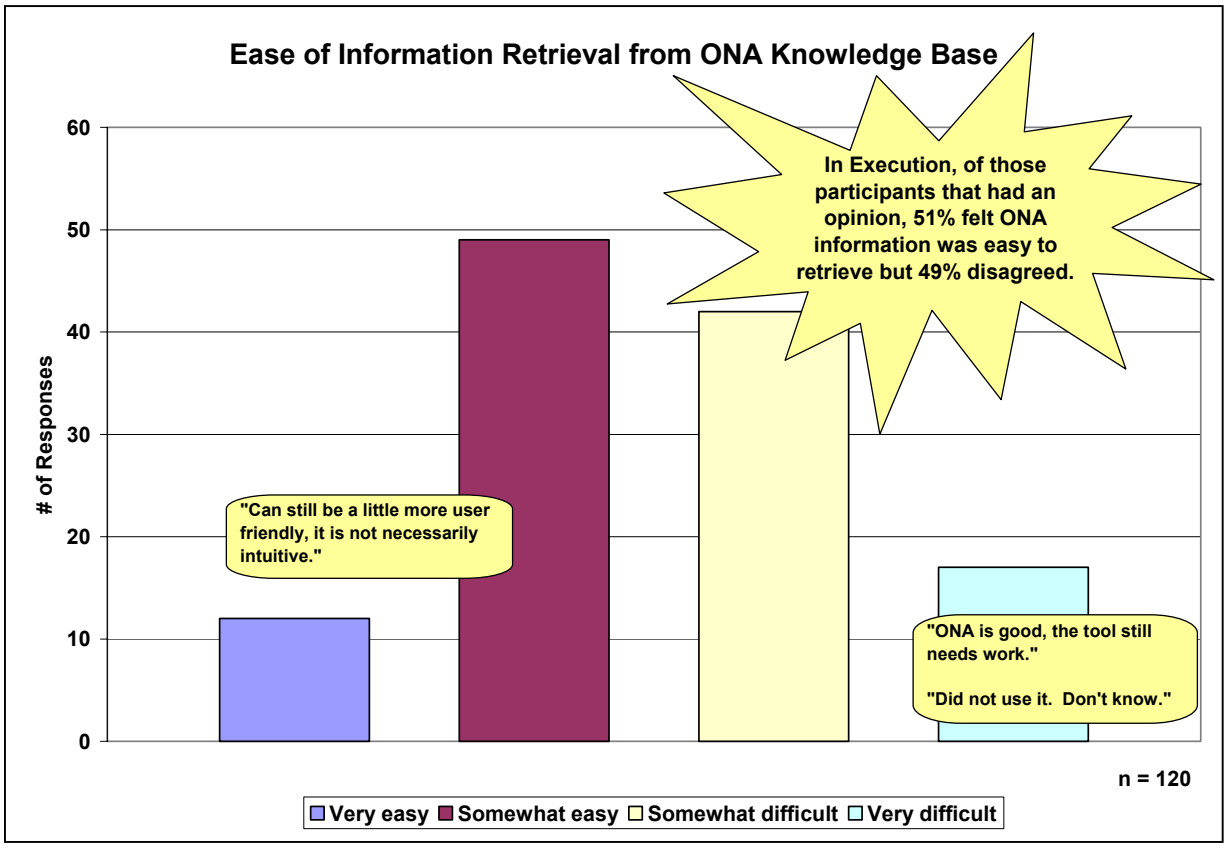


Figure 97: Ease of Information Retrieval from ONA Knowledge Base

SCD Comment: "These knowledge workers (ONA analysts) must be inquisitive, they must have holistic perspectives, and they must be "paranoid" about the opponent tricking or deceiving them. We need a balance between analytic thinkers and some people who rely more on synthesis for their thinking. We must prepare these mental skills in our Service and Joint school systems."

SCD Comment: "Future leaders will have to learn to think differently than we do today, more relationally than we do today. … In the future we will have to synthesize disparate data, and build combinations, relationships. To do that we'll have to start earlier to teach commanders and key staff to think relationally. The education will be a long term challenge. Training will take place latter, but it will be equally important to teach people to use the relational tools."

Participant Comment: "I wasn't really 'trained' to use ONA. Someone showed me where to find the database and I figured it out from there. Maybe I don't know all it can do?"

Participant Comment: "ONA is very hard to get useful information out of. While the information is valuable, it takes a long time to find it."

Participant Comment: "I have a couple of graduate degrees and it hurts my head to figure it out. Get some simple thinking guys to produce a database that any person can understand. Otherwise, no one will use it and go out of their way to shy away from it."

Participant Comment: "If you don't know what u (you) want it is a little daunting as a database to learn and find what u (you) want out of it."

4. Better tools are needed to manipulate the data and information.

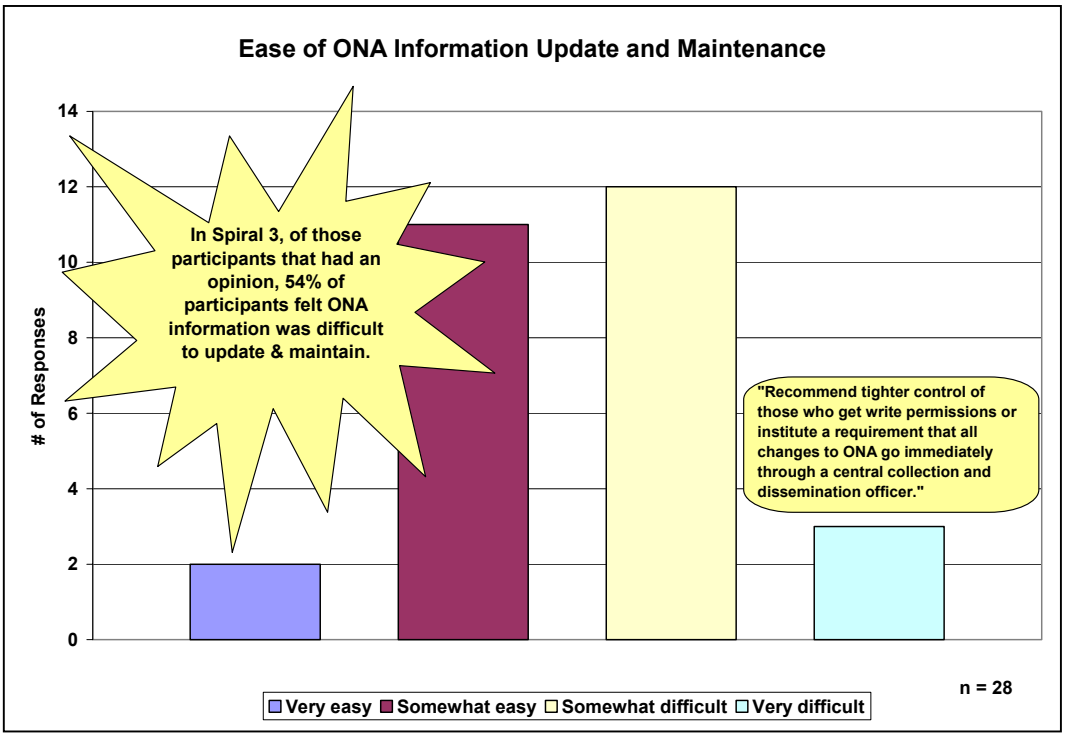


Figure 98: Ease of ONA Information Update and Maintenance

Even for the small scale contingency situation of MC02 the ONA knowledge base contained extensive information. For this information to be accessed, updated, and used, tools that accommodated these actions were needed. An "ONA" tab displayed on Share Point Portal Server (SPPS) web pages took users to the ONA Current Summary (ONA Today) page. From there additional tabs permitted access to the ONA Matrix, ONA References, and Related Products pages. All information included on these pages was located on the SPPS. There also was a tab that transferred users to the stand alone ONA Database. Manipulation of the SPPS pages was fairly straight-forward. Links within these pages to supporting documents supplied additional background and reference; the operation was essentially "typical" and intuitive. The ONA database was primarily intended to support effects based plan development. It contained listings of effects; nodes; actions; resources; references; PMESII systems; and conflict phases. Users could "mix and match" these components to support development and modification of plans as well as decision making. However, the actions required to do the mixing and matching were not obvious. Even using the included User's Guide did not smooth operations for many experiment participants. Their survey comments indicated it took too long to review the help information and even when they did, use of the database was still confusing. Manipulation of the database was not intuitive for many experiment participants.

The charts that follow detail experiment participants' thoughts during Spiral 3 and Execution on manipulation of the ONA data base. Ease of data base update is portrayed first and then ease of filter and sort is presented. Finally, their thoughts on information retrieval are presented. Although the easy/difficult responses are about evenly divided in all 3 situations, the

50 percent (or so) of participants who found the data base- tool relationship difficult to use were at a disadvantage. They could not contribute at the same level.

During Spiral 3 survey recipients were asked to respond to the statement, "Rate the ease of ONA information update and maintenance". Depicted in the figure above, 54 percent of the survey responses stated it was difficult (15 of 28) and 46 percent stated it was easy (13 of 28). This survey question was really asking about the support offered by the ONA tools. Almost half of the respondents found the tools difficult to use for ONA data base update and maintenance.

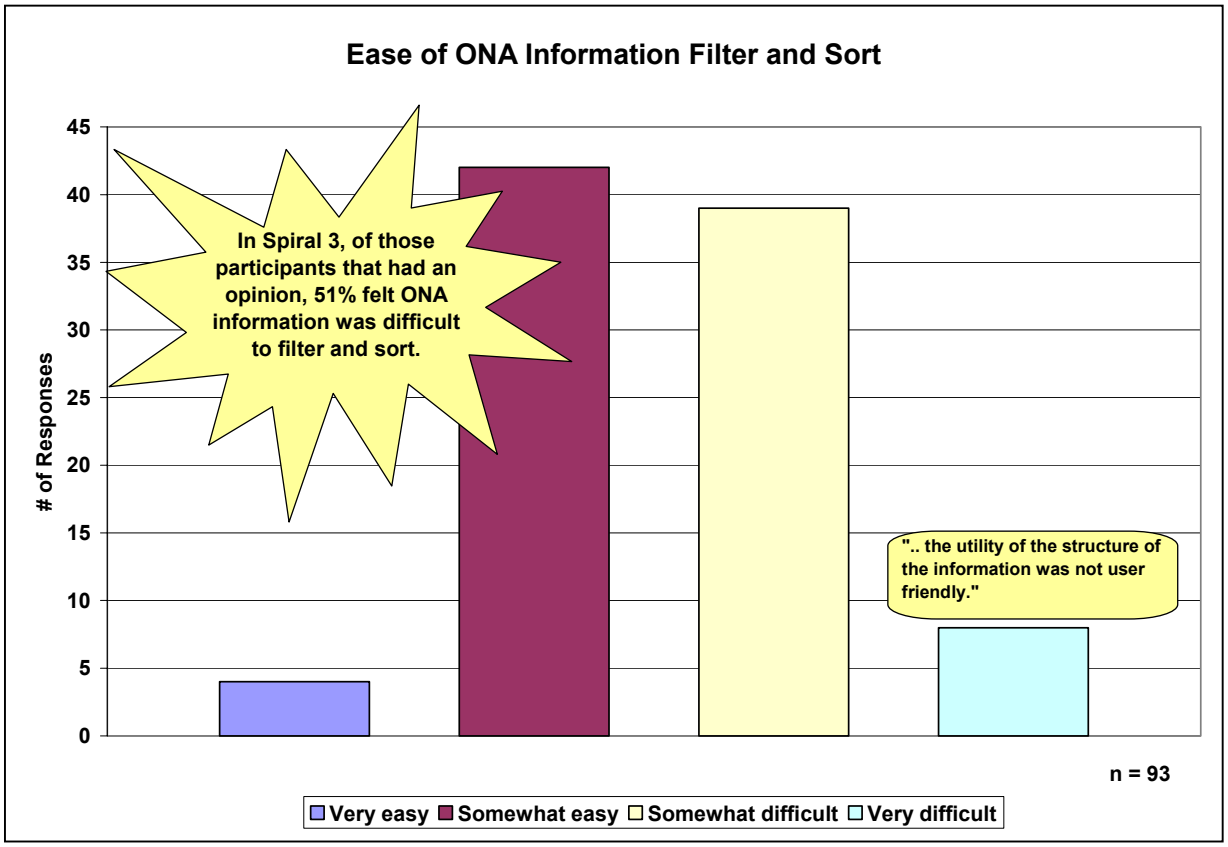


Figure 99: Ease of ONA Information Filter and Sort

During Spiral 3 survey recipients were asked to respond to the statement, "Rate the ease of ONA information filter and sort". 49 percent of the survey responses stated it was difficult (46 of 93) and 51 percent stated it was easy (47 of 93); the opinions were essentially evenly divided. Here again about half of the respondents said the tools were difficult to use for filtering and sorting data base data.

This chart displays the difficulty experiment participants had using the ONA knowledge base during MC02 Execution. They were asked to rate their estimate of the ease of information retrieval from the ONA knowledge base. 49 percent of the survey responses stated it was difficult (59 of 120) and 51 percent stated it was easy (61 of 120). The results were essentially divided evenly but the 59 participants who felt it was difficult could not contribute as productively to the JTF's effort because of their challenge with ONA. Relating this chart to the previous one, there was no change of opinion percentages about the tool design between Spiral 3 and Execution. Whether filtering and sorting or retrieving information, the percentages were the same between events.

Listed below are comments that emphasize the challenge participants had with the tools provided to access and manipulate ONA.

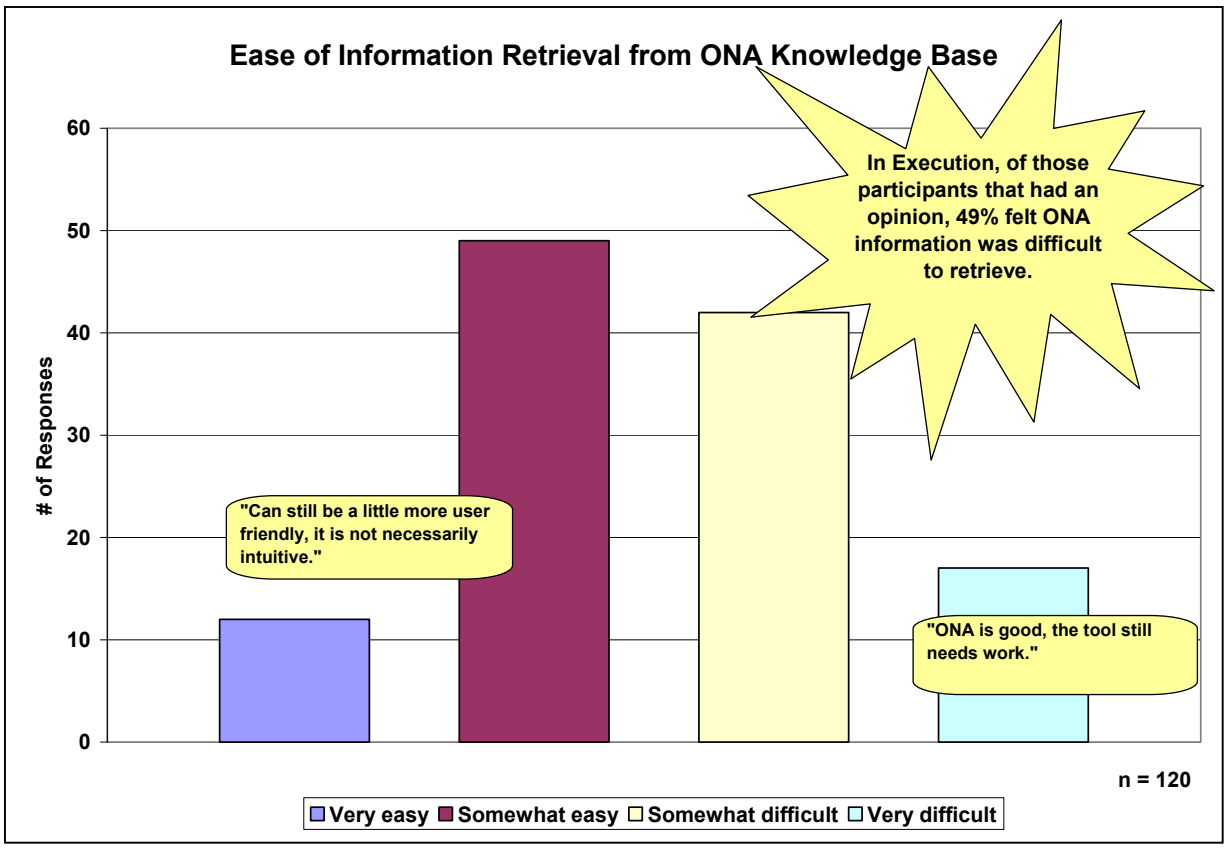
Participant Comment: "I do not really know how to use the ONA tool so I am not sure of the analysis that it provides."

Participant Comment: "ONA Tools are very time consuming."

Participant Comment: "The ONA tool does not communicate the information it contains."

Participant Comment: "ONA tool needs more database input and more refinement in terms of data relationships. The ONA process has potential but needs significant refinement to be useful, including a change in institutionalized processes which disregarded the ONA in favor of more familiar methods."

Clearly the tools designed to use the MC02 ONA Knowledge Base presented a challenge for the participants. They were acknowledged by experiment designers to be less than desired going into the experiment but they also were considered to be workable. In fact they were; the ONA was used enough for participants see it's potential. However, the experiment did demonstrate how important tool support was for ONA. It is an aspect of the concept that deserves considerable attention.



5. Visualization is a major consideration for the ONA concept and its components.

As the experiment progressed the word "visualization" was voiced more and more frequently. Its use in relation to the concepts was not surprising. The limited understanding of the concepts and their implementation caused SCDs, SMEs, and participants to suggest visualization as a solution for the frustration of expressing exactly what was occurring or needed.

The dictionary definition of "visualize" offers several statement variations for the word. They all support the need of grasping (understanding) and using the ONA concept. The Webster dictionary defines visualize as, "1) to recall or form mental images or pictures 2) to form a mental image of 3) make perceptible to the mind or imagination." Before any of these three mental events can take place an initial depiction of what the concept is, is necessary. Although numerous PowerPoint slides graphed input, output, and process there was not been a common depiction, a model, which displayed ONA's use and operation.

ONA is a complex concept; visualization would simplify this complexity by aggregating the disparate views that existed and bring them into a more common focus. Words can paint a picture for a group of readers who tend to interpret them individually; if the same group were shown a visualization (a picture), the commonality of interpretation tends to be much greater. An easily understood model is needed before visualization can occur. It is needed before changes or modifications can be made to the concept. ONA can't be changed if there first isn't a clear understanding of what is being changed. This same visualization requirement is also valid for the other concepts.

When senior mentors spoke of ONA, each added their slight "bend" to the pathway for ONA use and cautioned about the importance of visualizing the course. During an Information Superiority Group after-action discussion of the ONA database it was agreed there was a problem with database visualization. The users also had difficulty understanding how the tools functioned. Second and third order effects and unintended effects were identified as particular problems. During the same session the remark was made that a diagram system showing the relationship between ONA the SOSA cell and the Blue/Red cell was needed. That is, a visualization of these relationships was necessary. There was general agreement among experiment participants with the requirement for ONA visualization; there wasn't general agreement on what its image was.

The comments listed below provide an indication of how the MC02 audience felt about visualization.

SCD Comment: "We need different tools. We need to automate the operations synchronization matrix. National ("DI&E") effects have to be displayed, perhaps with a rotating Rubik's Cube. As a caution, however, visualization is very costly."

SCD Comment: "We are conscious of the need to visualize effects but we cannot do that today."

SCD Comment: "… visualization can't be normalized; it needs to be personalized."

*SCD Comment: "*What visualization we provide needs to be tailored for the individual so he or she can set filters and make better decisions without being overwhelmed with data."

SCD Comment: "… (We) need more tools that help you visualize …"

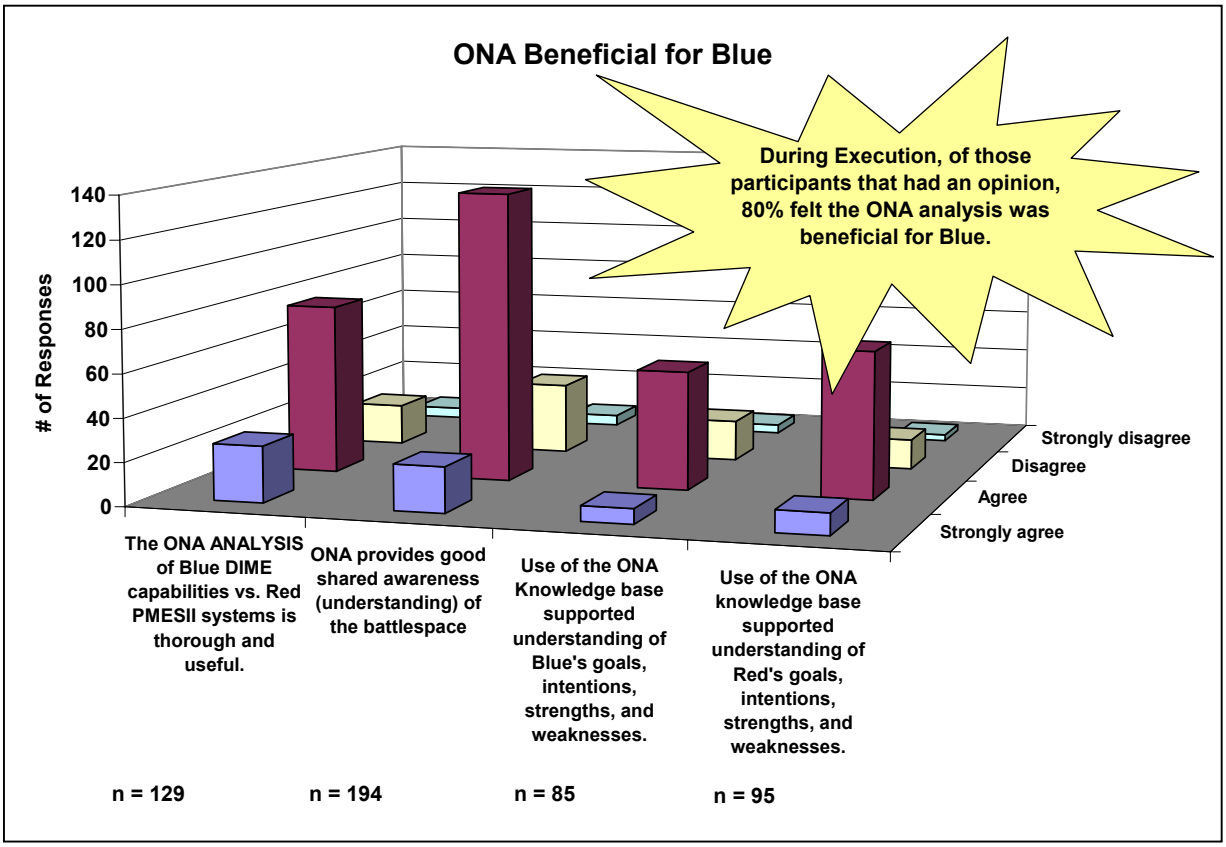
SCD Comment: "It is all about visualization. We have to visualize what effect has been achieved."

SME Comment: "There needs to be a way to *visualize* the ONA nodes. It is difficult to comprehend how a series of nodes relates to one another and effect."

SME Comment: "It (ONA) needs a better way to *visualize* all the links between the nodes."

SME Comment: "It (ONA) is definitely supportive in the earlier stages of the crisis. It provides initial insight into the nodal analysis and how and why an adversary may act a certain way. It will require overhauling in ease of use and should include a *visual* building of node-arc-node analysis in order to evaluate second and third order effects of operations."

Participant Comment: "The ONA tool does not communicate the information it contains. It needs a graphic *visualization* of nodal analysis. But it at least needs to contain a complete nodal analysis of the information systems and it must show how the system will morph when nodes are affected or removed."



6. ONA was useful for Blue during the experiment and it shows great potential for military operations. The potential benefits of ONA were recognized.

The first additional finding recognized ONA's strong potential. Participants and senior mentors made comment of the potential benefit ONA offered. Support was not unanimous, but it

was pervasive. The results of survey questions displayed the positive impact ONA had for Blue during the experiment. Using a product that was far less complete than depicted in concept papers, the MC02 JTF used it to enhance their activity. The concept of having a repository of pre-analyzed data readily available for all levels involved in a national defense challenge was very appealing for experiment participants. Supported with existing and the promise of new information management technology, participant comments indicated the concept was ripe for exploitation. The "how", "what", and "when" still required resolution; potential benefits are enormous.

The survey question result charts combined above were used elsewhere in this ONA report. They are presented together here to emphasize the positive impact ONA had on Blue and its efforts during the experiment. The survey questions were presented to different experiment participant groups on different dates and resulted in different survey response populations. As noted in the chart, 80 percent (401 of 503) of the respondents with an opinion felt ONA and its analyses had a beneficial impact on Blue; it was useful for Blue.

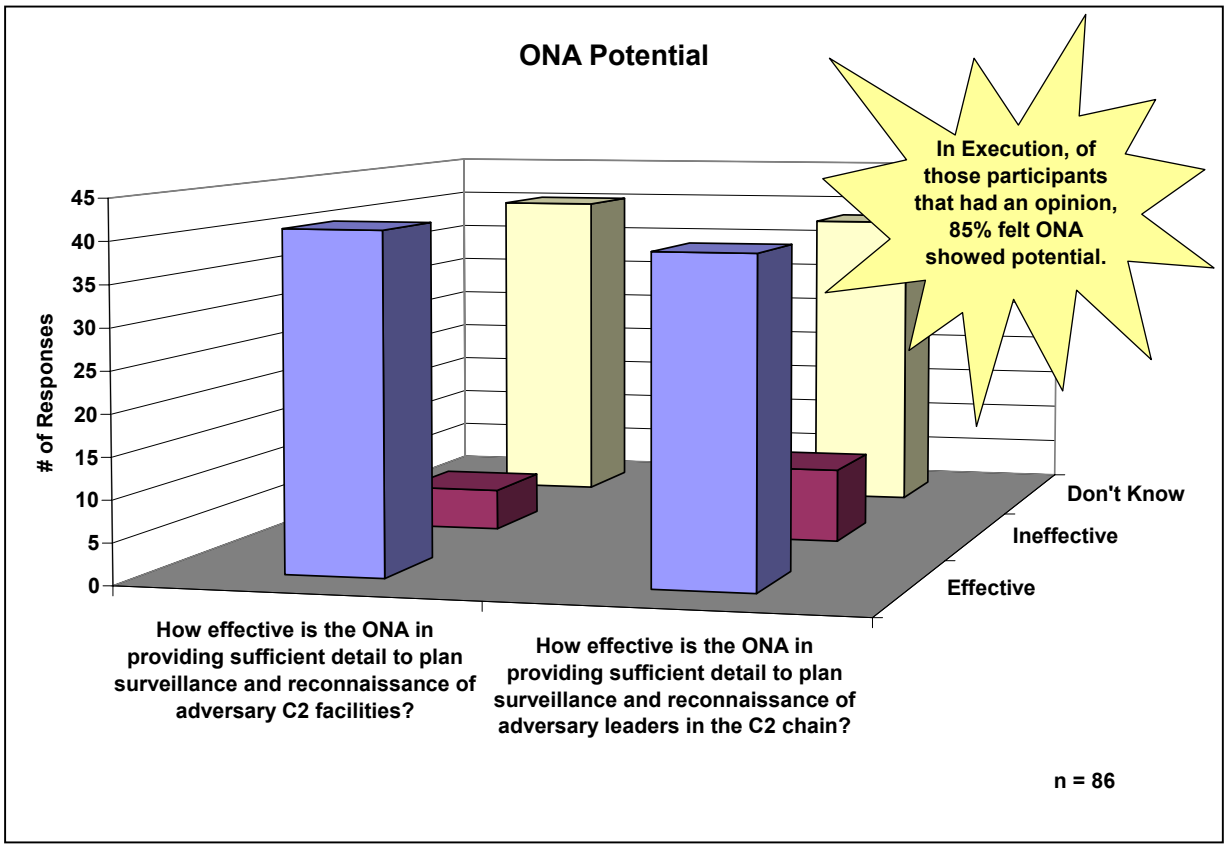


Figure 100: ONA Potential

There were several survey questions in the ONA warfighter challenge and task accomplishment matrix analysis (ONA Data Collection Matrix) that dealt with ONA's use and its potential. Shown here are the results of two very specific ONA use questions that also indicate ONA potential. The relatively high percentage of respondents without an opinion on the questions was consistent with many of the replies to other survey questions presented during the experiment. It was indicative of participant unfamiliarity with the new concepts and associated reluctance to make a decision. As shown, 47 percent (80 of 172) of respondents felt ONA offered

potential for planning action against facilities and leaders. Only eight percent (14 of 172) indicated ONA would be ineffective. Forty five percent (78 of 172) did not have an opinion. When the segment of respondents was parsed to those having an opinion, as displayed in the chart above, 85 percent (80 of 94) felt ONA would be effective; 15 percent (14 of 94) felt ONA would be ineffective. The "Effective" percentage indicated significant potential for ONA.

There was a particular event that took place during the experiment that showcased ONA's potential. It involved the Special Operations Force component commander and the JTF commander. Based on information derived from ONA the JSOF proposed a SOF mission against a current Intel based node that could obviate the need for a force assault against that node. ONA information was used to convince the commander of the economies and benefits for using the SOF force vice the invasion force. The incident also "sold" the JTF commander on ONA's potential; it made him a believer in the concept. (JTF CC: "I was making a bad decision by attempting to apply conventional combat power over a period of days rather than select a one night raid that had high potential to change the way.") A SME comment describing the event from his perspective is included with other comments provided below.

Listed below are some of the senior concept developer (SCD), subject matter expert (SME) data collector, and senior participant comments and observations that delt with ONA's utility for Blue during the experiment and its future potential. Additional comments are available at annex ___ (**Additional Observations and Comments Concerning Finding 6**).

JFCOM CC Comment: "I believe we validated the concept, although the tool might not be perfect."

SCD Observation: "The ONA concept shows great promise. In MC 02 it added significant value during the planning phase. It enabled commanders to develop a more comprehensive mission analysis, to establish a pertinent set of desired effects, and to define effects that should be avoided."

"The degree to which the outcome was different in MC 02 than it would have been without ONA is difficult to measure, but it is possible to get a glimpse of the possibilities inherent in the concept."

SCD Observation: "The Operational Net Assessment continues to grow and mature. The ONA has great potential, with one broad caveat. That is, the ONA is not a tool to satisfy all knowledge requirements."

SCD Comment: "Enabled by the ONA and collaboration, the JTF conducted rapid decisive planning. The ability of the JTF to execute rapidly and decisively was not confirmed."

SCD Observation: "The CJTF selection of desired effects to achieve the combatant commander's campaign objectives derived exclusively from the ONA."

SCD Observation: "The combination of the ONA and a focus on effects seemed to have a positive impact on the efficiency and effectiveness of the planning process."

SCD Comment: "There is an art to understanding ourselves and the enemy, to 'how we perceive the enemy and perceive ourselves.' Commanders fall along a bell-shaped curve. ONA

can move the whole curve to the right, make a commander more artful, if the commander can inquire and get better answers."

SME Comment: "Almost everyone in the IO Cell is using the ONA daily. JFMCC uses it much of the time, but information is not detailed enough to be more than an azimuth check. PSYOP/MMIC uses it to answer 1-2 questions/day. IW (information warfare) is a heavy user, but only recently received training (not in Spirals). Others stated that they used ONA several times a day to answer important questions."

SME Comment: "During discussion in JCB, WG, RM 101, 301530LJUL02, the targeting of an airport in CJTF-S area that had not been targeted before was discussed. The apron was to be destroyed and not the planes. It would just disable the use of the airport with minimal damage and save the planes for possible return to GOR much later in the conflict."

"Great job of following ONA. Minimal damage to GOR territory and receiving the desired effect...no planes in the air to oppose BLUE forces."

SME Comment: "Ref: AAR on 31 July 02 where JSOTF CDR commented on using ONA to assist him in a targeting proposal. My interview with one of the persons present yielded this short summary: 'JSOTF commander approached JTF CDR for permission to launch a SOF DA mission. From the ONA, JSOTF found a target of opportunity that would have 2nd and possibly 3rd order effects.' JTF CDR had difficulty understanding the value of such a mission until JSOTF presented the evidence drawn from the ONA. The JTF commander not only approved the SOF mission but finally grasped the value of ONA."

SME Comment: "For those that use it, the ONA supports better, more informed decisions."

Participant Comment: "ONA is a promising concept. It obviously takes a lot of work to manage and keep current!"

Participant Comment: "The ONA process has potential but needs significant refinement to be useful, including a change in institutionalized processes which disregarded the ONA in favor of more familiar methods?"

Participant Comment: "The ONA contributed to the overall success of components and the JTF throughout the experiment because it provided a basis for almost every collaborative session. The greatest benefit of the ONA is that it allows commanders and staffs to quickly focus on the problem and gain immediate situational awareness leading into mission planning and …"

Participant comment: "ONA provided viable nodes for attack that lead to accomplishment of the JTF Cdr's. desired effects."

7. The ONA database was not updated to the users' satisfaction.

Maintaining information update and currency would be a challenging effort for any system that supports a dynamic situation. For ONA to provide the support as described in the concept papers, its data and analysis would have to be continuously updated. Update was

expected to be a difficult challenge for ONA. During Spiral 3 ONA update was not noted as a problem; during Execution user comments reflected decreasing confidence in ONA when information was found to be outdated. Review of ONA database access and change activity indicated that changes (update) actually were made during Execution but they apparently did not keep pace with scenario activities.

A process for ONA change and update was included in SJFHQ TTPs; individuals were identified to make the changes. However, ONA information currency did not satisfy the users. There were model/simulation environment realities that contributed to the update challenge but the manpower investment within the JTF headquarters to keep the ONA abreast of dynamic events was not sufficient.

The charts that follow indicate the importance ONA users placed on database currency and update. ONA users endorsed the currency requirement. Survey responses suggested the ONA knowledge base (including the database) was not continually updated to reflect battlespace change. The challenge of updating the ONA was not adequate during MC02.

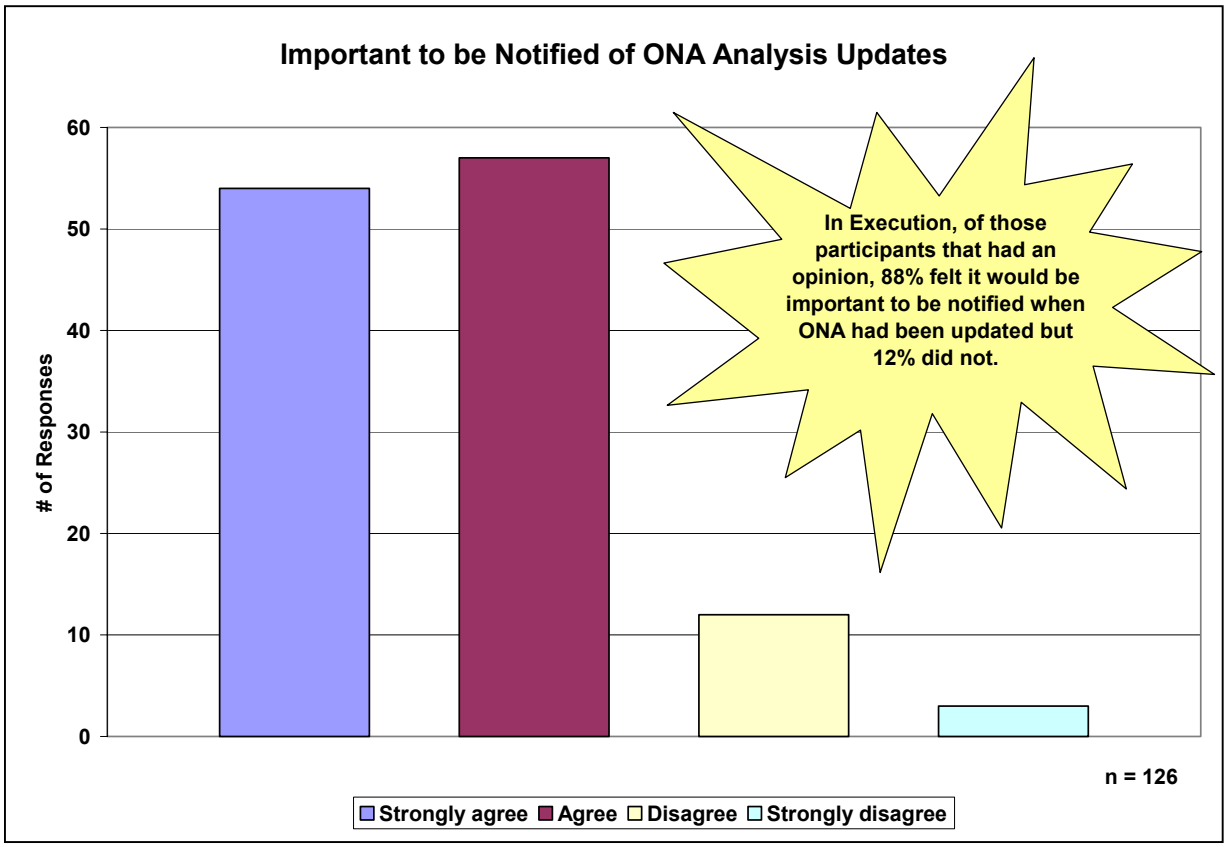


Figure 101: Important to be notified of ONA Analysis Updates

Execution participant responses to the statement, "It is important to be notified of ONA analysis updates", were definitely supportive. 88 percent (111 of 126) of respondents with an opinion agreed; 12 percent (15 of 126) disagreed. Of those who disagreed (15 survey recipients) 7 provided comments. Five of these 7 respondents based their disagreement on the assumption ONA would be continuously updated and therefore notification was not needed. Essentially they were in agreement with the statement and their position increased the percentage of actual agreement from 88 to 92 percent.

During Spiral 3, 81 percent (81 of 100) of survey respondents with an opinion felt they could not tell when the ONA had been changed or updated; 19 percent somehow felt they could tell when changes or updates were made. There was no built-in update notification feature associated with the ONA database. These results combined with those of the previous figure showed the importance experiment participants placed on update and notification.

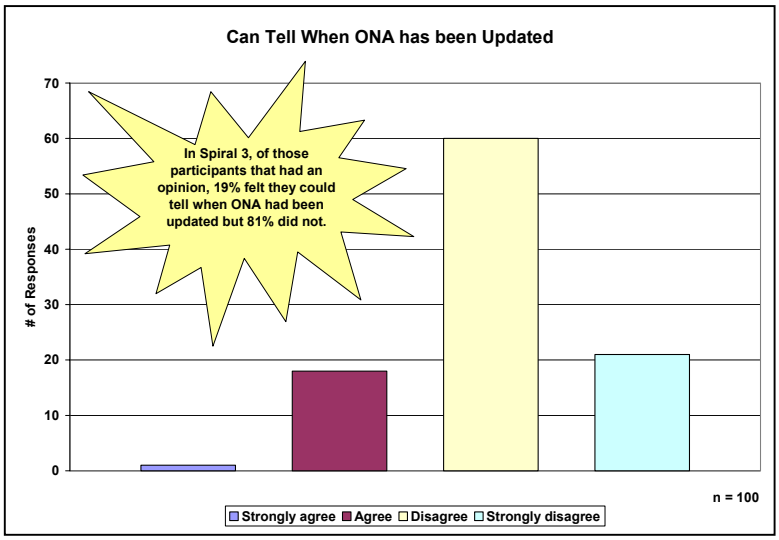


Figure 102: Can Tell when ONA has been Updated

The charts that follow indicate the importance ONA users placed on database currency and update. Database access information suggested the ONA database was not continually updated to reflect battlespace change.

The figure below indicates a gradual increase in the ONA database cumulative data changes as Spiral 3 approached but a gradual decrease in the cumulative data changes in the ONA database as Spiral 3 progressed. This decreasing data change trend occurred because the

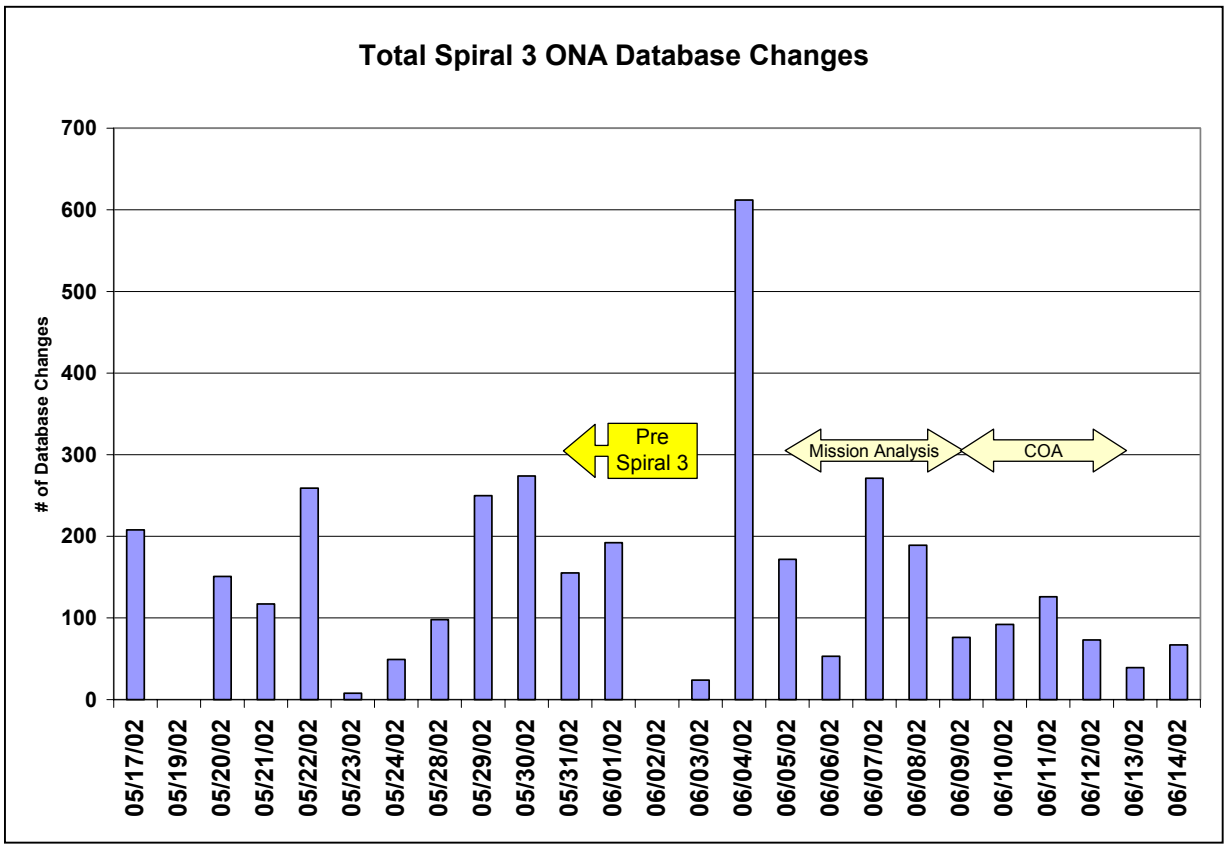


Figure 103: ONA database changes

SOSA cell was tasked for information by the Plans Group and did not have time to maintain their pre-Spiral 3 data change tempo.

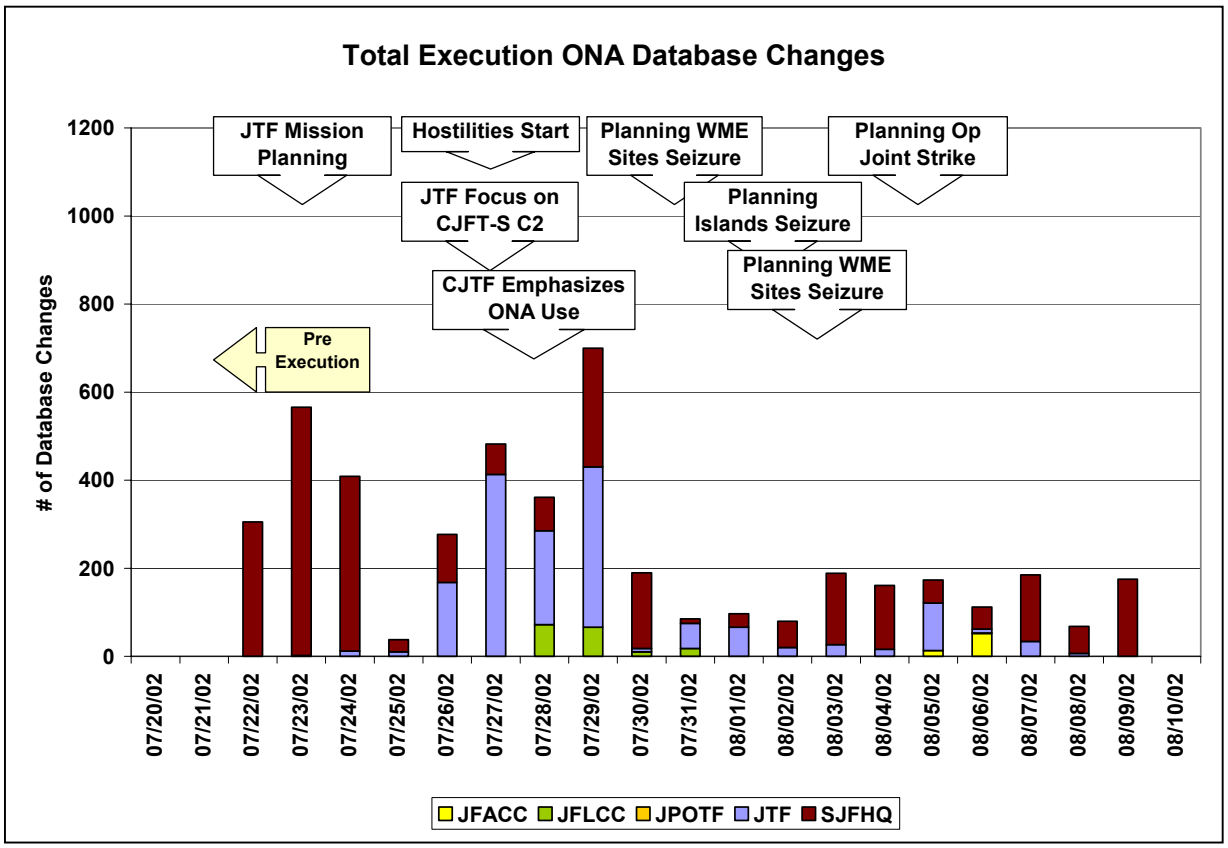


Figure 104: Total Execution ONA Database Changes

The figure above indicates a gradual increase in the ONA database cumulative data changes as Execution approached but a gradual decrease in the cumulative data changes in the ONA database as Execution progressed. As planning events (shown in the text boxes at the top of the figure) lead to operations, effect-node-action relationships are impacted and changed. Those changes were not reflected in the database as indicated by the reduced change levels from 07/30/02 through 08/10/02 relative to the pre Execution change activity levels.

Changes were made to the ONA but they were sporadic and not responsive to scenario actions. The participants placed high importance on database currency but could not tell when it had been changed.

8. Both ONA warfighting challenges were met.

Analysis of the challenge, task, measure, data requirement, and data element ONA matrix is included at annex ____ (**ONA Data Collection Matrix Analysis**). This analysis determined that both warfighting challenges were met.

Relationship to Other Objectives

Within the context of MC02, ONA directly impacted 2 of the 5 experiment objectives. Indirectly the concept impacted and was impacted by all objectives.

Experiment objective 1, Establish Information/Knowledge Superiority, contained 2 warfighting challenges; ONA knowledge was needed for successful accomplishment of both. Experiment objective 4, Conduct Decisive Effects Based Operations, had 3 objectives and all

used ONA information. In fact there were SCD statements that said effects based operations were not possible without an ONA (SCD: "We should not discuss ONA in isolation. It has to be discussed in the context of EBO").

Relationship to Baseline Analysis

There were no baseline data available with which to compare ONA. JFCOM J7 SMEs offered some comments on their estimate of ONA impact on JTF performance. These were founded on their personal experience and perception from the JFCOM J7 training environment and were not made in relation to a historical baseline.

DOTMLPF Linkage

The ONA DOTMLPF package included 5 training related recommendations. They were:

- Development of ONA Training Plan
- Evaluate Training Strategies
- Development of PME Strategies
- Evaluate and Implement Methods to Incorporate ONA Education Programs into Existing Intelligence Training Programs
- Services Incorporate ONA Education Strategies

MC02 Final Report, ONA Finding 3 **(**Training impacted understanding and use of ONA.), links with each of these DOTMLPF training recommendations. However, before moving too far along with them, response to MC02 Final Report ONA Finding 1 is needed. Without a clear definition of what ONA is to do; what it is to include; and how it is to be used, training programs can not be developed.

Another ONA DOTMLPF package recommendation was to, "Continue SJFHQ Experimentation Efforts to Determine Requirements for ONA Development". It links easily with ONA Findings 1, 2, and 6 ("ONA needs to be defined and focused … there is not a common understanding of what to expect … for implementation." "Command levels have different requirements for ONA … one size does not fit all." "ONA was useful for Blue during the experiment and it shows great potential for military operations. The potential benefits of ONA were recognized.") Once again, the considerations of ONA Finding 1 need to precede the DOTMLPF recommendation.

Finally the DOTMLPF recommendation for, "DARPA 'ONA for EBO' Tool Development" tracks with ONA Finding 4 ("Better tools are needed to manipulate the data and information."). The ONA Finding stresses that the importance tools supporting ONA should enhance a "mind's eye" view of the information in the database.

Recommendations:

The intended military use of ONA must be defined and focused; USJFCOM needs to lead the effort for focusing ONA. ONA's emphasis must be planning support; operational support; intelligence support; assessment support (bomb damage/BDA); or support of some other area of interest. The concept currently presents ONA as having answers at all conflict and command levels for most all of these areas. Technology can or will support many variations of a knowledge base but until the military's intended use for the ONA process and product is solidified, implementation will be disrupted. After the mission focus is made and a process established, the concept could grow into support for other areas.

Even though ONA is "very young" and can generate more questions than answers at this point, it still needs a trace that connects its dots. JFCOM must specifically define what ONA is to be used for; the command level it is to serve; how it is to be developed and maintained; and the type of information it is to offer. These decisions need to be made before ONA development can move forward and supporting elements like tools and training shaped. Also, questions like these require resolution: "Is the information in ONA analyzed or just information?" "If data is analyzed, who and with what background provides the analysis?" "Must the information be 'current'?" "Who is expected to use the information?" "Is the cost of development proportional to the benefit?"

Based on the results of this effort JFCOM can shape ONA development for further experimentation and begin to answer the other questions that critics of the concept have waiting.

Military ONA development needs to focus its implementation on the command level that will benefit most from the ONA concept. There may be aspects of ONA that can have relevancy for several command levels without particular specialization attention needed. If so and ONA is available these aspects should be exploited by the various levels. But if ONA is to be implemented from strategic to tactical levels, an "ONA" must be designed for each. Technology may permit availability of ONA from strategic to tactical command levels but the information (the "programming") will still have be designed and broadcast to each level. Each has particular interests that need update and information requirements that are most pertinent for them.

JFCOM needs to develop a template that guides development of joint and service PME training on the ONA and EBO concepts. This template should describe the concepts and then propose the new manor of leader thinking that will be needed to employ them. For all future experimentation with ONA, participants must be prepared as much as possible with this different way of thinking. They must be trained and proficient with it. They will need the training background to use the ONA and EBO as well as other concepts correctly. JFCOM needs to establish the basic requirements so other joint organizations and the services can construct supporting educational programs.

USJFCOM must push for design of knowledge base tools that are intuitive to use and dynamically support users. Complaints about the tools supporting ONA most often cited them as not being intuitive to use. No matter what the primary focus for ONA, access and manipulation tools supporting it must be straight forward and simple to use. In addition artificial intelligence process tools will be needed to identify pertinent information from the bundles of data that are reviewed. The tool needs the ability to continually read, categorize (taxonomy) and organize (index) large quantities of documents across file systems, web sites and databases using artificial intelligence (AI) data/web crawlers. Also it needs the ability to notify users via various avenues when content or concepts are changed according to predefined user-defined rules.

Once the significant pieces of information are developed they need to be pushed to the appropriate users. Tools that perform these functions need to be built.

Participants felt ONA improved the quality of decisions in MC02 but not the speed with which they were made. Decision support tools would complement this aspect of command and allow quicker decisions to be made. Depending on the primary focus for ONA other, specialized, tools may also be needed. They too will need the same "push" from JFCOM.

Relationship of the elements included within the planning tool was another concern of MC02 participants. They asked for a process that would allow them to visualize how these elements related to each other. To address the need for Effect-Node-Action visualization requirements by the users, the tool needs a graphical application that can visually portray the

interrelationships and linkages of the relevant concept information being categorized and indexed. This visual capability needs to be built into ONA support tools.

JFCOM needs to oversee a coordinated process that causes all of these tool capabilities to be developed. Until ONA is fielded JFCOM must be the gadfly that keeps the ONA tool development and integration effort moving.

USJFCOM needs to establish a section within joint experimentation that designs visualization models for its concepts. Participants voiced frustration with not having common understanding of the ONA concept. A visual depiction of ONA needs to be built that provides a clear unambiguous mental picture for all. This same needs to be done for the other joint experimentation concepts.

An experimental ONA prototype needs to be developed by USJFCOM. A decision is needed on the focus for ONA and then an ONA prototype must to be cast. The prototype needs to be easy to understand and visualize. This prototype should be built by a defined group that would develop an ONA when the concept has been adopted. It should address a real world circumstance. Once complete, refinements can be made as technology and experience shape change but at least it will be the common starting point.

If ONA is to be available for the strategic, operational and tactical levels of command, it should be tailored for each. Tools for access and update can be integrated into the prototype. Definition of a prototype will also allow training requirements to be defined.

The context of the exercise/experiment did influence both of the ONA warfighting challenges. For the first challenge Combatant Commander Blue's strategy for the experiment was developed outside of scenario play but within the bounds of the experiment's ONA. This strategy was employed by JTF Blue. The experiment developed ONA and was used for reference and support. Tasks associated with the second challenge were successfully completed using ONA during the experiment. ONA supported enhanced decision making.

ONA Warfighting Challenge 7.1: Ability to construct and use ONA knowledge base to support development of an effects-based strategy

Challenge 1 Supporting Tasks:

- Develop an ONA information knowledge base
- Analyze Red's PMESII systems (for tangible and intangible strengths and weaknesses)
- Continually update the ONA to reflect battlefield change
- Employ automated tools to virtually and collaboratively access, manipulate, and maintain the ONA knowledge base

Task 7.1.1 Develop an ONA information knowledge base

An ONA information knowledge base was developed by J9 for the MC02 experiment. It was not as robust as the product included in concept description documents but was complete enough to effectively stimulate experiment activity. The ONA information knowledge base was defined to include all ONA related data and information presentations (ONA Today; ONA Matrix; ONA References; ONA Products; ONA Database) available to experiment participants. The ONA database provided support for effects based plan development and revision.

Review of database development and change was conducted by using a Special Query Language (SQL) database audit log. Entries to the audit log were made by SQL triggers when certain events occurred in the ONA database tables. The audit log essentially recorded or

"counted" user activity. The ONA database contained detailed data tables on nodes, effects, actions, resources, references and Effects Based Operations (EBO) plans. Manipulation of these tables could be made relative to the conflict phase (Influence, Deter, Coerce, Compel, Defeat, and Transition), national power capability (DIME), and adversary systems (PMESII). When a change was made to an EBO based plan, the activity was added to another table titled Selected NAE (Node-Action-Effect) Link. This provided indication of plan change activity. When a document was linked to an Effect, Node, Action or Resource it too was noted and recorded within the Reference table. Review of the count totals provided insight as to how the database was used and by whom.

Spiral 3 and Execution count and survey results, indicated task 7.1.1 was completed. The several charts that follow detail this finding. Database change activity and survey result information were used to support the conclusion that an ONA information knowledge base was developed. The figure below is a screen capture of the browser-based user access page to the ONA database from which the audit log (mentioned above) derived its data.

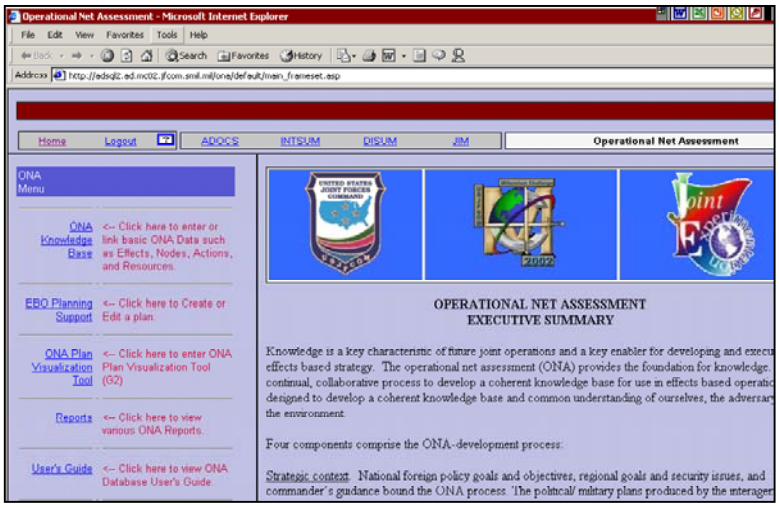


Figure 105

The following four figures depict the browser-based ONA database *data changes* (additions, deletions, corrections, updates, etc.) and database *viewings* that were made during development of the ONA database. While all participants had "viewing" privileges, some participants had "write" privileges to the ONA database. The pre Spiral 3 activity levels are included to show relative level of effort before experiment start.

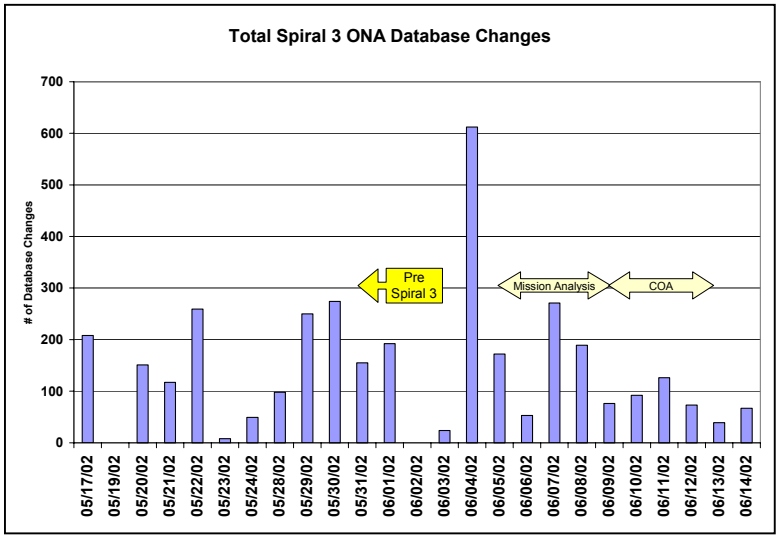
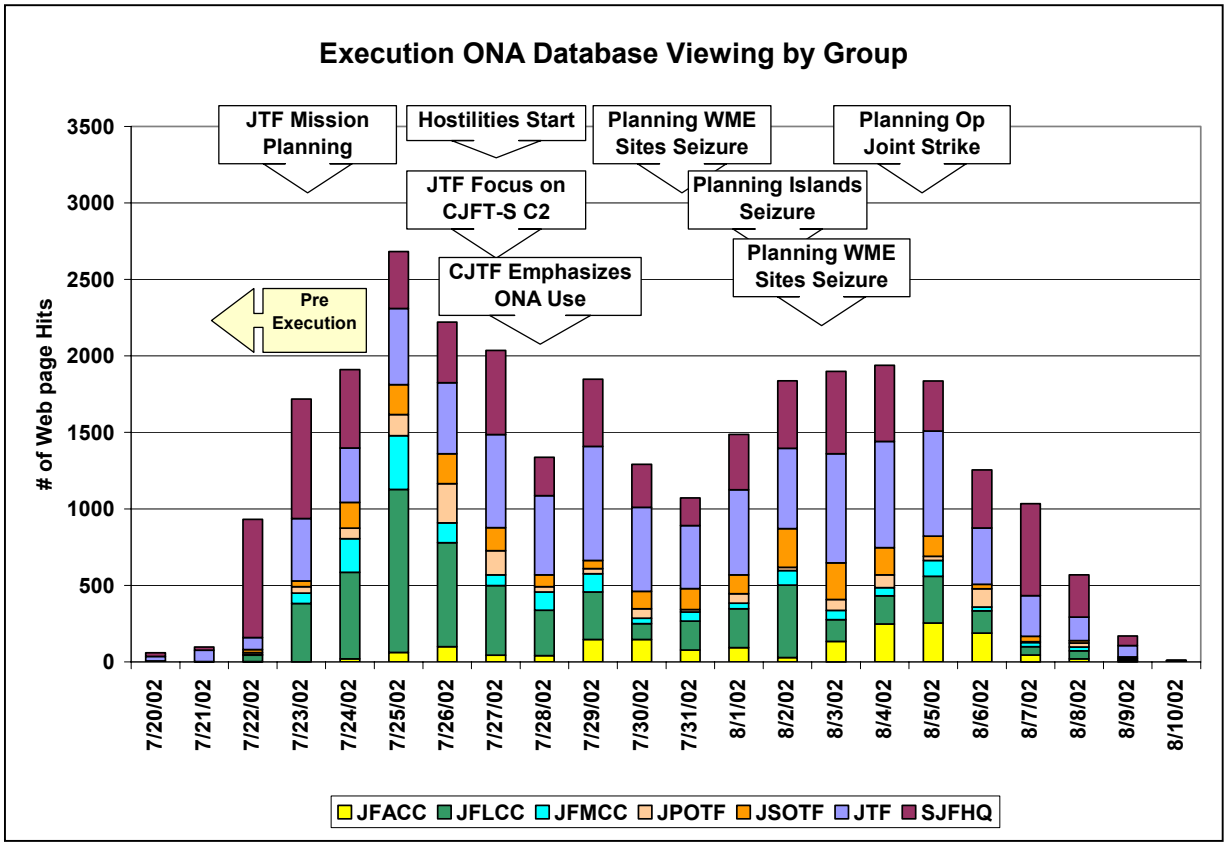


Figure 106:

This chart displays ONA database change actions prior to and during Spiral 3 which was principally a planning evolution. (Change action tracking was not available prior to 17 May 02) During the 17 May to 2 June period the System of Systems Analysis (SOSA) cell conducted *data change activity* (additions, deletions, corrections, updates, etc.) within the ONA database. This modification and development action presented database development just prior to Spiral 3. Discussion with members

of the SOSA cell confirmed this pattern of database development was typical for their entire build process. It was not a smooth straight line development effort. As information was developed and matured, it was added to the database. Some days seemed more productive than others but this productivity wasn't necessarily related to the effort expended for the day. The bar graph depicts a gradual increase in the cumulative data changes (development) in the ONA database as Spiral 3 approached and a modest but decreasing level of data change activity during the mission analysis and Course of Action (COA) phases of Spiral 3 planning development process.

Information in the ONA database was linked to the categories Effects, Nodes, Actions, Resources and References. The category titled "Selected N-A-E (Node-Action-Effect) link" shows the level of change activity in the Effects Based Operations (EBO) Plans area of the ONA database. That is, whenever an addition, deletion, correction, update, or other plan modification action was made, this database table received a count. These were the database categories that could be changed. The chart above breaks out the categories and their amount of *data change* activity from 17 May to 2 June. References (addition of a reference document), Nodes, and Selected N-A-E links were the predominant areas where data was being changed. Changes to Effects, Actions and Resources data were minimal during this database development and population period.



The figure below also presents perspective on database development. All participants had "viewing" privileges but some participants had "write" privileges to the ONA database as well. Due to the constructs of the ONA audit log, participants making changes to the data were also counted as viewers since access was browser based. The figure above depicts the cumulative

viewing of the ONA database by all experiment participants via their web browser before and during the Spiral 3 periods. The 17 May to 2 June period activity represented System of Systems Analysis (SOSA) cell viewing activity for the continued ONA database population just prior to Spiral 3. All viewing activity by experiment participants and SOSA analysts' during Spiral 3 (3 to 14 June) was as shown by the vertical bars. Potentially, each time the database was viewed a change could have been made and additional database development conducted. As with the database change chart, this figure shows a gradual increase in the cumulative participant viewing (and potential development) of the ONA database as Spiral 3 progressed through the mission analysis and COA phases of the JTF planning development process.

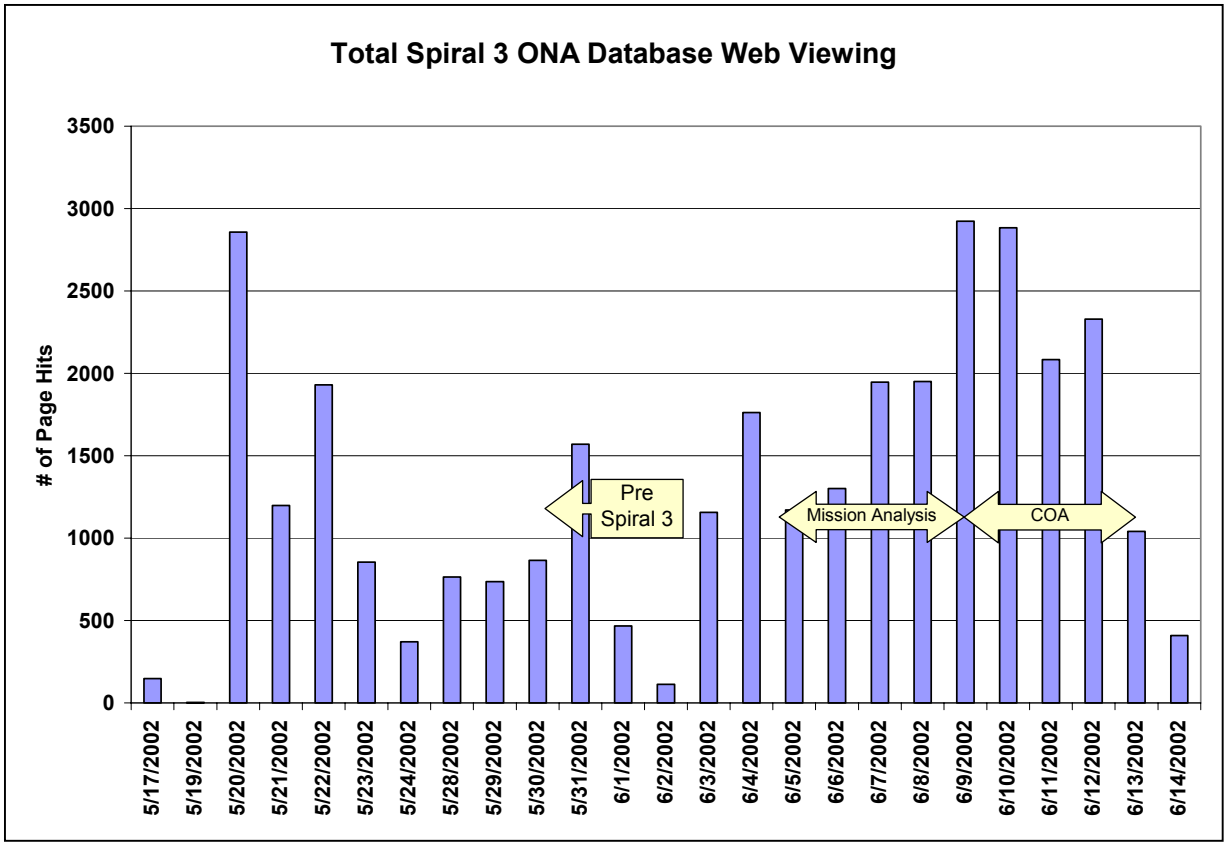


Figure 107:

Key to ONA knowledge base development was pre-analyzed PMESII and DIME data. This chart above shows that development was thorough enough that the analysis was understood by 84 percent (76 of 91) of survey respondents. Execution survey group members were asked to consider the statement, "ONA analysis of Blue DIME vs. Red PMESII is understood." This chart shows that respondents with an opinion felt the MC02 information knowledge base presented the DIME and PMESII analysis well enough that it was understood by more than 84 percent of them. Some 16 percent felt they did not understand the analysis.

Another indicator of database development adequacy was its utility. In addition to being understood, the chart above shows that during MC02 Execution the pre-analyzed PMESII and DIME data were thorough and useful for 75 percent (57 of 76) of the respondents who agreed or

disagreed; 25 percent (19 of 76) of this group disagreed. Twenty five percent of the total population surveyed indicated they did not know how to respond to the statement. Those who included comment with the "Don't know" said insufficient training was the reason for their response.

Shown here is another measure of ONA database development adequacy. The ONA concept portrays an information knowledge base that contains analysis of both Blue and Red data. Results of a Spiral 3 survey question asking for response to the statement, "ONA analysis of Blue information is useful", indicated the majority of respondents from the population with an opinion (51) agreed the analyzed Blue information was useful; but almost as many from the population (49) didn't know (weren't sure) about the statement. At this point in the experiment (Spiral 3), the uncertainty of so many respondents probably reflected their initial exposure to the ONA concept and associated inadequate training. Of those who agreed or disagreed, 51 percent agreed with the statement. The results say there was an operative ONA developed for the experiment.

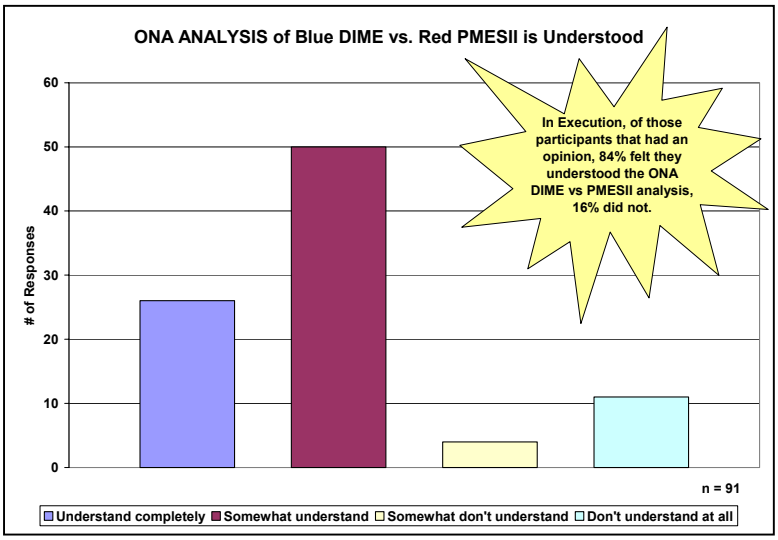
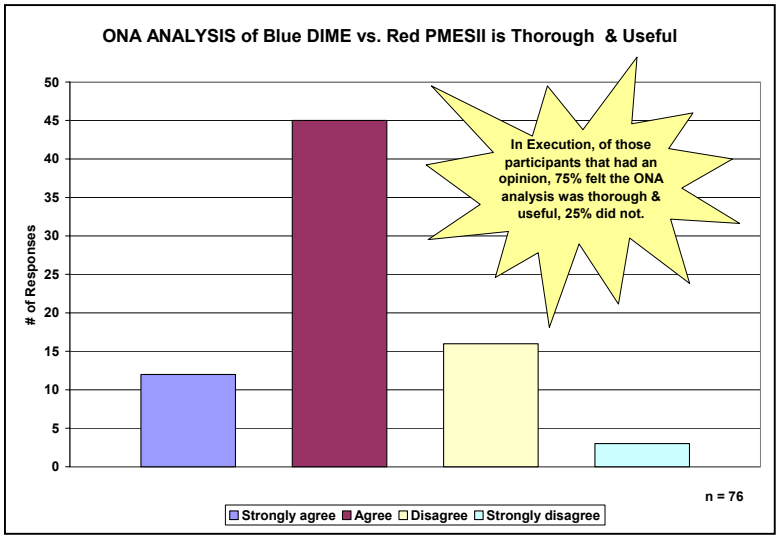


Figure 108:



Finally, development of ONA (among its other contributions) was to provide situational awareness. Presentation of shared battlespace awareness was a desired ONA attribute and an indicator of knowledge base development adequacy. Three times as many survey respondents (66) agreed that the ONA information knowledge base presented a shared awareness of the battlespace as those who disagreed (21). These numbers said 76 percent (66 of 87) agreed and 24 percent (21 of 87) disagreed. Fifteen percent (15 of 102) of all respondents said they did not know.

Review of database change activity, total viewing of the database, viewing of the database by participant organization in relation to on-going scenario activity, and participant responses to database understandability and utility questions all support successful competition

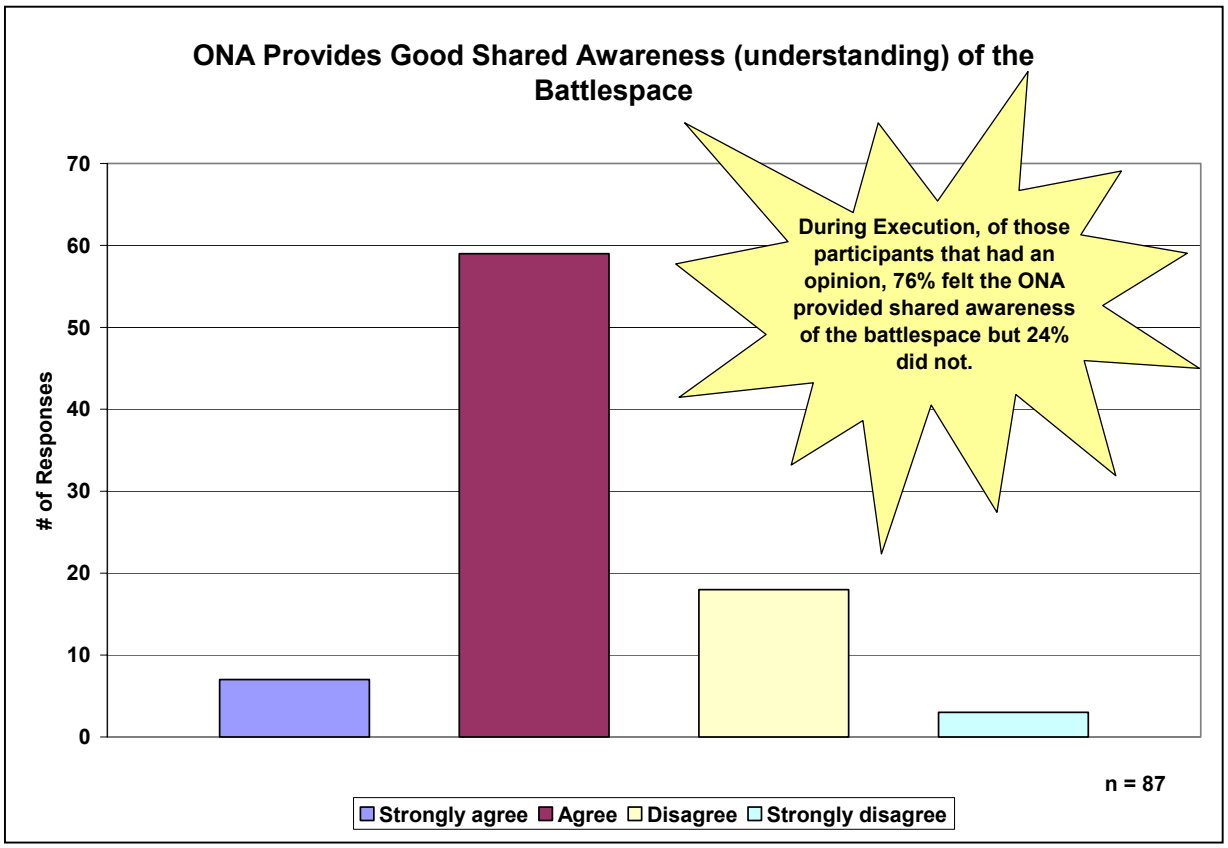


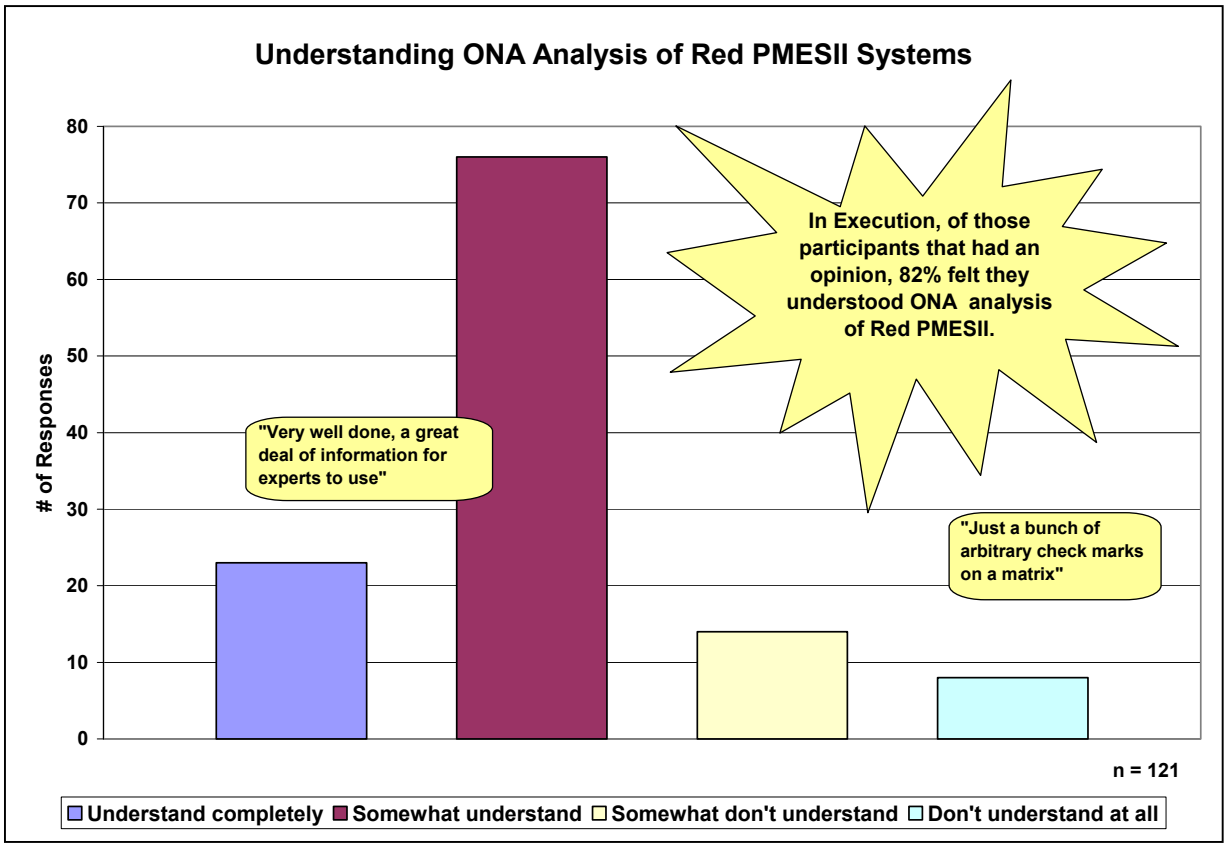
Figure 109:

of task 7.1.1. An ONA information database was developed (and used).

Task 7.1.2 Analyze Red's PMESII systems (for tangible and intangible strengths and weaknesses)

Central to the ONA concept is availability of analyzed adversary data. The information knowledge base developed by J9 and its analysis of Red PMESII systems, although not intended, did tend to be militarily flavored. There was sufficient cross culture breadth however to establish a sense of interagency involvement with the database. Survey results for questions that addressed this task indicate it was accomplished successfully.

The three charts that follow detail the measures that supported completion of this task.



This chart depicts Execution respondent understanding of the ONA Red PMESII analysis. Eighty two percent (99 of 121) of the survey respondents with an opinion felt they understood the analysis; the response comments said the analysis was comprehensive enough for their purposes. Twenty two respondents (18 percent) felt they somewhat did not or did not understand the Red PMESII analysis.

Utility of the Red PMESII analysis for experiment participants was also an indication of hoe well the Red PMESII systems were analyzed. Spiral 3 (when contingency planning was conducted) participants were presented with the statement, "ONA analysis of Red PMESII is useful"; 90 percent (91 of 101) of the respondents who agreed or disagreed, felt the Red PMESII analysis was useful and 10 percent (10 of 101) felt it wasn't useful. Nineteen percent (23 of 124) of the total population surveyed did not have an opinion.

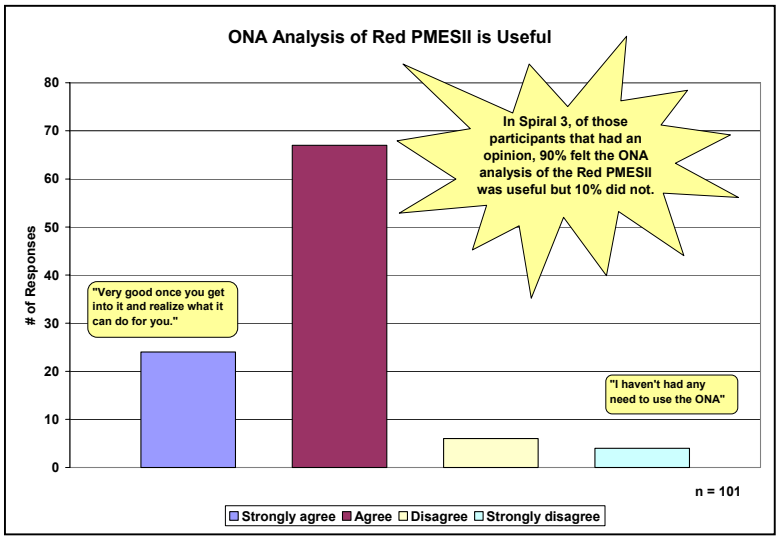


Figure 110:

Successful analysis of Red PMESII systems within the ONA was largely measured by its identification of Red goals, intentions, strengths, and weaknesses. Spiral 3 survey

recipients were asked to agree or disagree with the statement, "ONA analysis supported understanding of Red goals, intentions, and weaknesses". There was strong respondent agreement (82 percent; 78 of 95) among those agreeing or disagreeing that the ONA analysis did provide the noted Red information; 12 percent (17 of 95) disagreed. The 38 respondents who answered N/A to this survey question represented 29 percent (38 of 133) of the total survey population. There were only two of these N/A responses with comment and they indicated ONA was not used. This was not an uncommon comment for N/A question responses provided to other survey questions and for other surveys. Again, these responses probably reflect Spiral 3's initial exposure to the concept for many experiment participants and their less than adequate training.

Participants were asked if they understood the ONA analysis of Red PMESII; if the analysis of Red PMESII was useful; and if the ONA analysis supported Red's goals, intentions, strengths, and weaknesses. Their replies were positive for each. Based on these responses task 7.1.2 was accomplished.

Tasks 7.1.3 Continually update the ONA to reflect battlespace change

Maintaining information update and currency would be a challenging effort for any system that supports a dynamic situation. For ONA to provide the support as described in the concept papers, its data and analysis would have to be continuously updated. Update was expected to be a difficult challenge for ONA. During Spiral 3 ONA update was not noted as a problem; during Execution user comments reflected decreasing confidence in ONA when information was found to be outdated. Review of ONA database access and change activity indicated that changes (update) actually were made during Execution but they apparently did not keep pace with scenario activities.

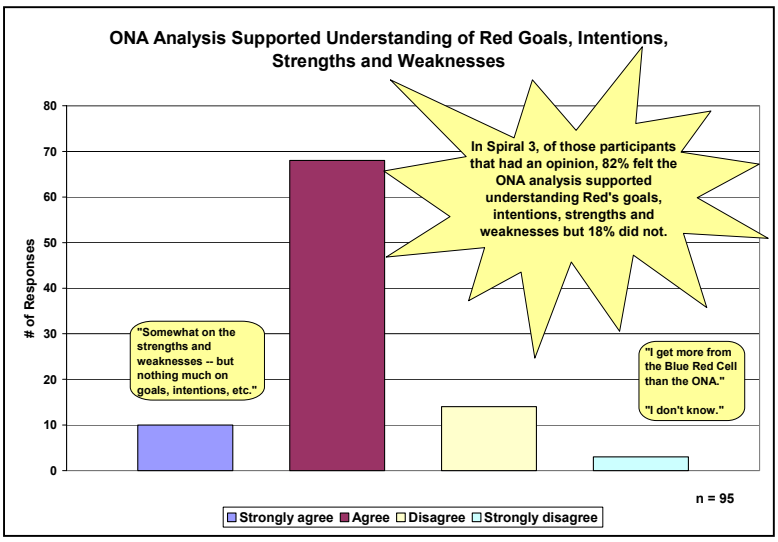


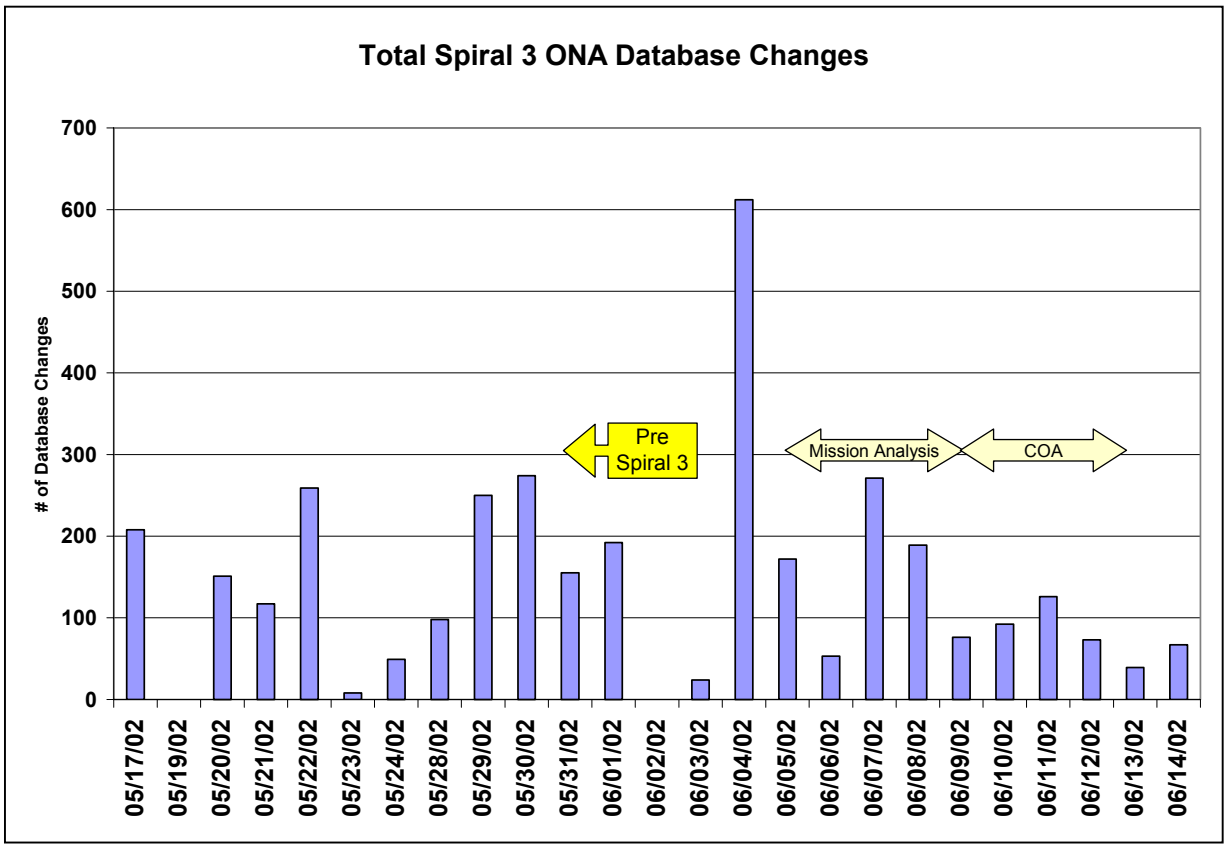
Figure 111:

A process for ONA change and update was included in SJFHQ TTPs; individuals were identified to make the changes. None-the-less currency response that satisfied the users was not achieved; that is for instance, the ONA did not provide a site for review of Blue attack impact. There were model/simulation environment realities that contributed to the update challenge but the manpower investment within the JTF headquarters to keep the ONA abreast of dynamic events was not sufficient.

As noted in the following quote of a JFMCC participant, ONA currency did not always "trickle-down" to the component level; "At the component level it (ONA) wasn't dynamically updated causing a static planning environment".

The charts that follow indicate the importance ONA users placed on database currency and update. ONA users endorsed the currency requirement. Database access information and participant survey responses suggested the ONA knowledge base (including the database) was

not continually updated to reflect battlespace change. This task of updating the ONA was not adequately achieved.



In the figure above, the number of ONA changes depicted during the 3 to 14 June period represents all of the Spiral 3 *data change* activities by participants and SOSA analysts. The figure indicates a gradual increase in the ONA database cumulative data changes as Spiral 3 approached and a gradual decrease in the cumulative data changes in the ONA database as Spiral 3 progressed. This decreasing data change trend occurred because the SOSA cell was tasked for information by the Plans Group and did not have time to maintain their pre-Spiral 3 data change tempo.

The figure above displays Spiral 3 (3-14 June) ONA database *change* activity. References, Nodes and Selected N-A-E Links continued to be the predominant data items that were changed. The peak activity on 4 June probably reflects “last minute” additions to the. database by the SOSA cell.

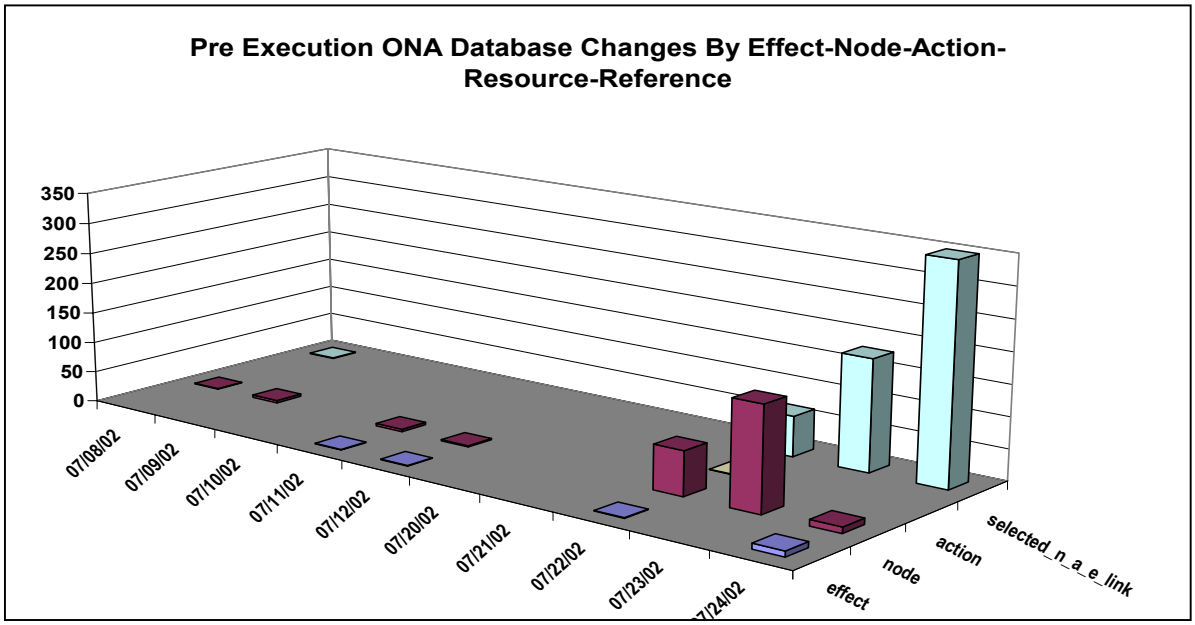


Figure 112:

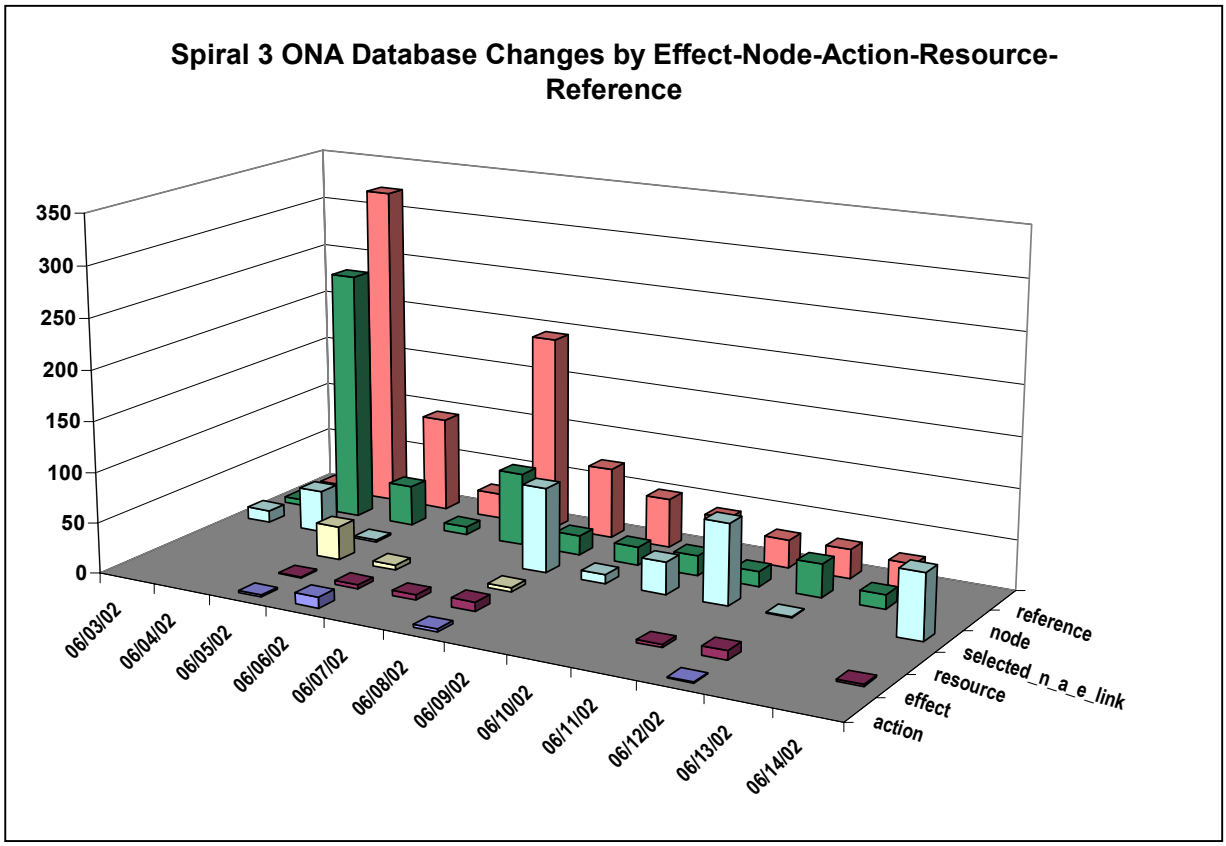
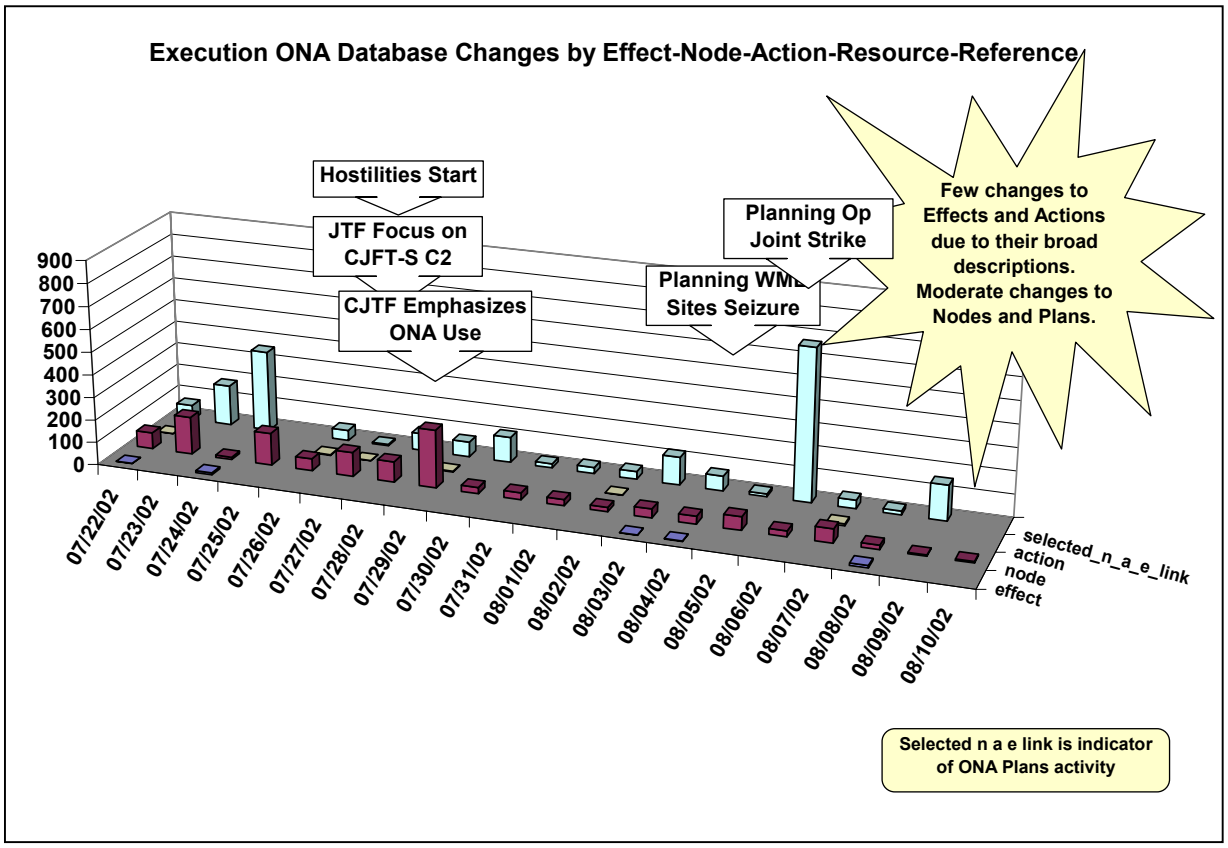


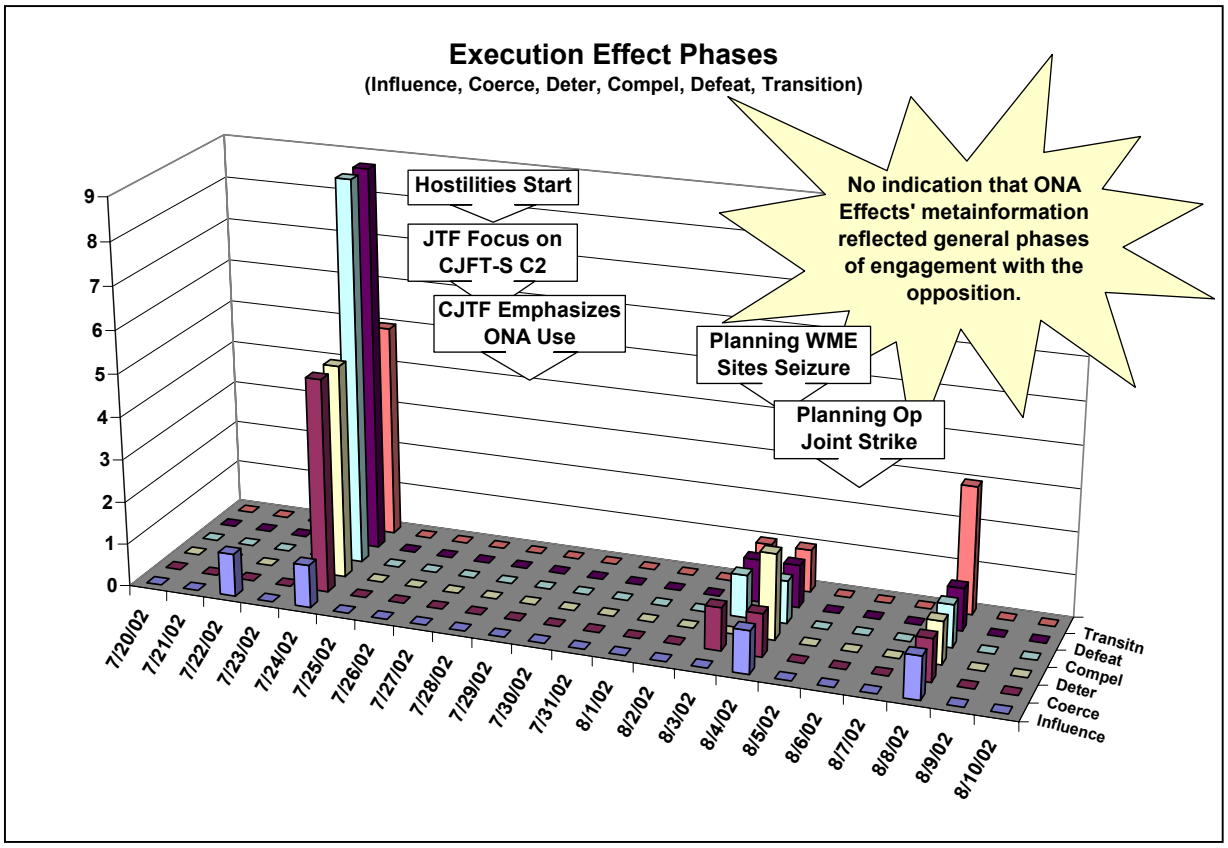
Figure 113:

Changes to Effects and Actions data were minimal during this pre-execution planning period. The figure above displays the pre-Execution (8-24 July) *data change* activity in the ONA

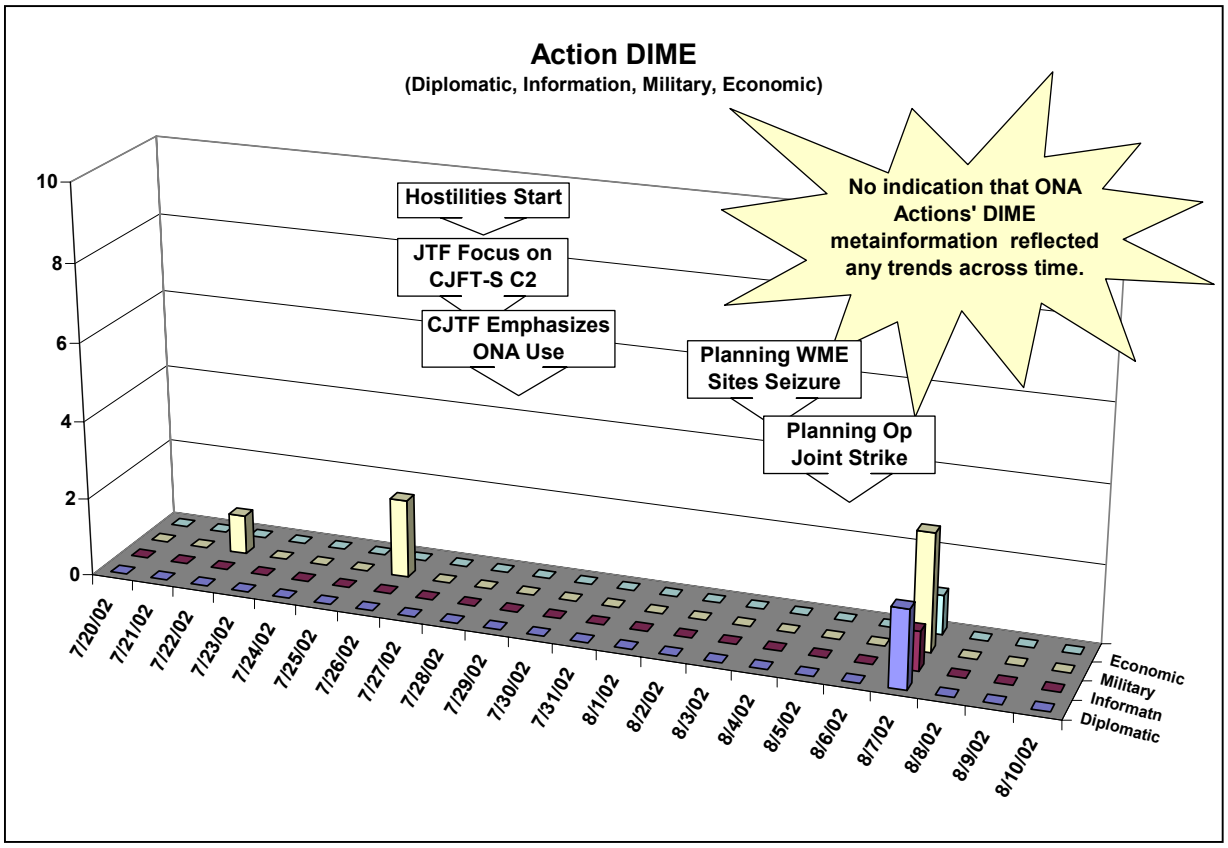
database. Nodes and Selected N-A-E Links (indicative of plan change) categories saw moderate levels of data being changed. Effect and Action items were described in very broad terms within the database. As a result they generally did not need to be changed. Changes to Effects and Actions data were minimal during this period.



The figure above displays the Execution *data change* activity in the ONA database from 22 July-10 August. Again nodes and Selected N-A-E Links (Plans activity) saw a moderate level of data being changed. Changes to Effects and Actions data were also minimal during this period; they were written in broad language that needed little modification as Execution progressed. The Plans activity change spike on Aug 6 may be explained by the joint operation strike planning that was occurring at the time. Average Planning (Selected N-A-E Links) changes increased from 27 changes per day during Spiral 3 to 103 changes per day during Execution. Average Node changes increased from 41 changes per day during Spiral 3 to 62 changes per day during Execution. This change activity, modest as it is, supports the task to continually update the ONA.

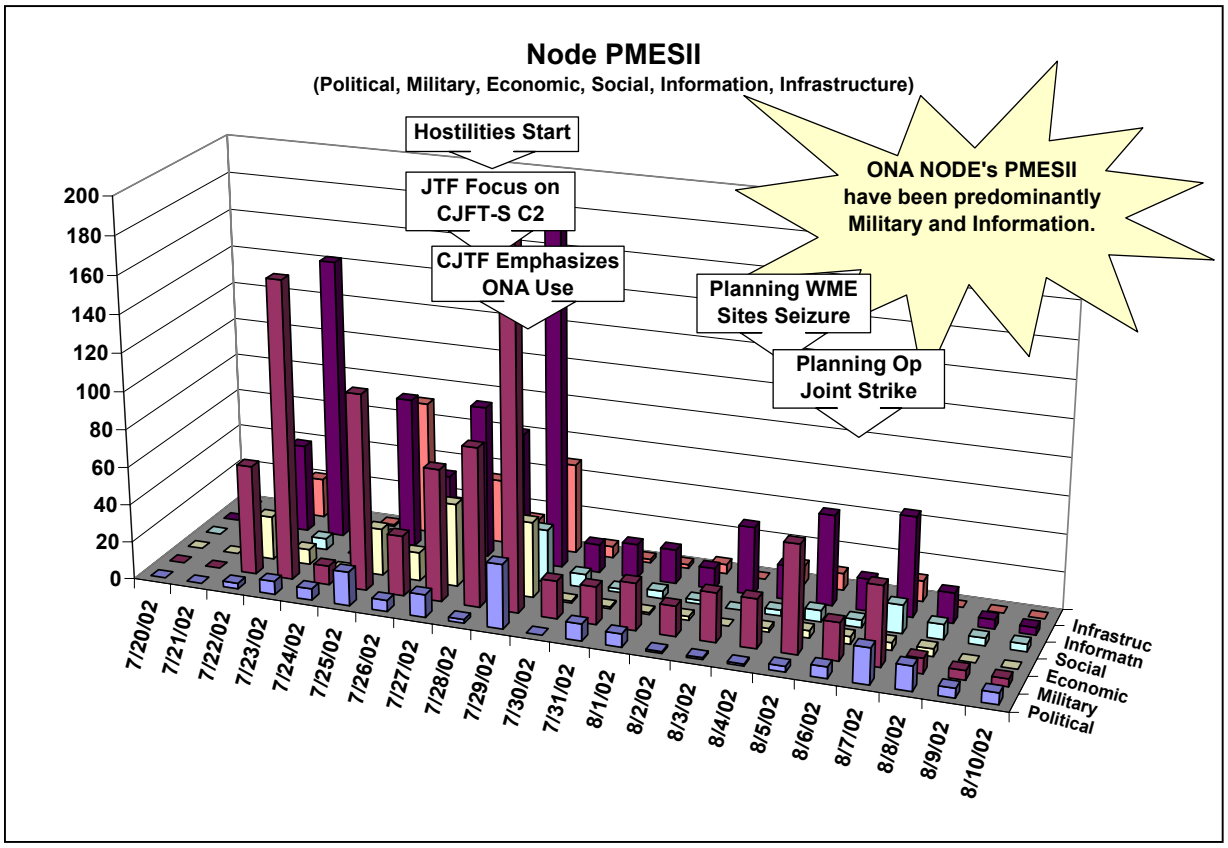


All Actions in the ONA database were also tagged with "phase of engagement" meta-information (influence, coerce, deter, compel, defeat and transition). The figure above breaks out the amount of phase-related *data change* activity for Effects during Execution. It was anticipated that the nature of data changed in the database might mirror the stages of engagement with Red but changes to Effects were minimal, sporadic and no trends were noted.



All Actions in the ONA database are also tagged with DIME meta-information. The figure above breaks out the amount of Actions DIME-related *data change* activity during Execution. Changes to Actions were minimal, sporadic and no trends were noted.

All Actions in the ONA database are also tagged with Phase meta-information. The figure above breaks out the amount of Actions Phase-related *data change* activity during Execution. Changes to Actions were minimal, sporadic and no trends were noted.



All Nodes in the ONA database were also tagged with "PMESII" meta-information. The figure above breaks out the amount of Nodes PMESII-related *data change* activity during Execution. It was anticipated that the nature of data changed in the database might reflect the phases of engagement with Red. Changes to the Nodes were extensive but predominantly military and information in nature. There was also a minor change increase trend noted across all the PMESII meta-information, especially political, economic, social and infrastructure, around 7 August which could have been caused by the transition to peace planning period.

While the Effects, Nodes Actions charts above all show there were changes made to the ONA database, participants generally felt the database was not presenting current information.

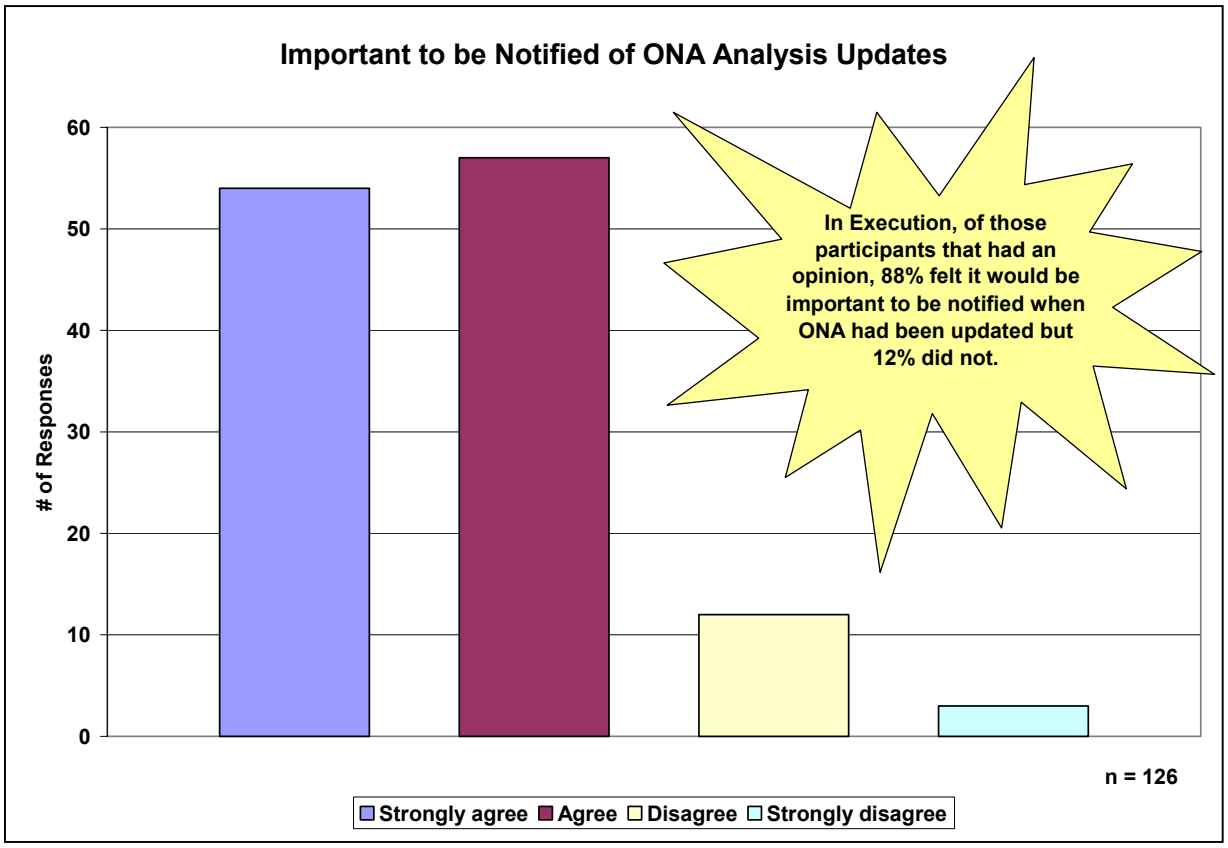


Figure 114: Important to be Notified of ONA Analysis Updates

Execution participant response to the statement, "It is important to be notified of ONA analysis updates", was definitely supportive. Eighty eight percent (111 of 126) of respondents with an opinion agreed; 12 percent (15 of 126) disagreed; and 7 percent of all participants replying to the survey (9 of 135) did not know about the correctness of the statement. Of those who disagreed (15 survey recipients) 7 provided comments. Five of these 7 respondents based their disagreement on the assumption ONA would be continuously updated and therefore notification was not needed. Essentially they were in agreement with the statement and their position increased the percentage of actual agreement from 88 to 92 percent.

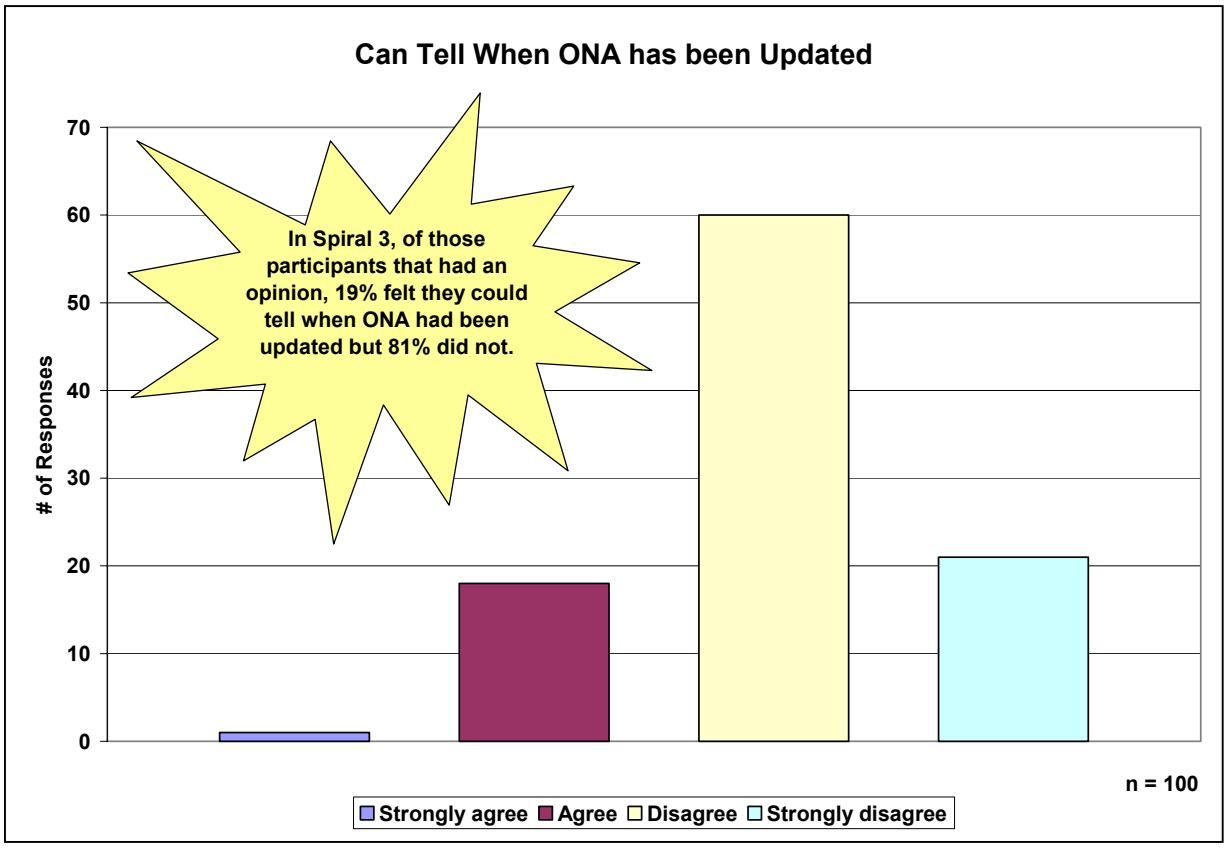


Figure 115: Can Tell when ONA has been Updated

During Spiral 3, 81 percent (81 of 100) of survey respondents with an opinion felt they could not tell when the ONA had been changed or updated; 19 percent somehow felt they could tell when changes or updates were made. There were no built-in update notification features associated with the ONA database. Fifteen percent of all respondents who replied were unable to agree or disagree (no opinion). These results combined with those of the previous chart showed the importance experiment participants placed on update and notification.

The results of database change activity and consideration of two very specific survey questions say the task to continually update the ONA was not accomplished during MC02. Changes were made but they were sporadic and not responsive to scenario actions. The participants placed high importance on database currency but could not tell when it had been changed. Task 7.1.3 was not accomplished.

Task 7.1.4 Employ automated tools to virtually and collaboratively access, manipulate, and maintain the ONA database

Even for the small scale contingency situation of MC02 the ONA knowledge base contained extensive information. To allow this information to be accessed, updated, and used, tools that accommodated these actions were needed. An “ONA” tab displayed on Share Point Portal Server (SPPS) web pages took users to the ONA Current Summary (ONA Today) page. From there additional tabs permitted access to the ONA Matrix, ONA References, and Related Products pages. All information included on these pages was located on the SPPS. There also was a tab that transferred users to the stand alone ONA Database. Manipulation of the SPPS pages was fairly straight-forward. Links within these pages to supporting documents supplied additional background and reference; the operation was essentially “typical” and intuitive. The

ONA database was primarily intended to support effects based plan development. It contained listings of effects; nodes; actions; resources; references; PMESII systems; and conflict phases. Users could "mix and match" these components to support development and modification of plans as well as decision making. However, the actions required to do the mixing and matching were not obvious. Even using the included User's Guide did not smooth operations for many experiment participants. Their survey comments indicated it took too long to review the help information and even when they did, use of the database was still confusing. Manipulation of the database was not intuitive for many experiment participants.

Training on use of the database seemed to be an equalizer for ease of ONA tool use. Comparison of training received with understanding of PMESII vs. DIME relationships suggested the more training, the more this aspect of ONA was understood. But when the training received was compared with information retrieval and information filter and sort, the same correlation was not there. Survey respondent comments stated hands-on training and practice allowed them to effectively use the database. Participants indicated ONA's use enhanced Spiral 3 plan development; therefore the tools must have provided some level of ONA access and database manipulation

Even though the tools developed for ONA received less than complimentary comments, they did do what was intended. Pre-experiment training did influence use of the tools. The charts that follow detail the challenge experiment participants had with ONA tools.

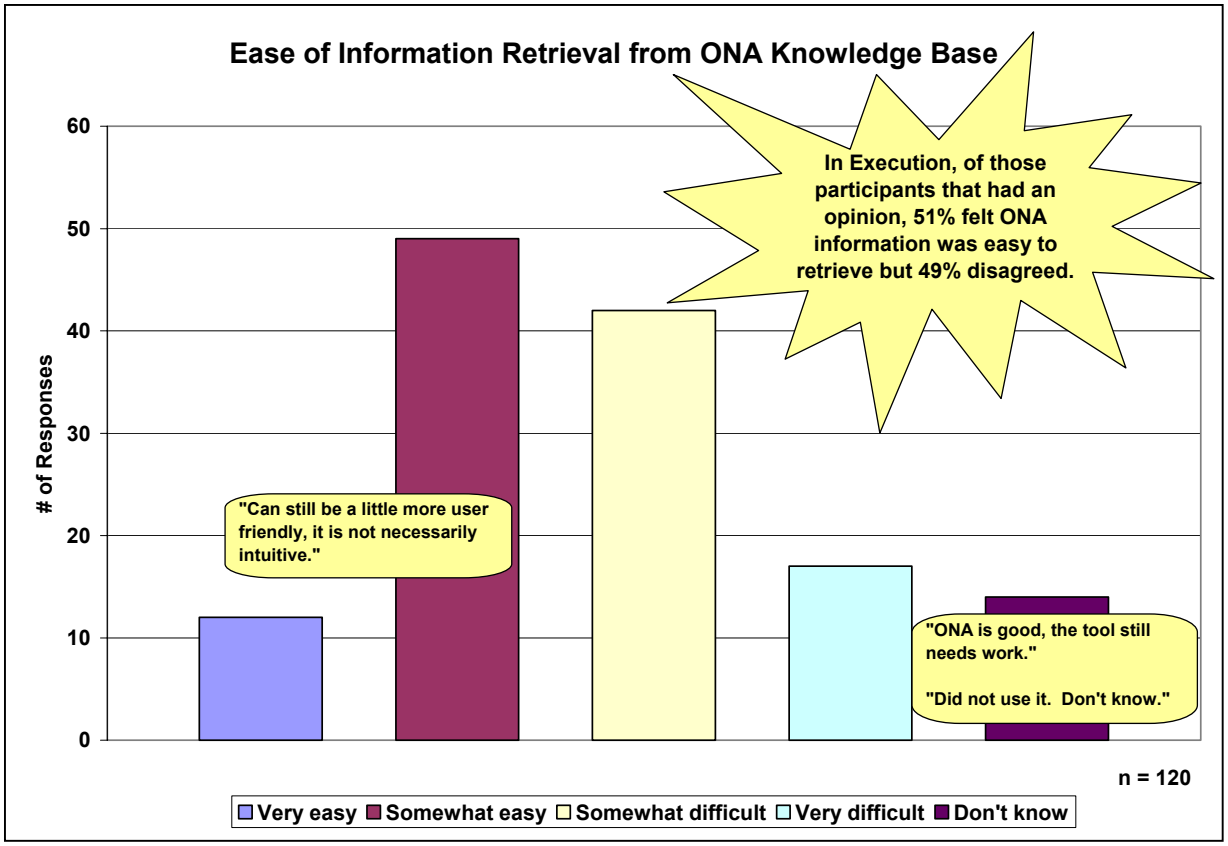


Figure 116: Ease of Information Retrieval from ONA Knowledge Base

This chart displays the difficulty experiment participants had using the ONA knowledge base during MC02 Execution. They were asked to rate their estimate of information retrieval

ease from the ONA knowledge base. Easy (51 percent; 61 of 120) and difficult (44 percent; 59 of 120) survey replies from those with an opinion essentially divided evenly; 10 percent (14 of 134) of all respondents indicated they did not know what to say about the statement, "Rate the ease of retrieval from the ONA knowledge base" during Execution. The same survey question was offered during Spiral 3. The easy category of response then was 45 percent (vs. 51 percent); 41 percent (vs. 44 percent) said information retrieval was difficult; and 14 percent (vs. 10 percent) did not know. Instead of Spiral 3 experience increasing the number of easy replies during Execution there was a 3 percent movement from not knowing to the difficult category (41 to 44 percent). Both sets of numbers point to the challenge experiment participants had during Spiral 3 and Execution using the tools developed for the ONA database.

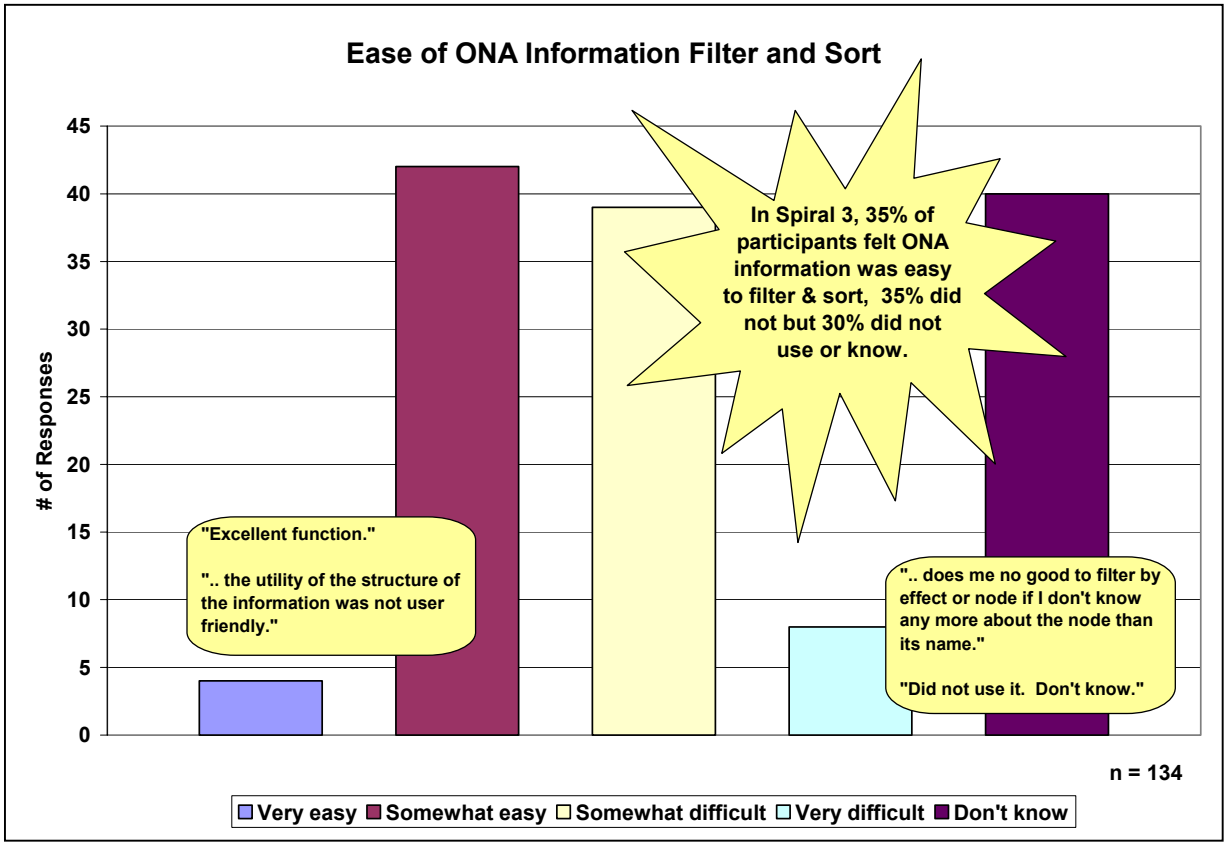


Figure 117: Ease of ONA Information Filter and Sort

Shown here are Spiral 3 results when survey recipients were asked to respond to the statement, "Rate the ease of ONA information filter and sort". The easy and difficult categories were essentially equal (35 percent; 46 and 47 responses of 134); 30 percent (40 of 134) had no opinion. Based on comments associated with other survey questions, training and familiarly were identified as important reasons for ease of ONA exploitation. The structured pre-experiment training was not specialized for individual groups. Many of the SJFHQ members who augmented the JTF headquarters were familiar with the ONA tools and incidentally helped JTF headquarters members with them. This ad hoc training was considered as a possible fix for training deficiencies and thus produced the even distribution of easy and difficult responses for this and the previous question. However, as depicted in the next chart, further examination of the pre-

experiment training seemed to say this training possibly was *not* the pacing factor for information retrieval, filter, and sort difficulty.

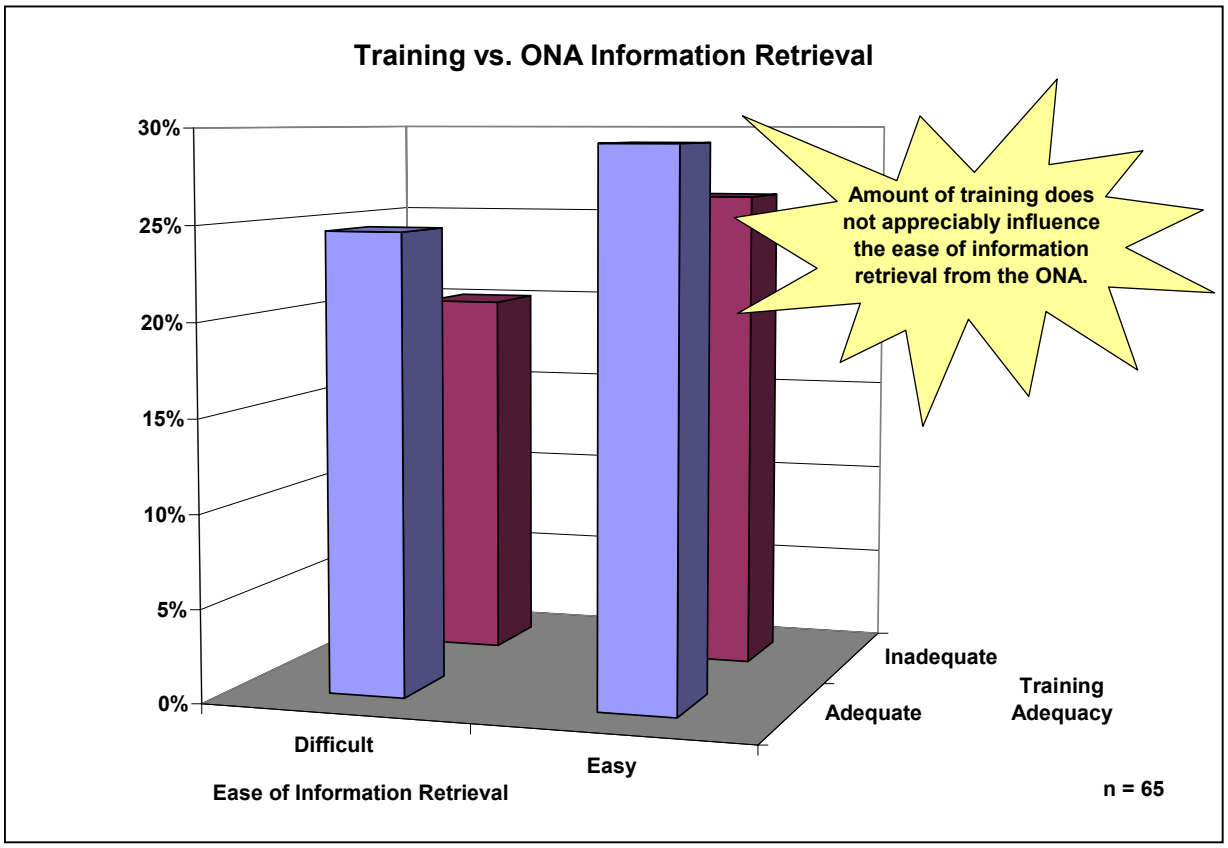


Figure 118: Training vs. ONA Information Retrieval

Responses from the Execution information retrieval question (previously discussed) were matched against those of a second survey question that was answered by the same respondents. The objective was to see how participants estimated their pre-experiment training impacted their use of ONA. The second question asked for a response (adequate; inadequate) to the statement, "I was trained adequately to use ONA for this experiment". The first question essentially was asking if the respondents could use the ONA tools. The results shown in this chart show that of those who felt retrieval was easy, 29 percent felt they had received adequate training and 26 percent felt their training was inadequate. That was only a 3 percent difference of retrieval ease with and without adequate training. The same puzzling relationship existed with those who felt information retrieval was difficult. Twenty five percent said they were adequately trained yet retrieval was difficult and 20 percent said it was difficult and had received what they felt was inadequate training. That is only a 5 percent improvement with adequate training.

These results do show that, for a segment of the experiment population, the ONA tools were difficult to use and training did not seem to make a difference. On the positive side the tools did function and the ONA information was retrieved and used.

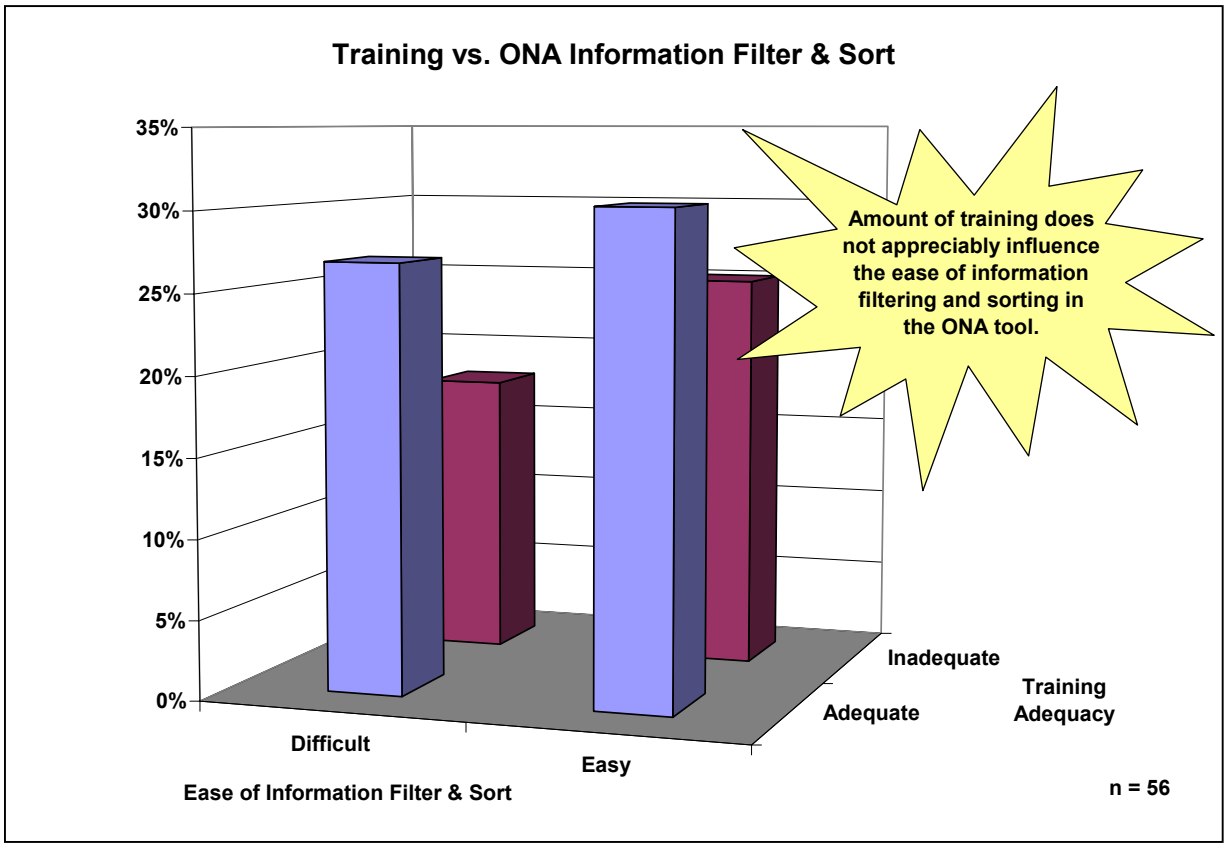


Figure 119: Training vs. ONA Information Filter & Sort

Ease of ONA filter and sort survey question responses were also matched against the adequately trained survey question. Here too the formal training did not appear to be the discriminator for easy and difficult replies. Of the easy replies, 30 percent felt they had been adequately trained and 25 percent felt their training was inadequate. Twenty seven percent of the difficult respondents felt they were adequately trained and 18 percent indicated their training was inadequate.

In spite of the training challenges approximately half of the respondents still felt retrieval and manipulation of ONA knowledge base information was not easy. Whether it was in fact a training problem or not was not determined. However, the MC 02 participants did use automated tools to virtually and collaboratively access, manipulate, and maintain the ONA database. Task 7.1.4 was accomplished.

With the exception of task 7.1.3 to continually update ONA to reflect battlespace change, all tasks supporting ONA warfighting challenge 1 were completed during MC02. Although currency is important it is still felt that that in spite of this failure, challenge 1 of the ONA concept was met.

Warfighting Challenge:

Ability to use ONA to enhance decision making

If ONA was to enhance decision making, it had to be used. This aspect of the concept was confirmed in challenge 1 analysis. In the circumstance of a Joint Task Force (JTF) operating with ONA, use of the ONA database should have complimented the JTF staff's other functions. Better operational decisions normally would have considered more than, tunnel-vision, primary effects; ONA was intended to help identify adversary vulnerabilities as well as secondary,

tertiary, and potential unintended effects that might result from proposed actions. ONA should have supported course of action prioritization and selection. Finally, if the ONA concept was to produce better decisions, the using organization (JTF) should have been able to operate within the adversary's decision cycle. It should have kept the adversary responding and not initiating.

Listed below are the tasks that describe the second ONA challenge. Analysis of the 5 tasks indicated they were successfully completed and the second warfighting challenge was met.

Challenge 2 Supporting Tasks:

- Determine if the ONA products compliment JTF staff actions
- Identify adversary's vulnerabilities, intentions, and key nodes
- Identify potential second and third order effects for contemplated actions
- Prioritize and select potential courses of actions
- Use ONA to operate within adversary's decision cycle

Finding

Task 7.2.1 Determine if the ONA products compliment JTF staff actions

The addition of a new process or tool should not complicate existing staff functions. Instead it should compliment and improve these activities. The results of this staff activity should help increase decision quality as well as improve the time needed to arrive at a decision. Experiment survey results tended to confirm both criteria were enhanced. The four charts that follow detail this improvement.

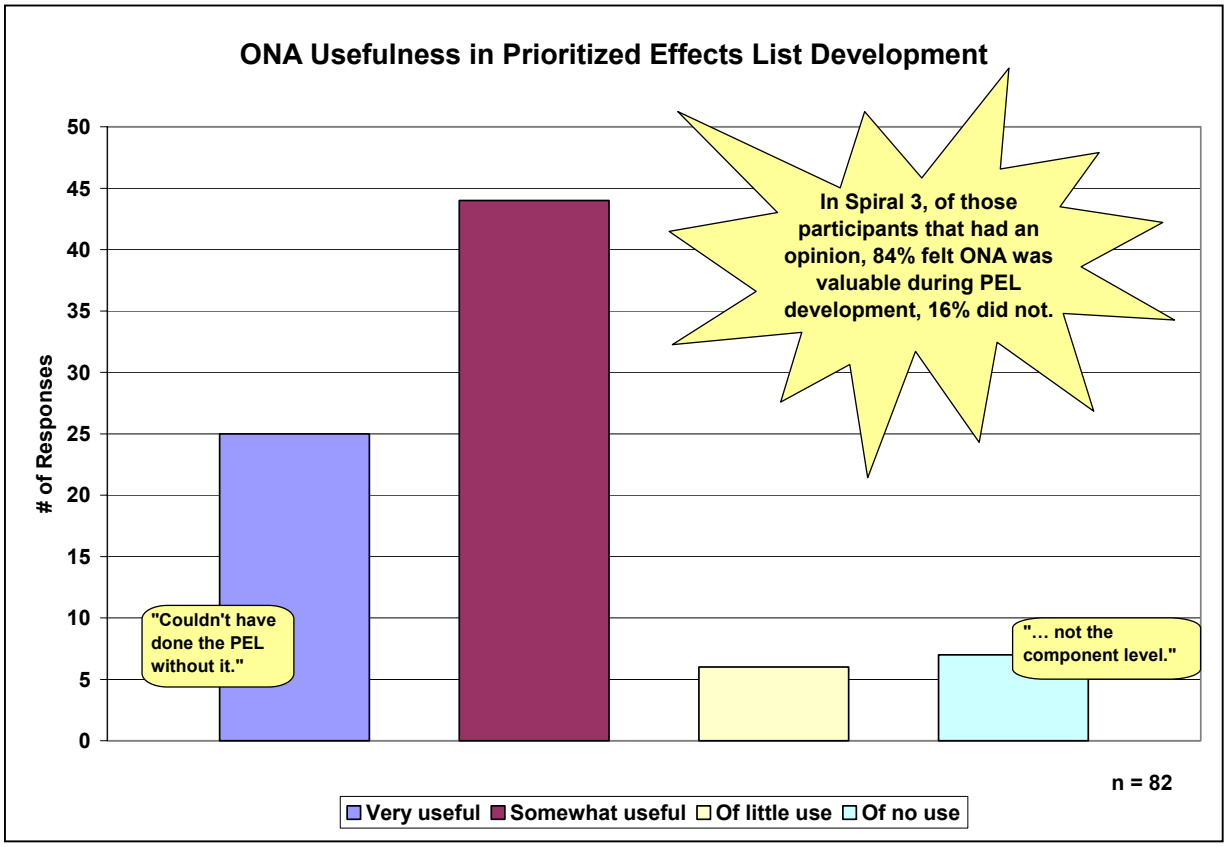


Figure 120: ONA Usefulness in Prioritized Effects List Development

Spiral 3 participants were asked to rate the utility of ONA in development of the Prioritized Effects List (PEL). Of the respondents that had an opinion, 84 percent (69 of 82) felt ONA was useful in working this JTF staff action; 16 percent (13 of 82) indicated it was of little or no use. Build of the PEL was a very important JTF staff action. This survey response provided confirmation of ONA's positive impact on this early staff activity.

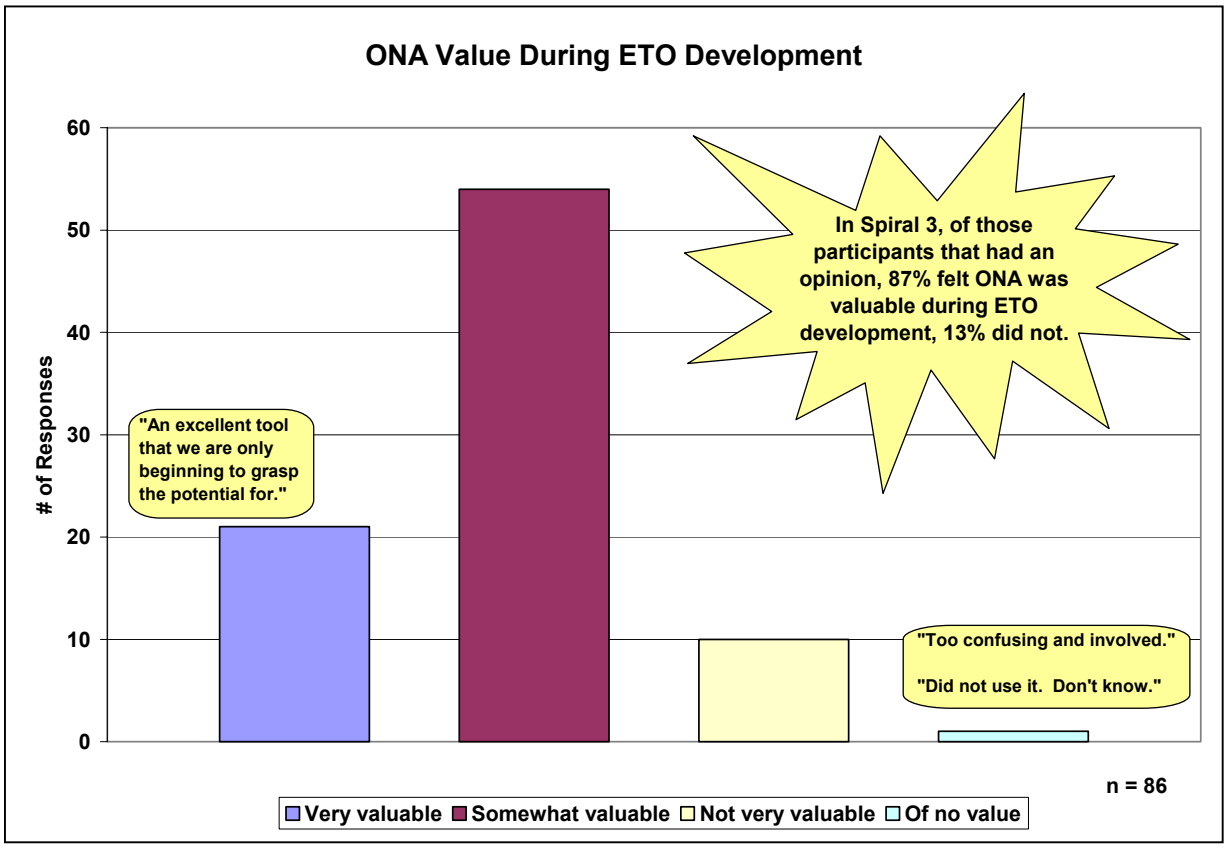


Figure 121: ONA Value During ETO Development

During Spiral 3 experiment participants were asked to rate the value of ONA in development of the Effects Tasking Order (ETO). Of those offering an opinion, 87 percent (75 of 86) said ONA was valuable in accomplishing this staff action; 13 percent (13 0f 86) felt it was of little or no value. This staff action was another high priority activity needed quickly after JTF formation. Again, participants felt ONA made a valuable contribution.

Figure 122: Usefulness of ONA for Board/Center/Cell Preparation

Dynamic conduct of JTF boards, centers and cells occurred during MC02 Execution. Participants were asked to rate the utility of ONA in preparing for these meetings. Eighty six percent (97 of 113) felt ONA was useful; 14 percent (16 of 113) said it was of little or no use. This was another plus for ONA and its contribution to JTF staff activity.

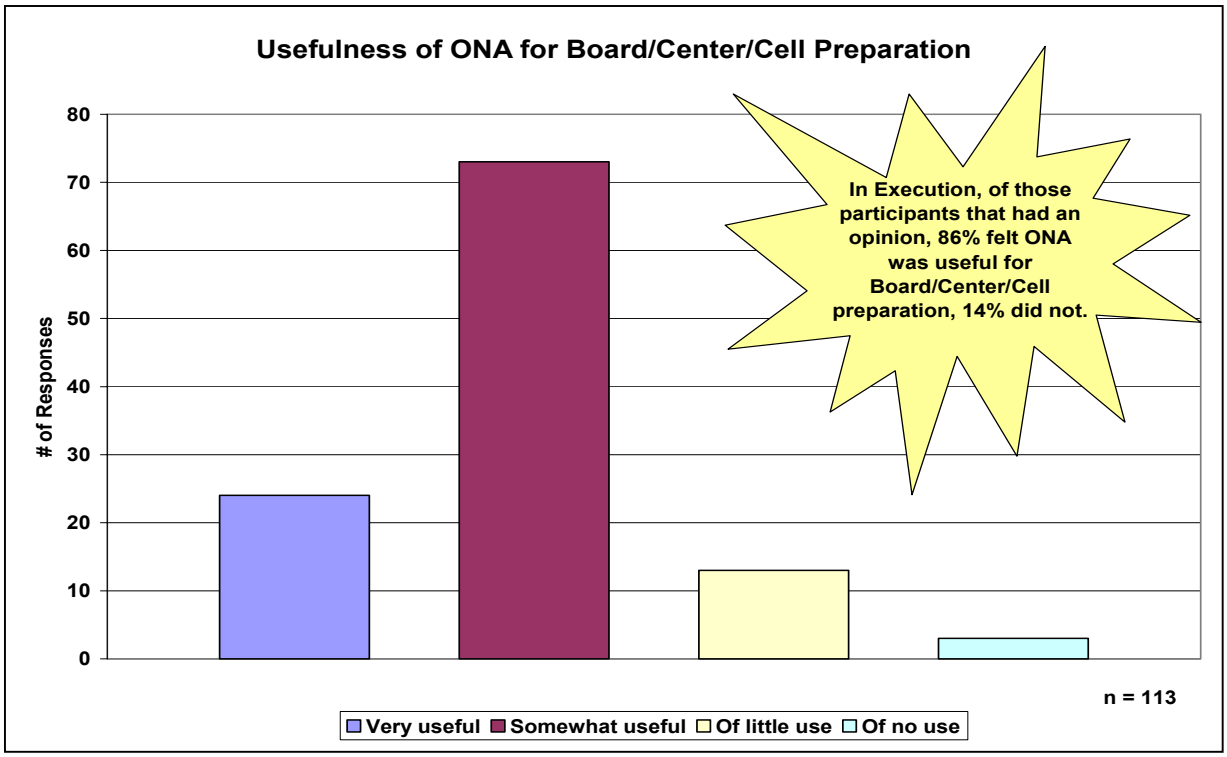
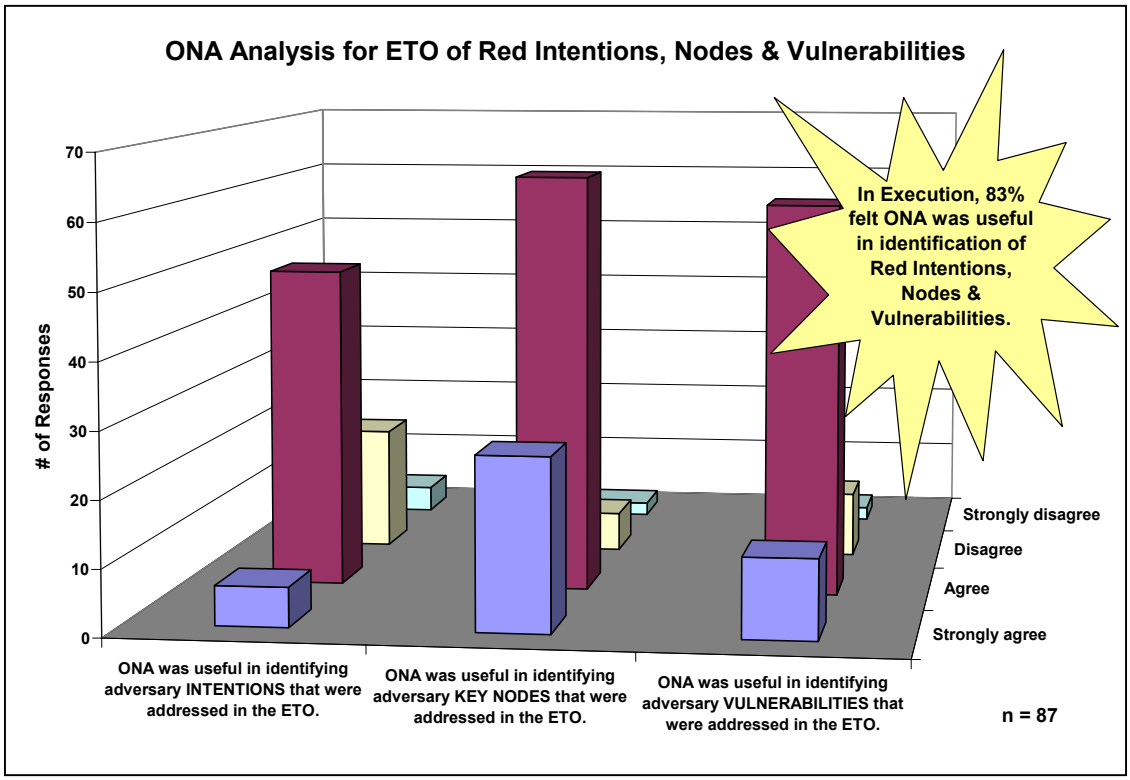
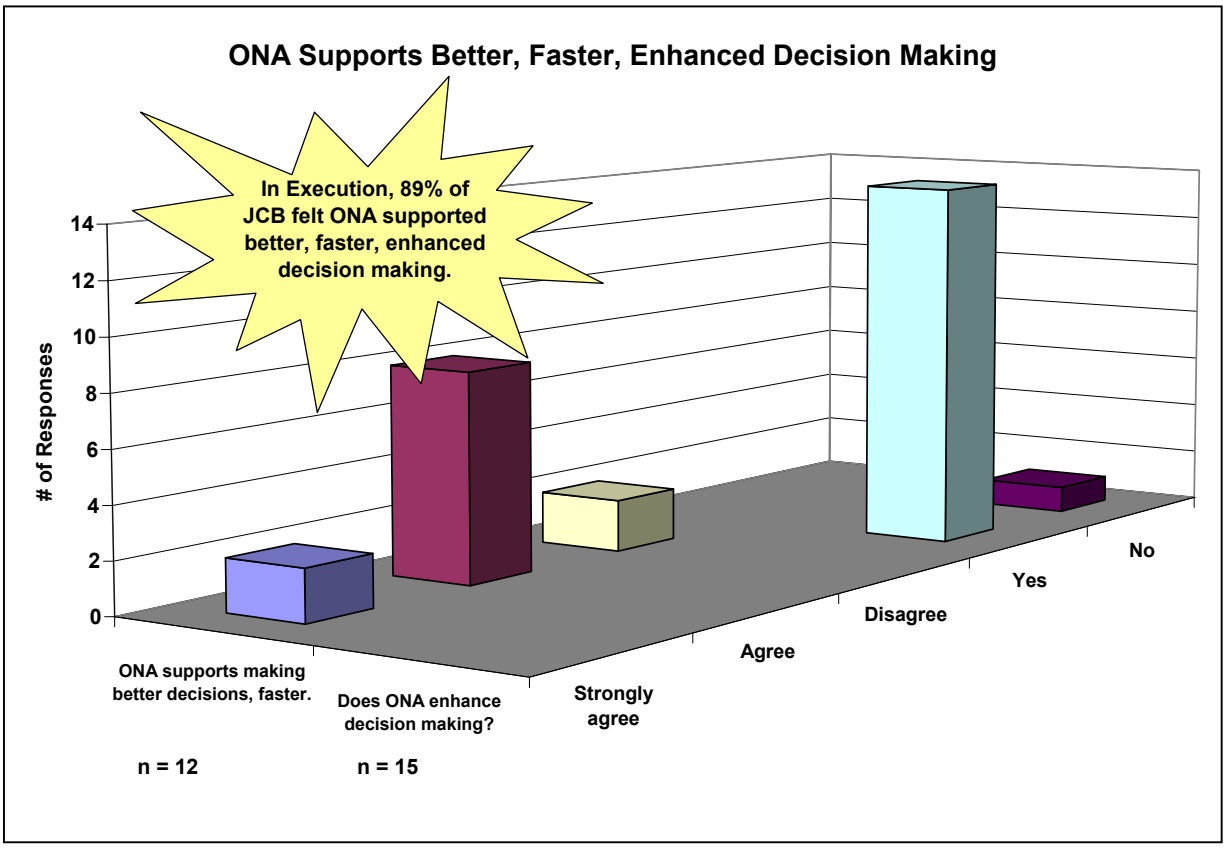

Usefulness of ONA for Board/Center/Cell Preparation
# of Responses
80
70
60
50
40
30
20
10
0
In Execution, of those participants that had an opinion, 86% felt ONA was useful for Board/Center/Cell preparation, 14% did not.
n = 113
Very useful
Somewhat useful
Of little use
Of no use

Figure 123:


ONA Analysis for ETO of Red Intentions, Nodes & Vulnerabilities
# of Responses
70
60
50
40
30
20
10
0
In Execution, 83% felt ONA was useful in identification of Red Intentions, Nodes & Vulnerabilities.
Strongly disagree
Disagree
Agree
Strongly agree
ONA was useful in identifying adversary INTENTIONS that were addressed in the ETO.
ONA was useful in identifying adversary KEY NODES that were addressed in the ETO.
ONA was useful in identifying adversary VULNERABILITIES that were addressed in the ETO.
n = 87



MC02 Execution members of the Joint Coordination Board (JCB) were presented two questions aimed at the core of ONA Warfighting Challenge 2. First they were asked for agreement or disagreement with the statement, "ONA supports making better decisions, faster". Next they were asked for a simple yes or no response to the question, "Does ONA enhance decision making?" The results of both survey questions shown in this chart indicate strong endorsement (89 percent; 24 of 27) by these members of the JCB for the supposition that ONA enhanced and speeded-up the staff decision process. Anecdotal comment by the JTF commander also provided the same support.

Based on positive participant response to survey questions asking their opinion about ONA's support of PEL development; ETO building; Board, Center, Cell preparation; and enhanced decision making, task 7.2.1 was completed. ONA did compliment JTF staff actions.

Identify adversary's vulnerabilities, intentions, and key nodes

A critical part of JTF staff planning was to identify adversary vulnerabilities, intentions, and key nodes. The commander looked for the staff to develop and update this information. The charted survey results and analysis that follow show ONA supported this JTF staff action.

During Execution experiment participants were asked to agree or disagree with statements of ONA's utility in identifying adversary intentions, key nodes, and vulnerabilities. The chart shows the combined results of these three questions. Eighty three percent (72 of 87) felt ONA was useful in identifying these three adversary items; 17 percent (43 of 87) disagreed.

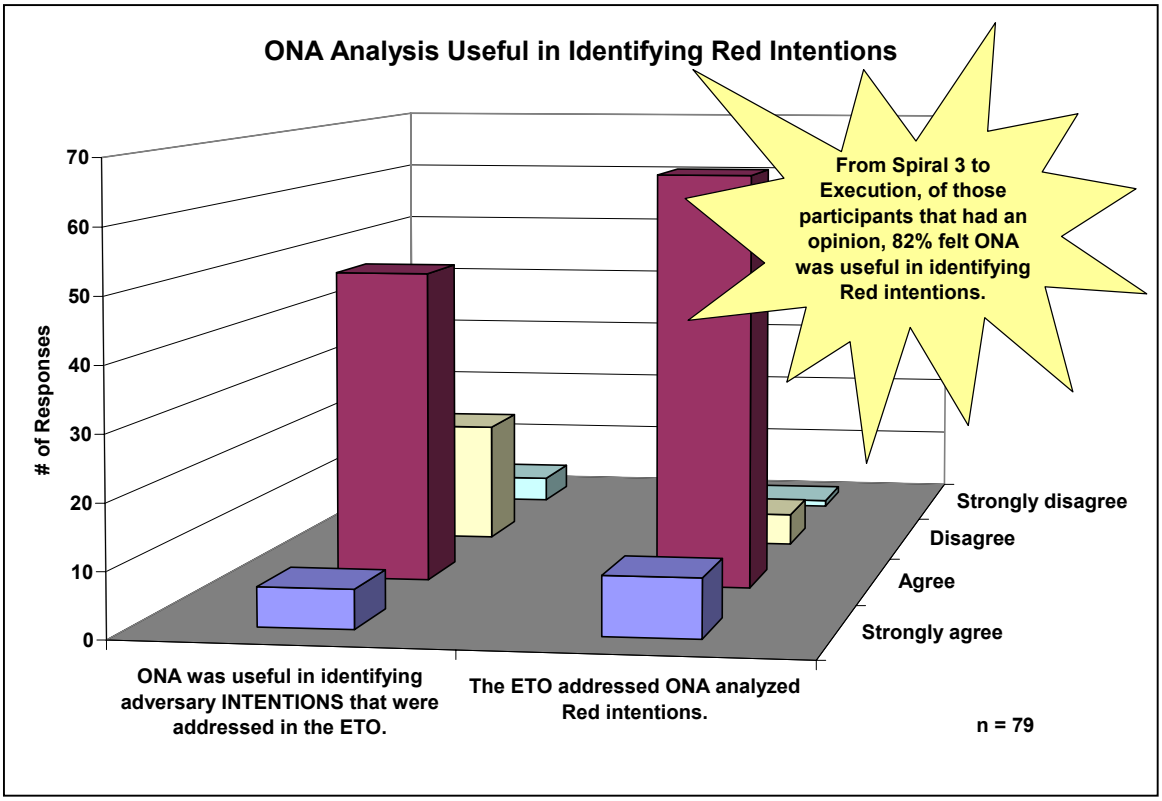


Figure 124: ONA Analysis for ETO of Red Intentions, Nodes, & Vulnerabilities

ONA support of adversary intention identification was also displayed by response to the two questions shown in this chart. In Spiral 3 participants were asked to agree or disagree with the statement, "ONA was useful in identifying adversary intentions that were addressed in the ETO". During Execution they were asked to agree or disagree with the statement, "The ETO addressed ONA analyzed Red intentions". The combined results show that eighty three percent (65 of 79) of respondents with an opinion agreed that ONA identified and addressed adversary intentions. Eighteen percent (15 of 79) disagreed.

Survey question results during both Spiral 3 and Execution indicated ONA did identify adversary vulnerabilities, intentions, and key nodes. Task 7.2.2 was completed.

Identify potential second and third order effects for contemplated actions

A JTF staff is expected to provide second and third order as well as unintended effects for contemplated actions. ONA supported this staff action.

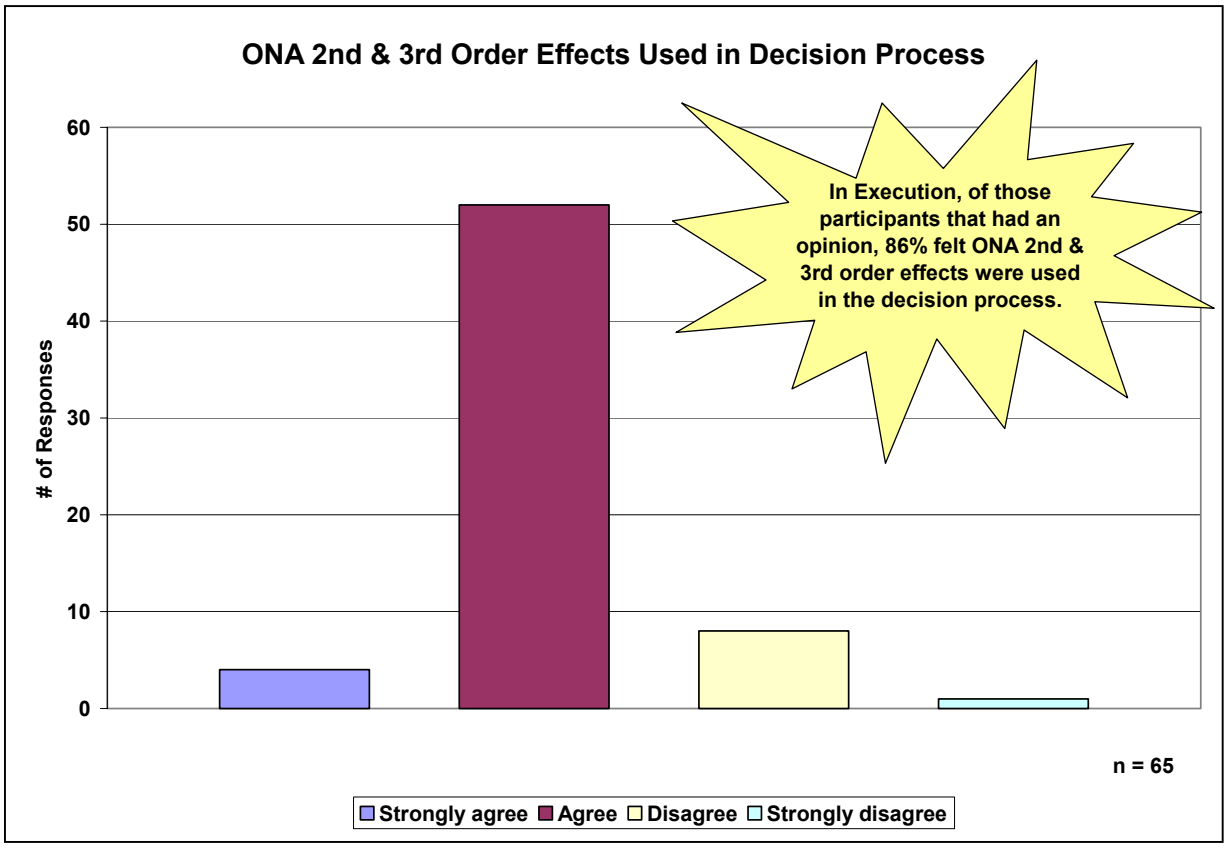


Figure 125: ONA 2nd & 3rd Order Effects Used in Decision Process

During Execution respondents were asked to agree or disagree with the statement, "ONA derived second and third order effects were included in the decision process when considering action against Red". Replies indicated 86 percent (56 of 65) agreed with the statement and supported this task.

Although there were some tactical level instances where it appeared either the ONA failed to provide second order impacts or ONA was not used to consider these impacts when planning an action, respondents did acknowledge the importance of this ONA capability. This is a capability that should be included in development of ONA. Task 7.2.3 was completed during the experiment.

Prioritize and select potential courses of actions

Another important JTF staff task was to offer potential courses of action and also to offer proposed prioritization of effects. ONA assisted both during the experiment.

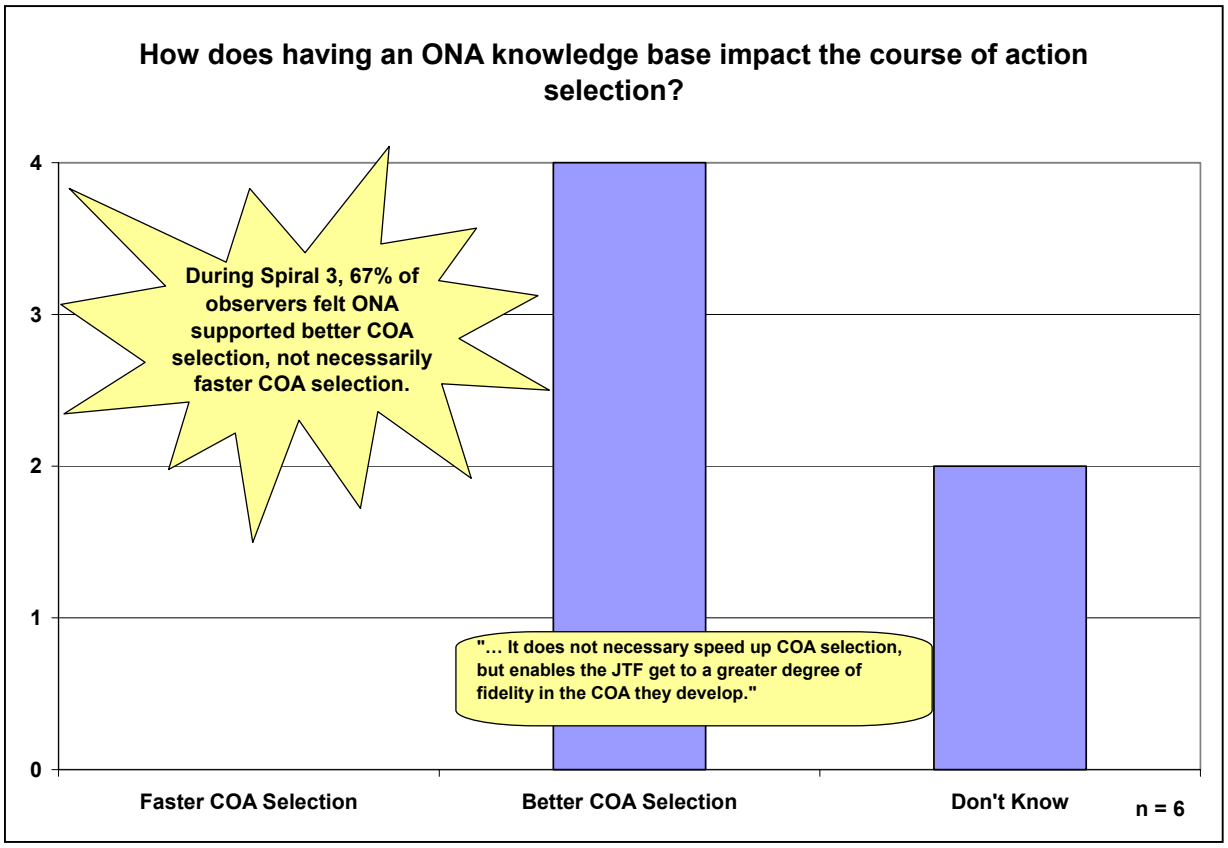


Figure 126: Course of Action Selection Impact

During Spiral 3, SME observers were asked how an ONA impacted the course of action (COA) selection. Although the number of individuals surveyed was small their experience and expertise were considered to be superior and their opinions respected. They essentially looked over the planner's shoulders while staff planning was on-going. They had first hand knowledge of ONA's impact on COA selection. As shown in the chart 67 percent (4 of 6) of these SME observers indicated ONA supported *better* COA selection but not necessarily faster COA selection.

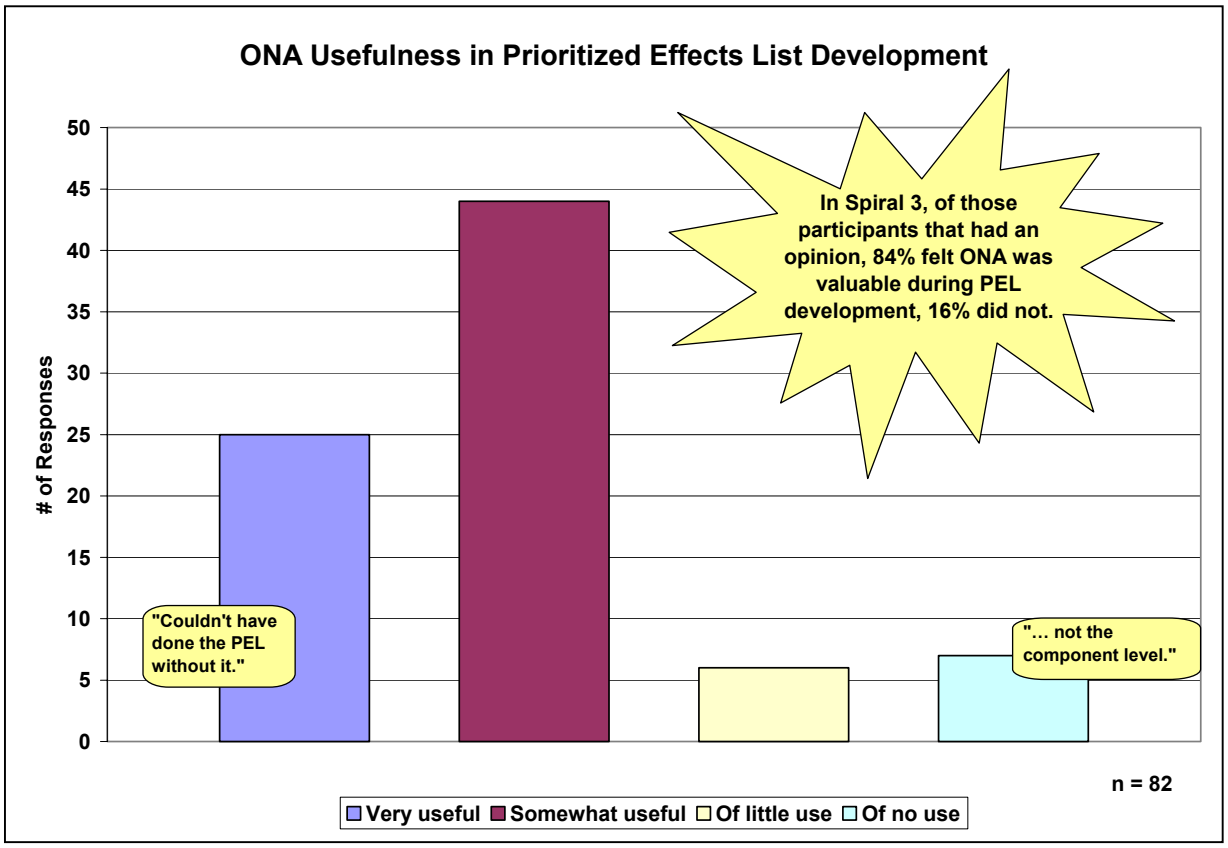


Figure 127: ONA Usefulness in Prioritized Effects List Development

Spiral 3 participants were asked if ONA was useful in their development of the prioritized effects list (PEL). This valuable tool established the commander's thinking and intentions early in the experiment. Support of its development suggested great potential for ONA. 84 percent (69 of 82) of the Spiral 3 respondents with an opinion indicated ONA was useful during production of the PEL. 16 percent felt it was of little or no use when developing the PEL.Initial course of action development was a Spiral 3 JTF staff action supported with a PEL with the commander's PEL. Results of survey questions presented during Spiral 3 suggest ONA supported COA development. Task 7.2.4 was completed during the experiment.

Task Use ONA to operate within adversary's decision cycle

It was expected that if Blue operated within the adversary's decision cycle it would dominate. ONA should have contributed to this capability if it improved planning and force employment. The three charts that follow support the ONA contribution to this task's accomplishment.

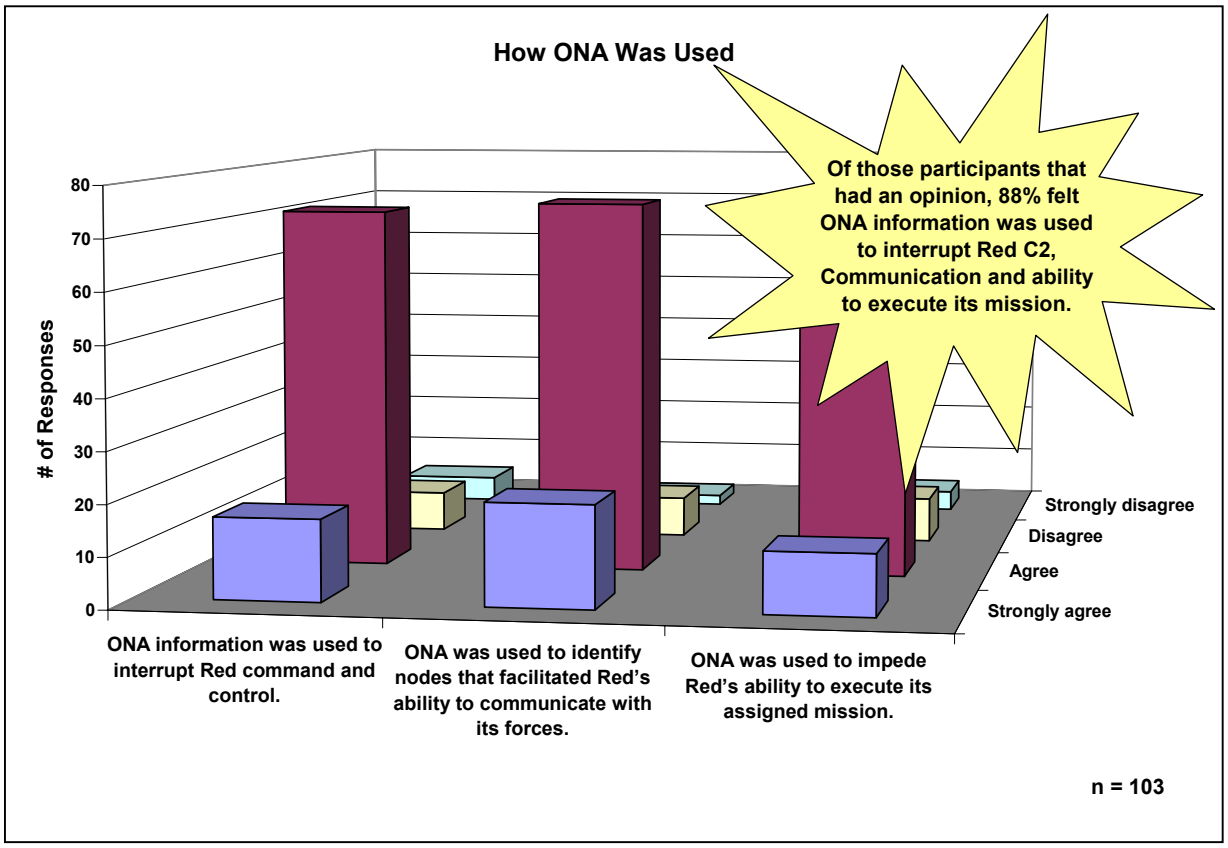


Figure 128: How ONA was Used

During Execution the three questions included in the chart above were presented to experiment participants. Each was intended to elicit some indication of JTF ONA use to get inside of the adversary's decision cycle. Of the respondents with an opinion, 88 percent (90 of 103) agreed ONA (information) was used to interrupt the adversary's ability to communicate with its forces and conduct intended activity. 12 percent (12 of 103) disagreed. 20 percent of all participants surveyed indicated they did not know if ONA supported interruption of this capability. Overall ONA did support this aspect of accelerating ahead of the adversary's intended activity.

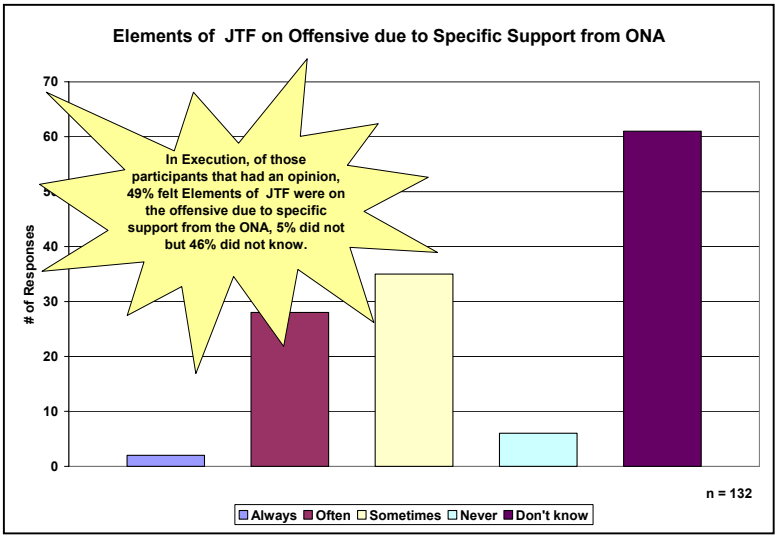


Figure 129: Elements of JTF on Offensive due to Specific Support from ONA

During Execution participants were asked to respond to the statement, "Elements of the

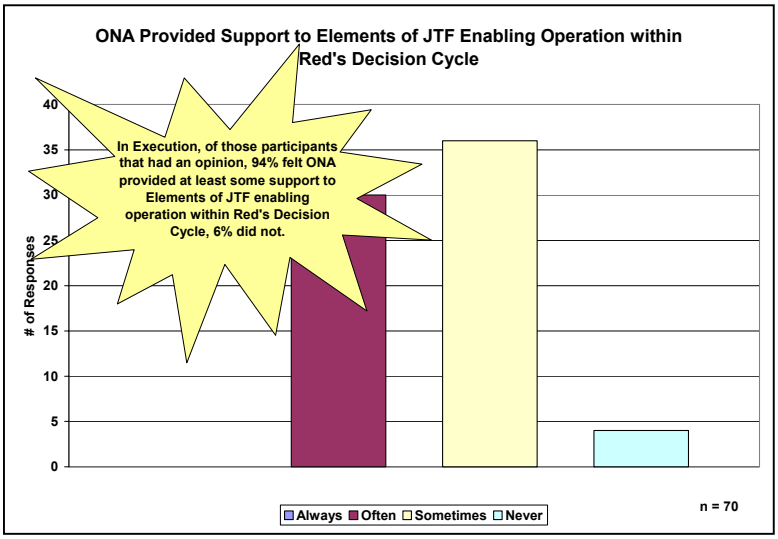


Figure 130: ONA Provided Support to Elements of JTF Enabling Operation within Red's Decision

JTF are on the offensive because of specific support from the ONA". 49 percent (65 of 132) of the respondents said there was some ONA support; 5 percent (6 of 132) said ONA never was a factor; and 46 percent (61 of 132) did not know. In retrospect this large number of "Don't know" replies probably reflects a poorly worded survey question. Taken at face value, these results indicated survey respondents felt ONA was used to support offensive operations with the expectation of operating inside the adversary's decision cycle.

During Execution survey participants were asked to respond to the statement, "ONA has provided specific support to elements of the JTF that enabled their operation within the adversary's decision cycle". This survey question directly addressed the task issue about using ONA to operate within the adversary's decision cycle. Of the respondents with an opinion, 94 percent (66 of 70) felt ONA provided support; 6 percent (4 of 70) felt ONA never supported JTF operating within the adversary's decision cycle. Survey responses indicated ONA was used to interrupt adversary command and control and interrupt its mission performance. They also said that ONA did provide support for units with the intent of their getting inside of the adversary's decision cycle. Task 7.2.5 was completed.

Both ONA challenges were met within the context of MC02 and the dendritic matrix. Task accomplishment during Spiral 3 and Execution supported these two warfighting challenges. This was the first experiment opportunity to examine the concept using a relatively "finished" ONA product. As noted earlier the database was not the robust product the concept demands but it did demonstrate the potential of what might be possible with a mature and active ONA process. **Annex __ONA Training**

Participant training on operational net assessment (ONA) presentations and tools was conducted as a part of the MC 02 XC4I training effort. The J9 Systems Training charter was to teach the students functional use of IWS, ADOCS, and Sharepoint Portal with only 12 classroom hours. It was conducted in a classroom setting by an "in-house" team at the JTASC and a mobile training team (MTT) on the road. The MTT visited each of the component sites at least once; on-site or in-house training was conducted at JFCOM (JTASC) steadily from January to execution in July. This training was in addition to the J7 academic on-line concept training modules that were to be completed prior to the start of class. These modules were available on the J9 home page as well as J7 academic computer-based training disks distributed at all MTT sites. Both training programs included definition of key terms associated with ONA such as system-of-systems, PMESII, and DIME. Students were also introduced to the nodes, actions, effects, and resources relationship of the relational database. The conflict stages were also included in this training.

Several experiment issues impacted the effectiveness of the MC02 C4I training. Foremost, it was evident that most "on the road" students had not completed the J7 academic modules prior to the start of class. (The exception to this was at the Fort Hood site where J9 and J7 staff simultaneously conducted systems and concept training.) The intent of the MTT and in-house training was to familiarize students with the functionality of core MC02 C4I tools, not provide in-depth training of MC02 concepts. Also, it was expected that only a few individuals would be permitted to add ONA records during experiment activity; therefore, this activity was generally not covered during MC02 C4I tools training (it was not discussed at all at the component level during MTT training). The effectiveness of training was also further influenced because the majority of the students attending class had not been assigned a job position at the time of training and thus these adult learners had little appreciation as to how ONA would be applied to their daily experimental duties and responsibilities. To fully exploit the full capabilities of ONA, the student participants required extensive hands-on experience as well as in-depth training and mentoring by ONA-experienced personnel. This level of student instruction was simply not possible due to real-world obligations and responsibilities that limited their time available for classroom instruction.

JTASC training and the MTT helped students accessed the ONA Knowledge Base through the Share Point Portal Server (SPPS). Players were shown the ONA informational pages (Executive Summary, et al) and the relational database. Within the database, report capabilities were used to reinforce the concept's effects, actions, nodes, and resources relationships. The effects based planning support that allowed these items to be matched and linked was not included in the course syllabus because it was not available until Spiral 3 execution. JTASC training on SPPS was conducted when server connectivity was available. The MTT servers contained an unclassified version of the ONA information and database that was available for all classes.

The practical exercise of the course highlighted ONA concepts. Students were given a fictitious ONA scenario with four nodes and a desired effect, and divided into virtual teams. Using the tools available (ADOCS, IWS, SPPS), each team was required to choose a node (which was also associated with a conflict phase – Influence, Deter, Coerce, Compel, or Defeat), and then produce a "quad" Joint Tactical Action/Resources chart based on their node assignment. The chart consisted of:

- An image of the node assigned
- A desired effect
- Blue actions
- Blue resources required by the actions to produce the given effect

The exercise was intentionally fictitious, and had no significant tactical or strategic value. Its intent was to exercise and practice functionality of the C4I tools and not to review the academic concepts.

Annex _____ Additional Observations and Comments Concerning Finding 1

SCD Observation: "The ONA problem is ultimately turning data into knowledge into understanding."

SCD Comment: "The ONA causes me to raise a couple questions. What is "knowledge?" Is it data? Is it information about the outside world? These are very different things. I'd spend

time on definitions before I spent $130M. It is easy to criticize the current ONA, but the problem is the concept. What will we do with it as a nation? Do we know what kind of knowledge we need to deal with our challenges? Does it fit with our national strategy?"

SCD Comment: "People are confused about the ONA. But if we build one using the SJFHQ and CIE, we'll have an example."

Component Comment: "The databases between ONA and MIDB were not reconcilable. We had to use MIDB because targets were not in ONA."

SME Recommendation: "Concepts such as 'ONA' and 'EBO' and related terms must be explained and understood down to the tactical level if ETO''s are going to be used to write Op Orders and Frag Orders. Even with the ""translation"" from ETO to OpO, there will be some bleed-over of new joint terminology."

SME Comment: "82nd ABN DTAC at Fort Irwin, CA received FRAGO #1 from 82nd ABN TOC at Fort Bragg on or about 26 July 02. FRAGO contained HHQ Cmdr''s. intent which referenced ""Nodes"" and ""Effects"". These terms were not understood at the tactical level as discovered with interviews with DTAC watch officers."

Participant Comment: "A better definition of exactly what ONA stands for is required – the concept has often led members of the JFT and Components (and JECG) to believe that the ONA should or will have just about all possible types of information included in it – in basis of all knowledge requirements for every elements on the JTF/Component staff. While it is going to grow and improve, unless some expectation management and definition is provided, the ONA evolves from the concept into real-life in the coming years and will never meet the expectations of future users."

Participant Comment: "It should be used as a research tool in order to provide decision makers the data that they need. It is difficult to maintain, and also is still just one source."

Participant Comment: "Needs to support planning and execution."

Participant Comment: (In response to, What should ONA contain?) "All relevant information, real time, and inherently easy to locate."

Participant Comment: "Should be used in all phases, planning and execution."

Participant Comment: "Useful in planning prior to combat ops."
Participant Comment: "Most useful for planning."

Participant Comment: "It was most powerful during planning."

Participant Comment: "It is a good planning tool. In concept it would work. It will take work to become operationally useful. It is difficult to navigate and it isn't linked with the targeting process."

Participant Comment: "The ONA helps facilitate/drive the mission analysis process. The better the mission analysis the better chance for success you have."

Participant Comment: "As the Chief of Operations, I very rarely if ever worked with the ONA. It is more of a planning tool than an operations tool."

Participant Comment: "As the Chief of Operations, I very rarely if ever worked with the ONA. It is more of a planning tool than an operations tool."

Participant Comment: "In Spiral 3, before the enemy was engaged, ONA was a great planning tool. We were all working with targets and concepts and data that the planners had anticipated. Once operations commenced, ONA value decreased."

Boil Down Session Notes, Tuesday, 13 August 2002:

Component: "ONA is a good planning tool > the question is at what level of input and maintenance it should be > CINC or SJFHQ or JTF should be responsible > ONA should contain information down to the targets and fires level of detail >"

Component: "ONA belongs at the component commanders' level and to the strategic level beyond the CINC > ONA should not reside below the JIPB >"

Component: "ONA has strategic and planning utility > other existing processes will take over from ONA down to the target folder levels > ONA might be a tactical net assessment level process >"

Annex _____ Additional Observations and Comments Concerning Finding 2

SCD Observation: "Unfortunately, without education and training on these advantages, the components may fail to fully exploit the ONA assessment, may not contribute to ONA upgrade and enrichment, and in fact may be unable to understand the enemy."

SME Comment: "Yes, but only if it (*ONA*) is robust enough to provide a fine degree of granularity of detail and breadth of subject areas."

SME Comment: "Overall the single version of the ONA makes sense for several reasons. Management of multiple databases could get difficult and promote conflicting information. It is additionally important for the components to get the view of what the higher headquarters has to deal with in regard of the DIE. (It is …) having a database that allows you to probe the virtual mind of the CJTF and the Combatant Commander."

Participant Comment: "The ONA provided basic insights...it did not, however, fulfill its fundamental promise of tying specific facilities to various nodes. In my view, the value of the ONA is in shaping the operational strategy to meet strategic goals and objectives...it loses its value when it attempts to become a tool to define tactical objectives and tasks. These need to be

derived from the JFC''s guidance and objectives based on his desired effects. The ONA allows the JFC to better frame his/her strategy by shaping the desired effects."

Participant Comment: "The Operational Net Assessment (ONA) database and construct was not synchronized or readily adaptable with the component's targeting databases and nodal analysis tools. The BE numbers and geo coordinates used by components did not always match with the ONA."

Participant Comment: "As a planner, I use the ONA to research potential ECOA."

Participant Comment: "(I used ONA for …) Mostly during spiral 3 for planning and only when searching for specific critical mission related data during Execution."

Participant Comment: "I wanted to use the ONA to gather technical information concerning RED."

Participant Comment: "(I used ONA …) to understand personal relationships with the adversary leadership, very useful."

Participant Comment: "Bird''s eye view... depiction of overall progress of efforts (graphical?). Order of Battle "“Bean-Counting"” correlated to Phase II (maybe Phase I) BDA."

Annex _____ Additional Observations and Comments Concerning Finding 3

SCD Observation: "Training should be provided to components on effects development and submittal, so the entire joint force is operating from the same database."

SCD Observation: "The JFLCC considers ONA a useful tool also. They caution that unless appropriate training occurs, the tool soon becomes useless. The training must be more than 'button-ology'. By that they mean the training must be more than learning how to physically use the tool. It must include the significance of the database functions, and how they support planning, operations, and effects assessment."

Component CC Comment: "We liked it but we wanted it to be dynamic when the fight started. My planners had trouble updating it."

SME Comment: "Everyone stated that the ONA interface was cumbersome and the amount of data provided was overwhelming. In spite of the large amounts of data provided, they often found that their particular question could not be answered. They said that if the gaps could be filled in, the tool would be much more useful."

SCD Comment: "Clearly, the training piece for ONA is critical. Senior leaders have to ensure the operations center floor personnel understand more than "buttonology." At present, most don't understand the significance of ONA and how they can use the tool to support assessment."

Participant Comment: "No formal training in the system so that made it harder to retrieve info in my …"

Participant Comment: "ONA use needs to be sustained and improved; need a better tool to make the use be sustained and improved."

Participant Comment: "Had a lesson, but didn't have time to practice using since I didn't have access to the info."

Participant Comment: "Didn't use it, wasn't trained in it."

Participant Comment: "The training method and training documents are terrible. I probably could not access 1/100 of the potential because most of my training with ONA and the database was OJT (even though I went through the class, which lasted about 1 hour at the most)."

Participant Comment: "I was taught the basics but when time allowed I learned more on my own."

Participant Comment: "Most of my knowledge of how to effectively use the ONA was done by myself through trial and error."

Participant Comment: "Last minute assignment into the slot did not allow for training time."

Participant Comment: "We had a lot of process (training) but little, very little application."

*Participant Comment: "*No training at all, learned it the old fashion way by just searching through the database."

Participant Comment: "Found it hard to navigate around."

Participant Comment: "Too complicated. If information is not a click away, it is worthless in a dynamic and fast flowing environment."

Participant Comment: "No one really has in-depth knowledge on how to use the tool. There has to be a longer training course for this tool, something like a whole day. The same should be true for ADOCS."

Participant Comment: "ONA is like the internet. It is out there somewhere but it may take you a month to find it."

Participant Comment: "Once we trained ourselves to get by the spatial problems, it worked pretty well."

Participant Comment: "Cannot update the ONA using other documents/spreadsheets or databases. ONA has to be manually updated, which in anything but a very low scale crisis would be impossible to maintain current."

Participant Comment: "It is not user friendly enough."

Participant Comment: "Needs work. People who use ONA need to sit down with programmers and help develop. ONA needs to be more operator friendly, rather than reflecting intelligence analysts comfort level."

Participant Comment: "The database needs to be exportable to allow easier sorting for CC objectives."

Annex _____ Additional Observations and Comments Concerning Finding 6

SCD Observation: "The Operational Net Assessment continues to grow and mature. The ONA has great potential, with one broad caveat. That is, the ONA is not a tool to satisfy all knowledge requirements."

SCD Observation: "The CJTF selection of desired effects to achieve the combatant commander's campaign objectives derived exclusively from the ONA."

SCD Observation: "The combination of the ONA and a focus on effects seemed to have a positive impact on the efficiency and effectiveness of the planning process."

SCD Comment: "There is an art to understanding ourselves and the enemy, to 'how we perceive the enemy and perceive ourselves.' Commanders fall along a bell-shaped curve. ONA can move the whole curve to the right, make a commander more artful, if the commander can inquire and get better answers."

SCD Comment: "Assessors need to understand every level of our activity and processes. We had too much IN and too little Ops."

SCD Comment: "ONA is a way of thinking that encourages emphasis on the whole rather than a focus on the parts of the whole."

SME Comment: "Almost everyone in the IO Cell is using the ONA daily. JFMCC uses it much of the time, but information is not detailed enough to be more than an azimuth check. PSYOP/MMIC uses it to answer 1-2 questions/day. IW (information warfare) is a heavy user, but only recently received training (not in Spirals). Others stated that they used ONA several times a day to answer important questions."

SME Comment: "During discussion in JCB, WG, RM 101, 301530LJUL02, the targeting of an airport in CJTF-S area that had not been targeted before was discussed. The apron was to be destroyed and not the planes. It would just disable the use of the airport with minimal damage and save the planes for possible return to GOR much later in the conflict. Great job of following

ONA. Minimal damage to GOR territory and receiving the desired effect...no planes in the air to oppose BLUE forces."

Participant Comment: "ONA is a promising concept. It obviously takes a lot of work to manage and keep current!"

Participant comment: "ONA provided viable nodes for attack that lead to accomplishment of the JTF Cdr's. desired effects."

Annex _____ ONA Data Base Development for MC02

Development of the ONA knowledge base for MC 02 was initiated in August 2001. In keeping with the intent of the ONA concept, J9 attempted to include governmental departments other than the Department of Defense. There was some tentative agreement to participate from intelligence and law enforcement departments and agencies but, following the September 11, 2001 attacks, they were forced to withdraw committed support. Informal involvement did continue occasionally. The J9 Blue Cell personnel (the system-of-system analysis [SoSA] cell) led the effort to develop knowledge and understanding of Red using real-world information up to the secret classification level.

A series of J9 staff experiment (STAFEX) events were conducted from September through November 2001 by the Blue Cell to help focus attention on the task of identifying potential effects, nodes and actions. The cell members then used all available research avenues to enrich the knowledge base information and analysis. The project was a daunting effort that grew larger as progress was made. The project was further hindered by the absence of adequate analysis, assessment and information management tools. Each effect required a range of node-action pairs that varied by phase and situation. Each variation tended to reveal another that produced an additional array of potential effects, nodes and related actions. An ONA limited objective experiment (LOE) in October 2001 provided concept clarification and confirmed the concept requirement for an integrated effort of Government Departments and Agencies to construct a knowledge base.

Development of the knowledge base continued through Spiral 3. The resultant product included: the ONA summary, six PMESII system summaries (for both Red and Blue), 15 regional country assessments, some 300 potential effects, 700 nodes and the appropriate actions and resources tied to them. The ONA was base lined for country Red and subsequently tailored to the MC 02 scenario setting for the experiment. The ONA knowledge base with its associated database provided sufficient clarity and options to respond to scenario situations. It was a solid introduction of a concept proposal.

Annex __ONA Knowledge Base Information for Spiral #3

Intended Use: For MC 02 Operational Net Assessment (ONA) is an operational support tool that is intended to provide joint commanders' visibility of effects-to-task linkages based on systems analyses of the adversary's political, military, economic, social, infrastructure, and information (PMESII) elements of power. Within the context of the concept, ONA is a product of collaboration among strategic, operational, and tactical levels providing a common knowledge base available to decision makers from the national strategic level to the tactical. The

development process builds situational awareness and understanding that supports planning and execution of Effects Based Operations (EBO). ONA embodies a philosophy that continuously drives a process to produce actionable knowledge. The Information Superiority Group of the headquarters has overall responsibility for coordinating the ONA among the Plans, Operations, and Knowledge Management groups.

ONA Knowledge Base: The ONA knowledge base includes the knowledge gained through focused research and analysis of a potential adversary. Context and actionable knowledge are the key components that are collectively referred to as the knowledge base. For the MC 02 experiment context access is provided through the Share Point Portal Server (SPPS) with the ONA Summary page and the ONA Matrix page. Actionable knowledge access (the relational database) is also provided through SPPS. This database provides the specific effects to task linkages as well as rationale and potential consequences of actions.

First the ONA Summary page provides a high-level context and an overall net assessment of Red and Blue objectives. The Matrix page provides a single page table with hyperlinks to the PMESII summaries, PMESII vulnerabilities and diplomatic, information, military, economic (DIME) objectives from both a Blue and Red perspective. Additionally, assessments of regional perspectives are also presented with more detailed hyperlinks embedded. Relevance to the developing situation is the key attribute of establishing context.

The actionable knowledge in the ONA database is the linkage between effects, nodes, actions, resources, (E/N/A/R) rationale and potential consequences of selected actions. For a desired effect, a range of actions and key nodes are presented for consideration by the commander in development of effects based plan.

SPPS ONA Summary Page. The ONA Summary page is an executive-level synopsis of Blue and Red objectives and a net assessment of the evolving situation. The summary provides a short assessment of ongoing activity and evaluates both complimentary and conflicting objectives to illuminate potential avenues for achieving Blue objectives. It is the result of a collaborative effort between the Blue Red Cell and Pol-Mil planner in the Plans Group and the Information Superiority Group.

SPPS ONA Matrix Page. The ONA Matrix page is a tailored selection of links to various executive level documents. The links include assessments from both Blue and Red points of view and allows the user to drill down to detailed documents supporting the assessment and the database. The matrix also allows selection of DIME strategy and presents a comparison of DIME intentions and Red vulnerabilities. Further, the Matrix page provides a collection of regional states and entity assessments that provide insight into how they might respond to Blue activities.

ONA Database. ONA includes an action-oriented process that provides a continuous stream of knowledge from desired Blue effects to adversary vulnerabilities to potential actions. Potential effects along with Red and Blue perspectives are captured from SJFHQ war-gaming sessions. Within the database, effects are referenced to supporting strategic guidance and engagement plans.

As described within the concept key nodes are developed through system-of-systems analysis. Node selection requires an understanding of the adversary as a set of interdependent PMESII systems. This understanding is developed through in-depth research, analysis and reach-back to centers of excellence. The operational net assessment development process relies upon habitual, persistent, institutionalized collaboration and integration to leverage a wide variety of experts from a wide variety of organizations to build a coherent knowledge base. Nodes

descriptions and significance statements are presented in the database as well as links to supporting documentation.

Actions are based on the DIME capability construct that reflects the range of national power elements. Actions are linked to nodes where the combined action-node pair has the potential to achieve the desired effect. Each effect-node-action combination is supported with a rationale and identifies potential secondary effects or consequences. The ONA database provides multiple node-action pairs that may achieve an effect and are presented for planning consideration and command decisions.

Tools. As designed Operational Net Assessment is expected to be a tool to support effects based planning and commander decision-making. The ONA Summary and Matrix pages establish the context for understanding the adversary. The relational database captures the core information (E/N/A/R) and linkages identified in the analysis process. It reflects the potential cause and effect relationships for planning and decision use.

A planning module within the data base brings together the effects, nodes, actions, resources, and secondary effects and presents a range of options to build an ETO. The planning module then provides a method to task components for selected effects as well as to prioritize and sequence effects and nodes. Changes to any effect, node, action, resource, or secondary effect are immediately reflected in plans based on those elements.

The ONA database offers an extensive reporting function. All aspects of the ONA database content are available as user selectable fields for generating reports.

Analyst Notebook is an analysis tool that provides a canvas for presenting, viewing and understanding associations between entities. For better perspective many diagrams using Analyst Notebook have been developed in the ONA analysis effort and are linked to the ONA summaries and database nodes.

In developing the ONA knowledge base for MC 02 analysts have used several models to further understand the adversary (Red). They include the Structured Evidentiary Argumentation System (SEAS), Situational Influence Assessment Model (SIAM), and Critical Intent Model (CIM). Built during ONA development, these models are manpower intensive. They do facilitate identification of interactions between PMESII categories, major influences on the adversary leadership, and critical activities required to conduct some threat operations.

The ONA database will undergo minor improvements following Spiral #3 based on input from the spiral. Most of the changes will be designed to improve utility and consistency between the modules.

As presented within the experiment the ONA knowledge base contains the knowledge developed in assessing the real world and overlaying the MC 02 scenario. The real world provided the necessary fidelity to understand the cause and effect relationships that are expressed as effects/nodes/actions/resource linkages in the database. ONA is intended to provide a focused introduction for conducting effects based operations and must be continuously updated by current operations and current intelligence. This is one of the concept aspects that will be considered during experiment execution. **Annex _____ONA Knowledge Base Access and Use_**

The following charts display MC02 participant access to ONA Knowledge base items contained in the SPPS. The data was extracted using the WebTrends tool. Access and use of this information was far more intuitive than the database information. The tools provided were considered to be adequate by participants.

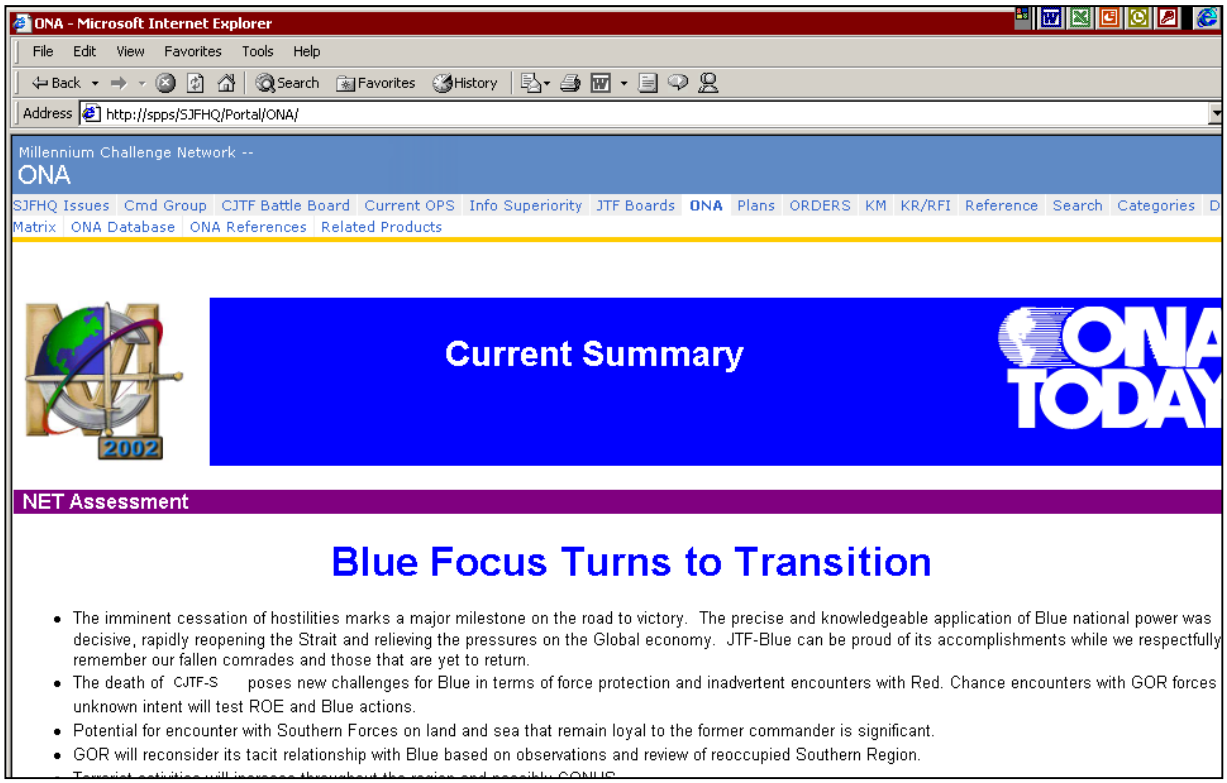


Figure 131: ONA Portal Page on SPPS

The figure above is a screen capture of the ONA portal (entryway) page on the MC02 SPPS. The ONA portal was also used as the ONA Today Executive Summary page. As such, this Executive Summary and portal page recorded more visits than the other ONA pages because users predominantly used it to transit to their destination page(s). 2051 users visited the ONA Portal page during the three week Execution period.

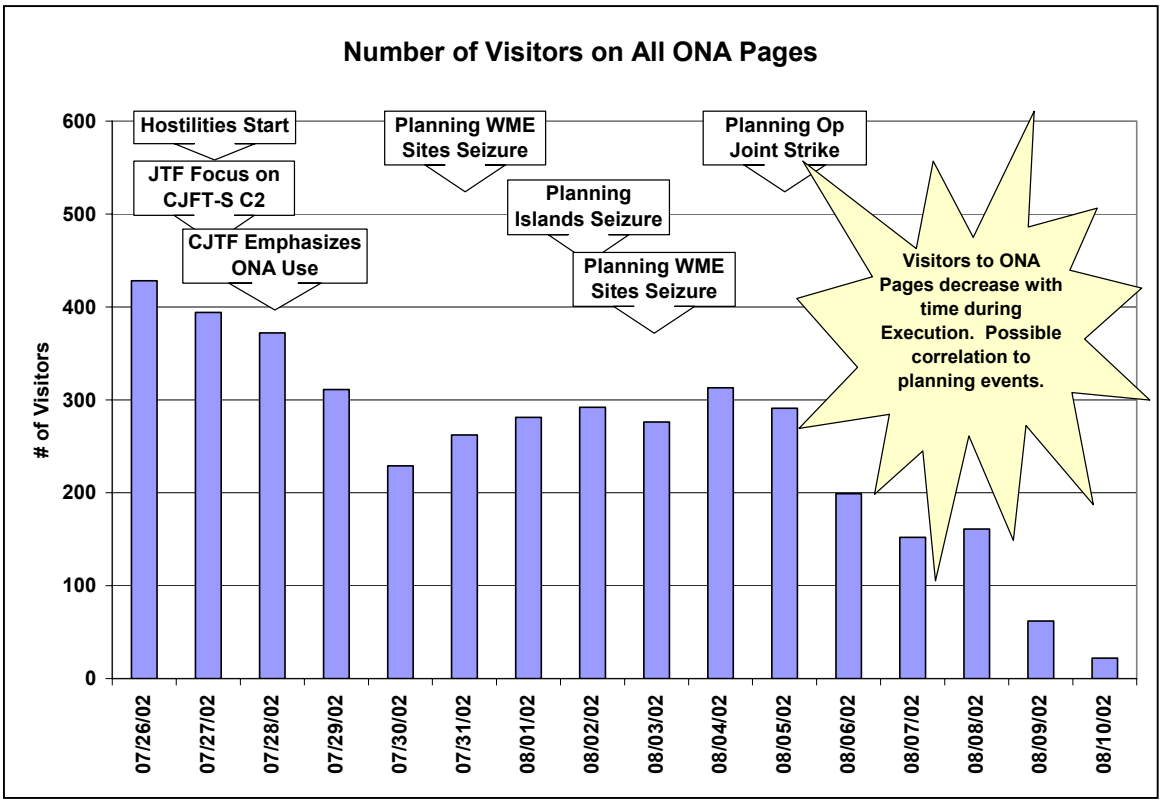


Figure 132: Number of Visitors on all ONA Pages

The figure above shows the cumulative number of visitors to all the ONA pages on SPPS per day. There appears to be a correlation between the major planning activities shown in the text boxes at the top of the chart with the cumulative number of visitors to the ONA pages.

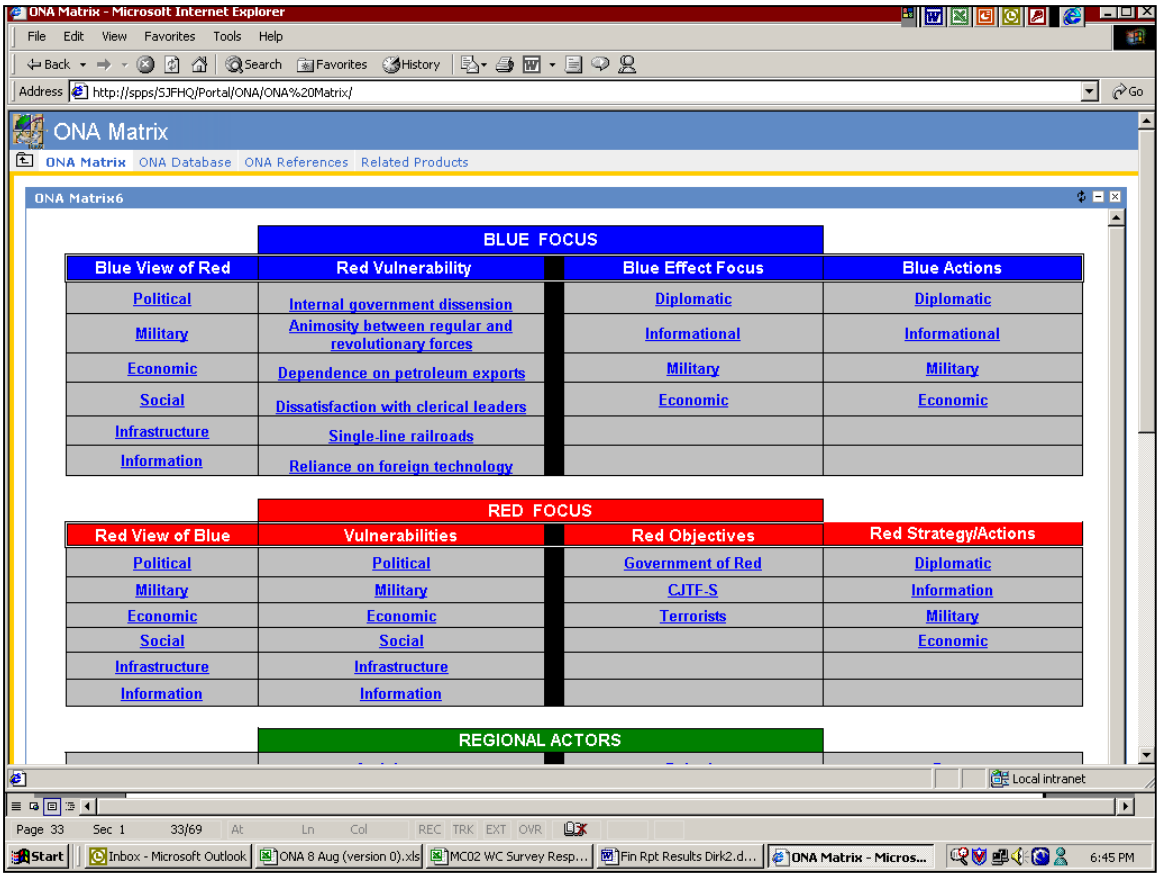


Figure 133: ONA Matrix Page on SPPS

The figure above is a screen capture of the ONA Matrix page on the MC02 SPPS. 256 users visited the Matrix page during the three week Execution period.

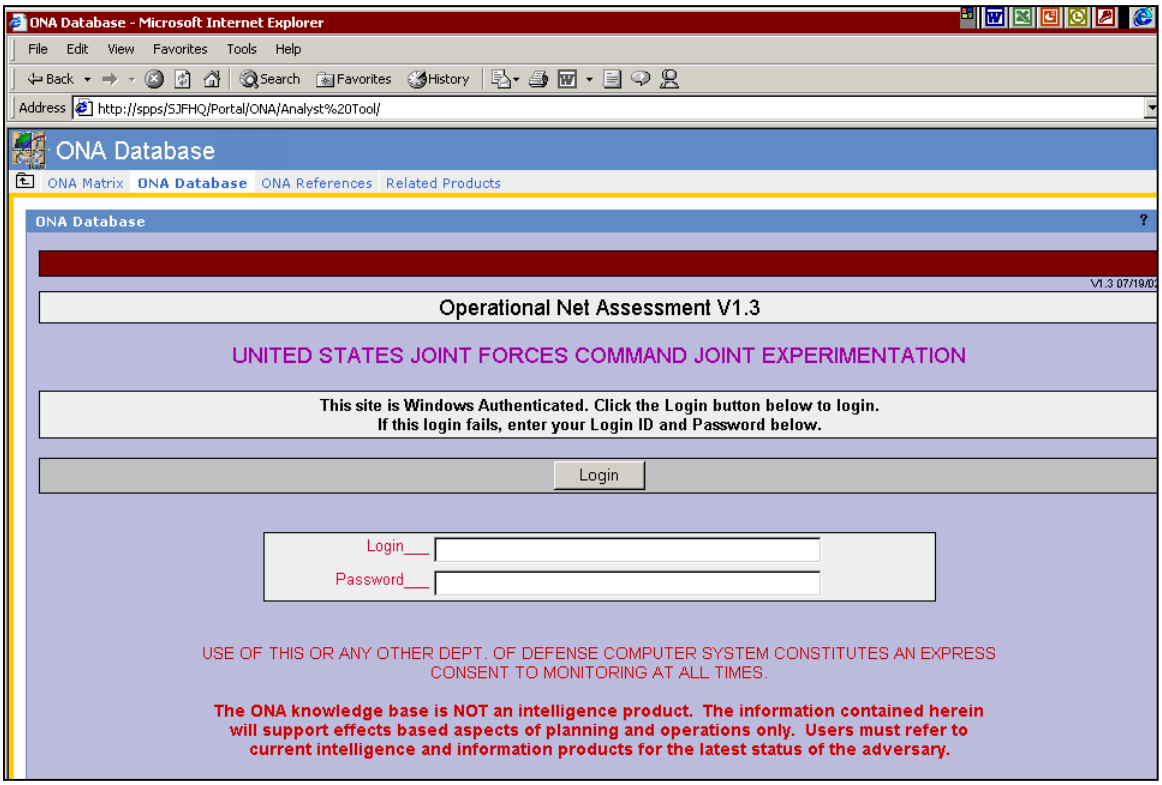
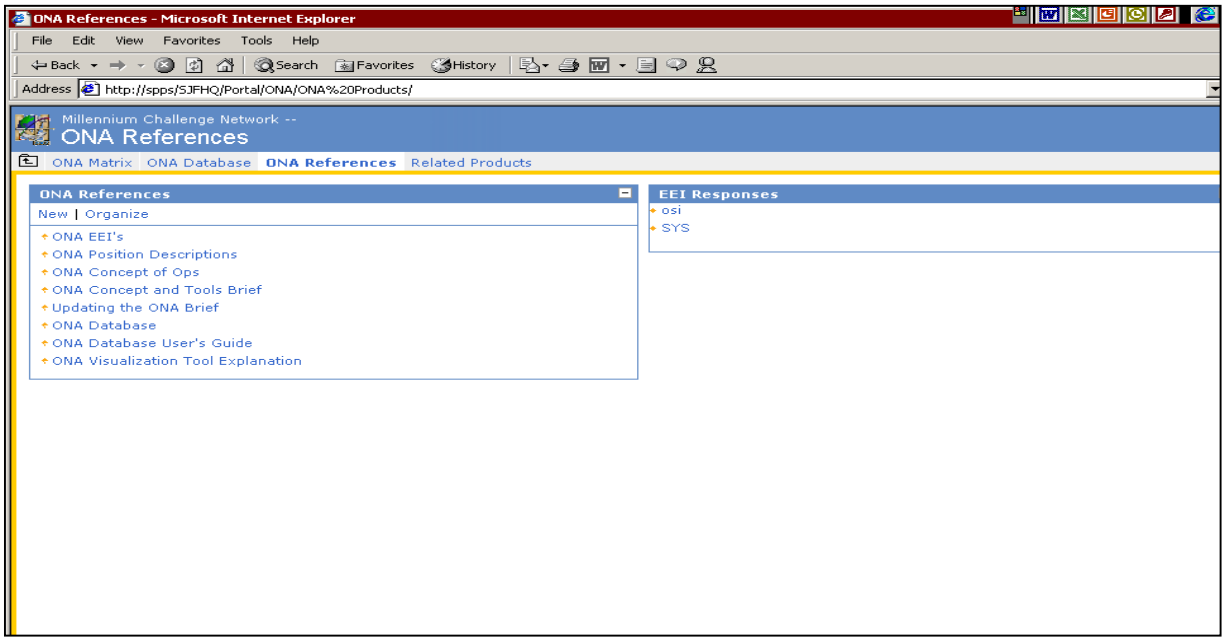


Figure 134: ONA Database Login Page on SPPS

The figure above is a screen capture of the ONA Database Login page on the MC02 SPPS. 1539 users visited the Login page during the three week Execution period.

Figure 135: ONA References Page on SPPS

The figure above is a screen capture of the ONA References page on the MC02 SPPS. 130 users visited the References page during the three week Execution period.



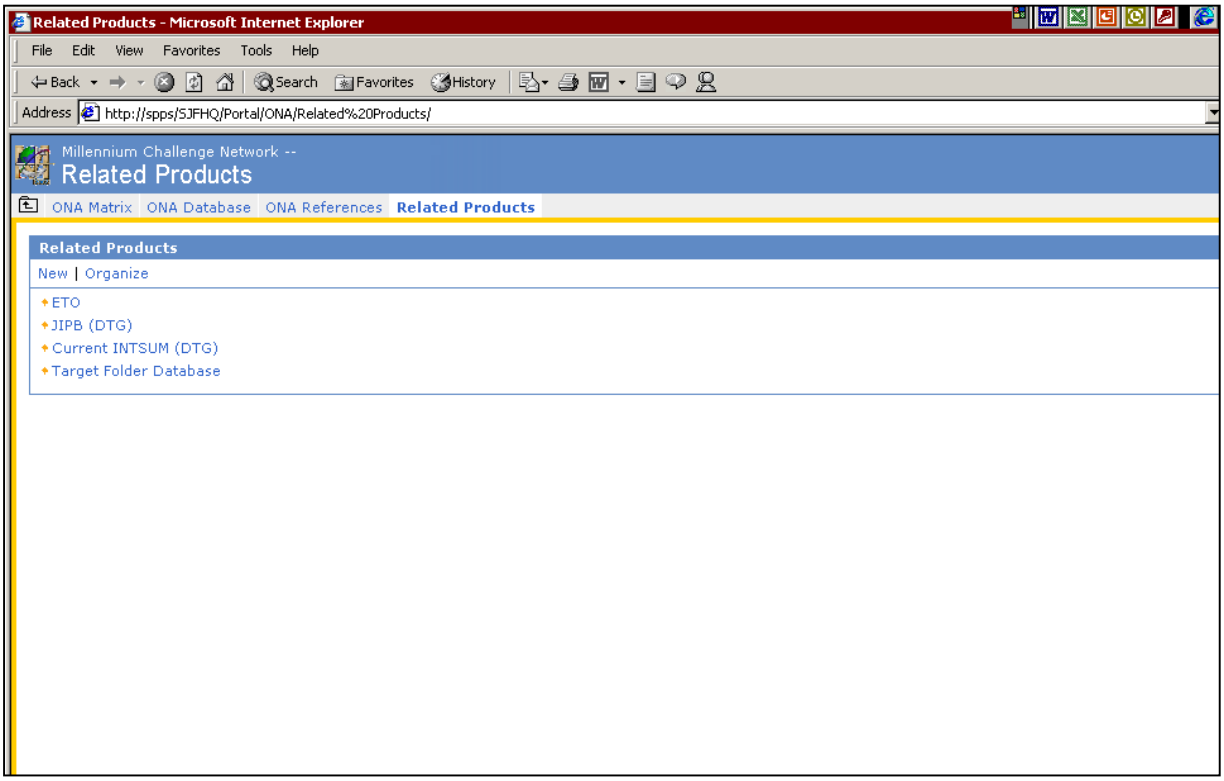


Figure 136: ONA Related Products Page

The figure above is a screen capture of the ONA Related Products page on the MC02 SPPS. 69 users visited the Products page during the three week Execution period.

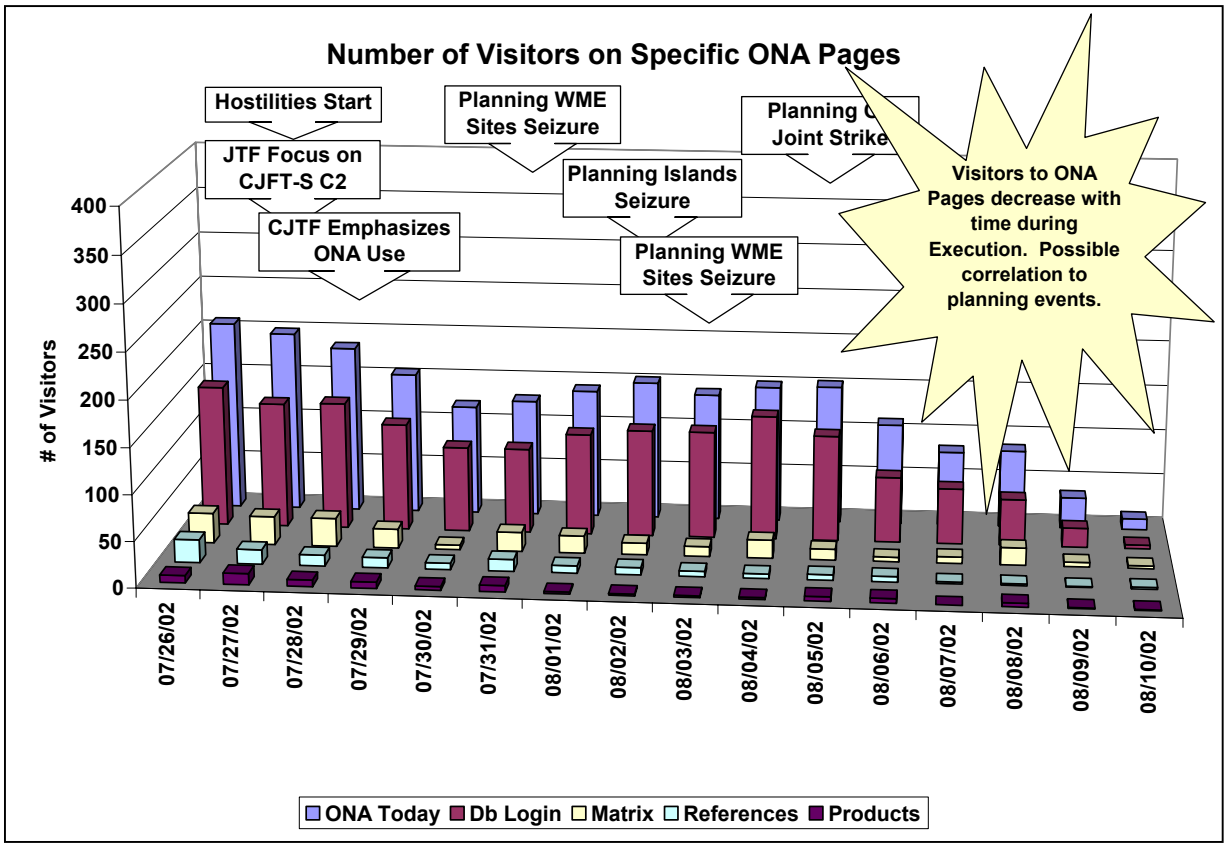


Figure 137: Number of Visitors on Specific ONA Pages

The figure above breaks out the various ONA pages to show that the ONA Today (Executive Summary and portal) and the Database Login pages were the predominant pages visited consistently. There still appears to be a correlation between the major planning activities shown in the text boxes at the top of the chart with the number of visitors to the various ONA pages.

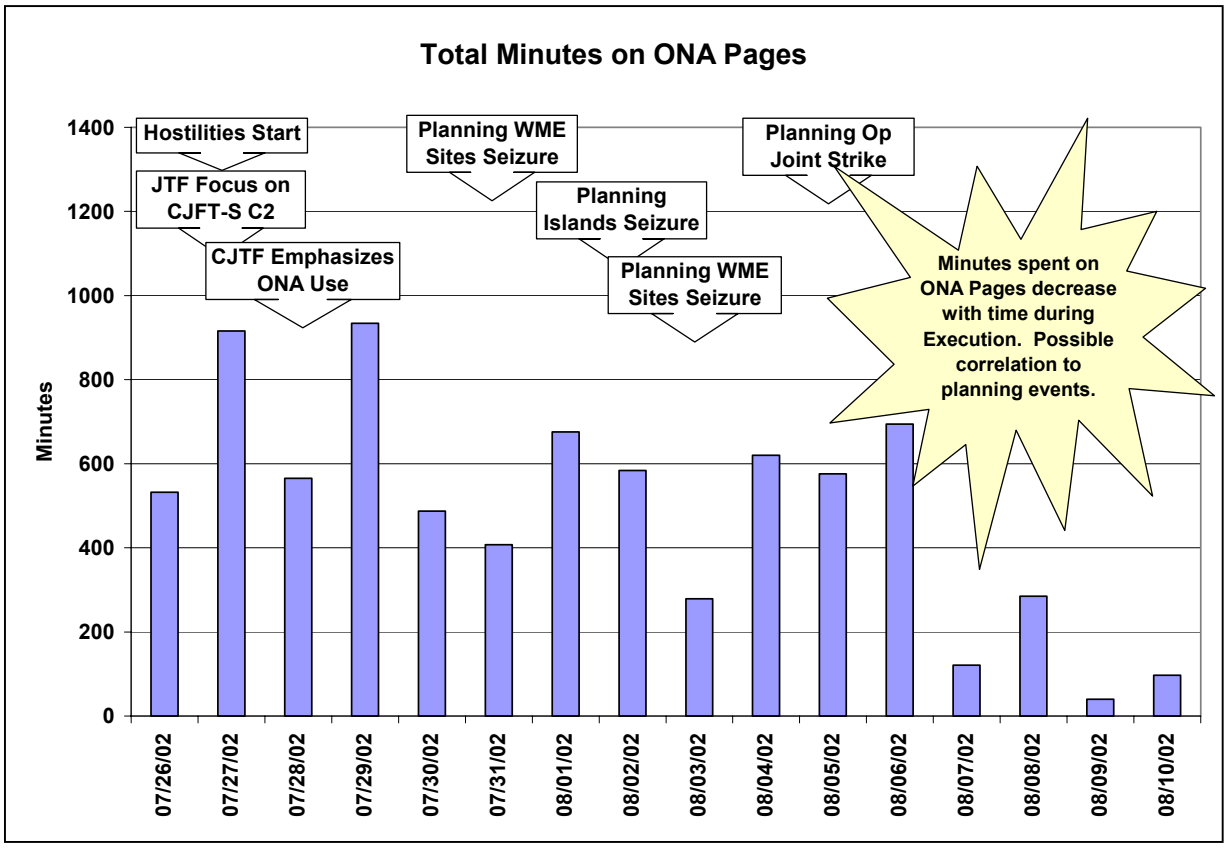


Figure 138: Total Minutes on ONA Pages

The figure above shows the cumulative number of minutes spent on all the ONA pages on SPPS per day. There still appears to be a correlation between the major planning activities shown in the text boxes at the top of the chart with the cumulative number of minutes on the ONA pages but it is less clear than the previous figures. It should be noted that the data does not differentiate productive from non productive activity while on spending time on the page(s). An individual could be productive the entire time or could have logged in and stepped away from the terminal for a break. As a matter of fact, if the terminal is inactive for 30 minutes and then the user returns and becomes active again, the system counts the new activity as a second visit with its own associated minutes recorded.

Figure 139: Total Minutes on Specific ONA Pages

The figure above breaks out the various minutes spent on the various ONA pages to show that the ONA Today (portal) and the Database Login pages were again the predominant pages where time was spent. There still appears to be a correlation between the major planning activities shown in the text boxes at the top of the chart with the number of minutes on each of the ONA pages but the correlation is less clear than the previous figures. It also appears that more cumulative time was spent on the ONA Today page than on the database login page as was expected.

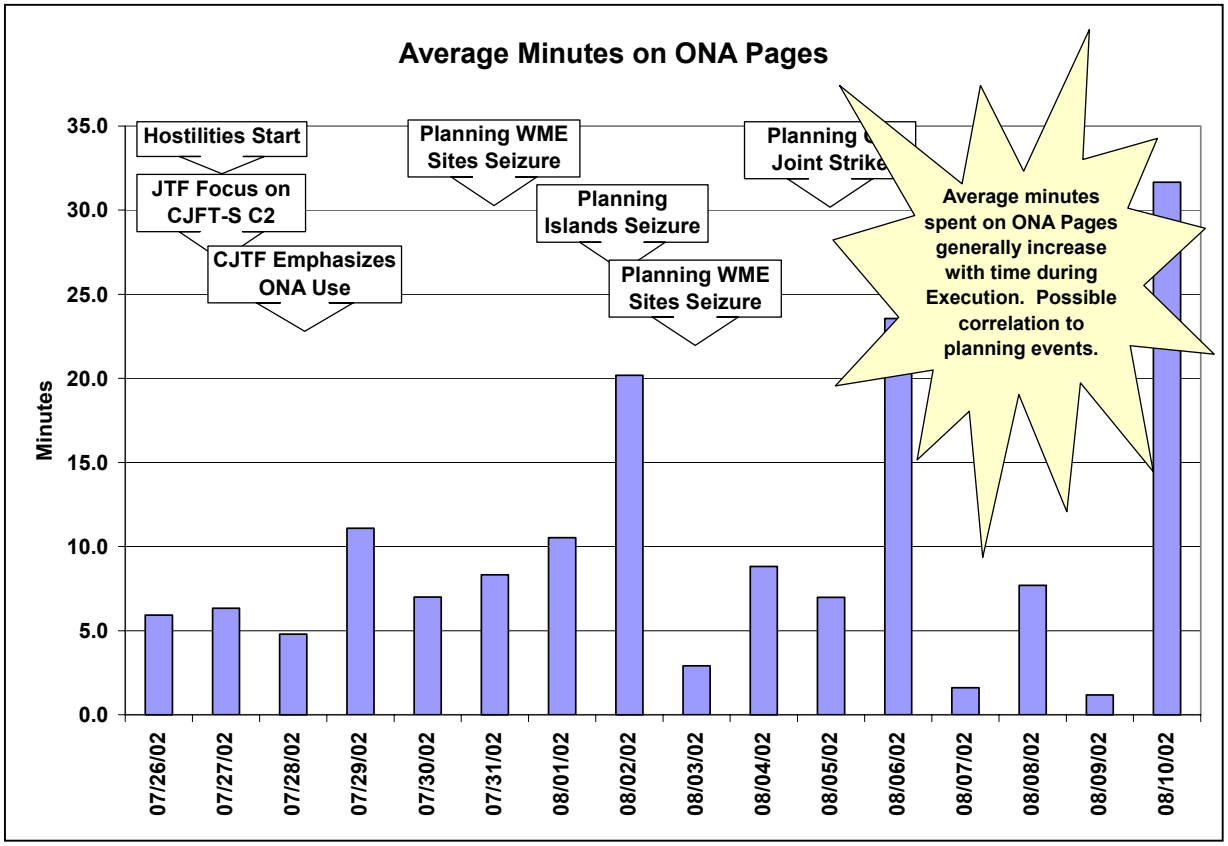
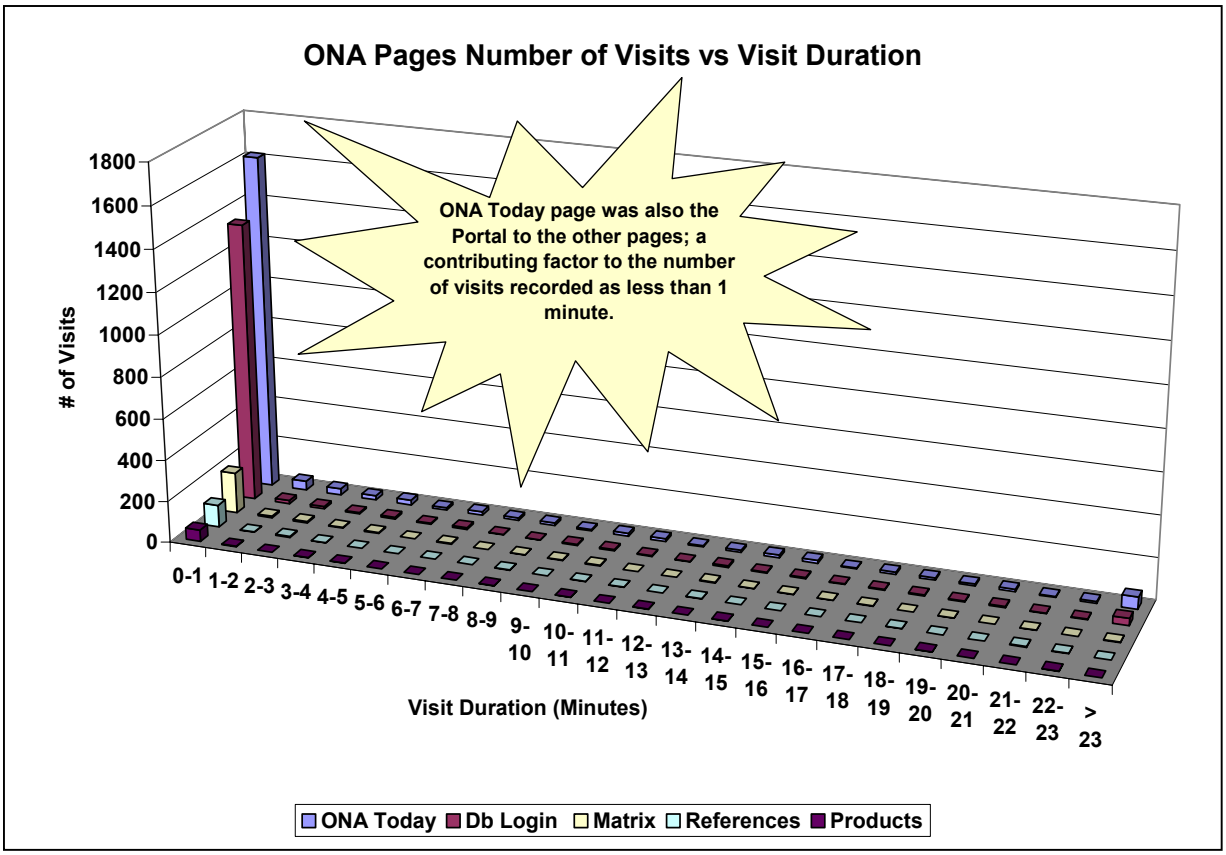


Figure 140: Average Minutes on ONA Pages

The figure above shows the average number of minutes spent on all the ONA pages on SPPS per day. This is the total number of visitors divided by the total number of minutes per day. There still appears to be a correlation between the major planning activities shown in the text boxes at the top of the chart with the average number of minutes on the ONA pages. The figure above shows the average number of minutes spent on each ONA page on SPPS per day. This is the total number of visitors divided by the total number of minutes per day. There still appears to be a correlation between the major planning activities shown in the text boxes at the top of the chart with the average number of minutes on the ONA pages.



The figure above shows the number of visits categorized by the visit duration in one minute intervals for each ONA page on SPPS.

- Since the ONA Today page was also the portal to the other pages, an assumption will be made that the bulk of the 0-1 minute visits were transitions to the other pages. The 0-1 minute category, however, represented 81 percent of all duration categories.

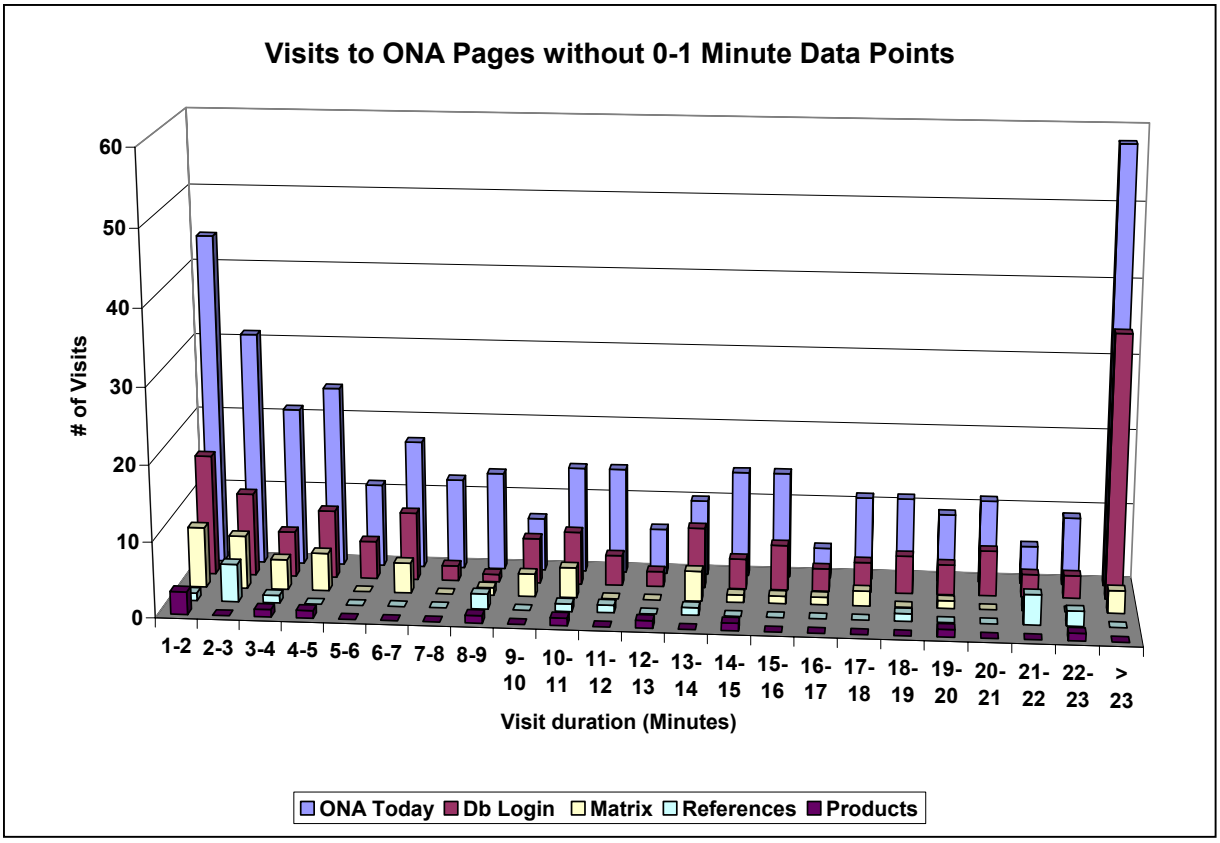
- Since the Database Login page did not require a user id or password but only a click of the "Login" button, an assumption will be made that the bulk of the 0-1 minute visits were transitions to the SQL database (WebTrends looses track of activity but the SQL audit log takes over). The 0-1 minute category, however, represented 89 percent of all duration categories.

- The Matrix, References and Products pages saw nominal use during Execution relative to the ONA Today and Database Login pages. The 0-1 minute category represented 80 percent of all duration categories for the Matrix page, 85 percent of all duration categories for the References page and 84 percent of all duration categories for the Products page.

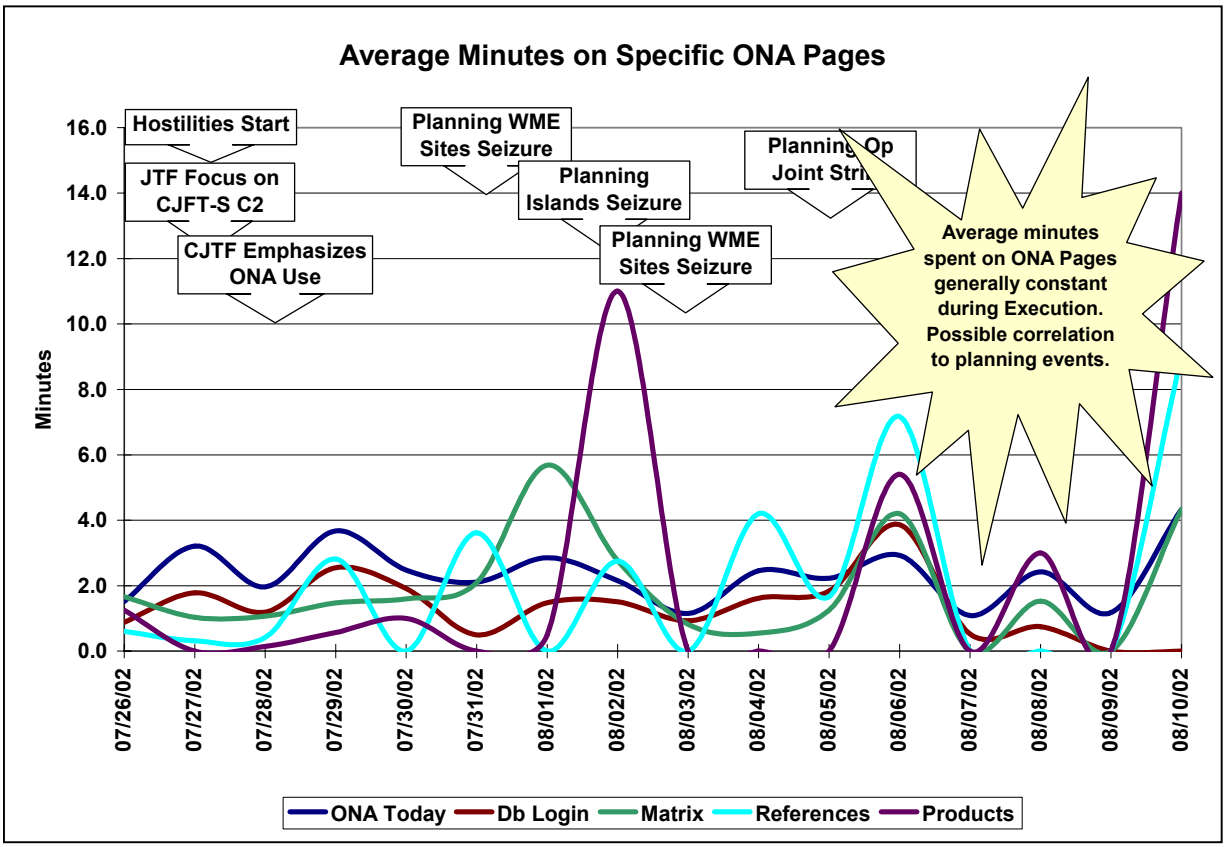
The figure above, like the one before it, shows the number of visits categorized by the visit duration in one minute intervals excluding the 0-1 minute category for each ONA page on SPPS.

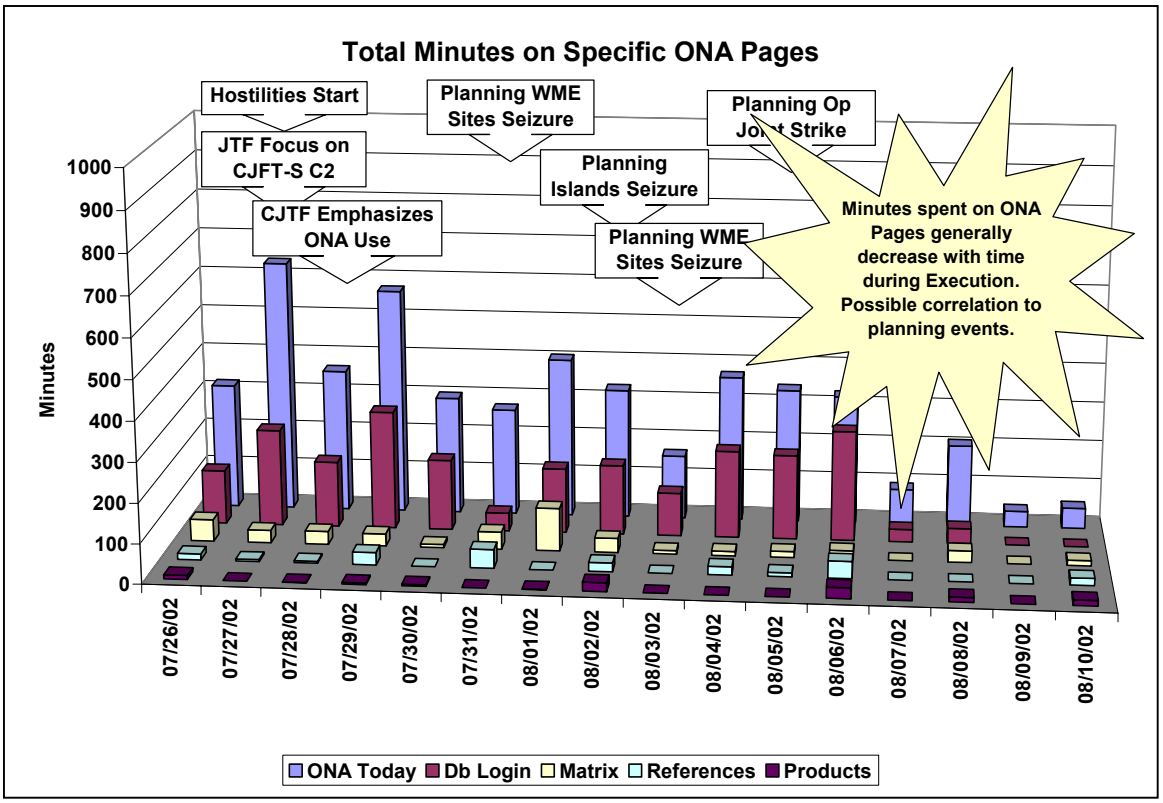
Since the ONA Today page was also the portal to the other pages, the assumption was made that the bulk of the 0-1 minute visits were transitions to the other pages. Therefore, the duration categories shown here represent the time spent reviewing the Executive Summary information. However, the most time needed to read the entire page was about 10 minutes or less. Any visits recorded greater than 10 minutes were more than likely a result of terminal inactivity. The 1-23+ minute categories represented 19 percent of all duration categories.

Since the Database Login page did not require a user id or password but only a click of the "Login" button, the assumption was made that the bulk of the 0-1 minute visits were transitions to the SQL database (WebTrends looses track of activity but the SQL audit log takes over). Any visits recorded greater than 2-3 minutes were more than likely a result of terminal inactivity. The 1-23+ minute categories represented 11 percent of all duration categories.



The Matrix, References and Products pages saw nominal use during Execution relative to the ONA Today and Database Login pages. The 1-23+ minute categories represented 20 percent of all duration categories for the Matrix page, 15 percent of all duration categories for the References page and 16 percent of all duration categories for the Products page.**Annex _____ONA Data Collection Matrix**




Total Minutes on Specific ONA Pages
Hostilities Start
JTF Focus on CJFT-S C2
CJTF Emphasizes ONA Use
Planning WME Sites Seizure
Planning Islands Seizure
Planning WME Sites Seizure
Planning Op Joint Strike
Minutes spent on ONA Pages generally decrease with time during Execution. Possible correlation to planning events.
Minutes
1000
900
800
700
600
500
400
300
200
100
0
07/26/02
07/27/02
07/28/02
07/29/02
07/30/02
07/31/02
08/01/02
08/02/02
08/03/02
08/04/02
08/05/02
08/06/02
08/07/02
08/08/02
08/09/02
08/10/02
ONA Today
Db Login
Matrix
References
Products

Appendix A in Assessment Area 7 ONA Data Collection Matrix

Concept/Challenge/Task/Measure/Data Requirement	Data Collection Method					Collection Audience (Who)	Collection Tool (How)	Collection Frequency (When)	UJTL Connection
	SME	SVY	SCD	M&S	Prodct.				
7. CONCEPT: OPERATIONAL NET ASSESSMENT									
7.1. WARFIGHTING CHALLENGE: Ability to construct and use an ONA knowledge base to support development of an effects-based strategy									
Task: 7.1.1 Develop an ONA information knowledge base	Is the Blue DIME vs. Red PMESII analysis in the ONA knowledge base useful?								ST 2.2
Measure: 7.1.1.0.1 Rating of the adequacy of how Blue DIME capabilities versus Red/adversary PMESII systems comparative analyses are captured in ONA knowledge base									OP 2.4.1
DR: ONA users' understanding of Blue DIME capabilities versus Red/adversary PMESII systems analyses									
DE: 1.Survey question(s)	S	P				Plans, Info S, & Cmd Gps.; JIAC; Comp.	JDCAT Survey	7 Jun.	
DR: Utility of Red/adversary DIME/PMESII system analysis for ONA users (thorough; correct; shallow; wrong)									
DE: 2.Survey question(s)	S	P				Plans, Info S, & Cmd Gps.; JIACG; Comp.	JDCAT Survey	7 Jun.	
DR: ONA users desired Red/adversary DIME/PMESII system analysis information missing from ONA knowledge base									
DE: 3.Survey question(s)	S	P				Plans, Info S, &	JDCAT	10 Jun.	

Concept/Challenge/Task/Measure/Data Requirement	Data Collection Method					Collection Audience (Who)	Collection Tool (How)	Collection Frequency (When)	UJTL Connection
						Cmd Gps.; JIACG; Comp.	Survey		
DE: 4.Count of JTF Hq DIME/PMESII system analysis requests for information (RFI)	S			P		Plans, Info S, Cmd & Ops Gps.; JIACG; Comp.	RFI Tool/log	As occurs	
DR Army: Does the database/ONA provide detailed and comprehensive information about adversary vulnerabilities and leadership profiles to enable IO planning and execution?									
DE: 5.Survey question(s)	S	P				Plans, Info S, & Ops Gps.	JDCAT Survey	Execution	
Measure: 7.1.1.0.2 Rating of Blue information adequacy included in ONA knowledge base	Is the Blue information in the ONA knowledge base useful?								
DR: Utility of Blue information included in ONA knowledge base for ONA users (thorough; correct; shallow; wrong)									
DE: 1.Survey question(s)	S	P				Plans, Info S, & Cmd Gps.; JIACG; Comp.	JDCAT Survey	7 Jun.	
DE: 2.Frequency count of ONA knowledge base accessed for Blue information	S			P		Plans, Info S, Cmd & Ops Gps.; JIACG; Comp.	ONA audit log	As occurs	
DR: ONA users' desired Blue information missing from ONA knowledge base									
DE: 3.Survey question(s)	S	P				Plans, Info S, & Cmd Gps.; JIACG; Comp.	JDCAT Survey	10 Jun.	
Measure: 7.1.1.0.3 Rating of the adequacy of how the ONA knowledge base provides a shared awareness of the JOA	Does the ONA knowledge base provide awareness of the JOA?								OP 2.5
DR: ONA knowledge base contribution to battlespace awareness for JTF staff									
DE: 1.Survey question(s)	S	P				Plans, Info S, Cmd	JDCAT	9 Jun.	

Concept/Challenge/Task/Measure/Data Requirement	Data Collection Method					Collection Audience (Who)	Collection Tool (How)	Collection Frequency (When)	UJTL Connection
						& Ops Gps.	Survey		
DR: ONA knowledge base contribution to battlespace awareness for components									
DE: 2.Survey question(s)	S	P				Comp	JDCAT Survey	9 Jun.	
DR: ONA knowledge base contribution to battlespace awareness for interagency									
DE: 3.Survey question(s)	S	P				JIACG	JDCAT Survey	9 Jun.	
DR Army: How does the Army Corps HQS when serving as a JTF synchronize of the Joint Intelligence Preparation of the Battle Space (JIPB) process with the Operational Net Assessment (ONA) process?									
DE: 4.Survey question(s)	S	P				Cmd, Ops & Info S Gps.	JDCAT Survey	Execution	
DR Army: What is the process by which the Army Corps HQS when serving as a JTF synchronizes of the Joint Intelligence Preparation of the Battle Space (JIPB) process with the Operational Net Assessment (ONA) process?									
DE: 5.Survey question(s)	S	P				Cmd, Ops & Info S Gps.	JDCAT Survey	Execution	
Measure: 7.1.1.0.4 Rating of the adequacy of how the ONA knowledge base supports ETO development	Does the ONA knowledge base support ETO development?								
DR: JPC's understanding of adversary's goals, intentions, strengths, and weaknesses using the ONA knowledge base									
DE: 1.Survey question(s)	S	P				JPC	JDCAT Survey	12 Jun.	
DR: Time it takes JPC to develop course of action packages									
DE: 2.Time course of action planning initiated	P	S				JPC	Data Sheet	8 Jun.	
DE: 3.Time course of action planning approved	P	S				JPC	Data Sheet	8 Jun.	

Concept/Challenge/Task/Measure/Data Requirement	Data Collection Method					Collection Audience (Who)	Collection Tool (How)	Collection Frequency (When)	UJTL Connection
DE: 4.Survey question(s)	S	P				JPC	JDCAT Survey	9 Jun.	
DR: Determine the utility of the ONA knowledge base in building an ETO									
DE: 5.Survey question(s)	S	P				JPC	JDCAT Survey	9 Jun.	
DR Army: Does an Army corps staff require augmentation and/or specialized training to exploit the ONA?									
DE: 6.Survey question(s)	S	P				Plans, Ops,& Cmd Gps.	JDCAT Survey	Execution	
Task: 7.1.2. Analyze Red's PMESII systems (for tangible and intangible strengths and weaknesses)									OP 2.4.1
Measure: 7.1.2.0.1 Rating of analysis comprehensiveness for Red's PMESII systems included in the ONA knowledge base	How comprehensive was the ONA knowledge base analysis of Red PMESII?								OP 2.4.1.1
DR: ONA users' understanding of Red PMESII analyses									
DE: 1.Survey question(s)	S	P				Plans, Info S, Cmd & Ops Gps.; IAC; Comp.	JDCAT Survey	9 Jun.	
DR: ONA users' impression as to how robust the Red PMESII system analysis was (thorough; correct; shallow; wrong)									
DE: 2.Survey question(s)	S	P				Plans, Info S, Cmd & Ops Gps.; IAC; Comp.	JDCAT Survey	9 Jun.	
DR: ONA users' opinion as to what was missing from the Red PMESII analysis									
DE: 3.Survey question(s)	S	P				Plans, Info S, Cmd & Ops Gps.; IAC; Comp.	JDCAT Survey	9 Jun.	

Concept/Challenge/Task/Measure/Data Requirement	Data Collection Method					Collection Audience (Who)	Collection Tool (How)	Collection Frequency (When)	UJTL Connection
DR Army: How effective is the JIPB in providing sufficient detail to plan and implement surveillance and reconnaissance of adversary C2 including leaders and facilities?									
DE: 4.Survey question(s)	S	P				Plans, Info S. Ops Gps.	JDCAT Survey	Execution	
DR Army: How effective is the ONA in providing sufficient detail to plan and implement surveillance and reconnaissance of adversary C2 including leaders and facilities?									
DE: 5.Survey question(s)	S	P				Plans, Info S. Ops Gps.	JDCAT Survey	Execution	
Measure: 7.1.2.0.2 Number of adversary nodes included in ONA knowledge base that adversary felt were critical/high value	Did the ONA knowledge base present nodes as critical that Red felt were critical?								OP 2.4.1.1
DR: Identify number of adversary nodes in ONA knowledge base identified as critical and that adversary felt were critical/high value									
DE: 1.Survey question(s)	S	P			S	OPFOR	JDCAT Survey	6 Jun.	
DE: 2. Extract critical/high value adversary nodes from ONA knowledge base	S				P/A	n/a	Data Sheet	6 Jun.	
Measure: 7.1.2.0.3 Number of adversary nodes in ONA knowledge base identified as vulnerable and that adversary felt were vulnerable	Did the ONA knowledge base present nodes as vulnerable that Red felt were vulnerable?								
DR: Determine number of adversary nodes in ONA knowledge base identified as vulnerable and that adversary felt were vulnerable									
DE: 1.Survey question(s)	S	P			S	OPFOR	JDCAT Survey	6 Jun.	
DE: 2.ONA knowledge base identification of vulnerable adversary nodes	S	S			P/A	n/a	Data Sheet	6 Jun.	
Measure: 7.1.2.0.4 Rating of the adequacy of PMESII analyses to promote understanding of adversary's	Did the analysis of Red PMESII in the ONA knowledge base promote understanding of Red's goals?								OP 2.4.1.2

Concept/Challenge/Task/Measure/Data Requirement	Data Collection Method					Collection Audience (Who)	Collection Tool (How)	Collection Frequency (When)	UJTL Connection
goals (intentions)									
DR: Percent of adversary goals correctly identified by JPC using ONA									
DE: 1.Survey question(s)	S	P				OPFOR	JDCAT Survey	6 Jun.	
DE: 2.Survey question(s)	S	P				JPC	JDCAT Survey	6 Jun.	
DE: 3.Compute JPC percent correct identification of adversary goals	P/A					n/a	Data Sheet	6 Jun.	
DR: Percent of adversary goals correctly identified by Joint Interagency Coordination Group (JIACG) using ONA									
DE: 4.Survey question(s)	S	P				OPFOR	JDCAT Survey	6 Jun.	
DE: 5.Survey question(s)	S	P				JIACG	JDCAT Survey	6 Jun.	
DE: 6.Compute JIACG percent correct identification of adversary goals	P/A					n/a	Data Sheet	6 Jun.	
Measure: 7.1.2.0.5 Rating of the adequacy of PMESII analyses to promote understanding of the adversary's (self) perceived strengths	Did the ONA knowledge base correctly identify Red's self perceived strengths?								
DR: Percent of adversary strengths correctly identified by JPC using ONA									
DE: 1.Survey question(s)	S	P				OPFOR	JDCAT Survey	6 Jun.	
DE: 2.Survey question(s)	S	P				JPC	JDCAT Survey	6 Jun.	
DE: 3.Compute JPC percent correct identification of adversary strengths	P/A					n/a	Data Sheet	6 Jun.	
DR: Percent of adversary strengths correctly identified by JIACG using ONA									

Concept/Challenge/Task/Measure/Data Requirement	Data Collection Method					Collection Audience (Who)	Collection Tool (How)	Collection Frequency (When)	UJTL Connection
DE: 4.Survey question(s)	S	P				OPFOR	JDCAT Survey	6 Jun.	
DE: 5.Survey question(s)	S	P				JIACG	JDCAT Survey	6 Jun.	
DE: 6.Compute JIACG percent correct identification of adversary strengths	P/A					n/a	Data Sheet	6 Jun.	
Measure: 7.1.2.0.6 Rating of the adequacy of PMESII analyses to promote understanding of the adversary's (self) perceived weaknesses	Did the ONA knowledge base correctly identify Red's self perceived weaknesses?								
DR: Percent of adversary weaknesses correctly identified by JPC using ONA									
DE: 1.Survey question(s)	S	P				OPFOR	JDCAT Survey	6 Jun.	
DE: 2.Survey question(s)	S	P				JPC	JDCAT Survey	6 Jun.	
DE: 3.Compute JPC percent correct identification of adversary weaknesses	P/A					n/a	Data Sheet	6 Jun.	
DR: Percent of adversary weaknesses correctly identified by JIACG using ONA									
DE: 4.Survey question(s)	S	P				OPFOR	JDCAT Survey	6 Jun.	
DE: 5.Survey question(s)	S	P				JIACG	JDCAT Survey	6 Jun.	
DE: 6.Compute JIACG percent correct identification of adversary weaknesses	P/A					n/a	Data Sheet	6 Jun.	
Task: 7.1.3 Continually update the ONA to reflect battlespace change									OP 2.6
Measure: 7.1.3.0.1 Number of times ONA updated after JTF formation	Did the ONA knowledge base provide current information as changes occurred in the battlespace?								

Concept/Challenge/Task/Measure/Data Requirement	Data Collection Method					Collection Audience (Who)	Collection Tool (How)	Collection Frequency (When)	UJTL Connection
DR: Identify number of times ONA updated									
DE: 1.Count of ONA knowledge base updates for incorrect information				P	S	n/a	ONA audit log	As they occur	
DE: 2.Count of ONA knowledge base updates for missing information				P	S	n/a	ONA audit log	As they occur	
DE: 3.Total ONA knowledge base updates				P	S	n/a	ONA audit log	As they occur	
DE: 4.JTF functional member who makes update				P	S	n/a	ONA audit log	As they occur	
Measure: 7.1.3.0.2 Rating of ONA update currency	Did ONA users trust the ONA knowledge base currency?								
DR: Number of ONA users that knew it had been updated									
DE: 1.Survey question(s)	S	P				Plans, Info S, Cmd & Ops Gps.; JIACG; Comp.	JDCAT Survey	12 Jun.	
Measure: 7.1.3.0.3 Time required to update ONA knowledge base	How long did it take to update the ONA knowledge base?								
DR: Individual responsible for deciding what JISR information should be added to ONA knowledge base									
DE: 1.Survey question(s)	S	P				Plans & Info S. Gps.	JDCAT Survey	12 Jun.	
DR: Determine how information is passed from JISR to ONA for update									
DE: 2.Survey question(s)	S	P				Plans, Info S. & Ops Gps.	JDCAT Survey	12 Jun.	
DR: Determine time required to update ONA after new node information available									
DE: 3.Survey question(s)	S	P				EAC,ISG;JOC,JPC	JDCAT Survey	12 Jun.	

Concept/Challenge/Task/Measure/Data Requirement	Data Collection Method					Collection Audience (Who)	Collection Tool (How)	Collection Frequency (When)	UJTL Connection
Task: 7.1.4 Employ automated tools to virtually and collaboratively access, manipulate, and maintain the ONA knowledge base									OP 5.1.4
Measure: 7.1.4.0.1 Rating of automated tool adequacy for information retrieval from ONA knowledge base	Did the ONA knowledge base tools provide adequate information retrieval?								
DR: Ease of information access for ONA users									
DE: 1.Survey question(s)	S	P				Plans, Info S, Cmd & Ops Gps.; JIACG; Comp.	JDCAT Survey	12 Jun.	
DR: Ease of information manipulation for ONA users									
DE: 2.Survey question(s)	S	P				Plans, Info S, Cmd & Ops Gps.; JIACG; Comp.	JDCAT Survey	12 Jun.	
Measure: 7.1.4.0.2 Rating of automated tools adequacy for ONA knowledge base maintenance	Did the ONA knowledge base tools provide adequate capability for knowledge base maintenance?								
DR: Determine ease of information maintenance/update for ONA analysts									
DE: 1.Survey question(s)	S	P				Plans, Info S, Cmd & Ops Gps.; JIACG; Comp.	JDCAT Survey	12 Jun.	
Measure: 7.1.4.0.3 Frequency of ONA knowledge base information access	How often was the ONA knowledge base accessed?								
DR: Determine frequency of ONA knowledge base information access									
DE: 1.Count of JTF ONA knowledge base information access by hour	S			P		ONA knowledge base	ONA audit log	As occurs (tot. ea. wk.)	

Concept/Challenge/Task/Measure/Data Requirement	Data Collection Method					Collection Audience (Who)	Collection Tool (How)	Collection Frequency (When)	UJTL Connection
7.2. WARFIGHTING CHALLENGE: Ability to use ONA to enhance decision making									
Task: 7.2.1 Determine if the ONA products compliment JTF staff actions									
Measure: 7.2.1.0.1 Time needed by ONA users to find desired information in ONA knowledge base	How long did it take ONA knowledge base users to find needed information?								
DR: Identify time it takes ONA users to find needed information in ONA knowledge base									
DE: 1.Survey question(s)	S	P				Plans, Info S, Cmd & Ops Gps.; JIACG; Comp.	JDCAT Survey	12 Jun.	
Measure: 7.2.1.0.2 Rating of adequacy of ONA use for board/center/cell preparation and other staff actions	Did the ONA knowledge base support board, center, cell activity and other staff actions adequately?								
DR: Determine if the ONA knowledge base enhanced board, center, and cell preparation									
DE: 1.Survey question(s)	S	P				Plans, Info S, Cmd & Ops Gps.; JIACG; Comp.	JDCAT Survey	12 Jun.	
DR: Determine if the ONA knowledge base enhanced JTF staff actions other than board/center/cell preparation									
DE: 2.Survey question(s)	S	P				Plans, Info S, Cmd & Ops Gps.; JIACG; Comp.	JDCAT Survey	12 Jun.	
Measure: 7.2.1.0.3 Number of instances information desired by ONA users but not included or not found in ONA knowledge base	Did the ONA knowledge base contain the information its users needed?								
DR: Identify number of times ONA users' desired information									

Concept/Challenge/Task/Measure/Data Requirement	Data Collection Method					Collection Audience (Who)	Collection Tool (How)	Collection Frequency (When)	UJTL Connection
not included in ONA knowledge base									
DE: 1.Survey question(s)	S	P				Plans, Info S, Cmd & Ops Gps.; JIACG; Comp.	JDCAT Survey	12 Jun.	
Measure: 7.2.1.0.4 Rating of adequacy of ONA use in PEL development	Did the ONA knowledge base provide adequate support for development of the PEL?								
DR: Determine if ONA knowledge base supported PEL development									
DE: 1.Survey question(s)	S	P				Plans, Info S, Cmd & Ops Gps.	JDCAT Survey	10 Jun.	
Measure: 7.2.1.0.5 Rating of adequacy of ONA use in ETO development	Did the ONA knowledge base provide adequate support for development of the ETO?								
DR: Determine if ONA knowledge base supported ETO development									
DE: 1.Survey question(s)	S	P				Plans, Info S, Cmd & Ops Gps.	JDCAT Survey	12 Jun.	
Task: 7.2.2 Identify adversary's vulnerabilities, intentions, and key nodes									OP 2.4.1.2/2.4.1.3
Measure: 7.2.2.0.1 Comparison of ETO focus of adversary's vulnerabilities with ONA depiction of vulnerabilities	Did the ETO focus on vulnerabilities identified by the ONA knowledge base?								OP 2.4.2.4
DR: Determine if ONA was used to identify the adversary vulnerabilities noted in the ETO									
DE: 1.Survey question(s)	S	P				Plans & Info S. Gps.	JDCAT Survey	12 Jun.	
Measure: 7.2.2.0.2 Comparison ETO focus of adversary's intentions with ONA depiction of intentions	Was the ETO developed with the ONA knowledge base depiction of Red intentions?								

Concept/Challenge/Task/Measure/Data Requirement	Data Collection Method					Collection Audience (Who)	Collection Tool (How)	Collection Frequency (When)	UJTL Connection
DR: Identify adversary's intentions									
DE: 1.Survey question(s)	S	P				Plans & Info S. Gps.	JDCAT Survey	12 Jun.	
Measure: 7.2.2.0.3 Comparison of ETO focus of adversary's key nodes with ONA depiction of key nodes	Was the ETO developed with the ONA knowledge base depiction of Red key nodes?								
DR: Identify adversary's key nodes									
DE: 1.Adversary's estimate of their key nodes	S	P				Plans & Info S. Gps.	JDCAT Survey	12 Jun.	
Task: 7.2.3 Identify potential second and third order effects for contemplated actions									OP 5.3.6
Measure: 7.2.3.0.1 Percent of ETOs developed with second and third order effects identified for tasked actions	What percent of ETOs included second and third order effects for nodes selected for attack?								
DR: Determine percent of ETO effects that include second and third order effects									
DE: 1.ETO effects with second and third order effects included	P	S			S	JPC; JOC	Data sheet	11 Jun.	
DE: 2.Number of ETO effects	P	S				JPC; JOC	Data sheet	11 Jun.	
DE: 3.Compute percentage of ETO (and updates) effects with second and third order effects	P/A					n/a	Data sheet	As needed	
Measure: 7.2.3.0.2 Number of instances JFC and staff used second and third order effects in their decision process	How often were second and third order effects considered by the JFC and staff when considering actions against Red?								
DR: Determine number of times JFC refused proposed COA because of second and third order effect information									

Concept/Challenge/Task/Measure/Data Requirement	Data Collection Method					Collection Audience (Who)	Collection Tool (How)	Collection Frequency (When)	UJTL Connection
DE: 1.Survey question(s)	S	P	S			Plans & Cmd Gps.	JDCAT Survey	9 Jun.	
DE: 2.Survey question(s)	S	P	S			Plans & Cmd Gps.	JDCAT Survey	9 Jun.	
DR: Instances of JFC using second and third order effect information in his decision process									
DE: 3.Survey question(s)	S	P	S			Plans, Cmd & Ops Gps.	JDCAT Survey	Execution	
DR: Instances of JFC disregarding second and third order effect information in his decision process									
DE: 4.Survey question(s)	S	P	S			Plans, Cmd & Ops Gps.	JDCAT Survey	Execution	
Task: 7.2.4 Prioritize and select potential courses of action									OP 5.3.6
Measure: 7.2.4.0.1 Number of instances JFC and staff used ONA knowledge base as reference source to prioritize COA branches and sequels	How often did the JFC and staff use the ONA knowledge base as a reference source for prioritizing courses of action?								
DR: Criteria JFC uses to prioritize proposed courses of action									
DE: 1.Survey question(s)	S	P	S			Plans & Cmd Gps.	JDCAT Survey	8 Jun.	
DR: Identify number of times JFC used ONA information to prioritize COA									
Measure: 7.2.4.0.2 Rating of ONA knowledge base adequacy as reference source for JFC to select COA branches and sequels	How often did the JFC and staff use the ONA knowledge base as a reference source for selecting courses of action?								
DR: Identify number of times JFC used ONA as reference source for course of action selection									
DE: 2.Survey question(s)	S	P	S			Plans & Cmd Gps.	JDCAT Survey	8 Jun.	

Concept/Challenge/Task/Measure/Data Requirement	Data Collection Method					Collection Audience (Who)	Collection Tool (How)	Collection Frequency (When)	UJTL Connection
Task: 7.2.5 Use ONA to operate within adversary's decision cycle									OP 5.4.4
Measure: 7.2.5.0.1 Number of instances ONA-supported Blue action interrupted adversary's ability to command and control its force	Did Blue use ONA knowledge base information to interrupt Red force command and control?								
DR: ONA impact on adversary's ability to command and control its forces									
DE: 1.Survey question(s)	S	P				OPFOR	JDCAT Survey	Execution	
DR: ONA impact on adversary's ability to communicate with its forces									
DE: 2.Survey question(s)	S	P				OPFOR	JDCAT Survey	Execution	
DR: ONA impact on adversary forces ability to execute their assigned mission									
DE: 3.Survey question(s)	S	P				OPFOR	JDCAT Survey	Execution	
DR Army: How did the ONA enable the JTF to influence the adversary's decision cycle?									
DE: 4.Survey question(s)	S	P				Plans & Cmd Gps.	JDCAT Survey	Execution	
Measure: 7.2.5.0.2 Number of adversary actions considered successful by JFC and staff	How often did the JFC and staff feel Red had conducted a successful action against them?								OP 5.4.4
DR: Determine number of adversary actions considered successful by JFC									
DE: 1.Survey question(s)	S	P	S			Plans, Info S, Cmd & Ops Gps.	JDCAT Survey	Execution	
Measure: 7.2.5.0.3 Number of adversary actions unexpected by JFC	How often were the JFC and staff surprised by Red actions?								

Concept/Challenge/Task/Measure/Data Requirement	Data Collection Method					Collection Audience (Who)	Collection Tool (How)	Collection Frequency (When)	UJTL Connection
and staff									
DR: Determine number of adversary actions unexpected by JFC									
DE: 1.Survey question(s)	S	P	S			Plans, Info S, Cmd & Ops Gps.	JDCAT Survey	Execution	
Measure: 7.2.5.0.4 Percent of time JFC and staff felt they were operating within the adversary's decision cycle	What percent of the time did the JFC and staff feel they were operating within Red's decision cycle?								
DR: Determine JFC and staff estimate of percent of time they were operating within the adversary's decision cycle									
DE: 1.Survey question(s)	S	P	S			Plans, Info S, Cmd & Ops Gps..	JDCAT Survey	Execution	
DR: Adversary's estimate of percent of time they were on the offensive									
DE: 2.Survey question(s)	S	P				Plans, Info S, Cmd & Ops Gps.	JDCAT Survey	Execution	
DR: Adversary's estimate of percent of time they were on the defensive (reactive)									
DE: 3.Survey question(s)	S	P				Plans, Info S, Cmd & Ops Gps.	JDCAT Survey	Execution	
DR: Blue's perception of consistently being on the offensive									
DE: 4.Survey question(s)	S	P				Plans, Info S, Cmd & Ops Gps.	JDCAT Survey	Execution	
DR: Blue's perception of consistently being on the defensive (reactive)									
DE: 5.Survey question(s)	S	P				Plans, Info S, Cmd & Ops Gps.	JDCAT Survey	Execution	
Measure: 7.2.5.0.5 JFC and staff rating of ONA effectiveness in support of operating inside of the adversary'	How useful was the ONA knowledge base for Blue to operate within Red's decision cycle?								

Concept/Challenge/Task/Measure/Data Requirement	Data Collection Method					Collection Audience (Who)		Collection Tool (How)	Collection Frequency (When)	UJTL Connection	
decision cycle											
DR: Determine JFC and staff estimate of ONA contribution to Blue offensive (proactive) success											
DE: 1.Survey question(s)	S	P	S			Plans, Info S, Cmd & Ops Gps.		JDCAT Survey	Execution		

Assessment Area 8 -- Effects-Based Operations: Planning and Assessment

Overall Assessment Results

The EBO P&A concept demonstrated strong potential for future Defense Department application during the conduct of this experiment. Additionally, the concept demonstrated a similar application in other government departments, potentially providing better integration of government responses to contingency situations. (See Assessment Area 10 for related information).

EBP's contribution to Blue Force operations was demonstrated and the ability to conduct EBP war fighting challenge was met. The CJTF selection of desired effects to achieve the Combatant Commander's campaign objectives derived exclusively from the ONA. Desired effects were translated into essential tasks for functional components. Components framed tactical actions in the context of desired effects and essential tasks. However, the linkage between desired effects and key nodes, and synchronization between tactical actions and resources were not always apparent.

The process for assessing achievement of effects did not work effectively and needs refinement. In some collaborative sessions, one or more components, the JTF staff, and the Combatant Commander reported different assessments of a specific effect. While it is not surprising that perceptions would diverge at different levels of command, there needs to be a process for identifying the reasons behind the divergence. It was clear the assessment process was either not understood or needs refinement. Not only is it a tremendous challenge to collect all the data and information necessary to conduct effects assessment, visualization of the knowledge thus gained is a serious mechanization (tools) challenge in its own right. (See Assessment Area 7 for related information.)

Overall Assessment Results

- **EBP EA concept demonstrated strong potential DoD application…**
- **Desired effects were translated into essential tasks for functional components…**
- **The process for assessing achievement of effects did not work effectively…**
- **It was clear the assessment process was either not understood or needs refinement…**

Methodology

Participant surveys, SME surveys, SME observations, and comments were all used as data collection tools. Additionally, senior concept developer observations and comments, "In Focus" sessions where senior concept developers debated the pros and cons of concepts, 'Azimuth Check' sessions where developers and senior experiment leadership discussed the JTF's application of concepts and out-briefs, called 'boil-down' sessions, with the senior JTF and functional component planners were also used as a means of collecting data to gain perspective on the EBP and effects assessment concept. Additionally, JTF and Component planning and assessment products were reviewed by the SMEs and analysis personnel to aid in understanding specific participant grasp of the concept.

Warfighting Challenge:

Ability to conduct EBP

Task: Conduct operational mission analysis to support effects-based operations
Finding 1:

Operating in a Collaborative Information Environment (CIE) and using the CIE tools, JTF planners were better able to assess the operational situation and develop better-reasoned courses of action in response. The CIE tools provide the planner with greater access to information, the use of IWS allows the free flow of information, and other more non-traditional players are brought into the planning process. (See Assessment Area 9 for related information) Thus, planners can more fully understand all the intended and unintended consequences of their actions, because they have access to more information and insight. It is difficult to assess the ability of the planners to identify key nodes and vulnerabilities using the ONA/JIPB. Most of the planners found these tools incomplete and hard to work with.

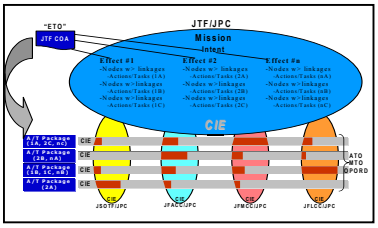


Figure 141: Cllick on the above file to display a power point slide show. Notes are available by right clicking the slide show and choosing the appropriate view.

In summary, based on observations and comments from the SMEs and responses to surveys administered to the war fighters, the general consensus is the CIE and CIE tools improve the planners' ability to assess the operational situation and develop better-reasoned COAs. The CIE tools provide the planner with more access to information than could be attained previously. In addition, the use of IWS allows the free flow of information within the EBP process, and can bring other more non-traditional players into the process enabling the planners to more fully understand all the intended and unintended consequences of their actions. This additional information can cause 'information overload' and does need to be carefully screened in order not to inundate the planners. It may be necessary to assign a skilled operational planner to this screening task to ensure JPC members do not waste their valuable time. Education and training are keys to successful implementation of the CIE into the planning process. Many problems encountered using the CROP, IWS, SPPS, and other planning tools introduced during MC02 will be resolved as planners become more experienced and comfortable with using the tools, and implementation TTPs are developed for the tools' use. By its very nature, the increased level of participation and information in the planning process can lead to a slowing down of the process; however, the increased time needed to assimilate the information into a cohesive and well thought out plan can be more than offset by the ability to produce a better-reasoned COA.

Subtask: Assess the operational situation using the collaborative information environment

JTF level planners felt the CROP enhanced the EBP process. Component level planners did not feel as strongly, however, their level of acceptance improved somewhat from Spiral 3 and from beginning to end of the Execution phase. Planners commented the CROP was difficult to use. As the experiment progressed, they became better at using the CROP, but information was hard to find, duplicative, and somewhat inconsistent. Planners also cited planning time constraints and the personal time required to participate in virtual collaborative planning sessions as restricting their time available to use the CROP. A JFMCC planner expressed a common frustration, "The only situational awareness provided to future planners is provided through monitoring of briefings and planning sessions conducted over IWS." The areas of the CROP identified as most useful by the JTF and Component planners was access to planning documents via SPPS, graphic representation of the battle-space via ADOCS, and access to the ONA. When

asked what information was not available on the CROP, planners listed 'thorough and authoritative written documentation of key collaborative sessions,' 'real reach-back to centers of excellence,' 'tools to better facilitate assessment,' 'COA analysis and war-gaming,' 'space planning tools,' 'plotting of nodes and nodal relationships,' and 'chronological file of significant and analyzed intelligence.'

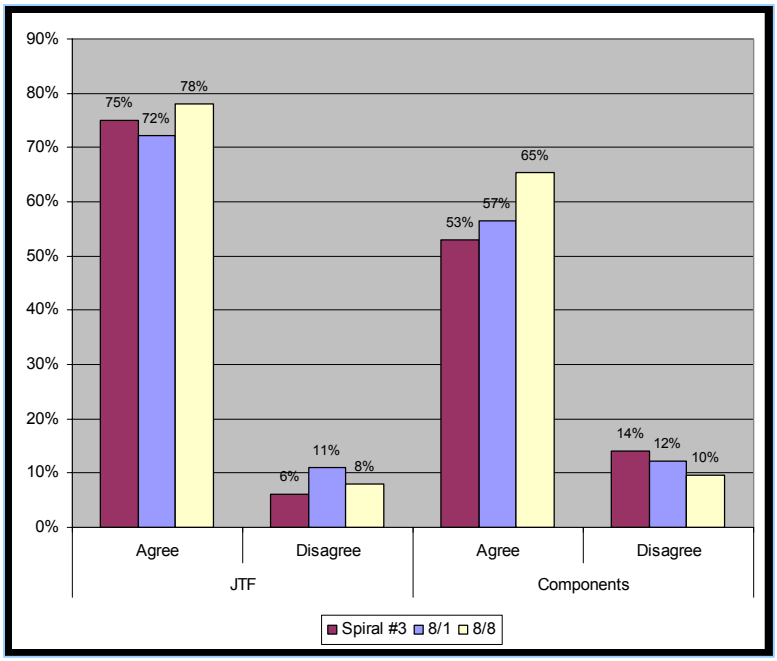


Figure 142: Planners agreed that CROP enhanced the EBP process

An overwhelming number of JTF level planners felt collaboration helped to develop a better-reasoned COA. Component level planners were not as enthusiastic. A big challenge at component level was the competing demands for time and attention between internal and external planning activities. As such, planners, thus pressed for time, were not able to reflect on their work and conduct thorough collaboration, as they would have preferred. Evidence suggests courses of action were developed in sidebars and vetted in collaboration. In the words of one component planner, "[CIE] brings more brainpower to the fight, but you need to have a staff product to help maximize the collaborative process, you cannot start with a blank page, and the collaborators need to see the information ahead of time to adequately prepare for quality collaboration."

JTF level planners also thought the use of collaboration helped them develop COAs more quickly. Again, component level planners were not as supportive of the faster COA idea. Some felt horizontal collaboration was problematic and that too many people were participating in the process creating delays in decision-making. Planners' comments suggest virtual collaborative sessions must be

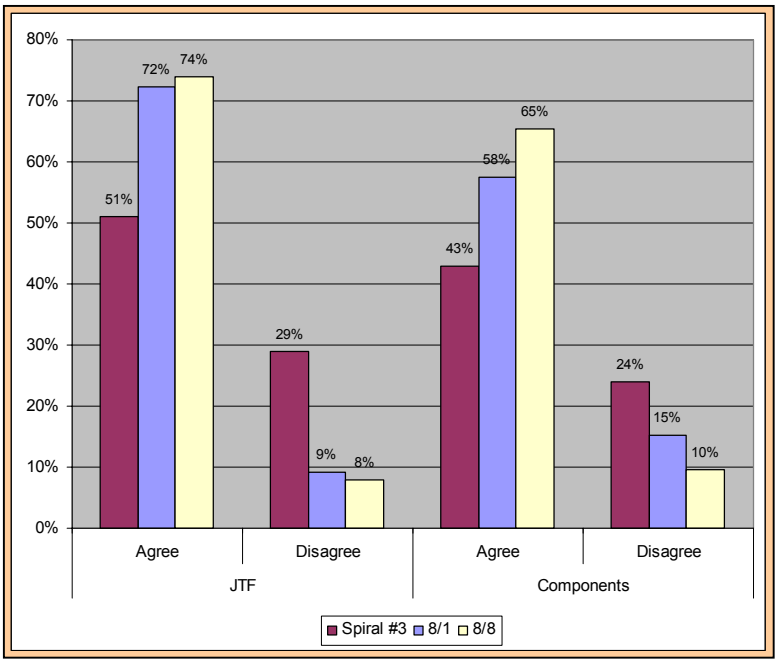


Figure 143: Most agreed that collaboration helped develop COAs more quickly

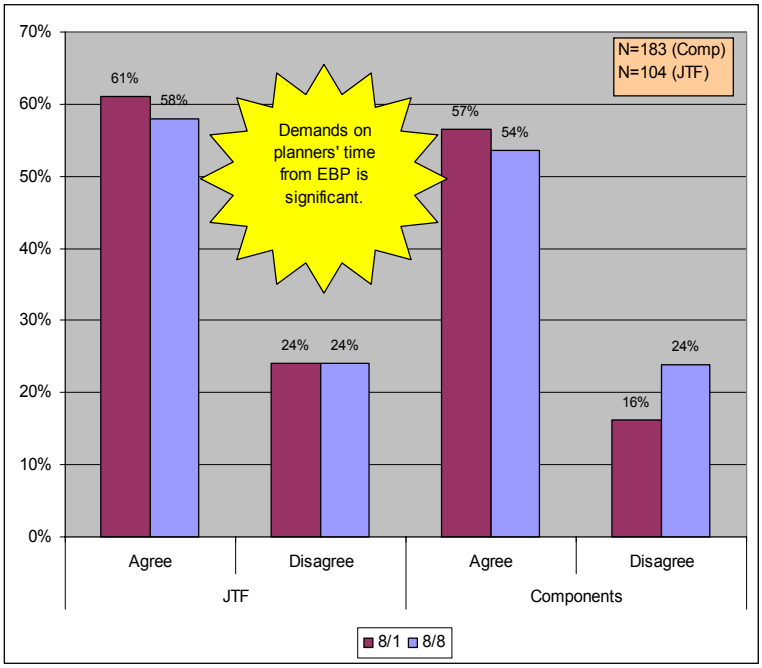


Figure 144: Collaboration takes up considerable time

driven hard to be timely. Planners also suggest it is very difficult to develop COAs through virtual collaboration, but works well in reviewing COAs with distant headquarters.

A majority of JTF level planners agree that additional demands on the planners' time resulting from EBP are significant. Planners felt this was particularly true at the component level, where they are more sparsely manned while having requirements to collaborate with more locations (higher, lower, and laterally). Some planners suggest the additional demands on time did not necessarily result from EBP but lack of reasonable analytical support—the analysis tools and products planners normally use were simply not available. And again, planners commented that a significant amount of time was wasted in collaboration due to facilitators' failure to keep the session on track or time line, and to have a clear idea of what the results of the session should be.

Despite the significant increase on planners' time using EBP in a virtual, collaborative information environment, the majority of the planners felt the benefits derived from the virtual collaboration far outweigh the additional time demands. Planners cited lack of joint planning experience, the need for better time and session management, and better participant management as reasons for the additional time demands.

The majority of SMEs surveyed during the experiment agreed the additional demand on a commander's time resulting from EBP is significant – 53 percent agreed and 47 percent disagreed. SME's commented that the additional demands might be due to the commander feeling driven to play a more detailed and important role in the planning process. Although doctrine states this, and

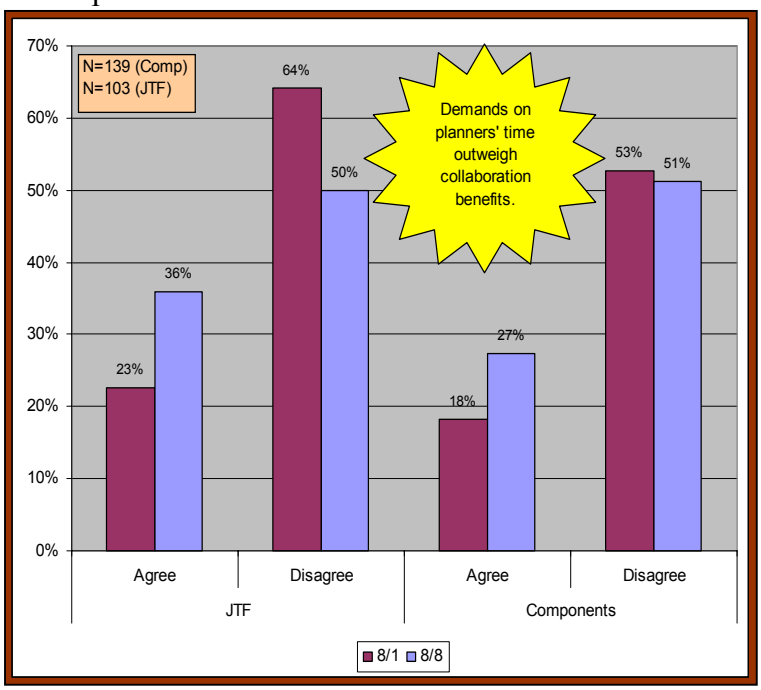


Figure 145: Collaboration worth extra cost in time

has for sometime, commanders have varying preferences in their approach to this requirement. The virtual collaborative environment during MC02 required the commander's focus and attention. As noted by one of the SME's, "If the commander wants to make a quick, accurate decision, this process speeds up that process. If he wants to procrastinate until he has every last piece of information, he can ask questions until the cows come home; the process will allow him to do that, also. Ultimately, Effects-Based Planning (in a virtual collaborative information environment) amplifies both of these commander tendencies — the good and the bad."

A majority of SMEs surveyed during the experiment agreed the benefits derived from virtual collaboration out-weigh the additional demands on a commander's time (83 percent agreed and 17 percent disagreed). As reported by one senior officer, "The commander has to strike a fine balance between the amount of time spent in virtual collaboration and being able to physically meet with component commanders and staff members. The collaborative environment has allowed the decision cycle to speed up greatly. This requires more commander involvement in the sessions in order to pass on guidance, intent, and make decisions. One pitfall is the commander can reach down and micromanage subordinates easily. The collaborative environment is "sexy" and the commander must fight the temptation to monitor all of the boards, centers, cells, and meetings so that he can continue to future focus his efforts."

Subtask—Identify desired effects

Based on a review of the ETO prepared by the JTF during the experiment, desired effects were identified and taken into consideration at all levels of the planning process. This construct allowed for a more informed mission analysis. The planners identified the effects in terms of changes to the adversaries' actions or behavior, the desired level of change, and the scope and distribution of the effects. Timing and duration of the effects was not apparent in the documentation examined. This omission has the potential to cause the PEL to be viewed as a sequenced prioritization list. Rather, the PEL probably should provide the necessary timing to allow planners to take into account sequencing and the enabling actions/tasks in order to achieve the higher headquarters effect and/or objective. All of the desired effects listed in the Prioritized PEL were present in the baseline ONA.

Based on examination of the Effects Tasking Order (ETO 001 dated 12 June 2007) and its associated Prioritized Effects List, Effects Tasking Order (ETO 001A dated 26 July 2007) and it's associated Prioritized Effects List (PEL), and Effects Tasking Order (ETO 002) WARNORD (dated 3 August 2007) and its associated Prioritized Effects List, JTF planners:

- Stated desired effects in terms of adversary action or behavior to be changed, created, or prevented
- Stated desired effects in terms of the desired level of change, (e.g., create, prevent, develop, disrupt, deny, or neutralize)
- Stated desired effects in terms of the desired scope and distribution of the effect, (e.g., geographic, organizational, political, and cultural)
- Did not state the desired effects in terms of the intended timing of the effect, (i.e., time when manifestation is desired or intended), and duration of time the effect is desired or intended to exist

All of the desired effects identified in each of the approved Prioritization Effects Lists were present in the baseline ONA. There were seven prioritized effects in ETO 001 and 001A.

ETO 002 contained six prioritized effects, retaining three from the original ETO 001 list and adding two new effects.

Subject Matter Experts agree prioritization of effects such as use of the PEL, assists the development and adaptation of COAs. They add that the prioritization of effects, along with commander's intent and other command guidance helps with developing and adapting COAs. At the functional component level, the PEL tends to drive the planning process. Some additional observations offered by the SMEs include "Although the PEL identifies priority of effort, it does not integrate and crosswalk links and key common nodes that should be the basis for COA development." "Prioritization of effects may actually hinder the development of a JTF level COA. The focus of planning becomes the priority effect and not the key nodes and links that may not be in that effect but impacts on the entire operation or is the center of gravity."

Subtask—Identify key nodes and vulnerabilities using the ONA and JIPB

Except for identification of key nodes in the adversaries' systems, the ONA as implemented by the JTF and component planners did not live up to expectations. Planners, during the end of experiment out brief, suggest that, "with ONA, we're removing strategy. We're losing the operational art. We can still have objectives with ONA. CoGs help campaign planners determine desired effects. Objectives help focus the effects."

Most survey respondents found the ONA and JIPB incomplete and hard to work with. Some had no training in the use of either of these tools. A few of the respondents found the ONA to be overwhelming in the scope of the information it made available to the planner and found accessing the information cumbersome at best. Questions also arose concerning the quality and timeliness of the information. Like the CIE and its tools, experience and training are the keys to successful use of the ONA and JIPB.

Component SMEs believe the ONA contributed to identification of key nodes in the adversaries' systems, but this predominant view was not shared by the JTF SMEs. The ONA assisted in the identification of nodes, but actionable levels of detail were lacking. Some of this lack of detail was probably due to classification restrictions required for work at the SECRET level. Furthermore, the experimental ONA was not as fully developed as the concept envisioned. Planner focus remained on adversary military systems with little work being done on diplomatic, information, or economic aspects, especially at functional component planning level.

That said, this is a controversial topic and SMEs commented extensively on this question. Said one participant, "The ONA data provided initial identification of some of the key nodes. As discussed in the Azimuth Checks, the data was not fully complete and left significant holes in the intelligence picture," he said. "This resulted in two problems: 1) the holes had to be filled from other sources of information. The information was hard to find and was located in over seven different locations, each with a different layout and search method. The data from the other sources was hard to verify its origination, its time sensitivity, and its context. 2) The development of the JIPB is essential to discerning an enemy's COA and intent.

"The ONA was extremely difficult to use. Its structure and lack of search capability made finding information very difficult and limited its usefulness in identifying targets. For the most part the ONA was like reading a DIA Country Manual. Although a lot of information was available, it was of such a general nature that it provided little real time, actionable information. Although the concept of the ONA is a good one, it is highly questionable that a single SJFHQ in each theatre could develop multiple or even a single ONA robust enough to meet the needs of EBO.

"We really couldn't tell [if the ONA identified key nodes and vulnerabilities]," he said. "You cannot access whether the key nodes that were identified were correct, there was no assessment made because the effects could not be determined. I see it as an OK planning tool, but what it fails to do is identify the key nodes that get at the centers of gravity, not the systems that allow the enemy to prosecute his campaign. If the ONA is not perfect in its understanding, then it is just a tool for planning, if you will, that allows us to think logically about setting the conditions to take this enemy down, sooner than later. For the amount of time we take to build it, let alone maintain it, it is not worth the effort. As for the lone success story with the JSOTF, that was by accident. He had a target he had to take out, then he went back to look at the nodes that were associated to the target, and saw the bang for the buck. The nodes did not lead him to the target; the target led him to the nodes," he said.

SMEs are about evenly split in believing the ONA was used by JTF or functional component planners as a major contributor to identification of key links between nodes in the adversaries' systems, with 11 responding yes and 9 answering no. As with the previous question, component SMEs were much more supportive of this observation than were those working at the JTF level . Furthermore, comments would indicate this aspect of the ONA was explored in lesser detail during the execution phase than was observed during Spiral 3 (the planning phase).

SMEs do not believe the JTF or the functional component planners used the ONA as a major contributor to the conduct of center of gravity and critical vulnerability analysis. "Not that I could tell beyond planning," said one participant. "Although in the planning, it was determined that the [CJTF-S] was the center of gravity, the nodes did not lead you or tie you to that end-state." During Spiral 3, of 22 responses received from SMEs, the majority (20) had no comments in regards to this question and felt it was not being addressed in the event.

Did the ONA contribute to ID of KEY NODES in the adversary systems?	72 percent Agree
Did the ONA contribute to ID of KEY LINKS BETWEEN NODES in the adversary systems?	55 percent Agree
Did the ONA contribute to the conduct of center of gravity and critical vulnerability analysis?	44 percent Agree
Did the ONA contribute to ID of adversary leadership decision making processes?	35 percent Agree
Did the ONA contribute to ID of friendly strengths and weaknesses relative to the adversary?	35 percent Agree
	N = 18..22

A majority of SMEs also do not believe the ONA contributed in any substantial manner to the identification of adversary leadership decision making processes. SME comments included statements such as "The ONA did not appear to be in depth enough…" and "Identified who the key leadership was, but did not drill down far enough to identify decision making processes." Of the 22 responses received from SMEs during Spiral 3, 19 of them were neutral and indicated that ONA contribution to this effort was not observed.

Continuing this trend, a majority of SMEs do not believe JTF or functional component planners used the ONA as a serious contributor to identification of friendly strengths and weaknesses relative to the adversaries. A recurring theme in the SME comments include "… users of the ONA database at the [Component] are not pleased with the utility of the ONA. Too slow, too many clicks to get anywhere, and people can't find what they want. Most give up in

frustration." "Since the enemy COA and intent could not really be developed with the data in the ONA, it was significantly more difficult to use the ONA to determine enemy and friendly strengths and weaknesses."

Task: Use EBP to develop and analyze COA

Finding 2:

The anticipated JTF level, organized "deep thinking" was not observed in the Spiral 3 planning effort with respect to anticipated, unanticipated, intended, and unintended effects. Some improvement was noted during the execution phase. Since individuals and small groups, did in fact, do this level of analysis, the JTF task to use EBP to develop and analyze COAs has potential. The "DIME" and "PMESII" thought structure was weak except for "M" effects. In this experiment, the JIACG was integrated into the Combatant Commander's staff, and worked through the JTF JPC pol-mil planners to influence operational level planning. Influence models and predictive analysis tools are not sufficiently available to assist in the COA development and COA analysis process. Simultaneous, parallel, horizontal planning amongst the components assigned multiple supported and supporting "effects-based missions" is difficult and extremely challenging even to the most experienced of joint planners. A common sentiment among the JTF planners was that the EBP process idea of predictive analysis seems like a good idea, but needs work and time for planners to accept. When used, it a appeared to make a difference.

Subtask—Conduct predictive analysis (examine anticipated potential outcomes of actions); model adversary critical systems to identify and analyze anticipated direct and indirect effects of action

	EAC	JPC	Components
Does predictive analysis, whether a manual process or assisted by knowledge management tools, help the JTF planners to produce a better-reasoned COA?	25 percent Agree	70 percent Agree	77 percent Agree
Were intended and unintended potential outcomes examined for each of the planned effects?	100 percent Agree	70 percent Agree	64 percent Agree
Were the causal linkages (between nodes) through which actions create effects examined for each of the planned effects?	100 percent Agree	50 percent Agree	64 percent Agree
SME responses	N = 4	N = 10	N = 13

Based on observations from the SMEs and responses to surveys from the war fighters, the general consensus is that numerous aspects of effects-based thinking, as applied to the joint operational planning process developing a COA, helps planners to develop a better-reasoned COA. Consideration of intended and unintended potential outcomes, causal linkages, indirect effects, and outcomes outside of the local area add value to the planning process. However, use of these aspects of effects-based thinking in conjunction with influence models and predictive analysis, as applied to the Joint operational planning process, analyzing a COA, is not well understood and even less well applied. Training, education, and maturing of IT support tools will help mitigate this challenge.

Manual analysis and Blue-Red Cell deliberations were the primary methods used to consider adversary potential COAs and potential responses to friendly action, primarily at the

JTF Headquarters level. SMEs did note an application of the ONA Visualization Tool, with promising results, during component led planning for one of the major operations. This planning group then worked with the JIACG to discuss possible mitigation of undesired effects and identification of possible "unanticipated" effects. JTF Headquarters level SMEs reported a trend to not conduct war-gaming at the operational level. The components conducted tactical level war-gaming, with the JTF synchronizing the operation in terms of task, purpose, time, space, and resources and not conducting action/reaction/counteraction war-gaming at the operational level. Functional component level SME comments tend to confirm this tendency.

A majority of JTF and component level SMEs agreed, despite the lack of IT support tools and using only manual analysis techniques, predictive analysis helped the JTF produce a better-reasoned COA. This success is due mostly to the efforts of the Blue-Red cell. However, since the EAC participation in the JPC sessions to war-game the action/reaction/counteraction possibilities was viewed by the SMEs as minimal, this cell did not contribute to the effort as much as anticipated. EAC SMEs cite insufficient manning levels as the most probable cause for lack of EAC participation in the planning process.

Members of the war-fighting staff were asked to rate the EBP process' usefulness in predicting the direct and indirect effects (intended and unintended) of proposed tactical actions. Of the 183 surveyed members, 61 percent agree to some level of usefulness with 22 percent choosing to abstain because they did not participate in this activity. A number of them commented that the JTF seemed to be more reactive than proactive, or they could not discern a clear linkage. The most common reason cited was an unresponsive effects assessment process in turn due to slow BDA from the experiment's M&S systems. A common sentiment can be summarized as "A good idea, needs work, and needs time for planners to accept. Where it was used, it seemed to make a difference."

Members of the war-fighting staff were then asked to comment on what tool(s) most enabled them to conduct predictive analysis. Of the 183 surveys returned, 84 contained comments responding to this specific question. The most common "helpful" tool cited was the ONA, followed closely by the CIE. Several planners had very strong feelings regarding this topic with comments such as "None of the tools enabled predictive analysis in any way. The ONA, in fact, was a hindrance because of the missing linkages between effects and nodes." And "I like collaboration because one can hear the reasoning behind the analysis; tends to be more acceptable retaining most of the human element. Stand alone data bases tend to lack credibility."

Most SMEs agree intended and unintended potential outcomes were examined for the effects published in the PEL. Multiple reports suggest unintended, second, and third order effects were a matter of routine discussion during the daily EAC Working Group deliberations. Such examinations however, are viewed as more of a JTF HQ task than a functional component task.

SMEs also agree the causal linkages between nodes were examined to determine those actions needed to create desired effects. Reports also suggest the current manifestation of the ONA did not permit the detailed analysis necessary to reduce and focus the JTF operational efforts.

SMEs agree the indirect outcomes for each of the planned effects were considered; however, many commented some serious possible outcomes (e.g., adversary preemptive attack, adversary media manipulation), in hindsight, did not receive a proper discussion.

Consideration of outcomes outside the JOA was problematic for members of the JTF planning staff. Mention is made regarding deliberations of non-military effects outside the JOA, but these discussions were mostly restricted to macro-level discussions of economic and media

impacts. Many planners saw this discussion primarily at JTF or Combatant Commander level with guidance passed down to planners for their use, or as participation by the political-military planners in the various planning centers.

	EAC	JPC	Components
Were indirect outcomes considered for each of the planned effects?	100 percent Agree	60 percent Agree	62 percent Agree
Were outcomes outside of the Joint operations area considered for each of the planned effects?	50 percent Agree	60 percent Agree	38 percent Agree
Did the ONA help the JTF planners in conducting predictive analysis?	75 percent Agree	70 percent Agree	62 percent Agree
	N = 4	N = 10	N = 13

SMEs agree the ONA helped the JTF planners in conducting predictive analysis, with strong agreement at the JTF level and weaker agreement at the functional component level. Dissenting comments included, "ONA does not have the degree of detail, up to date information, and information reliability to be a useful planning or analytical tool." And, "ONA was only good for an overall, if inaccurate, picture of the military situation. It was seriously lacking in the D, I, and E."

Subtask—Integrate input from JIACG

Based on observations from SMEs and responses to surveys from the war fighters, data suggests that aspects of effects-based thinking such as the JIACG, DIME, and PMESII were not well understood and have little visibility at the JTF planner level. This result is not unexpected since the JIACG was designed into the experiment at Combatant Commander level. These ideas have even less visibility at the functional component planner level. In actual practice, most non-military planning information was routed through the Pol-Mil Planning staff embedded in the JTF staff, and this group is credited with success for this aspect of effects-based thinking as used in the joint operational planning process.

JTF and functional Component planners agree interagency participation in the EBP process was useful in developing reasoned branch and sequel COAs at the JTF level (See Assessment Area 10 for related information). Numerous comments were received, as well.

"Very useful at JTF level—Not appropriate for the Component Commander level," said a participant. While another participant was unaware of significant JIACG involvement, "the only IA participation I was aware of was the [pol-mil] planner, and I don't know how linked in he was." "We were able to engage with (a member of the group) yesterday," said one officer, "and his input and collaboration was extremely helpful.

	Planners
Interagency participation in the EBP process was useful in developing better-reasoned branch and sequel COAs?	52 percent Agree
Center of Excellence (CoE) participation in the EBP process was useful in developing better-reasoned branch and sequel COAs?	23 percent Agree
	N = 183

"This would have been helpful from the beginning. Daily interaction is necessary. Helpful when we got it, but there are still many questions hanging out there and little current input. The JTF needs direct access to IA, not through the Combatant Commander — too slow in RDO."

One participant thought the group's participation grew as the experiment progressed, "The interagency participation actually seems to be increasing/improving. It seemed fairly limited in Spiral 3 and between Spiral 3 and the experiment execution," he said. "They seemed to be very useful to the plans process as a whole, but I found that I had little access to this resource."

Few JTF and functional component planners observed the participation of Centers of Excellence in the EBP process, hence, are unable to rate their usefulness in developing better-reasoned branch and sequel COAs. This result was expected as robust CoE participation was eliminated from the experiment's design due to IT costs and scenario sensitivities. Comments were almost exclusively positive.

"Although I did not use them, I believe the concept is good," said one. "If we'd had any input, it would have proven useful. However, we had no COE players in IO." "Never heard from them or used them. Too bad they were not available to support an exercise of this scope. Turn the concept into reality."

SMEs were asked to report observations of JIACG, COE, NGO, or other non-traditional participants in the effects based planning process. Their reports indicate they saw little use of these organizations at the JTF planner level and even less use at the functional Component level. As indicated previously, the JIACG was integrated into the Combatant Commander's staff during the experiment, and worked through the JTF JPC pol-mil planners to influence operational level planning.

Comments included the following, "I believe the IAC is the most important part of this experiment, however, if they do not possess the understanding of how a CJTF prosecutes his campaign, and how their expertise and efforts facilitate that process, then we need to start over. The lack of play with these elements significantly detracted from our ability to experiment with DIME were indicative of the general consensus."

Few SMEs felt all aspects of PMESII were considered during development of the branch and sequel COAs. Although 60 percent of participants at the JTF JPC agreed, comments clearly indicate this concept was sparsely used. "Some were just touched upon," said one SME. Another added, "lip Service was given to PMESII." Added another, "I saw very little of anything but the M in PMESII considered. Most SMEs felt the JTF planning emphasis was primarily focused on the military element of national power, with little if any focus on the other elements of national power. Since this is true during COA development, it follows the same can be said with respect to coordination and synchronization of other elements of national power during execution.

"Very little if any D, I, and E coordination and synchronization were evident," said one observer, while another noted that there was some discussion at the macro level, but the discussions never reached the operational level of detail.

	EAC	JPC	Components
Were the actions planned for execution selected based on their impact against adversary pressure points?	75 percent Agree	40 percent Agree	69 percent Agree
Were MoP developed by the Components for each task and/or action?	75 percent Agree	N/A	54 percent Agree
	N = 4	N = 10	N = 13

Subtask—Components refine concept of operations and COA using CIE.

	EAC	JPC
During development of the COA(s), were all aspects of PMESII considered?	50 percent Agree	60 percent Agree
Were all military and non-military (DIME) effects specified in the current ETO properly synchronized in time and space?	25 percent Agree	30 percent Agree
During development of the COA(s), were the capabilities of all elements of national power (DIME) considered?	50 percent Agree	60 percent Agree
	N = 4	N = 10

Based on observations from the SMEs and responses to surveys from the war fighters, data suggests use of collaborative planning tools greatly assists the Components in horizontally integrating their tasks and actions. The JTF and functional Component EACs however must be appropriately staffed to participate in both effects assessment (EAC) and planning (JPC) activities in order to properly link effects assessment to adaptation of plans for future execution.

Most SMEs at the JTF EAC and at component planner level believe the actions planned by the Components were selected based on their impact against adversary decisive points. SMEs at the JTF planner level disagree, commenting, "Most actions were planned to accomplish a mission and not really based on desired effect. Take islands… Capture WME sites… What's different?" This disagreement is due in most part to observations regarding the appropriate level for effects planning and assessment. During MC02 execution, functional Components were

given supported commander (or main effort) responsibilities to plan and executive affects levels missions, thus JTF operational level planning for these effects was minimal. Additionally, JTF EAC SMEs observed components developing measures of performance for each task or action planned, primarily based on their attendance at JTF EAC working group meetings. Linking the EAC work to the planners was problematic however, since most assessment personnel were gainfully employed with assessment tasks and were not able to actively and robustly participate in planning sessions at their respective levels.

Members of the war-fighting staff were asked to comment on the usefulness of the collaboration system in helping the components synchronize their horizontal, (i.e., component to component, planning.) Of the 183 surveys returned, 74 percent responded the CIE was useful in this endeavor. Comments included:

"Yes, we still have a way to go with this to get the right synchronization. In some ways by bringing them in too early we bog down the process and might send them into needless planning. We (JTF) need to be involved in horizontal collaboration to keep it synched with our plan so we have an understanding of their planning and to provide guidance if required."

"The lower the level of command, the more assumptions had to be made to plan concurrently. This becomes a liability."

"The power of this was that the functional components could lead the planning effort and have the same information available that the JTF had. This process really brought the power of functional components to the forefront."

Subtask—Identify assessment requirements.

The JTF EAC demonstrated the capability to identify assessment requirements. However, translation of these assessment requirements back into the JTF and Component level planning centers for branch and sequel planning in an anticipatory manner is extremely difficult. As stated in the previous task, the JTF and functional component EACs must be appropriately staffed to participate in both EAC and planning (JPC) activities in order to properly link effects assessment to adaptation of plans in anticipation of adversary action(s).

	EAC	JPC	Components
Are all Component actions and/or tasks traceable back through the desired effects to higher level strategy (objectives)?	100 percent Agree	60 percent Agree	90 percent Agree
Were MOE developed for each JTF level desired effect?	100 percent Agree	60 percent Agree	60 percent Agree
Were the MOE developed for the JTF level desired effects tied to theater objectives?	75 percent Agree	60 percent Agree	60 percent Agree
Were the MOE developed for the JTF level desired effects reliable?	75 percent Agree	40 percent Agree	40 percent Agree
Were the MOE developed for the JTF level desired effects observable?	75 percent Agree	40 percent Agree	60 percent Agree
SME responses	N = 4	N = 10	N = 10

The SMEs observing the JTF EAC give high marks to the JTF's ability to accomplish the "identify assessment requirements" task, a critical component of using the EBP process, to develop and analyze courses of action. Accomplishment of this task was given much lower marks at the JTF JPC and at the component planning levels. The lower marks resulted because the SMEs were looking for branch and sequel adaptations of the plan, based on assessment (and accomplishment) of the JTF prioritized effects. In fact, the Combatant Commander or the CJTF directed much of the branch and sequel planning based on their own assessments and, in some cases, political realities. Said one observer, "I never got the impression the requirements were reviewed and examined to see if desired effects were achieved -- particularly in the IO arena." Another observer said, "since some of the tasks lacked clarity as to what effect was really desired, the assessment cell was unable to rate the JTF's effectiveness in reaching those goals."

	EAC	JPC	Components
Does participation of the Blue-Red Cell enhance the COA analysis process?	N/A	70 percent Agree	N/A
Were potential Red reactions to Blue actions considered?	N/A	60 percent Agree	N/A
Were Blue counteractions (branches) planned for these potential Red reactions?	N/A	40 percent AgreeN/A	N/A
Did the JTF planners effectively war game the COAs using the CIE?	50 percent Agree	50 percent Agree	67 percent Agree
SME responses	N = 4	N = 10	N = 13

Subtask—Collaboratively analyze COA

Operational level war gaming of the approved JTF level COA by the JTF and functional Component planners using the CIE was not well demonstrated during this event. The planners believed the in depth wargaming at the Component level was sufficient to meet this task requirement. The Component tactical level wargaming, however, did not suffice for operational level synchronization and integration.

Had resources been more constrained in this experiment, this would have been much more evident.

Collaboratively analyzing the JTF level COA across the JTF HQ staff with functional component participation is a complex task and presented a serious challenge to the JTF JPC. As the data to the left indicates, the favorably viewed Blue-Red Cell participation. Red reactions to Blue actions (more difficult) were considered, but not as vigorously at the operational level. Blue counteractions to potential OPFOR reactions (even more difficult) were less well defined and largely ignored at the operational level. JTF EAC and JPC SMEs were evenly split on their agreement of whether or not the JTF planners conducted effective war gaming using the CIE. Components were more supportive of the position that planners had effectively wargamed their COAs, but during this event, the lion's share of the war gaming was done at the tactical level by the component planning staffs. With respect to the 'value-added' of Blue-Red Cell participation, one observer noted, "The Blue-Red Cell tends to be macro in their analysis of the enemy. The planners will tell you that they are not getting the fidelity in possible enemy COAs that they need." Another agreed that the Blue-Red team brought value to the deliberations, but added that the old J2 used to do the same thing, so where is the quantum leap in change, he said, and asked, "what's the difference?"

Task: Prepare, synchronize, and issue effects tasking order (ETO)

Finding 3:

The ETO process is well understood and received by the majority of participants at both the JTF and functional component levels. The process of ETO preparation enhances effectiveness of planners at both levels. Synchronization issues are common and need careful attention at both the JTF and component levels.

Subtask—Prepare ETO

Preparation of the ETO is understood by most participants at both the JTF and functional component levels. The relationships and effects, both supporting and supported, were clearly understood. The tasks to prepare, synchronize, and issue effects tasking orders went fairly smoothly as both the JTF and the component level participants were well informed.

	JTF OPS	Components
Were effects-based mission orders clear to the Components?	100 percent Agree	100 percent Agree
Were "supported" and "supporting" command relationships clearly understood by the Components?	80 percent Agree	86 percent Agree
Did the collaborative planning process contribute to the Joint force and Component integration and synchronization of capabilities?	100 percent Agree	100 percent Agree
SME responses	N = 10	N = 13

SMEs overwhelmingly believe effects-based orders issued by the JTF to functional components were clear. "Crystal. Collaborative environment allows the Commander to immediately confirm/deny with subordinates, and as importantly, all levels of staffs." Similarly, they also believed the supported and supporting command relationships were clearly understood by the functional components. A few cautions were noted, however:

- "There is still an unclear picture as to

who claims responsibility for fires in the JOA. Supported and supporting command relationships tend to cloud the picture even further when it comes to who is responsible for fires."

- "As the term 'main effort' got thrown around more and more, relationships got confusing."
- "Would have been better with establishing directives."

During the boil-down session with the JTF and Component planners, they suggested the supported and supporting command relationship during MC02 was not a problem because resources were not constrained. They further suggested that if resources were constrained, "… we probably would have come up short in some areas."

Likewise, SMEs overwhelmingly supported the assertion that the collaborative planning process contributed to the joint force and Component integration and synchronization of capabilities. Again though, a caution: a SME noted, "It both contributed to and detracted from the planning process. The unstructured nature of many of the collaborative sessions delayed actual planning efforts and in some cases caused confusion and misinformation. On the other hand there was better situational awareness and when sessions were established with specific goals they contributed to and enhanced the process".

Subtask—Issue and synchronize ETO

The CIE did enhance cross component planning, there were individuals in charge of the process—primarily component commanders and plans chiefs,—and there was a beneficial synchronization of the planning process. The Joint Integration Matrix (JIM) does not currently add much to the component planning process. Issuance of the ETO was straightforward. Not all of the components were using the same planning procedures or tools and the resulting variations led to some desynchronized actions.

The majority of SMEs agree the military actions of the functional Components were synchronized in time and space to maximize capabilities. As cautions, SMEs indicated, "The operational and tactical commands may not completely integrate properly. Some operational staff seem to be thinking at the tactical level and losing the 'long term' operational view." SMEs SMEs also believe IO was not as fully integrated as possible: "Although the IO campaign does strive to get the themes of the JTF Commander out to the public and take advantage of information opportunities, don't feel that the IO effort has been fully incorporated into the operational plans and execution effort."

	JTF	Components
Were military actions of the functional Components synchronized in time and space to maximize capabilities?	80 percent Agree	79 percent Agree
Did the Joint Integration Matrix enhance the Component planning process?	10 percent Agree	15 percent Agree
	N = 10	N = 13

Warfighting Challenge:

Ability to conduct Effects Assessment

Task: Assess the progress of achieving the full range of operational effects (DIME)

Finding 1:

The organization that owns the effect must be able to assess it. Because the JTF's adopted the Combatant Commander's CONPLAN, a number of the 'effects' were outside the purview of the JTF's ability to completely assess and achieve. Furthermore, assignment of effects to functional Components led to the same lack of ability to completely assess and achieve higher echelon 'effects'. The resultant gaps were not properly addressed in the execution of the JTF effects assessments process. The EBO concept envisions the JTF as the 'owner' and 'assessor' of operational level 'effects'. It may also be appropriate on occasion to designate a functional Component as the 'owner' and 'assessor' of an operational level 'effect'. Care must be taken during the effects assessment process not to create new 'boundary lines' to replace the old ground unit boundary lines, which the adversary can discern and exploit.

Subtask—Integrate effects assessment information requirements into the JISR collection plan

The overall process to assess the progress of achieving the full range of operational effects (DIME) seems to be sound in concept; however, this event was heavily "M" oriented and needs to expand to include "D, I, and E." The processes of deficiency analysis, (i.e., assigned tasks and actions are being executed to standard [MOP], however, the desired effect is not being realized [MOE]); is not working particularly well. The current rendition of the ONA contributes to this shortcoming in that it does not answer the mail WRT 1) key links between nodes, 2) center of gravity and critical vulnerability analysis, 3) adversary leadership decision-making process (es), and, 4) friendly strengths and weaknesses relative to the adversary. Hence, "targets" may be leading to nodes rather than nodes leading to "targets." Mitigating factors include M&S lack of BDA timeliness, accuracy, and completeness. In addition to the EAC, the JISC may need a predictive analysis and fusion cell to enable the anticipatory requirements necessary to "lead turn" the adversary.

In the design of this experiment, the concept and analysis teams expected the JTF's JPC, in cooperation with the Information Superiority Group's EA cell, to develop MOEs for each of the approved JTF level desired effects. Additionally, they were to ensure each of those MOEs were covered by at least one asset in the JISR collection plan. Noting that there was no data being collected aimed at determining whether the MOEs were adequately developed, a SME said, "MOE are not being collected against. MOE assessment is the analytical effort that is the result of the collection effort against PIR and DE [desired effects]," he said. "Currently the collection plan appears to be focused primarily on DE. Looking at the posted collection plan, no PIR are depicted. My understanding is that this is a work in progress and future collection plans will reflect collection against PIR," he said.

The chart to the left depicts the ETO developed by the JTF with associated desired effects and corresponding number of MOEs selected for the effect published in those respective orders. Furthermore, the matrix form of the effects with associated MOEs developed for ETO-02 clearly indicate an intent to at least attempt to assess each MOE on a day by day basis. ETO-01 and ETO-01A did not contain matrices depicting the intent to proceed in this fashion. This was indeed a work in progress.

Members of the JTF JISE were asked to respond to a survey question asking if the additional workload created by the effects assessment process was significant. 75 percent of the respondents agreed. Staffing levels of the EAC and supporting organizations deserve a serious

review to ensure the JTF is capable of the tasks required to properly assess MOE and desired effects in an anticipatory fashion.

SMEs were asked to comment daily on what direct and indirect effects were actually produced as a result of tactical actions and did the JTF correctly assess them. In response:

"Little to no BDA, but decision process is very logical. EAC is using all Components, IO, SOSA, BRC in making assessments." (D+4)

"Assessment always seems to be 'in progress.' As a result, no direct or indirect effects are actually assessed within the current day's execution cycle." (D+9)

"The EAC assessed the JTF actions in a very logical manner and presented the best assessments possible based on information and experience available. SOSA cell was very helpful in these assessments." (D+12)

In a related question, SMEs were asked daily to comment on what direct and indirect effects were actually produced as a result of Blue tactical actions. Comments were anecdotal, and for the most part, generally tactical in nature. This suggests the JTF was struggling with the process to synthesize the collective results of actions executed by component forces and relate these collective results to the measures of effectiveness. Hence, synthesis of collective MOE "measurements" back to their respective desired effects and follow-on synthesis of collective desired effects back to their respective campaign objectives was difficult to ascertain.

We were also interested in how the component combat assessments were passed to the EAC and how much of this BDA did the EAC really use. SMEs observing the assessment process responded that the EAC received BDA inputs from components and the JISE through the CIE. SMEs further stated "Component BDA was not getting to the EAC or the JISE [in a timely manner]. The lack of BDA negatively affected EAC ability to assess; they had to refer to worst case [assessing effects accomplishment as unacceptable or red on a stoplight chart]."

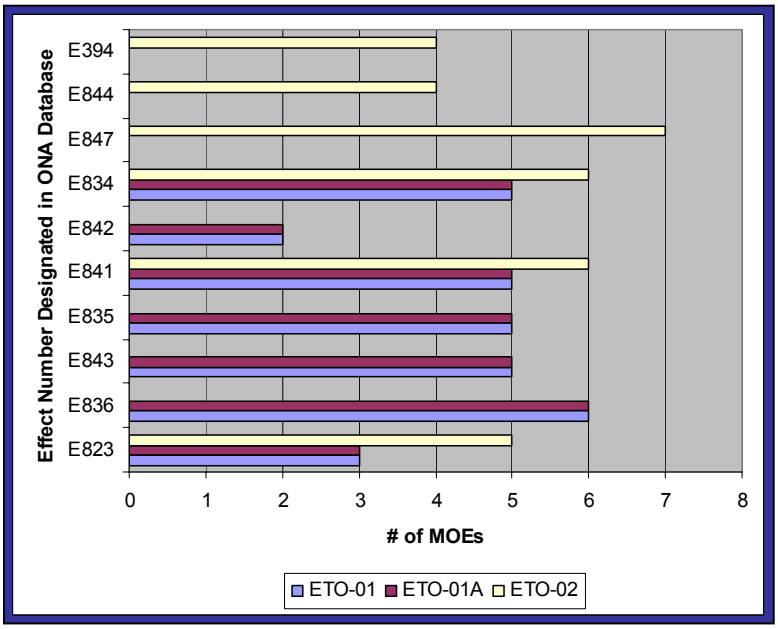


Figure 146: Effect number designated in the ONA database vs the number of Measures of Effectiveness

SMEs observing the functioning of the EAC responded overwhelmingly (100 percent) positive to the follow-on question asking if MOP were useful in assessing MOE, but commented, "Most meaningful inputs came out at the JCB." Concept and analyst teams expected this work to be routinely accomplished in the daily collaborative EAC working group meetings. The JCB is the intended recipient of the EAC's assessment work, not the intended generator of the effects assessment.

Were all the effects resulting from JTF and component actions anticipated (planned for)? This question was asked daily to SMEs in the JTF EAC, the JTF JOC, and JTF JPC during the

period D-2 thru D+13. The survey results showed that effects were anticipated 29 percent of the time by the EAC, 60 percent of the time by the JOC and 37 percent by the JPC.

A follow-on daily question for the EAC SMEs asked if the MOEs developed for each desired effect were looking in the right places to observe that effect. The SMEs responded this was true 27 percent of the time.

Below are a number of effects assessment questions were asked of the EAC members during the course of the experiment. Questions included:

- The collaboration system used in the effects assessment process was useful in producing more accurate assessments. [Agree, Disagree, Did Not Use]
- Interagency participation in the effects assessment process was useful in producing more accurate assessments. [Agree, Disagree, Did Not Use]
- Centers of Excellence participation in the effects assessment process were useful in producing more accurate assessments. [Agree, Disagree, Did Not Use]
- What non-traditional player brought the most value to the effects assessment process? [Comment, No Comment]

The prevailing response to all four questions was either "Did Not Use" or "No Comment," indicating these aspects of the concept were not visible or not used by the EAC.

	JTF EAC	JTF JOC	JTF JPC
Did the EAC provide centralized management of the effects assessment process?	75 percent Agree	60 percent Agree	N/A
The CROP visual display of effects assessment was useful in providing adequate detail and clarity to enable me to maintain good situation awareness.	Did Not Use	77 percent Agree	61 percent Agree

Even though a majority of SMEs agree the EAC provided centralized management of the effects assessment process, the comment, "Saw several levels of effect assessment—don't think the JTF cell was one-stop shop for effects assessment", is supported by analysts' observations during the experiment. Interestingly, the JTF EAC did not use the CROP as an effects assessment or situation awareness tool. Instead, the EAC used collaborative sessions during the EAC Working Group meetings as the forum to determine current affects assessment status. JTF JOC personnel are supportive of the CROP as an effects assessment or situation awareness tool, with less support from the JTF planners. Since the JOC is much more "today" focused than the planners, this divergence would be expected.

Task: Adapt COA based on effects assessment

Finding 2:

Assessment and prediction are separate and distinct functions, and may require separate cells within the JTF to properly address both of these process functions. The EAC is performing the effects assessment function. Anticipating adversary behavior as a result of this assessment is weak and not driving adjustments in the execution of the JTF COA.

SMEs observing JTF operations in the EAC, JPC and JOC were asked a series of questions in an effort to determine if the effects assessment process assisted in development of branch plans, sequels, and adaptation of COAs. Responses to those questions are shown in the associated table. The responses clearly indicate the effects assessment process had minor impact on the adaptation of JTF plans during this particular experiment. Additionally, members of the JTF JPC were asked if effects assessment was completed and posted to the CROP in a timely

manner to impact planning for future operations. Although 56 percent of the respondents believe this is true, the respondents were very vocal with their impressions as follows:

"I agree, but we did have problems with timeliness. Mostly based on fumbling with new systems."

	JPC+EAC	JOC
Were the set of tactical actions employed to achieve a desired effect changed as a result of deficiency analysis?	20 percent Of the time	26 percent Of the time
Was the approved COA adapted (branch plan) to respond to an unanticipated effect or enemy action?	14 percent Of the time	28 percent Of the time
Did the effects assessment process influence ETO execution when unanticipated effects or enemy actions were discovered?		48 percent Of the time
Were military and non-military (DIE) effects maintained in synchronization in time and space?		45 percent Of the time

"This is a process which requires much examination and work. Assessing the progress of the IO battle, difficult at best [with] the lack of metrics in many areas, did not occur in a manner that allowed for timely redirect of the battle. The "fog" of war played a big part in this, but the ability of a technologically advanced adversary to readjust his communications paths in near real time fashion will require a similarly speedy reaction on our part. Assessment must be speedier than we currently see."

"No. Information was not posted in a timely fashion. More importantly, it was not posted in a visible fashion. The traditional TOC map is still a good idea. SA would be enhanced if graphics of the battlefield were maintained and updated regularly, and the changes were linked to a pop-up or permanent display on each terminal. Probably needs to be a different slide for different staff groups but everyone should be able to see and know 'where the fight is'."

"As the Deputy Director of Plans, I have no idea where they were posted. I only saw them when briefed to the commander. These were not vetted through us so I have no basis to judge if they were accurate or not."

"As the future planner, I was never able to read an assessment that reached out more than 96 hours that appreciably affected planning. The partial reason is that the JTF focus dropped to within 48 hours. Secondly, sufficient MOE planning and ISRT tasking does not appear to have been successful, or JECG could not provide the background for assessment that far out in this experiment."

In a related question, JTF war fighters were asked if the JTF was able to maintain the initiative relative to the adversary. Respondents from the EAC offered no observations. Members of the JOC overwhelmingly (100 percent) agree the JTF maintained the initiative, "With the exception of the initial attack. I believe that we had the initiative the entire operation and [the] enemy forces were reacting to our actions (albeit in asymmetrical ways)." On the other hand, the

OPFOR believed they maintained the operational level initiatives in the movement and position of WME warheads and in the conduct of their IO campaign. Analysts agreed.

How did the CIE enhance the planning, execution, hand-off, assessment, and adaptive planning battle rhythm? Members of the JOC (100 percent) and the JPC (74 percent) agree the collaborative environment enabled the JTF HQ to maintain a more efficient battle rhythm. Many of the responses were qualified with comment. A review of the comments led analysts to conclude that war fighter s believed the CIE enhanced the execution, hand-off, and adaptive planning functions during this event, but hindered the planning and assessment functions. A representative sampling is provided as follows:

"[If] efficient means 'fight the war faster,' maybe. [If] efficient means 'accomplish the normal work with less time or energy,' then, NO, it's not efficient."

"Not as efficient as it will be, but as we get better and more practiced, we will be more efficient."

"Collaborative environment complicated personal battle rhythms. Trying to synchronize battle rhythms was next to impossible."

"However, allows you to attend more sessions because you don't have to physically attend and as a result you are pulled to more sessions and it is difficult to perform your primary duties."

"The JTF ran faster than expected and was more productive! The components had trouble keeping pace—better organization is required for them to support the Joint benefits to warfighting that we can achieve—what a great way to get inside the enemy's decision cycle."

"Initially started out OK, but soon drifted back to giving briefings despite the best intentions/efforts of a lot of people. We then became locked into the time of briefings (briefings stressed)/meetings as opposed to what the concept said (i.e. JFE W/G should meet about one hour after JCB). Well, the JCB lasted two hours and quite often 1+30. So, did we move the W/G back to allow an hour for the components to meet and discuss the guidance? No, the JFE W/G met immediately or 5 minutes later. Another example, later in the experiment, (the JTF) was dispensing with the battle rhythm entirely to focus on the island campaign, part two. Why would you delete the very thing designed to add rigor and help with planning and managing? We should have been able to do what the commander asked within the battle rhythm."

"This goes without saying. This new paradigm has exceptional potential. We are just beginning to scrape the surface of what could be possible in the future. We were able to understand intent and monitor discussions. I think it dramatically improved our SA and staff work."

"However, we need to establish better data management by using the technology more in line with its capabilities. Data collection and dissemination needs to be done with databases as opposed to email, chats and spreadsheets."

"Collaboration worked well. I am not sure I see a relationship with the collaborative environment supporting the battle rhythm. I see it the other way. The battle rhythm is a method to manage the collaborative environment by scheduling participation and directing the timing for the sessions."

Component participant surveys also asked if it is easy to know when the ETO has been changed. Sixty-one percent of the functional Component planners agreed this is true. Qualifying comments include:

"Not immediately obvious to a guy slugging out 10 different e-mails, monitoring two briefs and fielding phone calls."

"If you do a routine walk through all the data pages."

"Maybe an auto alert on all critical messages would be key to 100 percent awareness....most of the time got the word through JCB's."

"I often only stumbled upon changes to the ETO. The numbering convention still confuses me. I never felt up to speed on this."

Task: Assess the contribution of effects to achieving the desired end state.

Finding 3:

Functional component assessment of measures of performance is working OK, given the M&S latencies in BDA reporting. Except for the JFLCC, as noted during various JCB sessions, there appears to be no linkage of the measures of performance to associated measures of effectiveness. In turn, measures of effectiveness appear to play little or no role in the assessment of campaign objectives and end state, nor in the deficiency analysis process for possible modifications to JTF operational level ETOs.

The JTF EAC SMEs were asked to observe and document the process developed by the JTF to support the assessment of Combatant Commander and/or JTF objectives. In response, the following comments were provided:

"The process to support assessment or effects (as opposed to objectives) is pretty much per experiment SOP. PEL is established, components develop MOP to support DE, JTF (EAC/JISE) develop MOE for DE, and the subsequent assessment (stoplights) are reviewed during the EAC and presented at the JCB. During the JCB, the EA analyst also presents an assessment of JTF success relative to Combatant Commander objectives."

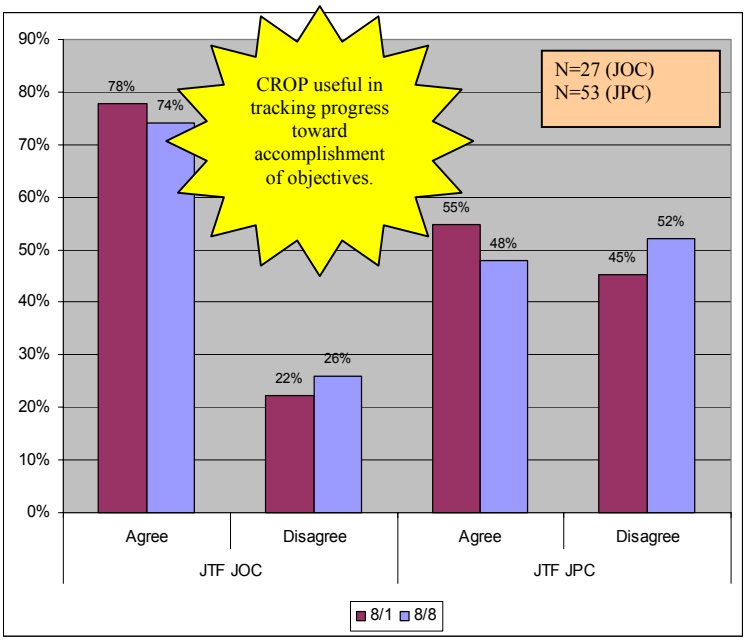


Figure 147: CROP was useful as a tracking tool

"The EAC met twice a day with the components, IO, Red/Blue Cell, ISR planner, Pol-Mil, ONA effects/assessment, members of SOSA cells. Cell discussed components MOPs, recommendations, and issues. The EAC Chief would make a subjective assessment and present to CJTF during JCB. One area where assessment seemed watered down was the amount of competing assessments that was presented to the CJTF at the JCB. Example of assessments given: EAC, Intel, components, Red/Blue, COM-Blue, IO assessments—so to some degree there was no fusion of assessments given to the CJTF."

"Component commanders provided reporting that assessed status of assigned "actions" against "nodes" in support of JTF "effects". This reporting was consolidated at the JTF level in order to evaluate success or failure WRT meeting Combatant Commander and JTF objectives."

A majority of JTF JOC personnel agree the CROP visual display of progress toward Combatant Commander and/or JTF objectives was useful in providing adequate detail and clarity to enable maintenance of good situation awareness. JTF JPC personnel were not as enthusiastic, and even less so as time worn on. In this event, the CROP seemed more useful for use in the "close" fight and was found lacking in its usefulness in anticipating requirements for future operations and plans. Even from those war fighters that agreed to some usefulness, comments included such things as:

"Tools not adequate for ground planning and SA."

"It's not there yet, too much pull and not enough push—too much data mining."

"Most situational awareness was obtained in the briefs that were conducted and tracking the comments in the JOC room. ADOCS did not provide a picture detailed enough to keep up on all happenings in the JOA."

"The concept is a good one, however, relative to providing adequate detail and clarity to enable me to maintain good situational awareness.... not so."

SMEs, especially at the functional component level, support the idea that collaboration processes enhanced and/or influenced the collective accomplishment of assigned objectives and effects.

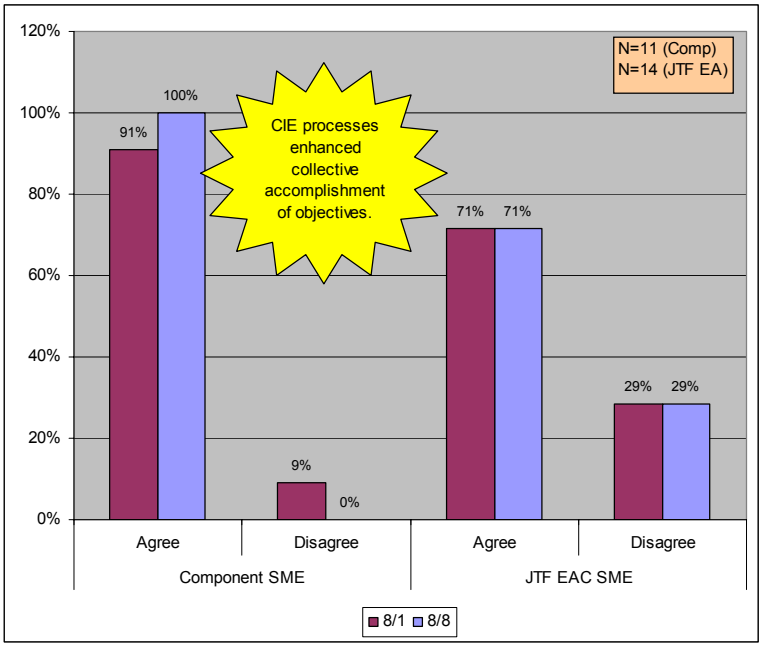


Figure 148: CIE enhanced the collection process

"The collaborative process supported the planning and execution process in not only the horizontal/linear plane, but vertically as well. It allows instantaneous decision making from the Combatant Commander down to the component level. I'm not sure that we necessarily plan faster, although depending how complex the task, one could argue either way. I think the issue is the planning effort is able to assimilate much more information and make more valuable judgments and decisions as a result."

Other Observations and Finding

None

Relationship to Other Objectives

EBP and EA are processes (methodologies, ways of thinking) designed for use at the JTF Headquarters and Functional Component Headquarters during the conduct of the MC02 experiment. As such, operational level implementation was dependent upon a number of other objectives and concepts being tested and/or observed during this event.

- Assessment Area #2: Setting Conditions, (i.e., a "product" of the EBP and assessment process)

- Assessment Area #3: Assured Access, (i.e., a "product" of the EBP and assessment process)
- Assessment Area #4: Conduct Effects-Based Operations, (i.e., a "product" of the EBP and assessment process)
- Assessment Area #5: Sustain the Force, (i.e., a "product" of the EBP and assessment process supporting effects-based operations, assured access, and setting conditions)
- Assessment Area #6: Standing Joint Force Headquarters, (i.e., the physical organization of the JTF Headquarters implementing the EBP and assessment process)
- Assessment Area #7: Operational Net Assessment, (i.e., the knowledge base upon which the SJFHQ drew its information and knowledge in order to conduct EBP and assessment)
- Assessment Area #9: Collaborative Information Environment, (i.e., the physical information systems used by the JTF and Functional Components to actually execute the EBP and assessment process)
- Assessment Area #10: Interagency, (i.e., the "organization" the JTF collaborated with to integrate all elements of national power during the EBP and assessment process in order to conduct effects-based operations, assured access, and setting conditions)
- Assessment Area #13: JISR, (i.e., the primary mechanism to physically plan and conduct effects assessment in order to design and adapt operational plans using the EBP process)

DOTMLPF Linkage:

This Assessment Area report supports the Effects-Based Operations Doctrine, Organization, Training, Materiel, Leadership and Education, Personnel, and Facility Change

Recommendations

Reachback – a powerful tool, but poorly replicated during this experiment. Needs to be more seriously explored.

CIE business rules must be developed and implemented so tools such as IWS are properly disciplined for planning activities.

In addition to describing desired effects in terms of changes to the adversary's actions or behavior, the desired level of changes, and the scope and distribution of the effect, the PEL should also provide the necessary timing to allow planners to take into account sequencing and the enabling actions and tasks in order to achieve the higher headquarters' effect and or objectives.

The JTF and functional component EACs must be appropriately staffed to participate in both assessment (EAC) and planning (JPC) activities in order to properly link effects assessment to adaptation of plans in anticipation of adversary actions.

Staffing levels of the JTF EAC and supporting organizations deserve a serious review to ensure the JTF is capable of the tasks required to properly assess MOE and desired effects in anticipatory fashion.

The EBP concept envisions the JTF as the 'owner' and 'assessor' of operational level effects. It may also be appropriate from time to time to designate a functional component as the 'owner' and 'assessor' of an operational level effect. In any case, the organization that owns the effect must be able to completely assess the effect. Care must be taken during the effects assessment process not to create new assessment 'boundary lines' to replace the ground unit boundary line that the adversary(s) can discern and exploit.

In addition to the EAC, the JISC may need a predictive analysis and fusion cell (in addition to the assessment cell) to enable the anticipatory requirements necessary to 'lead turn' the adversary.

Assessment Area 9 -- Collaborative Information Environment

Overall Assessment Results

This objective, stated as 'Establish and Maintain a Collaborative Information Environment', was accomplished in an effective and meaningful manner during the experiment. The three major concepts that made up the Collaborative Information Environment (CIE), — the Common Operational Picture (COP), the Common Relevant Operational Picture (CROP), and the Collaborative Tool — were used to communicate in the CIE, were all effectively established at the start of the experiment and were maintained in a operational status for 98 percent of the experiment period. Among these concepts, the use of the collaborative tool both for planning functions and for command and control functions during execution was clearly demonstrated as a useful and desirable capability for future Joint Task Force Headquarters. The CROP, incorporating a collaborative information portal, was also found to be a useful and desirable means for rapidly disseminating important information, for storage of multitudes of JTF and component generated products, and, to a lesser degree, for searching and retrieving needed information residing outside the direct control of the JTF and its components. The COP got mixed reviews for a variety of reasons, but, in general, was able to present a timely and accurate depiction of the forces in the Joint Operating Area at the operational level. As a whole, this portion of the experiment demonstrated that a JTF commander, his staff, and components sharing information in the CIE could achieve and maintain a detailed and timely level of situational awareness. The experiment also showed that they could use this shared awareness to collaborate effectively in both planning and execution phases, and that they could synchronize their efforts at the joint operational level to a degree beyond traditional deconfliction activities.

Overall Assessment Results

- **[XC4I tools], were all effectively established at the start of the experiment and were maintained in a operational status for 98% of the experiment period…**
- **CROP, incorporating a collaborative information portal, was also found to be a useful and desirable means for rapidly disseminating important information…**
- **The COP got mixed reviews…**
- **Experiment demonstrated that a JTF commander, his staff, and components sharing information in the CIE could achieve and maintain a detailed and**

Methodology

In order to experiment with the CIE, USJFCOM first had to build a CIE. This effort required a significant amount of resources. A series of surrogates were selected, as no existing integrated system was available. This architecture was based on a wide area network (WAN), which included the JTF Headquarters and the Combatant Commander Headquarters, both located at the JTASC in Suffolk, Virginia, and the functional component headquarters located at Nellis AFB, NV (JFACC); Camp LeJeune, NC (JFLCC); onboard the USS CORONADO (AGF-11) (JFMCC) homeported in San Diego, CA; and at Naval Base Norfolk, Norfolk, VA (JSOTF)

Also in the WAN were external agencies including the Department of State, the Joint Staff, and the Department of Justice, all participating out of locations in the Washington, D.C., area. This WAN was built within the DOD SIPRNET. The overall communication system for the experiment is depicted in the Windsor Diagram located at **Annex XYZ** to this document. The

WAN also carried the extensive data communications necessary to integrate numerous models and simulations, as well as, live-force reporting data.

A suite of experimental tools was provided for all participating MC 02 organizations. These tools served as surrogates for tools that were projected potentially to be available for use by all JTF's by the year 2007, the hypothetical setting of the experiment. This suite of tools with its linking communications was referred to as the Experimental Command, Control, Communications, Computer and Intelligence (XC4I) System. It must be re-emphasized that the XC4I system used in the experiment was a surrogate for a future system. It was built from commercial-off-the-shelf (COTS) and government-off-the-shelf (GOTS) systems to test the experimental concepts (see figure xx).To the extent that the concepts prove viable, the surrogate components are a potential point-of-departure for creating a prototype system for detailed development. XC4I is not and never was intended for immediate deployment. For example, the XC4I system was constructed to be as "open" as possible to facilitate getting it to work properly with the resources available. A future prototype operational system must incorporate security features that were impractical to develop and install for the purposes of MC 02 experimentation.

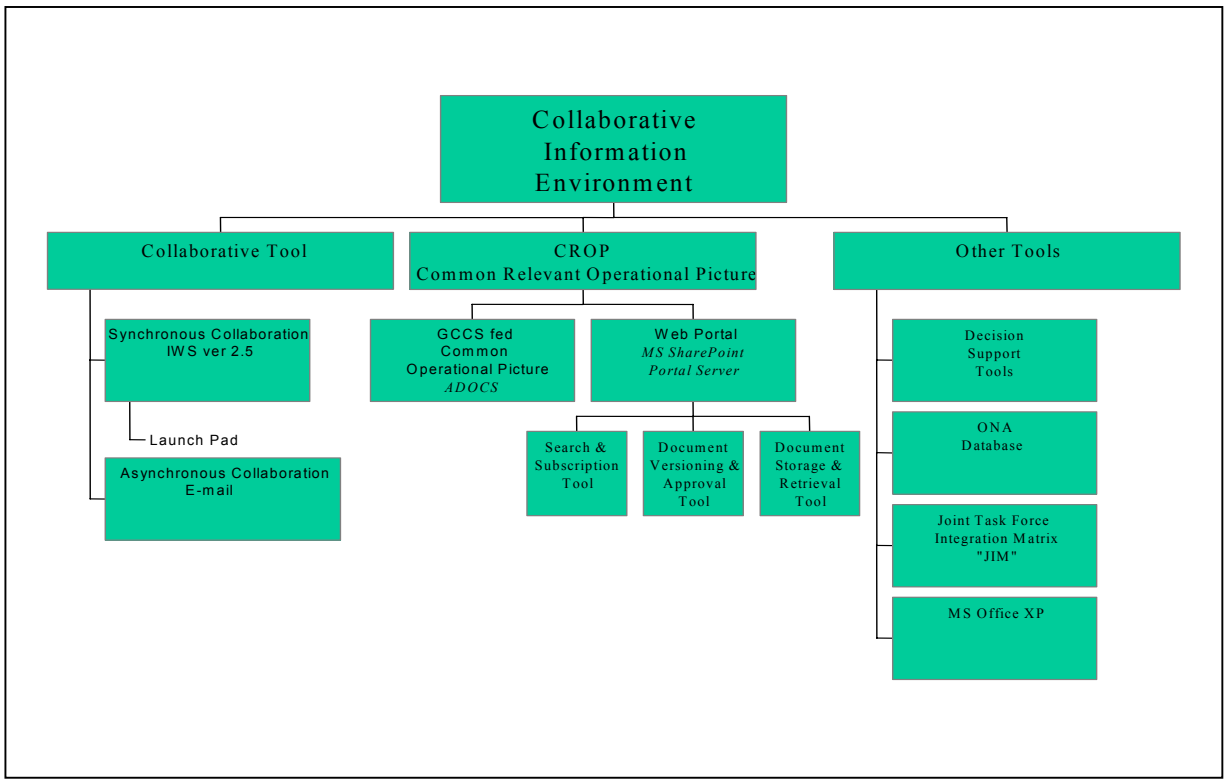
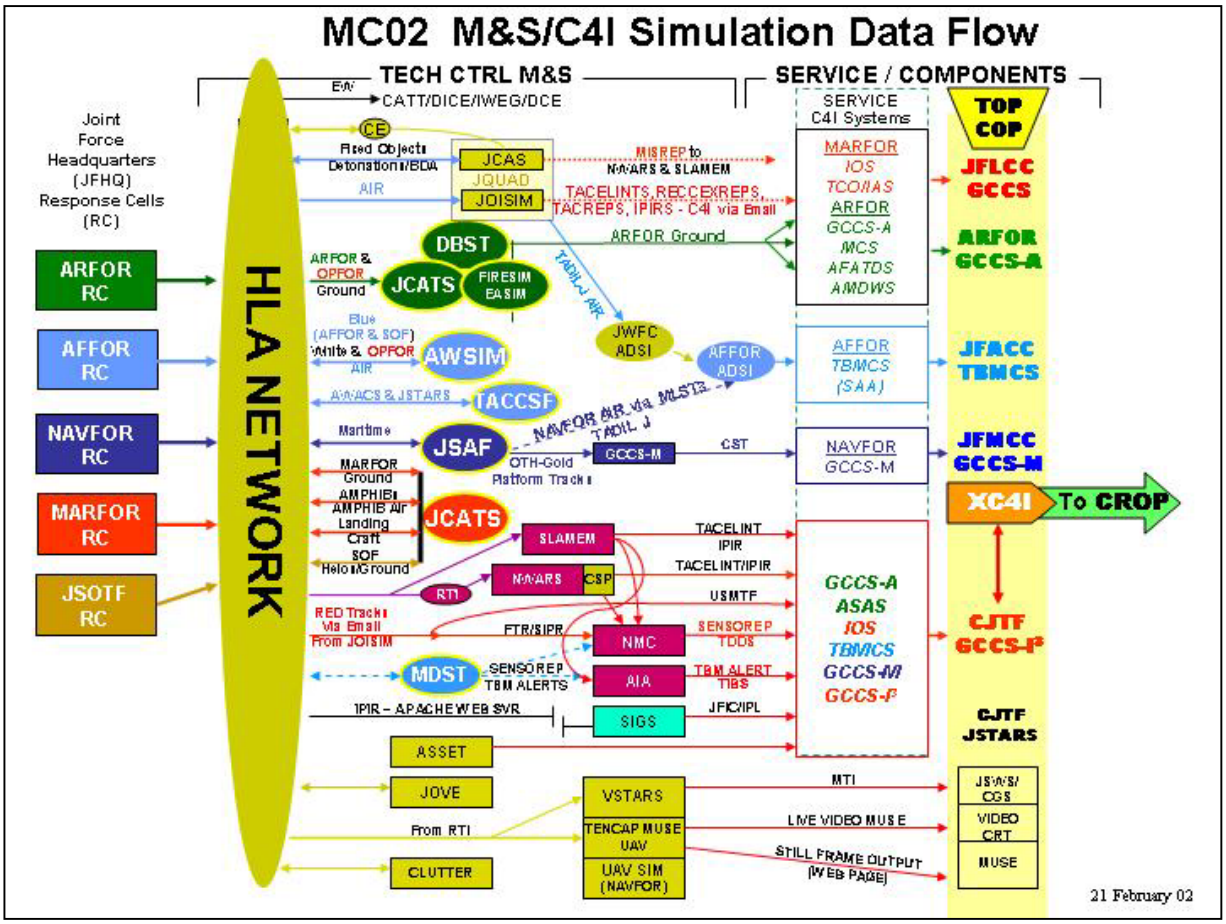


Figure 149: Collaborative Information Environment architecture

For the COP, the standard military Global Command and Control System (GCCS) was used. The architecture was as follows:

This architecture included inputs from live forces participating in the western ranges and from various models and simulations distributed across the country. These inputs entered the system at the lower levels, that is, at the component level or below. When these inputs and all their potential formats are considered, the level of complexity involved increases significantly. The hierarchal nature of the COP architecture should be noted. Such architecture was required in



order to synchronize and disseminate the picture to all participants. The COP Synchronization Tool (CST) was incorporated into the system at the JTF level so that a single, synchronized view of all tracks and units in the JOA was available to every participating headquarters. The diagram above illustrates the complexity of the COP integrated to the models, simulations, and live forces that it depicted. For the rest of the operational architecture, the CROP and the collaboration tools, the system was a flattened Wide Area Network (WAN) "cloud" with all participants having access to the system servers in a client-server environment. There were some work-arounds necessary to get the surrogate systems in the XC4I to function properly. (See MC02 Joint Common Operational Report, 26 Aug 2002 for greater detail).

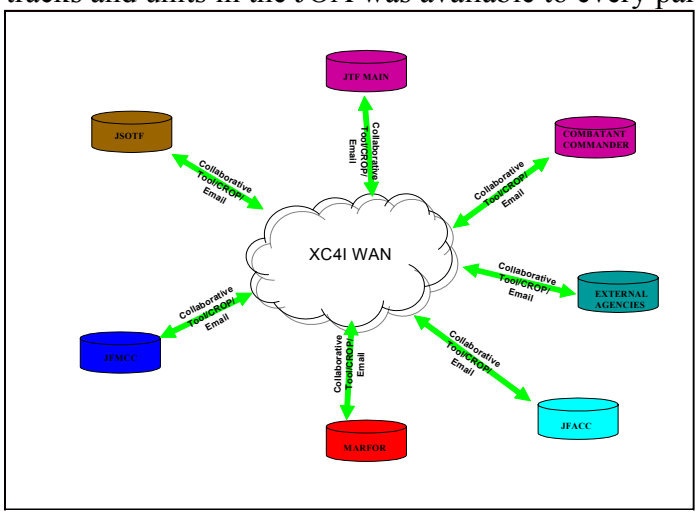


Figure 151:XC4I Wide Area Network running the CROP

For example, the collaborative tool required a "server farm" to handle the volume of activity that took place. While the system size required a total of eight servers the

available technology limited the "server" farm to six servers. The result was that two locations, USS CORONADO (JFMCC) and Camp Lejeune (JFLCC), had servers that were confederated into the system but were not integrated. The result was degradation in the quality of performance at those locations.

The COP for the MC 02 experiment was viewable through any appropriate "viewing" software. As the result of a Limited Objective Experiment conducted in 2001, the "viewing" software incorporated into the XC4I suite was the Automated Deep Operations Coordination

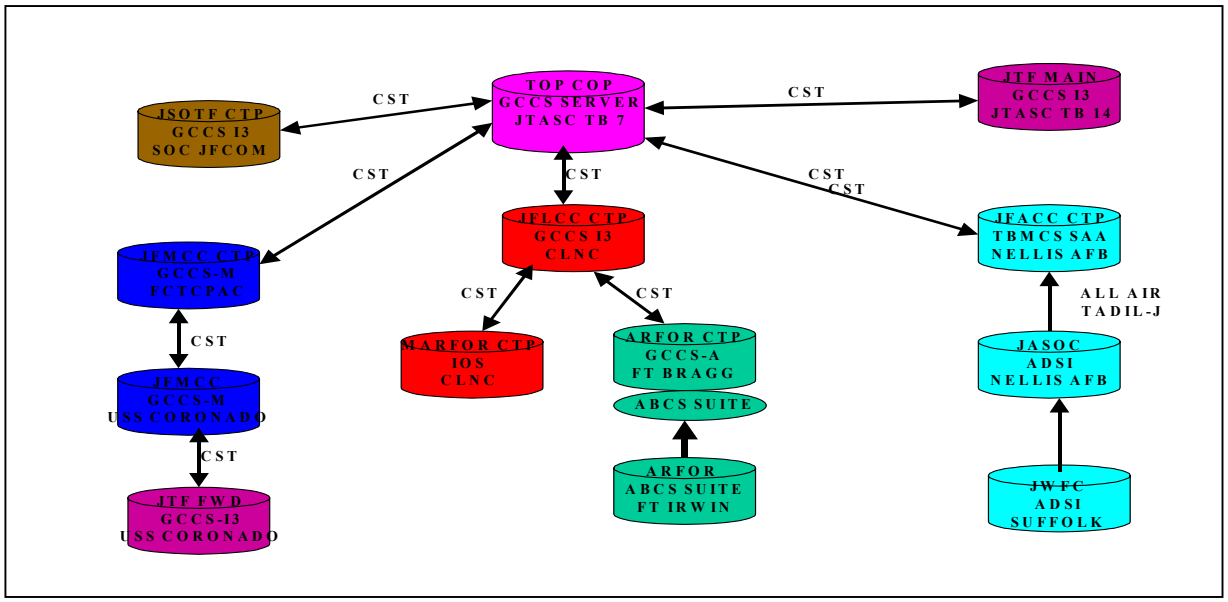


Figure 152: COP architecture at the time of MC02 Execution

System (ADOCS). ADOCS was used because it had capabilities such as 3D terrain viewing, ATO visibility, and fires planning and execution modules that were desirable in a graphic depiction of the battlespace. These modules were believed to have the potential to improve operator situational awareness.

For the CROP, the XC4I tool was Microsoft SharePoint Portal Server (SPPS). This tool is a COTS product that provides users with a web-enabled capability to post and retrieve their staff products. It also incorporates a search engine that enables users to search the web for information, as well as a local configuration capability that allows users, at all levels, to structure their portal windows to meet their individual or group needs. The collaborative tool used in the experiment was the InfoWorkSpace (IWS) tool. IWS is also a COTS product. Also, every XC4I work station was provided with the Microsoft Office suite for document production. This suite included the Microsoft Outlook application for sending and receiving Email.

Selection of these tools for use in the experiment was the result of several months of intense effort by the MC 02 experiment staff following the Unified Vision 2001 (UV 01) experiment in June of that year. Factors considered in the selection process included cost, user acceptance, known or identified functional capabilities, training requirements, and known or identified configuration requirements. To meet the requirements of the experiment, the staff selected a set of tools that conformed to the CIE concept, could be adapted for use in the XC4I system, could be acquired with the funding available, and that could be available early enough in

sufficient quantities to meet the training requirements of preparing both the JTF and the functional component staffs for the experiment all within about one year.

To experiment with the CIE, analyst developed a series of experimental issues or Warfighting Challenges that addressed the basic functionalities required by the concept as well as what the surrogate tools could be expected to produce in a networked environment. These functionalities were developed from the USJFCOM concepts of Joint Interactive Planning (JIP) and Common Relevant Operational Picture (CROP) and later, from the concepts described in the DoD Command and Control Research Program (CCRP) publication, Understanding Information Age Warfare, published in September, 2001.

Analysts, working with the concept developers, then dendritically broke down the Warfighting Challenges into supporting tasks and subtasks. At the task and subtask level appropriate data requirements were developed against which experimental data could be collected. This effort was finalized in the form of an experimental matrix that contained all the necessary information to support the data collection plan. The experimental matrix for this objective, Collaborative Information Environment is attached at **Appendix X to Annex Y** to this report.

A data collection method was developed for each data requirement associated with the tasks and subtasks. Many questions associated with the tasks and subtasks were subjective. To gather data on those subjective questions a series of surveys were prepared. During the experiment, these surveys on the COP, CROP, and collaborative tool were sent electronically to both participants and subject matter experts who functioned as experiment observers and data collectors across the JTF and components. Also incorporated into the experiment design was the

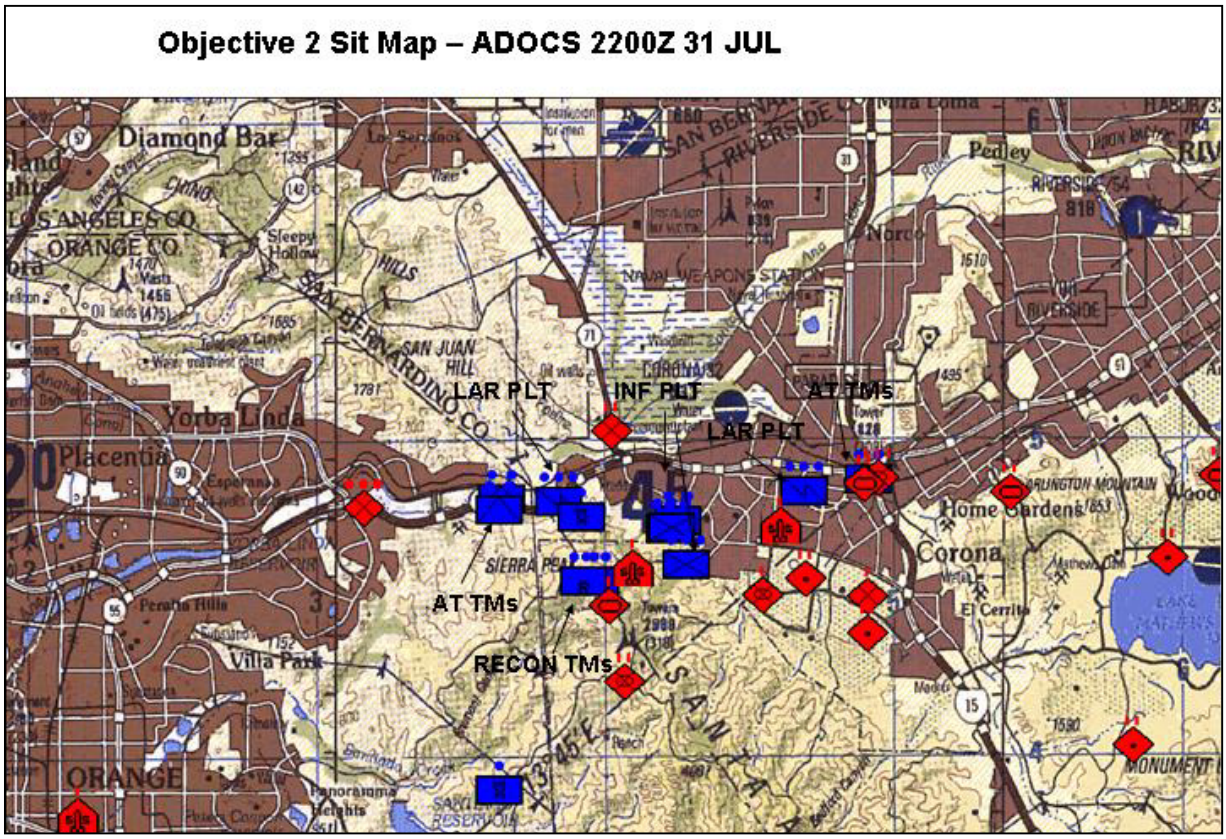


Figure 153: MC02 exercise map expressing a representative level of detail

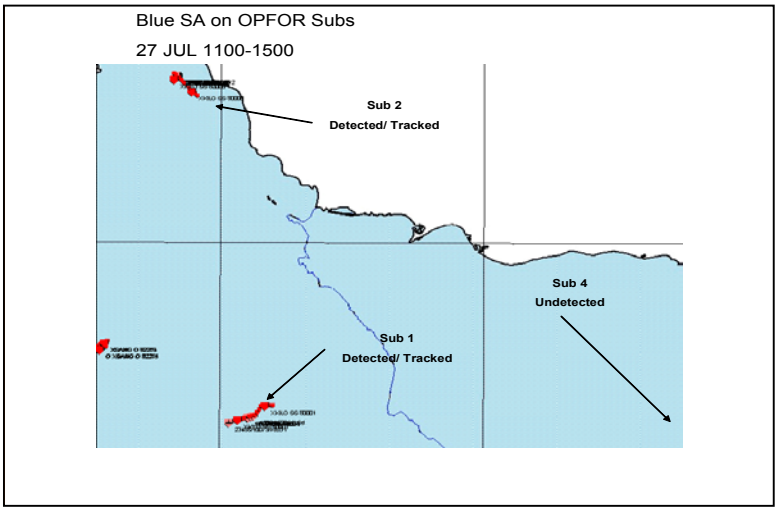


Figure 154: OPFOR submarine tracks in GCCS

use of a group of very senior retired officers, retired three-and-four-star generals and flag officers as well as former ambassadors, who were brought together on a daily basis to share their observations and insights on the experiment. Both formal and informal notes were taken of these meetings and used as sources of data for the experiment analysis.

For data collection and analysis of the COP, a tool was developed through a contract with the U.S. Army's Electronic Proving Ground to capture ground truth data from both simulations and instrumented live forces and perceived truth as contained in the GCCS data base. This tool, the Digital Collection and Reporting System (DCARS), was used throughout the experiment to collect the specified data. Other objective data collected in the course of the experiment included video tapes of approximately 100 collaboration sessions held at all levels during the experiment, logger data from both the collaborative tool servers and the CROP servers, and records of e-mail transactions.

Warfighting Challenge:

Ability to establish a valid COP and build the CROP in a CIE

- The first CIE Warfighting Challenge focused on the friendly force's ability to establish, maintain, and display a graphical depiction of available data on both friendly and adversary units and platform locations. This challenge also addressed how the friendly force developed information on the status of their own units as well as how the friendly force developed and displayed their opponent's locations, capabilities, and intentions.

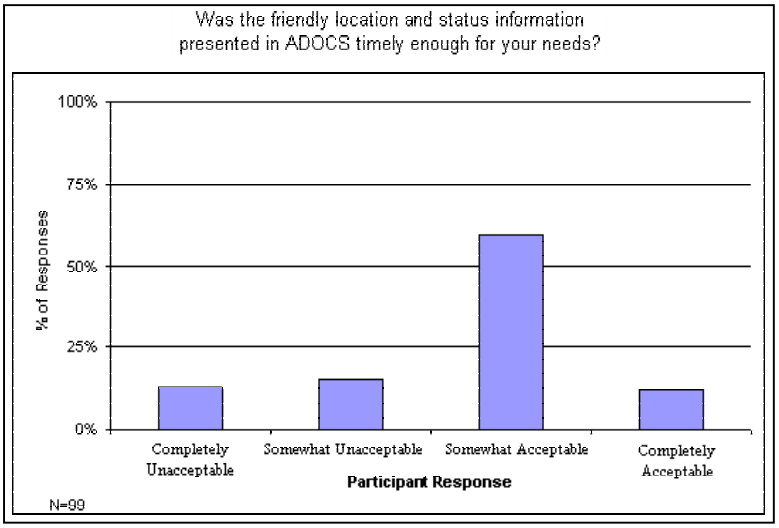


Figure 155: Timely enough for your needs

Finding 1:

Opponent ground force or unit information (unit identification, location, time) in the Modernized Information Data Base (MIDB) was readily displayed on the COP. Numerous views were collected throughout the

course of the experiment to show the information being provided to friendly forces on opponent ground forces by the COP. Spot checking of this data against the times that it was posted in the COP indicated that the information displayed was the latest contained in the MIDB. An example of these views is shown below. In this view, various opposition units can be seen to the west, east and south of the friendly forces deployed in the vicinity of JTF Objective 2.

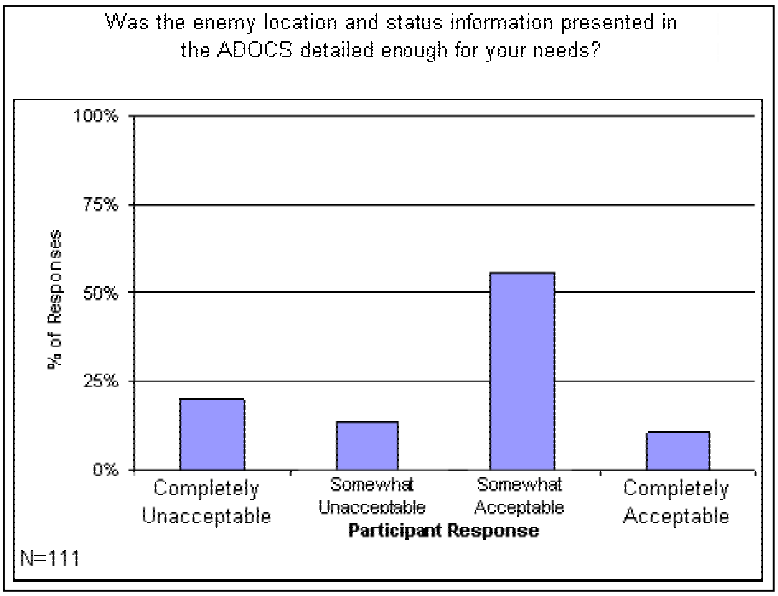


Figure 156: Information detailed enough for your needs

A major problem with the information contained in this view, and with the use of the COP during the experiment, was the timeliness and accuracy of the enemy position updates. New information on opposition forces had to be processed, fused and entered into the MIDB by someone before the display was updated. Responsibility for this process was never clear. The non-contiguous, non-linear battlespace no longer clearly distributes this responsibility as a function of component Areas of Responsibility (AOR) the way it was done in the past on the linear battlefield. Since no one "owns" the battlespace except the JTF, how do tactical level reports of enemy activity get placed into the picture in a timely and coherent way? Although users, in their survey responses, indicated the timeliness of the COP display was acceptable shown in MC02 exercise map above, their written comments indicated that the processes used to update the picture were too slow.

The level of detail on opponent forces available in the COP was regarded as acceptable by participants at the operational level as shown in the survey results.

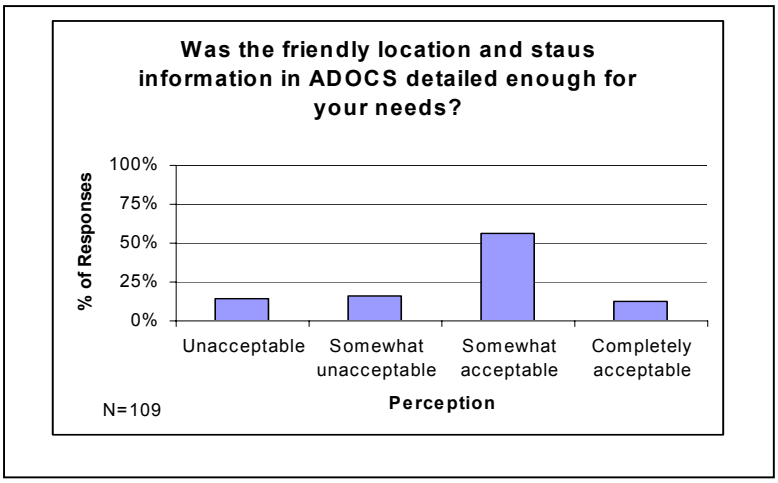
Many participants also indicated through their responses that they expected a COP view that would be more useful at the tactical level. In particular, the responsiveness of both the update procedures and the system itself appeared to be too slow for use in command and control of forces at the tactical level.

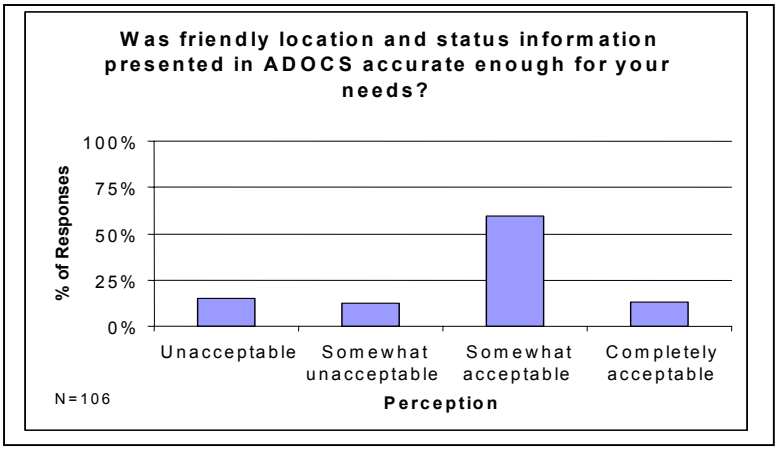
Finding 2:

Opponent track information (naval surface and air) was displayed on the COP in a timely and accurate manner for operational level situational awareness.

As with the opposing unit (ground) data discussed above, track data for opposition platforms was displayed on the COP. Participants also said that these displays were adequate for situational awareness at the operational level. However, as with the unit data, the picture was not accurate or timely enough for those making decisions at the tactical level.

Spot checking of track data indicated that it was updating on a regular basis. Using the Data Collection and Reporting System (DCARS) tool, data was collected from both simulations, i.e., ground truth, and GCCS data files used by the participants. Snap shots were compared. The result indicated that for both air and sea tracks, there was sufficient information available to





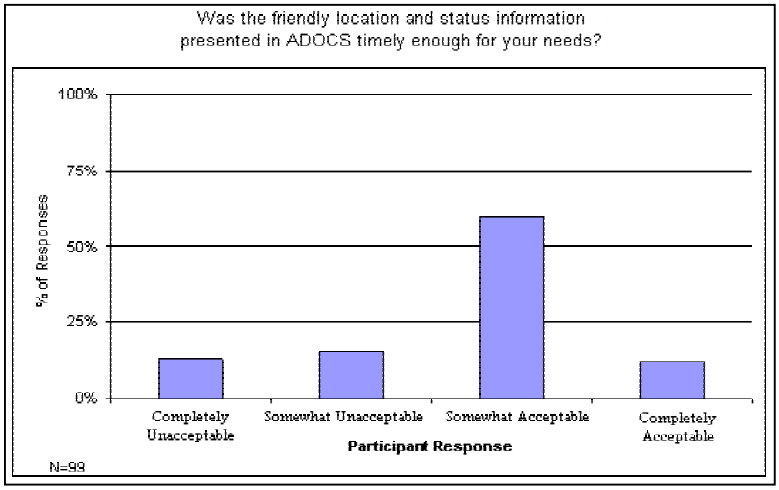


Figure 157: The above three graphics depict participant responses to survey questions asking about the adequacy of ADOCS for positional data

maintain situational awareness of enemy forces and their locations for the purpose of making decisions at the operational level.

For example, OPFOR submarines were regarded by both the JFMCC and the JTF Commander to be operational level threats. These vessels were sought out by Blue Forces before fighting began and subsequently tracked down and destroyed as a high priority. The adjacent DCARS graphs depict ground truth simulation tracks and the COP data available on the subs at all levels for situational awareness and decision making.

Finding 3:

Components were able to generate their own friendly picture of units and tracks, pass that picture to the CST at the JTF and receive back the necessary data to build a timely and accurate friendly force picture at the operational level.

However, again, the picture was not sufficient for making tactical level decisions. Survey responses indicate that a majority of participants thought the friendly force information in the COP met their needs at least minimally for detail, timeliness, and accuracy as seen in the adjacent charts.

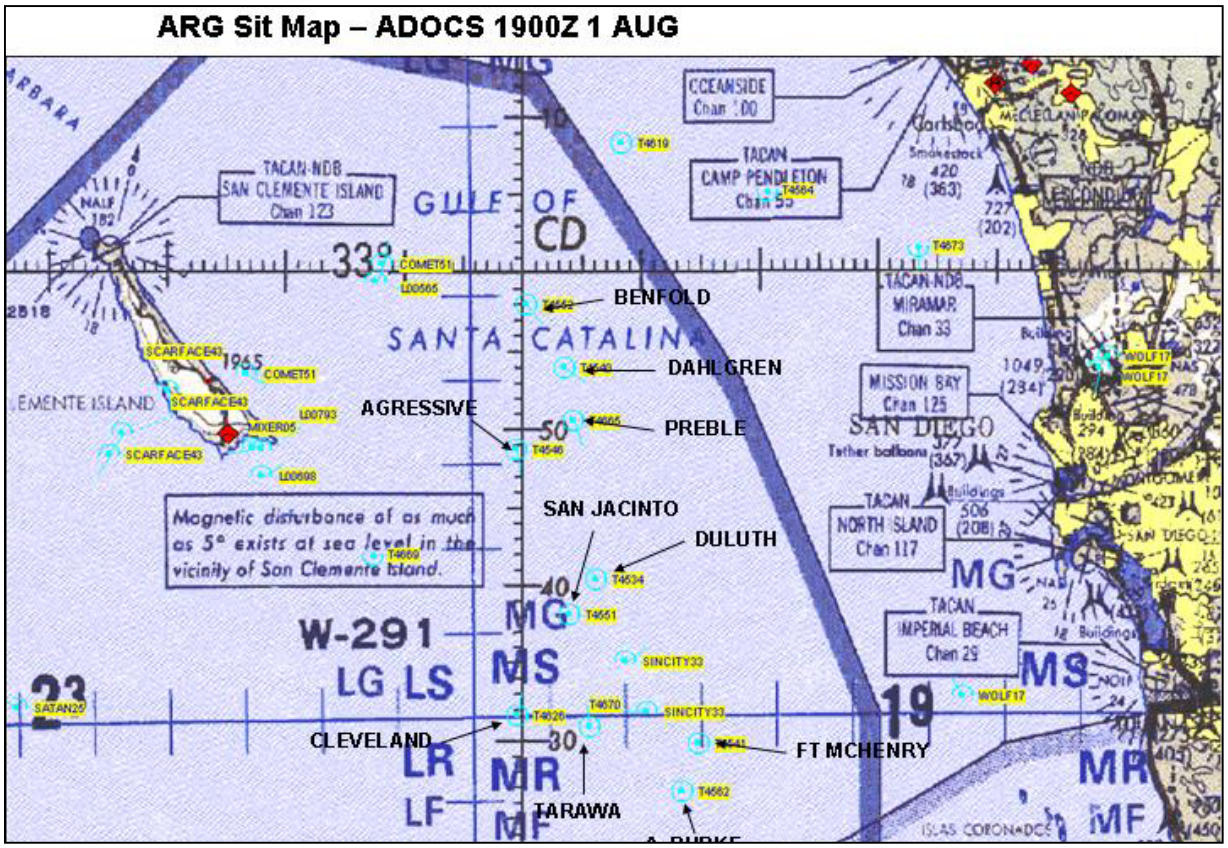


Figure 158: Naval force chart displayed in ADOCS

However, the survey responses also indicate that the friendly force COP had problems with tracks, including tracks being hard to maintain and being slow to update.

Track information was sometimes incomplete or erroneous, such as duplicate tracks or ship tracks traveling at excessive speeds indicating a mixing of surface and aircraft track identification. However, the COP was useful for situational awareness of friendly forces at the operational level with some concern for accuracy and timelines of the display. Numerous examples of the COP displays were collected such as the ARG situation map on the following page.

The captured ADOCS view above shows an ARG (USS TARAWA, USS CLEVELAND, USS FORT MCHENRY, and USS DULUTH) and its supporting vessels operating on the afternoon of C+8 during MC 02.

Participants, in some cases, and particularly the JFLCC, fell back to the use of paper maps displayed at appropriate headquarters locations to track or maintain situational awareness on both friendly and opposition forces of interest. Reasons for doing so included a perception of greater confidence in the information so displayed, an apparent sense of frustration with the difficultly of maintaining the COP partly due to a lack of adequately trained personnel, and the perception that available information such as the anticipated results of overflights by UAVs was not getting to the COP displays with accuracy and timeliness.

Again DCARS was used to compare ground truth and GCCS data. The results indicate that some friendly units and tracks were displayed with accuracy and timeliness. There were observable problems such as tracks not reporting in the COP or reporting as multiple tracks in

the COP. Many of the problems appear to be attributable to a lack of operator training and experience.

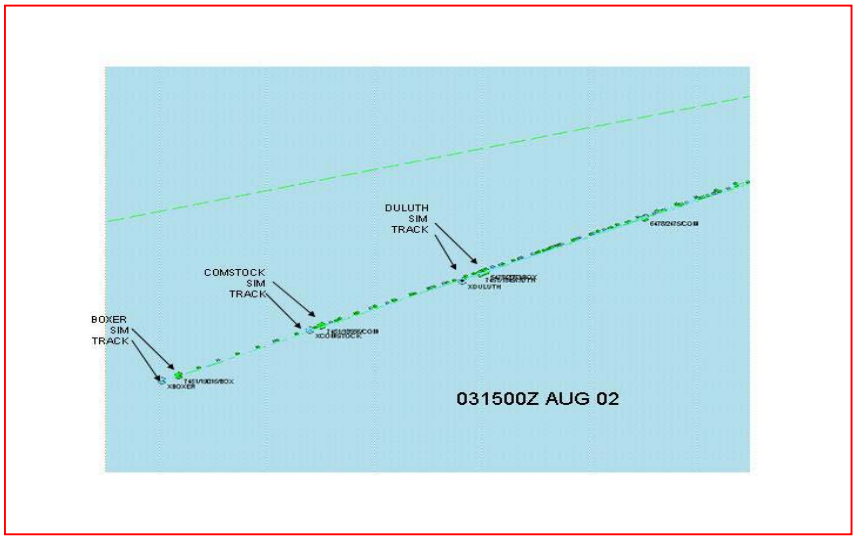


Figure 160: Ground truth and simulation locations were relatively accurate as displayed here.

Of all the XC4I tools used in the experiment, the COP with ADOCS as the viewing tool received the least participant training and pre-experiment hands-on experience. Training classes were limited to "buttonology" training and application training. There was no pre-experiment activity to provide appropriate track and unit feeds to GCCS to allow operators to practice their skills at manipulating COP filters in a dynamic situation. Only during the last day of the third "spiral" workup session (3-14 June) were there hands-on operational sessions in which units and tracks appeared in the COP in a coherent manner. These two practice vignettes last only about three hours each and incorporated only a minimal number of tracks and track activity. Spot checking of track data indicated that it was updating on a regular basis. Using the DCARS tool, data was collected from both simulations, i.e., ground truth, and GCCS data files used by the participants. Snap shots were compared. The result indicated that for both air and sea tracks a majority of the tracks were reasonably accurate such as in the tracks below. In the view above, we see three ships, Boxer, Comstock, and Duluth proceeding in-line in both the simulation and the GCCS track data. This indicates that an accurate and timely picture of these ships was potentially available to anyone who had the COP with filters properly set.

In nest figure, we see GCCS and simulation tracks for both rotary and fixed-wing aircraft participating in the action against JTF Objective 2 on C+6. This view also shows

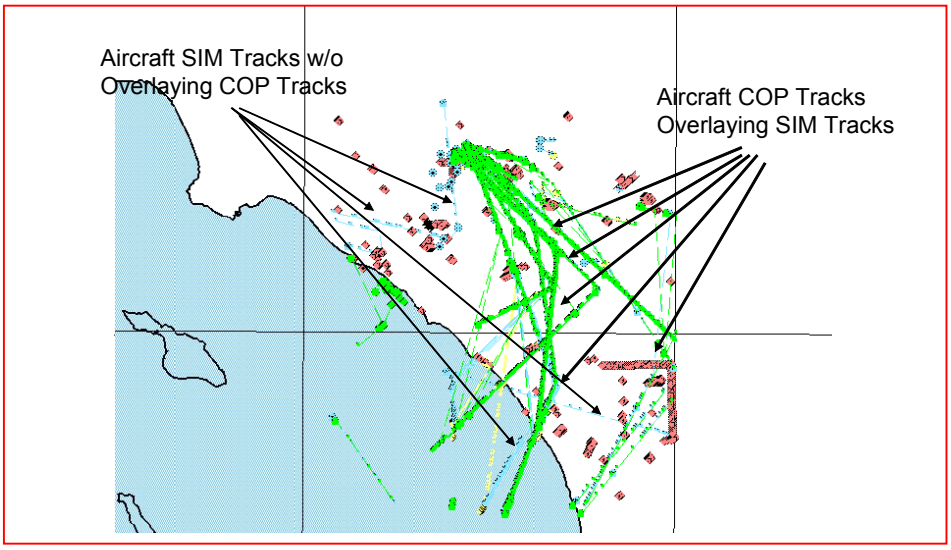


Figure 159: JFLCC attack on objective 2 showing both ground truth and the ADOCs display

that most of the simulation tracks were in the GCCS data and therefore were potentially visible with acceptable accuracy to everyone who had access to the COP and properly adjusted filters.

In an effort to determine the quality of the picture that was potentially available in GCCS an analysis was conducted of the friendly naval surface tracks and compared with ground truth from the simulations. Locations of ships were determined for the same period (1500Z – 1700Z) every other day beginning C+2. The results were as follows:

DATE	# of ships in SIM database	# of ships in COP database	Total # of unique ships in both data bases	# of ships present in both databases simultaneously	# of ships in both databases that are correlated	Percentage of ships in both data bases that are correlated	Percentage of ships in ground truth database that are correlated
C+2	38	43	43	38	31	82 percent	82 percent
C+4	41	34	44	31	27	87 percent	66 percent
C+6	35	32	40	27	25	93 percent	71 percent
C+8	31	30	32	29	27	93 percent	87 percent
C+10	30	29	31	28	27	96 percent	90 percent
C+12	19	26	29	15	15	100 percent	79 percent
C+14	29	26	30	25	19	76 percent	66 percent
Average	32	31	36	28	24	86 percent	75 percent

As can be seen from this sample, not all ships in the simulation appeared in the COP. There were some ships that appeared in the COP without appearing in the simulation during the sampling period on a given day. There was also a subset of those ships in simulation and COP that were in both, during the daily sampling period. While there is substantial variability from day-to-day, about 78 percent of the unique ships are simultaneously present in both databases some time during the period.

For determining the quality of the COP, an analysis of the correlation of the simulation and COP tracks was conducted. To be considered correlated the two tracks had to be within .1 degree of both latitude and longitude or about six miles apart during at least two ten-minute periods of the two hours of sample data. This evaluation was centered around 1530Z and 1630Z whenever the data allowed.

As shown on the chart, it was found that an average of 86 percent of those ships present in both data bases could be considered correlated for operational level situational awareness purposes. If we take the ships in the simulation database as ground truth then the percentage of COP tracks that are correlated averages 75 percent. The overall conclusion is that, on average, the JTF and JFMCC Commanders and their staff personnel could look at the COP and have confidence that 75-85 percent of the tracks displayed accurately reflected the current ship locations for every ship track in the force.

A more detailed and extensive analysis might adjust these figures somewhat. However, the 25 percent difference between the COP display and ground truth is probably the reason why

the operators expressed concern with the quality of the COP in some instances during the experiment. It must be noted that this level of accuracy is probably acceptable for situational awareness, planning and decision making at the operational level (Combatant Commander, CJTF, JFMCC) but is not acceptable for use at the tactical level.

Finding 4:

Effective management of the databases to support the COP remains problematic.

Although a majority of the survey respondents indicated that the COP display provided at least minimally acceptable level of situational awareness, there were a substantial number of individuals who also indicated in their survey comments that there were problems with the COP display. In particular, they indicated that the data presented for both friendly and opposition forces was too slow to update which resulted in varying degrees of inaccuracy. They also noted that pre-experiment training in the use of the COP was insufficient, preventing participants from being able to adequately use the data that was available in the COP to display the desired picture.

The Joint C4ISR Battle Center (JBC) at JFCOM addressed technical problems with the COP as part of an assessment they conducted during MC 02. JBC performed a follow-on assessment to a 1999 Joint Intelligence Interoperability Board (JIIB) Systems Baseline Assessment (JSBA) in which they examined the progress made to date in improving systems interoperability including the systems that provided the COP for MC02. The JBC found that the JIIB systems (GCCS-M, GCCS-A, TBMCS, GCCS-I3) were technically able to share a stable and dynamic COP between the JTF and component headquarters. They noted however, that there are still problems with database exchange and database replication that remain to be resolved, and particularly between the Army's All-Source Analysis System (ASAS) and other systems in the COP. The JBC report noted that while interoperability enhancements now allow the ARFOR to have a near real time COP, the maintenance of enemy ground order of battle at the joint level is still cumbersome. In particular, they noted the continuing requirement for manual injections of data as a requirement to properly maintain the picture.

The JBC report further noted that GCCS-I3, GCCS-M, and TBMCS all shared the same basic database during MC 02. This allowed the JTF to confederate database maintenance. The result allows key components to maintain and update a portion of the shared database for others to use. JBC regarded this as a major improvement in interoperability with the potential for the JFACC to maintain the Air Order of Battle (AOB) for the entire force using TBMCS and for the JFMCC to maintain the Naval Order of Battle (NOB) through GCCS-M. The Army's ASAS system, however, could modify data automatically only within its own Oracle-based All Source Correlated Database (ASCDB) and, therefore, needed to send data updates manually by USMTF messages to the rest of the joint force via GCCS-A.

Respondents also noted in their comments that the amount and level of training received on the COP was less than that received on the other portions of the CIE and were inadequate in their view. As discussed earlier, COP training was mainly focused on "buttonology" and applications. There were very few pre-experiment opportunities to work with the COP performing the tasks required to maintain the databases needed to keep the COP picture up-to-date and accurate. There appeared to be a lot of on-going "cross pollination" type training between individuals on the COP during the experiment. This activity was helpful for many, but survey comments indicate that many participants never were able to acquire the necessary skills to adequately configure or shape their own COP to meet their needs.

Finding 5:

An on-going requirement exists to link status information for both units and tracks to the icons displayed on the COP.

A linkage between a unit or track displayed on the COP and databases that contain up-to-data information on that unit or the platform is needed to provide adequate situational awareness. Such linkages were put forward for use as part of the COP during MC 02 planning but were not available to incorporate into the system. Participant survey comments indicated that they needed more status information for planning and decision making. Because it was not available in COP linkages they turned to the CROP and made inquiries within the information portal or directly to other staff participants via synchronous or asynchronous means. The status information sought usually was related to combat readiness status. Such information could be automated and presented to the viewer in the form of drop down windows displayed whenever the user clicks on the COP icon. Information on some platforms was available on the MC02 COP. This Information included platform identification, course, speed, and altitude. Other items needed could include time on station, anticipated time remaining on station, current weapons and ammunition status, fuel status, etc. For units the information available might include unit authorized strength, current strength, ammunition status, fuel status, time since last rest or maintenance period, current engagement status, etc.

This use of the COP also highlights the apparent convergence in joint force operations between the operational and tactical levels of war. During MC02 we saw plans generated and executed in which relatively small units, normally regarded as tactical units, were used with speed and precision to create effects that were intended to have an impact at the operational and even strategic level. This was particularly true of ground actions aimed at seizing or neutralizing weapons of mass effect in the battlespace and SOF direct actions to neutralize ONA based targets. Planning and execution of these actions at the joint level required details much greater than what would normally be expected for JTF operational level planning and execution. As operational level actions move toward this model based on speed and precision, the level of detail, accuracy, and timeliness required in the COP increases. This requirement was also reflected in participant comments to the COP survey. Participants needed tactical level detail for planning and execution of MC 02 activities. While it must be noted that the context of the experiment, small-scale contingency in a high threat environment, drove the planning and execution in this direction the trend from running from actions in Kosovo and Afghanistan to MC 02 is clear. Despite the much discussed potential for detailed information systems to enable the higher headquarters jump echelons in the chain-of-command, there is increased evidence that precision and speed in future operations of this kind will required a tactical COP with appropriately improved levels of detail, accuracy, and timeliness.

Finding 6:

The establishment of the “Virtual Warehouse” of information for the CROP was limited.

In the CIE the CROP is both a repository of information and an access point to the Global Information Grid (GIG). The GIG was unavailable to the MC02 experiment. In lieu of the GIG a substantial amount of information was created or, where possible, assembled to provide the JTF with the data and the information required for planning and execution. This limited repository was the defacto “Virtual Warehouse” for the experiment. The evaluation approach was to determine if users can subscribe to needed information, search the system for needed information, publish information products, and make others aware of availability of information

using the available information management and distribution system (the portal). Users were able to subscribe, search, and publish but not as effectively as required. The portal did not supplant e-mail, the traditional asynchronous collaboration method.

Survey results showed that participants found the portal to be a distant third at 13.8 percent to the experimental collaboration tool IWS and to E-Mail in providing the most useful information. The results from 321 respondents for the questions, "In your billet which of the tools listed provided you with the most useful information" show the collaboration tool IWS as the most valuable information tool with nearly 43 percent of the votes and e-mail second with just over 24 percent of the vote.

IWS	E-Mail	CROP	Other	COP	Telephone
42.8 percent	24.4 percent	13.8 percent	9.1 percent	6.3 percent	3.8 percent

Table: Warfighters Choice for Most Useful Information Tool

Analysis of the application logs also showed the portal as being used on a daily basis by significantly fewer participants than both the collaboration tool and e-mail. The average number of participants using a tool at least once is shown below.

Tool	Average Users/day	Avg Deviation	Standard Deviation
E-Mail	720	31	26
IWS	618	35	46
SPPS (CROP)	467	30	29

Table: The average daily number of users 26 July through 8 August 2002

The graph below illustrates the daily usage for each of the tools, SPPS(CROP), IWS (Collaboration Tool) and E-Mail:

The concept of operations contained in the JTF Knowledge Information Management Plan (KIMP) limited the impact of the portal except in the case of the Logistics CROP.

The establishment of the CROP was implemented by using a web portal with functionality that supported the creation and synchronous sharing of information and by publishing and implementing the Knowledge Information Management Plan (KIMP). This plan provided the policies and procedures for establishing and using the CROP. The concept of operations in the KIMP placed Knowledge Management (KM) responsibilities for many KM tasks on individual members of the JTF and component staffs. Together, the portal (SPPS) and the KIMP had important implications for the JTF.

SPPS is a web portal that implements Microsoft Digital Dashboard technology and is described as a dashboard site. The dashboard site contains a number of page links, or dashboards, and includes customization pages and custom Web Part forms. The dashboard site is used to distribute information to workspace users through a Web browser. It provides a Web view of the workspace and enables users assigned to appropriate roles to search for, view, and manage documents in the workspace and to search for and view content from other sources. Users can find many different types of information on the dashboard site, including group or enterprise news, announcements, links to other sites, personalized notifications for changes to documents, and more. The digital dashboard technology makes it easier for the coordinators and users to add and customize the Web parts that make up the visible content of the dashboards thereby more effectively bringing users the information they need.

This feature allowed for the distribution of portal building and management responsibilities. The KIMP implemented and supported this distribution and the Knowledge Managers directed the configuration of the portal, accordingly

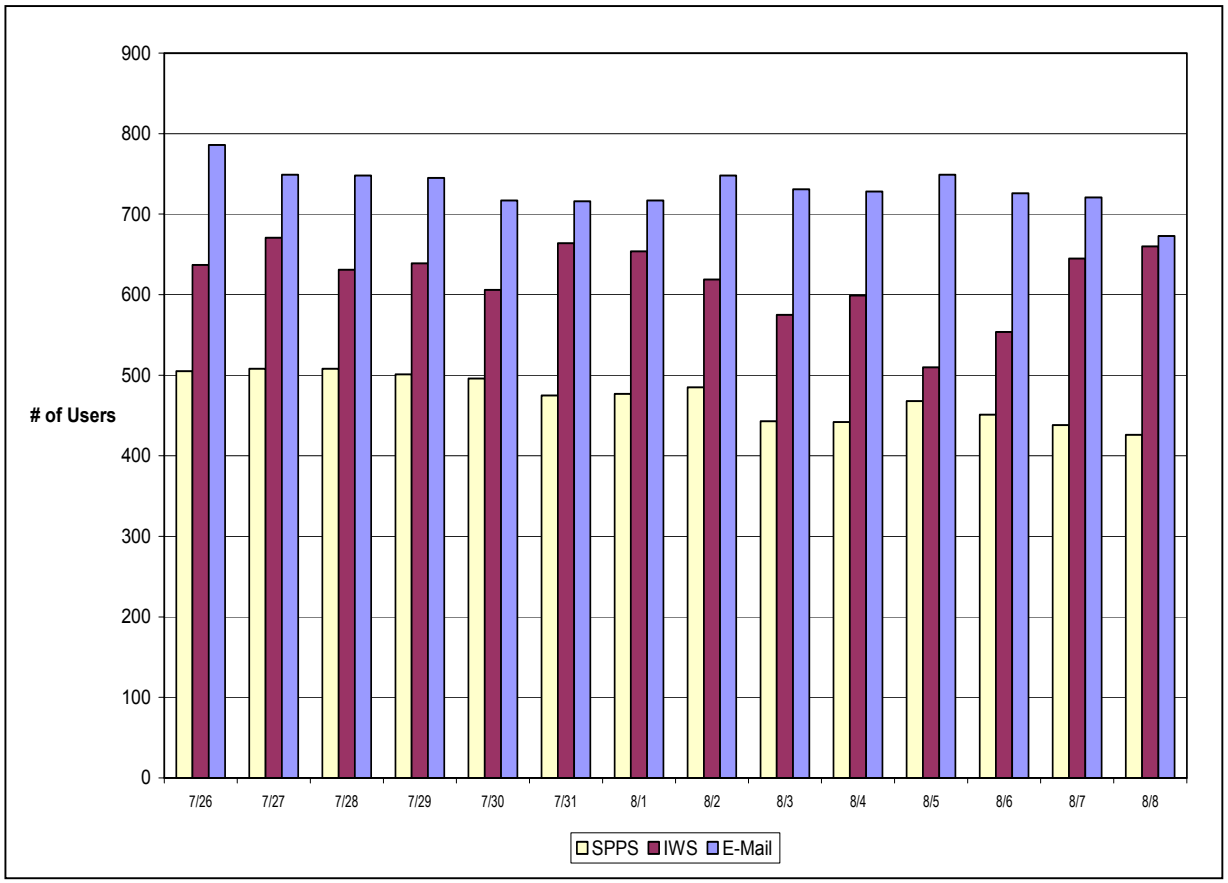
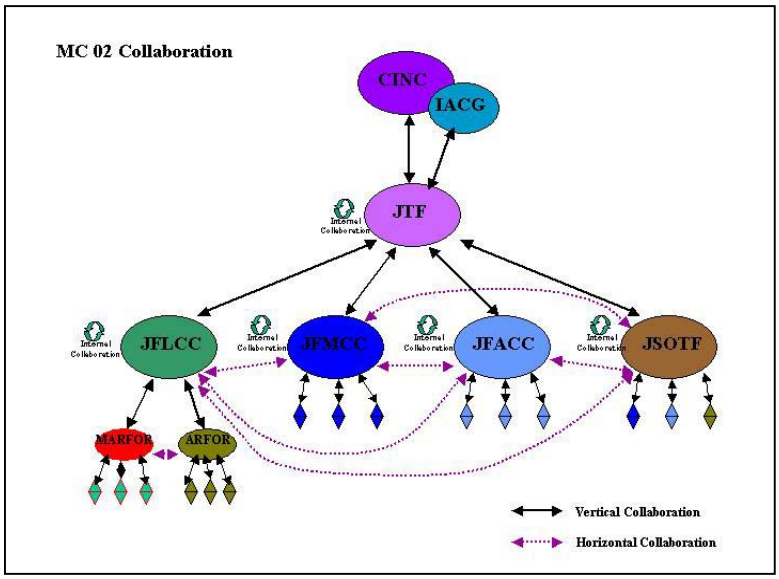


Figure 161: MC02 tool usage

A SPPS server was installed on the MC02 network for each of the component commands JFACC, JFLCC, JFMCC, and JSOTF at the physical location of the component. A unique SPPS workspace was created for the component on the respective server. Within the limits of the policies of the KIMP and the instructions of the JTF KM, the components were free to construct the component workspace as seen fit. Initially, a single server was installed at the JTF to support a unique workspace for the JTF, the JPOTF, the IAC-COE, and for the superior Combatant Commander Blue HQ. Three non-participant workspaces for the MC02 Analysts, the MC02 technical support, and testing also existed on the server. On or about 28 July these seven workspaces were switched to a backup server The SPPS application was reinstalled with a two server configuration and resumed operations early on the 31st of July. The new, second server was a Dedicated Content Index (DCI) server for documents and content that resided outside of the local Main SPPS Web Store in the Exchange Public folders and on the component SPPS servers. All other services remained on the original server but were more optimally distributed across the disk arrays. As was the case with the components, the five JTF Knowledge Managers and their JTF groups were free within the limits of the KIMP to grow their dashboards. Individual participants were free to build a personal dashboard. Participant usage of the portals were recorded in the MS Internet

Information Services (IIS) logs collected 24 July through 10 August. The JTF IIS logs for 24 and 25 July were lost as a result of the server rebuild described above. Therefore, most of the examinations of the system logs start with 26 July. Most of these examinations end on 8 August since the participant population dropped noticeable on 9 August.

Activation of the MC02 portal began before activation of the JTF. In accordance with the SJFHQ concept, the SJFHQ staff populated the portal and built the required dashboards. As previously mentioned this was done without access to the GIG and was a first of its kind endeavor. The JTF was activated at the start of Spiral 3 (3-14 June 2002). The building of the portal continued throughout and after Spiral 3.The knowledge demands of the commanders and their staffs occurred at such a volume and frequency that the CROP applications had to operate at maximum availability, application functions achieving exactly what was required, and the participants had to comply expertly with the KM tasks and practices as defined in the KIMP. Participants also had to apply experienced IT tool skills in order to get the job done. With notable exceptions the participants did not know the processes and procedures in the KIMP nor did they have the high KM and/or IT skill levels needed to work according to the KIMP. Furthermore, the experimental portal application experienced some moments of both availability and performance degradation. For the participants, MC02 was actually a high pressure exercise and not an experiment. Together, these problems and the resulting pressures caused participants to fall back on the reliable and familiar e-mail. E-mail usage is described in the table below.



Participant e-mail usage jumped to 10,000 messages per day on the second day of the experiment and never dropped below that until 7 August when participant attendance and the pace of information activity started dropping off significantly. A baseline of e-mail usage for a similar sized JTF operation without a portal has not been located. Since the participants have judged e-mail superior to the portal for providing useful information it is instructive to observe the usage of both. E-mail served as a complementary tool to IWS. It was in e-mail that the bulk of notifications, seeking , and distribution of information was accomplished.

The total number of participant messages was 175,569. 23 percent or 41,240 of all e-mail messages carried attachments. These messages varied in number of addresses from one to over 1,000. Messages with attachments function as a distribution or publication of documents. The experiment expectation was that this tasks would be accomplished via publication on the portal.

Voluntary comments provided with survey responses and through the Comments and Recommendations application available on the CROP explain the users' preference for e-mail. The criticisms noted that in SPPS needed information often was too difficult to access or locate in the large volumes of available information. There was too little time for conducting searches when one could find information easier via IWS or e-mail. Experiment participants did not have

Figure 162: MC02 Participants Daily E-Mail Message Count

enough experience working with the portal, documents were often moved or replicated in the course of updating, credibility of the information was uncertain, documents developed using the collaboration tool (IWS)were belatedly or sometimes never posted in the CROP, and sometimes information needed for their jobs was not available at all on the portal. [CROP SPPS Survey q1-17]

17 of the 21 questions given to the 53 SMEs observing the experiment asked for SME's position regarding a particular positive result from using the portal resulting 901 responses the SME's volunteered 213 (24 percent) comments. The critical comments out numbered the positive responses on this subject three-to-one.

Figure 163: Number of voluntary SME comments

A third of the comments from those in strong agreement on the positive impact of the portal qualified their endorsements by pointing out a fault.
Nearly half of those indicating agreement with the question also provided comments pointing out faults. On the disagree side only six of 88 made the effort to point out positive aspects of the portal.

The 17 questions are listed below. [SME CROP Survey]

1:Friendly unit status info posted in the CROP (SPPS) was AVAILABLE when needed by the users.
2:Friendly unit status information posted in the CROP (SPPS) was SUFFICIENTLY ACCURATE for planning and operational level decision-making.
3:Posted weather information in the CROP (SPPS) was accurate for operational level planning and/or C2 of execution.
6:The CROP (SPPS) information provided to participants was COMPLETE.
7:The CROP (SPPS) information provided to participants was CORRECT.
8:The CROP (SPPS) information provided to participants was TIMELY.
9:The CROP (SPPS) information provided to participants was CURRENT.
10:The CROP (SPPS) information provided to participants was ACCURATE/PRECISE.
11:The CROP (SPPS) information provided to participants was RELEVANT.
12:The CROP (SPPS) information provided to participants covered physical features of the JOA in sufficient depth and detail.
13:The CROP (SPPS) information provided to participants covered enemy OOB in sufficient depth.
14:The CROP (SPPS) information provided to participants covered relevant/needed POLITICAL information in sufficient depth.
15:The CROP (SPPS) information provided to participants covered relevant/needed SOCIAL information in sufficient depth.
16:The CROP (SPPS) information provided to participants covered relevant/needed ECONOMIC information in sufficient depth?
17:The CROP (SPPS) information provided to participants covered relevant/needed INFORMATION (MEDIA) information in sufficient depth.
18:The methods used for collecting, storing, and retrieving information in the CROP (SPPS) were useful participant's purposes.

20:The search capability provided in the CROP (SPPS) was satisfactory?

The Comments and Recommendations application on the portal provided a voluntary means for anyone involved in the experiment to pass on observations. All comments and recommendations containing the words portal, SPPS, or CROP were reviewed for observations directly addressing the portal. Eighty-seven comments submitted during the MC02 event were found. For each submission the preparer had to select an indicator of the observation as one of favorable, somewhat favorable, neutral, somewhat unfavorable, or unfavorable. The voluntary nature of making such a submission indicates extra motivation on the part of the submitter. Overall the critical comments outnumber the positive comments two to one. Two-thirds of the comments labeled neutral were also found to be critical when reviewed.

Ten of the 16 favorable and somewhat favorable comments addressed the Logistics CROP (dashboard). A thorough survey of the MC02 portal showed this dashboard to be the most developed. An informal poll of the logistics staff showed a high degree of satisfaction with this dashboard. Analysis of the portal logs showed this dashboard and the included web parts to be the fifth most used content group. Logistics documents are a close sixth. Combined together Logistics becomes the top visited content group in the CROP. The implication of this finding is that a well developed portal or web page has an impact and gets used, whereas poorly developed page don't.

The anticipated value of the CROP (portal) is likely to be fully realized when the right balance is found between commanders and staff personal KM expertise, responsibilities, and tool skills on the one hand and the degree of application standardization, establishment of KM billets, and KIMP scope required on the other hand.

Finding 8:

Systems operation and the Battle Rhythm have to be closely synchronized to maximize performance and availability when needed.

Figure 164: Number of SME comments during MC02

Two post event workshops were held on the subjects of Knowledge Management and Collaboration. The four SJFHQ Knowledge Managers, the JTF Knowledge Manager, the four Component Knowledge Managers, and several JTF and Component staff principals were in attendance. The workshops noted that application restarts were often a surprise to the JTF staff and frequently occurred at the worse possible times. Eventually there was improvement when recurring maintenance actions followed a routine schedule. However, this also became a problem when specific operations required exceptions to the routine. Requests were made by the JFMCC on 29 July to reschedule maintenance that evening around the arrival of the JTF Commander at the Coronado. Although the JFMCC KM received a positive response the adjustment did not happen and the performance of SPPS was degraded. Also that same night special operations against WME required maximum availability of systems that was not realized.

The JFMCC KMO raised the maintenance times issue at the 30 July daily KMO meeting. The time of the back up was supposed to be 2200 Pacific time. Instead with only 30 minutes warning it was advanced to ~ 30 minutes before the JTF Commander's arrival. Per the JFMCC KMO the JFMCC alternate procedures required at lease 2 hours warning but really needed 4. The JSOTF KMO echoed the same complaint saying that the four hours of down time (they experienced) right in the middle of the previous night's operations was unsatisfactory. This

discussion occurred in the KM collaboration room using both text chat and audio. The text chat was captured and is provided below.

JFMCKMO (2:29:52 PM): Still need resolution on the NET SEND issue.... We have to be able to notify all our COR users when we have to reboot or take portions of the system, systems delays, etc.
JFMCKMO (2:31:10 PM): Now that we have the JTF staff aboard - we need to also monitor the system and control bandwidth. The only workable solution is to use NET SEND alerts. What is the PERMISSIONS issue that outweighs the HUMAN FACTOR issue???
JTFKMOLEAD (2:31:56 PM): To JFMCKMO - Not sure why this isn't done yet. Will meet with the tech support people when we get done.
JTFKMOCG (2:51:10 PM): It would seem that since the IT systems are critical to this experiment, the system downtime should be coordinated with plans and operations. IT convenience SHOULD NOT drive these decisions.
JTFKMOCG (2:52:28 PM): Is there anyway to rotate the systems such that there really is no total downtime?
JFMCKMO (2:53:07 PM): Need 2 to 4 hours NOTICE to the downtime... we all live with the downtime
JFMCKMO (2:54:02 PM): See - if we had the NET SEND - they could be sending us ALERTS 4 hrs, 2 hrs, 30 min and 10 in advance of system outage

KM's also observed system degradation in conjunction with peak periods of document publication to the SPPS. This was regularly seen at deadlines for posting new Effects Tasking Orders and FRAGO's to same. Altogether there were 3 ETO's and 52 associated FRAGO's. The FRAGO's consisted of one document. The three ETO's contained 47, 52, and 53 documents. System Administrators on seeing the performance loss would restart the application. In several cases work was lost. Listed below is a summary review of performance and availability issues submitted by the SPPS system administrator.

Table x+2: Maintenance Activities Impacting on SPPS Availability and Performance

Application restarts:	Unplanned maintenance:	Before caching was turned on the SPPS server would became unresponsive. The condition was corrected when the IIS Web server service was stopped and restarted. The administrators observed the IIS was waiting for something to happen. All four processors would slow down to 1 percent or less activity for an extended period of time. On a few occasions the administrators waited 20 or 30 minutes and the Web server would "come back" and resume normal operation. The restart was the appropriate protocol for this condition as a restart could be completed faster than the 20-30 minute wait. Microsoft proscribed turning on the cache utility to avoid this problem.
		After caching was turned on the SPPS server would become unresponsive in a different way. The users would see a Microsoft IIS Server-side error instead of a decline in the Dashboard performance. To get the server to respond, the administrator had to recycle (stop/restart) the Microsoft Exchange Web Store (the core of the document/dashboard storage in SPPS).

	Routine service recycling:	At night, after the Share Point Exchange Online defragmentation routine ran, the administrators would receive an hourly error message indicating the Share point Exchange Web Store was fragmented. If that particular series of hourly error messages was seen in the morning, the Web store was recycled.
Server reboot		A couple times after recycling the web store the service did not restart. The server had to be rebooted
Temporary Performance Degradation		Performance was degraded noticeably when coordinators modified a dashboard while users were trying to view the dashboard. Users viewing the Logistics CROP while coordinators worked (changing web parts) on the Logistics CROP complained of slow response time.

Typically there would be two planned interruptions to SPPS availability per day, once before and once after the 12 hour experiment day. Since the models and simulations ran 24 hours a day, missions were executed outside of the 12 hour day, and the participants followed suite with a 24 hour a day operations the routine maintenance had some impact that had to be planned around. The XC4I desk recorded these and the unplanned events in a journal. The journal entries recorded 15 non-routine losses of SPPS availability.

The overall result is the Millennium Challenge experiment was affected by normal issues of systems availability and serviceability. Scheduled and unscheduled maintenance requirements impose synchronization and surge management challenges on the Collaborative Information Environment. These challenges will have to be addressed either through technology improvements or changes to processes and procedures that will reduce the impact of scheduled and unscheduled systems down time.

Warfighting Challenge:

Ability to plan collaboratively in a distributed joint C2 environment

This warfighting challenge was postulated because of the belief that the simultaneous involvement of the CINC HQ, the Joint Force Commander, the JTF, and the Component Commanders and Staffs in the planning and execution activities should result in the following:

- A better understanding of the commander's intent, better unity of effort, and reduction of planning-cycle times.

- Providing the Joint Force Commander a significant, asymmetric advantage over his adversary.
- Saving of time and enabling an efficient use of information from the Common Relevant Operational Picture (CROP).

Task: Conduct planning, execution, and assessment in a collaborative environment.

Finding 1:

The Joint Task Force was able to establish a persistent collaborative environment (CE) across all echelons of command including: CINC HQ; JTF Boards, Centers, and Cells; Component Command HQs; and interagency participants.

The data and observations on collaboration provided by the MC02 subject matter experts (SME), participant surveys, the objective record of respondents' use of the collaboration tools (IWS server logs), and the Knowledge Management and Collaboration working group results were analyzed . This analysis indicated that the CE was establish at the start of the experiment and remained in place, with no major disruptions except for a few technical problems, short audio outages and short, infrequent losses of network connectivity for the duration of MC02. The collaborative environment was operational approximately 97 percent of the time during MC02.

The surrogate collaboration tool used in MC02 was InfoWorkSpace (IWS). It is a web-based system owned by Ezenia Corporation. IWS is a commercial, server-based software system that offers a bundled package of collaborative tools (e.g., whiteboard, virtual workplaces in rooms and auditorium, audio and text chat, and distributed viewing of the same presentation or maps, etc.) to facilitate on-line communication, data access, and knowledge management among its users. IWS uses a physical metaphor of buildings and meeting rooms in which users can virtually assemble in order to conduct collaboration activities. This physical arrangement adds context to the virtual environment enabling participants to plan, develop courses of actions (COAs), and present briefings to other members in two types of IWS sessions.

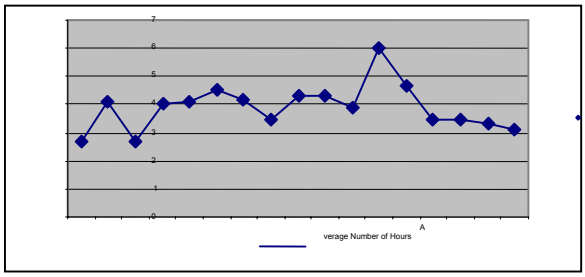


Figure 165: Avg. duration (in hrs) participants were active on IWS. The graph is in one hour increments from zero through seven hours.

First, IWS provides a virtual conference center in large auditorium rooms where users can present a fully interactive on-line presentation for hundreds of audience participants. Second, it also offers numerous small group-size meeting rooms where 25 or fewer participants can hold a meeting for the exchange of information or synchronous collaboration activities utilizing IWS tools.

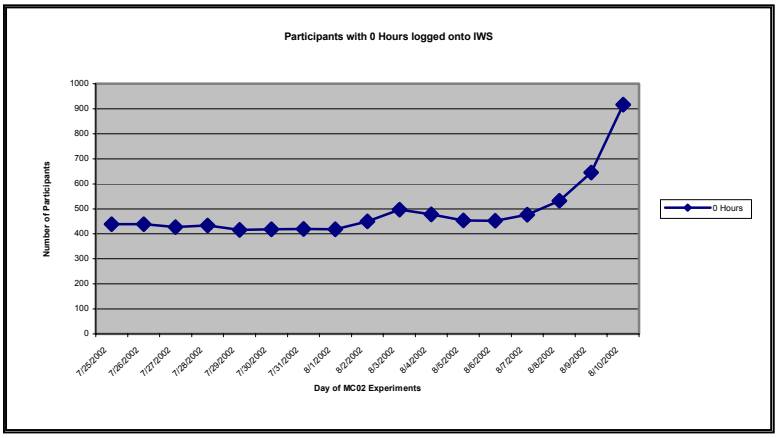
The IWS tool set used in MC02 consisted of the features listed below:

- Audio
- Public and private text/audio chat
- Collaborative rooms (large Auditoriums and small meeting rooms)
- File transfer
- Whiteboard
- Application sharing (shared view)
- Document storage of Word, PowerPoint, images & other documents in the file cabinet located in the small meeting rooms
- Polling (online voting, survey construction and analysis of results)

These tools provided the necessary capabilities and functions to support the warfighters' collaborative sessions in a virtual environment. These tools and their uses were outlined in the Concept of Operations for the Collaborative Information Environment publication.

A total of 1,298 unique MC02 participants used IWS, to share information and collaborate across all echelons at some time during the experiment. Over the course of the experiment, however, a large portion of these participants, approximately 489 participants each

day, did not log onto IWS. These infrequent users ranged from a low of 416 on C+7, day six, to a high of 916 participants on C=17, the last day of the experiment.



The majority of the MC02 participants logged onto IWS between three to four hours a day, with an average of 3.71 hours, over 17 days of the experiment, average usage times ranged from of a low of 2.7 hours, on the first and third days of the experiment, to a high of 6 hours on C+12.

During MC02, participants were questioned on the use of time they spent in the collaborative environment. Participants indicated that they spent 48 percent of their time in collaborative sessions, and 43 percent of their time in informal briefings. Over 70 percent of the MC02 participants surveyed indicated that they opened eight or more collaborative sessions on IWS every day. A majority of participants felt that the time spent in the collaboration session was beneficial in terms of task completion and product production.

MC02 participants were informed of the schedule for daily meetings by the MC02 battle rhythm (see the chart below) and from daily meeting announcements published on the JTF Integrated Microsoft Outlook calendar (see figure below) and other calendars.

To function properly in a collaborative environment, a battle rhythm must be disciplined. There was a pre-experiment perception that with collaboration there would be more potential scheduling flexibility. It was found, however, that the battle rhythm established by the JTF also must be used by the components, higher HQ, and the Interagency Community to plan participation in JTF sessions and to develop their own battle rhythms. Meeting schedulers and participants must remain flexible. During MC02, it was observed that changes to the daily battle rhythm (meeting time or location changes, delays in meeting start

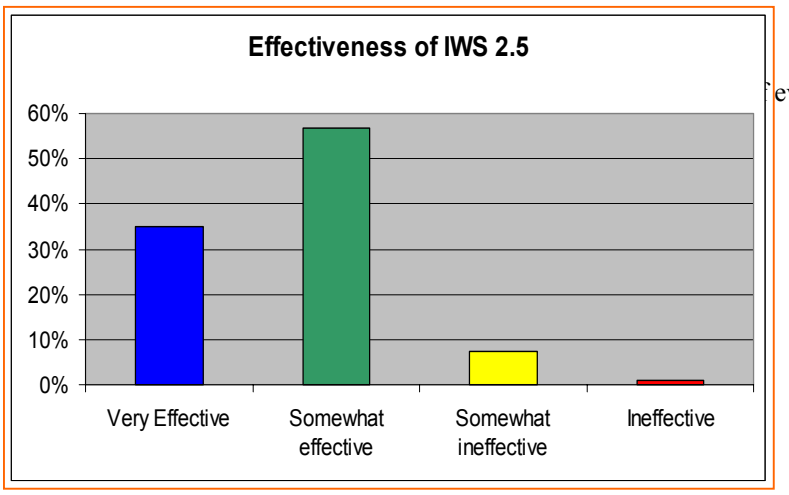


Figure 166: IWS considered effective by most

events times, or postponed or cancelled meetings) were made informally and not disseminated through a formal procedure. Meeting leaders often posted a change announcement on the IWS bulletin board, or if in the Auditorium, posted a change announcement on a slide so those entering the Auditorium would see the change and go to the new location at the appropriate time. The other informal method was by word of mouth between participants. These procedures appeared to work satisfactorily once participants were familiar with them.

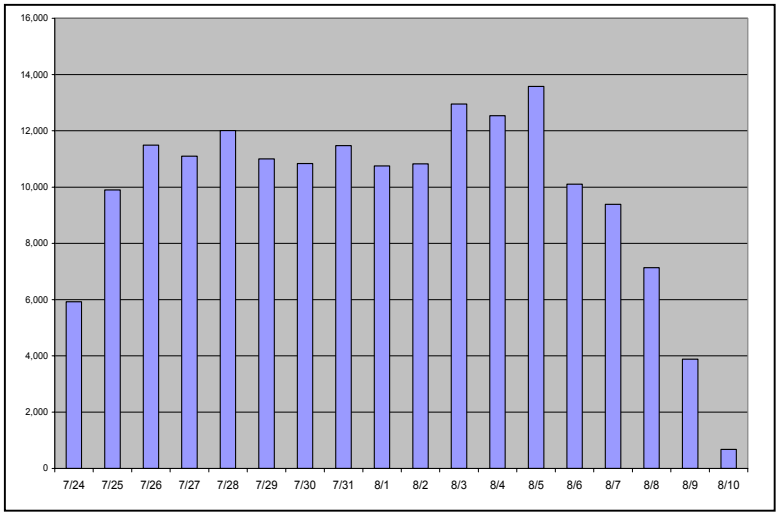
Finding 2:

The Joint Enroute Mission Planning and Rehearsal System- Near Term (JEMPRS-NT) enabled the JTF Commander and his staff to collaborate using secure voice, application sharing, whiteboard, text chat, file transfer, digital dashboard collaborative tools. He was able to accomplish all planned tasks, while airborne and enroute to the theater.

The JTF Commander used the JEMPRS-NT to enable mission planning via CIE including use of IWS, while enroute to NAS North Island, CA and the USS CORONADO. He was flying aboard a Special Operations Low Level (SOLL-II) C-17 aircraft.

While in transit, the CJTF and staff used 13 workstations loaded with CIE tools for conducting two Joint Coordination Board (JCB) virtual meetings and to maintain continuous situational awareness. The JTF Commander personally used JEMPRS-NT to participate in two collaborative sessions. The first virtual meeting was on C+5, as the CJTF and 60 members of his staff, transited westward. The second meeting was on C+8, on their return flight. The CJTF participated in the JCB virtual meetings with from the JTF main headquarters and Interagency Community in attendance. For these meetings, they used the main IWS Conference Center, Auditorium Room 101, which was the normal virtual meeting location for the JCB.

The time required for completing the session during the first JCB virtual session was 85 minutes. The session started at 1730 Eastern Standard Time and ended at 1855. During this session, audio and video problems were experienced during the latter part of the event. Communications with the CJTF were lost at 1829 and the Deputy CJTF ordered a pause. Communications were restored at 1834. During this session, briefing charts displayed in IWS could not be seen by many of the JCB participants probably due to bandwidth limitations. ADOCS screen-capture slides, in particular, were very detailed and slow to load. At 1847 the audio with the aircraft was lost. The IWS collaboration session was observed to have "locked up" at 1853. The session was finally terminated at 1855 after it was determined that most of the work required was accomplished.

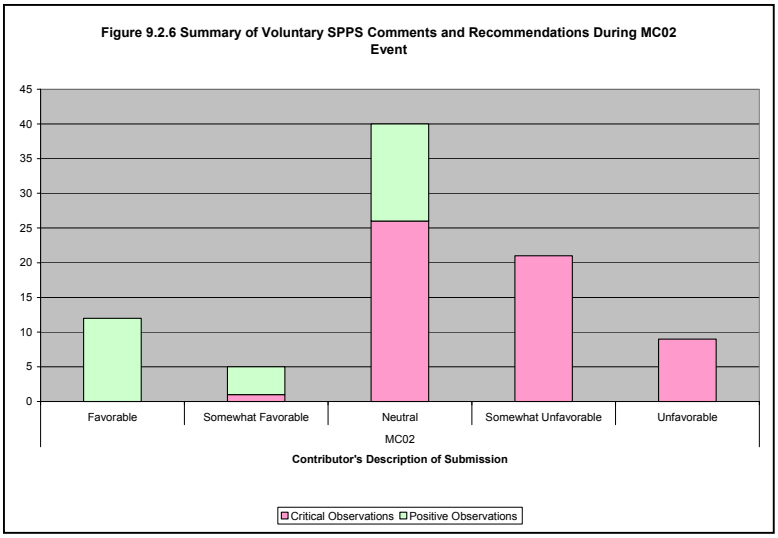


The second JCB meeting was 94 minutes in length. The session started at 1730 and ended at 1904. A pause occurred to allow time to restore the communications with the aircraft around 1830. Communications were restored and the session ended at 1904**.**

Most of the warfighters responded positively to survey inquiries regarding the effectiveness of the JEMPRS-NT for use in joint enroute planning. Those surveyed about the ability to use JEMPRS-NT to perform required staff tasks and activities responded with 17 percent endorsing it as excellent, 44 percent as good, and 22 percent as adequate. One drawback, noted by these users, was the communications data transfer rate. Thirty-seven percent indicated the data rate as partially adequate, 17 percent rated it as adequate, 28 percent as good, and only 5 percent said it was excellent.

Finding 3:

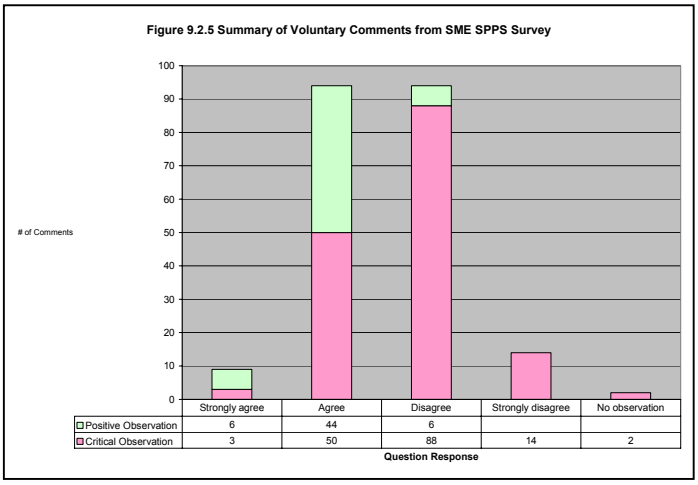
The JTF was able to conduct Command and Control of on-going operations using collaborative tools.



The judgments provided by the MC02 subject matter experts (SME), participants on surveys, the objective record of respondents' use of the collaboration tools (IWS server logs), and the Knowledge Management and Collaboration working groups' discussion results were analyzed collectively. The data collected indicated that the CIE was established at the start of the experiment and remained in place for command and control activity through the execution phase of MC02, with no major disruptions except for a few technical problems, several audio outage periods, and infrequent IWS network connectivity problems.

Conducting C2 in the Collaboration Information Environment of MC02 was determined to be useful and effective. There was a consensus among participants, SMEs, and senior observers that the situational awareness and common understanding resulting from the C2 sessions in the virtual Joint Operations Center (JOC) in IWS were acceptable.

Face-to-face, synchronous collaboration is the ideal form of collaboration. Virtual collaboration appears to be the next best substitute when face-to-face collaboration is not feasible. However, there remains a perceived need for improved collaboration tools and processes for use by the Joint Force. Virtual collaboration during MC 02 never appeared to be executed at its potential level of efficiency. Some observations indicated that virtual collaboration appeared to increase the time required to do certain tasks. Some participants reported that virtual collaboration was harder for them to execute than traditional methods and was not effective for all types of activities. It was noted that virtual teams could not sense nonverbal cues from other participants in a collaborative session. Such problems, however, did not appear to degrade the usefulness of the collaborative tool in executing command and control of the Joint force..



Finding 4:

As MC02 participants used collaboration and collaborative tools during the planning and execution phases of the experiment two types of collaboration emerged; vertical collaboration and horizontal collaboration. Differences in users' satisfaction between vertical and horizontal collaboration in the CIE were noted. MC02 participants reported that vertical collaboration was easier to perform than horizontal collaboration.

Data indicated a more positive endorsement of the collaboration process by the JTF staff than from the components. It appears that the components lower endorsement of IWS as a useful tool was because of difficulties they encountered when attempting to collaborate among themselves.

Collaboration was operationally defined in MC02, as activity involving two or more team members working together to solve a common problem. It generally resulted in a shared situation interpretation or course of action and a final product that was an improvement over its original, pre-collaboration session, form. This collaboration definition is based on definitions in the book, *Understanding Information Age Warfare,* by Dave Alberts, John Garstka, Richard Hayes, & David Signori (2001) from the DOD Command and Control Research Program (CCRP). A better definition of collaboration is needed for the future and should be phrased in terms better understood and aimed at the warfighter level.

Collaboration among members of the Joint Force in MC02 consisted of using appropriate electronic and physical communication and information sharing tools in standardized military planning and mission execution processes (e.g., crisis action planning, etc.) within the CIE. For collaboration the CIE was a robust and interactive technical architecture offering 100 percent connectivity between forces (especially among distributed sites) and implemented and scaled to the needs of the users.

Vertical collaboration occurs when information is exchanged between two or more organizations at different echelons (e.g., between the CJTF and the JFLCC). Horizontal collaboration occurs when knowledge and information is shared among co-equal participants within a single organization or between teams (e.g., JTF boards, cells & centers) from different organizations. The relationship between vertical and horizontal collaboration processes used by the Joint Force Commander and the JTF are illustrated in the figure below.

Collaboration Workshop discussions on vertical and horizontal collaboration revealed reports of insufficient time for components to do all activities required of them. The requirement for components to collaborate among themselves, that is, horizontally, needs to be explored. Participant responses indicated that the primary reason for collaboration being difficult to execute was insufficient time being available to perform all the required tasks. In particular, the horizontal collaboration required between components to synchronization their actions were an additional burden that stressed their resources.

It was also noted that when operations occur simultaneously with crisis action planning, the collaborative system must be capable of supporting both horizontal and vertical activities at the same time. Key staff may be required to provide critical inputs to both crisis action planning and mission execution. Attendance of these individuals at both types of collaboration sessions may be essential to mission success. The collaboration system makes this possible if the individuals in question have the ability to deal with simultaneous attendance in multiple sessions. During the experiment, certain individuals were observed who appeared to be able to attend such multiple sessions successfully.

In future experiments, participants should have a longer planning cycle. The planning time available, particularly during Spiral 3, when a significant amount of collaboration was required, was too short. The lack of time affected the participant's perception of the usefulness of the collaborative system. When operations and planning are occurring at the same time participants need to get a balance between vertical and horizontal collaboration duties. Vertical collaboration is usually a one way, top to bottom (leader to subordinate) effort. Horizontal collaboration and information sharing among components and functional areas is naturally less structured and appears to require more time. There is also a tendency to want to have the same key people continuously participating in many on-going sessions. A better policy is needed to ensure that participants are empowered to make decisions even when critical decision makers are unable to attend sessions.

MC02 participants were asked to rate the effectiveness of the collaborative tool and the concept of using it. The message from 90 to 95 percent of the IWS users was that collaborative tools are effective. More importantly, this effectiveness supports the horizontal and vertical coordination efforts necessary to synchronize the joint actions on the battlefield.

Some issues were identified in after-action reviews that address differences and difficulties experienced by the MC02 participants in collaboration performance between the JTF and Components.

JTF Interface with Components. The components were slower starting their activities and often changed personnel who were their principal points of contact. This created collaboration problems and slowed the JTF's ability to get needed feedback for situational awareness. Most observed collaboration was vertical with information passing from the JTF to components unless the components were requesting information. The collaboration rooms were used by the components, but more direct interface as part of activities, such as effects assessment, would probably have improved situation awareness for all. Recommend that components establish procedures for their staffers to contact their counterparts and the JTF more routinely.

Battle Rhythm needs to be realistic. Discussion comments during post-MC02 collaboration workshops indicated that participants were worn out from performing 24 hours operations. The experiment was not intended to conduct round-the-clock operations, however, that was what occurred. Participants indicated a need for a truth-in-lending type statement regarding number of hours of operations. This change had an impact on the experiment and the experimental results. For example, system admin time was planned for slack period to keep the collaboration tool working properly but on some days there was no slack time. Many of the components' night shifts were not manned adequately for 24 hours operations. Mission creep was noted. There was a tendency to continuously do more with less. Future operational-level experiments should be planned and resourced for 24-hour operations.

In the JFACC, the commander personally spent over 10 hours a day in collaboration sessions. This was not the way the JFACC planned to work (i.e., there was no time to walk the terrain or get a sense of the operations). Commanders need some time out of the collaborative environment for deep thinking.

Collaboration got better as MC02 went on. That is, our participants:

- Figured out the process,
- Asked fewer questions,
- Reported that they got better at finding the information they needed or they got better pushing it.

Finding 5:

MC02 Training had a positive impact on the collaboration performance of the JTF and Component staffs. The amount and type of training received impacted the participants' ability to collaborate.

Training on collaboration systems and tools had an impact on the performance of the JTF at the start of the experiment. The MC02 mobile team training that was provided to participants during May-June 2002 was helpful in getting them up to an acceptable skill level. The training investment paid off during execution with the incidence of fewer training related calls for help on collaborative tools.

The Digital Rules of Engagement (DROE) were developed with the intention of facilitating collaboration and of documenting meeting transactions and decisions. The DROE were briefed and explained prior to MC02 execution. Many of the MC02 participants ignore the rules. There was also no significant effort to enforcement these rules by the JTF and KMO leadership. Problems encountered with collaboration could have been reduced if the DROE had been followed.

It appears that approximately four to five days of intense hands-on activity in the collaborative environment were needed by the MC02 participants to fully understand and master the collaborative tool set in the CIE. Observations indicate that on about C+4 of execution, participants began to reach a steady state of performance, knowing what to do, how to used the right application, understanding how to perform their jobs in a collaborative environment, and understanding the strengths and limitations of the CIE architecture.

Part of the value that collaboration added to the experiment was how it enhanced the new processes being investigated. For example, the steps used in the processes for the IS C2, ONA, EBO, or IAC coordination are different. But they still have several common features that are shared (e.g., gathering of information, sharing information in a virtual setting, building of products, and problem solving and forming group consensus). While we have some expertise in the conduct of these processes, we could not spent the appropriate amount of time required to teach the MC02 participants the individual steps in each process. Nor could we have taught them how collaboration would help or hinder them in accomplishing their tasks, or ensuring that they had the right skill sets for conducting collaboration across all echelons, or among functional areas.

In his *Techniques and Strategies for Virtual Teams* publication, CPT Joshua Frank (March, 2000) outlined the successful steps for migration of the collaborative process. He theorizes, "the successful migration of one's processes in a collaborative environment depends on several factors:

- Buttonology- Knowing who to use the collaborative tool
- Leadership-Competent leaders with a knowledge of collaborative technology are critical to long term success
- Virtual Team Development Training-Understanding how the processes we use on a daily basis are transformed in a virtual arena and how to maximize the benefits of the technology to support your end objectives.
- Senior Management Buy-in-This is probably the most critical factor. You can plan, conduct exercises, and buy a server, but without direct support from senior management, collaborative technology will fail to be viewed or used as a key process in your organization. (Frank, March 2000, p. 8)"

The accomplishment of the above 4 steps are critical. The training program conducted with the MC02 participants was excellent. However, more training on how to collaborate could have been done to make the MC02 participants ready and enabled to collaborate among themselves and others at the start and during MC02.

Other Observations and Finding

Finding: A Knowledge Management Concept is required.

The CIE Concept of Operations for MC02 established an Information/Knowledge Management organization to enable CIE. In the course of executing the KM tasks the Knowledge Managers discovered the need for development of a concept to guide the execution of Knowledge Management. Paragraph one of the Millennium Challenge 2002 Joint Task Force Knowledge & Information Management Plan, 15 July 2002, Final Coordination Draft states ,"Knowledge Management (KM) includes all processes involved in the creation, receipt, collection, control, dissemination, storage, retrieval, protection, and disposition of information. KM also includes processes used to organize information and determine its applicability to a specific person, element or larger process. In general, the goal of KM is to ensure the best information is available when needed to Commanders and staffs as they execute command and control. In short, the right information needs to be available to the right person at the right time."

The Knowledge & Information Management Plan (KIMP) provides the Commander, Joint Task Force (CJTF) and his staff with the necessary guidance to accumulate information and create & disseminate knowledge throughout the JTF. The KIMP is a tool for war fighters to conduct JTF-wide KM**.** Each war fighter has a knowledge management responsibility. This plan specifies how to conduct a unified KM effort. The KIMP maps all processes to ensure that current, correct, complete, and germane information is available for command and control. The goal of this KIMP is to *operationalize* knowledge & information management in the JTF.

The MC02 KIMP establishes that the concept of operations for execution of KM is that the war fighters will conduct the KM. The plan provides for how the war fighters are to accomplish this function. The goal is to have:

- the right information
- available
- to the right person
- at the right time.

The purpose of the goal is to satisfy the information needs of the commander and staff, the self same war fighters, so they can execute command and control. This purpose manifests itself in a continuous avalanche of "need" windows of short duration after which the issue will have passed. "Each war fighter" has a KM responsibility. The avalanche of short duration needs created a premium on the readiness of the war fighters to conduct KM and use the tools and data warehouse that were used. The MC02 participants were not generally ready to execute this concept. In the post experiment working groups it was noted that "the KIMP tried to empower the users with a SPPS and allow them to address their own information needs. JTF Knowledge managers did not dictate how to do information storage, publishing, and retrieval." The trouble was the users were not uniformly able to use the tools and procedures, or have the skills and understanding of what Knowledge Management is. Preparation of a well developed concept of Knowledge Management for each JTF ought to be completed early and used to guide the preparations for future experiment. A great deal of progress is being made on the theory of

Knowledge Management. This body of experience should be referenced when developing such a concept. The MC02 KIMP should be available and used as a model for future JTF's.

Finding 1:

Data Collection in the CIE

During MC02, analysts used a variety of tools and techniques in the CIE to collect a breadth and depth of data that is not readily available when collecting data solely in the physical environment using traditional means. The CIE allowed MC02 data collectors to have a comprehensive knowledge of experiment/exercise battle spaces, battle rhythm and overall situational awareness regardless of physical location (to include Red and White Cell events and activities; 24x7 access to all data/ information posted within the CIE; and awareness of technical issues affecting experiment/exercise play. Use of the CIE also increased member interactions with fellow data collectors and other SMEs, such as JFCOM data analysts, Red and White cell members, and computer systems and network support technicians.

These advantages are thought to have enhanced the overall quality, quantity and validity of the MC02 data collection process. Although no data was gathered during MC02 to provide empirical support for this assertion, the paragraphs below discuss how the use of specific CIE tools enhanced team member interactions and improved MC02 data collection process.

Increased knowledge of the MC02 battlespace, battle rhythm and situational awareness were gained through the use of specific CIE tools and capabilities. During the experiment, data collectors adopted similar methods for posting and sharing data and used business processes similar to those being used by Blue Cell team members. Specifically, these tools and capabilities provided access to all portal content (situational awareness and battle rhythm postings) at all military echelons and levels no matter where the data collector was physically located, allowing for data comparisons and analysis not usually experienced in solely a physical environment. The tools also increased awareness of all (both physical and virtual) meetings being conducted at every military and interagency echelon and level, including detection of battle rhythm changes due to meeting postponements and cancellations.

These capabilities also allowed data collectors to "tag" specific documents, announcements, and other related portal content, so that an automated alert system would notify them when previously posted items had been modified or deleted. This allowed them to quickly identify changes and pending trends in situational awareness and battle rhythms. Data collectors were also able to gather data almost exclusively in an electronic format, making it easier for them to collect more comprehensive data (both text and graphics) in shorter periods of time. Much of the data derived from text applications within IWS and SPPS captured the players' MC02 situational awareness and use of battle rhythms (e.g., IWS File Cabinet documents, Bulletin Board notes, Text Chat, and Question Logs created in IWS auditoriums). Graphics capabilities provided by IWS Whiteboard and Automated Deep Operations Coordination System (ADOCS) screen captures, and SPPS graphics (e.g., PowerPoint slides, image displays, IWS room snapshots, et al), also enhanced the effectiveness of the data collection process.

Allowed data collectors to monitor multiple virtual meeting rooms at the same time, enabling them to "shift focus" to more active IWS rooms and cells when activities decreased or ceased in a given room. Multiple room monitoring also helped data collectors to gain a greater overall awareness of how well the player cells were working together as an organized group.

Allowed data collectors to conduct more comprehensive analysis of the data by allowing them to search announcements, web links, files, and other portal content posted on SPPS for all MC02 sites.

Allowed data collectors to understand the progression of concept development through the use of the SPPS document versioning capability. As each new version was posted, data collectors had a greater awareness concerning where players were having difficulty working through the concepts, and gained insight into how well players understood the significance of specific experiment MSELS and events.

The CIE also significantly increased interaction among the data collectors and SMEs (internal staff) and interactions with the White Cell team members (external staff). It allowed data collectors to fully use CIE tools and techniques to work together as a team regardless of the physical locations of individual team members. Specific examples of how CIE tools helped to foster effective team member activity are cited below:

Data collectors used a private IWS room to conduct meetings for all staff members regardless of physical location. This facilitated staff vertical and horizontal collaboration, reduced data analysis conflictions, and improved coordination of team member activities before, during and after experiment/exercise execution. Documents, bulletin board notes, and text chat helped team members to maintain a heightened awareness of their own internal activities and events throughout the MC02 environment.

Data collectors had greater situational awareness by being able to contact White Cell members to clarify data points, and to talk with technical support administrators (no matter where they were physically located) to discuss experimental technical issues (e.g., CJTF travel using the Joint Enroute Mission Planning System, and his USS CORONADO visit).

Data collectors had a more comprehensive understanding of data being presented in the IWS virtual rooms due to an increase in the number of data collectors able to attend each meeting (due to the distributed CIE). Most meetings had three or more data collectors in the room who could compare notes concerning the collected data.

More experienced data collectors were able to mentor novice data collectors located throughout the CIE to ensure the data collection process was being conducted properly. Novice data collectors contacted more experienced data collectors and managers to receive clarification concerning duties/task, and to ask questions concerning data being presented within the cells.

Data collectors created and populated their own internal SPPS portal page that allowed all data collectors (regardless of physical location) to view/download daily, intermediate, and final data analysis/reports. This portal page provided common data storage for all data collectors since no shared drive capability exists for users in the distributed virtual environment. This page was especially valuable post-MC02 for the continuation of data sharing and analysis amongst the team members at the distributed sites.

Data collectors were able to identify and report problem areas or “weak spots” in the data collection process earlier in the game by being able to access all information within the CIE. This increased oversight into the data collection process allowed data collection managers to refocus team efforts quickly and address shortfalls effectively.

In addition to the impact on data collectors, use of CIE tools and technologies also elicited similar player behavior and responses in the areas of MC02 computer/network technical support and experiment/exercise control (White Cell) personnel. For example, help desk technicians used IWS to monitor collaboration meetings for technical problems, decreasing technical response time, and improving technical coordination and troubleshooting across the

distributed environment. MC02 change configuration requests, lessons learned, and trouble reports were posted to a SPPS portal page for internal team review. Team members set up Alert subscriptions to learn when updates occurred. MC02 White cell members monitored Blue Cell collaborative meetings, and searched file cabinets, bulletin boards, and SPPS portal pages to determine players' response times (regardless of physical location) to specific MSEL events, ground truth interpretation, and other activities critical to effective experiment play. Using this information, White cell members adjusted experiment play to properly stress the MC02 concepts.

In summary, CIE played an extremely important role in the exchange of data at every level of the experiment among all staff players (data collectors, White and Blue Cell team members and technical support administrators). It allowed players access to a wider breath and depth of knowledge then previously experienced working in a 'non-virtual' experiment/exercise environment. Consequently, CIE revealed itself as a "force multiplier" in many areas of MC02 administration.

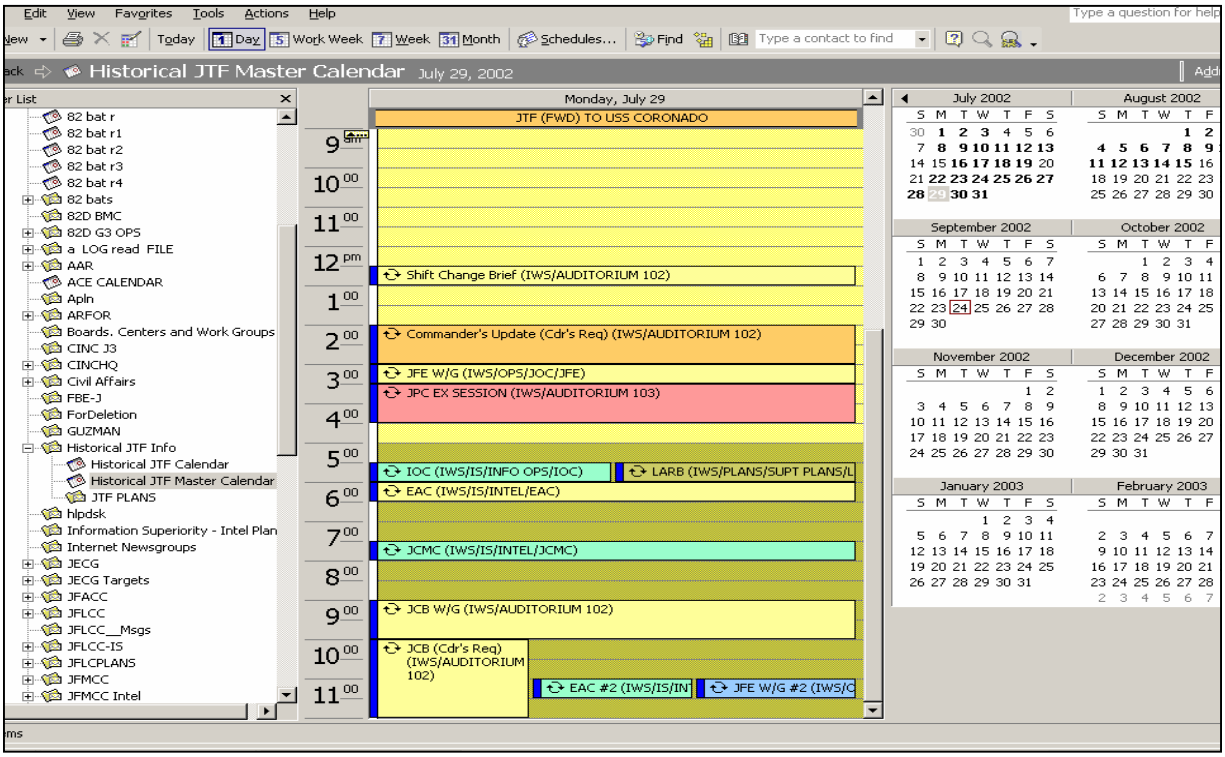
Relationship to Other Objectives

To be determined.

Relationship to Baseline Analysis

To be determined

DOTMLPF Linkage



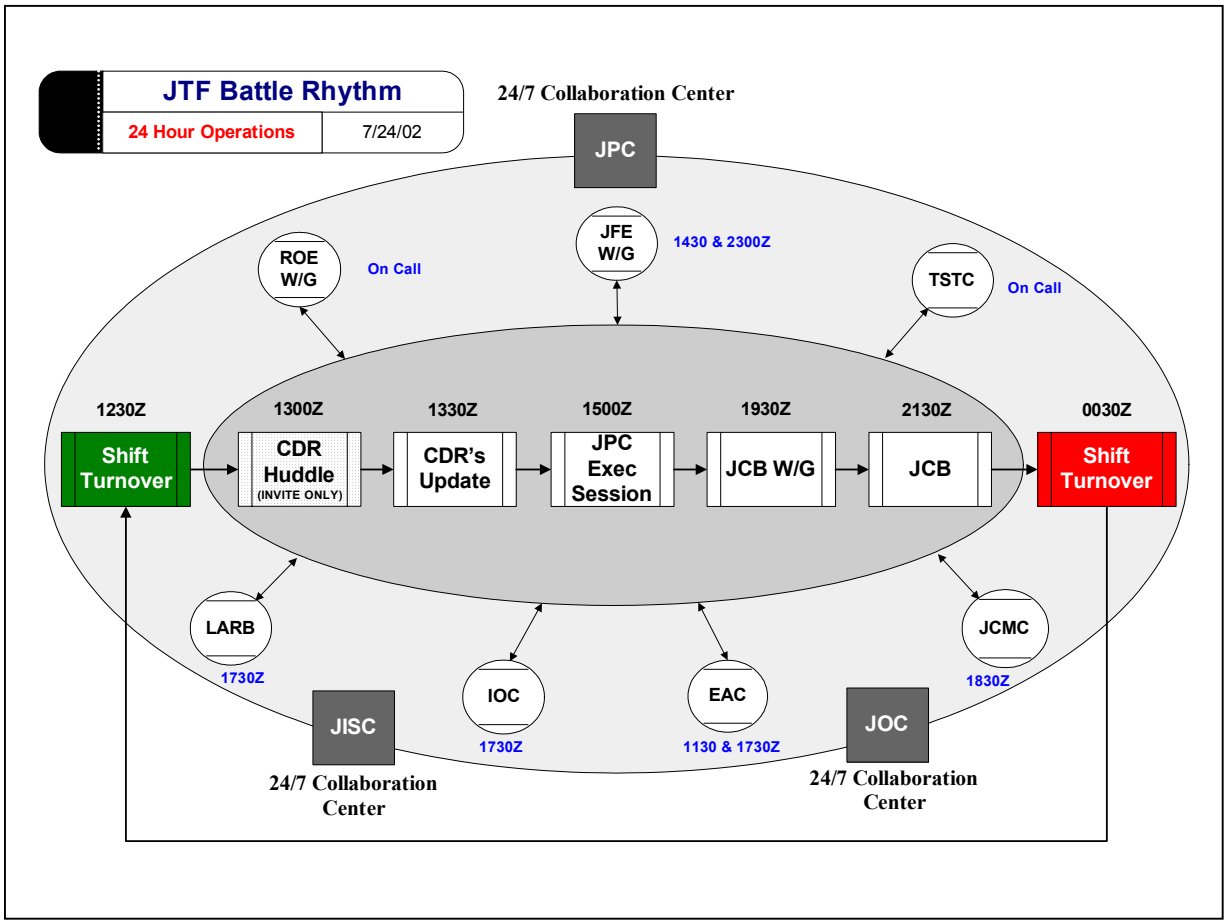
The CIE assessment supports on-going DOTMLPF CIE submissions. In particular, it shows that there is a significant value in using a XC4I-like system for both planning and execution activities at the operational level, It also points out that there is a need to further refine the technology and the processes and procedures so that the same system can be used effectively

at the operational level, as well. The results of the CIE portion of the experiment also support DOTMLPF linkage with the same use of the CIE such as SJFHQ, ONA and JISER.

Recommendations

Based on the success of the CIE as documented in this assessment, the XC4I system that operationalized the concept should be used as a baseline for a 'point-of-departure' model for the initial development of a prototype C4I system to support future Joint operations.

Since the fourth pillar of the CIE, decision support tools, was not addressed as part of MC02 experimentation, further experiments on transformational C2 concepts should incorporate the use of such tools. This will mean a significant effort in locating appropriate tools and adapting them such as was done with the XC4I system for MC02. Or, if necessary, developing new decision support tools that will meet the needs of Joint commanders at the strategic, operational ant tactical levels.



Appendix A to Assessment Area Nine

Top Comments Group				
	Group Name	Hits	percent of Total Group Hits	Visits
1	CC Blue	227,363	6.05 percent	6,503
2	JTF Current Ops	1,921,216	51.12 percent	5,157
3	JTF Info Superiority	958,902	25.51 percent	3,509
4	JTF Plans	64,540	1.71 percent	3,399
5	Logistics Dashboards (JTF & Components0	63,024	1.67 percent	3,294
6	Logistics Documents	57,499	1.53 percent	3,247
7	JTF Orders	213,202	5.67 percent	2,368
8	ONA Dashboard (Current Summary)	24,150	0.64 percent	2,342
9	Search Dashboard	9,419	0.25 percent	2,297
10	ONA References via Document Library	16,790	0.44 percent	2,162
11	News	7,506	0.19 percent	1,600
12	JTF Command Group	42,782	1.13 percent	1,500
13	JTF Boards	56,855	1.51 percent	1,436
14	ONA Database	1,945	0.05 percent	1,382
15	Document Library	2,552	0.06 percent	1,355
16	Reference Dashboard	40,667	1.08 percent	1,233
17	Categories	4,800	0.12 percent	1,091
18	JTF KM	18,114	0.48 percent	739
19	KR/RFI	4,222	0.11 percent	684
20	ONA Matrix	9,107	0.24 percent	513
21	Manage Personal Subscriptions	987	0.02 percent	351
22	ONA Matrix: Blue View Of Red	7,253	0.19 percent	349
23	ONA References	834	0.02 percent	122
24	ONA Matrix: Red View Of Blue	222	0.00 percent	66
25	ONA Related Products	425	0.01 percent	64
26	ONA Matrix: Country Profiles	683	0.01 percent	63
27	JTF Battle Board	2,594	0.06 percent	35
28	ONA Matrix: Blue Effects Focus	54	0.00 percent	30
29	ONA Matrix: Red Vulnerabilities	47	0.00 percent	21
30	ONA Matrix: Blue Actions	35	0.00 percent	16

Assessment Area 10 — Enhance Interagency Perspective Within The Joint Force Headquarters

Overall Assessment Results

The Millennium Challenge 02 Experiment validated the concept of Enhanced Interagency Perspective within the Joint Force Headquarters. Experimental conditions prevented the assessment of the concept as envisioned in the subject white paper. However, the IA Assessment Team (IAT) collected sufficient data to support validation. Generally, participants expressed a favorable opinion of the concept areas assessed by a 3 to 1 margin. Most acknowledged the requirement for further study and refinement. Further, MC02 IA participation surfaced several IA issues with regard to Information Operations, and other MC02 assessment areas, including EBO, ONA, and SJFHQ.

Overall Assessment Results

- **Enhanced Interagency validated by MC02…**
- **Generally favorable opinion…**

Methodology

The focus of MC02 Interagency Assessment was on the Joint Interagency Coordination Group (JIACG) nested in the Combatant Command (CC) Headquarters. The JIACG consisted of participants located in Suffolk and at three sites in the Washington DC area. Participants in the DC area composed the "virtual" members of the JIACG. The "virtual" members would have been located in Suffolk if they had been able to participate full-time. Due to real-world requirements, the "virtual" members participated in scheduled collaborative session, depending on the subject and the availability of the individual. They used the MC02 Collaborative Information Environment components Info Workspace (IWS) and the Share Point Portal Server (SPPS) over the SIPRNET. Additional participants from State, USAID, DOD, and the Joint Staff served as subject matter experts (SMEs) during several collaborative sessions.

The data collection focused on "how" the JIACG interacted with the SJFHQ, the CC Staff, the JIACG "virtual" members, and the IA SMEs in DC. Data collectors in Suffolk observed the JIACG, the Director of the JIACG, and the SJFHQ POL-MIL Planner. Data Collectors in DC focused on Virtual and SME participants at State, the Pentagon, and at the National Defense University. Suffolk participants completed surveys in JDCAT and provided Comments and Recommendations in SPPS. Senior participants provided written or oral responses to "Questions of the Day", which were then added to the JDCAT database. Data Collectors in DC surveyed or interviewed participants. The results of which were added to the JDCAT database.

The IAT reviewed, reduced and collated the survey comments, comments/ recommendations, and data collector observations with the warfighting challenges, tasks, and sub-tasks. The IAT reviewed and collated SCD comments from Infocus Sessions, Azimuth Checks, and After Action Reviews. The IAT identified the insights throughout the collation of the reduced data.

Warfighting Challenge:

Quickly achieve and maintain cohesive relationships with the Interagency (IA) community

The first challenge in Enhancing Interagency Perspective within the Joint Force Headquarters is to quickly achieve and maintain cohesive relationships with the interagency community (IAC). The tasks required to assess this Warfighting Challenge were to establish a Joint Interagency Coordination Group, establish an interagency Collaborative Information Environment, and develop secure process and protocols among the IA participants to enable effective collaboration. The rational is that the implementation of the three tasks will enable the achievement and maintenance of the cohesive relationship between the Combatant Commander's staff and the other members of the IAC.

Finding 1:
- The JIACG should be an integral part of the Combatant Commander staff.

Finding 2:
- The JIACG composition should be based on the Combatant Commander regional requirements.

Finding 3:
- The JIACG should consist of senior level personnel with extensive regional and Washington experience.

Finding 4:
- The CC must have ownership of the JIACG members. Use of "virtual" JIACG members will reduce the effectiveness of the collaboration with the CC staff and engaged agencies.

Finding 5:
- A compatible CIE linked to engaged agencies is essential to effective harmonization of IA actions.

The JIACG should be an integral part of the Combatant Commander staff.

Five IA mentors responded to the question, "Where should the JIACG be located? With the Combatant Commander's staff, elsewhere in the region, or in Washington/NCR?" All respondents agreed that the JIACG must be located with the Combatant Commander. The SCDs provided several reasons. They mentioned access to other staff elements in the Combatant Command, as an area where their capability would be most useful. Further, the face-to-face dynamics of human interaction between the JIACG and the CC provide maximum effectiveness. One IA mentor stated, "Any other location would dilute its purpose of giving the CC greater awareness of the IA policy process." During an SCD session, a member offered that the JIACG should be an "autonomous entity like any of the other J (staff) functions." The SCD added that the JIACG should operate under the Combatant Commander Chief of Staff's direction. Additionally, the JIACG should be "able to ask for support from other J-staff elements, and should be able to be asked to support other J-staff elements." This SCD continued that the JIACG should be the coordinator of requests from within the Command and JTF for information and assistance from elements of the Washington IAC, and should be a "funnel" into the Command for data needed by the Washington IAC for projects where policy is already set. After stating, "If the concept is to work, the JIACG must be just as much a part of the CC's staff as any other staff element," an SCD asked, "Would you design a J5 not co-located with the CC? A J2?"

The CC must have ownership of the JIACG members. Use of part-time "virtual" JIACG members will reduce the effectiveness of the collaboration with the CC staff and engaged agencies.

This finding is a result of the experimental conditions agreed to by the Washington area participants. Real-world concerns prevented the "virtual" members' full time participation in the experiment. While the participants where instrumental to the success of the sessions they attended, their absence was felt as well. One JTFHQ Plans participant noted the requirement for more JIACG involvement and more "higher HQ" JIACG meetings with State, Justice, and other Washington elements. This planner stated that during the "diplomatically-driven pre-hostilities phase we need more such meetings in order to more quickly resolve the usual POL-DIP issues that control the pre-hostilities phases - over flight, ISR, NOTAMs, etc. It still took too long to get answers to these issues - JIACG should expedite." In a dynamic environment, waiting for a time when the part-time "virtual" member is available to service the issue will hamper the overall planning effort.

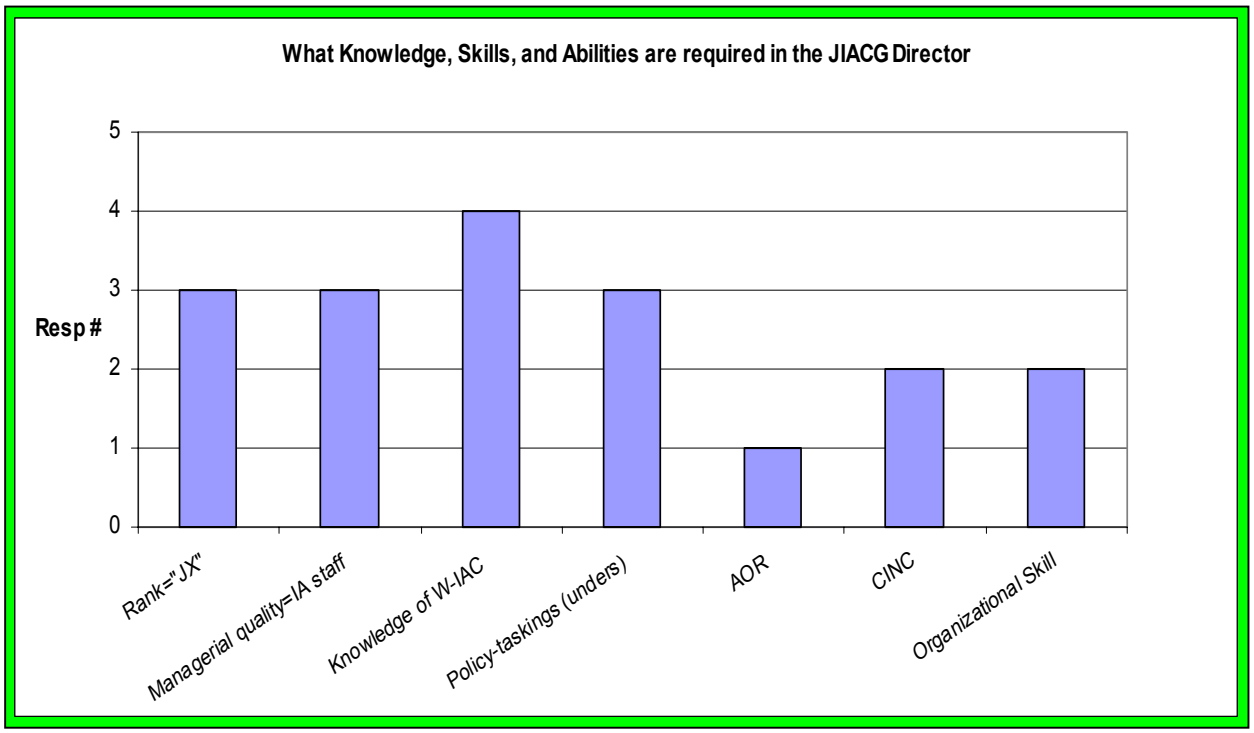


Figure 168: Key skills of JIACG Director defined by MC02 participants

The JIACG composition should be based on the Combatant Commander's regional requirements.

Several Senior Mentors recognized that the JIACG should be "tailored to the specific circumstances of the specific command", and that there "cannot be a one-size-fits-all model for a JIACG". Another agreed, "We can't be too prescriptive as to how the CC has to organize. We need to let each CC decide how the theater requirements lead him to organize." The SCD explained that EUCOM with NATO would be configured very differently from SOUTHCOM or CENTCOM. Another SCD gave an example stating, ". . . SOUTHCOM may in fact have the largest JIACG, though it is a small theater. The SOUTHCOM JIACG is heavily weighted to DOJ

and the Bureau of Alcohol, Tobacco and Firearms . . . The JIACG will have to be very fluid in design and execution to ensure the CC gets legitimate peripheral vision."

The JIACG should consist of senior level personnel with extensive regional and Washington experience.

Four senior IA mentors responded to the Question "What Knowledge, Skills, and Abilities are required in the JIACG Director?" Figure__ shows the distribution of responses. All agreed that the JIACG Director should possess the rank similar to that of the other Combatant Commander Staff Directors. The JIACG Director should have the "temperament and managerial qualities" to lead. The JIACG Director requires experience and knowledge of the formal and informal workings of the agencies and department most likely to be involved in a potential crisis action. One IA Senior Mentor provided a concise summary: "Must be a credentialed/credible player in IAC - Have served in IAC, preferably in NSC, and have working knowledge and facility in both the "formal" and "informal" processes in IAC - Credibility and access to CINC and Staff - Working knowledge and facility w/CINC Staff processes with full access and credibility - Ability to both travel and communicate "securely" on daily basis - not just a player in 'crisis."

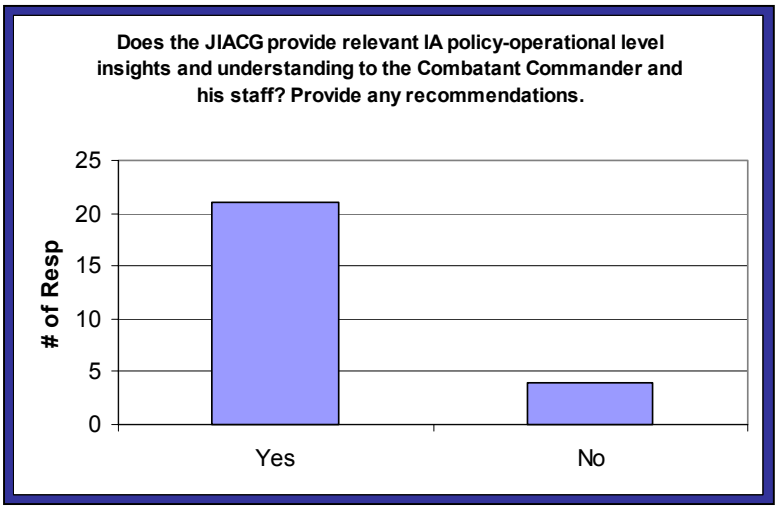


Figure 169:

Another offered that the JIACG Director "should probably not have a tenured position or be permanent Civil Service . . . must serve at the pleasure of the CC, and probably not have been around long enough to develop an 'I was here before you and I'll be here after you' attitude toward CC." With regard to rank and background, one SCD offered that the Director should probably be an O-7/8 SES 3/4 equivalent, preferably not from the State Department or Foreign Service. The IA Senior Mentor reasoned that this would prevent overlapping competencies and possible competition between the JIACG director and the POLAD. Additionally, this would reduce the possibility of too heavy a "State Dept" cast to JIACG activities. Further, the JIACG personnel should rank at the O-4/5/6 or GS 13-15 level. It should have a higher density of civilians with experience in the Washington IAC. Thirty participants answered the question, "Is the JIACG organization, composition, and size about right for its desired functions?" Most expressed that the experiment did not provide the opportunity to make an assessment. However, several saw a correlation between the size of the JIACG and it advisory role. The size and composition as envisioned in the concept will support the advisory role. Several saw the JIACG size increasing should the role change from an advisory group to a product oriented planning staff.

A compatible CIE linked to engaged agencies is essential to effective harmonization of IA actions.

The following questions and comment facilitated the analysis of Task 10.1.2 Establish USG IA Collaborative Information Environment (CIE). Twenty-five participants responded to

the question, "Does the JIACG provide relevant IA policy-operational level insights and understanding to the Combatant Commander and his staff?" Out of the 25 that responded, 21 responded positively (84 percent). The following chart shows the distribution of answers of the various groups.

Within the JTFHQ (Cdr, IS, OPS, & Plans) 10/13 = 76.9 percent stated that "JIACG provided relevant IA policy-operational level insights and understanding." (See chart below and comment below left). Typical comments from those giving a negative response were "don't know", and "much room for improvement." One SJFHQ planner stated that the JIACG provided only strategic level insights. Typical comments from those giving positive comments indicated the value of the advice provided to the JTF commander. One senior member of the JTF Command Group offered that, ". . .the advice given to the commander has been extremely beneficial...it has kept the CJTF sensitized to the Interagency challenges." An observer made a similar observation during Spiral 3. He observed the JIACG's participation in a Mission Analysis briefing that included a slide called "Interagency Support Actions" with lead agencies annotated. This was beneficial to the CJTF because it provided the opportunity to review ongoing actions in the diplomatic, information, and economic areas. If CJTF had any questions, the JIACG Director was present to answer. Still others on the JTF staff indicated an appetite for more, by stating that "Commanders rely on JIACG to "read the tea leaves" in their areas of expertise and provide concrete guidance about what to expect - and when - in the POL-DIP areas, such as demarches, overflight rights, NOTAMs, etc. Took too long to get these answers, especially when the pre-hostility phase is so uncertain. Great uncertainty here merited more JIACG meetings and more concrete JIACG guidance."

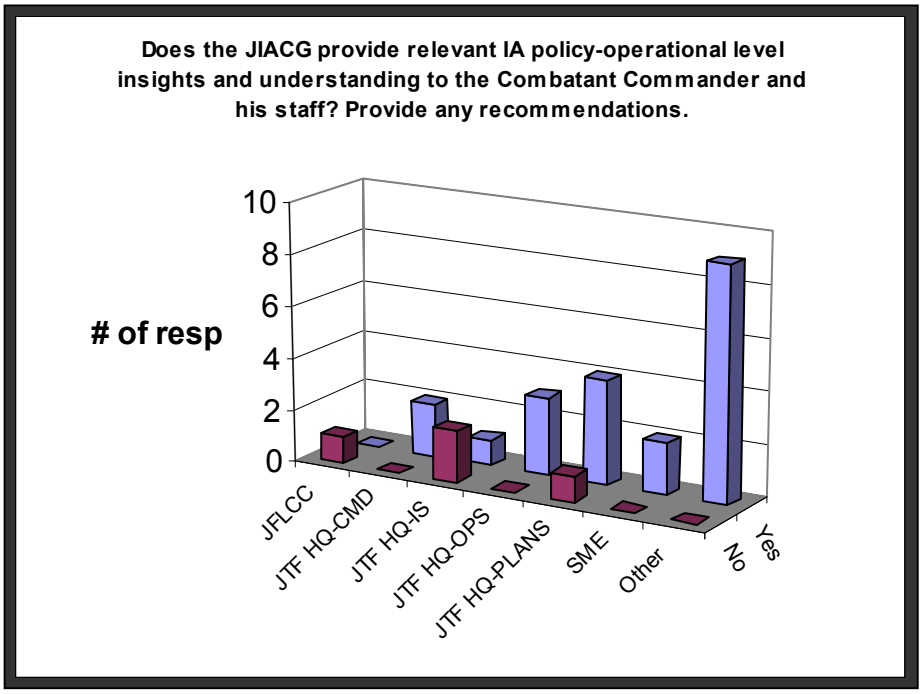


Figure 170:

Warfighting Challenge:

Ability to improve interagency campaign planning & execution

The second challenge in Enhancing Interagency Perspective within the Standing Joint Force Headquarters is the ability to improve interagency campaign planning & execution. The tasks required to assess this warfighting challenge are to implement Political-Military plans, and to provide continuity in coordinated planning and operations from pre-crisis through execution

and transition with the Joint Interagency Coordination Group. The rationale is that the implementation of the two tasks will enable improved interagency campaign planning and execution throughout the continuum of conflict. The benefits accrue to all members of the IA with equities in the crisis scenario. The context is the National prosecution of a Rapid Decisive Operation. The IA participants executing the National Security Council advanced planning process crafted a Strategic Approach for the scenario region. As the crisis emerged, the IA participants prepared a comprehensive Political-Military (POL-MIL) Plan for approval by a notional Deputies Committee. The POL-MIL plan identified 18 mission areas and the respective responsible departments and agencies. The scenario requires the failure of pre-crisis efforts in order to allow the full examination of the supporting concepts. Though the kinetic solution was a forgone conclusion, the IA participants leveraged the opportunity to explore potential contributions to the Combatant Commander's planning and execution, and particularly to transition.

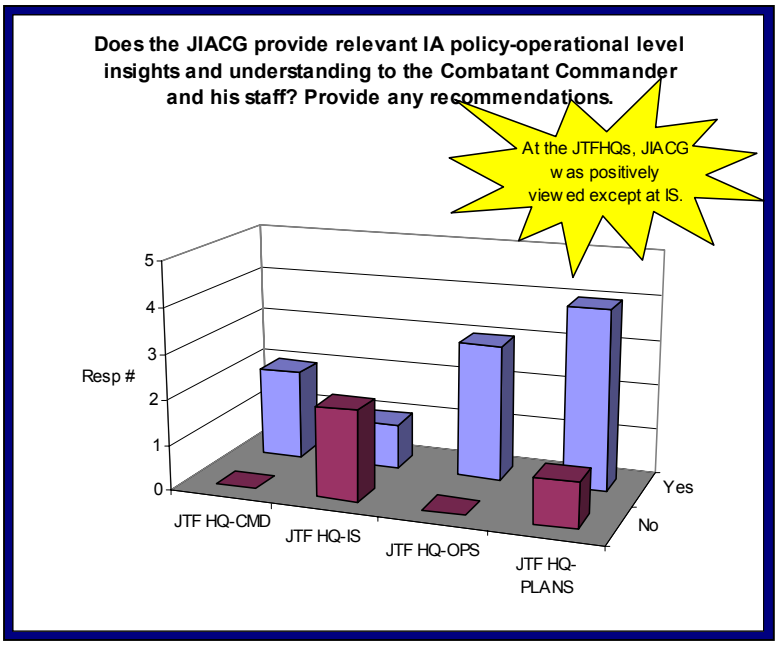


Figure 171:

Finding 1:

- The Combatant Commander's ability to plan and execute Rapid Decisive Operations requires a rapid and decisive national policy determination process.

Finding 2:

- The JIACG can enable the harmonization of national policy with a Combatant Commander's operational plans by informing national policy circles of specific requirements for decisions and guidance.

Finding 3:

- The JIACG's principal function is to focus on providing advisory support to the CC and staff and not on producing plans.

Finding 4:

- Habitual collaboration among JIACG, Departments, and Agencies provides benefits all participants by increasing the knowledge of one another's requirements, culture and procedures.

Finding 5:

The Combatant Commander's ability to plan and execute Rapid Decisive Operations requires a rapid and decisive national policy determination process.

This idea first surfaced during Unified Vision 01 when a SCD opined that you couldn't have Rapid Decisive Operations without Rapid Decisive Policy. During MC02, an SCD commented, "The interagency has to be rapid when we are rapid, and vice versa." Then as now, the implementation of this idea is outside the realm of the JFCOM and DoD. The obstacles to implementation are steeped in the bureaucracies of the Executive Branch of government in executing its Foreign Policy responsibilities. One SCD with Department of State experience stated, "There are various mechanisms, some run by the NSC, but history suggests we should not be optimistic about frequent and uniform policy emanations. What we do have is an Executive Branch with various departments. . . . one of which, the Department of State, is profoundly opposed to planning. Its great strength is policy development." He further likened the State Department to a soccer team that kicks the policy ball around (instead of scoring policy goals). This paradigm is reactive, and is precisely what RDO is intended to mitigate. Additionally, he indicated the cautious nature of "real world" interagency meetings, where "carefully prepared talkers from each Department are presented that would have to have been screened at the policy level first." All this exists to avoid the perception that anyone was giving guidance to the CC or CJTF other than SECDEF.

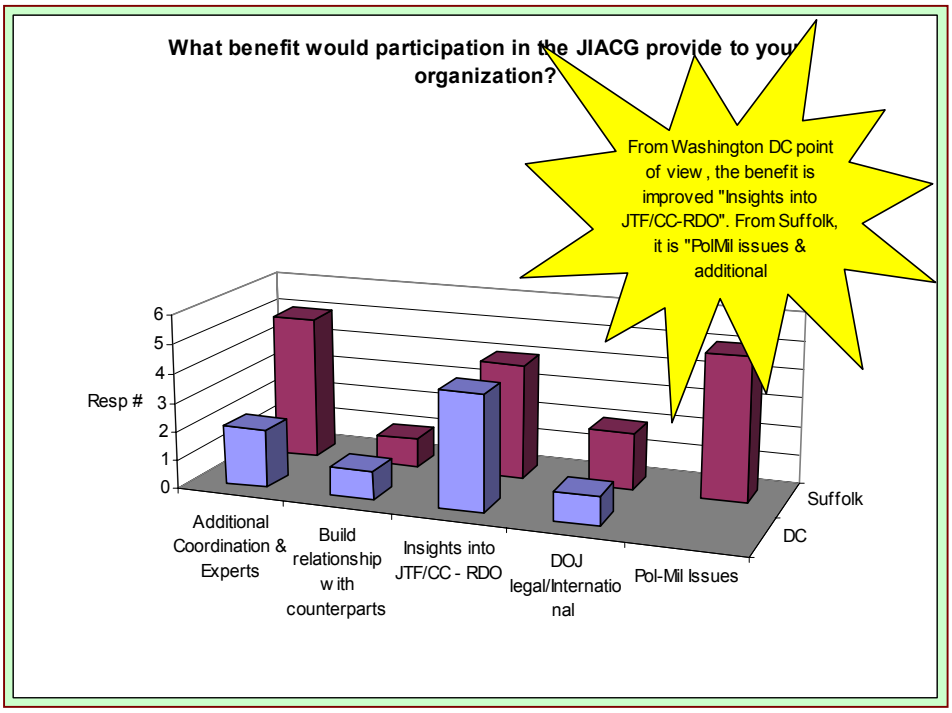


Figure 172: What benefit would participation in the JIACG provide to your organization?

Accommodating all of the sensitivities of the departments and agencies increases the time required to react, allowing the crisis to worsen, and therefore increases the risk to Combatant Command. The SCDs recognize that the JIACG cannot overreach with regard to relations with the Executive Branch. They also recognize the concern that the JIACG is too commander-centric, and would enhance the role of the Combatant Commander in policy making. A former Combatant Commander allayed this concern by offering, "In my experience, most Combatant Commanders (CC) don't seek a dominant policy role. But they do realize they are marginalized to the extent that they don't have good policy insight. Few have sought to unduly influence or control civilian agency resources, either. But we have to cultivate a climate of greater trust and confidence and the JIACG properly employed and properly located would assist this effort."

One survey asked, what benefit would participation in the JIACG provide to your organization? The response in figure XX illuminated the differences between the Core JIACG in Suffolk and the Virtual JIACG in DC with regard to the potential for the JIACG to overreach its Combatant Commanders responsibilities. Figure XX, show the results of the question; The participant responses are divided between the core JIACG and the virtual JIACG/IA. The Suffolk group (CC & staff) saw JIACG providing: 1. Additional IA coordination and expertise, and 2. Political-Military understanding/focus on IA issues. In contrast, the Washington DC group saw JIACG providing "Insights into JTF/CC – RDO requirements". Some SCDs suggested that there is a greater probability of DC participant gets involved in CC planning and execution, then Suffolk participant getting involved in IA policy issues.

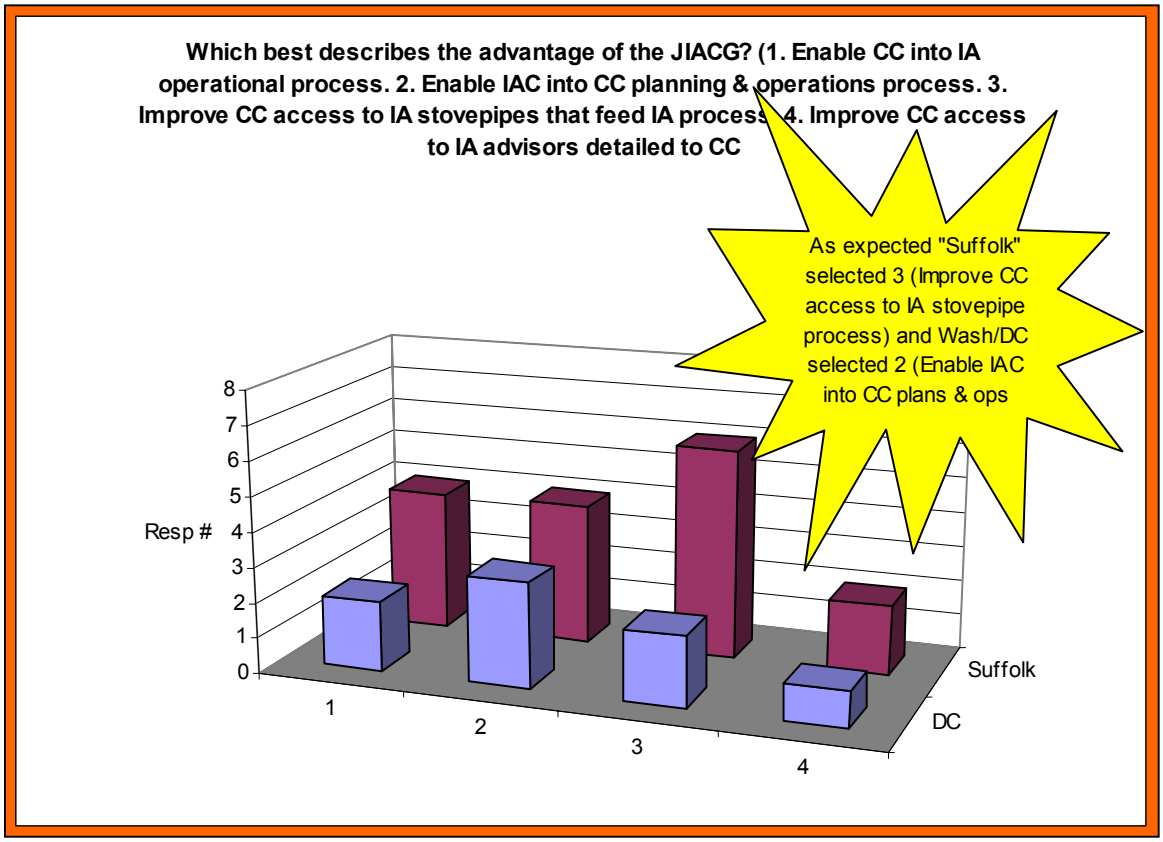


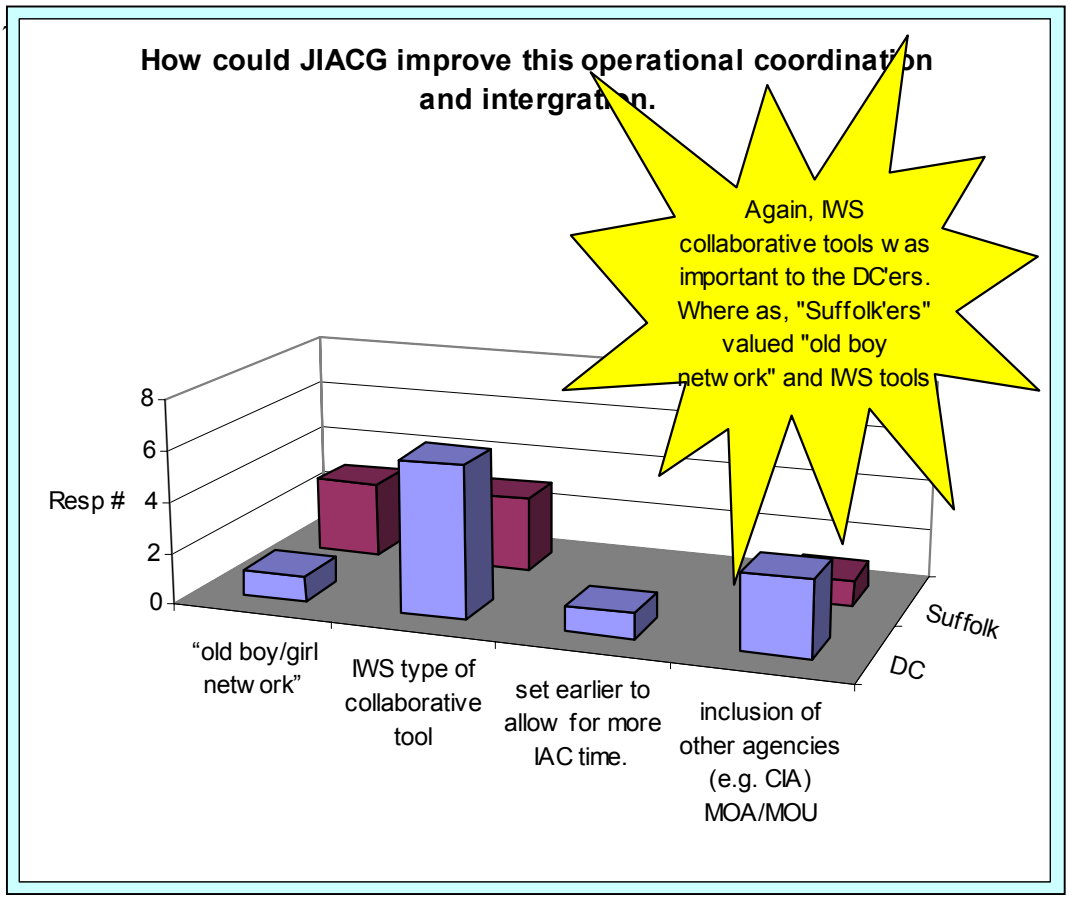
Figure 173: JTF staffers considered Combatant Commander access to the Interagency to be a significant capability, while the Washington DC agency sought access to the commander's planning and operations process.

Historically, the military is wary of micromanagement by the civilian leadership. The CJTF put this concern in context: "The real issue is how well the JTF can leverage this information. In MC-02 we have the preferred mode, but that may not be how the information exchange structure will transpire. We in the military want [IA] involvement, but don't want interference with lethal warfighting." When asked "Which best describes the advantage of the JIACG?" the Suffolk participants as shown in figure XX reinforces the above idea of military wanting IA involvement as selected by #3 Improve CC access to IA stovepipes that feed IA process". Whereas, the Washington DC group selected #2, Enable IAC into CC

planning and operations process. The long term establishment of this concept will be dependent on the balancing of the JIACG execution of using IA information versus trying to direct/influence IA to meet current and future CC plans. The second will get into the area of "IA Policy" which will cause difficulties with the SecDef in his primary role at the national level.

Another SCD described the teamwork aspect. "This operation involves more than JTF-Blue. Commander Blue and our national leadership have an oar in the water, as do the coalition partners." One SCD provided another concern, that we must include guidance and knowledge from all elements of our national power structure without inhibiting the military C2 structure. A survey question asked "How could JIACG improve this operational coordination and integration? The Virtual JIACG identified the IWS (CIE) as a way to improve coordination and integration. The Core JIACG identified "old boy/girl network" and "this enabler – IWS". One of the participant commented that the ability for the JIACG/IAC to collaborate real time on a secure system is priority one for many of the IA departments and agencies. The lack of such a system in today environment is unthinkable (Information age) and needs to be corrected (See figure below).

Figure 1



An SCD A declared that JIACG is a clear winner, that aids in the development of the RDO and EBO concepts. He noted that JIACG-like organizations have been established at each of the regional combatant commands suggesting that the Combatant Commanders have accepted this concept in some form. One SCD noted that the Deputy National Security Advisor approved a six-month trial in the Global War on Terrorism (GWOT). However, the trial JIACGs are not focused on

advanced or deliberate planning. These JIACG are focused on execution. Further, the current posture depends on temporary military manning, and interagency manning is insufficient.

The JIACG can enable the harmonization of national policy with a Combatant Commander's operational plans by informing national policy circles of specific requirements for decisions and guidance.

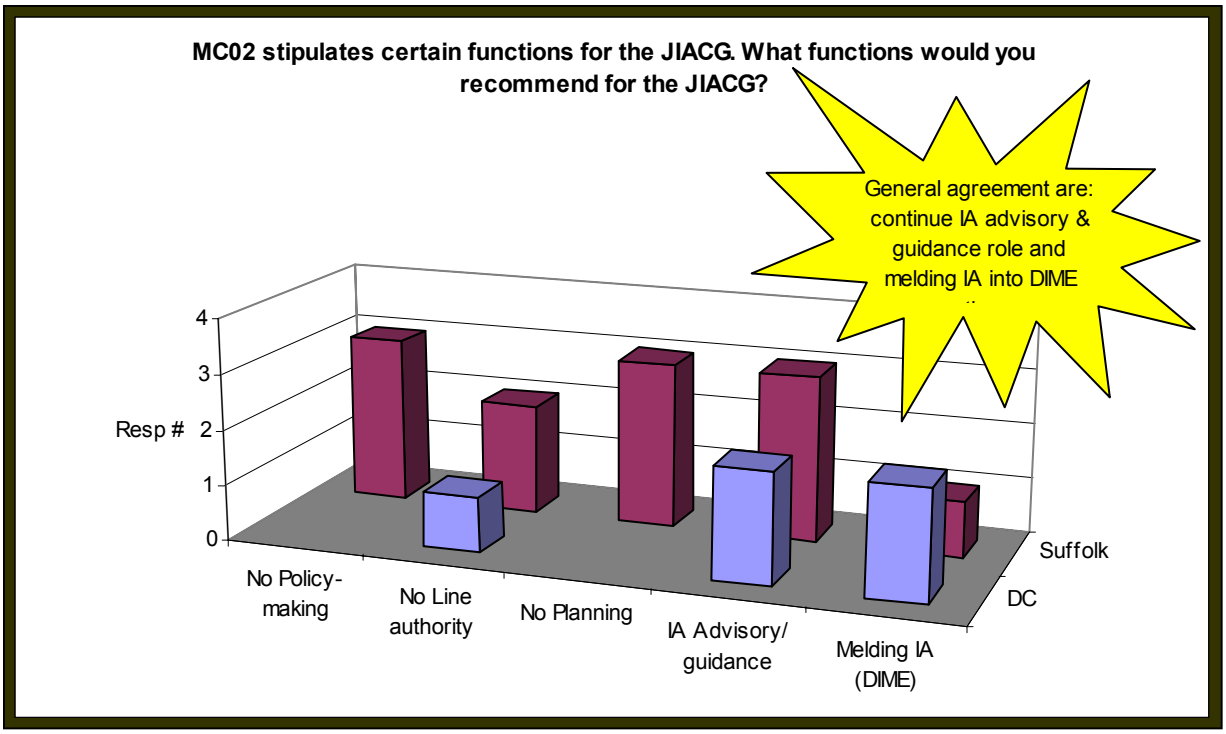
The idea of synchronizing IA efforts with the CC efforts was essential in the Concept White Paper. During the Spirals and execution, the participants agreed that "synchronization" would be difficult, if not impossible. The word "harmonize" became a more realistic and, therefore, a more achievable standard. During a discussion of the application of the Effects Tasking Order (ETO), one SCD commented, "We want to ensure the military components' actions are harmonized with the interagency efforts, and not vice-versa." Another SCD added, "When you said synchronize, the most you probably can achieve is harmony, but you can't synchronize diplomatic activities. We work on common guidance and consensus, not synchronization." The IA participants produced a comprehensive POL-MIL plan during the months leading up to the experiment. The CJTF the benefit of be able to incorporate this plan into the JTF planning. However, the JTF POL-MIL Planner cautioned the SCDs that it may be unreasonable to expect the scope and quality of that POL-MIL plan in real-world operations" From where I sit, we have a detailed political-military plan embedded in the JTF plan. The JTF knows what is in it. But we may have created a false expectation of IAC play."

The two planning areas where the JIACG would be most valuable are the development of the Theater Engagement Plan (TEP) and in Transition Planning. The aforementioned harmonization would be the focus during the inter-crisis period in the refinement of the TEP. Harmonization of transition plans becomes more important as a crisis evolves to the extent that a kinetic course of action becomes inevitable. A JTF planner commented on Transition Planning, "I see this as an area where the reach back to the JIACG and the centers of excellence is so important. We began with an ONA in peacetime, and the groundwork that leads you in, can lead you out as well. Coordination therefore is very important. We must link tightly with the JTF and the CC's staff . . . there is a clear link between transition and re-deployment." The CJTF offered the during transition is "where the DI&E piece reasserts itself, where other departments and agencies reassert their dominance . . . The ONA and the collaboration may be more important here than in combat. This may be the missing link that explains why we win battles and lose wars. We're desperately seeking guidance. Ten years later, people will second-guess not how we fought, but how we extracted ourselves." The SCDs recognized the utility in transition planning early in the crisis.

The JIACG's principal function is to focus on providing advisory support to the CC and staff and not on producing plans.

One SCD provided a comprehensive description of the major issues with regard to the principle functions of the JIACG. "But I don't share the view that planning should be a JIACG's primary function, or that JIACG planning should be embedded in a CC's Staff in the way that a J5's deliberate planning responsibility is, with direct responsiveness to Joint Staff deliberate planning." The SCD offered the following reasoning: total planning responsibility would undercut a JIACG's important advisory role in providing the CINC with Washington policy perspectives; and to the degree that a JIACG is seen to be engaged in formal planning, it risks being viewed by Washington interagency players, including both State and the Joint Staff, as a threat to their policy authorities rather than a value added policy insight into the regional CCs (sic) priorities and plans." Another SCD expanded the scope of the discussion stating, "If the

focus for a JIACG is to try to plug into and identify different views in Washington, or to get parts of the interagency to act on a discrete issue, the JIACG will be effective. . . A JIACG working for the CC can provide invaluable information on what is going on inside the Beltway. . .” Another SCD reiterated the “JIACG serves an advisory function to identify related issues. This is a validated concept, but the words you gave us do not all resemble the JIACG as we practiced it for MC-02. It is too heavy on the planning side. It is not possible to provide a “coordinated” position for Washington decision making. . . No one wants the JIACG to make policy! “[JIACG]: The JIACG should make a significant contribution to the Combatant Commander’s Theater Engagement and Contingency Planning. But I don’t share the view that planning should be a JIACG’s primary function, or that JIACG planning should be embedded in a CINC’s Staff in the way that a J5’s deliberate planning responsibility is, with direct responsiveness to Joint Staff deliberate planning. There are two reasons: total planning responsibility would undercut a JIACG’s important advisory role in providing the CINC (sic) with Washington policy



perspectives; and to the degree that a JIACG is seen to be engaged in formal planning, it risks being viewed by Washington interagency players, including both State and the Joint Staff, as a threat to their policy authorities rather than as a value added policy insight into the regional commander’s priorities and plans.”

Figure 175: Experiment participants suggest JIACG functions

Habitual collaboration among JIACG, Departments, and Agencies provides benefits all participants by increasing the knowledge of one another’s requirements, culture and procedures.

This lesson was learned during service experimentation. Knowing an adjacent units strength, capability, mission and intent has been proven essential to successful operations. Likewise, synergistic benefits of collaboration are evident in the business world as well. Knowledge is the key. MC02 provided the opportunity for all participants to gain great understanding of the missions, capabilities and issues of the other engaged departments and

agencies. The production and dissemination of the Strategic approach and the POL-MIL plan stimulated great interest in the potential of the concept. It also illuminated the many issues still requiring resolution. A better informed CC, familiar with the equities of the other Department and agencies, is better able to engage the SECDEF to get his policy guidance. Several SCDs commented on the value of collaboration with respect to working with other members of the interagency community. One SCD observed the benefit working on a single collaborative net, "The CC has a long-term focus, and the JTF has a very near-term focus. The JTF did have great situational awareness on Washington policy, and the Washington community had better SA on what was happening at the JTF level. One collaborative environment is where you want to go." Another offered comment on the value of active participation, ". . . what they picked up from the transition guidance allowed them to do a tremendous transition plan of their own. The JIACG folks should know you have had a tremendous impact on the training audience. The take-away by JTF commanders and staffs and components is extremely positive. We got a lot better because they participated. " One of the observer trainers noted the "huge need for pol-mil information" and the fact that the JIACG provided it." One SCD added that the process stimulated the JTF's appetite for a JIACG capability of its own; "There ought to be a cell as an extension of the JIACG at the JTF level that could keep us appraised of key policies and guidance so the JTF could better disseminate and synchronize. For example, we captured a key subordinate, but we've received very little fallout from the interrogation for further exploitation. The interagency collaboration might also have given us much needed insight into work on release for the captured A-Team."

Relationship to Other Objectives

The requirement to Enhance Interagency Activities in Operational Level Planning and Implementation affects all other objective areas. The JIACG will work closely with the POL-MIL Planner cell in the SJFHQ. While the JIACG will not input the DImE elements of the ONA, it can certainly educate the staff proponent for ONA. The JIACG will use the CIE to maintain habitual relationships with members of engaged departments and agencies and other members of the combatant commander's staff. The JIACG will educate the CC staff on the execution of DImE actions within the context of Effects Based Operations. JISR support during transition planning and operations. "The JIACG plays an essential advisory/planning role in coercive diplomacy, condition setting, access dominance, and post hostilities transition. . . . JISR has to continue providing feedback to the decision-maker during the transition phase. Generally speaking, though, JISR support to decision-making during transition operations will be much more difficult than JISR support during earlier phases. Regardless, the Commander still has to make effective decisions – these decisions now involve a wider range of people, organizations, and vested interests. Thus, feedback for actions leading to desired effects is often different than usual, and much more complicated. This feedback almost always involves intangibles and a wide variety of non-traditional sources of data, information, and knowledge. Often expertise required to turn information into knowledge is not with either the JTF or the Combatant Commander's headquarters. Architectures, knowledge production roles and missions, collaborative communities of interest and communities of practice, software and hardware, access rights, and request for information channels have to occur early in planning cycles for transition operations. Sharing of data, information, and knowledge in a collaborative information environment (CIE) will be different and important. This phase will find more of a focus on force protection, perceptions of populace, and civilian populations of neutrals, coalition partners, and people in the

United States. The sources of data, information, and knowledge needed to design effects and assess their effectiveness will often come from interaction with the national interagency community, e.g., Department of State professionals, and much information and existing knowledge will come from open source information existing on the Internet. HUMINT will also be very important for force protection and perception manipulation/management of host nation people. The communications, automation, and collection architectures to support transition will have to be planned by the SJFHQ before the execution of operations."

DOTMLPF Linkages:

The following findings from the JIACG DOTMLPF package are consistent with the finding of the MC02 Experiment .

- A clear, cohesive NSC approved political-military plan is required to fully employ the totality of national power against an adversary. It establishes agency task assignments, supporting relationships and resource allocation.
- Military operations must include an interagency planning cell (JIACG) as part of the Combatant Commander or JTF staff to bridge the gap between strategic and operational levels of planning.
- The JIACG strategy/concept is the vehicle for coordinating the operational level planning efforts between the civilian interagency community and the Combatant Commander or JTF staff in the execution of the political-military plan.
- Habitual, collaborative relationships between military planners on the Combatant Commander or JTF staff and the interagency facilitates the planning process for both and improves the quality of the plans.
- It is possible to define a core JIACG staff while also providing flexibility to the Combatant Commander in the staffing of the JIACG's based on specific missions and AOR's.
- A comprehensive Political-Military plan, and early collaborative planning is essential for the successful conduct of military operations other than war (MOOTW). The JIACG enables this process, including collaboration with international governmental organizations (IGO), international organizations (IO), and non-governmental organizations (NGO), all of which are essential participants in such operations.
- A reliable and secure collaborative information environment (CIE) is essential to leverage the knowledge and perspective found in the military and civilian planning community.
- Interagency participation in experiments and exercises, as facilitated by the JIACG, provides valuable training for military and civilian planners, as well as the benefit of training in the use of CIE tools.
- Rules of engagement for complex contingency operations require extensive training.
- Results of experiments such as MC02 have shown the value of interagency collaboration as facilitated by the JIACG, and guided military planners on incorporation of civilian agency input into military plans.
- Military planners on Combatant Commander and JTF staffs need to better understand the interagency planning and coordination process. They also need to understand how to collaborate with the interagency to produce more effective campaign plans. The JIACG facilitates this planning and provides civilian agency perspective.

- Professional military education at all levels needs to include an understanding of the NSC and interagency process, and reflect the value of the interagency process to operational planning.
- Lack of secure, interoperable communications systems inhibits effective interagency collaboration as well as collaboration with Combatant Commander and JTF staffs.
- For the JIACG to be effective, it needs a secure, collaborative communication system.
- DOD needs to consider the communication initiatives of other agencies to assure the development of a collaborative information environment (CIE) that is interoperable across the executive branch interagency community.

Recommendations

- Joint Staff: establish JIACG Program Office to oversee the refinement of doctrine TTP, and manpower requirements to facilitate accelerated implementation of the JIACG capability at Regional Combatant Commands
  - Define roles and responsibilities, relationships, functions, vertical and horizontal communication, and authority of a JIACG during peacetime theater engagement, crisis preparations, crisis response, and transition and recovery.
  - Explore civilian agency contributions to the SJFHQ and it's enabling concepts (CIE, ONA, EBO, and JISR).
  - Explore integration of civilian multinational entities, regional and international organizations, and non-governmental organizations.
  - Investigate approaches for expanding civilian agency play in joint exercises.

- DoD: establish Interagency CIE Program Office to oversee the refinement of operational and systems architecture requirements to facilitate integrated implementation of a secure CIE capability for use by all departments and agencies with national security responsibilities
  - Develop business rules (TTP's) for collaborative engagement internal and external to DOD.

Assessment Area 11 Joint Theater Logistics Management (JTLM)

Overall Assessment Results

The MC02 experiment construct provided substantial logistics play and clearly demonstrated that there has to be interaction by planners at all levels to achieve success in *integrating deployment and sustainment planning as an integral part of the Effects Based Planning process.* During Effects Based Planning the Combatant Command level Joint Logistics Management Center (JLMC) and the logisticians embedded in the JTF Plans and Operations Groups were successful in integrating and coordinating deployment, employment and sustainment actions and capably to support the MC02 upper end small-scale contingency. The deployment planning process requires more operational planner involvement in force selection and Time-Phased Force and Deployment Data (TPFDD) phasing.

Overall Assessment Results

- **Integrate deployment and sustainment planning as an integral part of the effects based planning process…**
- **Define the JTF Logistics Position Functions and Essential Elements of Logistics Information…**
- **Leverage DST emerging technologies to rapidly process data and create operationally relevant logistics information…**
- **Employ a networked sustainment**

The experiment did allow the validation of the JSOP in the area of *defining the JTF Logistics Position Functions and Essential Elements of Logistics Information,* further refinement of the functions and information needs are required. Having the SJFHQ logistics personnel embedded in the Operations and Plans Groups was a success in improving the coordination and synchronization of logistics and situational awareness in the JOA. The organization, structure, and skill sets of the JTF Logistics organization needs to be revisited to provide a more functional look. The roles and responsibilities of the JLMC, LogPLANS and LogOPS require some refinement in the JTF Standard Operating Procedures (JSOP). Additionally, there was support for a Logistics Support Group, putting the senior logistician in the JTF in parity with the Operations, Plans, Information Superiority, and Knowledge Managements Directors.

The collaborative logistics Board, Center, Cells and Working Groups enhanced the performance and SA of all planners and operators in the JTF, Components and the JLMC. The LARB was instrumental in the daily JTF and component battle rhythm. Several key functional areas created their own collaborative cells and working groups to increase SA at all levels, most notably the Deployment Planning Cell.

The experimental construct did allow the JTF the ability *to leverage Decision Support Tools (DST) emerging technologies to rapidly process data and create operationally relevant logistics information*. The web based GCSS Portal Tools was the most useful and beneficial in gathering data for planning and operations. Much of this information was assessable through links created on the Logistics Common Relevant Operating Picture (Log CROP). The Log CROP was very successful in providing logisticians a single place to find common information and achieve overall situational awareness. The utility of the Log Watch Board was tremendous but continued development is necessary to tie the data to an actual database and allow for easier and timely data updates. The Joint Logistics Tools should continue to be developed and tested. Most

of the participants could not access, or were not trained, on these tools so they only provided limited information. Given the restrictive access to these programs, these tools should be reviewed to determine if access is required below the JTF level.

The assessment area of *employing a networked sustainment distribution structure* was looked at extensively in Objective 5 and does not warrant further review.

Methodology

To analyze the first task in this concept, '*integrate deployment and sustainment planning as an integral part of the effects based planning process'*, three specific areas were observed. First, RDO construct to facilitate management of logistics functions. Second the logistics C2 battle rhythm (JTLM), and thirdly how JTLM reduced the logistics footprint in theater and JOA.

The second concept task, *Define the JTF Logistics Position Functions and Essential Elements of Logistics Information*, looked in detail at the functions, roles and relationships of the logisticians in the JTF Operations and Plans Groups Positions. The next task, *Leverage DST emerging technologies to rapidly process data and create operationally relevant logistics information,* analyzed the tools to provide the JFC and subordinates the information required to determine the logistics feasibility of operational actions. The logistics displays were also reviewed to synchronize sustainment in support of rapid decisive operations.

The final task in the concept, *Employ a networked sustainment distribution structure,* was assessed by determining how the following effected sustaining the force:

- Tailoring Intermediate Staging and Support Bases (ISBs) to support to RDO forces
- ISB management
- Synchronization of tailored sustainment with deploying forces
- Procedures and practices to support agile mobile forces.

Data was collected, primarily, from the logistics participants and Subject Matter Experts (SMEs) using automated questionnaires and from the Comments and Recommendations provided by all participants, various After Action Reviews (AARs) and In–Focus Sessions. The locations and number of the Logisticians follows: PLANS Group, 14; OPS Group, 12; SMEs, 12; Functional Component, 5; Joint Logistics Management Center (JLMC), 16; and the Joint Exercise Control Group, 17.

Warfighting Challenge:

Ability to plan for Agile Sustainment

The Warfighting Challenge, Ability to Plan for Agile Sustainment, was postulated because the current force requires a large vulnerable infrastructure, mountains of materiel in theater, and extensive time to establish in order to make up for lack of knowledge, therefore, it is unable to provide agile sustainment and delivery to highly mobile forces in non-continuous operations. Given this Warfighting Challenge, metrics (tasks, subtasks, questions and data elements) were developed based on information from several sources, most notable are:

- Concept Experimentation Strategy (CES) to Deploy and Sustain the Force in Rapid Decisive Operations (RDO, 2/14/01)
- Focused Logistics: Enabling Early Decisive Operations (FLEEDO, 10/10/99), Strategic Deployment (SD, 5/10/00) and RDO (3/1/02) Whitepapers
- Standing joint Force Headquarters (SJFHQ) Concept of Employment for MC02 (8/17/01)
- Deployment & Sustainment in MC02 Concept of Operations (CONOPS, 3/18/02)

- Deployment & Sustainment in MC02 Tactics, Techniques and Procedures (TTPs, 1/9/02)

MC02 Joint Standing Operating Procedure (JSOP) was used to generate the metrics and formed the basis for data collection plan development. The data collection plan was vetted with the Logistics Concept Developers and other members of the Analysis Division. The high order metrics follow:

- Task: Integrate deployment and sustainment planning as an integral part of the effects based planning process.
- SubTask: Determine the type and span of joint control that best facilitates management of logistics functions.
- SubTask: Reduce the logistics footprint in theater and JOA.

- Task: Define the JTF Logistics Position Functions and Essential Elements of Logistics Information.
- SubTask: JTF Operations Positions.
- SubTask: JTF Plans Positions.

- Task: Leverage DST emerging technologies to rapidly process data and create operationally relevant logistics information.
- SubTask: Determine the tools required to provide the JFC and subordinates the knowledge needed to assess the logistics feasibility of operational actions.
- SubTask: Determine the improvements needed to feeder and umbrella information systems.
- SubTask: Employ a logistics display that enhances the JFC's ability to synchronize sustainment.

- Task: Employ a networked sustainment distribution structure.
- SubTask: Leverage and tailor Intermediate Staging and Support Bases (ISBs).
- SubTask: Tailor sustainment for synchronization with deploying and redeployment forces.
- SubTask: Determine the means of reducing the logistics footprint in JOA.
- SubTask: Ensure time-definite delivery.

Finding 1:

Finding 1: Deployment and Sustainment was effectively integrated into Effects Based Planning by the Combatant Command level Joint Logistics Management Center (JLMC) and logisticians embedded in the JTF Plans and Operations Groups.

Deployment and Sustainment was effectively integrated into Effects Based Planning by the Combatant Command level Joint Logistics Management Center (JLMC) and logisticians embedded in the JTF Plans and Operations Groups. The management and functional structure of the JLMC provided sufficient support to the MC02 upper-end small-scale contingency. Using the collaborative information environment (CIE) strategic and operational lift issues were resolved and integration of strategic and theater movement control functions accomplished. An upper end small-scale contingency was, and can be, logistically supported by Augmenting the J4, Lead

Service / Executive Agency, or Dominant User / Most Capable Service or a combination of these support options.

To validate the experimental Joint Theater Logistics Management (JTLM) a series of questions was asked to logisticians.

- The first question asked if we centralize control of strategic and operational level joint logistics processes at the Combatant Commander JLMC were the processes carried out with increased effectiveness, improved synchronization, and greater flexibility, with fewer personnel. Just over half of the survey respondents agreed that the experimental JLMC did help to increase synchronization, but most felt that the organization did not increase efficiency.
  - Reach back was effective in several areas, specifically fuels and contracting. For example, contracting support was set up for meals in the Blue portion of the JOA. Additionally, substantial coordination was conducted in the area of aligning fuel supplies at various Air Force beddown locations.
  - The ability of the JLMC to support the JTF was strong and the situational awareness provided by the Log CROP and the collaborative information environment greatly enhanced the JLMC ability to support the JTF.

- Most disagreed with the statement above because they thought that effectiveness decreased with the logisticians split between Operations and Plans Groups and said that synchronization increased only because of the LARB.
- The JLMC improved some sustainment operations, but the organizational functions and staffing needs to be spelled out in more detail in the JTF Standard Operating Procedures (JSOP). Additionally, the JTF lacked the DLA and fuels expertise to effectively work many sustainment issues.
- There were strong opinions that JLMC, as it was in the experiment, did not allow synchronization or flexibility with fewer people, more were needed and in the JTF personnel felt more people were needed in LogOPS and LogPLANS and a truly functional J4 type staff was needed to conduct and coordinate operations.
- It was thought that the JLMC did not gain the same situational awareness as the JTF and remained in a reactive mode, rather than being proactive as was envisioned.
- A second survey question was posed, given the JTLM coordination was accomplished prior to MC02 during the Combatant Commander's normal theater engagement activities and documented in Annex D of CONPLANS, to included the logistics management structure. Was the logistics management structure in the CONPLAN sufficient to support the MC02 upper end, small-scale contingency (SSC)? A little over half of the respondents believed the structure was about right for the experiment scenario, but some common themes emerged.
  - Additional personnel and skill sets would be needed to make the JLMC a viable entity.

- The Modeling and Simulation failed to generate the logistics workload needed to stress the participants. JTF logistics manning was inadequate in several categories: engineer, personnel, medical, and movements specifically. The skill sets and positions in the SJFHQ LogOPS and Log Plans need to be revisited and refined. The breadth and depth of all the skills sets needed to operate in a SSC were not adequately demonstrated.
  - The JTF Headquarters needs a designated J4 and all logisticians in that headquarters need to work for him. Create a Chief, Support Operations who is directly responsible to the

JTF Commander for Joint logistics functions that includes the planning and execution of engineer, medical, sustainment and transportation support to the JTF.

- In the third area of this survey, they were asked if the JTLM responsibility and authority for transportation related a Joint Movement Center (JMC) integrated into the JLMC accomplished activities. Was the JLMC was able to resolve lift issues and accomplish the seamless integration of strategic and theater movement functions? Fifty seven percent of the respondents agreed and provided comments in this area:
  - The JMC functions must be retained at the JTF level. In RDO transportation requirements dramatically increased with less lead-time. The Joint Planning Center (JPC) needs to work Strategic movement and the Joint Operations Center (JOC) works the Intra-theater movement. Both must be staffed to perform these movement functions.
  - The CIE was instrumental in keeping situational awareness at the JTF and JLMC.
  - The collaborative Deployment Cell meetings were key in resolving numerous strategic movement issues and helping in prioritizing TPFDD flow items.
  - Numerous shortcomings were identified that need to be resolve in operationalizing logistics. Some of those shortcomings included a lack of a Defense Logistics Agency (DLA) Contingency Support Team (CST) in the JTF.
  - Procedures between plans and operations to the handoff and monitor the flow of the TPFDD were not as they should have been. Big picture oversight of the TPFDD was also mentioned as problematic. Example – A Ranger unit was deployed by air, but its equipment was sent by ship causing delays in making this unit mission capable.
  - A senior logistician, possibly a Logistics Director, is needed in the JTF to provide oversight and to fully synchronize operational logistics functions both in planning and operations.

In determining the MC02 logistics support options the following insights were provided:

- Most of the participants said that the MC02 support structure would work for RDO type operations (upper end small scale contingency).
- Directed Authority For Logistics (DAFL), although not specifically delineated in MC02, the JTF logisticians operated under that assumption, directing cross leveling between Components, changing lead service to the most capable component and establishing priorities of support.
- Some felt that a Joint Logistics Command at the Component level should be established. Best terminology of this organization would be Joint Support Command. Much work is needed to define the structure of the command and its authority to direct logistics

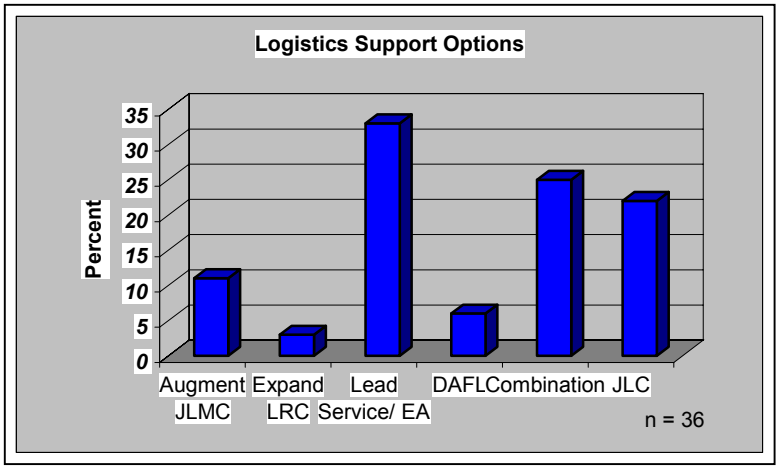


Figure 176: the various support opinions the experiment participants thought best supported RDO

across the services.

- The type of logistics support needed for MC02 was a subject of debate for the participating logisticians [JTF, JLMC, Components and Joint Exercise Control Group]. The previous chart represents the various support opinions the experiment participants thought best supports RDO.

Finding 2:

Finding 2: The JTLM concept was effective in reducing the logistics footprint in theater and JOA by using common-user support, establishing more effective Combatant Commander / Component / Service collaboration and cooperation and a common logistics picture.

The JTLM concept was effective in reducing the logistics footprint in theater and JOA by using common-user support, establishing more effective Combatant Commander / Component / Service collaboration and cooperation and a common logistics picture.

Seventy percent of the Logistics participants agreed that they saw several signs of cross-service cooperation and that the Logistics Action Response Board (LARB) was the key forum for bringing complex logistics issues to the forefront and working them. Examples follow:

- During collaboration, JSOTF forces were offered to help JFLCC with upcoming missions if the JLFCC equipment did not arrive in time.
- Cross-Service use of HSVs.
- The LARB was the forum for directing issues to the appropriate level, such as, strategic to DLA or TRANSCOM, Theater to the JLMC, and operational to the JTF or Components. Additionally, it replaced a portion of the log RFI process.
- The CINC J4, JLMC and JTF provided assistance /guidance for the allocation of strategic lift assets during the planning for the near simultaneous airborne assault and a retrograde during a LARB session.
- The LARB created and refined daily collaborative Deployment and Engineer Working Group to provide a single point for deployers and engineers to gain assistance and resolve intermittent or complex deployment or engineer issues. The Medical community also created a working group for their various issues.

Finding 3:

Finding 3: SJFHQ logistics personnel embedded in the Operations and Plans Groups was a success in improving situational awareness in the JOA. The SJFHQ personnel felt that the overall manning was about right, however, some changes are necessary in some skills sets.

SJFHQ logistics personnel embedded in the Operations and Plans Groups was a success in improving situational awareness in the JOA. The SJFHQ personnel felt that the overall JTF manning was inadequate and some changes are necessary in some skills sets.

LogOPS:

Sixty five percent of all the logisticians surveyed agreed that the embedding of the logisticians was effective in integrating the deployment and sustainment processes. Those who disagreed based their response on the logistics organization structure issues and not on the fact that the logisticians were embedding in the Plans and Operations Groups.

The graph below demonstrates the perceived importance by all players of the logisticians embedded in the Operations Group.

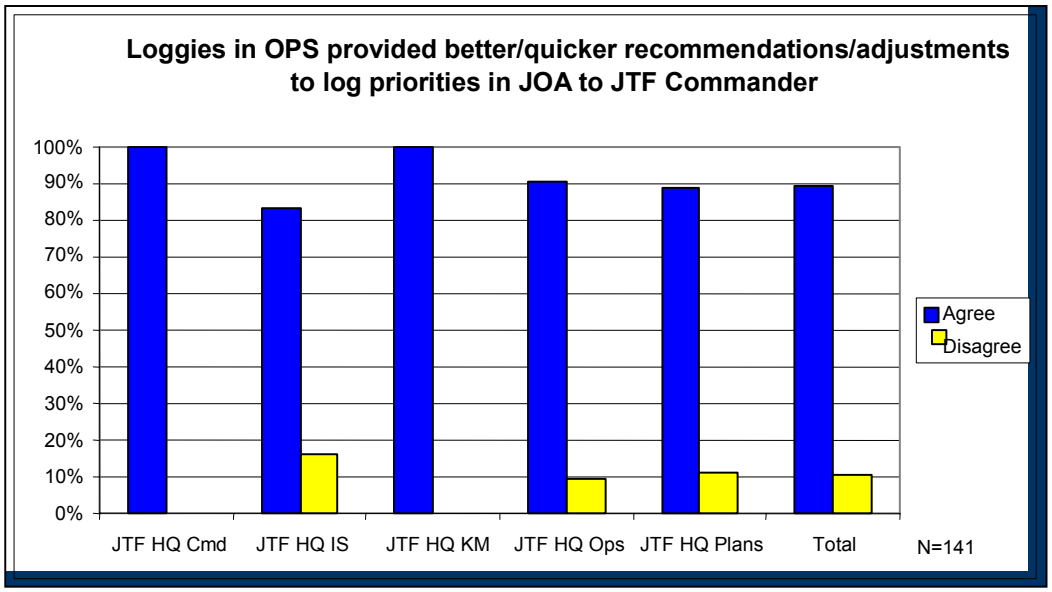


Figure 177: Most agreed that operators provided better recommendations

Though most participants agreed that embedded logistics personnel worked very well there was some feedback indicating that further experimentation may be needed.

"The embedding of the JTF headquarters logisticians in the Operations Group and the Plans Group from an operational viewpoint is prudent. In most current JTFs, the J4 has representatives in the JOC and JPG, which is similar to the current configuration of the experimental JTF organization. In current JTFs, the J4 is the senior logistician and ensures that logistics functions are fully synchronized in JTF operations. In the experimental JTF, there appears to be an integration and synchronization of logistics functions problem in the plans and operations groups. I feel the plans group has not fully synchronized the logistics tasks across the spectrum of the PEL and ETO. A way to fully synchronize operational logistics functions both in planning and current operations is to have a senior logistician in the headquarters that has oversight of all logistics functions. The logistician would work directly for the JTF commander," a SME said.

"The SJFHQ logistical relationship with functional components and services placed a huge workload on the logisticians embedded in the SJFHQ design. As a result, the logisticians, even with augmentation, could not meet both the needs of the plans or operations directors and the requirements of the functional components at the same time. The Components were confused on where to go for medical, engineer, contracting, personnel, mobility, request for forces, sustainment, ammunition and other logistics requirements (a subset of the 21 logistics functions). The SJFHQ design needs to be revised so that their is a fifth cell / director call "Support

Operations". The Logistics Operations Director needs to be moved to head that cell. Last, at the very least, include a medical, personnel and engineer expert." Combatant Command J4

LogPLANS:

Both the Spiral 3 phase and MC02 execution phase had a large focus on the Joint Planning Center. The logisticians in LogPlans made a valiant effort to support the operations through the Logistic Action Response Board (LARB) and Deployment Cell collaborative meetings despite limited personnel and a shortage of critical skills. The chart below illustrates the JTF's recognition of the contribution from the Logisticians embedded in the Plans to the success of RDO planning.

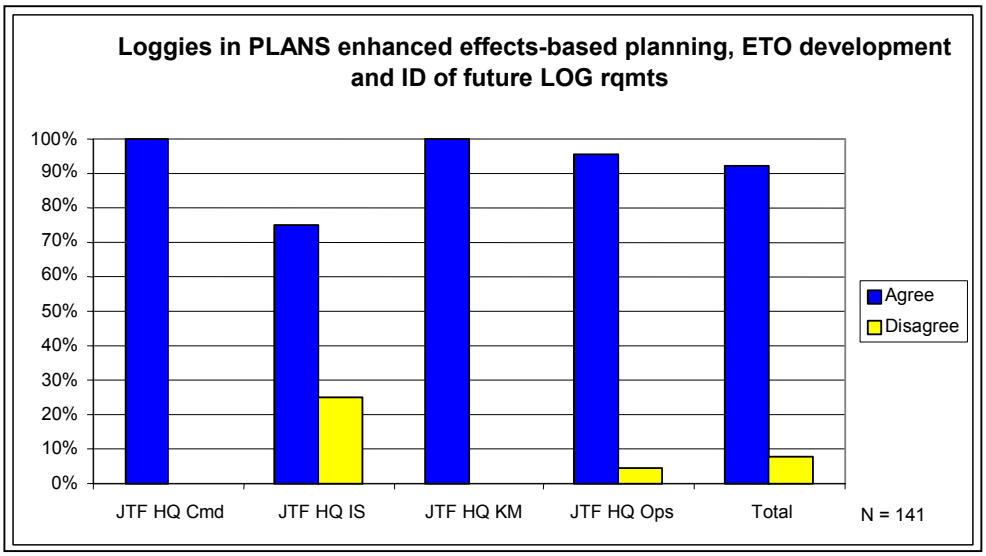


Figure 178: Logistics personnel working in Plans cells was a positive

The SJFHQ came with valuable planning, sustainment, and air lift skills and the remainder of planning expertise came from the JTF plugs. However, the logistics organization and skill sets need to be revisited as they relate to the JTF organization and structure. More medical and engineer planning expertise needs to be inserted into, or attached to, the SJFHQ. LogPlans could use an additional Transportation Plans Officer. This individual could assist the current Transportation Plans Officer with TPFDD development tasks and therefore would need detailed JOPES expertise. Additionally, LogPlans needs an additional deployment member with sealift expertise. It currently has an air and ground expert, but lacks anyone with sealift experience. The core Joint Planning Center (JPC) did not include a logistics representative. Issues being discussed off net within the Core JPC room did not have logistics input, nor did the logisticians outside the room have good situational awareness of the ideas being developed.

There was some procedural confusion within the Plans Group on force flow/deployment planning and the TPFDD build. According to the JSOP, Chapter 5, page 5-A-4, *"the deployment cell is responsible for deployment support planning in concert with effects-based planning process. Their effort will lead to the development of a TPFDD associated with the ETO. They help provide a transportation feasibility assessment to support COA development. It is comprised of the JTF Movement Officer, Transportation Planner, Strategic Lift Planner, Operations and Plans Group Representatives, Component Planners and JOPES/TPFDD technicians.*"

The deployment planning process needs to be further clarified in the JSOP and understood by planners to make this work. Operational planners should develop, coordinate, and synchronize the TPFDD. Logisticians execute the TPFDD.

Recommendation was made to for some type of synchronization tool or template that the JTF Planners can use that links effects, to forces, and to deployment/employment time lines. The logistics planners were given the task of prioritizing the force despite the fact that the operational planners should have been more involved in this process.

Finding 4:

Finding 4: The organization, structure, and skill set of the JTF Logistics organization needs a more functional look. A Logistics Support Group, which puts the Logistics Director in parity with the Ops/Plans/IS/KM Directors is called for.

The organization, structure, and skill sets of the JTF Logistics organization needs to be revisited to provide a more functional look. Numerous comments were made in favor of a Logistics Support Group that puts the Logistics Director in parity with the Ops/Plans/IS/KM directors.

Three of the logisticians in the SJFHQ indicated they were successful in MC02 but, not necessarily because of the organizational structure. Each indicated logistics could better serve the JTF if the entire logistics team was organized as a stand-alone entity, for example a Logistics Support Group with a Log Director. This structure would still matrix log planners and operators to the OPS and PLANS groups.

- Although many of the positions described in the Deployment and Sustainment TTP and the JTF JSOP are common to JTF staffs, the make up of the SJFHQ Logistics positions was designed to find the skills that would be of the greatest benefit to the JTF when it was exported.
  - In LogOPS some skill sets did not match the functions necessary to carry out their mission as well as other coordination issues. There were also procedural issues that need to be resolved in future JSOP procedures that deal with the handoff of responsibility between Log PLANS and Log OPS.

The JTF Log OPS transportation cell does not have the required expertise, functional sections, or numbers of people to perform the mission in RDO. The Joint Movement Center must be imbedded into the Transportation section of the JOC, to enhance the control and visibility of assets. Oversight of all common user transportation assets should be in the JOC to include common user air, sea, helicopter, and common user land movements. Service representation is necessary for air (AF), sea (Navy), land, and helicopter (Army or Marine). Procedures were also lacking early to allow for a handoff of responsibility from Plans to Operations to track and monitor the flow of the TPFDD. The plans shop continues to make changes and modifications to the validated TPFDD, which have impacts upon force flow and subsequently, impacts upon operations.

The construct needs to identify a “gatekeeper” for all LogPLANS and LogOPS to receive and prioritize tasks and distribute the workload. There is a great need for a Knowledge Manager (KM) type position to manage the Log CROP, handling the information flow, messages, RFI

tracking, and other KM responsibilities. Finally, the LogOPS Director position appeared to be misaligned in this construct. This position should on a level with the Plans and Operations Directors. Some recommendations follow:

- Create a Chief, Support Operations, who is directly responsible to the JTF Commander for Joint logistics functions, which includes the planning and execution of engineer, medical, personnel, chaplain, contracting, sustainment and transportation support to the JTF.
- Change the organization to include a Log Director (0-6) to manage overall logistics. Then appoint a Log Ops Director (0-5) to manage Log Ops and have a Log Plans Officer (0-5) to orchestrate logistics plans activities.
- It is thought that a Logistics Support Group, led by the senior logistician could be formed to consume the other services/functions overseen by the current J4, as well as to maintain command focus on the sustainment/movement of the JTF warfighters.

Finding 5:

Finding 5: The collaborative logistics Board, Center, Cells and Working Groups enhanced the performance and Situational Awareness (SA) of all planners and operators in the JTF, components and the Joint Logistics Management Center. The Logistics Action Response Board (LARB) was instrumental in the daily JTF and component battle rhythm. Several key functional areas created their own collaborative cells and working groups to increase SA at all levels.

The collaborative logistics Board, Center, Cells and Working Groups enhanced the performance and Situational Awareness (SA) of all planners and operators in the JTF, components and the Joint Logistics Management Center. The LARB was instrumental in the daily JTF and Component battle rhythm. Several key functional areas created their own collaborative cells and working groups to increase SA at all levels.

The LARB was designed as a cross-functional, multi-discipline forum. LARBs are supposed to accomplish three things - share information of general interest to the logistics/ deployment/ support community, conduct logistics and deployment planning in support of ETOs, and address more complex log & deployment issues, especially short-notice (Ops-related) ones, or those that involve coordination between three or more LARB constituents in the Joint Force. In MC02, the benefit of the LARB to the logistics community was summarized in a quote *"The LARB continues to be a great medium for logisticians to synchronize the logistics on the battlefield."* JTF LogOPS Director. That sentiment was echoed by the component logisticians saying *"the LARB was the most important meeting of the day."* We surveyed the participants to compare the perceptions of the LARB from Spiral 3 through Execution and to see if the LARB continued to meet the needs of the membership. Table X below is a summary of their answers and shows a high level of satisfaction with the conduct of the LARB in terms of products produced, the situational awareness gained and the contribution to their job daily.

Table 1: Players View of the Logistics Action Response Board

• ***Responses/ Events***	• ***Spiral 3****	• ***MC02****

• *Responses/ Events*	• *Spiral 3**	• *MC02**
• *Products produced were useful*	• *96 percent*	• *89 percent*
• *Performance of tasks was enhanced*	• *95 percent*	• *96 percent*
• *Level of trust in LARB was high among players*	• *91 percent*	• *94 percent*
• *Time in LARB was useful*	• *96 percent*	• *89 percent*
• *Situational awareness was gained/ increased*	• *96 percent*	• *92 percent*
• *LARB contributed to the performance of their job*	• *92 percent*	• *81 percent*
• *The interval the LARB was held was adequate*	• *88 percent*	• *89 percent*
• *The mix of the participants was adequate*	• *91 percent*	• *98 percent*

- ** =Percentage of respondents agreeing with statement*
- *Spiral 3 "n" = 20 from Log OPS/PLANS and JLMC*
- *MC02 "n" = 46 from Log OPS/PLANS, JLMC, and SME*

To review the contributions of the LARB, comments are provided for some of the areas in the chart above. The "products" the LARB provided were interpreted differently but the following comments summarize its meaning.

- **The biggest product of the LARB was the facilitation of communication between the components (horizontal) and between the components, JTF, and the JLMC (horizontal). This resulted in better logistics planning, fewer logistics and transportation related missteps, and faster response to log problems among the logisticians.**
- **The LARB provided very good logistics situational awareness, as well as involvement, for all affected parties.**
- **More tangible products identified were the development of the Concept of Support briefs, Class VII Replacement Reporting Procedures, and LARB minutes that could be reviewed by all. A negative trend mentioned by several participants was the fact there was too much staff coordination and discussion was performed in the LARB. Because no other working groups were established to lay the groundwork for synchronization, the senior logistics officers have to hear and help action officers do their staff work. Lower level collaborative working groups need to be established to develop options and recommendations for senior officers prior to the LARB.**

The effectiveness of the LARB to enhance the performance and completion of the logistics tasks required by the JLMC, JTF, or component staffs was asked and received very

favorable responses. At an After Action Review component representatives stated the LARB was a very instrumental forum for enhancing their performance. They felt this collaborative session increased their situation awareness of the JTF actions and helped resolved their issues. A component log director stated *"JLMC was a real force multiplier – having a direct line through the LARB to the CINC J4 was terrific! It also gave components confidence because they knew that their log issues were being worked at the highest levels.*" A few participants mentioned that the LARB worked some issues that were not logistic management issues. An example of this was deployment issues. The discussion of deployment often got into force selection and priority for flow between a few players. The LARB was not the place to solve these issues and eventually this subject was moved to a collaborative Deployment Cell (this is discussed in detail below).

Other suggestions:

- The publishing of LARB minutes and action items also enhanced JTF, JLMC and component performance.
- A recommendation to have the LARB Agenda presented at 24, 48, 72, and 96-hour points.
  - Present the projection of resources at these time points and compare them with the operations planned in the future. Quad charts and / or synchronization matrixes were recommended. The engineer community noted that when their issues or plans needed to be approved, the LARB served as a very good forum. However, they found the majority of the interactions between the JTF, JLMC, and component / service level had to be worked in an "Engineer cell" they instituted. The medical community also had a "Medical cell" for their day-to-day issues.

How effective was your time in the LARB? This was one of the most discussed issues during the Spirals and Execution. Most of the JTF and Component players felt the session were not too long because a lot of issues discussed affected them directly and indirectly. However, many of the JTF leadership and the JLMC felt the sessions were too long and often without direction. The administrator of the LARB continually received pressure from both the JLMC Director (who had no official role in the LARB) and the LogOPS Director to "speed up the meeting" - as if shortness of the LARB was a criteria of excellence. This obviously isn't the case, since a 5-minute LARB that accomplishes nothing would not be "excellent." Instead, the LARB was designed as a cross-functional, multi-discipline forum, and as such there are liable to be any number of issues raised that might not be of interest to 90 percent of the participants. Rushing through the meeting is not the proper solution, but perhaps narrowing the participation in the LARB is - if that is what is desired. But instead, the advantages of having a diverse group of experts participating in the LARB is worth the possibility that LARB meetings will take a little extra time.

Many felt the LARB got even better when the Log Ops Director instructed the operational issues (LogOPS) be discussed early in the agenda before the plans issues. Most felt the timing and interval of the LARB in the battle rhythm was effective. Many felt the LARB spends too much time doing action officer coordination. They requested an action officer working group prior to the LARB and develop options for resolving issues as well as recommendations to the LogOPS Director and JLMC director. The Logistics Coordinator disagreed with this stating, *"it gets away from the intent of the meeting, which is to provide a forum that goes both vertically and horizontally across command lines and the strategic, operational, and tactical levels of conflict."*

The "mix" of the participants in the LARB also got a variety of comments.

- The JTF players' comments included 'the mix was excellent' and 'the experience base was "outstanding"'. Also with the broad base of experience and skills there always seemed to be an expert in the LARB.
- The logisticians at all levels indicated a need for the participation of the employment planners in the LARB and Deployment Cell sessions, especially when planning.
- Once Loggies and deployment planners are fully integrated into the Plans Group, aren't they ALL operators? The Strategic Lift and deployment planner should be in the Plans cell and be integrated with the employment planners to understand the lift restraints and constraints of an operation.
  - Deployment is an operator requirement, but logisticians have been doing it for years. Logisticians are not tactical planners, only the operators know what they need in combat power to be successful. The logisticians can tell them what they need to support those forces, so it must be a team decisions to insure the right combat/support forces are selected to get the job done. Deployment is not a LARB function and should be done in the JPC.

Some valuable recommendations were received through comments and after action reviews.

- Change the name of the LARB and the last best proposal was "Logistics Coordination Board (LCB)
- Log Plans should be operating using a Joint Logistics Coordination Board (JLCB) to coordinate with Combatant Commander and components during planning.
- The LARB should be the LogOPS forum for execution to resolve real time execution logistics issues/shortfalls.
- LARB / LCB membership is about right.
- Joint Rear Area Command (JRAC) rep should be added as a core member.
- The Medical Planner should remain as a core member and consideration should be given to add Engineer Planner as a core member.

One of the other collaborative logistics cells and working groups that developed and matured during MC02. A Deployment Cell Meeting was established to discuss movement and deployment / TPFDD / transportation concerns. The key participants included: JLMC Log Planner, JLMC movement officer, Log Plans Officer, Log Coordinator, Deployment / transportation planner, Log Ops movement Officer and component Log planners. This meeting should involve, and be subordinate to, the "core" operational JPC planners whose input is needed for force movement decisions. The Deployment Cell meeting was very useful for developing the TPFDD and working the strategic deployment / lift / movement issues. Finally, it is recommended the Deployment Cell be codified in the SJFHQ concept.

Future guidelines were proposed to define the Deployment Cell responsibilities:

- It is critical to keep operators involved in the process as planning progresses
- Deployment Cell meetings should be held daily, with attendance required by ALCON until TPFDD is complete; then, personnel should attend on an "as needed" basis. Issues to address would include:
- Movement prioritization.
- Force Selection for EBO.

- Selection/Prioritization for theater lift.
- The cell leadership would be ready to address "how to do" theater lift
- Identify Common-user airlift assets.
- Appoint Executive Agents.
- Schedule & Prioritize.

Table 2: Recommended Deployment/Redeployment Cell membership:

• *Strategic*	• *Theater*	• *Components*
• *Deployment Planner*	• *Transportation Ops*	• *JFACC*
• *Strat Lift Planner*	• *JTF Movement Off*	•
• *DIRMOBFOR/AMD*	• *DIRMOBFOR/AMD*	• *JFLCC*
• *LogOPS Director*	• *LogOPS Director*	•
• *JLMC Strat Mvmt*	• *JLMC Strat Mvmt*	•
• *Operator (Plans Group)*	• *Operator (Plans Group)*	• *JFMCC*
• *Plans Director*	• *JOC Chief*	•

A second collaborative logistics cell was the Engineer Cell established because the LARB did not provide the medium to resolve all complex, sophisticated engineer issues. Additionally, the participation in the LARB did not facilitate coordination of engineering support to ETO planning and current operations. As the operation got underway the interaction increased, to include logistical information on the ISBs and beddown. The engineers used this forum to generate alternative engineer recommendations and actions. The collaborative discussions were helpful in generating these recommendations or actions. The functionally coordinated issues or recommendations could then be brought to the LARB for action.

The third collaborative cell established was the Medical cell collaborative meeting held daily in the JTF Ops/JTF Command/Support/Medical room. The participants were the medical personnel involved in the MC02: the JTF medical staff in the Command / Operations / Plans Groups, Service Components, JLMC, and JECG (onsite and offsite). Purpose of this meeting is to discuss medical issues that may have an impact on the warfight. Topics have included medical surveillance (e.g. Tularemia outbreak), casualty evacuation process, and medical concept of support from the Service Components. The information shared within this collaborative environment is then taken back to the medical planners and operators for their actions and inclusion into the warfighting plans/operations.

Overall the Logistics Boards, Centers, Cells and Working Groups operated as envisioned in the TTP and JSOP. The chart below

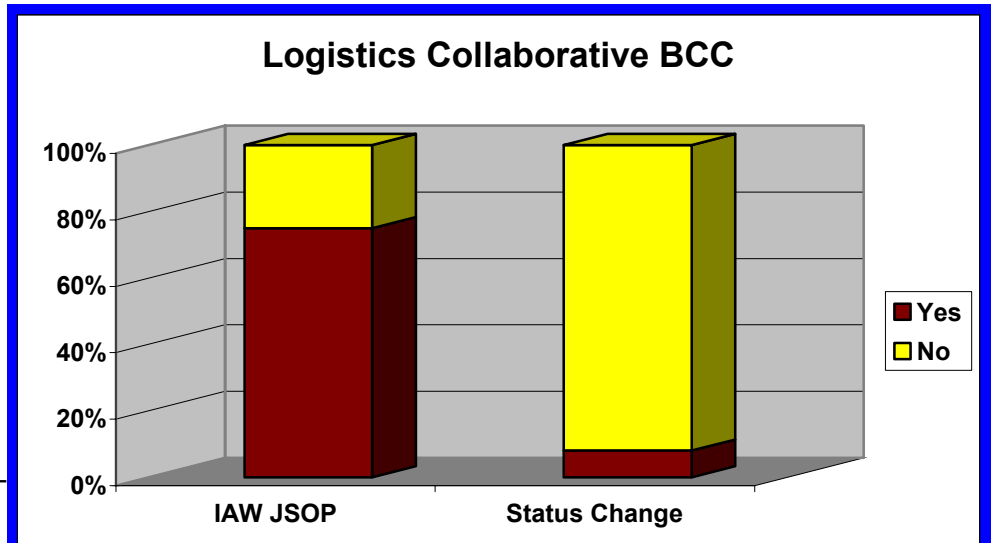


Figure 179: Logistics collaborative BCC was IAW the JOSP

summarizes the participation and status of the members in their assigned boards, center, cells or working group.

In the first bar of the graph above, JTF Logistics personnel responded positively to the question, *"Is your participation in a virtual board, center, or cell, in accordance with applicable TTPs and SOPs?"* Over 75 percent of the JTF players clearly understood their role in attending the appropriate collaborative session. A majority of the "no" responses were from assessors and the JLMC.

In the second bar of the graph, JTF Logistics personnel responded to the question, "During MC02, has your participation status (active / inactive / other) changed in any board, centers, cells or work groups? If yes, what was the change?" Ninety two percent of the logisticians state they did not have an assignment change, indicating the assignment of personnel to the various collaborative sessions is about right. Three JTF players changed status when they were no longer required to monitor an Effects Assessment Cell.

-

Finding 6:

Finding 6: During MC02, several logistics tools were provided to the JLMC, JTF, the Components and below to enhance planning and decision making in the determination the logistics feasibility of operational actions.

During MC02, several logistics tools were provided to the JLMC, JTF, the Components and below to enhance planning and decision making in the determination the logistics feasibility of operational actions. GCSS provided a user-friendly access to logistics information over a broad spectrum of sources. Many times it lacked some detailed information from its own queries and thus drove the "miners" of information to use the actual sources. Fortunately these sources were available via GCSS links. Most felt these were powerful tools and certainly the way ahead for logistics. However, most of the Joint Logistics Tools will require more extensive training and exposure on their function to the logistician.

- Global Transportation Network Exercise System (GES).
  - Value:

    GES provided the JTF the ability to pull the air and sea movement schedules, and allowed the posting of data to the Log CROP for all to see. It also proved to be useful for tracking movements. The program should continue to be developed for future exercises.
  - Problems:

    During the experiment the system was down a lot. The participants did not like the fact that GES did not match JOPES and was unable to support TPFDD changes as they occurred.

- Joint Operations Planning and Execution System (JOPES).
  - Value:

    MC02 proved the need to continue to require the execution of a realistic TPFDD in Joint exercises and Corps Warfighters. The training achieved would be invaluable in improving the Joint Deployment process. JOPES procedures were still the best method for handling the Force Deployment issues. It performed well in MC02.

- Problems:

  Once execution began and retasking was required, it has become quite evident that JOPES is just not the flexible tool required for this fast paced, crisis action planning environment. The 96 hour change insertion, verification and validation prior to USTC schedules is not the type of responsiveness that is required to facilitate action necessary at the operational level of war.
  JOPES skilled personnel proved to be in short supply. Need to continue to train this skill.
  JTF personnel needed manager's tools, displays and query functions. JFAST capability would have been helpful as well.

- Joint Total Asset Visibility (JTAV).
  - Value:

    JTF sustainment used JTAV exclusively to determine asset position and availability.
    JTAV was very useful for MC02 planning, particularly for the analysis of prepositioned and munitions.
  - Problems:

    System could be more user friendly.
    It is a real world system and was not useful in the experiment operations because it experiment inventories did not exist.
    JTF sustainment could not get total asset visibility with this tool.

- National Imagery and Mapping Agency (NIMA).
  - Value:

    Very useful basic infrastructure information to aid in beddown assessements.
    The site was easy to navigate and a great resource for operational planners.
    Provided pictures of Aerial Ports and Sea Ports making it easier to discuss and determine capabilities at certain areas.

- Port and Airfield Collaborative Environment (PACE).
  - Value:

    Provided good visibility on capacity and capability of potential APOD and SPOD locations.
    Provided very good imagery and was a useful tool.
    More user friendly than NIMA

- Joint Flow and Analysis System for Transportation (JFAST).
  - Value:

    USTRANSCOM supported MC02 strategic (inter-theater) and tactical (intra-theater) airlift scheduling requirements by using JFAST. JFAST was initially used to schedule and execute all TPFDD airlift missions using the Global Decision Support System (GDSS) exercise simulation. The USTC team provided tremendous support with JFAST and realistic assessments of USTC's capabilities.

The JTF planners found the JFAST products very helpful for TPFDD validation. But the program remained at the JLMC level and was not available to the JTF.
The Log Ops personnel made use of the CROP to display the JFAST output depicting Transportation Closure for air and sea schedules. It displayed current movements plus 24 hours and was displayed by ULN.

- Problems:

  The JTF players requested but were not given access to the program. JFAST operators were assigned to the JLMC level but did not get the products needed to Log PLANS.

- Sustainment Generator (SUSGEN).
  - Value:

    SUSGEN was intended to run a sustainment review and build applicable sustainment packages to apply to the TPFDD after the locking of the Spiral 3 TPFDD. The extended deployment planning hindered the use of planning this sustainment.
  - Problems:

    The program is a part of JFAST and was not available to the JTF sustainment planners until late in execution.
    There was not enough training on the program and it's use was limited.

- Integrated Consumable Item (ICIS).
  - Value:

    ICIS is a must-have tool for petroleum logistics planners from the JTF's service components all the way through the CINC's JPO and DESC Headquarters. The program takes TPFDD data and computes consumption factors for all troop locations. Was a very useful tool.
  - Problems:

    The program was not available to all the users and those that did have the program got it late in the experiment. The JLMC had the most exposure to the program.
    Work to make ICIS more user friendly for the more novice petroleum personnel that may be assigned to the JTF or service component headquarters.

- Joint Force Capability Register. (See Concept 2 for details on the JFCR.). Capability Assessment (CA).
  - JFCR saw limited use in the experiment. It was deemed to be user friendly and flexible and provided good capabilities.
    - Joint Electronic Battlebook (JEB).
  - JEB also saw very limited use in the experiment. A good tool but the database needs to be expanded to all military units.
    - Sustainment Visibility (SV).
  - SV also got very limited use in the experiment. It was used by the JTF for sustainment information and was valuable as a back up tool to JTAV.
    - Force Browser (FB).

- FB was used to analyze the contents of the TPFDD as it developed. It was viewed as one of the most popular of the JL Tools.

Finding 7:

The Logistics Common Relevant Operating Picture (Log CROP) was successful in providing logisticians a place to find common information and achieve situational awareness.

The Logistics Common Relevant Operating Picture (Log CROP) was successful in providing logisticians a place to find common information and achieve situational awareness. The utility of the Log Watch Board was tremendous.

- The Log CROP went beyond enhancing visibility of deployment and sustainment; it encompassed all logistics functions including Supply, Maintenance, Transportation, Contracting, Host Nation, Services, Supply and others. The Log CROP is not perfect, but it is going down the right road. During the early portion of MC02, units had a hard time getting the information they required in the CROP due to a lack of training and familiarization. As the exercise continued more personnel including non-logisticians were using the CROP to accomplish their mission and gain situational awareness.
  - One subject matter expert commented "the MC02 concept that enhances the capability of the JTF the most was the CIE and use of IWS and the virtual meetings enhanced the logistics community the most. The tools have facilitated the horizontal and vertical coordination and synchronization of logistics issues and missions. The logistics CROP and watch board have provided the virtual reporting and status of logistics assets and capabilities that have been needed for years".
  - Another SME commented "the Logistics CROP and Watchboard was the model for the rest of the JTF. It was praised by other lead SME/assessors virtually every day".

The survey of the players in the area of the CROP and Watch board provided some valuable information for future developments. [Link to Survey 11/35/8-05]

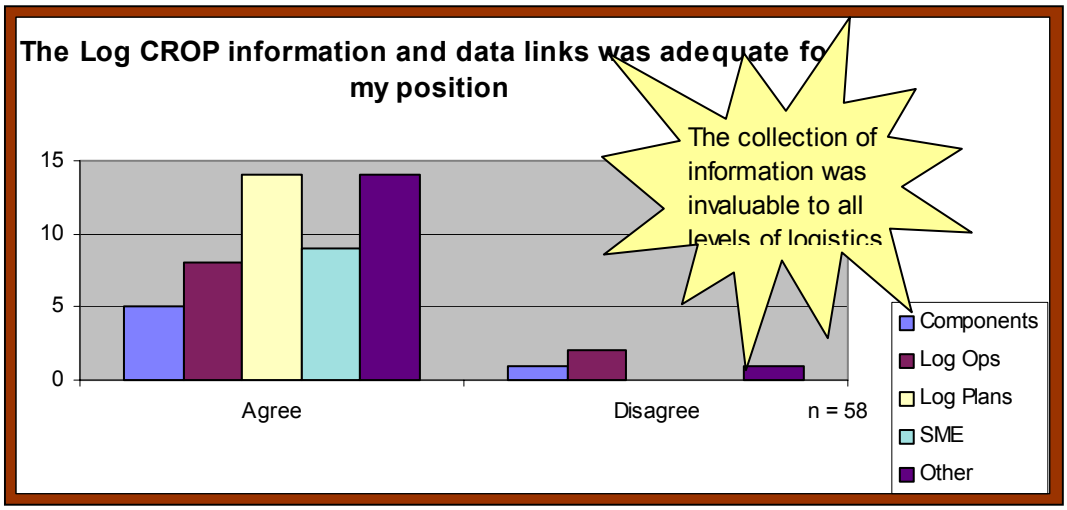


Figure 180: Most agreed that the Log CROP information and data links were adequate

- When asked if the information and the data links on the Logistics CROP were adequate for their needs, over ninety percent of the survey respondents agreed it was adequate.
- "Keep working this though we can do better. Agree."
- "Very good. Just need a knowledge manager to oversee the Log Watch board for timely and accurate data and police component updates."
- "However, the medical information and data links posted on the Medical CROP were a work in progress. Additionally, the information and the data links on the Logistics CROP were not adequate to meet the engineer needs."

- However, when asked how confident they were in the information they obtained or received from the Log CROP, only seventy percent responded they had confidence in the data and its currency.
  - The components were accessing the JTF Log CROP to obtain required information and have been satisfied that they were able to find all the information they needed. However, they did question the data on the CROP stating it was not dynamic throughout the experiment.
  - "Information on the CROP is dependent upon when functional sections post their updated data."
  - "In some situations, there were redundant reports that were updated at different times by different people."
  - "Confidence is only based on knowing the people entering the data are up to speed."
  - Rigor needs to be put into the update process for future operations. Various products such as air / sea schedules, and various SITREPS, have to be maintained by a dedicated knowledge manager.
  - The respondents were asked whether the GCSS Portal, Integrated Consumable Item System (ICIS), Joint Logistics (JL) Tools, Joint Forces Capability Register (JFCR), and Global Transportation Network were key data sources for their position. Only seventy five percent agreed these programs, or portals, were key to their jobs. The chart below illustrates that during execution the primary users of these tools (as a part of the CROP) were in the JLMC and at the JTF.

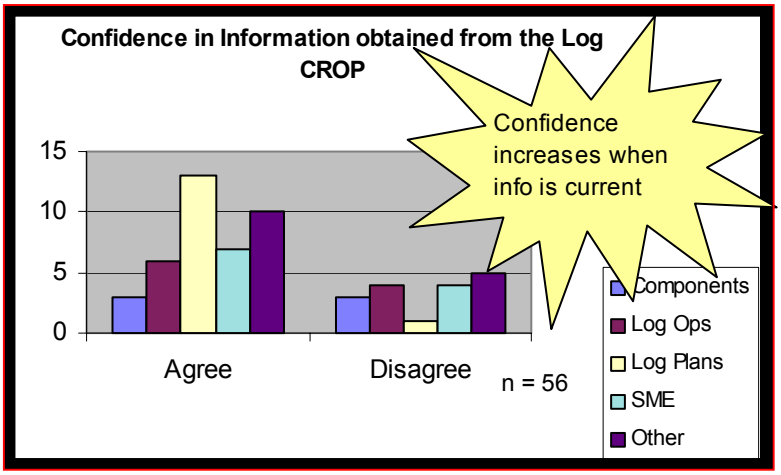


Figure 181: Most had confidence in information obtained from the

  - Furthermore, most of the JTF indicated they did not utilize the logistics tools suite during execution. However, the data and observations indicate that the players used programs or tools specific to their job and not the large variety present in the tool suite. More information on these tools can be found in the previous finding, Logistics Tools. (Link to Finding 3).

- Finally, the players were asked to respond to the CROP for ease of use and the intuitive nature of its display. This part of the CROP received very good reviews from the users and below is a sample of comments is below. [Further comments can be found at Survey 11/35/8-05 question 7]
  - "Very intuitive, can only get better, Thought is was one of the better SPPS pages used during this exercise." JFLCC
  - "Great display however, it needs to be able to link to the IWS so that we do not have to use power point slides." Log Ops
  - "Very ease to use and very intuitive". Log Plans
  - "Verry intuitive; it suffered from similar problems of other CROP pages, which is the abundance of info on them, and the time it takes to sort what is there and where it is." Log Plans
  - "Links on the CROP should be made back to the ONA to provide logistics back ground information on all service munitions, equipment types, etc." SME
  - "The CROP has proven to be a valuable asset to my mission. It enhanced my situational awareness vastly and enabled me to make on the spot decisions towards mission accomplishment." Log Ops

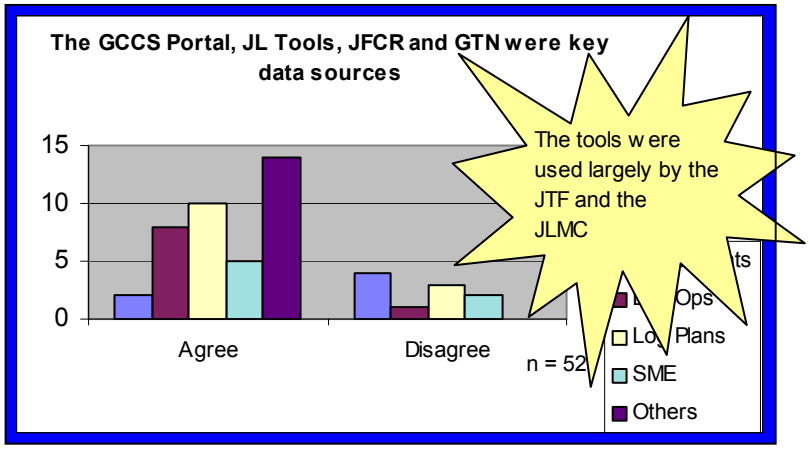


Figure 182: Most agreed that the GCCS portal, JL Tools, JFCR and GTN were key data sources

- The development of the Logistics WatchBoard for reporting critical logistics and equipment requirements greatly simplify reporting and provided a good electronic visualization of the status of forces, supplies and equipment. The information presented in the Watchboard was linked to an Excel spreadsheet that provided readiness information on all supply classes in a color code for each functional component of the JTF. The supply class levels were updated daily and the color change (green/yellow/red) alerted when it fell below an established level. This was one of the most controversial areas of the Log CROP, because the processes and procedures took a long time to refine throughout execution. Further development of a Logistics Watch Board should be pursued.
  - The players were surveyed and asked "The Logistics Watchboard enhanced awareness and assessment of logistics material and equipment readiness". Chart X below shows that over 90 percent of the participants agreed with the statement and praised the Watch board. However, most of the users also want to see it built around a central data repository that accepts feeds from components, rolls them up, segments them and provides them to higher headquarters in multiple, manipulative formats for tracking.

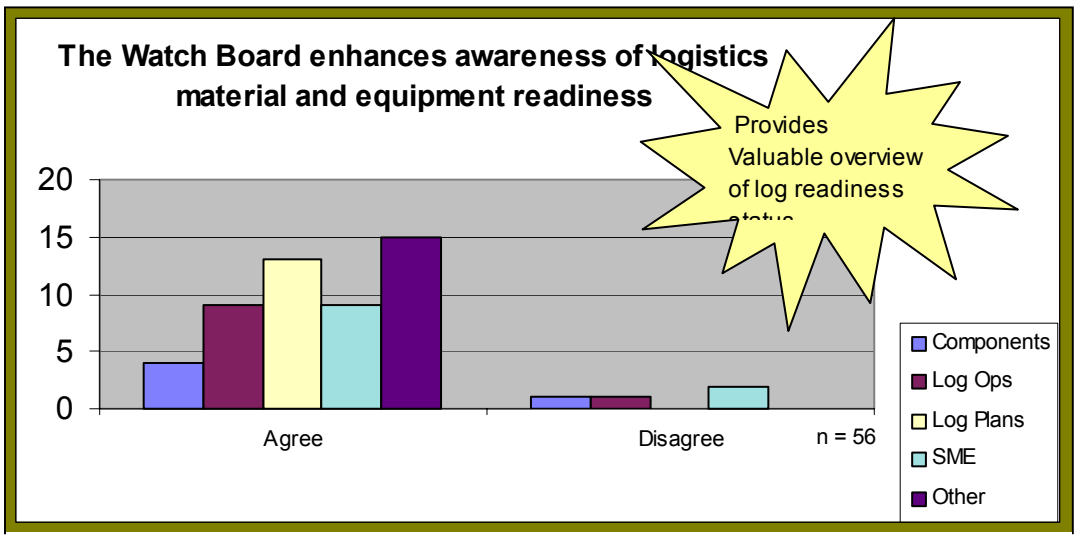


Figure 183: Most agreed that the watch board enhanced awareness of logistics material and equipment readiness

- "The CROP has to be developed to be user friendly. Components had hard time updating. Also need to look at what is displayed in the watch board."
- "Another great tool for visibility. Provides a good "one over the world" look at logistics status across the JTF, but does not provide any significant details on "show stopper" logistics issues."
- "The watchboard is great start. There needs to be more fidelity in the M&S to generate log data at the service level to properly populate the watchboard. Links need to be established from the services watchboards / reports to automatically populate the watchboard at the JTF and JLMC."
- "The construct of the watchboard spreadsheets had errors which led to some misinterpretation of readiness status. Daily adjustments to stock on hand were based on the requirement rather than the previous day's stock level. One component was also not aware of the option to UPGRADE the commander's assessment rather than going with the rating based on pure numbers."
- "Watchboard needs a lot of work in terms of how the services report data...needs to be standardized across the board (ie class V). Additionally, requirements need to be articulated on the Watchboard further out than 24 hours."
- "Very useful and had a lot of great information on it. Size of the window where the status board was located could have been bigger, though, in order to see more of it at the same time without scrolling."
- "To the engineer staff, the Logistics Watchboard was of little use. Although a civil engineer tab existed it did not include any engineer data."
- "Need a program that is dynamic and tied to Power Point for slide presentations and also allow users to update simulateously i.e., Excel spreadsheets linked to Power Point slides."

Finding 8:

The sub task of employing a networked sustainment distribution structure was assessed in the Objective 5 area during execution. This subtask findingcan be found in Objective 5.

Other Observations and Finding

The United States is not a sanctuary!

The United States is not sanctuary. Thus, we have to simulate and model CONUS with its posts, camps, stations, bases as well as lines of communications, sea ports of embarkation, and aerial ports of embarkation to include in multi-dimensional (to include cyber, sea, air, space, and ground) attacks, as our forces deploy to overseas locations in training exercises. Terrorists will surely attack these vital yet vulnerable aspects of our national military power, and we have to have the wherewithal to simulate these attacks and the cascading effects such attacks will have on key concepts such as synchronization, just in time logistics, protect the force, and so forth. (SCD)

> "Rapid, collaborative and dynamic planning and execution have reinforced and highlighted the need for improvements in our processes, procedures and philosophy toward the inter-related and inseparable functions of force deployment, employment and sustainment." Gen (Ret) Wilhelm (SCD)

Relationship to Other Objectives

Concept 11 crossed into several other experimental concepts and objectives. The ones affected are depicted in the comments and the table shown below.

SJFHQ -- Functions of personnel in Log Ops and Log Plans positions in SJFHQ

ONA -- Database research for facilities and infrastructure to support logistics operations in JOA

EBO -- Develop logistics concept of support for Effects Based Operation(s) and future branches and sequels. Execute logistics operations to sustain forces conducting effects based operations

Sustainment -- Plan and provide logistics sustainment for the JTF

Collaborative Information Environment (CIE) -- Environment for collaborative planning and coordinating logistics operations, force deployment and Sustainment, horizontally and vertically; i.e. Logistics Coordination Board (LCB)

Interagency Agency (IA) -- Interaction for coordinating Host Nation Support (food, facilities, equipment) and Humanitarian Assistance

JISR -- Intelligence on the JOA and adversary activities therein that would adversely impact force deployment and logistics operations

Initiatives -- Introduction and experimentation of new joint logistics tools (JL Tools)

Assured Access -- Ensuring access into the JOA and facilities therein to support force deployment

Joint Theater Logistics Management

Concept/Obj	SJFHQ	ONA	EBO	Sust	CIE	IA	JISR	Init.	IS	AA	DO	EBO	SF
Concept 11	X	X	X	X	X	X	X	X	X	X	X	X	X

Relationship to Baseline Analysis

The Joint Theater Logistics Management Warfighting Challenge relates the performances described for three Universal Joint Task List (UJTL) tasks in the Baseline Report

- UJTL Task: OP 1.1-Conduct Operational Movement--The deployment branch was not manned to handle assigned responsibilities and the branch staff did not have relevant experience or technical expertise.
- MC02 Observation: When MC02 began there was no structured deployment branch the JTF. As the experiment evolved a deployment room was established in the collaborative system to coordinate deployment issues. This proved to be very effective.

- UJTL Task: OP 4.1-Coordinate Supply of Arms, Munitions, and Equipment in the JOA--The J-4 was not able to adequately track key trigger points throughout the operation, or monitor major changes during the campaign.
- MC02 Observation: There were no predictive tools in the experiment to provide trigger points.
-
- UJTL Task: OP 4.4-Coordinate Support for Forces in the JOA--The JTF requested and received directive authority for logistics, enabling the JTF to direct or assign common user items and services to specific components. The resulting continuous flow of support was crucial to mission accomplishment.
- MC02 Observation: A combination of logistics support options were used in MC02 that proved to adequate.

DOTMLPF Linkage

The following insights could affect future Doctrine, Organization, Training, Material, Leadership, Personnel and Facilities.

Organization. The logistics personnel embedded in the Plans and Operations Groups were successful and increased the situational awareness for all players. A Support Operations Group was recommended to for further evaluation that integrates all logistics / support functions under a single director equivalent to the Plans and Operations Group Directors. Additional research is required to determine if engineer or medical positions are needed in the SJFHQ. There is a need for a Joint Movement Center in LogOPS to maintain visibility over cargo and assets. A Deployment Cell is needed in the JPC to correctly handle priority of forces and cargo in the TPFDD.

Training. In-depth training is required for future leaders in conduct planning and operations in a Collaborative Information Environment. Wide spread training in the Joint

Operation Planning and Execution System (JOPES) system and its products is needed for logistics and operations personnel

Recommendations

The RDO construct should reflect more logistics functions management:

- The functional structure of the JLMC provided sufficient support for an upper end small-scale contingency., The Deployment and Sustainment Tactics, Techniques and Procedures (TTP) and Joint Standard Operating Procedures (JSOP) needs more specific information on roles or responsibilities of the JLMC.
- Continue to challenge Modeling and Simulation to generate the logistics play to actively deploy, employ and manage the distribution of sustainment.
- A Defense Logistics Agency (DLA) Contingency Support Team (CST) should be added to the JTF.

With regard to logistics C2 battle rhythm (JTLM)

- The LARB provided very good logistics situational awareness and involvement, for all participants .
- A lower-level (action officer) collaborative working group should be establishedto develop options and recommendations for senior officers prior to the LARB.
- Joint functional areas such as Engineer and Medical should continue to establish collaborative cells to address their detailed planning and resourcing issues prior to raising issues to the LARB.
- The name of the LARB should be changed to "Logistics Coordination Board (LCB).
- The LARB Agenda should be changed to present checking data points in 24, 48, 72, and 96-hour increments. The projection of resources should be presented at these time points and compared with the operations planned in the future.
- The Deployment Cell meeting should be codified in the SJFHQ concept and adopt the future guidelines / structure / membership proposed in this paper as a starting point.
- The need for a JTF Support Operations Group should be studied that will integrate all Logistics / support functions under a single director equivalent to the Plans and Operations Group Directors. The group's roles and responsibilities should be defined and tested during future events.
- A Deployment Cell should be added to the JPC to correctly establish the flow and priority of forces and cargo.

With regard to JTF operations and plans groups logistics positions

- Change the organization to elevate the senior logistician (O-6) to a Log Director to manage overall logistics. Create an O-5, Log Ops Director to manage Log Ops and an O-5 Log Plans Officer to orchestrate logistics plans activities.
- JTF logistics manning should include engineer, personnel, medical, and movement personnel.
- The skill sets and positions in the SJFHQ LogOPS and Log PLANS need to be revisited and refined.
- LogOPS should have the Joint Movement Center (JMC) embedded into the Transportation section of the JOC to enhance the control and visibility of assets. Assign Intra-Theater Air and control of common user assets (air, sea, helicopter, and land movements) to the JOC with

representation from services to work air (AF), sea (Navy), land, and helicopter (Army or Marine) issues.

- LogPLANS should have an additional Transportation Plans Officer to assist the Deployment Plans Officer with strategic TPFDD issues and an additional Deployment Plans Officer with sealift expertise.
- A Knowledge Manager should be added to LogOPS to manage the Log CROP and other automated information systems.

Logistics Decision Support Tools and Joint Logistics Tools.

- A majority of play with these tools was at the JLMC and JECG level and very few comments were provided to judge these tools. Recommend further refinement of these tools and extensive training and availability for future events.

GCSS Web Based Tools.

- NIMA and PACE were valuable tools and should continue to be enhanced.
- JTAV served the JTF very well in determining asset position and availability. However, it is a real world system and for use in an exercise it needs to be tied to an experiment inventory/database.
- GES also became a valuable tool. It does not provide updates to the flow as TPFDD changes occur. It should continue to be developed.
- JOPES performed well in MC02. It is a vintage system and it was shown the JOPES/TPFDD procedures presently did not allow for rapid changes to meet rapid decisive operations.
  - Processes need to be developed to speed the entry and validation of changes to the TPFDD to meet RDO.
  - More trained JOPES operators are needed at all service and joint levels.

Logistics CROP and Watchboard.

- Log CROP went beyond enhancing visibility of deployment and sustainment; it encompassed all logistics functions. But the CROP needs to further enhanced to encompass more engineering, medical, contracting, personnel and chaplain linked information. Additionally, someone has to be assigned to ensure the different parts of the data are kept current.
- The Log Watch board has to be built around a central data repository that accepts feeds from components, and can be manipulated.

For final consideration:

- The Joint Logistics Transformation Center (JLTC), assisted by USJFCOM J9, should, in the near term, host Seminars, Work Shops or Limited Objective Experiments (LOEs) to respond to the following questions:
- Will a Joint Logistics organization (command or functionally designated) better facilitate the planning, synchronization and management over logistics operations within a joint task force's operations?
- What changes to the CIE must take place to fully integrate deployment and sustainment planning?
- How can the Common Relevant Operational Picture (CROP) be enhanced to reflect logistical operations and capabilities in an easily understood manner?

- How can a supported Combatant Commander, exercising directive authority for logistics, select a JTLM logistics support organization (choosing from a variety of support structures options, real or virtual) that will provide the most effective and efficient use of available logistics resources?

Assessment Area 12 — Joint Initiatives

The MC02 Joint Initiatives process was established to provide a systematic, objective review and evaluation of proposed joint initiatives in experimentation from the various governmental and service sponsored proposals. The process provided a multi-level review of initiatives with command-wide involvement supplemented by interagency and service representation. The initiative approval process objectively compared each proposed initiative to the overall experiment objectives as well as applicability to the joint environment. Additionally, the process provided continuous tracking and addressing of associated issues throughout preparation for the event. The Joint Initiatives process provided a two-way communication between the individual initiative sponsors and the MC02 Experiment planning and integration teams.

The review process provided for three examination sessions with each being progressively more detailed and requiring higher-level endorsement for proceeding. Phase I was the initial review by subject matter experts from the functional and experimentation communities

Joint Experimentation Initiatives Statistics:

- **103 Total Initiatives proposed by 24 separate organizations (Combatant Commanders/Services/Agencies) for inclusion in MC02 were reviewed.**
- **25 separate initiatives were recommended for integration into MC02**
- **20 of which were incorporated as Joint Experimentation initiatives.**
- **5 of which remained at the Service Level.**
- **79 initiatives were not approved or were withdrawn after initial approval due to failure to meet basic eligibility requirements (did not match objectives, funding, or initiative readiness for experimentation)**

that screened submissions against Rapid Decisive Operations (RDO) objectives and MC02 joint environment objectives. As part of Phase II, a ”Council of Colonels” was formed to review the recommendation of the operational/technical panels and forward its findings to the third stage (Phase III) – a General Officer/Flag Officer panel.

Many service proposed initiatives were not approved for joint integration due to their singular, service-oriented nature. This prototype initiative process is planned for use in future major experiments to ensure a standard and formal procedure exists for vetting new ideas and technologies into the Joint Experimentation process. The Joint Initiatives are discussed in detail in Annex K of this report.

The 20 Joint Experimentation Initiatives are:

1 – Collaboration Tool Suite (InfoWorkSpace 2.5 (IWS 2.5))
2 - Global C2 System - Integrated Intelligence and Imagery (GCCS-I3)
3 - Joint ISR Management Tools (JISR Tools)
4 - ONA Tool Suite
5 - Logistics Tools Suite (LTS)
6 - Theater Medical Integration Planning – Joint (TMIP-J)
7 - Joint Fires Initiative (Automated Deep Operations Coordination System) (JFI ADOCS)
8 - Automatic Network Information Flow (ANIF)
9 - Network Security Management Correlation & Display (NSMC&D)
10 - Joint Enroute Mission Planning and Rehearsal System-Near Term (JEMPRS-NT)

11 - Maneuver Control System-Tactical Combat Operations (MCS-TCO)
12 - Global Strike Task Force (GSTF)
13 - Joint Public Affairs Ops Group (JPAOG)
14 - National Imagery and Mapping Agency (NIMA) Initiative
15 - Command and Control for Space, Information Operations Forces (C2 for Space, IO Forces)
16 - Unmanned Sensor Support to Special Reconnaissance (US Support to SR)
17 - JSOTF Reachback/Special Operations Mission Planning Environment (SOMPE)
18 - Joint Automated Target Folders (JATF)
19 - Joint Automated Single Guard Solution (JASGS)
20 – Joint Special Technology Operations (STO)

Assessment Area 13 — Joint Intelligence, Surveillance, and Reconnaissance

Overall Assessment Results

The overall assessment of the Joint Intelligence, Surveillance, and Reconnaissance (JISR) concept is that while it displayed great potential, it requires further development and experimentation. There were areas where JISR clearly and significantly improved the JTF performance. Several significant factors limit the ability to make a clear determination in the latter areas. We address these factors under Other Findings and Observations. The concept should be more fully developed and given increased scrutiny in a Limited Objective Experiment.

Overall Assessment Results

- **JISR displayed great potential (but) it requires further development and experimentation…**
- **Additional training was required on the JISR tools and the JISR concept…**
- **(Some) desired additional personnel to perform collection management…**
- **The key to the successes and the**

Methodology

More than 196 experiment participants selected by their duty positions in relation to the JISR concept during MC02 evaluated JISR via survey. The participants received a series of 48 questions for evaluation. In addition to the questionnaires, other sources evaluated the utility of JISR. We tasked Subject Matter Experts (SME) to report on the performance of JISR on a daily basis. We presented the concept to senior concept developers made up of retired general and flag officers, and ambassadors for discussion and comments. Experiment participants were encouraged to submit their observations and recommendations. These participants submitted 36 comments on JISR. Technical collection to assess the use of the ISR Data Base was included in the collection plan.

Warfighting Challenge:

Ability to provide relevant intelligence to the commander

- Task: Plan and Direct ISR operations.
- Subtask: Link collaborative planning and execution.
- Subtask: Apply JISR Management.
- Subtask: Synchronize Operations and ISR.
- Task: Collect information.
- Task: Exploit information.
- Subheading: Improve reaction to emergent targeting.
- Subheading: Improve reaction to emergent information requirements.
- Task: Produce operational intelligence.
- Task: Disseminate operational intelligence.

Finding 1:

Finding 1: JISR improved synchronization of ISR and operations.

In surveys to the members of the Joint Operations Center (JOC) from the Joint Task Force (JTF) and the component commands over 80 percent of those expressing an opinion agreed that there was improved synchronization due to JISR.

"IWS facilitated collaboration," said one participant. "There was mutual sharing of information." "Collection for planned operations and TST events appeared to be well synched," according to another. "JISR was seated directly behind the BWC and provided and a comprehensive, accurate and precise picture to the BWC. JISR fed directly into JFE and NFN-EX, and both of those initiatives were very effective."

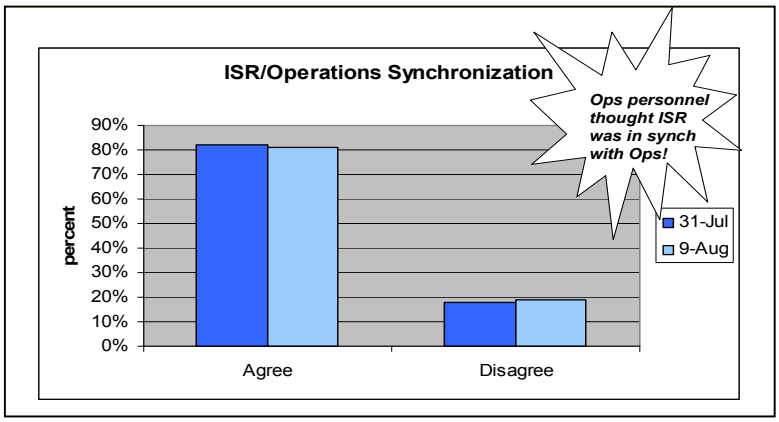


Figure 184: ISR/Operations Synchronization

Finding 2:

Finding 2: JISR improved ISR support to operations.

Again, this data comes from members of the JOC, from the JTF and components. Over 90 percent of those expressing opinions and over 70 percent overall agreed that JISR had increased ISR support to operations. One member of the JOC commented, that while the JISR worked well, the model lacked the necessary fidelity to produce really meaningful intelligence information. While two others noted, "coverage was wonderful. JISR is invaluable in providing the detection and tracking of CCOIs."

Finding 3:

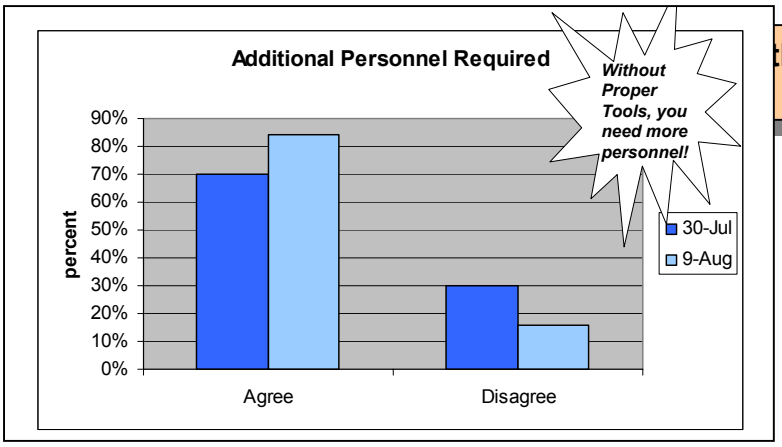


Figure 185: Additional personnel required

the JISR tools and the JISR

JISR personnel modified the Tactics, Techniques, and Procedures document between Spiral 3 and Execution to correct for tool emulation problems. This combined with a lack of service education, experienced collection managers, and personnel turnover from the spirals may be contributing factors. Almost 70 percent of participants expressed an opinion that additional training was required.

An Air Force player considered 'training' a Service problem that needs resolution, "Speaking from an Air Force and AOC perspective, Collection Managers require highly-specialized training. The growing complexity of ISR assets and enemy capabilities demands that we should be given advanced training," he said, adding, "it is a severe oversight that the Air Force doesn't have a Collection Management training course to train its' Collection Managers to use AF ISR platforms, let alone a career path."

Many others considered training an exercise/experiment management an issue. One participant said, "66 percent of my group were new players from SP3, that said, I needed more training as well on the tools and the process, we're slogging (through) here." "Many of the MC02 execution JISR players were not here for Spiral 3 and had zero exposure to concepts or tools. I had to train two officers at the JTF JOC. Many component players needed instruction via IWS, JISR-M, SPPS, and ADOCS DTL were some subject areas," said another.

Finding 4:

Finding 4: JCMC personnel desired additional personnel to perform collection management.

Many participants complained throughout the experiment that there were insufficient numbers of personnel assigned to intelligence management staff positions. Because of the manning deficiency, the quality of the ISR product suffered. A second twist on that scenario is that there were sufficient numbers of personnel, but exercise and experiment artificialities led to manning by untrained, unqualified personnel. The tool problems may also have affected the opinions of the JCMC personnel on the need for additional personnel to conduct ISR operations. Initially, 70 percent of those personnel, with an opinion a week into the experiment, felt they needed additional personnel to perform their mission. By the end of the experiment, almost 85 percent felt additional personnel were needed.

"You need an experienced and multi-talented team of ISR professionals--the actual number of bodies would have to be determined based on the scale of conflict and the degree of

responsibility delegated to that organization," according to one player. Yet another asserted that, "at the JFMCC, we needed additional personnel in targeting, collection/ISR planning, analysis/briefing, and ISR execution." "If the HQJTF is to truly manage the CM process, they need a larger group of people."

Right numbers, but wrong mix of people, according to some. "Rather, additional people with collections background (or training prior to STARTEX) are needed. The numbers are right but the skills sets were not among the audience for this experiment." A specific recommendation called for three more personnel on the SJFHQ for a total of eight collection managers representing all the services.

Finding 5:

Finding 5: Tool functionality as emulated did not support the JISR concept.

Software tools for manipulating the JISR were the area of widest discussion among the experiment participants. In general, the participants saw the need for a more user friendly, more functional, and comprehensive tool suite. By the end of the experiment, 77 percent of the JCMC personnel surveyed agreed that additional tools or tool functionalities were required.

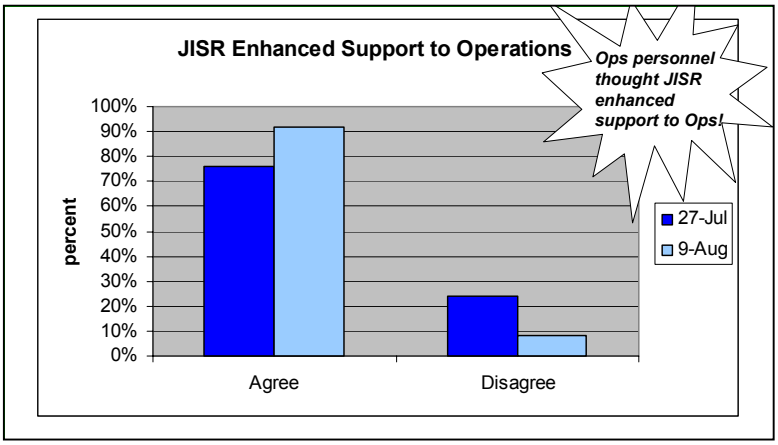


Figure 186: JISR enhanced support to operations

Said one, "In order to perform effective JISR, we desperately need a suite of advanced collection tools." Also, "The JISR process, as envisioned, does not have any tools that support it. The process is way ahead of the system development timeline." One participant provided a shopping list. We "need comprehensive, flexible visualization tools that show tracks, swaths, targets, coverage, accesses, etc." We "need a tool that will take multiple inputs (submissions), fuse them, and provide optimization, de-confliction, and synchronization options". General, negative comments included, "JISR tools were horrible--essentially JISR was the "Pong" of available ISR tools, they provided no value to the JISR process." "JISR visualization capability does not exist. Collection management tools were insufficient". The same comments came from the Senior Concept Developers were also less than complimentary. "The tools were inadequate in their ability to demonstrate planned ISR activity with that actually flown," said one. Others complained of poor displays, inability to work with ADOCS and TBMCS. Lastly, a participant noted that the collection manager had to resort to using an EXCEL spreadsheet because the tools were either unsatisfactory or not available to meet his needs.

Finding 6:

Finding 6: Collaboration was the key to JISR's successes and performance.

Three-fourths of the Joint Intelligence Support Element (JISE) personnel with an opinion thought that Interactive Multiple Intelligence Source Collaboration was effective. Better than 80 percent of JTF and component personnel selected from the JOC that expressed opinions agreed that JISR collaboration aided in the answering of urgent information. When asked if JISR collaboration enabled targeting over 75 percent of those expressing an opinion agreed.

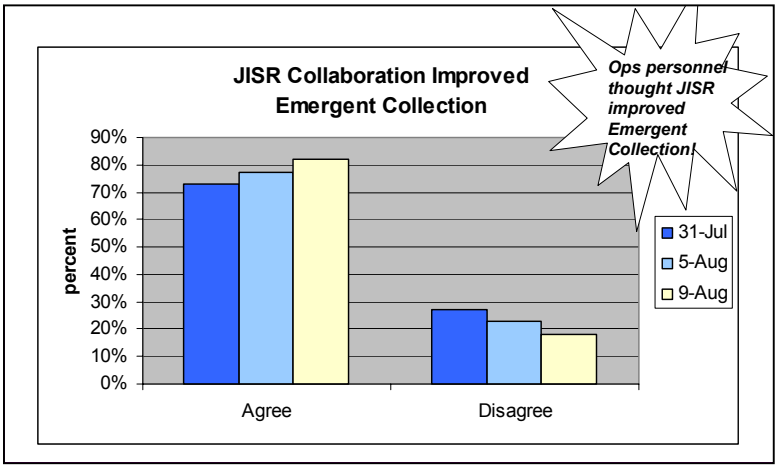


Figure 187: JISR collaboration improved emergent collection

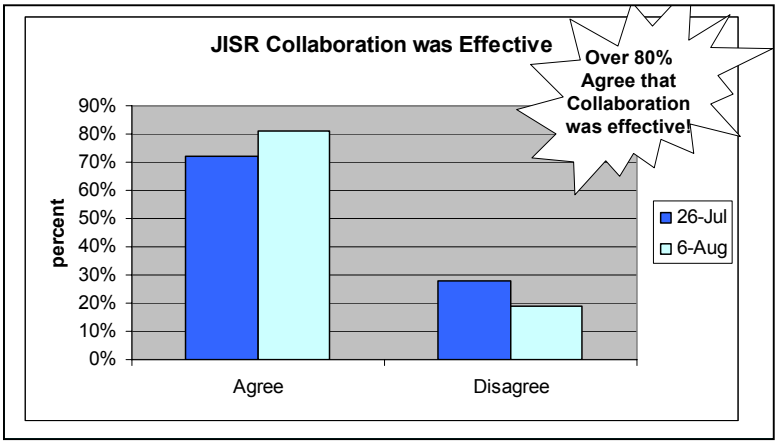


Figure 188: JISR collaboration was effective

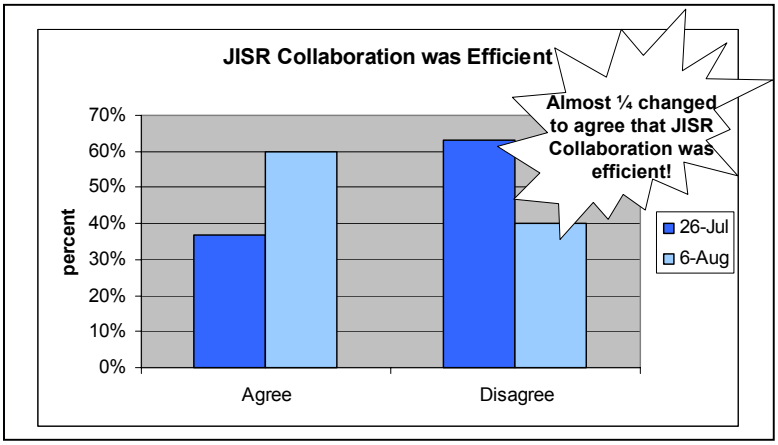


Figure 189: With increased experience, JISR collaboration became more efficient

The Joint Collection Management Center (JCMC) felt that JISR collaboration was effective. Slightly more than 70 percent of the personnel thought it was effective. This number grew to 81 percent by 6 August. However, the number of ISR assets available makes it unclear whether the concept or number of assets caused this to occur. This is addressed in more detail under Other Findings and Observations. The JCMC personnel initially did not consider JISR collaboration efficient with over 60 percent disagreeing. The vote changed to 60 percent agreement later in the experiment. The swing probably reflects the learning curve with the tools considering the large number of new, inexperienced personnel that had not participated in earlier Spirals.

There was great confidence in the CIE tools by participants. This was best expressed a by a participant when he was looking at a manning problem stated, "we need additional personnel, but may not necessarily need them at the JTF. If I have reach- back to a CINC J2 staff and JIC, much or what I need can get accomplished in the rear."

Other Observations and Finding:

There were significant obscurant factors that affected the JISR concept. Among them were emulated tools, which were not

sufficiently functional to support the concept, inadequate intelligence support from upper echelons, and no clear defining system to establish priorities was available as there was a conflict

Observation 1: The modeling and simulation federation did not provide data in the required format or level of detail necessary for success. No one in the experiment deployed enough (or in some cases any) analytical support to take the hundreds of thousands of simulation-generated reports and make heads or tails of it. The lack of analysis put an increased strain on the limited number of personnel scripting reports. Just days into the experiment a 51-page document on work-a-rounds had to be published to keep MC02 running.

between legacy planning and Effects-Based Planning systems.

MC02 participants were under-whelmed with the detail provided in the exercise intelligence package. Used too much greater detail, commander's expectations were high and the model and simulation effort was not up to the task. Said a staff officer, "there has been absolutely unrealistic feedback from airborne and ground based sensors," he said. "For example, 50-70 enemy aircraft were able to start, taxi, takeoff, assemble, and attack unnoticed. SIGINT assets and radar would have provided significant warning." And one rather negative report related, "intelligence support was some of the worst I've seen (I've spent 30 years exercising/inspections, two years at Red Flag and three years as Chief of Southern Europe (NATO) air exercises) to compare to." "IPIRs generated via JQUADS pull from IDB OB database was not occurring the way it was predicted to do so."

The lack of detail in the scripted intelligence feed back to the commanders resulted in JISR being painted with the same wide brush. "In MC02, the components are not manned to perform robust Intel functions," said one participant. "Consequently, everyone is relying on JECG support in the area of Intel reporting. That we are not getting the info we expected is very apparent in the frustration of commanders and staffs at the lack of 'return' given the extremely heavy ISR 'investment'. This is making JISR look bad, even though the JISR processes are doing an excellent job of planning and executing ISR tasks."

Joint Exercise Control Group (JECG) personnel responded saying, "the architecture of the simulators and models has become a hot issue for the JECG during MC02. Almost every JECG Intel person has needed, at one point or another, to know how the models and simulations interact with each other, how they come up with product, and how/where we must fill in gaps in order to lend 'reality' to the experiment. The learning curve on the M&S has been steep and at times painful."

Senior Concept Developers also commented on the problem. "The concept is ok, but after the operation, the patient died. The collection results were so much worse than we experience in the real world." Said another developer, "the effectiveness and responsiveness of JISR was difficult to assess because of anomalies in ISR adjudication and reporting in the synthetic experiment environment."

Observation 2: Analysts were unable to determine if the improvement noted in planning, improved reaction to emergent information requirements, and improved reaction to emergent targets was due to the concept or to the number of assets provided because of the large number of ISR assets

MC02 was excessively asset-rich, according to planners. Even considering it was based on FY07 assets, most considered the number of sensors available to the JTF and the combatant commander as being out of touch with reality. One participant put the number at 1500 percent of normal. The impact of the having ISR tools so readily available was a quantum improvement in all aspects of ISR. Noted one planner, "more than a JTF commander could reasonably expect," she said. "We were able to cover everything with several assets, all the time. No prioritization or resource choices to make. When you have far more assets than requirements there is no reason to deny any collection. If you really want to test collection managements and the JISR process, you have to create a situation where value judgment decisions are required." Another summed it up, "MC02's supremely unrealistic inventory of ISR assets made ISR planning far too easy."

A comment submitted by the JECG reflected on this problem from the game manager's perspective, "although the concept called for the prioritization and synchronization of requirements, it was not conducted (that way). This was not accomplished partly due to a 24-hour process shrunk into a 12-hour day. In addition, they had more than enough ISR assets to use, thus not having to prioritize that much."

Observation 3: Confusion as to what the priorities were for collection caused problems determining the collection focus.

We asked participants if Priority Intelligence Requirements (PIR) were the priority for collection. We also asked if Effects were the priority for collection. Initially, 70 percent of participants agreed with effects and 65 percent agreed with PIR. When asked again a few days before the end of the exercise, these numbers had both dropped. Effects were down to 60 percent agreeing with an increase in Don't Know responses. PIR was down to 58 percent with an increase in Disagree responses.

The uncertainty is demonstrated by a comment from an exercise participant who said, "it was very difficult for our analysts and others to consistently link their requirements to effects — in most cases it was left to the collection managers to pair targets to effects. We did the best we could with what we were given."

Another noted that he had problems with the process as it was employed saying, "I do not think it is possible to make a good collection plan based on the PEL alone;" he added, "no I&W. I do think it should be possible to make a solid plan based on the PIRs, SIRs, IRs...because they should encompass the PEL and the I&W deck. I also think the PIRs should be prioritized — III CORPS treats them as all equal. You can't prioritize based on all equal and when your PIRs are really broad, you'll end up with an incredibly large deck of all PRI 1s."

Others said that a more clear relationship was needed between PIRs and the PEL and how they affected the collection plan and that the commander needed to settle on which was to be the foundation for establishing priorities. "I struggled with the linkage between the CJTF priority intelligence requirements, verbal guidance, and the PEL," complained one analyst.

The key ISR Subject Matter Expert insight was the "commander is changing priorities on the fly and Intel is making adjustments." The Senior Concept Developers noted during the experiment that, "JTF ISR staff right now is frustrated attempting to apply ISR capability against requirements devoid of a broader context. The PEL is not a sequenced prioritization. The prioritization must take into account sequencing and the enabling effects, in order to reach the higher effect/objectives".

Observation 4: Fracturing of the ISR personnel across three groups of the SJFHQ, Information Superiority Group (ISG), Plans, and Operations created difficulties in synchronizing and maintaining a common picture.

This was illustrated in the 9 August JTF JISR after action review. The panelist identified the break-up between OPS ISR and the ISG as a significant problem. There was an inability to get feedback from Operations, even though there were tremendous accolades from the group with regard the performance of OPS ISR in Time Sensitive Targeting (TST) and dynamic re-tasking. It was a violation of the unity of effort and command principle in the group's opinion to have this position reacting to Operations rather than ISG. There had been a similar problem with Plans, but the ISG had managed to pull the position and make it an ISG ISR planner working in Plans. ISR personnel deemed this a major success. The ISR Planner remarked, "By splitting the team into two sections, we degraded our collection efficiency," he said, "something that was not readily apparent because of the breadth and depth of collection capability, and the inadequacy of the simulation drivers."

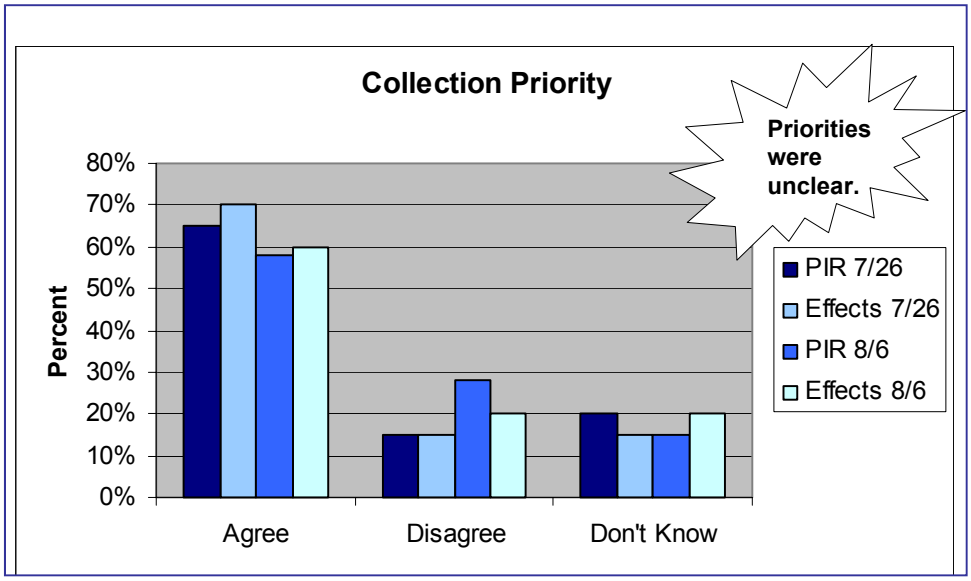


Figure 190: Collection priorities weren't clear

The issue came up again in the 12 August ISG after action review. The group felt that the intelligence personnel in Plans and Operations should be ISG personnel. This would allow these personnel to have reach back and provide the ISG essential feedback to keep intelligence synchronized between the three groups. The panelists also noted that the Blue-Red Cell should be in the ISG, as it was producing intelligence documents and was relying on intelligence personnel in plans to support them. An ISG member pointed out that the Red-Blue Cell role is actually a traditional Intelligence role in the Army.

Relationship to Other Objectives:

DOTMLPF Linkage

Relationship to Other Objectives

Collaboration was the major factor in the success of JISR, according to many of those providing experiment comments, and that provides links to Assessment Area Nine, the Collaborative Information Environment. Effects Based Operations lack of definition of its' position in the hierarchy of planning raised confusion on collection priorities. There are indications that there needs to be an increase in ISR personnel in the SJFHQ.

Recommendations:

- Conduct further JISR concept development and experimentation.
- Review the concept paper for changes from lessons learned in MC02.
- Make the emulated tools more user-friendly with the increased functionality MC02 participants described.
- Conduct a Limited Objective Experiment in an ISR asset constrained environment with modeling and simulations that will adequately support ISR experimentation.

Chapter 7 — Summary and Conclusions

Based on the analysis from Millenium Challenge and previous national level guidance, we feel our efforts are on track. We believe that many of the RDO enabling tools we advocated and examined in MC02 — effects-based philosophy, operational net assessment, standing joint force headquarters, and enhanced interagency collaboration — have relevance across the range of political-military-economic operations, including homeland defense and anti-terrorism, as well as to major theater war and SSCs. Several war games, seminars, and experiments culminated in Millennium Challenge 2002, which spotlighted RDO in this decade. The future includes the Olympic Path series, which will focus on implementing the SJFHQ and the Pinnacle Path series, which will transition RDO into a broader joint warfighting concept and investigate our ability to execute this concept in the next decade.

But we cannot afford to wait until our long-term plan is accomplished to begin making important recommendations to our political and military leaders. In fact, field commanders are using some of USJFCOM's basic concepts against our terrorist opponents even as these concepts are being refined. Nevertheless, we are not satisfied with the status quo. We expect to further refine what is now in experimentation, and make both near- and long-term recommendations for even more innovative ways to transform the U.S. Armed Forces for operations in a chaotic world.

We are facing a new environment where adaptive adversaries have learned to avoid our strengths, anticipate our well publicized moves and to challenge us asymmetrically with means such as terrorism, cyber warfare, advanced surface to air missiles, anti-space weapons, WME, and WMD. RDO responds to these challenges by providing a conceptual vision of a transformed way of operating — one that emphasizes superior knowledge and integrates all instruments of our national power.

The RDO Concept is a smart way to think about joint warfare regardless of the strategic environment in which we operate and the threats we face. The concept described here, exercised, and experimented with in MC02, is an evolving construct for conducting RDO in a high-end SSC in the next decade. It is a vehicle for transforming "Jointness" and for realizing the JV 2020 vision. It provides a Joint context for Service experimentation efforts. Concepts and doctrine drive organization, which should, in turn, drive the development and acquisition of combat, support, and lift systems and platforms.

The development of an effective capability for future joint operations is a journey rather than a discrete objective and Millenium Challenge was a step taken down that road. There is now a limited capability to conduct RDO. Improvements in doctrine, training, and organizations, as documented in MC02, will further improve the speed and effectiveness of RDO and expand the scenario sets in which it can be achieved. The establishment of an experimental standing joint command and control element is the next initiative to help realize joint force transformation. Development of collaborative planning tools and a functional CROP, as well as enhanced ISR and a truly integrated and accessible intelligence system, will significantly enhance decision superiority. Strategic mobility concepts, such as "ready off the ramp," and new deployment means, will enhance rapid force deployment. These and other Joint and Service technologies, processes and concepts, will enhance RDO as they come on line.

Our experimentation efforts to date and the version of the RDO Concept demonstrated in MC02 focused on a high-end SSC. Future versions of this concept will move toward a joint warfighting concept applicable to the entire range of joint operations. Millenium Challenge has played out its role in Joint Transformation.

Figure 191: NELLIS AIR FORCE BASE, Nev. (AFIE) -- An F-117 Stealth Fighter flies over the Nevada desert Aug. 6 during Millennium Challenge 2002.(U.S. Air Force photo by Staff Sgt. Aaron D. Allmon II) (VIRIN: 020806-F-7823A-004)

Annex A — Glossary/Acronyms

These definitions are taken from Joint Pub 1-02, various USJFCOM J9 Experimentation Directorate concept papers, and other references supporting MC 02.

Adaptive Joint Command and Control (AJC2)	The ability to adjust to a given situation and exercise authority and direction by a properly designated commander over assigned and attached joint forces in the accomplishment of the mission.
Assured Access (AA)	Access to the battlespace in all dimensions by U.S. forces and allies contributes to the Joint Force Commander's freedom of action. This does not necessarily mean that the battlespace is accessible from any direction, but at least that sufficient air and sea lines of communications for movement of forces and sustainment packages exist and can be protected successfully from interdiction.
Asymmetric Warfare	The waging of unbalanced or un-proportioned armed or unarmed war against the enemy.
Augmentees	Additional personnel who enhance existing capabilities of the SJFHQ. Personnel could come from the supported CINC staff or components, and supporting CINC staff and components.
Automated Deep Operations Coordination System (ADOCS)	A situation awareness tool which integrates a broad number and type of Service C4ISR systems, enabling horizontal and vertical integration and C2 actions. It makes the same information available to all users regardless of echelon and allows them to filter the information to their specific mission environment.
Battle Damage Assessment (BDA)	The timely and accurate estimate of damage resulting from the application of military force, either lethal or non-lethal, against a predetermined objective. Battle damage assessment can be applied to the employment of all types of weapon systems (air, ground, naval, and special forces weapon systems) throughout the range of military operations. Battle damage assessment is primarily an intelligence responsibility with required inputs and coordination from the operators. Battle damage assessment is composed of physical damage assessment, functional damage assessment, and target system assessment. See also bomb damage assessment; combat assessment.
Boards	Formal, non-standing organizations with designated membership that meet as required to conduct their business. Boards provide input to Centers and the CJTF.

Bomb Damage Assessment (BDA)	The determination of the effect of all air attacks on targets, e.g., bombs, rockets, or strafing. See also battle damage assessment; combat assessment.
Cascading Nature of Effects	Indirect effects can ripple through an enemy target system, often influencing other target systems as well. Typically this can influence nodes that are critical to multiple target systems. Most often this cascading of indirect effects flows from higher to lower levels of war. As an example, when destroying an enemy central headquarters, the effects cascade down through the enemy echelons to ultimately disrupt numerous tactical units on the battlefield.
Cells	Formal, non-standing, functionally-oriented organizations that meet on a regular basis to provide input to Boards and Centers.
Centers	Formal, standing organizations that meet and conduct major planning or operations business with the JTF Headquarters on a regular basis. Once established, Centers normally operate on a 24-hour basis.
Centers of Excellence (COE)	Institutions possessing special knowledge or expertise in a particular area of concern and incorporated into the collaborative environment to facilitate development of the products supporting SJFHQ and JTF functions and operations, e.g., academia, industry, banking.
Centers of Gravity (COG)	Those characteristics, capabilities, or localities from which a military force derives its freedom of action, physical strength, or will to fight. Critical capabilities are resources and means that support the center of gravity. From among these are identified critical vulnerabilities. They link to the center of gravity via casual links, such that destroying, degrading, or denying a critical vulnerability will cause a substantial degradation of one or more of the adversary's center of gravities.
Civil Affairs (CA)	Designated Active and Reserve component forces and units organized, trained, and equipped specifically to conduct civil affairs activities and to support civil-military operations. See also civil affairs activities; civil-military operations.
Civil Affairs Activities	Activities performed or supported by civil affairs that (1) enhance the relationship between military forces and civil authorities in areas where military forces are present; and (2) involve application of civil affairs functional specialty skills, in areas normally the responsibility of civil government, to enhance conduct of civil-military operations.

Civil-Military Operations	The activities of a commander that establish, maintain, influence, or exploit relations between military forces, governmental and nongovernmental civilian organizations and authorities, and the civilian populace in a friendly, neutral, or hostile operational area in order to facilitate military operations, to consolidate and achieve operational U.S. objectives. Civil-military operations may include performance by military forces of activities and functions normally the responsibility of the local, regional, or national government. These activities may occur prior to, during, or subsequent to other military actions. They may also occur, if directed, in the absence of other military operations. Civil-military operations may be performed by designated civil affairs, by other military forces, or by a combination of civil affairs and other forces.
Collaborative Information Environment (CIE)	The information backbone that provides warfighters the ability to enhance organizational effectiveness and reduce hierarchical, serial planning timelines through information and idea sharing and parallel planning.
Collateral Nature of Effects (CNE)	Collateral effects are unintentional or incidental direct or indirect effects causing injury or damage to persons or objects. Evaluation for potential collateral effects should normally include a consideration of second- and third-order levels of damage, e.g., the collateral effects of jamming or destroying a communications facility that disrupts civilian air traffic control or disrupts power to a local hospital. Collateral effects can become a major factor in determining whether or not to attack a target. Collateral effects can be further defined as additional and collateral damage.
Combat Assessment (CA)	The determination of the overall effectiveness of force employment during military operations. Combat assessment is composed of three major components, battle damage assessment, munitions effects assessment, and reattack recommendation. The objective of combat assessment is to identify recommendations for the course of military operations.
Command and Control (C2)	The exercise of authority and direction by a properly designated commander over assigned and attached forces in the accomplishment of the mission. Command and control functions are performed through an arrangement of personnel, equipment, communications, facilities, and procedures employed by a commander in planning, directing, coordinating, and controlling forces and operations in the accomplishment of the mission.

Commander's Intent	The stated purpose or desired end state of a commander in the accomplishment of the assigned mission.
Common Operational Picture (COP)	A single identical display of relevant information shared by more than one command. A common operational picture facilitates collaborative planning and assists all echelons to achieve situational awareness.
Common Relevant Operational Picture (CROP)	A presentation of timely, fused, accurate, and relevant information that can be tailored to meet the requirements of the Joint Force Commander and the joint force and is common to every organization and individual involved in a joint operation.
Computer Network Attack (CNA)	Operations to disrupt, deny, degrade, or destroy information resident in computers and computer networks, or the computers and networks themselves. Electronic attack (EA) can be used against a computer, but it is not CNA. CNA relies on the data stream to execute the attack while EA relies on the electromagnetic spectrum
Computer Network Defense (CND)	Defensive measures to protect and defend information, computers, and networks from disruption, denial, degradation, or destruction.
Computer Network Exploitation (CNE)	Intelligence collection and enabling operations to gather data from target adversary automated information systems (AIS) or networks
Computer Network Operations (CNO)	Comprised of Computer Network Attack (CNA), Computer Network Defense (CND), and Computer Network Exploit (CNE), collectively.
Concept of Operations Plan (CONPLAN)	A verbal or graphic statement, in broad outline, of a commander's assumptions or intent in regard to an operation or series of operations. The concept of operations is frequently embodied in campaign plans and operation plans; in the latter case, particularly when the plans cover a series of connected operations to be carried out simultaneously or in succession. The concept is designed to give an overall picture of the operation. It is included primarily for additional clarity of purpose. Also called commander's concept.
Course of Action (COA)	1. Any sequence of activities that an individual or unit may follow. 2. A possible plan open to an individual or commander that would accomplish, or is related to the accomplishment of the mission. 3. The scheme adopted to accomplish a job or mission. 4. A line of conduct in an engagement. 5. A product of the Joint Operation Planning and Execution System concept development phase.

Cumulative Nature of Effects	Cumulative effects result from the aggregate of many direct or indirect effects. This may occur at the same or at different levels of war as the contributing lower-order effects are achieved. However, cumulative effects typically occur at higher levels of war. As an example, increased operational-level air superiority would be the cumulative effect of destroying numerous surface-to-air-missile (SAM) sites at the tactical level.
Decision Superiority	The ability of the commander, based upon information superiority and situational understanding, to make effective decisions more rapidly than the adversary, thereby allowing one to dramatically increase the pace, coherence, and effectiveness of operations.
Decisive Operations	Those operations assigned to or undertaken by the U.S. military in which there is a firm or conclusive resolution.
Defeat Mechanisms	The best arrangement of ways and means to destroy the adversary's coherency and achieve our Rapid Decisive Operations campaign objectives.
Deficiency Analysis	Analysis of the tools or means employed in effects-based operations.
Desired Effects	The damage or casualties to the enemy or material which a commander desires to achieve from a nuclear weapon detonation. Damage effects on material are classified as light, moderate, or severe. Casualty effects on personnel may be immediate, prompt, or delayed.
Desired Operational Capability (DOC)	A concept based statement of the ways and means to satisfy a JFC's capabilities requirements. A fully articulated DOC identifies subordinate tasks, associated conditions, and criteria for measurement.
Diplomatic, Information, Military and Economic (DIME)	Areas of national power that are leveraged in "effects-based" operations against an adversary's vulnerabilities identified by Operational Net Assessment, and targeted against his will and capability to conduct war.
Direct Effects	Direct effects are immediate, first-order effects, the results of military actions with no intervening effect or mechanism between act and outcome, and are usually easily recognizable.

Dominant Maneuver	The ability of joint forces to gain positional advantage with decisive speed and overwhelming operational tempo in the achievement of assigned military tasks. Widely dispersed joint air, land, sea, amphibious, special operations and space forces, capable of scaling and massing force or forces and the effects of fires as required for either combat or noncombat operations, will secure advantage across the range of military operations through the application of information, deception, engagement, mobility, and counter-mobility capabilities.
Effect	The physical, functional, or psychological outcome, event, or consequence that results from specific military or non-military actions.
Effects Tasking Order (ETO)	Formalizes output of JTF virtual collaborative planning. It is the means to task and synchronize the actions and orders required to achieve the commander’s intent. ETOs replace the current operations orders (OPORDs) and Fragmentary Orders (FRAGOs) issued as required to support current and future operations. They do not replace component execution planning and execution orders.
Effects-Based Operations (EBO)	A process for obtaining a desired strategic outcome or “effect” on the enemy, through the synergistic, multiplicative, and cumulative application of the full range of military and nonmilitary capabilities at the tactical, operational, and strategic levels
Effects-Based Planning (EBP)	An operational planning process to conduct EBO within RDO. EBP is results-based vice attrition-based. EBP closely mirrors the current joint planning process, yet focuses upon the linkage of actions to effects to objectives. EBP changes the way we view the enemy, ourselves, and what is included and emphasized in the planning process. EBP uses a flexibly-structured battle rhythm that leverages a collaborative knowledge environment and capitalizes on the use of fewer formal joint boards. It employs virtual, near-simultaneous planning at all echelons of command.
Effects-Based Strategy	The coherent application of national and alliance elements of power through effects-based processes to accomplish strategic objectives.
Effects-Based Targeting	The focus of the targeting process is to produce COAs that will change the enemy's behaviors and compel him to comply with our will. The behavioral changes we attempt to create are the result of effects that flow from the employment of our lethal and nonlethal capabilities. Thus, effects-based targeting is distinguished by the ability to generate the type and extent of effects necessary to create outcomes that facilitate the realization of the commander's objectives.

Effects-Based Warfare	The application of armed conflict to achieve desired strategic outcomes through the effects of military force.
Electronic Warfare (EW)	A component of Information Operations (IO). Any military action that involves the use of electromagnetic and directed energy to control the electromagnetic spectrum or to attack the adversary. The SJFHQ should ensure coordination among EW and other IO, intelligence, and communications support activities for maximum effect and to reduce electronic fratricide. This coordination is necessary to ensure effective exchange of information, eliminate undesirable duplication of effort, and provide mutual support.
End State	What the POTUS and SECDEF want the situation to be when operations conclude – both military operations as well as those where the military is in support of other instruments of national power.
Expeditionary Aerospace Force	The U.S. Air Force concept of an expeditionary force capable of carrying out assigned air missions from forward deployed bases or long-range missions from home bases.
Field Experiment	Wargames conducted in the actual environment with actual military units and equipment. As such, these experiments have the highest applicability of results to real situations. Good field experiments, like good military exercises, are the closet thing to real challenges of actual operations; the ability to isolate the true cause of any detected change will suffer.
Flexible Deterrent Option (FDO)	A planning construct intended to facilitate early decision by laying out a wide range of interrelated response paths that begin with deterrent-oriented options carefully tailored to send the right signal. The flexible deterrent option is the means by which the various deterrent options available to a commander (such as economic, diplomatic, apolitical, and military measures) are implemented into the planning process.
Focus Area	That area of the CINC's AOR identified by the Commander for the SJFHQ to focus their efforts in ONA development, based on ambiguous indications of potential crisis.
Focused Logistics	The ability to provide the joint force the right personnel, equipment, and supplies in the right place, at the right time, and in the right quantity, across the full range of military operations.
Force Health Protection	The health and medical portion of agile sustainment operations.

Fragmentary Order (FRAGO)	An abbreviated form of an operation order, usually issued on a day-to-day basis, which eliminates the need for restating information contained in a basic operation order. It may be issued in sections.
Full Dimensional Protection	The ability of the joint force to protect its personnel and other assets required to decisively execute assigned tasks. Full dimensional protection is achieved through the tailored selection and application of multi-layered active and passive measures, within the domains of air, land, sea, space, and information across the range of military operations with an acceptable degree of risk.
Full Spectrum Dominance	1. The ability of U.S. forces, operating unilaterally or in combination with multinational and interagency partners, to defeat any adversary and control any situation across the full range of military operations. 2. The interdependent application of DM, PE, FL, and full dimensional protection utilized in order for the joint force to accomplish its mission.
Functional Components	Composed of two or more military departments that may be established across the range of military operations to perform particular operational missions that may be of short duration or may extend over a period of time.
Global Information Grid	The worldwide information network currently being developed by the U.S. that will link all data and communications networks together in a seamless environment. The globally interconnected, end-to-end set of information capabilities, associated processes, and personnel for collecting, processing, storing, disseminating, and managing information on demand to warfighters, policy makers, and support personnel.
Hierarchy of Experimentation	Shows the general hierarchical flow as a warfighting concept moves from inception to maturity
Indirect Effects	Indirect effects are second- and third-order systemic effects that are the results created through an intermediate effect or mechanism to produce the final outcome, which may be physical or psychological in nature. Indirect effects tend to be delayed, may be difficult to recognize, and are often a cumulative or cascading result of many combined direct effects.
Information	1. Facts, data, or instructions in any medium or form. 2. The meaning that a human assigns to data by means of the known conventions used in their representation.

Information Environment	The aggregate of individuals, organizations, or systems that collect, process, or disseminate information; also included is the information itself.
Information Operations	Those actions taken to affect an adversary's information and information systems while defending one's own information and information systems.
Information Superiority	That degree of dominance in the information domain, which permits the conduct of operations without effective opposition. The capability to collect, process, and disseminate an uninterrupted flow of information while exploiting or denying an adversary's ability to do the same.
Information Superiority Campaign	The desired outcome of the information superiority (IS) campaign is to create an imbalance of knowledge in our favor, in order to understand the adversary while denying him the ability to gather and exploit information on friendly forces.
Information Superiority Group	The group responsible for coordinating activities that contribute to building information and knowledge superiority within the JTF, enabling informed decision-making. The group conducts an initial assessment of the information environment and the ability to achieve and maintain information superiority.
Information System	The entire infrastructure, organization, and components that collect, process, store, transmit, display, disseminate, and act on information.
Information Workspace (IWS) Version 2.5	A virtual collaborative tool engineered for groups that work in multiple locations. It is based on a virtual environment. Each virtual building can represent an actual location or group of users. Within each building are floors which contain several rooms. These rooms can be organized as required to facilitate access to information and people. Part of the Collaborative Information Environment (CIE).
Integration Matrix	Part of an Effects Tasking Order that synchronizes component and Interagency Community actions in time, space and outcome.
Intelligence	The product resulting from the collection, processing, integration, analysis, evaluation, and interpretation of available information concerning foreign countries or areas. Also, information and knowledge about an adversary obtained through observation, investigation, analysis, or understanding.

Interagency Communities (IAC)	Overall term applied to those appropriate government and non-government organizations that are critical to conducting "effects-based operations" from deliberate planning to execution operations and transition operations. These interagency organizations would be part of the CINC and SJFHQ "collaborative environment."
Intermediate Staging and Support Base (ISSB)	A temporary location used to both stage forces and to locate sustainment and maintenance support when anti-access conditions and/or infrastructure in the JOA preclude early entry.
Joint Effects Area (JEA)	An area of land, sea, airspace defined by a Geographic Combatant Commander or Subordinate Unified Commander, in which a JTF Commander (JFC) integrates the military actions required to conduct the full range of Diplomatic, Information, Military, and Economic (DIME) actions necessary to achieve the effects required to achieve a specific operational mission. The JFC does not have to own an asset to exploit its employment within the JEA, i.e., have COCOM, OPCON. Operations by forces and capabilities assigned to the JFC are informed by, and inform, those actions conducted by non-assigned organizations or agencies operating within the JEA to achieve the same operational mission. A Primary Area of Military Operations (PAMO) may be established within the JEA to define and confine the area of primary military action w/o restricting the actions required outside this area to achieve the Commander's intent and mission.
Joint Experimentation	Application of scientific experimentation procedures to assess the effectiveness of proposed (hypothesized) joint warfighting concept elements to ascertain whether elements of a joint warfighting concept cause changes in military effectiveness.
Joint Force Commander (JFC)	A general term applied to a combatant commander, subunified commander, or joint task force commander (CJTF) authorized to exercise combatant command (command authority) or operational control over a force.
Joint Intelligence Preparation of the Battlespace (JIPB)	The analytical process used by joint intelligence organizations to produce intelligence assessment, estimates and other intelligence products in support of the Joint Force Commander's decision making process. It is a continuous process that includes defining the total battlespace environment; describing the battlespace's effects; evaluating the adversary; and determining and describing adversary potential courses of action.

Joint Interactive Planning (JIP)	Planning between the different Service commanders in a joint environment that takes place through the utilization of multiple electronic or communications systems in which responses are direct and continual.
Joint Mission Force	That military force that shares a common mission or goal that will allow for the overall attainment or success in completion of the assigned task.
Joint Network Control Officer (JNCO)	A member of the SJFHQ Information/Knowledge Management Group who establishes the systems architecture to support RDO, based on the JTF commander's operational architecture. The JNCO is also responsible for coordinating network management activities for the SJFHQ.
Joint Support Base (JSB)	A tailorable, temporary location on land or sea, designated by the JFC, used for the staging, sustainment, succor or maintenance of forces inserting into, extracting from, or conducting operations in a designated area.
Joint Tactical Actions (JTA)	Specific actions/engagements planned and executed by a Joint Force Commander (CJTF, JFACC, JFLCC, JFMCC) intended to achieve an effect that requires the capabilities of more than one Service or agency. JTAs are executed by mission-tailored joint force packages normally formed as short-term formations.
Joint Tactics, Techniques, and Procedures (JTTP)	The actions and methods that implement joint doctrine and describe how forces will be employed in joint operations. They will be promulgated by the Chairman of the Joint Chiefs of Staff, in coordination with the combatant commands, Services, and Joint Staff.
Key Enabler	That crucial element that supplies the means, knowledge, or opportunity that allows for the success of an assigned task or mission.
Knowledge	1. Familiarity, awareness, or understanding gained through experience or study. 2. The sum or range of what has been perceived, discovered, or learned.
Knowledge Network	A set of concepts related to providing critical information to the warfighter. It enables the most effective use of the information in a collaborative manner to conduct multi-level planning, execution, and assessment of military operations. It includes the Common Relevant Operational Picture (CROP), Joint Interactive Planning (JIP), and Adaptive Joint Command and Control (AJC2) concepts.

Leveraged Events	A leveraged event is an experiment, exercise, or demonstration "owned" by some other organization. Service or CINC experiments, training exercises, or wargames frequently provide these opportunities. While the event owner's objectives are always the primary event driver, there frequently are opportunities within those events to address JFCOM's experimental objective.
Liaisons	Personnel responsible for maintaining contact or intercommunication between elements of military forces or other agencies to ensure mutual understanding and unity or purpose and action. Liaisons may be provided from and to government agencies, nongovernmental organizations, international organizations, and coalition partners or allies.
Low-Fidelity Experiments	A low-fidelity experiment is one where there is an unknown or little-trusted knowledge level in the execution or outcome of the experiment.
Measures of Effectiveness (MOE)	Measures of effectiveness are most often subjective indicators that the outcomes of the "tactical actions" have achieved, or contributed to achieving the desired effect. MOE articulate where to look and what to measure in order to determine if the desired effect has been achieved.
Measures of Performance (MOP)	The objective metrics of the "outcomes" of "tactical actions," MOP are assessed at the component level as a result of the "tactical actions" performed to achieve a desired effect, i.e., were the targets hit and what level of damage was achieved.
Military Deception	A component of Information Operations. Actions executed to deliberately mislead adversary military decision makers as to friendly military capabilities, intentions, and operations, thereby causing the adversary to take specific actions (or inactions) that will contribute to the accomplishment of the friendly mission.
Mission	1. The responsibility of the Component Commander assigned by the ETO as the Supported Commander, who in coordination with Supporting Component Commanders, will conduct operations to achieve the JFC's intent and desired effect. 2. The task, together with the purpose, that clearly indicates the action to be taken and the reason therefore. The Component Commander assigns his tactical units Joint Tactical Actions in coordination with the tactical units of the Supporting Component Commanders.
Non-Contiguous Operations	Operations where one or more of the subordinate operations do not share a common boundary.

Objective	The physical object of the actions taken, e.g., a definite tactical feature, the seizure of holding of which is essential to the commander's plan. For purposes of RDO and the description of effects-based philosophy, the term objective is used in the broader sense of end state rather than physical objective.
Objective Force	The strategically responsive force that will result from the Army's transformation process. The objective force, capable of dominating at every point on the spectrum of conflict, will be characterized by its responsiveness, deployability, agility, versatility, lethality, survivability, and sustainability.
Open-Source Intelligence (OSINT)	Information of potential intelligence value that is available to the general public. See also intelligence
Operational Level of War	The level of war at which campaigns and major operations are planned, conducted, and sustained to accomplish strategic objectives within theaters or areas of operations. Activities at this level link tactics and strategy by establishing operational objectives needed to accomplish the strategic objectives, sequencing events to achieve the operational objectives, initiating actions, and applying resources to bring about and sustain these events. These activities imply a broader dimension of time or space than do tactics; they ensure the logistic and administrative support of tactical forces, and provide the means by which tactical successes are exploited to achieve strategic objectives. See also strategic level of war; tactical level of war.

Operational Net Assessment (ONA)	A continuously updated operational support tool that provides a JTF commander visibility of effects-to-task linkages based on a "system-of-systems" analysis of a potential adversary's political, military, economic, social, infrastructure, and information (PMESII) war-making capabilities. The ONA informs decision-makers from strategic to tactical levels regarding the complementary effects and supporting missions and tasks that can be considered when applying the full range of diplomatic, information, military and economic (DIME) actions to achieve specific effects on an adversary's will and capability in support of national objectives. ONA is a critical enabler for achieving rapid decisive operations. It is an integrated, collaborative product of Department of Defense and other appropriate government and non-government organizations. Its purpose is to identify key links and nodes within the adversary's systems and to propose methods that will influence, neutralize or destroy them and achieve a desired effect or outcome.
Operational-Level Effects	Operational effects influence activities at the operational level of war and focus on campaigns and operational objectives.
Operations Order (OPORD)	A directive issued by the commander to subordinate commanders for the purpose of affecting the coordinated execution of an operation.
Physical Attack	Refers to the use of "hard kill" weapons against designated information-related targets as an element of an integrated IO effort.
Physical Attack	Physical attack refers to the use of "hard kill" weapons against designated information related targets as an element of an integrated IO effort
Plug	A cell of personnel that provide a specific mission capability not organic to the SJFHQ.
Political, Military, Economic, Social, Infrastructure, and Information (PMESII)	Vulnerabilities identified by the ONA. These are researched as "systems of systems" networks that can be exploited by effects-based operations to affect an adversary's war-making/ warfighting will and capability.
Precision Engagement	The ability of joint forces to locate, surveil, discern, and track objectives or targets; select, organize, and use the correct systems; generate desired effects; assess results; and reengage with decisive speed and overwhelming operational tempo as required, throughout the full range of military operations.
Primary Area of Military Operations (PAMO)	An area defined and confined as that area in which primary military action is conducted without restricting the actions required outside this area to achieve the Commander's intent and mission.

Psychological Operations (PSYOP)	A component of Information Operations. PSYOP are actions taken to convey selected information and indicators to foreign audiences. They are designed to influence emotions, motives, reasoning, and ultimately, the behavior of the adversary. Examples of PSYOP include distribution of leaflets, loud-speaker broadcasts, radio and television broadcasts, and other means of transmitting information that encourages adversary forces to defect, desert, flee, or surrender.
Public Affairs (PA)	Those public information, command information, and community relations activities directed toward both the external and internal publics with interest in the Department of Defense. PA activities expedite the flow of accurate and timely information to the internal audience (the SJFHQ and the JTF) and the external audience (the public). Increasing availability of this information to these audiences may have a significant effect on national will, political direction, and national security objectives and policy. PA activities will not be used in support of military deception capability or to provide disinformation to either audience.
Rapid Decisive Operations (RDO)	Rapid decisive operations is a concept for future operations. A rapid decisive operation will integrate knowledge, C2, and operations to achieve the desired political/military effect. In preparing for and conducting a rapid decisive operation, the military acts in concert with and leverages the other instruments of national power to understand and reduce the regional adversary's critical capabilities and coherence. The U.S. and its allies asymmetrically assault the adversary from directions and in dimensions against which he has no counter, dictating the terms and tempo of the operation. The adversary, suffering from the loss of coherence and unable to achieve his objectives, chooses to cease actions that are against U.S. interests or has his capabilities defeated.
Relevant Information	The full range of necessary information about friendly forces, the enemy, the battlespace, and anything else that affects operational decision-making.
Share Point Portal Server	An enhanced information management tool, part of the virtual Collaborative Information Environment (CIE), streamlining document management for the JTF.
Ship-to-Objective Maneuver (STOM)	The concept of maneuvering landing forces directly to objectives ashore in order to avoid the necessity of establishing a beachhead and avoiding enemy defensive efforts.

Standing Joint Force Headquarters (SJFHQ)	Intended to provide each warfighting joint theater CINC with a trained and equipped standing, Joint Command and Control (C2) capability specifically organized to reduce the lag time involved in setting up a JTF headquarters ready to rapidly and decisively conduct operations in small-scale contingencies.
Strategic-Level Effects	Strategic effects influence activities at the strategic level of war and focus on national and multinational military objectives. Rarely will attacking a single target directly result in the desired strategic effect. The limited exceptions to this rule involved such exceptional circumstances as a successful action against a uniquely irreplaceable center of gravity.
System	Any organized assembly of resources and procedures united and regulated by interaction or interdependence to accomplish a set of specific functions.
System of Systems	A grouping of organized assemblies of resources, methods, and procedures regulated by interaction or interdependence to accomplish a set of specific functions. For example, a “system of systems” could include the economic entities in a nation such as the banking system, production system, etc.
Tactical-Level Effects	Tactical effects influence activities at the tactical level of war and focus on battles and engagements to accomplish military objectives.
Target	An area, complex, installation, force, equipment, capability, function or behavior identified for possible action to support the commander’s objectives, guidance, and intent.
Targeting	The process to detect, select, and prioritize targets; match the appropriate action; and assess the resulting Effects-based on the commander’s objective, guidance, and intent. Targeting is both a joint- and component-level command function that selects targets, which meet military objectives; determines desired effects, and selects or tasks the means to achieve those effects.
Technologies	1. The application of science, especially to industrial or commercial objectives. 2. The scientific method and material used to achieve a commercial or industrial objective.
Time-Phased Force and Deployment Data (TPFDD)	Units to be deployed to support the operation plan with a priority indicating the desired sequence for their arrival at the port of debarkation.
Time-Sensitive Targets (TST)	Those targets which require immediate response because they pose (or will soon pose) a clear and present danger to friendly forces or are highly lucrative, fleeting targets of opportunity.

Transformation	The creation of a force that is dominant across the full spectrum of military operations – persuasive in peace, decisive in war, preeminent in any form of conflict.
UNIFIED VISION (UV) 01	UV 01 was a major concept-refinement experiment run by the Joint Experimentation Directorate, U.S. Joint Forces Command JWFC in May of 2001.
Virtual Simulation	Virtual experiments employ human-in-the-loop simulations. The prototype virtual simulation is the flight simulator. In a command and control virtual simulation experiment, a sensor operator might receive real-time simulated sensor inputs and makes real-time decisions to launch simulated weapons against simulated targets.
White paper	A white paper is the principal tangible product of concept development and describes the concept in sufficient detail for experimentation. It describes the desired capabilities necessary to implement the concept. The white paper states the concept's hypothesis for assessment through experimentation. It contains a fully developed operational concept and an associated experimentation strategy. The JWEBL publishes white papers in serial editions. The 0.5 version is a product of basic research. Concepts ready for experimentation have a 1.0 version, with higher numbers showing the continued refinement of the concept.
Working Group	Informal, non-standing organizations that are mission-tailored for a specific event or action. Working Groups provide input to Centers, Boards, and Cells.

Acronyms

A

AAD	Area Air Defense Commander
AAMDC	Army Air and Missile Defense Command
ABCS	Army Battle Command System
ABLS	Airborne Laser Simulation
ACC	Air Combat Command
ACE	Analysis Control Element
ACO	Airspace Control Order
ACT	Analysis Control Team
ACTD	Advanced Concept Technology Demonstration
ADA	Air Defense Artillery
ADOCS	Automated Deep Operations Coordination System
ADP	Air Defense Plan
ADS	Advanced Distributed Simulation
ADSI	Air Defense Systems Integrator
AE	Army Experiment
AEC	U.S. Army Evaluation Center
AECP	Army Experimentation Campaign Plan
AFAMS	Air Force Agency for Modeling and Simulation
AFATDS	Advanced Field Artillery Tactical Data System
AFC2TIG	Air Force Command and Control Training Innovation Group
AFF	Air Forces
AFIWC	Air Force Information Warfare Center
AFRL	Air Force Research Library
AFSERS	Air Force Synthetic Environment for Reconnaissance and Surveillance
AFSPC	Air Force Space Command
AIA	Air Intelligence Agency
ALERT	Attack and Launch Early Reporting to Theater
AMDWS	Air and Missile Defense Workstation
ANIF	Automatic Network Information Flow
AOC	Air Operations Center
AODA	Attack Operations Decision Aid
AOR	Area of Responsibility
APL	Applied Physics Lab
APOD	Aerial Port of Debarkation
ARFOR	Army Forces
ARSPACE	Army Space Command
ARSST	Army Space Support Teams
ASAS	All Source Analysis System
ASI/IMCN	AOC Simulation Interface
ASOC	Air Support Operations Center
ASPO	Army Space Program Office
ASSET	Automated Scripted Simulator Exercise Trainer

AST	ATEC System Team
ASTAB	Automated Status Board
ASW	Anti-Submarine Warfare
ATACMS	Army Tactical Missile System
ATCCS	Army Tactical Command and Control Systems
ATD	Advanced Technology Demonstration
ATEC	U.S. Army Test and Evaluation Center
ATECP	Army Transformation Experiment Campaign Plan
ATEx02	Army Transformation Experiment 2002
ATI	AWSIM-TBMCS Interface
ATLOS	Acoustic Transmission Loss Sensor
ATO	Air Tasking Order
AUTODIN	Automatic Digital Network
AUTO SIGS	Auto Synthetic Imagery Generation System
AWACS	Airborne Warning and Control System
AWE	Advanced Warfighting Experiment
AWSIM	Air Warfare Simulation

B

BCC	Battle Control Center
BCD	Battlefield Coordination Detachment
BCT	Brigade Combat Team
BDA	Battle Damage Assessment
BFA	Battlefield Functional Area
BFTT	Battle Force Tactical Trainer
BMDN	Ballistic Missile Defense Network
BMDO	Ballistic Missile Defense Office
BOS	Battlefield Operating Systems
BRITE	Broadcast Remote Intelligence Technology Experiment

C

C2	Command and Control
C3	Command, Control, and Communications
C^2IPS	Command and Control Information Processing System
C^2PC	Command and Control Personal Computer
C^2W	Command and Control Warfare
C^4I	Command, Control, Communications, Computers, Intelligence
C^4IGWC^4I	Gateway
C^4ISR	Command, Control, Communications, Computers, Intelligence, S Surveillance, and Reconnaissance
CAOC	Combined Air Operations Center
CART	Crisis Action Response Team

CAS	Close Air Support
CATT	C^2W Analysis and Targeting Tool
CCDA	Command Center Decision Aids
CE	Civil Environment
CEM	Civil Environment Model
CEOI	Communications – Electronics Operating Instructions
CGS	Common Ground Station
CIS	Combat Intelligence System
CIWS	Close In Weapons System
CLGPS	Chicken Little Global Positioning System
CMO	Central MASINT Organ
CNO	Computer Network Operations
COMINT	Communications Intelligence
COMWX	Computered MASINT Weather
CONOPS	Concept of Operations
COP	Common Operational Picture
CORBA	Common Object Request Broker Architecture
CPX	Command Post Exercise
CRC	Control and Reporting Center
CRE	Control and Reporting Element
CROP	Common Relevant Operational Picture
CSIL	Commercial Satellite Imagery Library
CSP	Communication Support Processor
CSSCS	Combat Service Support Control System
CST	Common Operation Picture (C) Synchronization Tool
CSTAR	Combat Synthetic Training Assessment Range
CT	Capability Test
CTAPS	Contingency Theater Automated Planning System
CTDB	Compact Terrain Database
CUSP	Coupled Urban Dispersion Model (UDM) and SCIPUFF
CWHS	Carrier Weapon Handling System

D

DACP	Division Assault Command Post
DAG	Data Authentication Group
DAMA SUCCESS	Demand Assigned Multiple Access (DAMA) SUCCESS (Radio)
DBCC	Dynamic Battle Control Cell
DBM	Database Manager
DBST	Digital Battlestaff Sustainment Trainer
DCARS	Digital Collection Analysis and Review
DCE	Dynamic Communications Environment DCGS Distributed Common Ground Station
DCSCD	Deputy Chief of Staff for Combat Developments

DCTS	Defense Collaborative Tool Suite
DCE	Division Capstone Exercise/Digital Force Coordination Cell
DIA	Defense Intelligence Agency
DICE	Distributed Information Warfare Constructive Environment
DIS	Distributed Interactive Simulation
DISN	Defense Information Systems Network
DJFN	Digital Joint Fires Network
DLRC	Digital Leader Reaction Course
DM	Dominant Maneuver
DMPI	Desired Mean Point of Impact
DMTIX	Dynamic Moving Target Information Exploitation
DNBI	Disease and Non-Battle Injury
DOD	Department of Defense
DOTMLPF	Doctrine, Organization, Training, Material, People, and Leadership
DP	Dimensional Protection
DS^3	Distributed Sensor Simulation System
DSICS	Distributed Signal Intelligence Collection System
DSN	Defense Switching Network
DTC	U.S. Army Developmental Test Command
DTDL	Deployed Theater Downlink
D-TES	Division – Tactical Exploitation System
DTF	Digital Target Folders
DTLMOS	Doctrine, Training, Leader Development, Material, Organization, Soldier
DTS	DIS Tool Set
DTSS	Digital Topographic Support System
DTSS-D	Digital Topographic Support System - Deployable

E

EAB	Echelons Above Brigade
EAC	Echelon Above Corps
EADSIM	Extended Air Defense Simulation
EBO	Effects-Based Operations
EC	Electronic Combat
ECC	Exercise Coordination Cell
ECS	Engagement Control Station (Patriot)
EFX	Expeditionary Force Experiment
EIW – Light	Enhanced Imagery Workstation - Light
ELINT	Electronic Intelligence
EMPRS	Enroute Mission Planning and Rehearsal System
EMT	Expert Missile Tracker
EPLRS	Enhanced Position Location Reporting System
ESC	Electronic Systems Command

ESG	Expeditionary Sensor Grid
ESM	Electronic Support Measures
ETC	Exercise Technical Control
ETF	Electronic Target Folders

F

FAADC^{3}I	Forward Area Air Defense Command, Control, Communications, and Intelligence
FBCB^2	Force XXI Battle Command Brigade and Below
FBE	Fleet Battle Experiment
FCTC	Fleet Combat Training Center
FDDI	Fiberoptic Distribution Data Interface
FDO	Flight Deck Operations
FID	Federation Implementation Document
FIRESIM	Fire Simulation
FMS-D	Flight Mission Simulator – Digital (Patriot)
FOM	Federation Object Model
FT	Functional Test

G

GALE-L	Generic Area Limitation Environment - Lite
GAWSGIAC	Analytical Workstation
GBS	Global Broadcast Service
GCCS	Global Command and Control System
GCCS-A	Global Command and Control System – Army
GCCS-I^3	Global Command and Control System – Intelligence, Imagery and Information
GCCS-M	Global Command and Control System – Maritime
GCN	Ground Communications Node
GDS	Generic Data Server
GEED	Geophysical Environmental Effects Distributor
GIAC	Graphical Input Aggregate Control
GISR-C	GCCS Intelligence Surveillance Reconnaissance Component
GLCM	Ground Launched Cruise Missile
GPS	Global Positioning System
GSM	Global System for Mobile Communications
GSTF	Global Strike Task Force
GTN	Global Transaction Network/Global Transportation Network

H

HIMAD	High and Medium Altitude Missile Air Defenses
HLA	High Level Architecture
HRSS	High Resolution Systems Simulator
HSV	High Speed Vessel
HUMINT	Human Intelligence

I

IADS	Integrated Air Defense System
IAS	Intelligence Analysis Station
IBIS	Integrated Battlefield Intelligence System
ICC	Information and Coordination Central (Patriot)
ICD	Interface Control Document
ICE	Interactive Constructive Environment
IDM	Improved Data Modem
IDS	Intrusion Detection System
IIR	Initial Imagery Report
IM	Integration Milestone
IMETS	Integrated Meteorological and Environmental Terrain System
IMETS – L	Integrated Meteorological System - Light
IMINT	Information Management Intelligence
IMO	Information Management Officer
IMPACT	Integrated Modeling Platform for Advanced Computational Technologies
INTEL	Intelligence
IO	Information Operations
I/O	Input/Output
IOS	USMC Integrated Operations System (TCO & IAS)
IPIR	Initial Photographic Interpretation Report
IPL	Image Product Library
IPRNET	Internet Protocol Router Network
IRDM	Information Retrieval and Delivery Management
IS-C^2	Information Superiority Command and Control
IWEG	Information Warfare Effects Generator

J

JASGS	Joint Automated Single Guard Solution
JBC	Joint Battle Center
JBMI	Joint Battle Management Integration
JCAS	Joint Command and Control Attack Simulation
JCATS	Joint Conflict and Tactical Simulation
JCC	JTASC Control Center
JCF	Joint Contingency Force
JCSE	Joint Continuous Strike Environment
JDISS	Joint Deployable Intelligence Support System

JDPI	Joint Deployment Process Improvement
JECEWSI	Joint Electronic Combat-Electronic Warfare Simulation
JECG	Joint Exercise Control Group
JEFX	Joint Expeditionary Force Experiment
JEMIS	Joint Event Management Information System
JESNET	JTASC Exercise Support Network
JETF	Joint Electronic Target Folder
JFACC	Joint Force Air Component Commander
JFC	Joint Force Commander
JFI	Joint Fires Initiative
JFLCC	Joint Force Land Component Commander
JFMCC	Joint Force Maritime Component Commander
JGG	Joint Ground Game (JQUAD+)
JHU	Johns Hopkins University
JICO	Joint Interface Control Officer
JIMM	Joint Interim Mission Model
JIOC	Joint Information Operations Center
JISR	Joint Intelligence, Surveillance, and Reconnaissance
JISRM	Joint Intelligence, Surveillance, and Reconnaissance Management
JMedSAF	Joint Medical Simi-Automated Forces
JMEWS	Joint Medical Work Station
JNETS	Joint Networks Simulation
JNIC	Joint National Integration Center
JOISIM	Joint Operations Information Simulation
JOTBS	Joint Operational Test Bed System
JOVE	Joint Operations Visualization Environment
JQUAD	The System Consisting of: JCAS, JECEWSI, JNETS, and JOISIM
JSAF	Joint Semi-Automated Forces (NAVFOR simulation)
JSF	Joint Strike Fighter
JSOP	Joint Standard Operating Procedure
JSOTF	Joint Special Operations Task Force
JSS	JSTARS Simulation
JST	JWFC Support Team
JSTARS	Joint Surveillance Target Acquisition Radar System
JSWS	JSTARS Work Station
JTAV	Joint Total Asset Visibility
JTAGS	Joint Tactical Ground Station
JTASC	Joint Training, Analysis and Simulation Center
JTF	Joint Task Force
JTIDS	Joint Tactical Information Distribution System
JTMD	Joint Theater Missile Defense
JTT – B	Joint Tactical Terminal – Briefcase
JWEBL	Joint Warfighting Experimentation Battle Lab
JWFC	Joint Warfighting Center

JWICS	Joint Worldwide Intelligence Communications System

L

LAN	Local Area Network
LAWS	Land Attack Weapons System
LEAPS	LOCAAS Engagement Analysis Program Simulation
LOGSIM	Logistics Simulation
LRSD	Long Range Surveillance Detachment
LVRS	Lightweight Video Reconnaissance System

M

M&E	Mapping and Enumerations
M&S	Modeling and Simulation
MAGTF	Marine Air Ground Task Force
MAIS	Material Acquisition Integrated System/Mobile Automated Instrumentation Suite
MARCI	Multi-host Automation Remote Control and Instrumentation
MARFOR	Marine Corp Forces
MASINT	Measurements and Signatures Intelligence
MATT	Multi-Mission Advanced Tactical Terminal
MCE	Modular Control Element (AN/TYQ-23)
MCM	Mine Countermeasures
MCS	Maneuver Control System
MDS/RPM	Mission Database System
MDST	Missile Defense Space Warning Tool
METOC	Meteorological Operations
MIDB	Modernized Integrated Database
MISREP	Mission Report
$MLST^3$	Multi Link System Test and Training Tool
MOUT	Military Operations in Urban Terrain
MSC	Mission Support Center
MSEL	Master Scenario Events List
MSIM	Master Simulation
MSTP	MAGTF Staff Training Program
MTI	Moving Target Indicator
MTO	Maritime Tasking Order
MTIX	Moving Target Information Exploitation
MUSE	Multiple UAV Simulation Environment
MUST	Multi-mission UHF Satellite Transceiver

N

NAVFOR	Naval Forces

NJI	Naval JSTARS Interface (GCCS-M)
NMC	Network Management Center
NRO	National Reconnaissance Office
NSC	National Simulation Center
NTDS	Navy Tactical Data System
NUWC	Naval Undersea Warfare Center
NWARS	National Wargaming System
NWDC	Naval Warfare Development Command

O

OASES	Ocean Atmosphere Space Environmental Services
OMFTS	Operational Maneuver from the Sea
ONA	Operational Net Assessment
OPCON	Operational Control
OPFOR	Opposing Force
OSD	Operational Sequence Diagram
OTB	OneSAF Testbed Baseline
OTH-G	Over-The-Horizon, Gold

P

PAC2	Patriot Anti-tactical missile Capability, Phase 2
PAC3	Patriot Anti-tactical missile Capability, Phase 3
PATRIOT	Phased Array Tracking to Intercept of Target
PC-SWAT	Personal Computer Shallow Water Acoustic Tool Kit
PDU	Protocol Data Unit
PE	Precision Engagement
PEGEM	Post-Engagement Effects Model
POC	Point of Contact
POTS	Plain Old Telephone Set
PSM+NAV	Portable Space Model Enhanced/Navigation
PTW+	Precision Targeting Workstation

Q

QC	Quality Check

R

RBECS	Revised Battlefield Electronic CEOI System
RC	Response Cell
RDO	Rapid Decisive Operations
RECCE	Reconnaissance
RECCEXREP	Reconnaissance Exploitation Report

RJMT	Rivet Joint Mission Trainer
RPM	Route Planning Module
RRF	Ready Room of the Future
RTI	Run Time Infrastructure
RTOS	Reconfigurable Tactical Operations Simulator
RTSS	Real Time Software System
RTV	Rapid Terrain Visualization

S

S507L	Blue Unit Report
SA	Situational Awareness
SAA	Situational Awareness and Analysis
SABRE	Synthetic Aero Battle Research Environment (AWSIM simulation in an HLA/RTI architecture)
SAC	Simulation Analysis Center (@ JWFC J9 Building)
SALUTE	Size, Activity, Location, Unit, Time, Equipment (Report)
SATS	Stand-Alone TENCAP Simulator
SBIRS	Space-Based Infrared System
SCIF	Sensitive Compartmented Information Facility
SDF	Simulation Data Flow
SDFD	Simulation Data Flow Diagram
SHF	Super High Frequency
SIGS	Synthetic Imagery Generation System
SIPRNET	Secret Internet Protocol Router Network
SITREP	Situation Report
SLAMEM	Simulation of the Location and Attack of Mobile Enemy Missiles
SMART	Secure Messaging And Routing Terminal
SMAT	Space Missile Analysis Tool
SMDBL	Space and Missile Defense Battle Lab
SME	Subject Matter Expert
SMV	Space Maneuver Vehicle
SOJ	Standoff Jammers
SOTVS	Special Operations Tactical Video System
SPJ	Self-Protection Jammers
SPOD	Sea Port of Debarkation
SNN	Simulation Network News
STAMPS	Stand Alone Message Processing System
STOM	Ship-to-Objective Maneuver
STRED	Standard Tactical Receive Equipment Display
STRICOM	Simulation, Training, and Instrumentation Command

T

TACCSF	Theater Air Command and Control Simulation Facility

TACELIN	Tactical Electronic Intelligence
TACFIRE	Tactical Fire Direction System
TACREP	Tactical Report
TACSAT	Tactical Satellite Terminal
TADIL	Tactical Digital Interface Link
TAIS	Tactical Air Intelligence System/Tactical Airspace Integration System
TAOC	Tactical Air Operations Center
TBA	Theater Battle Arena
TBM	Theater Ballistic Missiles
TBMCS	Theater Battle Management Core System
TBMD	Theater Ballistic Missile Defense
TCO	Tactical Combat Operations
TCT	Time Critical Targeting
TDDS	TRE/TRAP Data Dissemination System
TEL	Transporter, Erector, Launchers
TENCAP	Tactical Exploitation of National Capabilities
TES	Tactical Exploitation System
TES-N	Tactical Exploitation System - Naval
TIBS	Tactical Information Broadcast Service
TIMF	TIBS Inter-computer Message Format
TIRT	Tactical Imagery Rendering Tool
TIU/PC	TIBS Interface Unit/Personal Computer
TLAM	Tomahawk Land Attack Missile
TM	Test Manager
TOC	Tactical Operations Center
TPFDD	Time Phased Force Deployment Data
TPS-75	Air Defense radar (USAF)
TR	Trouble Report
TRAP	TRE and Related Applications
TRE	Tactical Receiving Equipment
TSIU	Tactical Simulation Interface Unit
TST	Time Sensitive TargetingTT Tactics, Techniques, and Procedures
TUAV	Tactical Unmanned Aerial Vehicle
TV	Technical Verification
TWS	Tactical Weather System
TXC4I	Targeting Experimental C4I

U

UAV	Unmanned Aerial Vehicle
UAVSIM	Unmanned Aerial Vehicle Simulation
UGS	Unattended Ground Sensor
UHF	Ultra High Frequency
UMS	Unattended MASINT Sensor
USJFCOM	U.S. Joint Forces Command

USMTF U.S. Message Text Format

V

VHF Very High Frequency
VIEW Virtual Interactive Environment Worldspace
VLAN Virtual Local Area Network
VLF Very Low Frequency
VMF Variable Message Format
VPN Virtual Private Network
VSSGN Virtual Submarine
VSTARS Virtual Surveillance Target and Attack Radar System JSTARS
VT Vignette Test
VTC Video Teleconference
VV&A Verification, Validation and Accreditation

W

WALTS Weapons Analysis and Lethality Toolkit
WAN Wide Area Network
WG Work Group
WOC Wing Operations Center
WS Work Station or Workstation

X

XC^4I Experimental Command, Control, Communications, Computers, I intelligence

Annex B — Baseline Report

This annex contains information that is identified as baseline information. It was used to support the assessment of the experimental concepts and objectives. The contents were extracted from a detailed report specifically written by USJFCOM J7 to support MC02.

Background. The baseline information originated from an initial set of 126 UJTL tasks that were identified as being relevant to the experimental concepts and objectives. This list is included at the end of this Annex. Analysts reviewed over 1,500 records extracted from over 60 after action reports of joint force training exercises, real world operations, and 4,500 records in the Joint Center for Lessons Learned Database. Data that was analyzed as being relevant to a JTF's ability to accomplish the identified Uniformed Joint Task List (UJTL) was selected for inclusion into the baseline. These selections and results were reference points to which MC02 results could be compared.

The baseline results are presented in their entirety and organized into the following nine sections:

UJTL Baseline Tasks
Top Ten Joint Task Force Challenges
Ad Hoc Joint Task Force Staff Manning
Forming on the Fly
Deployment Process
Experience Level of Joint Task Force Personnel
Information Management
Joint Task Force Headquarters Standing Operating Procedures and Tactics, Techniques, and Procedures
Integration of Joint Task Force Intelligence Assets

Universal Joint Task List Baseline Tasks (From Version 4.0)

OP 1.1	Conduct Operational Movement
OP 1.1.1	Formulate Request for Strategic Deployment to a Joint Operations Area (JOA)
OP 1.1.2	Conduct Intra-theater Deployment and Redeployment of Forces Within the JOA
OP 1.1.3	Conduct Joint Reception, Staging, Onward Movement, and Integration (JRSOI) in the JOA
OP 1.2	Conduct Operational Maneuver and Force Positioning
OP 1.2.1	Coordinate the Transition of Joint Forces to and from Tactical Battle Formations
OP 1.2.2	Posture Joint Forces for Operational Formations
OP 1.2.3	Assemble Forces in the JOA
OP 1.2.4	Conduct Operations in Depth
OP 1.2.4.4	Reinforce and Expand Lodgment
OP 1.2.4.6	Conduct Penetration, Direct Assault, and Turning Movements
OP 1.2.4.7	Conduct Direct Action in the JOA
OP 1.2.5	Conduct Offensive Operations in the JOA
OP 1.2.6	Conduct Defensive Operations in the JOA

OP 1.3	Provide Operational Mobility
OP 1.3.1	Overcome Operationally Significant Barriers, Obstacles, and Mines
OP 1.4	Provide Operational Counter Mobility
OP 1.5	Control Operationally Significant Areas
OP 1.5.4	Isolate the JOA
ST 2.2	Collect Theater Strategic Information
OP 2.1	Direct Operational Intelligence Activities
OP 2.1.1	Determine and Prioritize Operational Priority Intelligence Requirements (PIR)
OP 2.1.2	Determine and Prioritize Operational Information Requirements (IR)
OP 2.1.3	Prepare Operational Collection Plan
OP 2.1.4	Allocate Intelligence Resources in the JOA
OP 2.2	Collect and Share Operational Information
OP 2.2.1	Collect Information on Operational Situation
OP 2.2.4	Determine Logistical Capability of the JOA
OP 2.2.5	Collect Target Information
OP 2.3	Process and Exploit Collected Operational Information
OP 2.3.2	Collate Information
OP 2.3.3	Correlate Information
OP 2.4	Produce Operational Intelligence and Prepare Intelligence Products
OP 2.4.1	Evaluate, Integrate, Analyze, and Interpret Operational Information
OP 2.4.1.1	Identify Operational Issues and Threats
OP 2.4.1.2	Determine Enemy's Operational Capabilities, Course of Action, and Intentions
OP 2.4.1.3	Identify Friendly/Enemy/Neutral Centers of Gravity
OP 2.4.2	Prepare Intelligence for the JOA
OP 2.4.2.1	Provide Indications and Warning for the JOA
OP 2.4.2.2	Provide Current Intelligence for the JOA
OP 2.4.2.3	Provide General Military Intelligence for the JOA
OP 2.5	Disseminate and Integrate Operational Intelligence
OP 2.5.1	Provide Intelligence for the JOA
OP 2.6	Evaluate Intelligence Activities in the JOA
OP 3.1	Conduct Joint Force Targeting
OP 3.1.1	Establish Joint Force Targeting Guidance
OP 3.1.2	Apportion Joint/Multinational Operational Firepower Resources
OP 3.1.3	Develop Operational Targets
OP 3.1.4	Develop High-Payoff and High-Value Targets
OP 3.1.5	Publish Air Tasking Order(s) (ATO)
OP 3.1.6	Conduct Operational Combat/Military Operations Other than War Assessment
OP 3.1.6.1	Assess Battle Damage on Operational Targets
OP 3.1.6.3	Assess Re-attack Requirement
OP 3.1.7	Employ Fire Support Coordination Measures (FSCM)
OP 3.2	Attack Operational Targets
OP 3.2.2.1	Employ Psychological Operations (PSYOP) in the JOA
OP 3.2.2.3	Employ Information Attack in the JOA

OP 3.2.7	Synchronize Operational Firepower
OP 4	Provide Operational Logistics and Personnel Support
OP 4.1	Coordinate Supply of Arms, Munitions, and Equipment in the JOA
OP 4.2	Synchronize Supply of Fuel in the JOA
OP 4.3	Provide for Maintenance of Equipment in the JOA
OP 4.4	Coordinate Support for Forces in the JOA
OP 4.4.2	Provide for Personnel Services
OP 4.4.3.2	Manage Flow of Casualties in the JOA
OP 4.5	Manage Logistic Support in the JOA
OP 4.5.1	Provide for Movement Services in the JOA
OP 4.5.2	Supply Operational Forces
OP 4.5.3	Recommend Evacuation Policy and Procedures for the JOA
OP 4.6.1	Determine Number and Location of Sustaining Bases in the JOA
OP 4.6.2	Provide Civil-Military Engineering
OP 4.6.6	Manage Contracts and Contract Personnel
OP 4.7	Provide Politico-Military Support to other Nations, Groups and Government Agencies
OP 4.7.3	Provide Support to DOD and Other Government Agencies
OP 4.8	Acquire, Manage, and Distribute Funds
OP 5	Provide Operational Command and Control (C2)
OP 5.1	Acquire and Communicate Operational Level Information and Maintain Status
OP 5.1.1	Communicate Operational Information
OP 5.1.2	Manage Means of Communicating Operational Information
OP 5.1.3	Determine Commander's Critical Information Requirements
OP 5.1.4	Maintain Operational Information and Force Status
OP 5.1.5	Monitor Strategic Situation
OP 5.1.9	Coordinate Information Assurance (IA) Procedures
OP 5.2	Assess Operational Situation
OP 5.2.1	Review Current Situation
OP 5.2.2	Formulate Crisis Assessment
OP 5.2.3	Project Future Campaigns and Major Operations
OP 5.3	Prepare Plans and Orders
OP 5.3.1	Conduct Operational Mission Analysis
OP 5.3.2	Issue Planning Guidance
OP 5.3.3	Determine Operational End State
OP 5.3.4	Develop Courses of Action/Prepare Staff Estimates
OP 5.3.5	Analyze Courses of Action
OP 5.3.6	Compare Courses of Action
OP 5.3.7	Select or Modify Courses of Action
OP 5.3.8	Issue Commander's Estimate
OP 5.3.9	Prepare Campaign or Major Operations and Related Plans and Orders
OP 5.4	Command Subordinate Operational Forces
OP 5.4.1	Approve Plans and Orders
OP 5.4.2	Issue Plans and Orders
OP 5.4.3	Provide Rules of Engagement

OP 5.4.4	Synchronize and Integrate Operations
OP 5.4.5	Coordinate/Integrate Components, Theater, and Other Support
OP 5.4.6	Conduct Operational Rehearsals
OP 5.5	Establish, Organize, and Operate a Joint Force Headquarters
OP 5.5.1	Develop a Joint Force Command and Control Structure
OP 5.5.2	Develop Joint Force Liaison Structure
OP 5.5.3	Integrate Joint Force Staff Augmentees
OP 5.5.4	Deploy Joint Force Headquarters Advance Element
OP 5.5.5	Establish Command Transition Criteria and Procedures
OP 5.5.6	Establish or Participate in Task Forces
OP 5.5.7	Conduct Joint Force Staff Operations
OP 5.6	Coordinate Operational Information Operations
OP 5.6.1	Integrate Operational Information Operations
OP 5.6.3	Control Information Operations
OP 5.7	Coordinate and Integrate Joint/Multinational and Interagency Support
OP 5.7.1	Ascertain National or Agency Agenda
OP 5.7.2	Determine National/Agency Capabilities and Limitations
OP 5.7.3	Develop Multinational Intelligence/Information Sharing Structure
OP 5.7.4	Coordinate Plans with Non-DOD Organizations
OP 6.1	Provide Operational Air, Space, and Missile Defense
OP 6.2	Provide Protection for Operational Forces, Means, and Noncombatants
OP 6.2.14	Employ Operations Security (OPSEC) in the JOA
OP 6.3	Protect Systems and Capabilities in the JOA
OP 6.4.1	Develop Operational Deception Plan
OP 6.5	Provide Security for Operational Forces and Means

Notations used in the following tables are:

*	With five being considered the most difficult.
**	Indicates the source of the comment.
***	Indicates the area of doctrine, organization, training, material, leadership, personnel, or facilities (DOTMLPF) affected.

OP 1 - Conduct Operational Movement and Maneuver

UJTL Task	Description of Performance	Assessment of the Degree of Difficulty Joint Forces have Experienced in Task Completion (1-5*)	Nature/Causes of the Difficulties or Successes Joint Forces Experienced in Task Completion (Source**) (DOTMLPF***)	Enablers or Workarounds That Joint Forces Have Used/Should Use to Assist in Task Completion
OP 1.1-Conduct Operational Movement	The deployment branch was not manned to handle assigned responsibilities and the branch staff did not have relevant experience or technical expertise. This resulted in poor time-phased force and deployment data (TPFDD) performance in the conduct of movement planning and execution.	4	Joint task force (JTF) staff personnel were not trained to use the TPFDD. (Commander's Summary Report [CSR]) (Training-Leadership) The deployment cell and joint movement center (JMC) were inadequately manned. (CSR) (Personnel-Leadership)	The joint force used video teleconferencing (VTC) to coordinate the TPFDD. A United States Transportation Command (USTRANSCOM) liaison officer (LNO)/representative was assigned to the JMC. A Director of Mobility Forces (DIRMOBFOR) from USTRANSCOM was assigned to the joint force. The JTF staff must be manned with appropriately trained and experienced personnel to effectively conduct movement planning and execution.
	The JMC had difficulty in force tracking,	4	The JMC did not utilize deployment automation	The JMC was established in accordance with JP 5-00.2,

	reducing force capability to develop and execute movement plans.		tools for tracking the force. (CSR) (Training) The joint planning group (JPG) was insufficiently involved with TPFDD development. (CSR) (Training) Staff planners, operators, or senior staff personnel did not understand the importance of the TPFDD. (CSR) (Training-Doctrine) Components were not adequately staffed to integrate TPFDD development with the operational planning process. (CSR) (Personnel-Leadership) The J5 TPFDD cell was omitted from course of action (COA) wargaming and the COA selection phase during crisis action planning (CAP). (CSR) (Training-Leadership)	"Joint Task Force Planning Guidance and Procedures." Movement plans must be developed in close coordination with operational plans to synchronize the flow of force capabilities with campaign objectives.
OP 1.1.1-Formulate Request for Strategic Deployme	Forces arrived late in the JOA, severely degrading the commander, joint task force (CJTF) ability to successfully prosecute his assigned mission.	4	Lack of standing operating procedures (SOP) guidance, and incomplete understanding of the Joint Operation Planning and Execution System	USTRANSCOM LNO/representatives were assigned to the JMC. A DIRMOBFOR from USTRANSCOM was assigned to the joint force.

nt to a Joint Operations Area (JOA)			(JOPES) process, limited JTF staff ability to obtain required forces. (CSR) (Training) The JTF staff had difficulty developing a valid TPFDD. (CSR) (Training) Component inputs to the TPFDD were inaccurate/incomplete. (CSR) (Training-Leadership) Components were not adequately staffed to integrate TPFDD development with the operational planning process. (CSR) (Personnel-Leadership)	A deployment cell was established in accordance with JP 5-00.2. The JTF should ensure sufficient numbers of JOPES operators are on hand to guard against single point failure in critical skills. JTF and component staffs must use the JOPES to develop an executable force deployment/redeployment plan in support of operational plans.
OP 1.1.2-Conduct Intra-theater Deployment and Redeployment of Forces Within the JOA	The major challenge of JTF TPFDD managers was obtaining a common understanding of the relationship between prioritization, synchronization, and flow of forces within the constraints of lift and throughput.	3	The TPFDD was not used as a dynamic tool to track force capabilities or support new operational decisions. (CSR) (Training-Leadership) JTF staff personnel were not trained to understand JOPES/TPFDD. (CSR) (Training) The deployment cell was not a viable, functioning entity within the JPG.	A JMC and an on-call Joint Transportation Board (JTB) were established, along with the DIRMOBFOR from USTRANSCOM, and provided a sound infrastructure to facilitate the deployment and redeployment of forces in the JOA. Procedures were established to handle additions to the TPFDD

			(CSR) (Training-Leadership) J3/joint operations center (JOC) did not monitor the flow of forces to ensure it supported the JTF COA selected. (CSR) (Training-Leadership)	that exceeded lift capabilities. The JTF staff must monitor the flow of forces within theater to ensure that capabilities are available to support planned operations.
OP 1.1.3-Conduct Joint Reception, Staging, Onward Movement, and Integration (JRSOI) in the JOA	The staff had a good working knowledge of its responsibilities during JRSOI.	3	The JMC developed a TPFDD training tool to train personnel in JRSOI. (CSR) (Training-Leadership)	Components must understand JRSOI requirements and processes. A single manager who fully understands and complies with the TPFDD should be designated.
OP 1.2-Conduct Operational Maneuver and Force Positioning	Marine Corps forces (MARFOR) and Army forces (ARFOR) were embedded in the joint force land component commander (JFLCC) staff for CAP, enhancing coordination but increasing time required for concept of operations (CONOPS) problems, solutions, and day-to-day operations issues.	2	The JTF commander assumed the role of JFLCC. However, the organization for conduct of maneuver was not economical in terms of economy of force or unity of command. (CSR) (Training-Leadership) JTF/JFLCC control measures (area of operations (AO), phase lines, objectives, fire support coordination lines	Ground force operations (ARFOR/MARFOR) must be synchronized in operational maneuver. Joint doctrine should be applied to every operational situation. Whenever organizations do not comply with doctrine, specific measures must be taken to ensure detailed responsibilities are adequately addressed.

			(FSCL), the amphibious operations area (AOA), and boundaries) were not clearly stated or understood by the components. (CSR) (Training-Leadership)	
	In meeting the commander's intent, component commanders belatedly identified and attacked the enemy center of gravity (COG).	2	The JTF Staff should provide focus for deep battle opportunities. (CSR) (Training-Leadership)	JTF planners must identify enemy COG during CAP.
	The JTF did not maintain adequate visibility on rear area operations (RAO).	2	After delegating responsibility for RAO to the ARFOR, the JTF did not follow up and review plans for evacuating refugees or supporting policy considerations. (CSR) (Training-Leadership)	The JTF commander and staff must maintain visibility on RAO.
OP 1.2.3-Assemble Forces in the JOA	The capability to deconflict deployment problems in the JOA or plan for redeployment was limited.	3	The joint deployment board and the joint theater movement staff were not integrated fully into operations during the execution phase. (CSR) (Training-Leadership)	The JRSOI must prepare forces adequately for assigned operations.
OP 1.2.4-Conduct Operations	The lack of well-developed measures of effectiveness (MOE)	2	The JTF did not establish non-lethal fires MOE to facilitate planning. (CSR)	The JTF must establish MOE to gauge mission accomplishment.

in Depth	reduced the capability to continually gauge mission accomplishment.		(Training-Leadership)	particularly in military operations other than war (MOOTW).
OP 1.3.1-Overcome Operationally Significant Barriers, Obstacles, and Mines	The lack of visibility on the engineering efforts degraded J7 assessment of progress to prioritize, plan, and redirect engineer assets.	2	The J7 did not have sufficient visibility on the engineering efforts and capabilities of coalition partners. (CSR) (Personnel-Leadership)	The JTF staff (J7) should be manned appropriately, to include expertise in all mobility and counter-mobility functional areas. The JTF J7 must achieve and maintain awareness of coalition efforts.
OP 1.5-Control Operationally Significant Areas	Better coordination of the air tasking order (ATO) process and integration of available air assets would have enabled the CJTF to fight the opposition force (OPFOR) echelons concurrently, as opposed to sequentially.	2	Air assets were not integrated effectively through use of the ATO. (CSR) (Training-Leadership)	Assigned forces must be employed effectively to dominate an area or deny use to the enemy.
	The lack of integration and coordination between the JTF and allied forces limited the overall effectiveness of both forces.	2	U.S. forces were not initially integrated or coordinated with allied assets. (CSR) (Training-Leadership)	All available forces must be integrated to maximize effectiveness and minimize confusion and uncertainty.

OP 2 - Provide Operational Intelligence, Surveillance, and Reconnaissance

UJTL TASK	Description of Performance	Assessment of the Degree of Difficulty Joint Forces have Experienced in Task Completion (1-5*)	Nature/Causes of the Difficulties or Successes Joint Forces Experienced in Task Completion (Source**) (DOTMLPF***)	Enablers or Workarounds That Joint Forces Have Used/Should Use to Assist in Task Completion
OP 2.1- Direct Operational Intelligence Activities	Flow of intelligence information within the joint task force (JTF) was problematic.	4	There was a lack of coordination in passing information in a timely manner between J2 cells inside and outside the sensitive compartmented intelligence facility (SCIF). This was caused by an apparent disconnect between personnel working within the SCIF and those on the outside. An understanding of information flow requirements within the JTF is essential. (Commander's Summary Report [CSR]) (Organization)	Close working relationships between J2 sections should be developed to facilitate the distribution of information.

	Confusion arose out of the employment of some of the intelligence support systems for dissemination of information.	4	Within the JTF headquarters, there was a shortage of personnel trained on various intelligence systems, (e.g., joint deployable intelligence support system (JDISS), intelligence data handling system (IDHS), modernized intelligence database (MIDB), and community on-line intelligence system for end-users and managers (COLISEUM).) (CSR) (Training)	Training on the various intelligence systems in use within the JTF should be increased. JTF personnel must be fully trained on supporting intelligence systems.
	There was only limited predictive analysis conducted throughout the JTF.	4	Analysis was limited in part because of a lack of a fully developed joint intelligence preparation of the battlespace (JIPB). (CSR) (Training-Materiel)	The use of the JIPB process to gather data that reflects adversary activities should be optimized. The JTF should use a form of trend analysis to predict future requirements.
OP 2.1.3-Prepare Operational Collection Plan	The JTF was not effective in obtaining intelligence collection assets at the national level.	3	Lack of an identified collection manager hampered the ability of the JTF to lobby for national assets. (CSR) (Organization)	Intelligence collection requirements should drive national and theater posture and focus, as well as tactical assets that belong to the JTF. A collection manager, with direct interface with the theater is essential. Functions that collection

				managers are responsible for must include collection planning for all requirements, collection tasking, and synchronization.
OP 2.2-Collect and Share Operational Information	The theater collection management plan, the JTF collection plan, and component collection plans were not disseminated on a timely basis, making it difficult to coordinate collection efforts.	4	The theater collection management plan was not disseminated. The JTF was unaware of the existence or location of the plans. After it was posted on the homepage, the staff had difficulty implementing the plan. (CSR) (Training)	Well-planned and orchestrated collection management is one of the keys to the success of intelligence support of operations. The theater collection management plan must be completed and disseminated. Homepages must be simple to use, contain relevant information, and contain a "push" mechanism to notify all users of new postings, especially with regard to time sensitive information.
	Communications within the J2 Staff were undefined and fractious.	4	The flow of information and general coordination between the SCIF and other J2 personnel lacked clear-cut procedures to allow for all-source intelligence information fusion. (CSR) (Organization)	Sanitation procedures for all-source materials should be in place to facilitate the flow of time sensitive information.
	Lack of proper manning	4	The JTF J2 staff was not	The planning cells should

	during the planning phase resulted in incomplete analysis of enemy capabilities.		adequately manned. (CSR) (Personnel) A shortage in personnel seriously degraded the ability of the JTF to complete associated JIPB processes, negatively impacting JTF performance. (CSR) (Personnel)	contain representation from all components to better provide a complete analysis of the situation.
OP 2.4- Produce Operational Intelligence and Prepare Intelligence Products	During numerous exercises, joint forces experienced difficulty distributing/using secret compartmented information.	4	Moving some of the SCIF analysts into the joint operations center (JOC) brought about a patchwork system for the relay of time sensitive information. (CSR) (Organization)	The JTF must ensure that procedures are in effect to provide intelligence information to the personnel that require that information.
OP 2.5- Disseminate and Integrate Operational Intelligence	Difficulties in passing information to NATO and coalition partners caused delays and disconnects during operations.	4	Exercises/operations that included coalition or North Atlantic Treaty Organization (NATO) personnel required special disclosure procedures. (CSR) (Organization-Doctrine)	Additional guidance is required for dissemination of intelligence information between allies and coalition partners.

OP 3 - Employ Operational Firepower

UJTL TASK	Description of Performance	Assessment of the Degree of Difficulty Joint Forces have	Nature/Causes of the Difficulties or Successes Joint Forces Experienced in Task Completion (Source**) (DOTMLPF***)	Enablers or Workarounds That Joint Forces Have Used/Should Use to Assist in Task Completion

		Experienced in Task Completion (1-5*)		
OP 3.1-Conduct Joint Force Targeting	The joint fires element (JFE) did not function as required.	3	From the beginning of the planning phase, the JFE was hampered by a lack of personnel to staff the organization. This negatively impacted the ability of the organization to conduct joint force targeting. (Commander's Summary Report [CSR]) (Personnel-Leadership)	Personnel authorized on the manning document should be present. Personnel authorizations should be reviewed in an effort to cross-level personnel to fill critical positions.
	The individual selected to represent the FSE in the joint planning group (JPG) was well qualified and, as a core member of the JPG, provided valuable information to the group on targeting procedures.	1	Personnel assigned to the FSE were fully qualified. (CSR) (Training-Leadership)	Qualified personnel should be selected for key staff positions.
	Service procedures did not adequately address the Tomahawk Land Attack Missile (TLAM) strike planning cycle.	4	Many joint force commanders and their staffs are not familiar with TLAM employment procedures and associated targeting	TLAM employment and targeting procedures should be understood by members of the joint task force (JTF). A training program to adequately address the

			requirements. (CSR) (Training-Leadership)	targeting requirements and security considerations of the TLAM strike planning cycle should be developed.
	JFE personnel were not experienced in the planning of joint operational fires.	5	The JTF did not initially establish a JFE. When the JFE was established, the TLAM planning cell was designated as the JFE. The JFE composition lacked joint representation and assigned personnel were not familiar with the requirements associated with functioning as a JFE. (CSR) (Doctrine-Training)	The JTF did not consider all requirements associated with boards, centers, and cells. They also did not assign knowledgeable personnel from all Services to the JFE. Consulting applicable joint publications and selecting qualified personnel could have avoided this.
	The continued proliferation of terms and varying guidance regarding different categories of immediate targets – to include time sensitive targets (TST) – hindered the joint integration of targeting and fires.	4	A consistent lexicon for describing immediate targets was not developed and incorporated into the joint community. (CSR) (Leadership) While the single definition from Joint Publication 1-02, "Department of Defense Dictionary of Military and Associated Terms," seems adequate, additional terms continue to be used. This indicates	Confusion on terms can be avoided by consulting the most recent version of Joint Publication 1-02. If the term appears in the dictionary, it will have a definition and is an approved term for use in the joint arena. If it is not included in Joint Publication 1-02, it should not be used (unless it is found in other joint publications that are more current than Joint Publication 1-02).

			that the single term may not fully meet operational needs. (CSR) (Doctrine)	
	JFE personnel were confused on what targets should be included on each of the target lists, what organization was the establishing authority, who was maintaining the lists, and how target nominations were to be processed.	3	The joint target, restricted target, and no strike target lists were developed with minimal input from the JFE. (CSR) (Training-Leadership)	The JFE should have received a copy of the joint publication covering their organization and used it to guide the operation.
OP 3.1.1-Establish Joint Force Targeting Guidance	The joint targeting coordination board (JTCB) operated at a level that was not sufficiently broad to be consistent with joint doctrine. No clear guidance on objectives for combat operations was provided.	4	The JTCB did not focus on approving the joint target list (JTL), joint integrated prioritized target list (JIPTL), or on identifying additions and changes to these lists. (CSR) (Training-Leadership) JTF staff and components represented on the JTCB were not familiar with how a JTCB should operate or their role on the board. (CSR) (Training-Leadership)	Clearly define the roles and responsibilities of the JTCB.
	A rehearsal board that met prior to the	1	The J3 Fires Cell assumed a proactive role	The JTF formed a JTCB and the J3 Fires Cell was

	employment phase of the exercise "jump started" the JTCB and expedited the organization's ability to become fully involved in the business of synchronization, integration, and coordination of joint fires.		and conducted a rehearsal board meeting just prior to the employment phase of the exercise. The primary purpose of the rehearsal was to inform participants of the requirements of the board. The Chief, J3 Fires Cell clearly defined roles and responsibilities, discussed the agenda, and provided graphic examples of presentation slides. (CSR) (Training)	designated as the executive agent for the board. Qualified personnel should be selected for key staff positions.
	The coordination and engagement process for TST was fragmented across the joint force.	5	The operational architecture for engaging TST was not streamlined to permit efficient integration of the targeting process. (CSR) (Training)	Following joint doctrine would have established the architecture to permit efficient integration of the targeting process.
	There were problems in coordinating procedures necessary for the Space Control Center (SCC) to attack targets in these areas.	5	There was confusion within the JTF staff and the component headquarters over the specific boundaries of the Army forces (ARFOR), Marine Corps forces (MARFOR), and the shoreline boundary of the Navy forces (NAVFOR). (CSR) (Leadership-	Boundaries must be clearly defined and their locations understood. This is a problem that can be solved only by the leadership (joint force commander [JFC] or chief of staff). Commanders must ensure that the staff has established proper control measures for fire control

			Training)	purposes.
	In a limited engagement operation, the target nomination and approval process frequently comes from higher authority. Under these circumstances, it is difficult to align the targeting process with JTF objectives.	4	Higher headquarters/outside organizations and agencies targeting requirements will impact those of the JTF. (CSR) (Training-Leadership-Doctrine)	The JTF leadership should realize the operational environment they are confronted with and conduct their planning and execution accordingly.
OP 3.1.2-Apportion Joint/Multinational Operational Firepower Resources	When the Army Tactical Missile System (ATACMS) was made available, neither component (ARFOR or MARFOR) knew for certain how many missiles were available in theater or how many had been apportioned to them.	4	JFC guidance on the apportionment of ATACMS to the warfighters caused confusion. (CSR) (Training-Leadership) The JTF did not demonstrate the capability to conduct inter-component apportionment planning in support of the JTF campaign. (CSR) (Training)	Clear apportionment guidance is required from the JFC.
	TLAM were launched from the sea, through friendly airspace to distant enemy targets, generating several	5	Airspace deconfliction between rotary wing aircraft and TLAM was not completed. TLAM launches were scheduled	The use of airspace must be fully deconflicted. Coordination is critical. The JFACC has to be cognizant of each of the component's

	close calls with rotary wing aircraft.		on the joint force air component commander (JFACC) daily air tasking order (ATO). However, the ATO did not indicate the various seaward launch locations for each missile. (CSR) (Training-Doctrine)	systems that will operate in the airspace of the area of responsibility (AOR), and ensure the use of these systems is coordinated.
OP 3.1.3-Develop Operational Targets	The JFACC is trained and staffed to provide support from the air, throughout a joint operations area (JOA). If the JFACC is required to focus on a segment of the JOA such as an area of operations (AO), the effort in support of the remainder of the JOA suffers.	2	During an exercise, the (JFACC) was assigned an AO, leaving the JFACC neither manned nor equipped to have responsibility for the entire AO. (CSR) (Doctrine-Leadership)	The JTF must carefully consider the ramifications associated with assigning boundaries and an AO. The JFACC must ensure that the organization is manned and equipped to provide the required operational service. Should the organization not be properly sized and equipped, then the JFACC must either figure how to compensate, or inform his commander that he is not mission capable. The JFACC usually operates under a JTF organization. It is not often responsible for both the JOA and an AO within the JOA. Should this be required, the JFACC must make his commander aware of his organization's

				limitations.
OP 3.1.4-Develop High-Payoff and High-Value Targets	Throughout the exercise there was some confusion on what was included in the category of TST.	5	The JTF never developed any "up front" plans to engage TST. (CSR) (Training-Doctrine) The JFACC developed a plan for servicing TST requests. It did not, however, include a JTF wide process or an organizational cell to handle TST requests. There were no primary/backup sensors, weapons systems, or communications links that could be used to attack TST. (CSR) (Training-Doctrine) TST engagement was not linked to any fire support coordination measures (FSCM), which could have facilitated the engagement process. (CSR) (Training)	Processes associated with engagement of TST must be carefully planned and implemented. This is both a doctrinal and a training issue. The JFACC leadership has to establish a JTF wide organization/system capable of quickly servicing a TST. The JFACC leadership must understand that a target can be attacked with other than air assets (i.e., artillery, etc.). The use of FSCM should expedite any attempt to service a fleeting target in the AO. The JFACC must be aware of this and incorporate it into his plan.
	The JFE developed a list of four or five targets daily that were considered to be the commander's "high priority" targets.	4	JFE personnel felt all targets on the joint target list (JTL) were considered high value targets. If a target on the JTL was included on the ATO, it	All personnel involved in the targeting process must have a clear understanding of what is included on the various target lists and how these lists are used.

	These targets were posted in the JFE. The priority list was not posted in the other staff sections concerned with targeting. It was difficult to determine if the targets were struck or any follow-up was conducted.		was then considered a high payoff target. (CSR) (Training-Doctrine)	JFE personnel need to be trained to a standard that allows them to do their job. The commander's "high priority" target list must be disseminated to each staff section and component.
OP 3.1.5-Publish Air Tasking Order(s) (ATO)	A description of aircraft ordnance was not included on the ATO, making it difficult to re-direct sorties to meet TST requirements.	5	ATOs were published late and did not support the commander's specific objectives. (CSR) (Leadership-Training) There was a shortage of trained operators familiar with production of an electronic ATO. (CSR) (Personnel-Leadership) The equipment required to support ATO production did not arrive as planned. (CSR) (Materiel)	The ATO is central to the ability of the JTF to effectively schedule and coordinate joint fires assets. The ATO has a standard format which, when used, provides all necessary information. Proper management of the ATO should eliminate its being late. Training and equipment shortages are normal. Prior planning and sourcing should eliminate these difficulties in producing an electronic ATO.
OP 3.1.6.1-Assess Battle Damage on Operational Targets	Reattack of some targets did not achieve desired results, rendering the battle damage assessment	3	The joint intelligence support element (JISE) was responsible for BDA. In completing this responsibility, the JISE	The JTF must ensure processes for BDA are implemented. Personnel in the JISE need to be trained to use all

	process (BDA) questionable.		personnel believed the unmanned aerial vehicle (UAV) was the best source of information for target damage. The JISE relied on it almost exclusively because it gave them what they believed to be the best "picture" of the target once it was struck. They were not aware of where special operations forces (SOF) were located, and therefore, did not use them for BDA. (CSR) (Training)	sources of information when conducting BDA. The leadership within the JISE should be knowledgeable on what sources are available and how to use them.
OP 3.1.7-Employ Fire Support Coordination Measures (FSCM)	The JTF planned for and fully coordinated the integration of the fire support coordination line (FSCL), accomplishing a difficult task with minimum problems.	1	Prior to the exercise, a plan was developed on the use of a FSCL. The plan included information on planned locations and movement times of the FSCL. When the plan had to be changed, the information was given to liaison personnel and coordinated with all subordinate headquarters and components. (CSR) (Training) The JFE did not exercise effective oversight for the	This approach on use of the FSCL worked well and reduced friction between the JTF and components significantly. The JTF must plan for and fully coordinate the integration of FSCM.

			JTF in coordinating geometry issues with the components. Instead, JTF policy was established that delegated development and dissemination of battlespace FSCM to the components, resulting in problems with cross-component establishment of geometry. (CSR) (Training-Leadership)	
OP 3.2-Attack Operational Targets	Separate and distinct fires battles, while marginally deconflicted, appeared not to be synchronized in time, space, and purpose.	4	There appeared to be at least four distinct occasions when joint fires were used, all with minimal overview/control by the JFE. (CSR) (Leadership-Training) The JFACC, ARFOR, MARFOR, and NAVFOR each conducted independent operations with marginal coordination with the JTF or other components. (CSR) (Leadership-Training)	Joint fires should be used to effectively shape the battlespace. The JFE should perform the function of controlling, coordinating, and synchronizing joint fires.
OP 3.2.2.1-Employ Psychological Operations	The joint psychological operations task force (JPOTF) was able to	1	The JPOTF closely coordinated and monitored the activities of organizations responsible	The JTF used PSYOP assets to assess the situation and help in transition. The JFC, JPOTF

(PSYOP) in the Joint Operations Area (JOA)	advise and focus the activities of relevant organizations to assist repatriation efforts and ultimately support JTF objectives.		for information operations. (CSR) (Doctrine-Training)	commander, and JTF J3 must monitor, modify, and focus PSYOP activities to support and enhance JTF operations.
	Late arrival of the JPOTF impacted heavily on planning, integrating, and conducting the initial PSYOP campaign.	4	The JPOTF commander and staff were delayed in joining the JTF. (CSR) (Leadership-Organization)	PSYOP assets must be integrated into the planning process at an early stage. PSYOP elements should immediately join any JTF they are designated to support.
OP 3.2.7-Synchronize Operational Firepower	The JFE did not adequately develop the necessary architecture to support the synchronization, integration, and coordination of joint fires. The JFE and targeting cell made plans to distribute target lists and other fires information between staff sections and the components during later phases of the exercise. However, plans on how this was to be completed were not made.	4	The manning document for the friendly force coordination center (FFCC) did not allow for an adequate number of personnel. It did not provide for representation from all Services. (CSR) (Personnel-Leadership) During the planning phase, the joint fires representatives that served as members of the course of action (COA) working groups were hesitant to become fully engaged in the process. (CSR) (Training) FFCC personnel were unfamiliar with the	If the JTF elects to form and use a JFE, it should be properly staffed; roles and responsibilities should be clearly defined; and the supporting organizational architecture must be developed. Personnel authorized on the manning document should be present. Personnel authorizations should be reviewed in an effort to cross-level personnel to fill critical positions. Staff section personnel must be trained on their responsibilities.

			mechanics of developing a joint target list (JTL) to support a joint operation. (CSR) (Training-Personnel) The JFE became involved in several issues that were component responsibilities, causing the primary mission of the JFE (to provide overall control of joint fires) to suffer. (CSR) (Training)	

OP 4 - Provide Operational Logistics and Personnel Support

UJTL TASK	Description of Performance	Assessment of the Degree of Difficulty Joint Forces have Experienced in Task Completion (1-5*)	Nature/Causes of the Difficulties or Successes Joint Forces Experienced in Task Completion (Source**) (DOTMLPF***)	Enablers or Workarounds That Joint Forces Have Used/Should Use to Assist in Task Completion
OP 4.1-Coordinate Supply of Arms, Munitions, and Equipment in the JOA	The joint task force (JTF) had difficulty integrating and successfully executing the time-phased force and deployment data (TPFDD).	3	There was a lack of (JTF) personnel trained in the use of the Joint Operation Planning and Execution System (JOPES), which made it difficult to develop a TPFDD. (Commander's Summary	The number of trained JOPES personnel should be increased.

			Report [CSR]) (Training)	
	The J4 was not able to adequately track key trigger points throughout the operation, or monitor major changes during the campaign.	3	The JTF experienced a lack of trained Global Command and Control System (GCCS) personnel. (CSR) (Training) The common operating picture (COP) provided by GCCS was neither used nor understood by the majority of personnel within the joint operations center (JOC). (CSR) (Training)	The number of GCCS trained personnel should be increased.
OP 4.4-Coordinate Support for Forces in the JOA	The JTF had difficulties in developing complete courses of action (COA).	3	The TPFDD feasibility for each COA was not developed, as subject matter experts were not always available to conduct critical analysis. (CSR) (Training-Organization)	Additional training should be provided on the intricacies of the TPFDD.
	The commander, joint task force (CJTF) was briefed that all COAs were supportable when the complete logistics capability was not available.	3	Because the JTF J4 was not fully aware of JTF resources, it was difficult to provide the combatant commander with a proper assessment of sustainment capabilities. (CSR) (Organization) There was a	The JTF J4 must know and understand the staff and component logistics requirements. Involvement of the J4 early in the planning process should be increased, and continuous cross talk

			misunderstanding of force tracking responsibility between the joint movement center (JMC) and component J4 staffs. (CSR) (Organization)	throughout the staff should facilitate the planning process for logistics and coordination of support.
	The JTF requested and received directive authority for logistics, enabling the JTF to direct or assign common user items and services to specific components. The resulting continuous flow of support was crucial to mission accomplishment.	3	The JTF did not understand fully and requested clarification on the combatant commanders directive authority for logistics. Fully understanding this guidance was critical in understanding the logistical support that was to be provided by the components. (CSR) (Doctrine/Leadership)	The JTF must fully understand requirements associated with the combatant commanders directive authority. Directive authority for logistics should be requested from the combatant commander during COA development.
	Supply items were delayed in arrival to the joint operations area (JOA).	3	Just-in-time logistics was dependent on mature lines of supply that did not exist. (CSR) (Organization)	Supply expediters should be used to provide in-transit visibility and to decrease transit time.
OP 4.4.2-Provide for Personnel Services	Follow-on accountability of personnel proved to be difficult for the joint force.	3	Contributing factors to the accounting problems experienced by the JTF included the use of different personnel check-in points, reassignment of personnel to remote sites,	The persistence of the Headquarters Commandant staff was the key to resolving this problem. A computer tracking system should resolve this problem by providing

			and the check-in of some personnel by social security number and others against a specific manning document line number. (CSR) (Personnel-Doctrine-Materiel)	personnel accountability, facility usage data, and cost accounting information.
OP 4.8-Acquire, Manage, and Distribute Funds	When the original amount of cash brought into the theater by Army forces (ARFOR) was expended, Air Force forces (AFFOR) funds were available and were used until more ARFOR funds arr0ived.	3	In certain areas, local merchants are unable or unwilling to accept credit cards or other forms of payment such as U. S. Treasury checks. (CSR) (Facilities) Paying agents were often required to carry large sums of cash because of the distances between merchants and the volume of purchases. (CSR) (Training-Doctrine)	The use of cash as a method of payment should be avoided whenever possible. Contracting personnel should attempt to encourage the acceptance of credit cards or U. S. Treasury checks. JTF Contracting Officers should consider the establishment of local checking accounts and have funds forwarded through the local Embassy or via electronic media.

OP 5 - Provide Command and Control

UJTL Task	Description of Performance	Assessment of the Degree of Difficulty Joint Forces have Experienced in Task	Nature/Causes of the Difficulties or Successes Joint Forces Experienced in Task Completion (Source**) (DOTMLPF***)	Enablers or Workarounds That Joint Forces Have Used/Should Use to Assist in Task Completion

		Completion (1-5*)		
OP 5.1-Acquire and Communicate Operational Level Information and Maintain Status	The joint force experienced difficulty in the use of video teleconferencing (VTC).	3	Compatibility and standardization problems hindered use of the VTC suite. (Commander's Summary Report [CSR]) (Materiel)	A communications site survey should be conducted prior to deployment to determine C2 architecture requirements. An appropriate deployable VTC suite should be developed.
	The Air Force forces (AFFOR) liaison officer (LNO) to the joint force air component commander (JFACC) and the joint task force (JTF) staff did not communicate during most of the exercise. This lack of communication led to a delay in JTF understanding of AFFOR actions, primarily in airlift and tanker constraints.	3	Not all LNOs attended critical morning JFACC operational update briefings. (CSR) (Leadership) The JTF was not assigned an adequate number of LNOs. (CSR) (Organization)	LNO architecture should be developed to adequately support JFACC planning requirements. LNO personnel should understand their duties and responsibilities. LNOs must be assigned and participate fully in JTF activities.
	There was confusion within the JTF staff	3	The failure of the JTF to stand up a joint operations	The JTF must ensure activation of the

	as to what information should be communicated between staff sections.		center (JOC) at the beginning of the exercise contributed to the overall poor flow of operational information between staff sections. (CSR) (Leadership-Organization)	organizations required to effectively control the operation.
	The JTF established a joint deployment branch to monitor deployment of the JTF into the joint operations area (JOA). However, the organization was not successful.	3	The joint deployment branch did not monitor the time-phased force and deployment data (TPFDD). Because of this, the joint deployment branch could not provide the joint force commander (JFC) information on the JTF organizations already in or en route to the JOA. (CSR) (Doctrine)	A joint movement center (JMC) under the JFC J4 should be established to provide an interface with the Joint Operation Planning and Execution System (JOPES) and monitor and effect changes to the deployment of forces. (JP 4-0, "Doctrine for Logistics Support of Joint Operations") The TPFDD flow should be monitored.
	The JTF had success in handing off critical information to the JTF due to excellent information management (IM) processes, JTF homepage, JFC accessibility, and a manageable request for information (RFI) process.	1	The joint operations center (JOC) team chief managed all IM processes. Critical information was disseminated via effective organizational homepages. The JFC was accessible to the JOC team chief. (CSR) (Training) Components monitored progress of RFI via the JTF homepage. (CSR)	The key to IM is a thorough and well-developed IM plan and standing operating procedures (SOP), designation of someone to monitor and track the information flow, and integration of collaborative tools to facilitate IM.

			(Doctrine)	
	The JTF was successful in handling, analyzing, and providing information to the JFC and key JTF staff members.	1	Information was disseminated and managed through highly effective organizational homepages. (CSR) (Doctrine)	Homepages should continue to be refined. Common relevant operational picture (CROP) requirements should continue to be developed.
	The JTF plans/operations were biased toward land operations.	3	Because the JTF headquarters was staffed predominately with land Services officers, the JTF tended to look more towards the sole use of land assets to satisfy requirements. (Exercise Summary Report [ESR]) (Doctrine)	Key positions within the JTF staff should be representatives of Services that have a significant number of forces assigned. (JP 5-00.2)
	Boards, centers, cells, and agencies placed a heavy time demand on the JTF staff, in some cases becoming counterproductive.	4	Attendance at meetings of boards, centers, cells, and agencies overwhelmed the staff in some cases. (ESR) (Organization)	These organizations should be disbanded when no longer needed.
	The Army forces (ARFOR) and JFACC could not	4	The JTF used Service unique systems: ARFOR – All Source	The JTF should establish a joint communications control center (JCCC) to

	directly interface, as Service tactical decision support systems did not link across Service lines.		Analysis System (ASAS). JFACC – Combat Identification System. ARFOR – Advanced Field Artillery Tactical Data System (AFATDS) and Automated Deep Operations Coordination System. JFACC – Rapid Application of Air Power and contingency Theater Air Control system Automated Planning System (CTAPS). (Multi-Service Assessment Support Team [MAST] Report) (Materiel) JTF warfighters used manual procedures to interface. (MAST Report) (Materiel)	provide the technical direction essential to maintain effective C2. (JP 6-0, "Doctrine for C4 Systems Support to Joint Operations")
	It was difficult to ensure that each organization was using the same version of a document. It was also often difficult to locate specific documents.	4	There was a proliferation of local area networks (LAN), (i.e., a proliferation of systems within the JTF.) (CSR) (Organization) The joint force used a combination of LANs, wide-area networks (WAN), and homepages. (CSR) (Doctrine)	IM systems must be fully interoperable among all users.

	The JTF made a continuous and successful effort to communicate with allies.	1	The JTF crafted a jargon and acronym free talking paper for use in initial discussions with allies (United Kingdom, France, and Belgium). This led to a variety of coalition coordination mechanisms. (CSR) (Doctrine) Open information sharing and a coordinated use of limited host nation resources governed coordination with allies. (ESR) (Training)	Mechanisms established to facilitate communications increased and included a movement control center (MCC), a Coordination Planning Committee, and a Senior Officer Coordination Committee.
	The joint force experienced difficulties in disseminating information through use of web pages.	4	The JTF often incorrectly assumed that posted information equaled disseminated information. (CSR) (Training)	Web-based technology does not replace C2. JTF staffs must confirm receipt and understanding of information.
	The joint force disseminated information without regard to the level of importance.	4	The dissemination policy resulted in information "overload", prompting indifference on the part of some who concluded, "if he wants me to know, he will tell me." (Interoperability Capabilities Assessment [ICAT Report] (Doctrine-Leadership)	The JFC must insist on information quality vs. quantity. Coordination between the JOC Chief and the information management officer (IMO) should help to minimize this problem.

	The JTF staff either did not understand, or elected to use improper terminology.	3	The JTF staff used Service and colloquial terms and acronyms and was not familiar with key joint terms. (CSR) (Training) The terms CROP, common operating picture (COP), common tactical picture (CTP), and single integrated air picture (SIAP) were frequently used interchangeably and incorrectly. (ICAT Report) (Training)	The pre-exercise training/exercise directive/operation order (OPORD), etc., should emphasize the use of joint terminology, to the fullest extent possible.
	Co-location of the JTF headquarters and the JFACC proved to be an effective method of organizing the joint force.	2	Effective communications between the JFC and JFACC was critical and was accomplished face-to-face. (CSR) (Organization)	The JTF and JFACC should be co-located to optimize information flow. If not feasible, an executable C2 architecture should be in place.
OP 5.1.1-Communicate Operational Information	The joint force experienced some difficulty in managing information.	3	The JTF did not establish a JOC. This had a negative impact on the ability of the JTF to maintain situational awareness (SA). (CSR) (Organization-Training) The JTF J1 did not ensure that key noncommissioned officers (NCO)s were provided the information they required. (CSR) (Leadership-Training) Messages were often	A JOC, or "mini" JOC, should be established concurrently with the forming of a JTF to ensure adequate information flow during the planning phases. All JTF staff sections that have "a need to know" should be included in the information "loop." Acknowledgement of receipt should be required

			misrouted and acknowledgement of receipt of critical messages was not required. (CSR) (Training)	for all critical messages.
	Language and cultural differences contributed significantly to communications problems within the multinational joint force.	3	Effective communications within the multinational environment were difficult to achieve. (CSR) (Training)	Verbal orders should be followed up with written orders. Back-briefs should be used to ensure that orders are understood. The commander, joint task force (CJTF), must clearly establish and define who has the authority to speak for him.
	Having all commanders at a single meeting for back-briefs facilitated cross-component understanding of each other's plans and identified cross-component coordination and interoperability issues.	3	Back-briefs provided the JFC an opportunity to review component plans and, if necessary, clarify the component commander's intent. (CSR) (Training)	If it is not possible to have all JTF commanders in the same location for the back-briefs, the use of VTC should be considered.
OP 5.1.2-Manage Means of	The JTF experienced difficulty with internal information	3	No central point within the JOC was assigned responsibility for receiving	An IMO should be assigned. An IM Plan should be executed.

Communicating Operational Information	flow.		incoming information/messages for the JOC, and for deciding who within the JOC needed to receive that information. This often resulted in intended recipients within the JOC not always receiving the information directed to them. (CSR) (Organization-Training) RFI management was difficult, as there was only one person that was assigned RFI responsibilities per shift. Principal RFI addresses got information; secondary personnel did not. The significant volume of RFIs transmitted within the JTF, contributed to this problem. (CSR) (Organization-Training)	Within the JOC: Use information displays. Maintain a schedule. Delegate authority. Verify/confirm information. An effective RFI management process should be established.
	Use and management of the homepage proved difficult for the JTF.	4	The use of news groups caused problems and confusion as they were not well managed, monitored, or controlled. (CSR) (Training-Leadership) Information was initially difficult to find on the JTF homepage and	Use of news groups requires policy guidance, management, and SOP. All efforts should be made to maintain a stable homepage format and IM process. The JTF should have a range of back-up systems

			manipulation of the information included was difficult. (CSR) (Training) Documents were filed in folders of the originating staff, as opposed to being assigned topical labels. (CSR) (Training) The JTF homepage was overly complicated and included redundant information. (CSR) (Training) RFIs appeared in two locations, only one of which was current. (CSR) (Training) An efficient back up to the JTF homepage did not exist and the issue was not addressed by the JTF. (CSR) (Materiel-Training)	to support the IM process. Units must train to shift from a homepage to a back-up system as required. System redundancy and hardening of critical technology should also be pursued.
	The JTF enjoyed extraordinary IM success.	1	Four factors contributed to successful IM during the exercise: a commonly understood IM process which was clearly articulated in the IM plan, a useable JTF home page, accessibility of the JFC, and a manageable RFI process. (CSR) (Doctrine)	A JTF needs a range of back-up systems and procedures to support the IM process. Units must train to shift rapidly from higher to lower technologies while at the same time minimizing the impact on IM processes.

OP 5.1.3-Determine Commander's Critical Information Requirements	The JTF did not possess the requisite skills to effectively manage the commander's critical information requirements (CCIR) process.	3	Junior members of JTF J2 were not familiar with the term "CCIR," and how the planning process was impacted by CCIR. (CSR) Training) The JTF did not "crosswalk" combatant command, JTF, and component CCIR for synchronization, supportability, and intent. (CSR) (Training) JTF CCIR information was not placed in a visible place on the homepage, while the CCIR of some component's had no visibility. (CSR) (Doctrine)	JTF personnel should be trained on the use of CCIR and associated processes.
OP 5.2-Assess Operational Situation	Assessment completed by the JTF staff tended to be compartmented and was not updated to incorporate operational updates.	4	The JTF made no effort to extend the COP to workstations outside the JOC, which made it difficult for the staff to maintain SA. (CSR) (Training) Staff coordination between the JTF J2, J3, and J5 was not sufficiently robust to overcome the lack of SA that would have been provided by a more	The role of the operations analyst should be incorporated into the JTF SOP. The number of trained GCCS operators available to the JTF should be increased. The COP should be exported to additional workstations. The JTF should review the combatant command

			complete COP network. (CSR) (Training) An insufficient number of trained Global Command and Control System (GCCS) operators were assigned to the JTF. (CSR) (Personnel-Training) There was no evidence within the JTF of discussions concerning the assessment of JTF operations and their relationship with the combatant commanders long-range mission and intent. (CSR) (Training-Leadership)	theater engagement plan (TEP) and any approved plans related to the JTF mission, where applicable.
	Assignment of the operations research/systems analysis (OR/SA) teams resulted in development of feasible, practical solutions during course of action (COA) assessment. This further resulted in flexible branch planning.	1	Four-man (OR/SA) teams were assigned to the joint planning group (JPG). (CSR) (Doctrine)	The OR/SA teams provided timely, effective analysis, and suggested solutions, to many problems raised during the OPORD development phase.

	The mission and purpose of the Joint Analysis Center (JAC) was vague and not well defined.	1	The "mission" of the JAC was not clear, i.e., " … a group of intelligence and operations officers which may be formed to assist the JTF J3, JOC Chief, … in the fusion of SA related information and conduct predictive analysis …". (CSR) (Doctrine) The JAC mission changed during various phases of the exercise, leading to increased confusion. (CSR) (Leadership) Responsibilities of the JAC caused confusion, as many of the tasks associated with these responsibilities were not related to the mission of the organization. (CSR) (Leadership-Training)	As there is no information included in joint doctrine on the use, purpose, and composition of a JAC, it is critical that this information be included in the JTF SOP. The JTF staff should have a clear understanding of this information.
OP 5.2.2-Formulate Crisis Assessment	The JTF experienced difficulty in formulating an assessment of the operational situation.	4	The JTF special staff provided limited inputs to the planning process. Public affairs, legal, surgeon, and civil affairs staffs were not active participants during the assessment and planning phases. (CSR) (Leadership-Training) Operational assessments	A thorough front-end mission analysis should be conducted. Lessons learned from previous exercises should be incorporated in JTF plans. An SOP for future staff organization, policies, procedures, etc., should be developed, based on

			were often made without requisite expertise and there was limited use of LNO assets to help in obtaining/providing a better assessment of the situation. (CSR) (Training)	CJCSM 3500.05, "Joint Task Force Headquarters Master Training Guide (JTF HQ MTG)," joint doctrine, and previous exercise lessons learned.
OP 5.2.3-Project Future Campaigns and Major Operations	The JTF did not elect to form a J35 future operations section.	4	The JTF JOC performed functions associated with future operations. The JTF SOP, however, did not specify how these functions were to be accomplished, or what staff section was responsible for each function. (CSR) (Training-Organization)	The JTF should clarify the methodology to be used to accomplish these functions and incorporate this information into the JTF SOP. The JTF should consider establishing and empowering a J35 or J5 to perform these functions.
OP 5.3-Prepare Plans and Orders	Branch planning of the JPG did not completely meet the needs of the JTF.	4	There was confusion within the JTF on enemy and friendly COAs that were developed for branch plans. (CSR) (Training) Parallel planning was degraded, and resulted in confusion within the JTF staff. (CSR) (Training) Information flow from the JPG to the JTF staff was not completed in an expeditious manner. (CSR) (Training) A disconnect appeared between the JTF and component planning	The JPG must be adequately staffed and the JTF chief of staff must ensure the JTF staff is coordinated and in "sync" with the JPG. The components should identify the total force they bring to the JOA (as well as their capabilities). Core JPG members should participate fully at all planning sessions.

			processes. In an effort to limit attendance at planning sessions, the JPG did not include component planners. (CSR) (Training) The JPG conducted some planning sessions (i.e., deployment planning) without representation from the JTF staff that was critical to this process. (CSR) (Training) The JPG's closure analysis was flawed, as it was based on limited knowledge of component combat support, and combat service support assets and capabilities. (CSR) (Training) Staff estimates were based on incomplete information. (CSR) (Training)	
	The JFC was effective in providing timely planning guidance and "heading" checks.	1	The JFC provided guidance in an open forum to the full JPG, which was a major benefit to the JPG. (CSR) (Leadership)	The JFC should consider the use of VTC to transmit open forum sessions to the entire JTF staff.
	The staff estimate process was not effective.	4	The JTF J3 planning function was assigned to the operations planning group (OPG). The OPG functioned continuously and	Staff estimates should start as soon as possible in planning. They should be updated continuously, as additional information

			members were expected to perform COA development as well as complete staff estimates. The OPG lacked requisite expertise. The friendly forces coordination center (FFCC) plans officer, who participated in the OPG, did not keep the FFCC up to date and did not ask for supporting assistance from the FFCC staff. (CSR) (Training)	becomes available. The J3 Section must be kept informed of OPG/JPG planning progress.
	The JTF experienced difficulty in completing mission analysis.	4	Factors that contributed to the difficulties the joint force experienced in mission analysis included: Mission analysis was compromised as not all specified/implied missions were considered. The individual staff estimate process was not rigorous. Planning time was inadequate. The JTF J5 prompted staff sections to begin work on OPORD annexes, although the commander's estimate had not been completed. Inappropriate planning templates from previous	The final planning structure adapted during previous exercises should be incorporated into the JTF SOP. SOP planning checklists should be used to emphasize timelines, estimates, staff responsibility for annexes, and formats of plans and orders.

			operations were used. Intra-staff coordination was ineffective. There was no system (checklist) to account for annexes, resulting in at least one missing annex. There was no central reviewing authority for the OPORD developing process, resulting in a quality control issue. (CSR) (Training)	
OP 5.3.1-Conduct Operational Mission Analysis	The JTF JPG mission analysis was hindered by incomplete intelligence preparation of the battlespace (IPB).	3	The IPB conducted prior to mission analysis did not provide adequate information for the JPG to begin mission analysis. The IPB lacked detailed analysis of threat capabilities, tactics, intentions, and weather. Essentially, the IPB provided an intelligence update, as opposed to an intelligence mission analysis. (CSR) (Organization)	A complete IPB must be produced in order for the JPG to begin its mission analysis. A more complete mission analysis up-front would save time later in the planning process.
	The JTF requested additional forces too early in the planning phase.	4	Mission and COA development began prior to JTF stand up. Planning was completed by the JTF prior to receiving joint augmentation and	A thorough mission analysis review and staff estimate should be conducted prior to any request for additional forces/component taskings.

			component input. The JTF requested an additional aircraft carrier without knowledge of the impact this would have on NAVFOR. (CSR) (Doctrine)	
OP 5.3.2-Issue Planning Guidance	The OPG planning effort lacked focus.	4	Because there was little interface between the OPG and JFC, it was difficult to develop a focused plan, hampering the overall planning effort. The guidance that the JFC provides during frequent interface opportunities with staff planners is invaluable. (CSR) (Leadership-Training)	A battle rhythm should be established that helps ensure that the JFC is included/remains a part of the planning process.
OP 5.3.3-Determine Operational End State	The JFC was effective in establishing end state.	1	The JFC established end state criteria for each mission essential task, to include measures of effectiveness (MOE). The effect was that end state accomplishment was measured accurately, in a timely manner. (ESR) (Leadership)	The JFC should continue to review and revise end state criteria and provide MOE for each mission essential task. The combatant command staff should also participate in this process.
	The combatant commander and JFC were very	1	Establishment of conditions for JTF success was often the “central theme” of	Effective coordination between the JFC and the combatant commander

	effective in establishing the conditions for JTF success.		discussions between the JFC and the combatant commander. This proved very beneficial to the joint force, as clearly establishing conditions for success can be a difficult process. (ESR) (Leadership)	facilitated the process of establishing conditions for success.
OP 5.3.4-Develop Courses of Action/Prepare Staff Estimates	Some staff estimates were disjointed, unorganized, and incomplete.	4	The JTF staff did not conduct its own mission analysis and was not familiar with the staff estimate process. (CSR) (Training)	Staff mission analysis training sessions should be conducted for individual staff sections, as a preliminary step to the staff estimate process.
	The JTF staff spent a disproportionate amount of time on one COA during development/analysis of COAs. This COA was eventually selected as the best COA for the JTF.	4	Experience suggests that staffs often select COAs that get the most attention, thereby reflecting a wargaming process that is not completely unbiased. (CSR) (Training)	JTF staff planners must ensure all COAs are carefully and equally analyzed. The staff should strive to give each COA proposed equal consideration, analysis, and comparison against the other COAs.
OP 5.3.6-Compare Courses of Action	COA teams lacked the capability to develop COAs because they did not possess requisite expertise, e.g., there were not enough	4	Staff planners were organized into three teams as the JTF began the COA development and analysis process. Each team was tasked to develop three COAs. Team size was adequate (15 personnel per	The JTF staff planners should ensure that the staff is properly organized to analyze and compare COA. Simultaneous COA development and analysis saves time, but requires a greater number of

	"specialists" in fires, information operations (IO), civil military operations, etc., to support three teams.		team) but "expertise" was spread too thinly. (CSR) (Organization)	specialists and "expertise" in order for each team to develop a quality product. If this method of planning is used, planning teams must be staffed with requisite "expertise."
OP 5.4-Command Subordinate Operational Forces	Lack of coordination, and subsequent lack of visibility of the joint special operations task force (JSOTF), caused significant confusion on the joint force land component commander (JFLCC) and combatant command staffs.	4	The JSOTF placed special operations forces (SOF) in the JOA without fully coordinating the insertion of these forces. (CSR) (Training)	The JTF must maintain visibility of all forces operating within the JOA. The JTF staff must help synchronize the operations of all forces within the JOA to ensure that all organizations are aware of the friendly situation. SOF representation (similar to that of other Service components) should be present at all JTF planning and execution forums.
OP 5.4.3-Provide Rules of Engagement	The rules of engagement (ROE) process did not adequately support JTF operations.	3	During the early phases of the exercise, there was confusion within the JTF on the use and application of ROE. The JTF was using peacetime ROE, while the allies were using wartime ROE. (CSR) (Training) Mission specific ROE were developed by the Staff Judge Advocate staff that	ROE guidance should be included in all plans and orders. A ROE planning cell should be established to provide responsive intra-staff coordination and planning.

			did not include operational expertise. Further, the ROE process was isolated from the operation and the operational planning process. (CSR) (Training)	
OP 5.4.4-Synchronize and Integrate Operations	Functional responsibilities assigned to the JAC detracted from the overall ability of the organization to perform its role.	4	Organizationally, the JAC was under the purview of the JTF JOC Chief. The JAC was used for future and current operations planning, as well as for preparing morning update briefings and serving as the lead agency for conducting rehearsals for other JOC briefings. These types of taskings did not allow the JAC to focus on what should have been the primary JAC mission, analyzing the current situation and recommending options to the JFC. (CSR) (Training-Organization)	The JTF should ensure that, if formed, the JAC is properly organized and responsibilities are clearly defined. This information should be documented in the JTF SOP.
	The JSOTF capabilities were not fully utilized by the JTF.	4	The JTF did not plan for the use of SOF assets and did not develop a concept of operations to support the integration of the SOF into the JOA. (CSR) (Training)	SOF support should be considered in all JTF plans, and integrated if used.

	The JTF JOC had difficulty planning for requirements associated with integrating and synchronizing JTF operations.	4	JOC personnel were not familiar with the operational plans of the components. Without this information, it was difficult for the JOC to make plans for and fully deconflict, coordinate, integrate, and synchronize the full range of JTF operations. (CSR) (Organization)	JTF plans and operational personnel must be familiar with component plans. Participation in component planning brief-backs is a good source for obtaining required planning information.
OP 5.5-Establish, Organize, and Operate a Joint Force Headquarters	Manning, reception, and training of personnel proved difficult for the JTF.	4	The Joint Manning Document was maintained neither accurately nor in a timely manner. This made it extremely difficult for the JTF to determine which staff positions had been filled and to identify manning shortfalls. (CSR) (Personnel) Augmentee reception and training were inadequate; failing to provide arriving personnel the tools they required to effectively contribute as a member of the JTF staff. (CSR) (Organization-Training)	A complete and detailed JTF SOP should be available for JTF use. The JTF HQ MTG should be considered for use as the initial basis for JTF staff training.
	The JOC had difficulty in maintaining SA.	4	Responsibilies for future plans, future operations, and current operations were not clearly defined. Sometimes	Roles and responsibilities within the JTF headquarters should be clearly defined and

			the JPG was responsible, while at other times the JOC was responsible. This led to confusion within the JTF, making it especially difficult for the JOC to maintain SA. (CSR) (Leadership)	assigned. Information flow within the JOC should be optimized with regard to quality and timeliness.
OP 5.5.1-Develop a Joint Force Command and Control Structure	The JTF was unable to conduct prolonged operations because the JTF staff was not adequately manned.	5	There were noticeable differences in rank and experience between the day and night shift staff in the JTF JOC. (CSR) (Leadership-Personnel)	The JTF must carefully plan for twenty-four hour operations. Rank and experience differences should be normalized between shifts. The staff should be adequately manned.
	JTF psychological operations (PSYOP) were relegated to a secondary relationship with the JFC.	4	PSYOP products were unnecessarily filtered through three layers of staff prior to being seen by the JFC. (ESR) (Organization)	Consideration should be given to establishing a psychological operations assessment team (POAT). The POAT assesses the situation, confers with the commander, develops the PSYOP objectives, and recommends an appropriate combination of personnel, equipment, and Service components to accomplish the mission (see JP 3-53, "Doctrine for Joint Psychological Operations").

	The JTF was uncomfortable with requirements associated with land operations.	3	There were few land force personnel in the JTF, with the nucleus of the staff being Navy. (CSR) (Organization-Leadership)	The JTF should be manned with representatives of all relevant Services.
OP 5.5.2- Develop Joint Force Liaison Structure	LNO personnel within the JTF were not effectively used.	3	Most LNO sections were undermanned for 24-hour operations and there was little knowledge on how LNOs should be used. LNOs must not do "grunt" work; rather, they should communicate desires, orders, and information between staffs to expedite the parallel planning process. (CSR) (Personnel-Training)	The chief of staff and staff directors must understand LNO functions and utilize LNOs correctly.
	Component LNOs were a major strength of the JTF.	1	LNOs were fully engaged and ensured their respective headquarters were kept up to date. They were also effective in keeping the JFC and JTF staff informed of their respective commanders' concerns. (CSR) (Organization)	LNOs should be adequately resourced.
OP 5.5.3- Integrate Joint Force Staff Augmentees	Augmentees did not always possess desired qualifications.	3	Too many augmentees could not perform their intended jobs because of inadequate, insufficient, or no prior training. (CSR)	The receiving organization must establish a training and orientation program to prepare augmentees for their assignments.

			(Training-Personnel)	A core JTF sponsor should be assigned to each augmentee. An initial orientation/indoctrination should be conducted for each augmentee. Augmentees should be provided SOPs, directives, turnover folders, etc., for retention and reference. Augmentees should be trained for the specific assignment they will perform.
	The JTF conducted a successful indoctrination and training program for augmentees.	1	Augmentees were fully and successfully integrated throughout the JTF staff. (CSR) (Training-Personnel)	Effective and timely training, as well as recurring use of reservists from the same organization, enhanced augmentee continuity and effectiveness.
	The JTF had difficulty in personnel accountability and JMD reconciliation.	4	The JTF did not establish a joint personnel reception center (JPRC). Integration of augmentees was hampered by a lack of advance information, SOP, and staff "continuity" books. (CSR) (Personnel-Training)	JTF personnel managers should: Establish a JPRC. Identify personnel shortfalls early. Identify augmentees during pre-exercise training and provide them with orientation information on their specific duties. Develop and build

				continuity books to familiarize augmentees with their specific duties prior to the beginning of the operation/exercise.
	Late arrival of the manager of the JOPES support element adversely impacted the ability of deploying units to build a TPFDD early on.	5	The deploying unit requested ten augmentees to report immediately to the unit's home station. Some of these personnel (about five) did not arrive for five days. One of the individuals that reported late was the manager of the JOPES support element. This seriously degraded the ability of the JTF to build and manage a TPFDD. (ESR) (Personnel)	The JTF staff must ensure that critical positions are filled on time in order to meet requirements.
OP 5.5.4-Deploy Joint Force Headquarters Advance Element	The JTF deployed with redundant capabilities that slowed deployment.	1	The JTF staff did not adequately assess and then maximize the host nation's support assets; then remove redundant assets to make an effective force package. This is a deliberate, coordinated process. (ESR) (Organization)	The JTF should use advance element personnel to assist in crafting force packages. This technique requires a robust assessment team or advance party with contracting and force protection assets necessary to locate and commit services while concurrently conducting the assessment. Modular force packages should be crafted so that

				components do not duplicate capabilities within the TPFDD. Force packages should be either inserted into "flow" or "stood down," and moved back to home station.
OP 5.5.7- Conduct Joint Force Staff Operations	The JFC guidance was not translated effectively into staff action.	4	The CJTF SOP meeting sequence did not reinforce proper staff coordination. (CSR) (Doctrine-Training) No procedure existed to capture the commander's guidance and to translate that information into staff action. (CSR) (Leadership)	The meeting sequence should be modified. The component commanders' conference should be followed by a staff update. After this, the COS should conduct a staff review to ensure that CJTF guidance is promulgated and staff actions/requirements are assigned.
	The JTF chief of staff office functions were not performed well.		The JTF chief of staff office could not manage all taskings from the command group because it was inadequately manned, (i.e., there was no staff general secretary billet.) (CSR) (Personnel, Organization)	The joint manning document should be changed to include a staff general secretary in the chief of staff office. The adding of an administrative section NCO and clerk should be considered.
	The JAC assessment function did not mesh with the JTF battle rhythm and		The JAC lacked JTF J2 representation. (CSR) (Organization) The JAC was tasked to address items, which were	Required JAC manning should be determined and documented in CJTF SOP. J2 representation should be provided to address

	decision-making cycle.		not related to analysis and assessment. (CSR) (Leadership) The JAC received taskings beyond its charter and organizational capabilities. (CSR) (Organization)	threat issues. The current operations branch should be manned sufficiently to ensure that current issues do not detract from JAC duties.
OP 5.6-Coordinate Operational Information Operations	The ability of the JTF IO cell to support operational planning was impaired.	4	The IO cell composition was significantly short of that depicted in JP 3-13, "Joint Doctrine for Information Operations," and the combatant commanders directive. (CSR) (Doctrine) Few IO cell members possessed joint experience. (CSR) (Training-Personnel)	The IO cell manning should be refined in accordance with JP 3-13. The tactics, techniques, and procedures (TTP) should be used to integrate IO cell efforts with the JPG, JOC, and joint intelligence support element (JISE), and to incorporate the cell into respective plans and SOPs.
OP 5.6.1-Integrate Operational Information Operations	JTF IO were not well developed and focused.	5	The JTF IO campaign was characterized by: An offensive IO element that was somewhat fragmented and a defensive aspect that was virtually non-existent. A "stagnant" nature of IO objectives. No MOE. No IO planning/management tools.	The templates included in JP 3-13 (IO synchronization matrix) should be considered for use. Generic guidance for predeployment training aids should be developed in areas such as communications, computer, and operations security.

			(CSR) (Doctrine-Training)	
OP 5.6.3-Control Information Operations	The JFC emphasized IO.	1	The JFC directed his staff to be proactive in planning for IO. The staff effectively combined IO and targeting functions into the Joint Targeting and Information Coordination Board. (ESR) (Doctrine)	This innovative approach ensured that IO were well integrated into the targeting process. A similar process should be considered for future operations.
OP 5.7-Coordinate and Integrate Joint/Multinational and Interagency Support	Identifying the agencies available to support the JTF was difficult.	3	There is no standard way to determine what agencies are available to support the JTF mission or how to contact these organizations. Agencies support the local community and the military. They do not work for the military. Some humanitarian assistance agencies refuse military liaison for fear of compromising their own position. (ESR) (Training)	The military should determine the capabilities of each agency and assess whether or not their support would be beneficial to the military mission. The JTF should establish liaison with these agencies whenever possible, even if support is not required.
	Since the JTF had neither a combined operations/intelligence center nor a Friendly Force Coordination Center, special coordination procedures and	3	The JTF co-located (rather than combined) its JOC and JISE with the host nation headquarters. (CSR) (Organization-Leadership) Primary pre-exercise discussions centered on how U.S. forces and the host nation would "interface" in	Lessons learned from DESERT SHIELD/STORM and other coalition operations suggest that a combined operations and intelligence center is the best method for exercising C2 over coalition forces.

OP 6 - Provide Operational Force Protection

	mechanisms had to be defined, disseminated, and used.		the "big tent." There was little discussion on how other partners (nations) would be integrated into the combined C2 structure. (CSR) (Leadership)	
UJTL TASK	**Description of Performance**	**Assessment of the Degree of Difficulty Joint Forces have Experience d in Task Completion (1-5*)**	**Nature/Causes of the Difficulties or Successes Joint Forces Experienced in Task Completion (Source**) (DOTMLPF***)**	**Enablers or Workarounds That Joint Forces Have Used/Should Use to Assist in Task Completion**
OP 6.1- Provide Operational Air, Space, and Missile Defense	Having the Army area air and missile defense command (AAMDC) commander serve as the deputy area air defense commander (AADC) improved on the ability to integrate and synchronize air	3	Neither the AAMDC commander nor his staff had the tactical, technical, or procedural expertise to perform all of the AD/DCA functions required of an AADC in a joint environment.	Air defense planning, coordination, and execution can often be more effective if the duties and responsibilities of the Air Force AADC and the AAMDC commander are linked. Although the AAMDC

	defense/defensive counter air (AD/DCA) planning and operations in support of the joint force mission.		(Commander's Summary Report [CSR]) (Training-Organization)	commander serves as the deputy AADC, his primary responsibilities are to assist the AADC in planning, coordinating, integrating, and synchronizing surface-based AD/DCA systems.
	The AADC capability to protect the force against air and missile threats was accomplished whether afloat or ashore, collocated or not.	4	Separation of the joint force air component commander (JFACC) and AADC may: Create higher demand for interoperable command, control, communications, computers, and intelligence (C4I), especially tactical digital information link (TADIL) and intelligence support data. Require additional personnel augmentation, particularly liaison officers (LNO). Complicate the logistics and command and control (C2). Diffuse some of the authority and responsibility of the JFACC. (CSR) (Doctrine-Training-	Co-location of the JFACC and AADC may: Eliminate potential conflict in asset control. Prevent communications failure between the JFACC and the AADC/airspace control authority (ACA) in the event of a C4I interruption. Enhance ability for integrated planning and execution. Create a force protection (FP) issue with the JFACC/AADC/ACA C2 nodes and their vulnerability to a single attack. Joint doctrine recommends that the functions of the JFACC, AADC, and ACA normally be combined under one component commander (normally the JFACC). When not collocated, the functions must be

			Leadership) However, separation of the JFACC and AADC provides for: Facilitation of rapid transition to joint operations. A more focused approach to specialized tasks. (CSR) (Doctrine-Training-Leadership)	integrated, as the responsibilities inherent in these joint functions are interrelated and symbiotic.
	As a result of incompatibilities between automated track identification systems on the carrier and Aegis cruisers, the tracking systems were shut down.	3	Incompatibilities between automated identification systems prevented the development of a seamless joint air and missile picture. (CSR) (Materiel) Frequent developmental changes in automation software and hardware can create new seams between equipment that had previously performed as seamlessly, interoperable systems. (CSR) (Materiel) These problems have been manifested in exercises and operations when systems are brought together for the	The desired interoperability end state for theater air and missile defense is still only a potential capability due to the inability of systems designed to accomplish similar tasks to communicate and share information seamlessly without significant intervention by operators or systems managers.

			first time and interoperability conflicts surface. (CSR) (Materiel-Training-Leadership)	
	There was little coordination between the theater missile defense (TMD) cell and the joint fires element (JFE). This resulted in ineffective targeting guidance.	3	The TMD cell did not include the requisite number of both land and air missile defense personnel. (CSR) (Personnel) The TMD cell impinged on roles and functions of the AADC, AAMDC, or J2 Section in various aspects of TMD. (CSR) (Training)	In a theater missile defense heavy scenario, a joint task force (JTF) may have to form a TMD cell to provide guidance and oversight. The TMD cell must be involved in the planning effort through representation in the joint planning group (JPG). The TMD cell must provide input to the defended asset list (DAL). The TMD cell roles and functions must be clearly established with regard to relationships with the AADC and the AAMDC. The primary focus of the TMD cell is similar to that of a JFE – to assist in developing planning guidance and in providing oversight of TMD planning and operations.
	The JTF headquarters was not sufficiently robust to provide the	3	Information and sensor data available from multiple sources must be	The JIPB is a key doctrinal element of joint theater air and missile defense.

	joint intelligence preparation of the battlespace (JIPB) the full doctrinal support needed by the components.		fused and focused for use by the JTF. (CSR) (Training-Doctrine) Once in position, theater missile units are extremely difficult to acquire and destroy before they launch. Theater missile transporter-erector-launchers are highly mobile and able to rapidly disperse and seek cover after launch. (CSR) (Training-Doctrine)	The most effective way to attack the TMD threat is in assembly areas, forward operating bases, or during movement. The key predictive tool available to the JTF and components in locating and targeting theater missile systems is the JIPB process.
	Procedures to allow surface-based DCA to engage ballistic missiles without conducting real-time coordination were used and demonstrated successfully.	3	Early engagement of ballistic missiles is critical. (CSR) (Doctrine) Because of the extremely short timelines associated with engaging ballistic missiles, surface-based AD/DCA must be allowed to engage ballistic missiles without conducting real-time coordination/airspace deconfliction. (CSR) (Training-Doctrine-Leadership)	Surface to air missiles such as Patriots must be allowed to engage incoming ballistic missiles in a weapons control status of "Free." This is possible because the flight profile is distinctive and target identification is not an issue.

OP 6.2-Provide Protection for Operational Forces, Means, and Noncombatants	Without joint search and rescue center (JSRC) representation for planning, the JTF staff estimate and subsequent annexes were not course of action (COA) specific, and lacked mission-related detail.	3	The JSRC was not formed during the early stages of the operation. (CSR) (Training-Leadership-Organization) The JPG did not use JSRC personnel for COA development in respect to combat search and rescue (CSAR) capabilities and requirements. (CSR) (Training)	The JSRC is one possible center that the JTF may establish with facets of protection as its primary concern. The JTF should establish a JSRC during the early stages of the operation, and assign responsibility for the mission to the JFACC. During the planning phase, the JSRC should advise the JPG in the development of COA concerning CSAR capabilities and requirements. The JSRC needs to be proactive in establishing duties/responsibilities, developing and disseminating policies and procedures, and starting the search and rescue/combat search and rescue estimate.
	The capability to discriminate quickly and accurately between friendly, enemy, and neutral air targets in a complex environment was difficult. There were several engagements of friendly	4	The training level of individuals, crews, C2 personnel, and leaders plays a significant role in fratricide prevention. The final decision to engage a target rests with the individual who fires the weapon. (CSR)	To prevent engagement by "friendly" air assets, JTF special operations forces (SOF) should make effective use of procedural control measures, coordinated through the JFACC. Restricted and no-fire areas need to be planned and

	(blue-on-blue) or neutral aircraft (blue-on-white) during the exercise.		(Personnel-Training) All aircraft should be equipped with identification, friend, or foe (IFF) systems, which confirm the nature of the target as either friend or foe. These systems must use proper encryption methods, function properly, and be compatible with other systems within the battlespace. (CSR) (Materiel-Doctrine) The lack of a compatible, effective auto IFF system is a significant deficiency that contributes to the possibility of fratricide. (CSR) (Materiel-Doctrine)	coordinated with the JFACC. Clear rules of engagement (ROE) are required to ensure effective application of JTF combat power, while providing maximum protection to the force. Reliance on IFF systems requires robust C2 displays and a large number of personnel who are intimately familiar with the air tasking order (ATO).
	When the joint force commander (JFC) gave his initial guidance and intent, the acceptable level of risk was not clearly stated.	4	The JTF staff did not address risk assessment during the mission analysis briefing. (CSR) (Training-Leadership) The JFC or J3 did not define the responsibility for FP functions. (CSR) (Training)	JTF plans must incorporate a scheme for FP that is comprehensive in nature, and goes beyond delegating FP requirements to the components. The JTF should form a FP working group to integrate FP functions across the JTF. The means for tracking the FP effort should be stated in

				the commander's critical information requirements (CCIR). Friendly centers of gravity should be used as the basis for focusing the protection effort. The FP working group should be integrated with the JPG. The FP working group should be under the overall jurisdiction of the J3, to assist in establishing a force-wide operational-level FP perspective.
	The JFACC had difficulty distinguishing between the different roles and planning responsibilities of the JTF TMD cell, JFACC, and the AADC.	3	Delineation of roles and responsibilities for execution between the JTF TMD cell, JFACC, AADC, and components was unclear. (CSR) (Doctrine) TMD guidance was not briefed by the JFC or J3. (CSR) (Training)	Joint doctrine assigns certain planning responsibilities to different command elements. The JTF staff develops plans for JTMD operations and ensures that JTMD measures are included in appropriate operation order annexes. The AADC tasks include the development and execution of plans for active defense operations. The JFACC plans and executes attack operations in the theater/JOA, based on JFC guidance.

	The ROE cell lacked the operational expertise of J2, J3, and J5 membership.	2	ROE were completed as an afterthought. (CSR) (Training) ROE planning was relegated to legal representatives. (CSR) (Training)	The J3 should establish a ROE cell at the outset of planning. ROE are operators business. The ROE cell should include appropriate membership, (e.g., the J2, J3, J5, and the staff judge advocate) (SJA). A J3 representative should chair the cell.
	The synchronization and integration of the TMD guidance could have been more easily realized if the guidance had been briefed and approved by the CJTF or J3.	3	No DAL guidance was included in the planning order from the combatant commander. (CSR) (Training-Doctrine-Leadership) No DAL guidance from the JFC was included in the initial commander's intent/guidance provided during the commander's estimate brief. (CSR) (Training-Doctrine-Leadership)	A process for development and implementation of a joint definition of the DAL is required. The JTF TMD cell should articulate the JFC guidance and priorities to the AADC. The AADC, in coordination with the component LNOs, should create the DAL for JFC approval. The AADC should develop a database of friendly active defense capabilities to facilitate planning the defense of prioritized assets. Based on the active air defense capabilities, a "cut line" should be placed on the DAL, separating the defendable assets from those that cannot be defended. The components should then

				position active defense resources to defend the above the "cut line" assets.
OP 6.3-Protect Systems and Capabilities in the JOA	Shortfalls in operations security (OPSEC) were evident throughout the JTF. OPSEC procedures in the JTF were not defined clearly, and were not disseminated.	4	The JTF did not develop procedures to protect systems from computer viruses. (CSR) (Training-Doctrine) The JTF did not provide procedures for protection of disks entering the JTF, and for protection of incoming/outgoing electronic message traffic. (CSR) (Training-Doctrine) The JTF did not have assigned security managers. (CSR) (Personnel-Leadership) The JTF did not address information assurance or recovery procedures. (CSR) (Training-Doctrine)	Heavy reliance on automated information systems for JTF information management creates a host of interlinked information assurance requirements and challenges. Institute an aggressive OPSEC/communications security (COMSEC) awareness plan. Include an internal monitoring program at the beginning of the operation. Assign security managers. Develop procedures to protect systems from computer viruses. Create a detailed information management plan. Provide information assurance briefings. Air Land Sea Application (ALSA) Center information management publications can be used to achieve basic procedural interoperability.
	Throughout the planning and execution	3	JTF EEFI were compromised. (CSR)	OPSEC must be emphasized at the JTF level.

	phases of the exercise, the JTF failed to identify and actively protect essential elements of friendly information (EEFI).		(Training) OPSEC procedures in the JTF were not defined clearly and were not disseminated. (CSR) (Training-Doctrine)	The J3 information warfare (IW) cell should be appointed as the proponent for all OPSEC matters. Components should be tasked to develop EEFI for their respective command, and to implement their own force monitoring. Proactive OPSEC considerations should be included in an assessment of the impact of compromised information. Procedures beyond general awareness measures should be developed to protect EEFI more effectively, and to develop deception actions utilizing the same means of communications.
OP 6.5-Provide Security for Operational Forces and Means	Overall, security matters within the JTF were disjointed, or not addressed.	3	The JTF focused little attention on security and FP. (CSR) (Leadership-Training) The JTF standing operating procedures (SOP) lacked definitive guidance on FP/security operations. (CSR) (Doctrine-Training) The Marine expeditionary force	SOP are necessary to ensure that appropriate security/FP activities are integrated into all operational planning/execution. The provost marshal should be assigned the mission of joint staff supervision over military/security police operations and physical security. A FP working group should

			(MEF) provost marshal did not deploy to the exercise. (CSR) (Personnel-Organization)	be created, with clearly defined roles and responsibilities. The chief of staff should be used to focus the FP working group. A FP matrix should be developed to focus the FP working group on solutions to critical security issues. The organization, procedures, and responsibilities of the provost marshal cell and the FP working group should be added to the JTF SOP.
	The joint rear area (JRA) was not defined until well after the planning phase, causing general confusion in JRA operations.	4	Although a joint rear area coordinator (JRAC) was identified, his role and responsibilities were unclear. (CSR) (Doctrine-Training-Leadership)	Planning must include the JRA and JRA operations. The roles and responsibilities of the JRAC should be defined early in the planning phase, to include how JRA operations will be completed. The JRA associated processes and procedures should be documented in SOPs. The FP planners should be included in the JPG. The use of a FP cell should be considered.

* With five being considered the most difficult.
** Indicates the source of the comment.
*** Indicates the area of doctrine, organization, training, material, leadership, personnel, or facilities (DOTMLPF) affected.

Top 10 Joint Task Force Challenges

The following are analyses of selected readings from the Experience Database keyed to the top 10 Joint Task Force (JTF) challenges.

Combined/Joint Task Force Headquarters Activation and Augmentation. Most of the challenges we face in training at the JTF headquarters level stem from the "Ad Hoc" manner in which we organize the headquarters. The lack of a "center of excellence" for exercising the organizations, processes, and technologies necessary to carry out operational level headquarters functions lead to inefficiencies in almost every aspect of headquarters operations. Without a truly joint group that trains together with familiar processes the amount of time that any augmented headquarters will need to get traction on the myriad tasks that have to be performed will be relatively long. In order to achieve the efficiencies desired (not to mention what will be required to carry out the RDO concept) the standing JTF headquarters is a required component.

Common JTF Standing Operating Procedure (SOP); Tactics, Techniques, and Procedures (TTP), and Collaborative Tools. It is imperative that an information management plan that clearly defines guidelines on how information is to be handled is essential. What can be called the "push/pull dilemma" has stifled many JTF concept planners. "Pushing" too much information overloads staff personnel and "information overload" makes it impossible for the staff to separate the important from the mundane. Posting information on homepages and expecting personnel to "pull" the information usually leads to information not getting to the proper individuals because they do not know where to find it or that it even exists. Hardware, software, and processes that solve this problem must be identified. Additionally, the database tells us that the battle rhythm of the JTF must serve the process of delivering products and the information needs of higher and lower headquarters and the timing of product delivery to both. An information manager within every major division of the JTF staff is a requirement for efficient operations.

Common Operating Picture (COP). The COP is not used in the JTF staff because commanders and staff at the JTF staff level do not use it to make decisions. Mention is made of inaccuracies in the COP being caused by lack of trained operators to keep it updated. The COP is obviously important, but at the JTF staff level, it has not been used for decision-making.

Multi-level Security (MLS) Procedures. Recurrent in the database is the issue of coalition partners' information and computer access. When using a computer, which serves as a SECRET Internet Protocol Router Network (SIPRNET) node, the using coalition partner must be under the direct supervision of U.S. personnel. This issue is very familiar to exercise planners. In order for coalition members to be full and equal partners, multi-level security procedures (including software) must be developed which protect U.S. classified information while permitting designated coalition members access to the tools they require to perform their staff functions.

Integrated Force Protection and Rules of Engagement (ROE). Problems with the drafting and (even more difficult) dissemination of ROE are a challenge for JTF staffs. The addition of coalition partners complicates the situation. The relationship between ROE and force protection (and to a greater extent the fact that ROE must complement the tactical actions used by all friendly forces) is a theme in the database.

Underdeveloped Information Operations (IO). While many JTF staffs attempt to optimize IO, they are confronted with the reality that the high impact IO actions are usually not at the discretion of the JTF Commander. Those decisions and actions are at the Combatant Command level and higher. There is a training issue with having tactical level IO planners orchestrating a coherent IO plan at the operational level of war — that is very seldom done effectively.

Additionally, the lack of simulations, that reward IO play, makes it difficult to effectively integrate it into training events.

Time-Phased Force Deployment Data (TPFDD), Plan Forecasting, and Scheduling Strategic Airlift (STRATLIFT). TPFDD and STRATLIFT planning is a constant theme. Primarily it is a training and leadership development issue. There is a lack of understanding by senior leaders that the prioritization of the flowing of assets into the joint operations area (JOA) must be accomplished by operations personnel to ensure that the right things show up at the right time. Without the prioritization, accomplishing the commander's intent and supporting the sequencing of the operation may be impossible. Lack of understanding of the Joint Operations Planning and Execution System (JOPES) leads senior personnel to shy away from total involvement in the process.

Command, Control, Communication, and Computers (C4) Equipment and Procedures. The database is full of acronyms of all types of C4 systems that cover the spectrum of tasks that the staff must accomplish. In many cases, different systems are used to accomplish the same task (request for information [RFI] processing is a good example . . . the J2 uses one tool and the rest of the JTF uses another). One would be hard pressed to find any two JTF staffs that have used the same equipment and procedures to carry out the same functions. J9 hosted an Information Superiority Workshop in Feb 2000 . . . one of the many findings that came out of that group was the requirement to streamline our current C4 assets . . . in what do we invest and from what do we divest ourselves?

Training Program For Complex Interoperability Issues. For this, we must draw on the database entries from the Category 2 events. Multiple interoperability issues create warfighting seams that reoccur in events like ROVING SANDS and Joint Task Force Exercises (JTFEX). A lack of "Joint" standards in the Services' acquisition process results in equipment that is not 100% interoperable, and leads to inefficiencies when the components attempt to work together. Training programs are made more difficult because training must focus on how to make things work that were not configured or designed to work together. A lack of standards in "Material" leads to greater challenges in "Training" and "Leadership."

Contingency Contracting and Host Nation Support (HNS). The database refers sparingly to this type of play in the events J7 has conducted, centered on J4 specific training in a limited number of events.

Ad Hoc Joint Task Force Staff Manning

PURPOSE. Provide an analysis of effects of "ad hoc" manning of the joint task force (JTF) staffs.

BACKGROUND. Currently, there is no standing joint task force headquarters staff. In crisis, the U.S. military depends on existing three and two-star service component headquarters to provide the core of the JTF staff structure. Extensive augmentation is usually required to provide the broad base of expertise and experience required to conduct coherent joint operations. An analysis of over 100 Joint exercises has been conducted to understand the impact of this method of organization on staff performance.

AD HOC STAFF MANNING

Many difficulties are encountered in the forming of a JTF staff by augmenting an existing Service staff. These difficulties lead to inefficiency and ineffectiveness in performing many

tasks. This is particularly critical in the early stages of the life cycle of a JTF. The following are quotes from exercise reports:

"The JTF staff faced a typical array of command and control (C2) challenges during the reception/forming phase of the exercise."

"During the initial meeting of the joint planning group (JPG), members were introduced, but the JPG director had no roster of personnel, who were expected to be present. The director later recognized the need for a roster and for checking representation in the group. Directions were given to planners to coordinate with counterparts in the joint operations center (JOC). The JPG director clearly understood that his focus was on future operations and the need to avoid being drawn into current operations. He also discussed the division of labor between J35 and J5. J35 was identified to work branches and sequels for Phase III (combat operations), and J5 was tasked to plan Phases IV and V (transition and redeployment)."

"A battle roster defining makeup and roles of JPG members was not provided prior to the initial meeting of the group. The meeting was attended by more than 80 representatives of the JTF staff but was unproductive due to size and lack of organization. Similarly, duty descriptions and organization charts were not provided to staff members in J6."

"During the Planning Phase of the exercise (Phase II) less than 20 percent of the J2 staff came from the Standing Joint Task Force. This exacerbated the usual forming problems encountered by a JTF intelligence staff with so many people working together for the first time. From the outset of the operation, the J2 staff had difficulties with familiarization of systems, techniques, and procedures."

"Information dissemination was initially a problem."

"A comprehensive plan for reception, orientation, and training of the JTF staff is a key element to effective team building. Recommend that a reception and orientation program be developed and incorporated into existing directives."

"Where billets were not filled, or where they were filled with other than specified skill sets, the staff lacked the expertise or manpower to perform some tasks."

"During the first week, the staff trained as it worked through practical exercises and examined the processes and systems involved. The first week of training set the conditions for success in the second week. In a crisis situation, the staff may not have the luxury of an extra week. A deliberate training plan is critical."

Ad hoc headquarters have no rehearsed standing operating procedures. The headquarters personnel initially are in unfamiliar positions working with strangers. They are asked to perform collective and collaborative tasks interrelating with those whom they have little or no experience. The quotes continue:

"Because the JTF did not receive sufficient augmentation, it pressed the component liaison officers into duty as component planners. This presented two problems. First, as liaison officers, they were familiar with parent force availability and capability but were not prepared for in-depth planning of force employment at the JTF level. Second, as component planners, they were diverted from their principal duties as liaison officers. As a result, neither function could be performed to full potential."

"Many of the JTF augmentation personnel were unfamiliar with the JTF staff concept and many were inexperienced with the systems they would use. Given the nature of a JTF, these problems may be unavoidable."

"Many of the J2 staff lacked previous JTF experience and many had no experience or background in the specific specialty to which they were assigned. This was most evident in the collection management, analysis, request for information (RFI) administration, and dissemination elements. There was a demonstrated unfamiliarity with the associated systems, procedures, and specific collector capabilities."

" . . . to establish, train, and maintain component-based JTF headquarters. These headquarters require Service and functional augmentation as they transition from familiar Service business to less familiar joint business. There is generally a period of adjustment in which the headquarters focuses on a new, operational level mission, with new processes and augmentation personnel."

" . . . manning levels and inadequate experience and training haunted the information warfare (IW) cell. This was the biggest challenge facing the IW staff. Members were receptive to Observer/Trainer (O/T) guidance and recommendations and readily worked through problems. For the JTF to have a fully functioning IW program that permitted coordination up and down the chain of command, more assets needed to be dedicated to the process. There just were not enough personnel assigned with appropriate levels of training to properly coordinate and execute IW options."

" . . . a lack of personnel trained in the intelligence preparation of the battlespace (IPB) process, and no established procedures for sharing IPB products were observed at both the JTF HQ and component level. These factors contributed greatly to the paucity of joint intelligence preparation of the battlespace (JIPB) related products available during this exercise."

The core of the ad hoc staff usually finds solutions to joint problems by planning for solutions conceived within their "comfort zone". These joint solutions are often Service centric solutions that may not optimize the capabilities of the joint force. Specifically,

"The overwhelming majority of the JTF staff consisted of officers and non commissioned officers (NCOs) with a maritime background . . . the staff appeared at times to be uncomfortable with land operations, causing the staff to either overlook essential land operations issues or to micro-manage operations on the ground. Both of these situations could have been avoided if a senior member of the JTF staff had been an officer with extensive land operations experience. In the future, when this JTF is called upon to command an operation that includes significant ground operations, consideration should be given to identifying a deputy JTF commander or J3 with a land operations background."

"Due to a restriction in the exercise Joint Manning Document, component to component LNOs were not resourced. This adversely effected component planning and subsequent component input to the JTF planning process."

"The predominantly Service representation, both in numbers and in key positions, initially limited the scope of planning to maritime solutions. As a result, JTF planning efforts did not consider all the capabilities the joint force could apply toward accomplishing the mission. The staff identified this shortfall in planning and began to explore other joint options, as they became better educated on the capabilities of the other services."

CONCLUSIONS. The performance of the JTF staff suffers from the lack of a standing JTF staff. Some organizational core is needed that can act as a "center of excellence." This core would develop standard JTF staff processes and procedures for the myriad staff functions and processes required to plan and execute a complex joint operation. This core would reduce the

inefficiencies and ineffectiveness that results when forming an "ad hoc" JTF staff. Adequately manning and exercising this staff could significantly increase awareness of joint capabilities and processes that are now learned on the job after a very painful forming process.

Forming On The Fly

PURPOSE. Provide insights from the Experience Database that describe forming staff sections on the fly.

DISCUSSION**.** Below are selected quotes from reports resident in the Experience Database that illustrates the downside of forming staff sections on the fly. In this situation, the JTF commander desired a specific outcome from the staff regarding information warfare (IW). These quotes come from the same event, but others under different conditions described the same difficulties. They reveal that although the idea may be good, the execution, however, runs into doctrine, organization, training, materiel, leadership, personnel, and facilities (DOTMLPF) difficulties.

"IW activities were accomplished in the J3 Command and Control Warfare (C2W) cell. As course of action (COA) development proceeded, the commander decided to form another organization to address IW. He had several options: 1) form a J3 IW element as part of the operations directorate; 2) create a joint (J) (IW) directorate on a par with the other "J" codes; 3) form functional component - joint information warfare centers (JIWC); 4) create a JIWC warfare center. The commander selected option 2 and created a J (IW) on the third day of the planning cycle. The organization was a haphazard conglomeration of the several disciplines that compose IW - command and control warfare (C2W), operations security (OPSEC), psychological operations (PSYOP), intelligence, public affairs, deception, and legal. The joint PSYOP task force (JPOTF) was assigned the duties as deputy J (IW). Attendance at J (IW) meetings by designated participants was intermittent. Not all of the staff was aware of the existence of this new organization. The group also lacked the physical space and attendant administrative and automated data processing (ADP) equipment. Reforming at the onset of Phase III was a noteworthy gain in the personnel area but not in the other areas. The group formed an identity and gelled into a smooth operating organization. However, questions still arose among the remainder of the staff as to the status of the IW organization. Notes were passed and questions asked about reporting an IW cell, directorate, commander or just a JPOTF. Intelligence personnel initially did not recognize the need to support the new organization (request for information [RFIs], assessments), but they quickly corrected the situation. A J (IW) RFI matrix was developed and close coordination between the joint intelligence support element (JISE) and J (IW) ensued. Good use of liaison officers permitted this exchange. When the CJTF opted for COA 3 (Deterrence using IW), the staff section became the primary focus of the JTF's effort. A noticeable increase in the attendance at meetings occurred. The lack of facilities and spaces began to impact the efficiency of the staff. Short notice taskers were difficult to respond to due to a lack of computer equipment. Some members lacked the required level of security clearance to attend meetings and get fully involved in the process. Of note, J (IW) operated on three levels of clearance - General Service (GENSER) Secret meeting in the cell, sensitive compartmented information (SCI) in the JTF SCIF, and other compartmented (black) for the special technical operations (STO). All these issues combined to place a large burden on the director, causing him to rush from meeting to meeting."

"As with previous exercises of this type, manning levels and inadequate experience and training haunted the IW cell. This was the biggest challenge facing the IW staff. Members were

receptive to observer/trainer guidance and recommendations and readily worked through problems. For the JTF to have a fully functioning IW program that permitted coordination up and down the chain of command, more assets needed to be dedicated to the process. There just were not enough personnel assigned with appropriate levels of training to properly coordinate and execute IW options."

"As a result of late formation (two days into the planning cycle), the J (IW) never caught up during the crisis action planning phase. The creation of the J (IW) was never formally promulgated by a change to the command relationships portion of the operations order (OPORD). This evolution served to promote confusion among the staff and components."

"The J (IW) conducted planning almost independently of the joint planning group (JPG). These two organizations lost synchronization of effort. At the heart of the matter were issues surrounding the ability of IW to perform the deterrence mission and assess the success of its performance. By the conclusion of Phase II, the J (IW) had produced portions of the OPORD (Annex C, Appendix 3, and Annex S), but none was completed to the level of detail required. Analysis of the IW plan as it existed, identified significant deficiencies in the areas of task assignment and method of application. Due to exercise constraints, the ability of the components to support and coordinate IW play was limited."

"As the JTF prepared to enter hostilities, the J (IW) began to focus more on the assessment aspect of the plan. It was difficult to obtain feedback on the degree to which they were attaining their goals. The joint operations center (JOC) was not well informed of the plan; further evidence that execution of the plan was difficult to obtain. Also, the group relied strictly on coordination through a liaison officer to distribute information. No fragmentary order (FRAGO) or execute order was transmitted to the components. It was not until conflict occurred that the group began to address the electronic warfare (EW) issue. Questions arose about the ability of the J (IW) to task EW assets needed to execute the IW plan (this also relates back to choice of command structure for the organization when created). Close cooperation and coordination between J (IW) and the J2 resulted in the provision of some required assets. This relationship would be severely strained in a prolonged, higher intensity conflict."

"Deception plan integration was not accomplished. Given the selected COA the staff should have had a well thought out, coordinated deception plan. The plan that was developed relied exclusively on tactical level deception and not on IW issues such as the populace, leadership, economy, etc. The lack of deception guidance at the operational level was a severe dismissal of responsibility by the JTF. The reliance on tactical level deception was indicative of the last minute, afterthought approach to deception planning."

"Integration and synchronization of the IW plan were challenges for the JTF. A great deal of effort was expended keeping the commander, components and theater level participants informed and updated on the status of plan execution. At the heart of this issue was the classification level of IW operations. As mentioned earlier, this setup impacted the performance of the group due to a lack of clearances by several members. This issue also impacted staff awareness of IW. Many did not know of the existence of IW or of the capabilities it brought to the battlespace."

"The IW group arrived for a later exercise phase with a comprehensive IW plan. This plan was a significant improvement over the OPORD created during earlier phases. J (IW) developed eight COAs covering various aspects of IW application available to the commander. One of the COAs, SCUD hunt/suppression, was developed on short notice. Some difficulty implementing the plan was noted when the JPG informed J (IW) that the option developed was

not a branch or FRAGO. Execution of the plan was fragmented due to the lack of an established order process with the JOC. Each area of the plan (there were three) was handled by a separate liaison officer from the group. The only component that was made aware of the plan was the joint force air component commander (JFACC). Synchronization was lost."

"Another challenge centered on rules of engagement (ROE) for IW. Since IW spans the spectrum of conflict from deterrence to destruction, a flexible, time sensitive method for addressing changes to ROE should be in place. The IW group made several COA changes without identifying or requesting the appropriate ROE to execute those plans."

CONCLUSIONS. Forming new organizations of any size requires careful planning to integrate them into existing organizations. Personnel, SOP, and support, among many difficulties, cause the well intentioned action to fall flat because skills, activity fit, and supply difficulties must be overcome.

Deployment Process

PURPOSE. Provide an analysis of major trends in the deployment process. The time-phased force deployment data (TPFDD) process continues to challenge joint task force (JTF) headquarters personnel during training events.

BACKGROUND. Numerous joint training events point to shortfalls in the JTF staff's ability to carry out the TPFDD process. The TPFDD process is not well understood by a cross section of the JTF staff in both the planning and execution of JTF operations. Joint force deployment is a dynamic and complicated process with numerous process stakeholders and process seams, resulting from the multitude of organizations and functional processes involved in deployment planning and execution. Deployment stakeholders include: the supported commander responsible for mission accomplishment, operational commanders of forces deploying to execute a joint force mission, and supporting commanders of forces and organizations supporting the deployment portion of a force projection mission. Ideally, all process stakeholders should endeavor to strike a balance between operational effectiveness and deployment efficiency. Operational effectiveness, however, will normally take priority over deployment efficiency. An analysis of over 50 joint exercises has been conducted to understand the shortfalls in the TPFDD process. Examples of observations from selected events follow:

TPFDD PROCESS SHORTFALLS

Planning Stage. During crisis action planning, the JTF staff experiences many difficulties in the process that develops the TPFDD. JTF staff personnel often lack understanding of the Joint Operations Planning and Execution System (JOPES) process and the inputs required to facilitate the process. The database provides the following examples:

"Within the J2 itself there was little understanding of the TPFDD development process."

"The JTF Staff had difficulty in developing a TPFDD. The problem stemmed from several sources."

"The JTF failed to properly plan for, develop and execute a validated TPFDD."

"During course of action (COA) analysis the J4 and J5 determined that all COA were supportable and feasible. The J4 made its determination without having a complete idea of the number and type of logistics units required to execute each COA. The J5 made its determination without an initial TPFDD analysis to check the transportation feasibility of each COA. There was very little analysis to support the statements made by the J4 and J5 staff sections.

Consequently there was a danger that the recommended COA, when studied further, might have proven to be unfeasible because of transportation or logistics constraints."

"Initially, a J3 deployment cell representative was not included in the joint planning group (JPG); consequently, deployment considerations were not addressed during COA development, and both COAs had to be revisited to determine deployment feasibility."

"A thorough review of joint doctrine dealing with crisis action planning and JOPES appears necessary. During the exercise the JTF operations and planning cells operated as if the crisis action planning (CAP) process must be conducted in a sequential rather than a parallel manner. This caused the staff to refuse to request forces or deployment orders until their COA was approved which jeopardized the successful accomplishment of the JTF mission."

"The JTF headquarters was not organized to accomplish concurrent operational planning and TPFDD development as an integrated process."

Execution Stage. Likewise, during plan execution, the JTF staff usually experiences difficulties in flowing forces to the theater in a manner that supports the operational plan. JTF leadership often is unable to prioritize and sequence forces effectively to support operations. The database provides the following examples:

"The deployment of forces did not support the commander's scheme of maneuver because the forces required to accomplish the mission were not available on D-Day."

"The staff, as a whole, was not familiar with the flow of requirements or who validates and prioritizes and how the information is then passed to components for sourcing."

"Although TPFDD validation worked well and the Deployment Management Team (DMT) was proficient in the procedure, there appeared to be no one that validated requested forces against the force flow outlined in the combatant commanders intent."

"Despite these outlined procedures, the validation process broke down frequently."

"There was a lack of understanding/emphasis on the TPFDD at the senior staff level. The joint planning group (JPG) seemed to be uninterested in the process, and senior leaders were not involved."

"However, it was recognized that additional training was required to handle the challenges of reviewing and validating a dynamic TPFDD."

"The components were not effectively staffed to integrate TPFDD development with the operational planning process."

"The TPFDD provided to the JTF lacked sufficient unit data to allow review, validation, or revision without a major rework and the JTF was not staffed to accomplish that."

"Service component and combatant command planners were not fully engaged in exercise TPFDD development, nor were real-world procedures and resources (manning levels) used."

CONCLUSIONS. Leadership development should include an intimate knowledge of JOPES to include the major decisions that must be made in order to effectively and efficiently flow all required capabilities in the proper sequence to accomplish the mission. Some leaders lack of familiarity with the process has resulted in less than adequate results because they chose to be detached from this very important phase of JTF operations. There are inadequate numbers of trained personnel who can facilitate the TPFDD process.

Experience Level Of Joint Task Force Staff Personnel

PURPOSE. This paper reports the results of research, analysis, and study seeking to understand the training and experience levels of personnel assigned to joint task force (JTF) headquarters (HQ).

RESULTS. Research and analysis focused on over 1,300 records spanning over 60 JTF events. Generally, JTF HQ staffs are formed from Service component staffs by augmenting those staffs with sister Service personnel. These are termed augmentees and liaison officers (LNO). The personnel on the Service staffs, normally, are skilled and practiced in their assigned positions focused on Service specific tasks. During the augmentation period these personnel receive academic instruction focused on JTF Operational Level tasks. The least skilled personnel oftentimes are the augmentees and LNOs. Therefore, the records search focused on those staff personnel categories. Seventy-one records contained information on liaison officers (LNO) and nine on augmentees. Analyses of these records indicate that problems begin when an augmentee or LNO arrives at the Joint force headquarters. The reception center has no idea where to assign the individual and there are no adequate indoctrination procedures in effect. The following are selected representative extracts from the records examined:

"When the component LNO teams reported to the JTF, it was not clear to whom they would report, where they would work, or what the JTF envisioned as their roles and responsibilities."

"Because there was no space set aside for the LNOs, their work area became the joint operations center (JOC). This arrangement tended to isolate the LNOs since the joint planning group (JPG) was meeting and working in an area separate from the JOC."

"The JTF faced a number of challenges associated with rapidly integrating a large number of augmentees into a headquarters. Many of the JTF augmentees were unfamiliar with the JTF staff concept and many were inexperienced with the systems they would use."

"The JTF headquarters should prepare a detailed reception and training plan for augmentees."

Training. Many personnel assigned as augmentees and LNOs are not trained in the areas where they are to work, or are not of the appropriate rank and/or experience level for the position they will occupy. The following are selected representative extracts from the records examined:

"JTF LNO were effectively used to convey information to the components in a timely manner; however, more LNO training, more senior LNOs, and additional LNOs would have made the process even better."

"LNO selection, training, and performance still need additional attention."

"There was a lack of communication between the JPG and LNOs. LNOs needed to more critically review all JPG products to check for their components' involvement."

"Direction and control of the components was not exercised by the JTF. At times the components, through the LNOs, were driving what the JTF was doing. The LNOs would hear, assess, and report to their components. The components would make decisions and send the orders they wanted to the JOC via E-Mail. The JOC would then produce orders."

"The joint force air component commander (JFACC) LNO would have benefited from U.S. Coast Guard (USCG) assistance to resolve USCG aviation issues. The USCG had two O-6 LNOs, one surface operator and one aviator, assigned to joint force maritime component commander (JFMCC). The surface operator was sufficient to assist the U.S. Navy LNO to the JFMCC on USCG surface issues. The JFACC LNO had no USCG assistance but needed to include USCG aircraft, both fixed wing and rotary, in his planning. USCG operations almost

always combine surface and air aspects; therefore, both surface and air planning teams need USCG representation/assistance."

"Joint special operations task force (JSOTF) LNOs were not provided training or orientation on the JTF E-mail and message traffic system used."

"The lack of an Air Force forces (AFFOR) LNO on the JTF staff hindered the mission analysis process and essentially omitted the component planning perspective. All components must be represented in the JPG during the crisis action planning process."

"The selection and use of LNOs within a JTF has traditionally been a source of problems. However, following some of the initial observations (similar to those occurring during previous exercises, as well as the planning phase of this exercise) that mainly concerned identification of LNO operating space/equipment and responsibilities, roles and missions, the assigned LNOs were extremely valuable to the JTF staff and were able to effectively represent their commands/agencies."

"JTF staff augmentees, in particular those assigned to the JFACC, reported without the requisite contingency Theater Air Control System Automated Planning System (CTAPS) familiarization. Much of the training received in this exercise is "graduate level" work. Personnel are assumed to have a working knowledge of systems such as CTAPS."

"CTAPS training continues to be a problem in joint exercises. Services should ensure that personnel are familiarized with equipment as per the manning documents. The JTF should ensure people selected for critical billets have the appropriate pre-training."

"The use of pre-designated, experienced, staff modules to augment the JTF nucleus staff is one way to mitigate the problems associated with integrating a large number of augmentees."

"Augmentees should receive a written description of their specific responsibilities when they in-process to the JTF headquarters. These job descriptions would be part of the JTF standing operating procedures (SOP) and would help the individual augmentees quickly familiarize themselves with their duties and responsibilities."

"The receiving staff organization must have a training and orientation program established to prepare augmentees for their assignments."

CONCLUSIONS. The problems that arise with the use of augmentees and LNOs often begin when the individual arrives at the joint force headquarters. In many cases the reception center has no idea where to assign the individual and adequate indoctrination procedures have not been placed in effect. Organizations that assign someone the responsibility of "being in charge" of the augmentees/LNOs tend to experience fewer problems and are able to more effectively use these personnel. Numerous augmentees and LNOs are not trained in the areas where they are to work, or, are not of the appropriate rank/experience level for the position they will occupy.

Information Management

PURPOSE. This paper reports the results of research, analysis, and study seeking consistent performance of tasks supporting information management (IM) on joint task force (JTF) staffs.

RESULTS. Research and analysis focused on over 1300 records spanning over 60 JTF events. 119 of these records related to IM. The analysis of these records indicates the Information Management Plan (IMP) and Information Management Officer (IMO) is a critical combination in a successful JTF headquarters operation. The inverse is also indicated; JTF staffs

struggle when the IMP and/or the IMO are lacking or weak. The following are selected representative extracts from the records examined:

"The joint task force headquarters standing operating procedures (JTF HQ SOP) and operations order (OPORD) provide sufficient instruction and procedures for the establishment of Mission Oriented Protective Posture (MOPP) for subordinate units. However, there is no internal staff SOP for establishing and disseminating the MOPP level within the headquarters."

"During the forming phase, information managers from each staff directorate and major functional area met to clarify procedures and discuss IM issues. The joint operations center (JOC) team chief, who managed the IM process, facilitated a thorough discussion of IM procedures as they were outlined in the SOP."

"Several staff officers in the JOC, who were individually responsible for the mechanics of the IM process, managed information. A central IM cell, composed of three officers on each shift, managed the JTF Homepage and scheduled video teleconferences (VTCs). Two JTF request for information managers served on each shift to process requests for information from subordinate organizations and to elevate appropriate requests to the combatant command."

"The extraordinary success that the JTF experienced in handling, analyzing, and providing critical information to the commander can be attributed to four key factors: commonly understood IM processes, employment of a JTF Homepage, accessibility of the commander, and a manageable RFI process."

Dissemination. The task of disseminating information is difficult even when all conditions are met. Rapid advances in, and unfamiliarity with, available technology often cause information to be misrouted or inaccessible, which may result in required actions not being taken. When using web-based technology for disseminating information it is necessary to ensure that the data is not buried too deeply in the system. The following are selected representative extracts from the records examined:

"Initially, information was difficult to locate on the Homepage. Many documents were filed within the file structure of the originating staff rather than under a topical label. For instance, the exercise IMP was filed on the exercise Homepage under J3 Current Operations instead of under IMP. For staff members who did not know the origin of documents, it took considerable time to locate them."

"The training audience was very successful in handling, analyzing, and providing critical information to the commander and key decision makers. Information was disseminated and managed through highly effective organizational Homepages. The headquarters and each component had a Homepage, as did each subordinate agency. Pull-down menus were used to access documents in sub-pages, and hot links were used to access priority information. Users selected a specific section of a Homepage and followed a thread to post or obtain information."

"Worthy of specific note was the command emphasis on IM. At the outset, the commander emphasized his concern for accessing critical decision-making information from the anticipated vast accumulation of general information and data. His guidance was clear - the Homepage should not become a huge and cumbersome electronic filing cabinet. The exercise offered an excellent opportunity for the staff to employ their IMP processes and their principal IM tools, such as their JTF Homepage and RFI process."

"Using the Homepage as the primary means of disseminating information, the training audience was exceptionally effective in handling, analyzing, and providing critical information to the JTF commander and key decision makers."

"JTF information managers had to constantly review, evaluate, and prioritize information on the web pages to ensure that information was current and not buried under layers of directories."

"While the Homepage process for rapid posting of critical, time-sensitive information was a major contributor to the JTF's success, it also is vulnerable. The Homepage is a technological tool that consists of computer and network equipment, necessary software programs, trained operators, and knowledgeable managers. Without all of these parts, there is no Homepage IM tool. The back-up plan, in the event of Homepage outage due to loss of network service or software corruption, consisted of a combination of data fax, secure telephone, and courier service."

"Web-based technology does not replace active command and control (C2). Due to a well-researched and executed IMP, as well as effective functional training, the training audience was extraordinarily successful in handling, analyzing, and providing critical information to the commander and key decision makers. In general, the Homepage was user-friendly and creatively designed so as not to bury information under layers of directories. However, while the Homepage was an excellent tool for rapidly posting information, there was often an incorrect assumption that "posted equated to disseminated" and that information posted was the same as information fully disseminated. JTF staffs and components should bear in mind that posting information on a web page is a form of passive communication and does not eliminate the requirement for active personal confirmation of receipt and understanding."

Access. Access and security issues also hinder execution of a good IMP. In exercises and operations that include allies and coalition partners, problems often arise with gaining access to U.S. systems. The following are selected representative extracts from the records examined:

"Security managers need to provide guidance to information owners regarding the specific information that can and cannot be passed to allies. When staff members post releasable information to the U.S. network, they need to identify it immediately to the gateway administrator for posting to the allies. There needs to be a method for coalition members to make their information requirements known to the IMO, and the IMO should have an expeditious process to determine how to best to meet those requirements."

"Recommend that the component command further develop and document IM processes. It is vitally important that procedures be standardized and practiced to achieve a smooth transition to unified operations under the IMO, and to integrate augmentees, liaison, and coalition members into the IMP."

"A final issue raised under this theme related to the security implications resident with the use of Global Command and Control System (GCCS). In multinational/coalition operations, filtering of information to our allies will be necessary since they will not be cleared for GCCS access."

CONCLUSIONS. Success of a joint force headquarters is based on how well they use available information and assigned personnel. A workable IMP and a qualified IMO are key to a successful operation. Dissemination of information can be efficiently handled through the use of web-based technology, but care must be taken to ensure that all concerned are aware of where it may be found. JTF commanders, staffs, and IMOs struggle with providing U.S. operational information to Allies and Coalition Partners.

Joint Task Force HQ SOP and Tactics, Techniques, and Procedures

PURPOSE. This paper reports the results of research, analysis, and study seeking consistent use of standing operating procedures (SOP) and tactics, techniques, and procedures (TTP) in a joint task force (JTF) staff.

RESULTS. Research and analysis focused on over 1,300 records spanning over 60 JTF events. Fifty-four of these records related to SOPs and nine to TTP.

Analysis of these records indicates that JTF staffs have written SOPs and some TTP. However, individual members of those staffs usually have little working knowledge of the JTF SOP and TTP. The following are selected representative extracts from the records examined:

"It is essential that staff members become familiar with the SOP and are intimately familiar with procedures directly affecting them. SOPs should be reviewed and updated as necessary to support mission tasking. Additionally, each member of the staff should maintain a clear understanding of mission requirements and intent in order to effectively support the commander and assist other staff sections."

"The commander considered the daily decision cycle and established the cycle through an SOP item. This paid dividends for the JTF, as they were able to quickly establish daily schedules and routines. The exercise allowed the JTF to practice the established decision cycle process and afforded the opportunity to adjust or modify the process, as required."

Most of the JTF SOPs and TTP are not reviewed regularly, and, are out of date. The following are representative extracts from the records examined:

"The length of the SOP presents a significant challenge to the staff on how to get full comprehension of all areas. The tendency of each section was to review and update their SOP with little familiarization of other SOP sections. This becomes an even more significant issue as the staff comes to full strength and since augmenting personnel have little time to become familiar with all staff policy and procedures."

"Documentation of the experience gained during the exercise in the form of SOPs, was key to passing the knowledge gained, to new nucleus staff members and augmentees."

"The exercise provided the JTF staff with an opportunity to practice many of the procedures outlined in the SOP."

"In addition to validating the existing SOPs the staff also identified areas where new procedures or processes were required."

Some critical elements were not covered in SOPs. The following are representative extracts from the records examined:

"Doctrine and joint TTP need to address and provide definition on establishing criteria and quantifying the achievement of air and maritime superiority."

"There are no current joint TTP for collection management and dynamic retasking for low-density, high-demand collection assets. This limitation forces each JTF to establish and implement non-standard procedures that are inconsistent between operations."

CONCLUSIONS. The records reviewed indicate that, in most cases, joint force staffs have little working knowledge of SOPs/TTP, and in many instances, the documents in use were incomplete or out of date. Without current and readily available SOPs/TTP, JTF staffs are required to use valuable time "reinventing the wheel".

Integration Of Joint Task Force Intelligence Assets

PURPOSE. This paper reports the results of research, analysis, and study seeking to understand the task capability of OP 2.1, Direct Operational Intelligence Activities.

RESULTS. Research and analysis focused on over 60 joint task force (JTF) events. Currently, and in these events, JTF staffs, including J2, are formed around a parent Service component augmented with sister Service and Agency personnel. The personnel on the Service staffs, normally, are skilled and practiced in their assigned positions using Service specific intelligence support systems. Within the core of the headquarters, the first requirement is to conduct reception, staging, onward movement, and integration (RSOI) activities. For the J2 staff this normally includes training and integration of core intelligence systems and procedures. In a crisis environment, failing to completely orient a forming JTF staff in time leads to predictable adverse results. None has more immediate consequences than overcoming the inertia inherent in organizing information management (IM) within the J2 staff and outward from them to the command group and the operations and plans staffs.

Three typical quotations:

Information Flow. "Flow of intelligence information within the JTF was problematic. There was a lack of coordination in passing information in a timely manner between J2 cells inside and outside the sensitive compartmented intelligence facility (SCIF). This was caused by an apparent disconnect between personnel working within the SCIF and those on the outside. An understanding of information flow requirements within the JTF is essential."

Intelligence Support Systems. "Confusion arose out of the employment of some of the intelligence support systems for dissemination of information. Within the JTF headquarters, there was a shortage of personnel trained on various intelligence systems, e.g., joint deployable intelligence support system (JDISS), intelligence data handling system (IDHS), modernized intelligence database (MIDB), and community on-line intelligence system for end-users and managers (COLISEUM)."

Joint Intelligence Preparation of the Battlespace (JIPB). "There was only limited predictive analysis conducted throughout the JTF. Analysis was limited in part because of a lack of a fully developed JIPB."

CONCLUSIONS. The practice of forming JTF staffs around a Service component core staff requires a well designed plan for RSOI of augmentee personnel. Within the J2 staff and its interfaces with the command group and operations and plans staffs, time is required to build the interpersonal relationships and human networks necessary to properly pass information. The lack of networking is exacerbated by the use of Service specific intelligence systems and lack of use of joint systems. Developing familiarity and ease of use takes time when time is not available. The impact is that the JIPB required to initiate course of action development and analysis is not always sufficiently mature to meet its purpose.

Annex C — Assessment Methodology

HQ, U.S. JOINT FORCES COMMAND
NORFOLK, VA 23551-2488

Annex U To MC02 EXDIR Assessment And Reporting

References:

a. U.S. Joint Forces Command Experiment Analysis Plan, MC02

b. U.S. Joint Forces Command J9 Joint Futures Lab, RDO White Paper Version 2.0, *A Concept for Rapid Decisive Operations* (Final Draft), dated 25 October 2001.

c. Chairman, Joint Chiefs of Staff Manual 3500.04B, *Universal Joint Task List Version 4.0*, dated 1 October 1999

d. Chairman, Joint Chiefs of Staff Memorandum, *Guidance for USCINCJFCOM Joint Experimentation*, dated 2 November 2001

1. General

a. Purpose. This Annex presents the Joint Forces Command (JFCOM) plan for assessing the Joint Field Experiment on Rapid Decisive Operations (RDO) in 2007, Millennium Challenge 2002 (MC02). This Annex provides an overview of the intent, scope, concept, and methodology for assessment of the Joint Field Experiment to meet JFCOM's joint experiment objectives. A detailed assessment plan, the JFCOM Experiment Analysis Plan (JEAP), reference (a), will be published to document the detailed methodology, data requirements, and reporting plan for MC02. The Services and the Special Operations Command (SOCOM) will develop assessment plans for their experiment objectives as appropriate.

b. Background. The Defense Authorization Act for FY 2001 (Public Law 106-399) required the Secretary of Defense to conduct a joint field experiment in fiscal year 2002 to explore critical warfighting challenges at the operational level of war in this decade. MC02 fulfills this requirement.

2. Experiment Description

a. Experiment Overview. JFCOM, in conjunction with the Services and SOCOM, SPACECOM, and TRANSCOM will conduct the MC02 Joint Field Experiment from 24 July through 15 August 2002 using computer simulation and live forces to determine the extent to which the joint force will be able to execute RDO in this decade. The experiment will assess the impact of three primary RDO enablers: Standing Joint Force Headquarters (SJFHQ), Operational Net Assessment (ONA), and Effects-Based Operations (EBO) on future joint warfighting operations. MC02 will also provide evidence to support doctrine, organization, training, materiel, leadership, personnel, and facilities (DOTMLPF) change recommendations that will enable the joint force to meet future warfighting challenges at the joint operational level of war.

b. Experiment Hypothesis

If *an Enhanced Joint Force Headquarters is informed by an Operational Net Assessment and employs Effects-Based Operations which utilize the full range of our national capabilities;*

then *the 2007 Joint Force will be able to conduct Rapid Decisive Operations against a determined 2007 adversary.*

c. RDO Concepts. The "if" portion of the experiment hypothesis describes an enhanced Joint Force Headquarters (JFHQ). See Figure U-1. The experiment will assess the three primary aspects of the RDO concept for an enhanced joint headquarters: Standing Joint

Force Headquarters (SJFHQ), Operational Net Assessment (ONA), and Effects-Based Operations (EBO). Additional aspects of the enhanced joint headquarters will also be assessed: an experimental Collaborative Information Environment (CIE), Interagency (IA) collaboration, Joint Theater Logistics Management (JTLM), and Joint Intelligence, Surveillance, and Reconnaissance (JISR). These RDO concept enablers are fundamental to the Joint Force's ability to accomplish the RDO warfighting tasks. Workable concepts for an SJFHQ, ONA, and EBO are the three primary experiment deliverables that will support the enhanced JFHQ. Each of the concept enablers depicted on the left side of Figure U-1 will be represented in MC02 in an experimental form with aspects of the individual capability emulated because of difficulties representing 2007 capabilities in 2002. However, each of the seven concepts will potentially yield DOTMLPF recommendations. The RDO concept enablers are as follows:

(1) Standing Joint Force Headquarters. The joint field experiment will examine the strengths and weaknesses involved in providing a pre-established SJFHQ knowledge element to augment a deploying Joint Task Force Headquarters (JTF HQ). The SJFHQ is intended to provide each warfighting theater CINC a trained and equipped standing, joint Command and Control (C2) capability organized to reduce the time involved in setting up a JTF headquarters ready to rapidly and decisively conduct operations. The SJFHQ will provide continuity to the CINC's staff in planning and operations necessary to support EBO and RDO. This 55-person cell will provide specific plugs and augmentees to the designated JTF to enable it to support EBO planning and assessment quickly.

(2) Operational Net Assessment. ONA provides the foundation of knowledge and understanding about an adversary needed for RDO. It provides knowledge in sufficient detail to apply integrated diplomatic, information, military, and economic (DIME) friendly actions decisively against an adversary's political, military, economic, social, infrastructure, and information (PMESII) systems. This knowledge base includes systems analyses that identify critical adversary vulnerabilities and potential friendly DIME actions with the goal of causing desired effects. It is a product of collaboration among a wide variety of organizations and informs decision makers from strategic to tactical levels. The ONA provides a joint task force commander and components visibility of effects-to-task linkages supporting effects-based operations.

(3) Effects-Based Operations. The joint experiment will examine if the Joint Force can plan, execute, and assess the results of EBO. The EBO concept defines a process for obtaining a desired outcome or "effect" through the synergistic and cumulative application of the full range of military and non-military capabilities at all levels of conflict. An effect is the physical, functional, or psychological outcome, event, or consequence that results from specific military or non-military actions. The EBO concept envisions more comprehensive insight into the adversary, ourselves, and the environment to facilitate the determination of desired effects, the consideration of the full range of potential results of the appropriate application of power from the full spectrum of military and non-military capabilities, an assessment of the resultant outcomes, and rapid adaptation by the joint force.

(4) Collaborative Information Environment. An experimental CIE will be assessed that includes use of collaboration tools and an enhanced situational awareness through a common relevant operational picture (CROP). The JTF headquarters depends on collaboration and maximized use of collaborative tools in order to fully realize a truly "distributed" JTF C2 network linking the JTF, components, CINC, interagency, and centers of excellence. This C2 network will use reach-back capabilities to access fixed base support and other resources which

should reduce the need for a large forward C2 footprint. The results of this experiment will support follow-on experimentation to identify a uniform organization; a baseline Joint command and control system; standard operating procedures (SOPs); and tactics, techniques, and procedures (TTPs) to support Combatant commanders in the establishment of a SJFHQ element within their regions (reference (d)).

(5) Interagency. A Joint Interagency Coordination Group (JIACG) will be constituted on-site at JFCOM with secure, virtual collaboration to JIACG interagency participants in Washington, D.C. JIACG participants will coordinate in four areas: (1) strategic guidance and a regional assessment, (2) political-military plan, (3) operational planning issues and crisis response, and (4) interagency coordination during execution to support crisis response and transition planning. Information to support interagency planning will be provided by the ONA. The ONA will include collaboration with civilian and military departments and agencies engaged in the collection, analysis, and production of estimates and assessments that support the National Security Council (NSC).

(6) Joint Theater Logistics Management. The MC02 organization for JTLM operates at two tiers. At the combatant commander level is a Joint Logistics Management Center (JLMC) within the CINC J4 staff. The JLMC will operate in a CIE with the logistics elements of the CINC's Service components, host nations, DLA, TRANSCOM, coalition forces, other CINC "J codes," the country team, and the logistics element of the JTF staff and those of the JTF functional components. At the JTF level, a collaborative Logistic Action Response Board (LARB) is convened as required and is composed of logisticians and other key personnel integrated into the Plans and Operations Groups of the JTF staff as well as those in the functional component staffs. This experimental organization concept is intended to provide distributed command and control for logistics and transportation to carry out joint logistics processes with increased effectiveness, better synchronization, and greater flexibility with fewer personnel.

Figure 192: **The Pacific Ocean, Aug. 2, 2002** — An MH-60S *Knighthawk* multi-mission helicopter from the "Packrats" of Helicopter Combat Support Squadron Three (HC-3), makes an approach to the experimental high-speed vessel *Joint Venture* (HSV-X1) off southern California. *Knighthawk* is a newly-designed helicopter and uses the *Black Hawk* airframe to provide a larger cabin area for cargo and passenger transport yet keeping the automatic rotor blade folding system and rapid folding tail pylon for shipboard operations. Originally designed as a civilian car and passenger ferry, *Joint Venture*, an experimental craft being studied for troop transport, is participating in Fleet Battle Experiment Juliet (FBE-J), part of *Millennium Challenge 2002* (MC02). U. S. Navy photo by Photographer's Mate 2nd Class Frederick McCahan. [020802-N-8894M-001] Aug. 2, 2002

(7) Joint Intelligence, Surveillance, and Reconnaissance. JISR is a joint mission to produce relevant information from all sources in a dynamic, comprehensive, responsive, timely manner enabling information superiority. JISR functions within the EBO

processes and includes ISR sensor management, collection operations, and the level of processing and analysis necessary to support initial phase exploitation of collected information, and the dissemination of this intelligence to the user.

d. Experiment Objectives. The following five experiment objectives reflect what the Joint Force needs to accomplish in MC02 in order to conduct RDO as reflected in the "then" portion of the experiment hypothesis (see Figure U-1 above).

Objective 1: Establish and maintain information/knowledge superiority.

Objective 2: Rapidly set the conditions for decisive operations by seizing and exploiting the initiative, posturing the joint force, establishing the nature of operations, and shaping the environment.

Objective 3: Assure access into and through the battlespace to provide sufficient freedom of action.

Objective 4: Conduct decisive effects-based operations.

Objective 5: Sustain itself, specifically to deliver sustainment to combat units in synchronized non-contiguous operations.

e. Joint Initiatives. JFCOM issued a call for joint initiatives that supported the RDO concept. Each initiative is a potential future RDO enabler for overcoming one or more warfighting challenges associated with conducting RDO in this decade. Appendix U-1 presents the 27 sponsored joint initiatives.

f. Potential Change Recommendations. MC02 is expected to be the culminating event for a number of potential DOTMLPF change recommendations. The findings of the experiment, along with findings from previous experiments and other events, will determine which of the potential changes have sufficient evidence to support a formal change recommendation. JFCOM is in the process of developing approximately 20 potential change recommendation packages that may have sufficient evidence after the completion of MC02 to support a formal change recommendation.

3. Experiment Execution. The MC02 Joint Field Experiment combines a military computer-assisted headquarters event and a military field event that includes both live and simulated forces, set in the 2007 time frame, focused on those joint warfighting concepts that enable RDO. The setting is a small-scale contingency (SSC) against a determined, locally numerically superior 2007 adversary. The experiment includes four preparatory events (spirals) and the concluding field experiment.

a. Spiral 0. Initial technical testing conducted 3 to 14 December 2001.

b. Spiral 1. A technical event, conducted from 28 January to 8 February 2002, to test the core and ancillary models as well as the C4I systems fed by the simulations.

c. Spiral 2. An academic event, conducted from 18 to 29 March 2002, to discuss U.S. Joint Doctrine and RDO Concepts, as well as Effects-Based planning, operations, and assessment. The academic event will be followed by a practical exercise, and continued technical integration and testing.

d. Spiral 3. Conducted from 3 to 14 June 2002. The JTF will develop the Effects Tasking Order and component headquarters will develop the supporting component orders. The JTF will conduct a rehearsal during the final two days.

e. Joint Field Experiment. The field experiment will be conducted from 24 July to 15 August 2002. The Joint Field Experiment will include computer-simulation and live forces to determine the extent to which the joint force will be able to execute RDO in this decade. It will also include opportunities for Service-related experimentation. The MC02 Joint Field

Experiment is designed to permit as realistic an operational warfighting environment as possible. It includes a robust, adaptive, independent 2007 adversary, which will have its own objectives and campaign plan. Both the Blue force and the Adversary will be minimally constrained to enforce the scenario boundaries. The control cell will ensure validity of all Blue-Adversary actions and engagements. The intent is to assess the concepts against a robust, adaptive and independent 2007 adversary before making any recommendations. In order to keep the experiment from terminating too soon, if one side or the other gets "too far" ahead, the control cell will make adjustments, but only after the assessors have noted the successes and failures and their causes. The control cell may have to "resurrect" or "protect" some Adversary or Blue entities to continue the experiment until all experimental objectives are achieved. The intent is to minimize the intervention of the control cell and promote maximum free play for Blue and the Adversary within the scenario boundaries.

4. Assessment Strategy

a. JFCOM Assessment Focus. The JFCOM assessment and reporting will focus at the joint operational level of warfighting. Accordingly, JFCOM data collection will focus on the CINC HQ (response cell), the JTF Headquarters, and the Functional Component Headquarters: JFLCC, JFMCC, JFACC, JPOTF, and JSOTF. A representative sample of data will be collected at the tactical level during the live tactical actions to examine accuracy of situational awareness at the joint operational level. The Services and SOCOM will execute and report on their component-level experiments through their own reporting chains.

b. JFCOM Assessment priorities. The JFCOM assessment is organized into four assessment tasks: two primary assessment tasks and two secondary assessment tasks.

(1) Primary Assessment Tasks

(a) TASK 1: Assess the capability of the experimental RDO concepts to impact JTF HQs planning processes and coordination processes. This assessment task examines the "if" component of the experiment hypothesis and answers the question: To what extent did the concept enhancements to the Joint Force Headquarters facilitate the Joint Task Force Headquarters command and control processes and products?

(b) TASK 2: Assess the capability of the experimental RDO concepts to impact Joint Task Force actions against a determined 2007 Adversary. This assessment task examines the "then" component of the experiment hypothesis and answers the question: to what extent did the experimental concepts affect Joint Force actions (influence, deter, coerce, compel, and defeat) against a determined 2007 adversary?

(2) Secondary Assessment Tasks

(a) TASK 3: Assess the strengths and weaknesses of the RDO sponsored Joint Initiatives in supporting the JTF planning processes and products.

(b) TASK 4: Provide lessons learned on joint field experimentation for the next Joint Field Experiment.

c. Warfighting Challenges, Tasks, and Measures. JFCOM Joint Futures Lab Concept Development Department has identified 22 potential warfighting challenges, which are presented in the following paragraphs. 11 are related to the JTF HQs planning process and 11 related to the ability of the Joint Force to accomplish the five MC02 objectives in 2007. Planning tasks have been developed for each warfighting challenge for the JTF HQ and operational execution tasks were developed for the Joint Force as a whole. Many of these tasks have been taken directly or adapted from reference (c), Universal Joint Task List (UJTL) Version 4.0. Measures of task accomplishment have been developed for each task. When applicable, the measures have been

adapted from the measures provided in the UJTL. The 23 warfighting challenges are provided below. The associated tasks along with the qualitative and quantitative measures for each of the warfighting challenges are provided in Appendix 2 to this Annex.

(1) Assessment Task 1: Assess the impact of the primary RDO Concept enablers on JTF Headquarters process and products. Appropriate warfighting challenges have been developed for each of the three primary RDO concepts (SJFHQ, ONA, and EBO) and the four supplemental components of an enhanced Joint headquarters (CIE, Interagency, JTLM, and JISR). These warfighting challenges are provided below. The answers to these challenges will indicate how each concept affected the planning process.

Standing JFHQ
Warfighting Challenge:
Quickly achieve cohesive C2 of a Joint force

Operational Net Assessment (ONA)
Warfighting Challenges:
Analyze Adversary PMESII systems for tangible/intangible strengths and weaknesses
Use ONA to enhance decision making

Effects-Based Operations (EBO)
Warfighting Challenges:
Conduct effect-based planning
Conduct effects assessment

Collaborative Information Environment
Warfighting Challenges:
Establish a valid COP/CROP
Maintain collaborative capabilities

Interagency
Warfighting Challenges:
Quickly achieve and maintain cohesive relationships with the Interagency community
Improve Interagency campaign planning and execution

Joint Theater Logistics Management
Warfighting Challenge:
Plan for agile sustainment.

Joint Intelligence, Surveillance, and Reconnaissance (JISR)
Warfighting Challenge:
Provide relevant intelligence to the commander

Appropriate tasks and subtasks were developed for each of the warfighting challenges. Each task and subtask has associated measures that serve as indicators of task accomplishment. These are provided in Appendix U-2. Comments from the Senior Mentors, SMEs, and JTF warfighters, and

data provided from the model federation, will help determine why the task could or could not be accomplished.

(2) Assessment Task 2: Assess the capability of the Joint Task Force to execute the RDO Objectives. Warfighting challenges have been developed for each of the five MC02 objectives. These warfighting challenges represents an issue question pertaining to the ability of the joint force to execute operations against a determined 2007 Adversary.

Objective 1. Establish and maintain information/knowledge superiority
Warfighting Challenges:
Provide situational awareness of JOA throughout the JTF
Use the CROP and collaboration to enhance JTF operational timelines

Objective 2. Rapidly set the conditions for decisive operations by seizing and exploiting the initiative, posturing the joint force, establishing the nature of operations, and shaping the environment
Warfighting Challenges:
Establish advantageous positions for decisive operations
Decrease Joint Force vulnerability to disruption, especially ISR and logistic infrastructure

Objective 3. Assure access into and through the battlespace to provide sufficient freedom of action
Warfighting Challenges:
Provide selective dimensional superiority
Provide sufficient operational reach
Enhance force protection

Objective 4. Conduct decisive effects-based operations
Warfighting Challenges:
Synchronize the application of the full range of joint capabilities in order to engage decisive points in time and space
Integrate full joint capabilities against tactical level objectives
Integrate execution of Information Operations into EBO

Objective 5. Sustain the force, specifically to deliver sustainment to combat units in synchronized non-contiguous operations
Warfighting Challenge:
Provide agile sustainment

The assessment strategy for Task 2 is similar to that for Task 1. Tasks with associated measures were developed for each warfighting challenge. These are also provided in Appendix U-2. If the tasks mapped to the warfighting challenges under a particular objective are accomplished, it indicates that the Joint Force could execute that objective and that the pre-identified potential warfighting challenge to that RDO objective could be overcome in 2007 provided the task enablers are available in 2007. If, on the other hand, a substantial proportion of the tasks under a particular RDO objective could not be accomplished, then this would indicate the potential

warfighting challenge associated with that the experimental RDO concept enablers might not alleviate RDO objectives.
Comments from the SMEs and JTF warfighters plus model data will provide assistance in determining the extent that the experimental concepts facilitated, or did not facilitate, the ability of the joint force to execute its operational tasks. Senior Mentors, (retired senior military commanders) will also assess the extent to which the Joint Force accomplished each RDO objective and accomplished the CINC mission objectives over the course of the campaign. Additionally, the Adversary team will be monitored to assess the extent to which the Joint Force was able to influence threat capabilities and options over the course of the campaign.
Each objective task has been mapped to a concept. If the tasks mapped to a concept are accomplished, it is evidence that the concept contributed to task completion and that causality will be explored by the analysts, Senior Mentors, and SMEs.

(3) Assessment Task 3: Provide "warfighter comment" observations on the RDO Concept Sponsored Initiatives. The sponsored initiatives will be assessed primarily through warfighter and SME comments on operational functionality. Additional comments and observations may come from the Senior Mentors. The sponsored joint initiatives will be mapped to the tasks that support the warfighting challenges. The assessment will use SME and Warfighters comments to determine the extent that these initiatives facilitated JF Headquarters' planning tasks.

(4) Assessment Task 4: Provide lessons learned on Joint field experimentation for the next Joint Field Experiment. Data will be collected from all participants and experiment control personnel to document the lessons learned in the planning, execution, and reporting of this joint field experiment. The lessons learned will be used improve joint field experimentation.

d. Data Collection Strategy

(1) Exercise Baseline Data. JFCOM J7 is developing an exercise database that will provide baseline information on selected JTF tasks. This database encompasses over 100 exercise and real-world operations reports over the last six years. The reports have been entered as individual task records corresponding to UJTL task identifiers. This baseline will provide a history of task accomplishment or difficulty.

(2) Experiment Data

(a) JTF Warfighter Observations. Warfighters in the CINC response cell, the JTF HQ, and the Functional Component Headquarters (JFLCC, JFMCC, JFACC, JPOTF, and JSOTF) will submit observations on specific processes and procedures. They will be required to complete periodic surveys to capture their specific observations on the strengths and weaknesses of the RDO concept capabilities employed to facilitate their warfighting tasks.

(b) SME Observations and Ratings. Manual, over-the-shoulder data collection will be accomplished by SME data collectors. A majority of these SMEs are from the pool of the Observer/Trainers and After Action Review Analysts from JFCOM J7 who are experienced in conducting observations and collecting data during Joint Task Force training events. Service and SOCOM functional experts will augment the JFCOM SMEs and will be trained in the experiment concept. To the maximum extent possible, the SME teams assigned to the functional components headquarters and to the live Service events will consist of functional experts from multiple Services.

(c) Ground Truth for Situational Awareness. Ground-truth data are required for comparison to the CROP/COP databases in GCCS to assess the validity of the CROP/COP at the JTF Headquarters and at the Functional Component Headquarters (JFLCC, JFMCC, JFACC, and

JSOTF). The majority of the "ground-truth" data will be taken from the experiment simulation federation where the majority of the RDO campaign will take place. Limited ground truth on a sampling basis will be taken from selected live operations. The resolution of ground-truth data will be at the level necessary to assess the accomplishment of effects and their associated tasks.

(d) Joint Force Operations Outcomes (Simulated Forces). The primary quantifiable data to support the Joint Force task accomplishment under the five Experiment Objectives will be based on the achievement of Effects-based operations and achievement of campaign objectives as portrayed will be obtained from the simulated forces in the experiment simulation federation.

(e) Assessment Organization. The assessment team will be organized to accomplish data collection and quality control of data consistent with the battle rhythm established for the experiment. Service and SOCOM analysts will be integrated into the JFCOM analysis team to assist with the quality control of the data and interpreting the results.

(f) Model-Experiment-Model. A Model-Experiment-Model (M-E-M) process as a proof-of-principle will determine the utility of using a constructive, analytical model to overcome some of the limitations of conducting a large field experiment. The M-E-M methodology will also establish the foundation of a continuous experimentation environment to support future joint experimentation. Since MC02 Joint Field Experiment does not have an "on-the-ground" baseline to determine effectiveness gains, the focus in M-E-M is to build a constructive baseline for comparison to a constructive RDO variation that has been calibrated to the results of the field experiment. If the calibration of constructive to live is successful and time permits in the post-experiment modeling phase, we also expect to conduct some sensitivity runs on the major field findings. There will not be sufficient time for full-scale pre-experiment modeling. The post-experiment modeling will calibrate the constructive models using the results and insights gained from the field experiment to determine to what extent the a constructive simulation can replicate the MC02 2007 Blue force executing the same Joint field Experiment SSC. If the model can be calibrated to the field experiment results, a baseline excursion will be attempted to determine if a 2007 Blue force executing a SSC without the RDO Concept enablers can be modeled. Whenever possible, service high-resolution models and study results will be used in support of this proof-of-principle modeling effort. This M-E-M effort will not be used to shape the experiment design or execution, but will be used to determine the process and potential of doing so for future experiments.

5. JFCOM Reporting

a. JFCOM Joint Field Experiment Report. JFCOM will develop and staff the JFCOM Joint Experiment Report for review and comment with Services and SOCOM. Services and SOCOM will be requested to provide analysts to assist JFCOM in developing the Joint Experiment Report to provide insight and expertise pertaining to the functional components. The report will focus on the results of the two primary assessment tasks. It will identify the degree to which the primary RDO Concept enablers (SJFHQ, ONA, and EBO) were implemented in the Joint Force headquarters and the contribution of these enablers to the Joint Force achieving the five RDO experiment objectives. The report will identify the strengths and weaknesses of these RDO enablers to support future joint DOTMLPF considerations. For the additional RDO sponsored initiatives, the report will provide functionality "insights." The JFCOM Experiment Report will be made available in draft for Service and SOCOM review with anticipation for the final signed report available for distribution in February 2003. The Services and SOCOM will

submit separate reports for component experiment-specific findings and recommendations through their chain of command as appropriate.

b. Formal Joint DOTMLPF Recommendation Submissions. Based on the findings in the JFCOM Experimentation Report, JFCOM will develop separate formal DOTMLPF Recommendation Submissions to JCS who will staff them with the CINCs, Services, and Agencies for review.

Appendixes:

1 – MC02 Joint Initiatives Integration Recommendation List

2 – Objectives, Warfighting Challenges, Tasks, Subtasks Matrix

HQ, U.S. JOINT FORCES COMMAND
NORFOLK, VA 23551-2488

Appendix 1 To Annex U To MC02 EXDIR
MC02 JOINT INITIATIVES INTEGRATION RECOMMENDATION LIST

GROUP TITLE	ACRONYM	INITIATIVE NAME	DESCRIPTION	SPONSOR
Experimental C4I Systems Group	MSCTS/IWS2.5	Defense Collaborative Tool Suite	Integrates collaborative tools, decision support tools, M&S, and CROP.	USJFCOM (J9)
Experimental C4I Systems Group	GCCS-I3	Global C2 System - Integrated Intelligence and Imagery	Fused assessment and battlespace visualization.	USJFCOM (J29)
Experimental C4I Systems Group	JDISRM	Joint Dynamic ISR Management	ISR Management Tool that feeds the CROP.	USJFCOM (J28)
Experimental C4I Systems Group	ONA Tool Suite	ONA Tool Suite		USJFCOM (J9)
	GENOA	GENOA	Structured argumentation methodology for decision support	
	AnalNB	Analyst Notebook	Visual investigative analysis software	
	ArcView/IMS	Arcview/IMS	Multi-user geo-database storage and management	
Experimental C4I Systems Group, Log	LTS	Logistics Tools Suite	Suite of decision support tools that provide the ability to develop, assess, monitor and visually display logistics support	USJFCOM (J9)
Experimental C4I Systems Group, Log	TMIP	Theater Medical Integration Planning	Automated medical record data capture and medical intelligence gathering.	USJFCOM (J9)
Joint Fires Group	JFI (ADOCS)	Joint Fires Initiative (Automated Deep Ops Coord Sys and ADOCS Presentation)	Coordinates joint assets on time sensitive targets, integrates C4ISR.	USN (NWDC) USA (JPSD)
Federated Exploitation Group	TES-EJT	Tac Exploit Sys (TES) Enhanced Joint Targeting	Direct target nomination to both Army and Navy	USA (USAMDC)

GROUP TITLE	ACRONYM	INITIATIVE NAME	DESCRIPTION	SPONSOR
			indirect fire systems.	
Network Operations Enhancement	ANIF	Automatic Network Information Flow	Dynamic reapportionment of bandwidth	USJFCOM (JBC)
Network Operations Enhancement	NSMC&D	Network Security Management Correlation & Display	Central database for correlation, analysis and reporting of network status.	USJFCOM (JBC)
Stand Alone	JEMPRS-NT	Jnt Enroute Msn Planning and Rehearsal Sys-Near Term (JEMPRS-NT)	Collaborative capability for enroute SOCOM and Navy.	USJFCOM (JBC)
Stand Alone	MCS-TCO	Maneuver Control System-Tactical Combat Operations	Interfacing of Army and Marine C2 systems	USJFCOM (J8)
Stand Alone	SAC	Signal Analysis Comparison (classified)	Comparison of emerging national capabilities vs. legacy capabilities in support of tactical operations.	USA (USASMDC)
Stand Alone	Avalanche	Avalanche - (classified)	Software that provides an intelligent agent to perform data mining functions	USSOCOM
Concept Initiative	GSTF	Global Strike Task Force	Air Force rapid-reaction force package to meet anti-access challenges.	USAF (AC2ISR)
Procedural Initiative	JPAOG	Joint Public Affairs Ops Group	A centralized PA office at the JTF HQ representing all services.	USJFCOM (PAO/APAC)
Procedural Initiative	NIMA-CART	NIMA Crisis Action Response Team (CART)	Reachback to NIMA data, products and Subject Matter Experts.	NIMA
Procedural Initiative	C2SpaceCno	Command and Control for Space and Computer Network Ops	Space Cell embedded in JTF HQ for reachback to USSPACECOM	USSPACECOM
Procedural Initiative	UGS-TBM	Unattended Sensors support to Theater Ballistic	Small concealable sensors help SOF locate TBM targets	USSOCOM

GROUP TITLE	ACRONYM	INITIATIVE NAME	DESCRIPTION	SPONSOR
		Missiles		
Procedural Initiative	JSOTF-JCTP	JSOTF Reachback Msn and SOF Joint Collaborative Planning Tool	Link CONUS Subject Matter Experts to SOF Warfighters	USSOCOM
Tools for Showcasing	JATF	Joint Automated Target Folders	Automated interoperable targeting tool.	USJFCOM (J9)
Tools for Showcasing	JASGS	Joint Automated Single Guard Solution	JTF and Multinational viewing of multi-level imagery, sensor data and GMI.	USJFCOM (JBC)
Service Initiative	HSV	High Speed Vehicle	4000 ton, 3000 mile, Catamaran, Live ship	USN (NWDC) USSOCOM
Service Initiative	PEO-IP	Program Executive Office-Interchange Proposal	Fused assessment and battlespace visualization for time critical targets.	USA (PEO C3S)
Service Initiative	SB-BFT	Space Based Blue Force Tracking Mission Architecture Integration	Space based system for tracking and reporting on status of friendly units.	USSPACECOM
Service Initiative	COMWX	Computered MASINT Weather (COMWX) ACTD (classified)	High level weather gathering capability.	NRO/EUCOM
Service Initiative	UAV-Interoperability	UAV Interoperability	UAV C2 and product dissemination from ground stations.	USJFCOM (J28)

Table U-1-1-1. Summary of Joint Initiatives by Group

Prioritization Legend:

Prioritization is the perceived level of importance to the joint experimental objectives and major focus areas (e.g. SJFHQ, ONA, EBO, RDO).

1. Primary (need or want): Closer to the primary objective of RDO. This would significantly impede the execution of MC02 if removed.
2. Secondary (enhancers): High interest capabilities that appear to be strong enhancers of the concepts and objectives, but may not appear as “key” as the previous category. Enhances the experiment but would not significantly impede the execution of MC02 if removed.

3. Tertiary (nice but not critical): All have merit in their own right, but probably would not influence the joint experiment to the same degree as the fore runners. It will not change any of the constructs of the experiment if removed.

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Appendix 2 To Annex U To MC02 EXDIR

OBJECTIVES, WARFIGHTING CHALLENGES, TASKS, SUBTASKS MATRIX

1. General

a. Assessment Strategy for Each Assessment Task. The Concepts Department of USJFCOM has identified potential warfighting challenges facing RDO operations in 2007. For each warfighting challenge, a number of JTF tasks and subtasks have been identified. These are provided in Tab 1 to this Appendix. Many of the tasks and subtasks have been taken directly or adapted from reference (a), Universal Joint Task List (UJTL) Version 4.0. Measures have been associated with each of the tasks and subtasks. Where applicable, the measures have been adapted from the measures provided in the UJTL.

Tab 1:

General. This Tab contains the tasks, subtasks, and related measures for each experiment warfighting challenge, organized by JTF HQ planning process and MC02 experiment objectives.

Objective #1: Establish And Maintain Information Superiority

Warfighting Challenge: Ability to provide Situational Awareness of JOA throughout the JTF

Task: Maintain and distribute a timely and accurate relevant integrated picture of JTF units, locations, status and actions

- Number of times each organization/staff is unable to obtain needed location information on friendly forces from the CROP
- Number of times each organization/staff is unable to obtain needed status information on friendly forces from the CROP
- Rating of Blue Forces ability to maintain and distribute a timely and accurate relevant integrated picture of JTF units, locations, status and actions

Task: Determine and disseminate timely and accurate information on relevant adversary's operational capabilities, location, courses of action, and intentions

- Instances in which organization/staff is unable to obtain needed location information on adversary forces from the CROP
- Instances in which organization/staff is unable to obtain needed adversary forces operational capabilities information from the CROP
- Instances in which organization/staff is unable to obtain needed adversary anticipated course of action information from the CROP
- Instances in which organization/staff is unable to obtain needed adversary intentions information from the CROP
- Rating of Blue Forces ability to determine and disseminate timely and accurate information on relevant adversary's operational capabilities, location, courses of action, and intentions

Warfighting Challenge: Ability to use the CROP and collaboration to enhance JTF operational

Task: Use information to prevent surprises by the adversary

- Instances in which organization/staff is surprised by adversary actions
- Instances in which Blue Force organizations raise issues that "challenge" the situation
- Rating of Blue Forces ability to use information to prevent surprises by the adversary

Task: Use shared awareness and collaboration to maintain operational tempo

- Instances in which Blue Force commanders delayed making operational decision in order to obtain additional information
- Instances in which JTF submits RFIs to higher HQ for information
- Instances in which approved ETOs or Op Orders are modified after they are approved
- Rating of Blue Forces ability to maintain operational tempo
- Number of unopened e-mails at HQ level

Task: Use shared awareness and collaboration to facilitate synchronization of forces

- Rating of Blue Forces ability to synchronize Joint forces
- Instances in which Blue Forces action are assessed as not synchronized

Objective #2: Rapidly Set Conditions For Decisive Operations
Warfighting Challenge: Ability to establish advantageous positions for decisive operations

Task: Position combat-configured joint forces for decisive operations.

Subtask: Use joint force deployment planning procedures

- Rating of effectiveness of joint force deployment planning procedures
- Rating of effectiveness of the JSOP on deployment planning procedures
- Number of deployment requirements adjusted within seven days of movement by air and why
- Rating of effectiveness of tailoring initial and follow-on logistics packages to reduce lift and minimize footprint
- Rating of effectiveness of logistics procedures to develop and approve COAs (quicker) compared to current procedures
- Rating of the effectiveness of the experiment procedures and systems for sourcing, tailoring, and validating the time-phased force and deployment data (TPFDD)

Subtask: Determine the impact of various Prep alternatives on the ability to rapidly close a force

- Rating of the effectiveness of Prep alternatives on the ability of the force to close rapidly

Subtask: Reduce JRSOI processing time

- Rating of the effectiveness of the JTFs ability to shorten the JRSOI process by rapidly moving and integrating the force compared to current RSOI process

Subtask: Assess deployment distribution structure

- Rating of the effectiveness of ISBs to rapidly move and integrate deploying forces compared to the current support concept
- Rating of the effectiveness of different ISB locations

Subtask: Determine the information, communications and systems and tools that are required to synchronize the deployment flow

- Rating of the effectiveness of information systems to synchronize deployment and redeployment flow
- Rating of the effectiveness of communications systems to synchronize the deployment and redeployment flow
- Rating of the effectiveness of tools (DSTs) to synchronize the deployment and redeployment flow

Subtask: Determine the amount of asset visibility required to divert assets

- Rating of the JFC's (JTLM) capability to divert assets based on the visibility of units, equipment and sustainment provided by the Logistics CROP

Task: Conduct operational maneuver.

Subtask: Position joint forces for operational formations

- Percent of forces allocated to the JTF for planning that are actually deployed to theater
- Instances of forces deployed to theater, but not used by the JTF

Subtask: Assemble forces in the joint operations area (JOA)

- Percent of effects packages in designated assembly areas according to planned timelines
- Percent of effects packages detected prior to reaching their designated assembly area
- Percent of effects packages attacked prior to reaching their designated assembly area

Subtask: Provide operational mobility

- Instances of friendly operational maneuver delayed, disrupted, canceled, or modified due to enemy emplaced obstacles
- Hours that enemy obstacles delay movement of friendly forces

Subtask: Provide operational countermobility Instances of enemy major operations no longer feasible due to friendly countermobility actions

Warfighting Challenge: Ability to decrease joint force vulnerability to disruption

Task: Prevent hostile observation and disruption to operational forces

- Instances of enemy or terrorist activity at APODs or SPODs
- Instances of friendly operations delayed, disrupted, canceled, or modified due to enemy or terrorist activity at APODs or SPODs
- Instances of enemy or terrorist activity at supply or ammunition receiving/staging sites
- Instances of friendly operations delayed, disrupted, canceled, or modified due to enemy or terrorist activity at supply or ammunition receiving/staging sites
- Instances of friendly operations delayed, disrupted, canceled, or modified due to enemy or terrorist exploitation of ISR.
- Rating of the Joint Force ability to decrease Joint Force vulnerability to disruption

Objective #3: Assure Access Into And Through The Battlespace

Warfighting Challenge: Ability to provide selective dimensional superiority

Task: Isolate and suppress adversary anti-access capabilities.

- Rating of adequacy of enemy strategy to prevent friendly access to the theater
- Rating of adequacy of friendly assessment of the enemy's anti-access strategy
- Rating of adequacy of friendly strategy to counter enemy anti-access strategy
- Instances of the movement of supplies or equipment to the enemy from outside JOA
- Instances of enemy DIME support from outside the JOA

Task: Achieve operational sanctuaries of space and time necessary to execute RDO.

- Friendly aircraft losses to enemy defenses (and enemy system engaging)
- Friendly naval losses to enemy defenses (and enemy system engaging)
- Friendly ground forces losses (forces in action) to enemy activity (and enemy system engaging

Warfighting Challenge: Ability to provide sufficient operational reach

Task: Provide sufficient forces, capabilities, and sensor positioning mix to maximize operational reach

Subtask: Optimize positioning to maximize operational reach (i.e., finding the adversary)

- Percent of JTF units employed from their in-place theater locations
- Percent of JTF units employed from staged locations
- Instances of force positioning that does not take advantage of a units operational reach and reason why

Subtask: Employ stealth capabilities (i.e., extending operational reach)

- Percent of JTF air assets with stealth capability
- Percents of enemy PMESII nodes attacked with stealth air assets

Subtask: Maximize sensor and weapon ranges (e.g., use of space)

- Percent of information requirements covered by space assets
- Instances of airborne sensor employment that does not take advantage of the asset's operational reach and why
- Instances of enemy PMESII nodes being attacked by a weapon when a longer range and equally capable weapon was available
- Instances of BLUE stand off weapons use

Warfighting Challenge: Ability to enhance force protection

Task: Provide protection for operational forces, means, and noncombatant in the JOA.

- Friendly losses (troops and/or equipment not in action) resulting from enemy forces (ground or naval), partisans, or terrorists
- Damage to critical friendly infrastructure resulting from enemy forces (ground or naval), partisans, or terrorists
- Instances of friendly operations delayed, disrupted, canceled or modified due to attacks from enemy forces (ground or naval), partisans, or terrorists
- Percent of friendly ground forces assigned to rear area security

Task: Protect systems and capabilities in the JOA.

- Instances of compromise of friendly intentions causing joint operations to be delayed, disrupted, canceled, or modified

Task: Provide operational air, space, and missile defense.

Subtask: Provide integrated air and missile defense

- Time to establish an integrated friendly air and missile defense
- Instances of friendly operations delayed, disrupted, canceled or modified due to enemy offensive air or missile attacks

Subtask: Process/allocate operational aerospace targets

- Percent of enemy offensive air threats engaged
- Percent of enemy offensive missile threats engaged
- Percent of friendly sorties devoted to air defense
- Friendly support aircraft damaged or destroyed by friendly or enemy fires
- Percent of enemy offensive air threats destroyed or neutralized
- Friendly losses resulting from enemy offensive air attacks

Subtask: Conduct JOA missile defense

- Percent of enemy offensive missiles destroyed in flight
- Friendly losses resulting from enemy missile attacks

Subtask: Conduct tactical warning and attack assessment in the JOA

- Percent of enemy offensive air threats detected
- Percent of enemy offensive missile launches detected

Objective #4: Conduct Decisive Effects-Based Operations
Warfighting Challenge: Ability to synchronize the application of the full range of joint capabilities in order to engage decisive points in time and space
Task: Conduct joint force targeting to support EBO.

Subtask: Use reach-back capabilities to enhance the targeting process

- Rating of adequacy of the Joint Automated Target Folders (JATF)
- Instances of issues concerning the relationship of the PEL to the JIPTL
- Instances of issues concerning the cyclical targeting cycle and the non-cyclical ETO process
- Instances of the usage of a High Payoff Target List (HPTL) and any issues over its relationship to the PEL, JIPTL, and TST priority list
- Rating of reach back capability in support of the targeting process
- Rating of collaboration capability in support of the targeting process

Subtask: Establish joint force targeting guidance

- For each desired effect in the ETO, the percent of available enemy PMESII nodes from the ONA that are identified for "attack"

Subtask: Develop operational targets

- Instances of enemy critical nodes discovered and attacked during ETO execution
- Instances of joint force operations delayed, disrupted, canceled or modified awaiting operational firepower support

Subtask: Conduct operational combat assessment

- Percent of targets for which combat assessment is available
- Percent of targets assessed as killed that are actually mission capable
- Percent of targets unnecessarily reattacked
- Average time to provide full combat assessment of attacks to JTF HQ

Task: Attack operational targets to achieve desired effects.

- Percent of enemy PMESII nodes successfully attacked (MoPs)
- Instances of friendly actions having unintended effects that violate ROE or NCA guidance
- Instances of collateral damage and fratricide
- Percent of enemy nodes selected for attack that can be attacked using non-kinetic weapons
- Percent of enemy nodes that are attacked using non-kinetic weapons
- Percent of attacks using non-kinetic weapons that achieve desired effect

Subtask: Conduct precision engagement against time sensitive targets

- Percent of TSTs detected by friendly assets
- Percent of TSTs identified by friendly assets
- Percent of TSTs engaged by friendly assets
- Percent of TSTs successfully neutralized or destroyed by friendly assets
- Average target detection time
- Average target ID and nomination time (time from initial detection to transmission of targetable location data)
- Average engagement time (time from target ID and nomination to engagement)

Subheading: Document specific aspects of the TST process

- Percent of TSTs detected by SOF assets
- Percent of TSTs identified by SOF assets
- Percent of TSTs engaged with SOF assets
- Percent of TSTs successfully neutralized or destroyed by SOF assets
- Percent of TST BDA provided by SOF assets
- Instances of TST missions being canceled by the JTF HQ
- Instances of TST resource (sensor/weapon) issues that needed to be adjudicated by the JTF HQ
- Instances of joint force operations delayed, disrupted, canceled or modified due to TST mission
- Document the TST guidance issued by the JTF Commander
- Instances of the usage of TST priority categories and their impact on TST operations
- Emerging joint collaborative planning lessons and requirements for future TST operations
- Rating of collaboration processes for JTF and component planning of TSTs
- Instances of degraded TST capability during transfer of TST responsibility from one functional component to another
- Rating of TST procedures used for MC02
- Rating of functions of ADOCS as common targeting toolset P

Task: Coordinate and integrate joint / multinational and interagency support for EBO.

- Percent of enemy nodes selected for attack that can be attacked using DIE actions
- Percent of enemy nodes that are attacked using DIE actions
- Percent of attacks using DIE means that achieve desired effect

Warfighting Challenge: Ability to integrate full joint capabilities against tactical level objectives

Task: Synchronize and employ joint capabilities against key tactical objectives.

- Instances of operational branches formerly closed to BLUE as options now feasible and acceptable due to disrupted adversary
- Instances of operational branches formerly open to adversary no longer feasible, suitable, or acceptable due to disrupted adversary
- Instances of adversary capability sufficiently disrupted to allow BLUE control of timing and tempo of campaign or major operation
- Instances of operational branches formerly open to BLUE no longer feasible, suitable, or acceptable

Subtask: Conduct operations in the JOA

- Instances of adversary surprised at initiation of BLUE actions
- Instances of Blue surprised at initiation of adversary actions
- Time for Blue to detect adversary's attack from execution of adversary action
- Time for Blue to decide a new plan is required following detection
- Time to prepare and disseminate the new plan following decision to act
- Time for Blue to reposition to counter adversary's attack from plan dissemination

Subtask: Conduct Joint Tactical Actions (JTAs)

- Percent of effects packages that are Joint Tactical Actions (JTAs)
- Number of effects packages which include support from, or support to, non DoD organizations

- Percent of JTA packages detected prior to concentration at decisive point
- Percent of JTA packages attacked prior to concentration at decisive point
- Percent of JTA packages executed by each functional component commander as the supported commander
- Percent of JTA packages executed by each functional component commander as the supporting commander
- Percent of functional component specific effects packages executed by each functional component commander

Task: Dynamically re-task effects packages for follow-on actions

- Instances of effects packages, previously committed to action, not redeployed in response to newly developing situation
- Instances of JTF assets being double tasked
- Number of effects packages supported by "forward presence" forces on or after C-Day
- Number of effects packages supported by forces "transiting" the AOR on or after C-Day
- Number of effects packages supported by "long range strike forces from the CONUS / other AOR" on or after C-Day
- Percent of effects packages under direct JTF HQ supervision P

Warfighting Challenge: Ability to integrate execution of Information Operations into EBO

Task: Execute offensive information operations, to include PSYOP and military deception.

- Instances where appropriate IO resources and capabilities are not factored into operational plans and actions
- Time to get approval for proposed operational IO plans and actions
- Instances of unintended IO actions causing disruption or delay of operational plans and objectives
- Instances of operational IO actions being delayed, defeated, or disrupted due to adversary offensive IO actions
- Instances of operational IO actions discarded due to timeliness of approval concerns
- Percentage of operational IO cell nominated "targets" struck during the timeframe planned for in the ETO
- Average time to provide full combat assessment of attacks to IO "targets"
- Percentage of operational IO cell nominated "targets" restruck when called for after combat assessment of initial strike
- Percentage of preplanned targets successfully attacked
- Percentage of operational IO objectives verifiably achieved

Objective #5: Sustain The Force

Warfighting Challenge: Ability to provide agile sustainment

Task: Rapidly process data and generate logistics knowledge by integrating sustainment as an integral part of effects based operations

- Rating of effectiveness to collect, process and display full visibility of operations and logistics information
- Rating of effectiveness of displaying complex logistics information
- Rating of effectiveness of DSTs to ensure a "predictive" capability for logistics

- Rating of effectiveness of how well DSTs assisted and synchronized the deployment flow in accordance with the directions of the supported commander
- Rating of effectiveness of the ability to acquire critical logistics information from the Logistics CROP for planning and analysis and dissemination to subordinate logistics commanders

Task: Employ a networked sustainment distribution structure to satisfy the JFC sustainment requirements for RDO

Subtask: Tailor sustainment for synchronization with deploying forces

- Rating of effectiveness of tailoring sustainment for synchronization with deploying forces
- Rating of effectiveness of a networked sustainment distribution structure to satisfy the JFC sustainment requirements for RDO

Subtask: Shape the logistics footprint in JOA to extend operational reach

- Rating of effectiveness of shaping the logistics footprint in JOA to extend operational reach
- Rating of effectiveness of the RDO procedures and practices to ensure time-definite delivery, improve throughput and support agile mobile forces
- Rating of effectiveness of using strategic lift to augment theater distribution
- Rating of effectiveness of the combination of delivery platforms to ensure time-definite delivery, improve throughput and support agile mobile forces
- Rating of effectiveness of employing a combination of delivery platforms to improve throughput and provide the agility needed to sustain mobile forces while ensuring time-definite delivery

Subtask: Employ a combination of delivery platforms to ensure time-definite delivery, improve throughput and support agile mobile forces

- Rating of effectiveness of the combination of delivery platforms to ensure time-definite delivery, improve throughput and support agile mobile forces
- Rating of effectiveness of using strategic lift to augment theater distribution

Task: Gain and maintain knowledge of force health status

Subtask: Track patients throughout the theater of operations and to CONUS

- Rating of effectiveness of the ability to track patients throughout the theater of operations and to CONUS
- Rating of effectiveness of medical SITREP
- Rating of effectiveness of the ability to monitor DNBI / combat casualty rates as related to force readiness
- Rating of effectiveness of the chemical / biological early detection and early warning

Task: Provide battlefield medical care

- Rating of effectiveness of advanced life support far forward
- Rating of effectiveness of the ability to provide Blood Services in the JOA
- Rating of effectiveness of the ability to transport seriously injured and unstable casualties
- Rating of effectiveness of the ability to provide Joint Medical Theater Logistics Management

Concept: Standing Joint Force Headquarters

Warfighting Challenge: Ability to quickly achieve cohesive C2 of a Joint Force

Task: Quickly establish a JTF HQ ready to conduct RDO.

- Time required for the JTF HQ to commence effects based planning.
- Instances of difference between Battle Rhythm proposed by JSOP and that observed
- Rating of SJFHQ value-added in surmounting the JTF HQ learning curve.

Subtask: Establish a Standing element of a Joint Force Headquarters

- Difference between JSOP proposed SJFHQ structure to that observed.
- Time SJFHQ was actually established and actually functioning as its mission was defined.
- Percent of SJFHQ positions filled.
- Amount of change to SJFHQ membership.
- Rating of adequacy of scope of responsibility for SJFHQ positions

Subtask: Employ the SJFHQ to conduct pre-crisis planning

- Comparison of JSOP proposed SJFHQ pre-crisis activities and products to those observed.
- Instances of intentionally omitted pre-crisis SJFHQ activities or products.
- Rating of pre-crisis SJFHQ product adequacy
- Assessment of info available to allow development of pre-crisis products.
- Rating that ADP tools were sufficiently available/capable to develop pre-crisis products.
- Rating of workload within SJFHQ groups.
- Rating of SJFHQ pre-crisis product utility.
- Instances where JTF HQ needed/desired additional products from SJFHQ pre-crisis planning.
- Rating of SJFHQ pre-crisis planning adequacy.

Subtask: Integrate the SJFHQ into the JTF HQ to perform RDO planning and execution

- Rating of SJFHQ responsibility distribution as a result of integration.
- Instances of recommended improvements to SJFHQ organization and positions.
- Rating of the adequacy of SJFHQ support.
- Rating of SJFHQ contribution to JTF HQ accomplishment of key elements of effects based planning and operations.
- Instances of process help Corps needed/desired/requested from the SJFHQ.

Task: Provide continuity in planning and operations from pre-crisis through execution and transition.

- Rating of SJFHQ contribution to continuity in planning and operations from pre-crisis through execution and transition.

Subtask: Establish cell-organized JTF HQ around the SJFHQ structure and processes.

- Rating of the ability to form JTF HQ according to JSOP.
- Instances of JTF HQ organization and function differing from JSOP.
- Rating of effectiveness of new JTF HQ organization.

Subtask: Utilize a SJFHQ architecture to establish a Joint Force C2 structure

- Instances of differences between JSOP prescribed Component participation on virtual Boards/ Cells/ Centers/ WGs and that observed.
- Assessment of affect Group/ Board/ Center/ Cell/ WG structure had on Component participation.
- Instances of differences between JSOP prescribed CINC participation on virtual Boards/ Cells/ Centers/ WGs and that observed.
- Assessment of affect Group/ Board/ Center/ Cell/ WG structure had on CINC participation.

Subtask: Employ the SJFHQ to assist deployment of forward headquarters

- Rating of utility of SJFHQ to support deployment of forward HQ.
- Instances of difference from JSOP forward deployment process.

Subtask: Employ the SJFHQ to assist in the conduct of staff operations.

- Rating of SJFHQ contribution to JTF HQ performance of key operational C2 functions.
- Rating of the utility of the SJFHQ to JTF C2 functions over the course of the contingency.

Subtask: Employ the SJFHQ to assist in coordination and integration of Interagency support.

- Rating of the utility of the SJFHQ habitual relationship on JTF-IAC interaction.
- Instances of difference between JSOP-envisioned IAC participation in virtual Boards and Cells and that observed.
- Rating of SJFHQ-IAC relationship over the course of the contingency.

Concept: Operational Net Assessment

Warfighting Challenge: Ability to analyze adversary PMESII systems for tangible and intangible strengths and weaknesses

Task: Develop an ONA information knowledge base

- Rating of the adequacy of how Blue DIME capabilities versus Red/adversary PEMSII systems comparative analyses are captured in ONA knowledge base
- Rating of Blue information adequacy included in ONA knowledge base
- Rating of the adequacy of how the ONA knowledge base provides a shared awareness of the JOA
- Rating of the adequacy of how the ONA knowledge base supports ETO development

Task: Analyze Red's PMESII systems (for tangible and intangible strengths and weaknesses)

- Rating of Red PMESII systems comprehensiveness included in the ONA knowledge base
- Number of adversary nodes included in ONA knowledge base that adversary felt were critical/high value
- Number of adversary nodes included in ONA knowledge base that adversary felt were vulnerable
- Rating of the adequacy of PMESII analyses to promote understanding of adversary's goals
- Rating of the adequacy of PMESII analyses to promote understanding of the adversary's (self) perceived strengths
- Rating of the adequacy of PMESII analyses to promote understanding of the adversary's (self) perceived weaknesses

Task: Continually update the ONA to reflect battlespace change

- Number of times ONA updated after JTF formation
- Rating of ONA update currency
- Time required to update ONA knowledge base

Task: Employ automated tools to virtually and collaboratively access, manipulate, and maintain the ONA knowledge base

- Rating of automated tools adequacy used for information retrieval from ONA knowledge base
- Rating of automated tools adequacy used for ONA knowledge base maintnance
- Frequency of ONA knowledge base information access

Warfighting Challenge: Ability to use ONA to enhance decision making

Task: Determine if the ONA products compliment JTF staff actions

- Time needed by ONA users to find desired information in ONA knowledge base
- Rating of adequacy of ONA use for board/center/cell preparation and other staff action
- Number of instances information desired by ONA users but not included or not found in ONA knowledge base
- Rating of adequacy of ONA use in PEL development
- Rating of adequacy of ONA use in ETO development

Task: Identify adversary's vulnerabilities, intentions, and keynotes

- Comparison of ETO focus of adversary's vulnerabilities with ONA depiction of vulnerabilities
- Comparison ETO focus of adversary's intentions with ONA depiction of intentions
- Comparison of ETO focus of adversary's key nodes with ONA depiction of key nodes

Task: Identify potential second and third order effects for contemplated actions

- Percent of ETOs developed with second and third order effects identified for tasked actions
- Number of instances JFC and staff used second and third order effects in there decision process

Task: Prioritize and select potential courses of action

- Number of instances JFC and staff used ONA knowledge base as reference source to prioritize COA, branches, and sequels
- Rating of the adequacy of the ONA knowledge base as reference source to select COA, branches, and sequels

Task: Use ONA to operate within adversary's decision cycle

- Number of instances ONA-supported Blue action interrupted adversary's ability to command and control its force
- Number of adversary actions considered successful by JFC and staff
- Number of adversary actions unexpected by JFC and staff
- Percent of time JFC and staff felt they was operating within the adversary's decision cycle
- JFC and staff's rating of ONA effectiveness in support of operating inside of the adversary's decision cycle

Concept: Effects-Based Operations (Planning And Assessment)
Warfighting Challenge: Ability to conduct effects-based planning
Task: Conduct operational mission analysis to support EBO.

- Documentation of mission, intent, and planning guidance given to the JTF Commander by the CINC
- Documentation of the Mission Analysis Brief

Subtask: Assess the operational situation using the CIE

- Rating of CROP value to effects-based planning
- Rating of collaborative environment value to effects-based planning
- Rating of the additional demands on the planners' time resulting from effects-based planning and collaboration.
- Rating of the additional demands on the Commander's time resulting from effects-based planning and collaboration.
- Number of IAC, CoE, NGO, or other non-traditional participants in the mission analysis process

- Instances of non-traditional participant contributions to mission analysis

Subtask: Identify desired effects

- Assessment of ability of planners to state desired effects in terms of adversary action or behavior to be changed, created, or prevented
- Assessment of ability of planners to state desired effects in terms of the desired level of change
- Assessment of ability of planners to state desired effects in terms of the desired scope and distribution of the effect
- Assessment of ability of planners to state desired effects in terms of the intended timing of the effect
- Percent of desired effects that were in the baseline ONA
- Instances where prioritization of effects assisted or restricted COA development and adaptation

Subtask: Identify key nodes and vulnerabilities using the ONA and JIPB

- Instances of ONA/JIPB contributing to identification of key nodes in adversary systems
- Instances of ONA/JIPB contributing to identification key links in adversary systems
- Instances of ONA/JIPB contributing to the conduct of center of gravity and critical vulnerability analysis
- Instances of ONA/JIPB contributing to identification of adversary leadership decision making process(es)
- Instances of ONA/JIPB contributing to identification of friendly strengths and weaknesses relative to the adversary

Task: Use effects-based planning to develop and analyze COA.

- Documentation of the initial planning guidance given by the CJTF to his staff
- Documentation of any warning orders issued by the JTF
- Documentation of approved PEL, CONOPs, and COAs

Subtask: Conduct predictive analysis (examine anticipated potential outcomes of actions); model adversary critical systems to identify and analyze anticipated direct and indirect effects of actions

- Rating of effectiveness of the process for consideration of the adversary's potential COAs and potential responses to friendly action
- Rating of effectiveness of the process for examination of intended and unintended potential outcomes
- Rating of effectiveness of the process for examination of causal linkages through which actions create effects
- Rating of effectiveness of the process for consideration of indirect effects
- Rating of effectiveness of the process for consideration of outcomes outside of the local area
- Number of indirect effects that were in the baseline ONA
- Rating of the utility of modeling and simulation tools used in the identification of the pros, cons, and alternatives to tactical actions
- Assessment of the use of influence models to assist in the production of a better reasoned plan
- Rating of the utility of the ONA/JIPB to predictive analysis
- Instances where predictive analysis assists in the production of a better reasoned COA
- Rating of the value of predictive analysis

Subtask: Integrate input from JIACG

- Rating of utility of non-traditional players to the production of a better reasoned COA
- Instances of valuable contributions by non-traditional participants to the COA development process
- Rating of whether all aspects of PMESII were addressed during development of the COA
- Instances where military and non-military (DIME) effects were not synchronized in time and space
- Instances where the capabilities of all elements of national power (DIME) were not considered during COA development

Subtask: Components refine concept of operations and COA using the CIE

- Rating of effectiveness of actions selected based on their impact against adversary pressure points
- Rating of collaborative environment value to cross component COA development
- Percent of PMESII nodes identified for attack that were contained in the baseline ONA
- Instances where MoP were not developed for each component level task and/or action

Subtask: Identify assessment requirements

- Instances where actions are not traceable back to higher level strategy
- Instances where MoE were not developed for each JTF level desired effect
- Assessment of whether MoE were meaningful, reliable, and observable

Subtask: Collaboratively analyze COA

- Rating of effectiveness of the Blue/Red Cell contribution to the COA analysis process
- Instances where potential Red reactions to Blue actions were considered
- Rating of the wargaming process to produce branches and sequels

Task: Prepare, synchronize, and issue effects tasking order (ETO)

Subtask: Prepare ETO

- Rating of clarity of effects based mission orders to the components
- Rating of clarity of supported / supporting command relationships to the components
- Number of effects given to each functional component commander for planning as the supported commander
- Number of effects given to each functional component commander for planning as the supporting commander
- Rating of utility of collaboration processes for component planning of joint tactical actions

Subtask: Issue and synchronize ETO

- Instances where military actions of the components were not synchronized in time and space
- Document who facilitated/directed the component planning process
- Rating of how the integration matrix enhanced the component planning process

Warfighting Challenge: Ability to conduct effects assessment

Task: Assess the progress of achieving the full range of operational effects (DIME).

- Percent of time the JTF correctly assesses the effects achieved by their actions
- Instances of effects that were not anticipated by the JTF
- Average time to provide full effects assessment to the JTF
- Instances of incorrect effects assessment due to missing or poorly constructed MoE
- Rating of the collaboration capability in support of the effects assessment process

- Rating of the IAC and CoE contribution to the effects assessment process
- Instances of the JFC receiving different views of the success of the operation
- Rating of CROP tool adequacy for displaying progress toward desired effects
- Rating of the effectiveness of the process by which Combat Assessment is passed to the EAC
- Rating of the usefulness of Combat Assessment to Effects Assessment
- Rating of usefulness of MoP in assessing MoE

Subtask: Integrate effects assessment information requirements into the JISR collection plan

- Percent of MoEs covered by at least one asset in the JISR collection plan
- Rating of the additional workload created by the effects assessment process on the intelligence organizations

Task: Adapt COA based on effects assessment.

- Instances of the JTF changing the set of tactical actions employed to achieve a desired effect as a result of deficiency analysis
- Instances of the COA being adapted to respond to an unanticipated effect or enemy action discovered during effects assessment
- Average time to adapt the COA and produce a change to the ETO
- Rating of the value of effects assessment to the planning process
- Instances of the ETO being adapted during execution due to an unanticipated effect or enemy action discovered during effects assessment
- Instances of military actions that were not maintained in synchronization with non-DoD actions during COA adaptation
- Rating of the CIE impact on daily battle rhythm
- Rating of the ability of the players to recognize changes to the ETO
- Rating of the JTF's ability to maintain the initiative relative to the enemy

Task: Assess the contribution of effects to achieving the desired end state

- Document the process to support the assessment of CINC/JTF objectives
- Rating of CROP tool adequacy for displaying progress toward CINC/JTF objectives
- Rating of collaboration processes adequacy for collective accomplishment of NCA assigned objectives and/or effects
- Number of operational objectives achieved by Blue actions
- Number of operational objectives achieved by Blue actions within prescribed time lines
- Number of operational objectives achieved by adversary actions

Concept: Collaborative Information Environment (Cie).
Warfighting Challenge: Ability to establish a valid COP and build the CROP in a CIE
Task: Develop the Common Operational Picture (COP)

Subtask: Collect, Process Fuse, and Disseminate Information On Opponent Force

- Percent of enemy ground forces correctly located and identified in the COP
- Percent of enemy naval forces correctly located and identified in the COP
- Percent of enemy air forces correctly located and identified in the COP
- Timeliness of enemy ground force situation display in the COP
- Timeliness of enemy naval situation display in the COP
- Timeliness of enemy air situation display in the COP

- Timeliness of status on enemy communication systems in the COP
- Accuracy of status on enemy communication systems in the COP
- Timeliness of status on enemy sensors in the COP
- Accuracy of status on enemy sensors in the COP

Subtask: Generate Service-specific Friendly Integrated Tactical Picture

- Timeliness of each Service's friendly single integrated tactical picture
- Accuracy of each Service's friendly single integrated tactical picture (unit locations@ time)

Subtask: Merge/Fuse Component Tactical Pictures into a COP and disseminate to all Echelons of the Joint Force

- Timeliness of the fused picture disseminated to each echelon
- Accuracy of the fused picture (unit locations & status) disseminated to each echelon
- Rating of usefulness of the fused picture disseminated to each echelon

Subtask: Enable supporting/background data to be associated with tracks and cut and paste between applications

- Percent of attempts successful

Subtask: Manage track database to support valid/viable COP

- Rating of adequacy of process and procedures used to maintain track database

Task: Establish the "Virtual Warehouse" of information for the CROP

Subtask: Manage system enabling exchange of relevant information IAW the IM Plan

- Rating of adequacy of process and procedures used to exchange relevant information
- Timeliness of friendly unit status information (personnel/equipment/supply) posted on CROP (update schedule vs. actual time update complete)
- Accuracy of friendly unit status information (personnel/equipment/supply) posted on CROP (posted status vs. ground truth)
- Timeliness of information regarding status of friendly information systems/communications nodes
- Accuracy of information regarding status of friendly information systems/communications nodes
- Timeliness of information regarding status of friendly sensor systems
- Accuracy of information regarding status of friendly sensor systems
- Timeliness of enemy OOB status information (readiness/posture) posted on CROP (update schedule vs. actual time update complete)
- Accuracy of enemy OOB status information (readiness/posture) posted on CROP (posted status vs. ground truth)
- Document methods employed to collect, store and retrieve information

Subtask: Coordinate/manage collection, processing, and dissemination of information to be "pushed" IAW Commander's policy

- Number and content of information products "pushed" to users during each 24 hour period
- Timeliness of weather information posted on CROP (time updates available vs. actual time update disseminated)
- Ratings of usefulness of weather information posted

- Timeliness and awareness of operational information (Mission, Commander's Intent, ROE, ONA, ETO, ATO) posted on CROP (update availability time vs. actual time update disseminated vs. actual time update
- Timeliness and awareness of operational targeting information (Tgt Number, shooting platform, time of engagement, effects assessment) posted on CROP
- Timeliness and awareness of operational maneuver/attack information (Units participating, supported/supporting relationships, objectives, time of action) posted on CROP
- Ratings of the CROP for indicators of "richness"

Subtask: Coordinate/manage collection, processing, and dissemination of information to be subscribed to IAW Commander's policy

- Number and content of information products "pulled" by users during each 24 hour period
- Rating of usefulness of tools and processes used to collect, store, and retrieve information from the CROP

Subtask: Implement a standard desktop configuration for the "joint" level of the CROP and enable limited user tailoring

- Ratings of accessibility/usefulness of standard CROP desk top configuration

Subtask: Enable users to be able to publish available information to the CROP IAW the IM Plan

- Ratings of ability to publish to the CROP

Subtask: Enable users ability to advertise available information to the CROP IAW the IM Plan

- Ratings of ability to advertise to the CROP
- Ratings of ability to alert affected organizations to time sensitive information in the CROP

Subtask: Enable users to "search" for specific information requirements

- Ratings of the adequacy of "search" tools in the CROP

Warfighting Challenge: Ability to plan collaboratively

Task: Conduct Planning, Execution, and Assessment in a Collaborative Environment

Subtask: Establish a persistent Collaborative Environment Across Echelons of Command, Interagency Participants, and Centers of Excellence enabling formal and informal collaboration sessions as well as large auditorium sessions

- Number of collaborative sessions across echelons of command, interagency participants, and centers of excellence
- Length (time) of collaborative sessions across echelons of command, interagency participants, and centers of excellence
- Ratings of quality of Products produced by collaborative sessions across echelons of command, interagency participants, and centers of excellence
- Ratings of usefulness of collaborative sessions across echelons of command, interagency participants, and centers of excellence
- Ratings of impact of differences in culture among participants in collaborative sessions across echelons of command, interagency participants, and centers of excellence
- Ratings of ability to overcome problems encountered during collaborative planning sessions
- Number of times (Instances) that misunderstandings occurred regarding current situation
- Ratings of participants shared awareness provided by information available
- Number of times that specified means of collaboration were observed
- Number of times that specific types of collaboration occurred
- Ratings of participants confidence in information received via collaboration systems

Subtask: Conduct Joint Enroute Planning and Mission Rehearsal

- Time required to complete enroute planning
- Ratings of effectiveness of joint enroute planning

Subtask: Conduct Command and control of on-going operations using collaborative tools/capabilities

- Number of collaborative C2 sessions across echelons of command, interagency participants, and centers of excellence
- Length (time) of collaborative C2 sessions across echelons of command, interagency participants, and centers of excellence
- Ratings of usefulness of C2 planning sessions across echelons of command, interagency participants, and centers of excellence
- Ratings of standing procedures for compensating for system problems encountered during C2 collaborative planning sessions

Concept: Enhance Interagency Perspective Within The Jfhq

Warfighting Challenge: Ability to quickly achieve and maintain cohesive relationships with the interagency (IA) community

Task: Establish Joint Interagency Coordination Group (JIACG)

- Percent of JIACG manned IAW concept

Task: Establish Interagency Collaborative Information Environment (IACIE)

- Tool Availability Rate: time C4I tool used divided by the time tool required
- Rating of adherence to the published C4I tool business rules.

Task: Develop secure process and protocols among interagency participants to provide effective collaboration.

Subtask: Establish interagency planning mechanisms that will guard internal security information.

- Frequency of Instances where IA security processes had an effect on IA collaboration

Subtask: Establish interagency planning mechanisms that will guard internal protocols

- Frequency of Instances where IA protocol processes had an effect on IA collaboration

Warfighting Challenge: Ability to improve interagency campaign planning & execution

Task: Implement Political-Military Plans

Subtask: JIACG coordinates with OSD and Joint Staff strategic planners.

- Frequency of expanded coordination with NSC system (DC/PC/PCC) during parallel operational planning and implementation.
- Rating of effectiveness of the ability of the JIACG to coordinate with OSD and Joint Staff strategic planners

Subtask: JIACG informs CINC/JTF staffs of PCC's POL-MIL guidance

- Rating of effectiveness of the implementation of POL-MIL guidance

Subtask: JIACG coordinates with other departments' and agencies' campaign planners

- Frequency of expanded coordination with departments and agencies in parallel campaign planning.
- Rating of effectiveness of the JIACG to coordinate with other departments and agency campaign planners

Task: Provide continuity in coordinated planning and operations from pre-crisis thru execution and transition with the Joint Interagency Coordination Group

Subtask: JIACG provides IA perspective on proposed Flexible Deterrent Operations

- Rating of participation by JIACG/IA departments and agencies providing perspective on FDOs during the deterrent phase of operation.
- Rating of effectiveness of the JIACG to provide IA perspective on FDOs

Subtask: JIACG coordinates potential desired effects with other departments and agencies

- Frequency of the CINC/JTF collaboration process with departments and agencies
- Rating of effectiveness of the JIACG to coordinate potential desired effects with other departments and agencies

Subtask: JIACG provides CINC/JTF staffs IA operational concerns/ recommendations during execution of compel/defeat actions

- Frequency of the CINC/JTF collaboration process with departments and agencies during execution of compel/defeat actions
- Rating of effectiveness of the JIACG to provide CINC/JTF staffs IA operational concerns/ recommendations during execution of compel/defeat actions

Concept: Joint Theater Logistics Management

Warfighting Challenge: Ability to plan for Agile Sustainment

Task: Integrate deployment and sustainment planning as an integral part of the effects based planning process.

Subtask: Determine the type and span of joint control that best facilitates management of logistics functions

- Rating of effectiveness of the RDO construct to facilitate management of logistics functions
- Rating of effectiveness of the Logistics C2 Battle Rhythm

Subtask: Reduce the logistics footprint in theater and JOA

- Rating of the effectiveness of (how) JTLM to reduce logistics footprint in theater and JOA

Task: Define the JTF Logistics Position Functions and Essential Elements of Logistics Information

- Rating of the effectiveness of TTP and JSOP prescribed functions and processes for the Logistics Operations Positions
- Rating of the effectiveness of TTP and JSOP prescribed High order Logistics EEI for the Logistics Operations Positions
- Rating of the effectiveness of TTP and JSOP prescribed Boards, Centers, Cells and Working Group for the Logistics Operations Positions
- Rating of the effectiveness of TTP and JSOP prescribed functions and processes for the Logistics Plans Positions
- Rating of the effectiveness of TTP and JSOP prescribed High order Logistics EEI for the Logistics Plans Positions
- Rating of the effectiveness of TTP and JSOP prescribed Boards, Centers, Cells and Working Group for the Logistics Plans Positions

Task: Leverage Decision Support Tool (DST) emerging technologies to rapidly process data and create operationally relevant logistics information

Subtask: Determine the tools required to provide the JFC and subordinates the knowledge needed to assess the logistics feasibility of operational actions

- Rating of effectiveness of tools to provide the JFC and subordinates the information required to determine the logistics feasibility of operational actions

Subtask: Determine the improvements needed to feeder and umbrella information systems

- Rating of the effectiveness of feeder and umbrella information systems to improve asset visibility
- Rating of effectiveness of feeder and umbrella information systems to increase the capacity of the logistics system, including both supply and transportation
- Rating of effectiveness of feeder and umbrella information systems to improve control of supply and transportation assets

Subtask: Employ a logistics display that enhances the JFC's ability to synchronize sustainment

- Rating effectiveness of a logistics display to synchronize sustainment in support of rapid decisive operations

Task: Determine and employ a networked sustainment distribution structure

Subtask: Leverage and tailor Intermediate Staging and Support Bases

- Rating effectiveness of tailoring Intermediate Staging and Support Bases (ISBs) to support to RDO forces
- Rating of the effectiveness of the ISB management

Subtask: Tailor sustainment for synchronization with deploying and redeploying forces

- Rating of effectiveness synchronization of tailored sustainment with deploying forces

Subtask: Determine the means of reducing the logistics footprint in JOA

- Rating of effectiveness of the reducing the logistics footprint in JOA

Subtask: Ensure time-definite delivery

- Rating of effectiveness of the procedures and practices to ensure time-definite delivery
- Rating of effectiveness of the procedures and practices to improve throughput
- Rating of effectiveness of the procedures and practices to support agile mobile forces

Joint Initiatives

Ability to employ joint initiatives to facilitate the planning coordination and execution of Rapid Decisive Operations (RDO).

Task: Employ Collaborative Tool Suite, IWS 2.5 to facilitate collaboration.

- Rating of the ease of use of IWS 2.5 (i.e. file sharing, posting to the whiteboard, holding sidebars)
- Rating of the effectiveness of IWS 2.5 tool suite in support of distributed collaborative planning.
- Rating of IWS 2.5's ability to help maintain an accu Rating of CROP by the use of its various tools (i.e. whiteboard, file sharing, audio collaboration, etc.).
- Document user recommendations on the collaborative tool suite for XC4I functionality improvement.

Task: Employ Global C2 System Integrated Imagery and Intelligence (GCCS-I3) to facilitate assessment and battlespace visualization.

- Rating of GCCS-I3 ability to access the collaborative tool via the web browser to validate critical nodes in ONA.
- Rating of GCCS-I3 ability to access information in the Image Management Database, Reference Database, and the Naval Intelligence Database.
- Rating of GCCS-I3 ability to access the required databases to collabo Rating of with the ETO (and ONA) development group using standard collaboration tools and the COP.
- Rating of GCCS-I3 ability to access the Imager Manager and the Video Ingestor and/or the Java Image Video
- Exploitation capability to collabo Rating of on combat assessment using saved or live streaming video and imagery files.
- Rating of GCCS-I3 ability to access required databases and networks to collabo Rating of with the targeting tools and Electronic Targeting Folders.
- Rating of GCCS-I3 ability to search, view and share information drawn from required databases to demonst Rating of the capability to collabo Rating of with targeteers and the ETO assessment development
- Document user recommendations on GCCS-I3 for XC4I functionality improvement.

Task: Employ Joint Dynamic ISR Management (JDISRM) to enhance the passing of control of assigned unmanned sensors between the military services.

- Rating of the ability of JDISRM to facilitate functional components in conducting mission planning.
- Rating of the ability of JDISRM to facilitate functional components in the development of Operational Net Assessments.
- Rating of the ability of JDISRM to facilitate functional components in maintaining enemy situational awareness.
- Rating of the ability of JDISRM to facilitate functional components in executing the planned mission.
- Rating of the ability of JDISRM to facilitate functional components in receiving or providing targeting information.
- Rating of the adequacy of established unit TTPs (how's, when's, what's, and where's) on coordinating the transfer or receiving of sensor control between sensors/Services.
- Rating of the ability of JDISRM to facilitate functional components in coordinating with the other functional components.
- Document user recommendations on JDISRM for XC4I functionality improvement.

Task: Employ ONA SUITE (Genoa, AnalNB, ArcView/IMS) to facilitate structured argumentation methodology for decision support, visual investigative analysis software, and multi-user geo-database storage and management.

- Rating of the ONA Suite's ability to enable assessments of strategies to counter crisis progression.
- Rating of the ONA Suite's ability to be used as a multimedia knowledge management tool for organizing, presenting, and sharing diverse information in a notebook-centric paradigm.
- Rating of the ONA Suite's capability to provide metadata search and editing of objects within a Windows file system.
- Rating of the ONA Suite's capability to perform as a structured tool for providing early warning and situation assessments.

- Rating of the ONA Suite's capability to function as a collaborative structured argument tool for planning and analysis of uncertain situations.
- Document user recommendations on the ONA Suite for XC4I functionality improvement.

Task: Employ Logistics Tool Suite (LTS) to facilitate logistics support.

- Rating of effectiveness of tools to provide the JFC and subordinates the information required to determine the logistics feasibility of operational actions.
- Rating of effectiveness of displaying complex logistics information.
- Document user recommendations on the LTS for XC4I functionality improvement.

Task: Employ Theater Medical Information Program (TMIP) to facilitate automated medical record data capture and medical intelligence gathering.

- Rating of the effectiveness of the ability to provide Joint Medical Theater Logistics Management.
- Document user recommendations on the TMIP for XC4I functionality improvement.

Task: Employ Joint Fires Initiative (JFI) Automated Deep Operations Coordinating System (ADOCS) to facilitate the coordinating of joint assets on time sensitive targets.

- Rating of ADOCS ability to timely and accurately exchange information between the SJFHQ and the Component Services.
- Rating of ADOCS ability to timely and accurately plan/coordinate the joint battlespace needs of the SJFHQ (Airspace Deconfliction, ACO Visualization, Limited/Protected Targets, and Kill Box Management).
- Rating of ADOCS ability to timely and accurately execute Time Sensitive Targeting for the SJFHQ (Weapon Target Pairing, Predictive BDA, Counter Fire COP).
- Rating of the ADOCS ability to timely and accurately perform joint targeting missions for the SJFHQ (ELINT Display/Analysis, Terrain Analysis, 3D Visualization, Radar Exploitation).
- Documentation of how ADOCS was used for warfighting tasks.
- Rating of utility of ADOCS for warfighting tasks accomplished.
- Document user recommendations for ADOCS functionality improvement. P

Task: Employ Tactical Exploitation System - Enhanced Joint Targeting (TES-EJT) to facilitate direct target nomination to both Army and Navy indirect fire systems.

- Rating of the components capability to support the JTF when TES-EJT connectivity is lost.
- Rating of the TES-EJT ability to view real-time pictures from another service's system using the Remote Terminal Console (RTC).
- Rating of the ability of the JTF HQ to monitor tasking and reassign work priority (tasks) between TES and TES-N.
- Rating of the TES-EJT ability to accept and transfer data from another component's sensor data (including UAVdigital imagery).
- Rating of the TES-EJT ability to "reach back" for additional ISR information from another component's system to support missions.
- Rating of the TES-EJT ability to hand-off the tracking of critical targets between component's systems.
- Rating of the TES-EJT ability to hand-off targets for nomination to another services fire control system.
- Rating of the ability to share ISR information between TES and TES-N overall.

- Documentation of how TES-EJT was used for warfighting tasks.
- Rating of utility of TES-EJT for warfighting tasks accomplished.
- Document user recommendations for TES-EJT functionality improvement.

Task: Employ Automatic Network Information Flow (ANIF) to facilitate the dynamic reapportionment of bandwidth.

- Rating of the ANIF ability to dynamically reapportion bandwidth.
- Instances of significant difficulties with functionality of system as a Stand Alone.
- Instances of significant difficulties with integration, transmitting, receiving of information to/from the MC02 JDN (Joint Data Network).
- Instances of significant difficulties with the speed and reliability of the system. P
- Instances of significant difficulties with availability of external support (I.e. Service, JFCOM, Program Office, Contractor).
- Instances of significant difficulties with any additional interoperability or integration problems.
- Instances of Unexpected IERs (Information Exchange Requirements) or KPP (Key Performance Parameter) requirements.
- Rating of the usefulness of ANIF towards helping JTF HQ in completing its mission.
- Documentation of how ANIF was used for warfighting tasks.
- Rating of utility of ANIF for warfighting tasks accomplished.
- Document user recommendations for ANIF functionality improvement.

Task: Employ Network Security Management Correlation & Display (NSMC&D) to facilitate the central database for correlation, analysis, and reporting of network status.

- Rating of the NSMC&D ability to monitor the Service Components' and JFHQ's intrusion detection/firewall sensors throughout the JTF enterprise, to cover the Computer Network Defense aspects of the CROP.
- Instances of significant difficulties with functionality of system as a Stand Alone.
- Instances of significant difficulties with integration, transmitting, receiving of information to/from the MC02 JDN (Joint Data Network).
- Instances of significant difficulties with the speed and reliability of the system.
- Instances of significant difficulties with availability of external support (I.e. Service, JFCOM, Program Office, Contractor).
- Instances of significant difficulties with any additional interoperability or integration problems.
- Instances of Unexpected IERs (Information Exchange Requirements) or KPP (Key Performance Parameter) requirements.
- Rating of the usefulness of NSMC&D towards helping JTF HQ in completing its mission.
- Documentation of how NSMC&D was used for warfighting tasks.
- Rating of utility of NSMC&D for warfighting tasks accomplished.
- Document user recommendations for NSMC&D functionality improvement.

Task: Employ Joint Enroute Mission Planning & Rehearsal System - Near Term (JEMPRS-NT) to facilitate the use of collaborative tools enroute to AOR.

- Rating of the collaborative capability between the JTF Forward HQ element and the components as it transitions to the Area of Operations.
- Rating of the communications data rates in support of reach-back communications.

- Rating of the information flow and process support capability to allow the warfighters to perform required tasks without additional bandwidth demand.
- Documentation of how JEMPRS-NT was used for warfighting tasks.
- Rating of utility of JEMPRS-NT for warfighting tasks accomplished.
- Document user recommendations for JEMPRS-NT functionality improvement.

Task: Employ Maneuver Control System - Tactical Combat Operations (MCS-TCO) to facilitate Army and Marine Corps Interface Command and Control / Situational Awareness systems.

- Rating of the ability to establish connectivity between the MCS and TCO.
- Rating of the ability to accept situational awareness data from the other service's system.
- Rating of the ability to display graphics from the other service's system.
- Rating of the ability to populate ones system's databases with data from the other service's system via Auto-Post/Auto-Fill.
- Documentation of how MCS-TCO was used for warfighting tasks.
- Rating of utility of MCS-TCO for warfighting tasks accomplished.
- Document user recommendations for MCS-TCO functionality improvement. Task: Employ Global Strike Task Force (GSTF) to facilitate Air Force rapid reaction force package to meet anti-access challenges.
- Rating of the GSTF ability to disseminate information to support the JTF ONA build.
- USAF looking at additional service specific measures.
- Documentation of how GSTF was used for warfighting tasks.
- Rating of utility of GSTF for warfighting tasks accomplished.
- Document user recommendations for GSTF functionality improvement.

Task: Employ Joint Public Affairs Operations Group (JPAOG) to facilitate the planning, and command and control of PA units.

- Rating of the JPAOG's ability to timely and accurately collect PA actions for the SJFHQ.
- Rating of the JPAOG's ability to timely and accurately collect and classify field reports for public release.
- Rating of the JPAOG's ability to interface with mobile secure and non-secure sources.
- Rating of the JPAOG's ability to collaborate with military and civilian/NGOs on issues/requests for information.
- Rating of the JPAOG's effectiveness in command and control of the various PA units in the pre-deployment to early entry phases of the operation.
- Documentation of how JPAOG was used for warfighting tasks.
- Rating of utility of JPAOG for warfighting tasks accomplished.
- Document user recommendations for JPAOG functionality improvement.

Task: Employ National Imagery & mapping Agency Crisis Action Response Team (NIMA-CART) to facilitate the reach back to NIMA data, products and Subject Matter Experts.

- Rating of the NIMA-CART ability to establish and maintain communications with NIMA Centers.
- Rating of the NIMA-CART ability to transfer and process imagery/geospatial information in support of preliminary assessment analysis.
- Rating of the ability of NIMA CART to support and update ONA developments.
- Rating of the ability to use NIMA CART to collaborate on combat assessment and target selection using saved imagery files.

- Rating of the NIMA-CART ability to enhance the capabilities of the SFJHQ.
- Documentation of how NIMA-CART was used for warfighting tasks.
- Rating of utility of NIMA-CART for warfighting tasks accomplished.
- Document user recommendations for NIMA-CART functionality improvement.

Task: Employ Command and Control for Space and Computer Network Operations (C2SpaceCNO) to facilitate the synchronization and coordination of Space/CNO/IO with other fires.

- Rating of the C2SpaceCNO ability to timely and accurately coordinate an exchange of information between the Joint Task Force HQ and the USSPACECOM reach back element.
- Rating of the C2SpaceCNO Plans Group's ability to provide relevant and timely information for the Operational Net Assessment.
- Rating of the input from the Space and Information Operations Element (SIOE) in support of maintaining the CROP.
- Rating of the responsiveness of the SIOE in providing Space Computer Network Operations and Information Operations support to the JTF Headquarters.
- Documentation of how C2SpaceCNO was used for warfighting tasks.
- Rating of utility of C2SpaceCNO for warfighting tasks accomplished.
- Document user recommendations for C2SpaceCNO functionality improvement.

Task: Employ Unattended Ground Sensors support to Special Reconnaissance of Theater Ballistic Missiles (UGS-TBM) to facilitate small concealable sensors help SOF locate TBM targets.

- Rating of the UGS/TBM ability to provide accurate and timely notification and location of Theater Ballistic Missiles to the JFACC and JTFHQ.
- Rating of usability of the UGS/TBM system.
- Documentation of how UGS-TBM was used for warfighting tasks
- Rating of utility of UGS-TBM for warfighting tasks accomplished.
- Document user recommendations for UGS-TBM functionality improvement.

Task: Employ JSOTF-Joint Collaborative Planning Tool (JSOTF-JCTP) to facilitate reach back capabilities.

- Rating of the JSOTF-JCTP ability to facilitate functional components in conducting mission planning.
- Rating of the JSOTF-JCTP ability to facilitate functional components in developing courses of action.
- Rating of the JSOTF-JCTP ability to facilitate functional components in developing targeting plans.
- Rating of the JSOTF-JCTP ability to facilitate functional components in the military decision making process (MDMP).
- Rating of the ability of the JSOTF-JCTP to facilitate functional components in the development of Operational Net Assessments.
- Rating of the ability of the JSOTF-JCTP to facilitate functional components in executing the planned mission.
- Rating of the ability of the JSOTF-JCTP to target enemy locations, key terrain, facilities, and infrastructure.
- Documentation of how JSOTF-JCTP was used for warfighting tasks.

- Rating of utility of JSOTF-JCTP for warfighting tasks accomplished.
- Document user recommendations for JSOTF-JCTP functionality improvement.

Task: Employ Joint Automated Target Folder (JATF) to facilitate Electronic Targeting Folder Development for Time Critical Targeting

- Rating of the JATF ability to facilitate functional components in developing courses of action.
- Rating of the JATF ability to facilitate functional components in prioritizing enemy target list.
- Rating of the JATF ability to facilitate the functional components in developing, maintaining, and providing a common ope Rating picture.
- Rating of the JATF ability to facilitate the functional components to execute rapid targeting/retargeting.
- Rating of the JATF ability to facilitate the functional components to modify or adjust planned missions, to include positioning/repositioning forces.
- Rating of the JATF ability to facilitate the functional components to command and control assigned units.
- Instances of significant difficulties with integration, transmitting, receiving of information to/from the MC02 JDN (Joint Data Network).
- Instances of significant difficulties with the speed and reliability of the system.
- Instances of significant difficulties with availability of external support (I.e. Service, JFCOM, Program Office, Contractor).
- Instances of significant difficulties with any additional interoperability or integration problems.
- Instances of Unexpected IERs (Information Exchange Requirements) or KPP (Key Performance Parameter) requirements.
- Documentation of how JATF was used for warfighting tasks.
- Rating of utility of JATF for warfighting tasks accomplished.
- Document user recommendations for JATF functionality improvement.

Task: Employ Joint Automated Single Guard Solution (JASGS) to facilitate the exchange of information securely between networks of different classifications.

- Rating of the JASGS ability to process unformatted information from the MC02 Unclassified Net to users on the MC02 Secret Net.
- Rating of the JASGS ability to process unformatted releasable information securely from the TS SI/TK JWICS network to users on the MC02 Secret Network.
- Rating of the shared view of multi-level security data such as imagery, track and sensor data, and general military intelligence.
- Documentation of how JASGS was used for warfighting tasks.
- Rating of utility of JASGS for warfighting tasks accomplished.
- Document user recommendations for JASGS functionality improvement.

Concept: Joint Intelligence, Surveillance, and Reconnaissance (JISR)
Warfighting Challenge: Ability to provide relevant intelligence to the commander
Task: Plan and direct Intelligence Surveillance, and Reconnaissance (ISR) operations.

- Instances of adversary Command, Control, Communication, Computers, Intelligence, Surveillance, and Reconnaissance nodes, links, and vulnerabilities in ISR prioritization
- Instances of ISR planning addressing counter ISR and deception measures
- Instances of Joint Intelligence Preparation of the Battlespace/Operational Net Assessment providing sufficient detail to plan and implement ISR Operations
- Instances of additional resources needed to perform JISR planning, analysis, and oversight
- Instances of Universal Joint Task List task changes needed to accomplish ISR functions
- Instances of additional training required to conduct JISR

Subtask: Link collaborative planning and execution.

- Instances of efficient collaborative ISR planning
- Percent of Component Priority Intelligence Requirements (PIR)/Essential Elements of Information (EEI) covered in JTF collection plan
- Percent of Priority Effects List Measures of Effect (MOE) receiving ISR coverage
- Instances of ISR Planner involvement in MOE development
- Instances of effective ISR collaboration
- Instances of Named Area of Interest (NAI) overlay improving collection planning
- Instances of NAI overlay improving situational awareness
- Instances of sensor coverage overlay improving collection planning
- Instances of sensor coverage overlay improving situational awareness

Subtask: Apply JISR Management.

- Instances of ISR Planners contributing to increased capability of ISR
- Rating of ICSAS utility for JISR management
- Rating of Automated Deep Operations Coordination System(ADOCS) utility for JISR management
- Rating of Share Point Portal Server (SPPS) utility for JISR management
- Rating of Information WorkSpace (IWS) utility for JISR management
- Number of times Integrated Collection Situational Awareness System (ICSAS) used to determine sensor suitability
- Instances of prioritization of coverage deviating from CDRs PIR and intent
- Rating of Blue ISR Data Base adequacy
- Number of times Blue ISR Data Base accessed

Subtask: Synchronize Operations and ISR.

- Instances of ISR supporting the operational plan
- Number of retaskings to support current operations
- Percent of ISR requirements not receiving coverage
- Percent of ISR requirements receiving redundant sensor type coverage
- Instances of unfulfilled component requirements in ISR plan.
- Instances of insufficient ISR assets available to support operations
- Instances of National, Joint, and Commercial ISR asset integration

Task: Collect Information on the operational situation.

- Percent of threat forces located
- Percent of PIRs/EEIs collected in time to meet operational needs

Task: Exploit information to improve credibility and reliability

Subheading: Improve reaction to emergent targeting.

- Percent of time ISR asset managers monitoring Joint Operations Center
- Instances of ISR collaboration providing positive input to emergent targeting
- Percent of emergent targets effected
- Percent of emergent targets identified
- Number of Priority Effects coverage lost due to retasking for emergent target
- Number of NAIs losing coverage due to retasking for emergent target

Subheading: Improve reaction to emergent information requirements.

- Instances of ISR collaboration providing positive input to emergent information requirements
- Percent of emergent information requirements answered by latest time information is of value
- Number of Priority Effects coverage lost due to retasking for emergent information requirements
- Number of NAIs losing coverage due to retasking for emergent information requirements

Task: Produce operational intelligence.

- Number of cross cueing ISR assets from other intelligence sources
- Instances of interactive multiple Intelligence source collaboration being effective
- Number of cross cueing ISR assets from other services

Task: Disseminate operational intelligence.

- Rating of adequacy of processes for updating the Common Operational Picture (COP) from JISR Assets
- Rating of adequacy of JISR input to COP for Joint Fires capability P
- Instances where JISR input was useful
- Rating of ISR coverage and priorities reflected in the Common Relevant Operational Picture
- Instances where JISR provided increased knowledge of the Battlespace
- Rating of JISR contribution to view of the Battlespace

Annex D — Model-Experiment-Model Methodology

Purpose

The purpose of this study is to apply the Model-Experiment-Model (M-E-M) methodology to overcome some of the limitations of conducting a large, single-trial field experiment and to establish the foundation of a continuous experimentation environment. The focus of the project has been to investigate whether we can construct a simulated baseline using an analytical combat model.

The use of the M-E-M methodology in MC02 was as a "proof-of-principle" intended to determine its potential and the process with which to integrate it into joint experimentation. The resulting "lessons learned" are not included in the MC02 Findings.

Methodology

The inherent limitations of using a large, single-trial field experiment pose numerous challenges to obtaining quality insights and conclusions supported with quantifiable data and analysis. These limitations include:

- The experiment is a single-trial event
- The experiment lacks a baseline
- The experiment takes precedence, but exercise considerations may intrude
- Experimental concepts may be immature
- Experimental systems may be immature
- Participating units may not be proficient with the systems or concepts

These limitations may result in the following consequences:

- Non-repeatability of the experiment results
- Difficulty in establishing causality
- Difficulty in quantifying the impact of experimental systems or concepts

The use of the M-E-M methodology can mitigate or eliminate these limitations and consequences. This methodology is an application of the Model-Test-Model and Model-Exercise-Model methodologies successfully used for years by the Army's TRADOC Analysis Center (TRAC).The M-E-M methodology uses constructive, analytical modeling prior to and after the experiment to enhance the experiment execution and results. Pre-experiment modeling should be initiated upon the experiment conception in order to:

- Refine the experimental concepts
- Shape the experiment design and execution
- Predict the experiment events
- Focus experiment data collection efforts
- Manage experiment expectations

Post-experiment modeling is conducted in order to:

- Demonstrate repeatability of experiment results
- Investigate causality
- Conduct sensitivity analysis
- Extend experiment results with "what if" analysis
- Conduct baseline extrapolation
- Increase confidence in the experiment results

The M-E-M methodology should be an inherent part of every large field experiment, and the post-experiment modeling should lead seamlessly into the pre-experiment modeling for the next experiment, thereby establishing a continuous experimentation environment. Although M-E-M is not model-specific, we have focused on investigating the utility of using an analytical combat model – the Joint Warfare System (JWARS) – within this methodology to support joint experimentation.

The selection of JWARS was based on its potential to assess current and future operational concepts. It was designed to be an inherently joint analytical model that is "information-based and perception-driven." As such, it has numerous improvements over the existing JAMIP Prong 1 suite of warfare simulations. It is important to note that JWARS is still under development and that the modeling results must be considered in the context of the varying maturity of the many capabilities of the model in the beta release version (version 1.4).

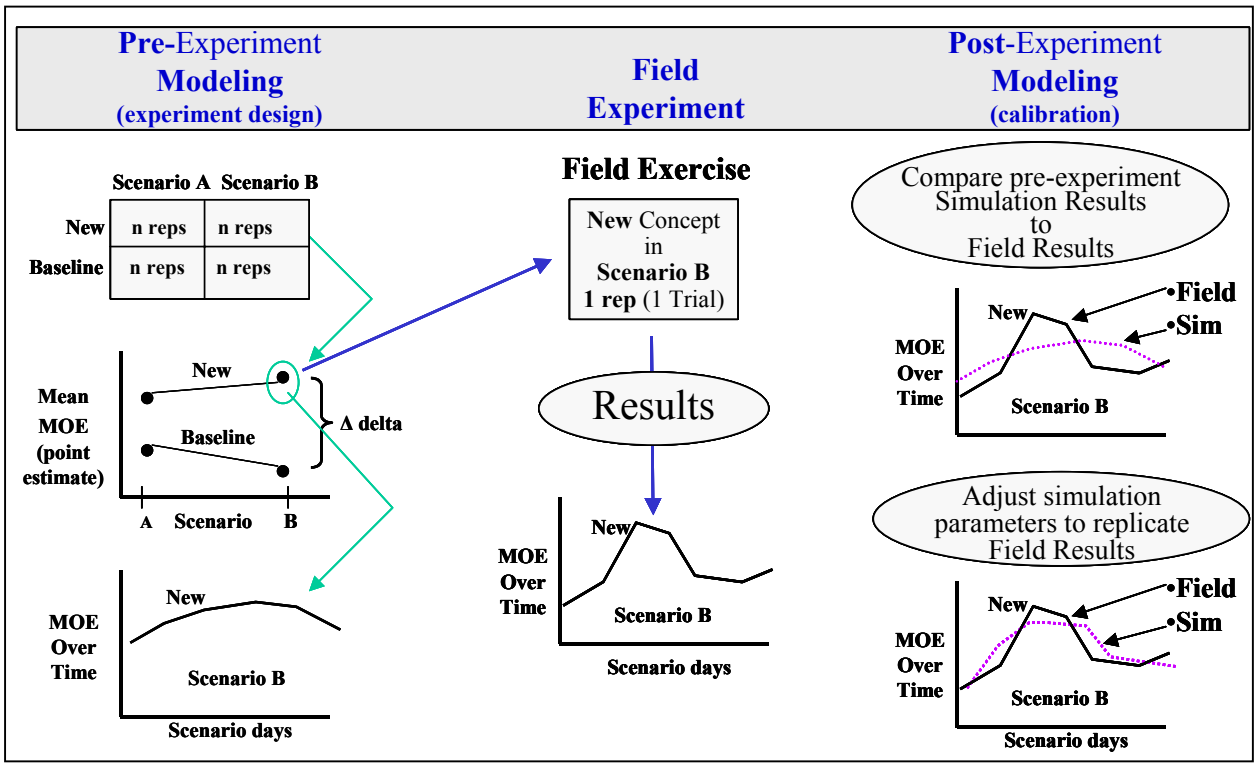


Figure 193: Using pre-experiment modeling to design field experiments and using the field experiment to calibrate the simulation.

One of the objectives of the study is to determine whether we can construct a simulated baseline using an analytical combat model (see figure 22). We would test two different forces: the "new" force would employ the experimental concept, system or organization; the "baseline" force would not. Optimally, these forces would be tested in different scenarios (e.g., different adversaries, different terrain, etc.), each of which for some number of repetitions, as appropriate.

The expected result is a Δ in performance between the two forces, as measured by the selected Measures of Effectiveness (MOE).

The performance of the new and baseline forces in these MOEs may or may not resemble the performance of the force during the execution of the field experiment. This actual

performance would be compared to the pre-experiment modeling results and the differences analyzed to determine the contributing factors to this. Where appropriate, model parameters are adjusted in order for the model to better replicate the field results.

Having calibrated the model to the field experiment results we will repeat the pre-experiment modeling runs of the new and baseline forces in the various scenarios, resulting in a 'calibrated' Δ of performance (see figure). Due to the inclusion of the field experiment results, we will have an increased confidence in the model results. Furthermore, we can conduct sensitivity and excursion analysis; the latter of which may include model runs that "remove" the limitations of the field experiment (e.g., scripted events, limited playbox, etc.) and estimate the optimal Δ of performance (reflecting the potential of the new concept, system or organization).

Findings, Recommendations and Lessons Learned

The MC02 M-E-M post-experiment modeling and analysis is ongoing; therefore, the resulting findings, recommendations and lessons learned will be detailed in a separate report.

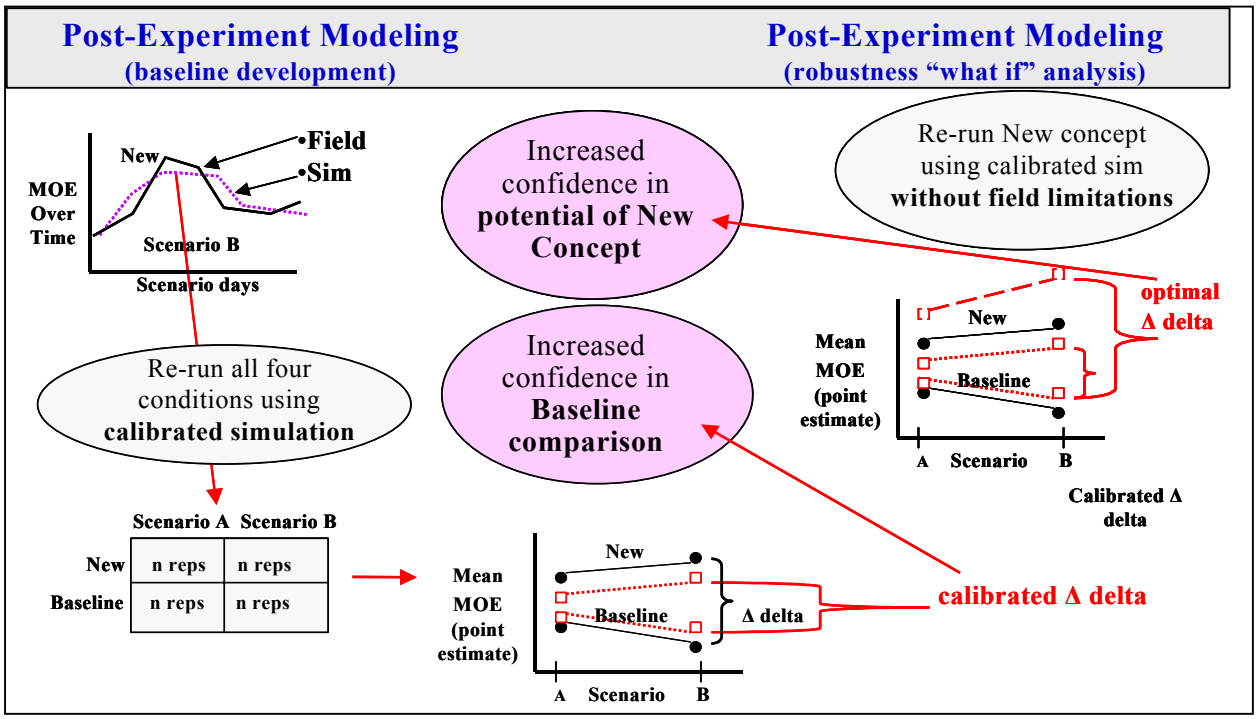


Figure 194: Using the calibrated simulation to estimate field experiment robustness and baselines.

Annex E — Exercise Control Description

Purpose

This plan describes the concept, organization, functions, responsibilities and procedures for control of the MC02 experiment.

The overall joint experiment force structure was an integrated organization including live (Service experiment) and simulated forces. Central control of Service experiment live forces, to include OPFOR, was restricted to agreed upon joint events. Outside of those events, Services had full control over live forces. Control over all simulated forces (included in the joint experiment) remained with JFCOM's Joint Experiment Control Group (JECG).

Live forces were located primarily on ranges in the western United States (Fort Irwin,CA, Camp Pendleton, CA, China Lake, CA, Nellis AFB, NV) and the San Diego, CA, Naval Operating areas including the various islands off the coast of California. In addition, component response cells with their simulations were located at Fort Irwin, CA, Camp LeJeune, NC, Hurlburt Field, FL, and Fleet Combat Training Center Pacific in San Diego, CA. The component commands were located at Camp LeJeune, NC – JFLCC, at Nellis AFB, NV – JFACC, on board the USS CORONADO (AGF 11)– the JFMCC, and at the Norfolk, VA, compound of the SOCJFCOM – JSOTF. The JTF was located in the JFCOM JTASC facility in Suffolk, VA, with a forward element on board the JFMCC command ship, operating in the Pacific Ocean waters off San Diego, CA, and accompanied by forward elements of the JSOTF and JFACC.

The Senior Simulation Controller and Simulation Tech Control at the JTASC centrally controlled all simulation forces. The JTASC also controlled certain live forces participating in certain key joint events supporting specific experiment objectives. However, central control over live OPFOR and live forces during joint events did not extend to control over these forces during Service specific experiments and events.

The total experiment was conducted through a series of Limited Objective Experiments (LOE), three spirals (1 – 3) and a three-week execution phase. Spiral III was conducted for 10 to 12 hours per day, while execution, although originally planned for a 12-hour play day, was run on a 24-hour play day. Spiral III provided academic instruction for the JTF and components, an opportunity for planning and orders development, and culminated in a full-up rehearsal of all exercise elements. Technical testing of communications, C4I systems and simulations took place throughout the Spiral. Execution encompassed the major simulation supported experiment, and Service experiments using live forces that were partially integrated into the overall scenario.

The MC02 experiments were conducted within the framework of an exercise to provide the structure required to support and control the experiment. This approach took advantage of and melded the experience and abilities found in the training and experimentation communities, while freeing the experiment to focus on critical events required to assess the concept.

Exercise Overview

MC02 was one of a series of experiments designed to assess concepts for transformation of forces into the Joint Vision 2010 and 2020 precepts and time frame. These experiments include the Unified Vision, Millennium Challenge and Global Challenge exercises. Congressional language in the FY01 Defense Authorization Act directed JFCOM, the Services and U.S. Special Operations Command to demonstrate rapid, decisive operations in 2002, with elements representative of their future force concepts.

MC02 was to assess U.S. capability to carry out Rapid Decisive Operations in this decade. A number of related and supporting technical and conceptual experiments were included in the exercise design, along with integration of Service live experiments conducted concurrently with MC02.

An essential element for conduct of RDO is development and sustainment of an Operational Net Assessment (ONA), which encompasses input from the entire U.S. Government, and issuance of Effects-Based Orders (EBO). The ONA for MC02 was drafted during meetings and seminars held among the Interagency members in Washington, D.C., prior to the beginning of Execution, and was to be updated throughout the exercise. Additionally, updated technology in the form of the Common Relevant Operating Picture (CROP) was to enhance rapid dissemination of information, coordination between participants, and visualization of the battle space.

MC02 staged a high-end, small-scale contingency that had the potential to escalate into a major theater of war. It overlay a real-world military threat for which robust and realistic databases are available to develop an operational net assessment. Both simulated and actual forces participated in the conduct of the experiment. These forces operated on a terrain database, which superimposed terrain from the contingency area over the western USA.

Control Overview

Exercise control consists of a set of procedures used to guide the exercise toward

Figure 195: NELLIS AIR FORCE BASE, Nev. (AFIE) -- An HH-60G Pave Hawk from 66th Rescue Squadron here refuels from an MC-130E Combat Talon from the 711th Special Operations Squadron at Duke Field, Fla., on Aug. 5 during Millennium Challenge 2002. MC02 combines live field forces and computer simulations at several locations across the United States with the purpose of testing and validating several joint and service-specific experimental warfighting concepts. (U.S. Air Force photo by Staff Sgt. Aaron D. Allmon II) (VIRIN: 020805-F-7823A-006)

achievement of the exercise and experiment objectives. The JECG controls the exercise through use of a Master Scenario Events List (MSEL), responses to requests for information, the observer/trainer and data collection networks, role players, and functional area controllers. Secure telephone and intercom, local and wide area networks, VTC and periodic meetings provide the primary means for communicating instructions and coordinating the efforts of all controllers. Controllers ensure tracking events are satisfying objectives and participant reaction to MSEL and other injects, and then steering the exercise as required to retain the focus on objectives. The goal was to have a realistic and consistent story line and sequence of events so that control would be virtually transparent to the exercise participants.

Primary control was located at the Joint Warfighting Center in Suffolk, VA. with Component Response Cells and simulations located with each of the components. An Integration Cell from the JECG was located within each Service Experiment control organization, with reciprocal Service representation in the JECG, who were knowledgeable of the Service experiment. The Senior Simulation Controller and Simulation Tech Control controlled simulation forces at the JTASC.

The JECG was responsible for guiding the experiment and did so by orchestrating events, and ensuring objectives were met. The Chief Controller was overall responsible for ensuring satisfaction of the exercise and experiment objectives, and was the final approving authority for all information flowing to the experiment participants from the JECG. He controlled the exercise tempo and direction by injection of data and information as specified by the MSEL, through responses to RFI's, and through information developed by role players in the JECG. Each Service was responsible for designing, manning, and operating the control structure for its own Service experiments, to include representation on the JECG.

The overall joint experiment force structure was an integrated organization including live (Service experiment) and simulated forces. Central control of Service experiment live forces, to include OPFOR, were restricted to agreed upon joint events. Outside of those events, Services had full control over live forces. Control over all simulated forces (included in the joint experiment) remained with the JECG.

Live forces were located primarily on ranges in the western United States (Fort Irwin, Camp Pendleton, China Lake, and Nellis AFB) and the San Nicholas Sea Ranges off California. In addition, component response cells with their simulations were located at Fort Bragg, Camp LeJeune, Hurlburt Field, and FCTCPAC in San Diego. The component commands were located at Camp LeJeune, NC, at Nellis AFB, NV, onboard the USS Coronado, and at Naval Amphibious Base Coronado with a forward element on board the JFMCC command ship. The was located in the JTASC with a forward element on board the JFMCC command ship.

Simulation forces will be centrally controlled at the JTASC through the Senior Simulation Controller and Simulation Tech Control. The JTASC controllers handled all simulated OPFOR in the joint experiment. Central control over live OPFOR and live forces during joint events did not extend to control over those forces during Service specific experiments and events.

Joint Exercise Control Group (JECG).

The JECG provided the experiment and exercise structure, provided close coordination between operations and data collection on the experiment, and provided the control necessary for overall direction of the exercise. The JECG also assured full integration of the separate Service experiments into the joint experiment. Figure 7 below, displays the senior level of the control

and analysis structure, while Figure 8, Exercise Control Architecture, provides a more detailed breakout of the principal elements of the Joint Exercise Control Group.

Subordinate component headquarter elements were represented in a response cell responsible for operating the simulations and portrayed all organizations required by the scenario. The players located in these cells interpreted the output from the simulations to provide necessary reports to the component headquarters, and received direction/orders for input into the simulations. The group was a conduit for inserting events, and for monitoring the experiment. The size and composition of each response cell depended on the nature and robustness required to meet experiment objectives, such as planning activities, reports generation, size, and organization of the forces represented.

A Coordination Cell, working directly for the JECG Chief Controller, provided a view of what was taking place in the simulations and live force elements. The cell was responsible for maintaining a status of forces, making recommendations on play changes to assure joint events took place in a seamless fashion, and providing a capability to give overview briefings to distinguished visitors.

Overall coordination of OPFOR activities took place in the JECG for all events requiring both live and simulated OPFOR forces. The Senior OPFOR Controller in the JTASC personally controlled those OPFOR forces represented in the simulation. The Service experiment representatives in the JTASC provided the channel for coordination of Live OPFOR activities with the Service experiments. Service experiment senior controllers and Integration Cell

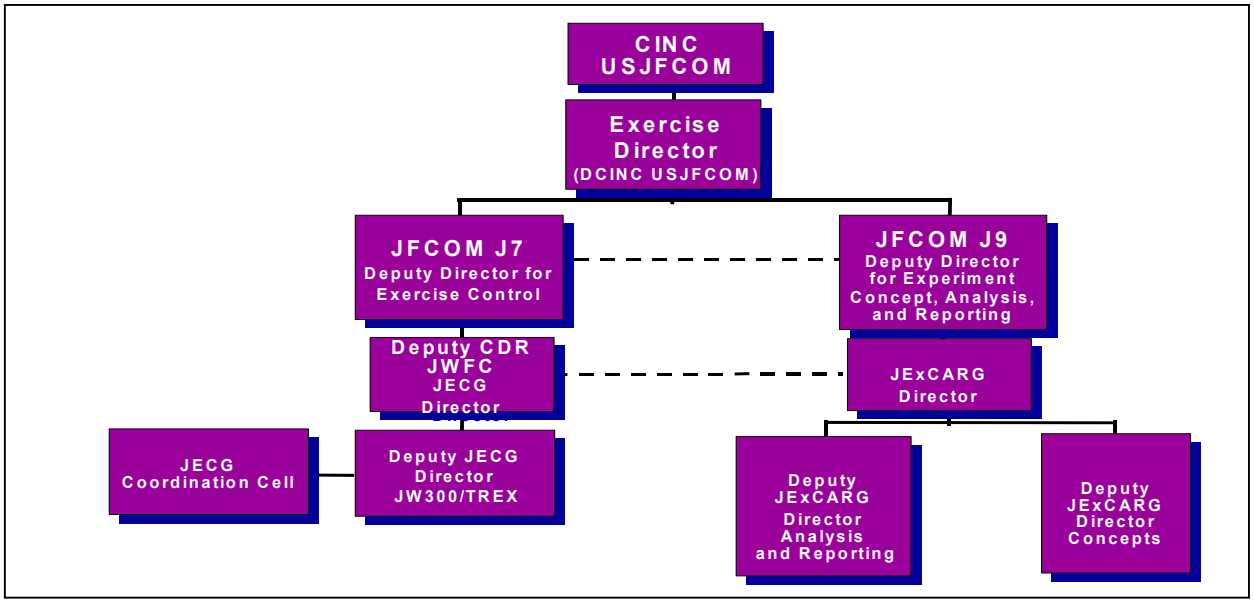


Figure 196: Experiment Control Organization

personnel provided current information to the JECG regarding the location and activity of live Blue and OPFOR forces. The OPFOR effort was enhanced by the DoD Red Team, which focused on potential asymmetrical threat capabilities.

Role Players

Sufficient role players, response cells and control functions to provide the necessary input to the experiment audience at the strategic level, and guide the activities of component Response Cells at the tactical level were provided to the JECG. The cells varied in size depending on the number of SME's needed to run the various functions/organizations. Examples of such organizations include defense and other national agencies, other governments and their militaries, and ambassadors. Also SMEs were needed to work in the areas of normal control functions such as scenario/MSEL, OPFOR, simulations, operations, intelligence, information operations, and combat service support.

The MSEL cell maintains, modifies, provides injects, and executes events in the MSEL, the exercise roadmap. Each event in the MSEL is harmonized across the entire exercise. The MSELs act in concert, as catalysts to guide experiment player actions and evoke desired responses. Within guidance from the Chief Controller, and in conjunction with other JECG Cells, the MSEL cell developed and coordinated additional scripted events to maintain the focus of the experiment and assure objectives were met.

The CSS cell served as the focal point for all experiment logistics control and response issues. CSS ensured that logistics play, to include medical, transportation, engineer and sustainment issues, was realistic and controlled to support achievement of objectives.

The intel support cell provided the background information (to include the database for the terrain, enemy forces and country infrastructure) leading up to the exercise, and supported the experiment throughout with information on enemy activities.

Appropriate primary simulations were operated in a distributed fashion at each

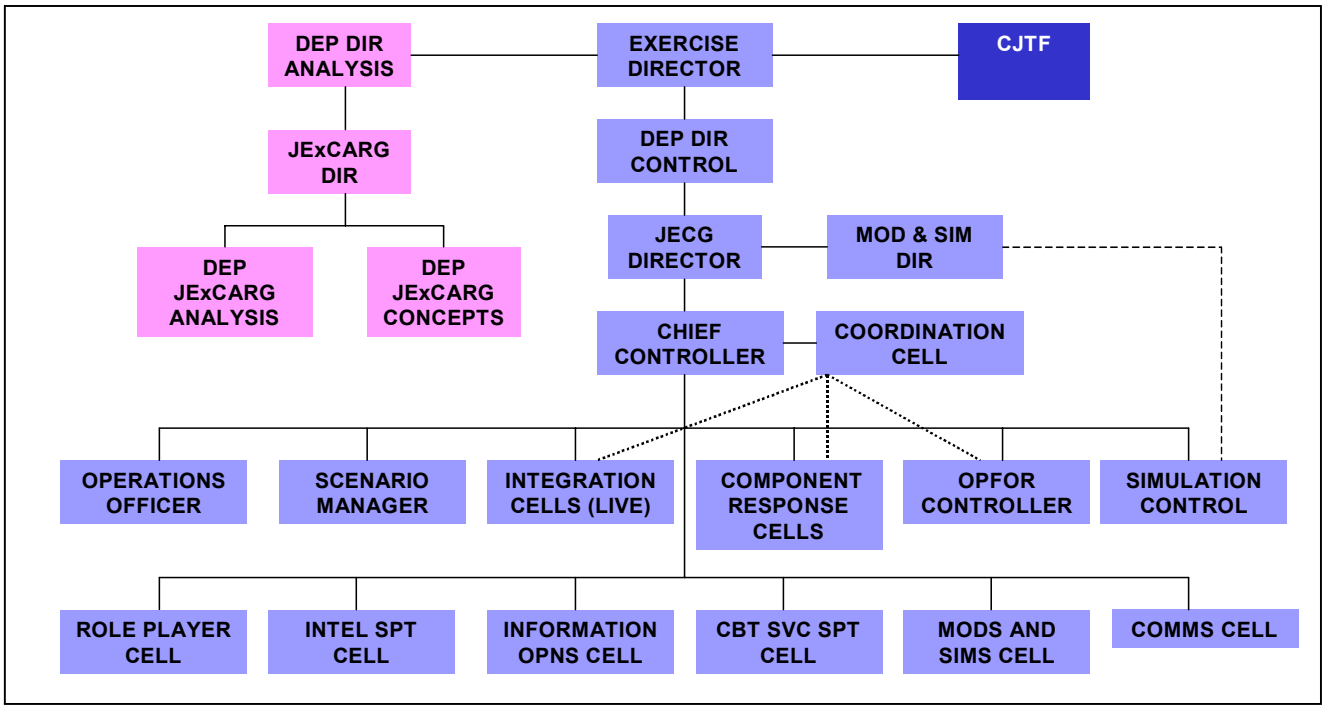


Figure 197: Experiment Control Architecture

Component Response Cell site (Army – EAGLE/ONESAF, Navy – JSAF, Marine Corps –

JCATS, Air Force – AWSIM), with senior simulation control and technical control centralized at the JTASC. The Services used additional models to support specific initiatives. The output of the models, representing tactical actions on the part of the Service, were fed to the experiment audience through appropriate Service command and control systems, or were provided via scripted message prepared by Service role players. The role players injected orders from Component headquarters into the models. Integration of Service experiment live-force operations with model outputs took place at the Component level. The primary avenue for control of experiment audience actions was through the control cell that was an integral part of each component Response Cell, and via injections inserted at that level, or through crafting of the information provided up to the Component HQ. The size and composition of each Component HQ and the component Response Cell was driven by the level of fidelity required in orders and reports that had to be prepared by those elements, the functional specialties that must be represented, and the number of simulation stations the component had to operate.

Control is both a top-down and bottom-up process. The JECG inputs strategic and operational information through scripting and role-playing down to the experiment participants. This information consisted of initial and follow-on military information and event guidance and orders from higher headquarters such as JCS and information from foreign governments, non-governmental organizations, and international organizations. At the same time, tactical information from the simulations, from scripting, and from role playing were injected from the component response cells as if it were coming from tactical units.

Control Communications

Primary JECG communications was through the Common Relevant Operating Picture (CROP), secure telephone to include teleconferencing, secure intercom, and video teleconferencing. To some extent, the audio/video capability available through the CROP eliminated the need for frequent video teleconferences, and possibly the secure intercom. All communications provided for the JECG were separate and distinct from, and not accessible by, the experiment audience. Regular, structured conferences, between the Component Response Cell Site Managers and the Service Experiment Senior Controller and integration cells, were used to assure all controllers had a common understanding of what had taken place, the direction the experiment was following, and the significant upcoming events that were to be initiated. Each Service Experiment Control Cell was responsible for providing current information regarding live Blue and OPFOR forces to the JECG.

Automated feeds from the models through Service C4I systems to the COP provided the representation for simulated forces. The communications structure replicated all normal communications available to the experiment audience, plus some experimental systems.

Annex F — Adaptive Adversary

This annex summarizes the Opposition Force (OPFOR) organization, objectives, and success in addressing RDO weaknesses. The credibility of the Red adversary is also analyzed in terms of how it was fought, constraints placed upon it, and its ability to act as an adaptive opponent for the RDO experiment. Key findings and recommendations are summarized at the end.

The intent of the OPFOR assessment during MC02 was to support the JFCOM Experiment Assessment Plan (JEAP) Primary Task 2. This was, "Assess the Capability of the Experimental RDO Concepts to Impact Joint Task Force Actions Against a Determined 2007 Adversary." To address this task fully, assessments were required on both the Blue and the Red sides.

The overall objective of the MC02 OPFOR was to provide a 2007-based, realistic, adaptive opponent that would test the vulnerabilities of the RDO concept. In concert with the MC02 scenario, the multi-faceted adversary portrayed to the Blue JTF provided a realistic 2007 threat environment in which the RDO concept could be explored. This allowed exploration of ONA, EBO,IAC, SJFHQ, and other supporting concepts/objectives. The JFCOM J7 Joint Warfighting Center Support Team (JST), in coordination with the J9 World Class Adversary (WCA) Team, provided the OPFOR.

Analysts from the J9 Analysis Division and Subject Matter Experts (SMEs) from J7 assessed the OPFOR organization and campaign during MC02. This allowed for an in-depth understanding of the success and failure of Blue effects-based operations. The assessment team met with OPFOR senior leaders daily to review their operations, response to Blue efforts, and self-assessment data.

The OPFOR senior leadership team included a senior member of the J7 JST, who played the role of Joint Task Force – South (JTF-S) military commander, and a retired lieutenant general, who initially played the JTF-S commander before assuming a role as an advisor six days into the experiment. Also, a former U.S. ambassador served as the Supreme Leader for the Government of Red (GOR).

The MC02 scenario called for an upper level, SSC. As such, the OPFOR organized into a multi-faceted group that included government, military, terrorist, pirate, subversive, militant, and criminal elements. Each of these elements had their own objectives and did not always work cooperatively. As such, they posed a considerable challenge for the Blue JTF. Success could only be achieved by taking full advantage of OPFOR interagency capabilities and looking beyond the JTF's internal assets.

Limited staffing was a problem for the OPFOR during MC02. Total staff support for all OPFOR operations was approximately 90 personnel. At times, the small staffing level limited the OPFOR's ability to be a fully adaptive adversary. The most obvious shortfall was a lack of an intelligence staff. Total staffing for OPFOR intelligence operations was limited to four analysts, who worked two on each shift.

To help maximize their effectiveness for experimental play, the OPFOR divided into three functional groups; GOR, JTF-S, and other non-governmental groups such as terrorists, pirates, and militants. This allowed separate, non-coordinated responses to be injected into the scenario as needed. Each of the OPFOR elements is described in detail below.

OPFOR Organization

JTF-S. The military organization faced by Blue. This was a joint organization with air, land, and maritime assets sized to reflect a high level SSC. It was not controlled by the government but by a rogue military commander.

Government of Red. This represented all governmental organizations of the country of Red and provided an interface for all diplomatic communications. The GOR was led by a former U.S. ambassador with a staff of one.

Terrorist Network. The terrorists represented an international terrorist organization that had ties with a regional militant religious group. The terrorist network provided an asymmetric force capable of conducting "on-call" missions throughout the Blue AOR. Types of missions

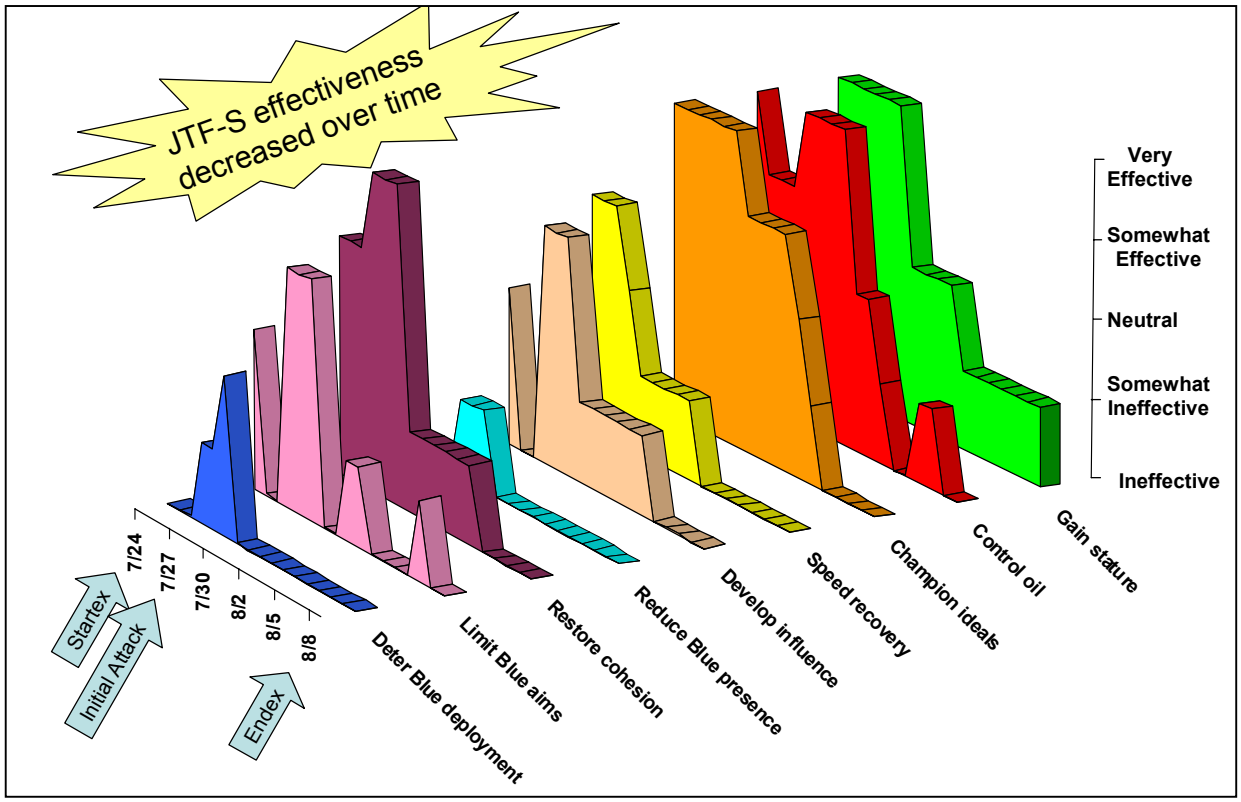


Figure 198: JTF-S effectiveness chart showed that over time the adversaries became less and less effective.

included suicide bombings, assassinations, and threats against regional/world leaders.

Pirate Group. The group was a maritime criminal element that included members of an international crime consortium. The pirates were linked to smuggling, narcotics, and arms trading criminal organizations. Connections were also established with corrupt provincial government officials. Funds generated through these criminal activities were laundered through business elements associates.

Gulf Fisheries Company (Private Company). A small, privately held company that operated within the country of Red and was an affiliate of a larger corporation, Southern Fisheries Corp. The business operated in collusion with corrupt officials within the country of Red's Ministry of Industries. The company also provided money-laundering connections for the pirates and terrorists.

(Charitable Medical) Non-Governmental Organization (NGO). A charitable medical organization based in the region. This NGO provided medical relief to civilians throughout the region. Skilled medical specialists were made available to countries if requested by the government. The organization also took advantage of its trusted position to conduct surreptitious biological operations against Blue and its allies throughout the region.

Militant Religious Group. A militant religious cell dedicated to the welfare of related religious minority groups worldwide. They established an international educational system for their followers throughout the region while their spiritual center was in an ancient city in the country of Red. Ideologically, they were aligned with JTF-S. They had known connections with subversive elements in the terrorist network and the charitable medical NGO and were supported by funds obtained through criminal activity.

Criminal Clan. The criminal group was a large, powerful clan with a criminal history. They controlled a large portion of the southeastern area in the country of Red and neighboring countries. As a part of their operations, they were able to provide a transportation network that was used for arms smuggling, trading, and narcotics trafficking among other criminal activities. They routinely circumvented, challenged, and coerced law enforcement officials in the country of Red and neighboring areas.

OPFOR Campaign Objectives

The OPFOR Campaign Plan was written by the JWFC OPFOR to protect and expand the Red regime. Signed by the CJTF-S, the campaign plan was the basis for actions by the JTF-S forces. However, since the various OPFOR related groups were not under a centralized command and control scheme, they each had their own interests and objectives. In general, these objectives were contrary to Blue's interests but were not always executed in a synchronized fashion. At times, the OPFOR groups would take actions counter to each other's efforts. Given the multi-player scenario, this was not an unusual condition.

Initial stated campaign objectives for JTF-S were finalized during Spiral 3. The objectives were based on the pre-hostilities situation following the earthquake. The achievement of these objectives was founded on strong military and information capabilities with little economic and diplomatic influence. There were seven campaign objectives for the JTF-S, one of which had three components. The first four objectives were the same as for the GOR, but the JTF-S Commander had different interests than those of GOR. During the course of the experiment, the JTF-S commander rated his effectiveness in achieving each national objective. Overall, the JTF-S was prevented from meeting all of its predefined objectives (see figure 26) but did find success in the following unstated objectives:

JTF-S Objectives

- **Preserve the regime - Deter Blue military deployment**
- **Preserve the regime - Limit Blue war aims**
- **Preserve the regime - Restore internal cohesion**
- **Reduce Blue presence in the region**
- **Develop regional influence**
- **Speed economic recovery**
- **Champion ideals in Red**
- **Control western access to oil**
- **Gain Red stature**

- Prevented Blue from free use of the Straits
- Used WME as bait to damage Blue units
- Accepted a fight for the disputed islands in an effort to bloody Blue's forces vs. just peacefully returning the islands as offered by GOR

- Successfully kept the CJTF-S alive until 5 August
- Forces on the mainland were attrited but generally kept intact organizationally
- Fought Blue, absorbed damage, and improved regional status
- Successfully launched first strike against Blue

JTF-S Objective 1: Preserve the regime. The JTF-S focus was to preserve the strength and unity of the country of Red through military strength and regional influence. The three components of this objective were to "deter Blue military deployment", "limit Blue war aims", and to "restore internal cohesion". The JTF-S felt it possible that his military strength would deter Blue from deploying its military, however, when Blue gave him an ultimatum, it became clear to the JTF-S commander that he could not prevent Blue deployment. So he felt it necessary to make a preemptive strike against Blue to help in achieving the second part of this objective, limit Blue war aims. The successes he had with his preemptive strike caused him to increase his rating in all three components of this objective to "neutral", "somewhat effective", and "very effective", respectively. Once Blue started its military campaign against the JTF-S, his rating on deterring deployment fell to "ineffective" throughout the remainder of the experiment. His rating of Blue war aims was also lowered to "ineffective" and remained low through the end of the experiment (some daily military successes temporarily raised the rating to somewhat ineffective). The JTF-S commander tended to be a little more optimistic about restoring internal cohesion. He felt the success of his preemptive strike and the pullback of Blue at WME site 1 helped to raise the morale and cohesion of the people, giving him the confidence to rate this part of the objective as "very effective". Once it became apparent to JTF-S Commander, that Blue was on the ground, he lowered his rating of internal cohesion to "somewhat ineffective". This rating remained at that level until five days before the end of the experiment, when he felt he had lost much of his military capability to oppose Blue.

JTF-S Objective 2: The JTF-S objective was to remove Blue from the region and to declare itself victorious in its ability to reduce Blue presence. Initially, the JTF-S commander believed his military was strong enough to deter and reduce Blue's presence in the region. Once Blue entered the region, he lowered his rating to "ineffective". After his preemptive strike, he had some hope of reducing Blue presence and so raised his rating to "somewhat ineffective". Once Blue started the ground campaign, he no longer had confidence in his ability to reduce Blue presence and therefore lowered his rating back to "ineffective" where it remained through the end of the exercise.

JTF-S Objective 3: Develop regional influence. The JTF-S objective was to establish the GOR and JTF-S as a strong regional power. The JTF-S actions to establish shipping tolls and to control the flow of oil in the region were intended to further its regional strength. Initially, the JTF-S commander believed the earthquake recovery was hindering their ability to develop regional influence. Although he rated this objective as "somewhat ineffective" at the end of Spiral 3, the additional earthquake recovery time at execution led him to believe there was improvement and therefore rated this objective as "neutral" on the first day of execution. The regional sister-state council demarche on the second day of the experiment denouncing the JTF-S actions caused him to feel "ineffective" in his ability to develop regional influence. However, two days later the JTF-S preemptive strike gave him confidence his military successes would aid in developing regional influence. He rated the objective as "somewhat effective" until Blue's air and ground campaign started to limit the JTF-S capabilities.

JTF-S Objective 4: Speed economic recovery. The earthquake had caused considerable damage to infrastructure and economic capabilities. The shipping tolls and control of oil were used to help speed economic recovery, however, future actions were focused primarily on military control and not on economic recovery. Over the course of the experiment, as the JTF-S commander lost capabilities and his ability to speed economic recovery, he lowered his objective rating to "ineffective".

JTF-S Objective 5: Champion ideals in Red. An additional objective for the JTF-S and not the GOR, the JTF-S commander's desire was to further the ideals of Red and to strengthen the importance of Red in the region. The JTF-S commander initially felt "very effective" in championing the ideals of Red. This decreased over time to ineffective as he lost diplomatic, military, and information capabilities.

JTF-S Objective 6: Control western access to oil. An additional objective to the JTF-S and not of the GOR, the JTF-S commander desired to control oil in the region in order to help achieve its other objectives of economic recovery and championing ideals in Red. Initially the JTF-S commander was confident he could very effectively control western access to oil with military and economic capabilities. His preemptive strike encouraged him to continue to control oil in the region, as did the mining and blockage of the canal. Once the canal was re-opened, he began to lower his rating of this objective. This decline continued as he lost military and economic capabilities.

JTF-S Objective 7: Gain Red stature. An additional objective to the JTF-S and not of the GOR, the JTF-S commander desired to gain Red stature in order to strengthen its military and economic powers in the region and the world. He initially believed he had the power and capability to gain stature based on the oil reserves and regional position of Red. However, once the air and ground campaign started to decrease his military capabilities, he began to reduce his rating for this objective. This objective ended the experiment as somewhat ineffective; indicating some hope that Red's strengths would help to gain stature in the future.

Government of Red Objectives

- Preserve the regime
- Reduce Blue presence in the region
- Develop regional influence
- Speed economic recovery

Government of Red. The GOR focus was to gain control of the country of Red and to restore its internal cohesion, without Blue intervention. Their long term objective to gain additional status within the region. The Supreme Leader of Red and his staff defined four national objectives for MC02 execution. These objectives are described below. During the course of the experiment, the GOR rated itself daily on its effectiveness in achieving each national objective. Overall, the GOR maintained its ability to achieve most of its objectives (see figure 27).

GOR Objective 1: Preserve the regime. The GOR focus was to restore the strength and unity of the country of Red through diplomatic and economic intervention. The three components of this objective were to "deter Blue military deployment", "limit Blue war aims", and to "restore internal cohesion." The GOR quickly found it was incapable of achieving the first part of this objective; deter Blue military deployment. On the third day of the experiment, GOR believed Blue had deployed in the country of Red and therefore rated their ability to achieve this objective as ineffective. The GOR did feel somewhat effective or confident that through diplomatic means, they could limit Blue war aims throughout the experiment. In the last week of the experiment, the GOR had proposed a peaceful solution to the island situation and hoped this would deter Blue from using force to take over the islands.

When Blue quit discussions with the GOR, they started to rate their ability to limit Blue war aims as somewhat ineffective. After the island attacks had occurred and Blue began a transition to let the GOR resume control, they raised their rating to very effective in limiting Blue war aims. The third component of this objective, restore internal cohesion, was rated by the GOR as somewhat effective to very effective during the entire experiment. The main concern at the beginning of the experiment was that the JTF-S commander may attempt to permanently take over the southern region. Once Blue deployed in the region and started to attack the JTF-S forces, the GOR was no longer concerned with CJTF-S and therefore raised its rating to very effective in restoring cohesion.

GOR Objective 2: Reduce Blue presence in the region. The GOR desired to keep Blue out of the region and to restore its regional power without Blue intervention. While Blue remained in the region, the GOR would be limited in what actions it could take within the country of Red and the region. At the end of Spiral 3, the GOR knew Blue was already in the region and therefore rated this objective as neutral. This rating continued from the first day of the experiment until the GOR believed Blue had gained access to the country of Red. On the second day of the experiment, the GOR lowered its rating of the objective to somewhat ineffective. Two days later, after the JTF-S

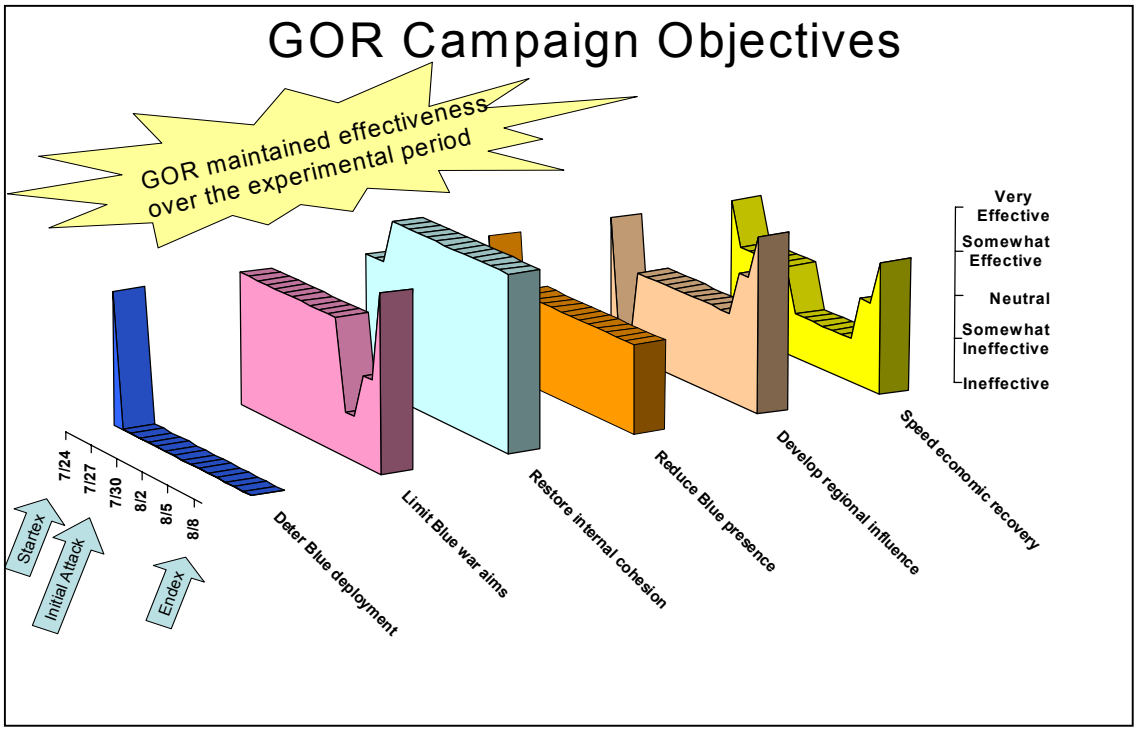


Figure 199: GOR Campaign Objectives

commander had initiated an attack on Blue, the GOR raised its rating to neutral with the belief that JTF-S action would impact Blue's ability to stay in the region. This rating of neutral continued throughout the remainder of the experiment with the belief that GOR could not control Blue's presence in the region.

GOR Objective 3: Develop regional influence. The GOR objective was to establish itself as a strong regional power. Utilizing its regional location as a strength, the GOR desired to gain influence in the region by playing a strong role in the flow of oil. At the beginning of the

experiment, the GOR felt it was capable of developing regional influence through its strong oil reserves. On the second day of the experiment, the GOR lowered its rating on this objective to ineffective as Blue gave an ultimatum to the JTF-S commander. Once the JTF-S commander attacked Blue on the third day, the GOR raised its rating back to neutral with the expectation Blue would not intervene with Red. In addition, GOR began diplomatic talks with Blue that helped to alleviate concerns by the GOR on Blue's long term intentions. Towards the end of the experiment, the GOR had received a letter from the President of the U.S. that indicated the GOR was recognized as a regional influence. In addition, the GOR was successful in negotiating a profitable contract for future oil sales. These two indicators caused the GOR to finish the experiment rating this objective as very effective.

GOR Objective 4: Speed economic recovery. The earthquake had caused considerable damage to infrastructure and economic capabilities. The GOR desired to re-establish its communications and transportation links between the north and south in order to speed economic recovery and to continue to influence the flow of oil in the region. Initially, the GOR felt it was capable of improving economic conditions in the southern region. However, once it appeared Blue would intervene with military action, the GOR lowered its rating to neutral and then to somewhat ineffective as infrastructure damage resulted from Blue military actions. Towards the end of the experiment, the GOR was more positive that Blue would not stay in the region and that economic assistance may come from European countries. By the end of the experiment, the GOR rated this objective as somewhat effective based on the new oil contract and expected assistance.

Terrorists. The terrorist organization was working along with the JTF-S commander to achieve similar goals. Specifically, the terrorist organization was interested in promoting the spiritual ideals and unity of the religious element. The terrorists had three objectives in order to achieve this goal: deny Blue access to the region, attack opposing political and religious organizations, and disrupt Blue operations. The terrorist organization used asymmetric attacks to help achieve their campaign objectives and as can be seen in the figure 28, believed they were somewhat effective in achieving those objectives.

TER Objective 1: Deny Blue access. Throughout the entire experiment, the terrorist organization conducted asymmetric attacks against Blue to deny them access to the region. Although they were not successful in keeping Blue out of the region, they were able to successfully limit Blue's ability to enter the region. Attacks included mining, a small boat bomb against a Blue allied naval vessel, an attack against a U.S. navy oiler in port, the shoot down of a commercial 767 and a military C-5, and the sinking of vessels near the entrance of a strategic canal causing the canal to close for a period of time. Initially, the terrorists felt they were very effective in denying Blue access to the region. As Blue began to establish itself, their rating of this objective decreased to somewhat ineffective. This was temporarily raised to neutral on 3 August with the success of the two aircraft shoot downs, but again lowered to somewhat ineffective two days later. On the last day of the experiment, the terrorist organization attacked targets in the continental U.S. and so felt they still had capability to achieve this objective. The rating at the end of the experiment was somewhat effective.

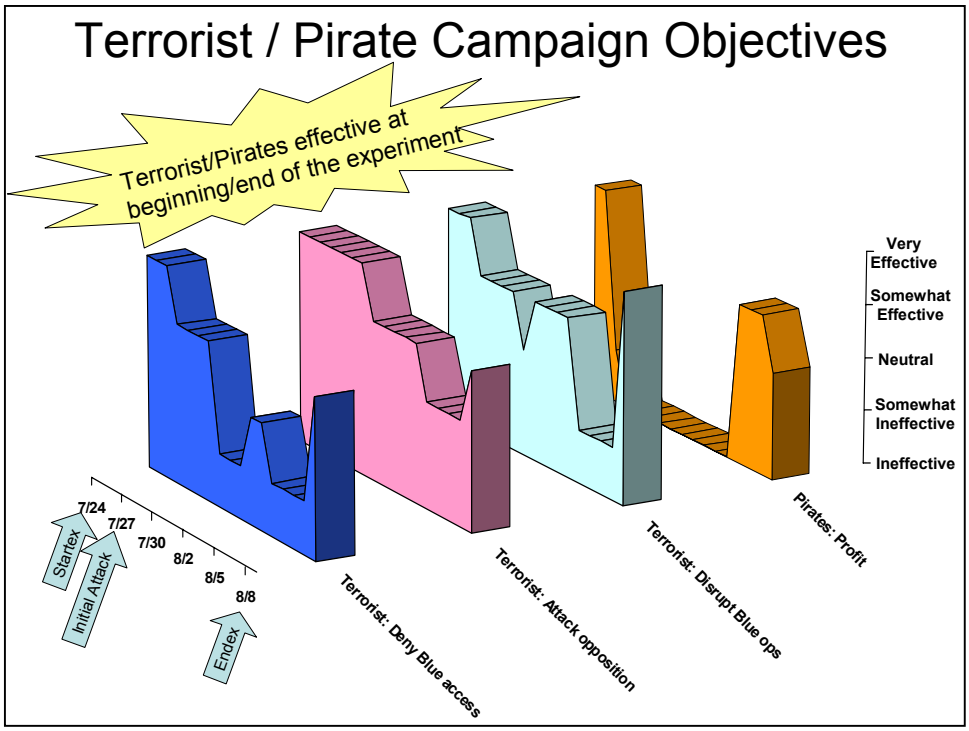


Figure 200: Terrorist/Pirate Campaign Objectives

TER Objective 2: Attack opposing political and religious organizations. The terrorist organization attacked not just Blue, but also other countries that supported Blue and opposed their political and religious beliefs. This included the execution of the Foreign Minister of Purple, the attempted assassination of the President of Purple, the assassination of the Deputy Prime Minister of Green, demonstrations within Purple and Green, a truck bomb at the royal palace in Brown, and personnel attacks in Grey. The terrorists initially rated themselves as very effective in achieving this objective and slowly decreased its rating to neutral as Blue began to attack their organization and to take additional security measures. At the end of the experiment, the terrorists rated themselves as somewhat effective, continuing to believe they had the capability to oppose political and religious organizations.

TER Objective 3: Disrupt Blue operations. The actions to deny Blue access to the region also disrupted Blue operations. Other actions included an attack on water treatment equipment, the scuttling of a ship carrying chlorine and ammonia, drive by shootings, and car bomb attacks. The terrorists felt very effective in disrupting Blue operations, but lowered their rating to somewhat ineffective towards the end of the experiment. On the last day of the experiment, they raised their rating back to very effective as they saw Blue end their military campaign against the JTF-S commander. Blue did not take away their capability to disrupt Blue operations.

Terrorist Objectives

- **Deny Blue access**
- **Attack opposing political and religious organizations**
- **Disrupt Blue operations**

Pirates. The pirates operated in conjunction with the Gulf Fisheries Company with the sole objective of making money. Prior to Blue intervention, the pirates attacked shipping in the region and looted the cargo on the vessels. As shown in the terrorist objectives (above figure), the pirates rated themselves as very effective in making a profit. Once Blue began vessel escorts and had a major presence in the region, opportunities for attacked vessels decreased. The pirates stayed in port, thus rating the objective as ineffective. On 6 August, Blue stopped vessel escorts and focused on the island attacks. The pirates took this as an opportunity to attack vessels waiting for transit. They increased their rating to somewhat effective when Blue

halted vessel escorts. At the end of the experiment, the pirates rated their future ability to make a profit as neutral; believing there would continue to be Blue control over shipping but also believing there would be opportunities to attack shipping.

Charitable Medical NGO. This organization was a religious, fundamentalist aid organization that operated in collusion with anti-western organizations and terrorists to prevent or remove western influence from the region. Their goals were to provide humanitarian assistance to the regional populous and others in times of natural or man-made disasters, support disaster preparedness activities, and to assist in the supply, transportation, and treatment of refugees and victims of man-made or natural disasters. This organization established tent camps on the islands for temporary housing and to provide trauma and medical assistance, established field sanitation centers and water purification facilities, encouraged dedicated religious faithfuls to volunteer as aid workers and to provide funding, equipment, training, and facilities, to these volunteers. They have also been known to provide research on effects of biological, chemical, and radiological systems on the victims of such events and to develop antidotes or treatment modalities to counter or cure the effects of CBR warfare. During the experiment, no objectives were measured for this organization. Even though they played a role in helping the island inhabitants, their role in attacking Blue was limited to information operations and some biological operations against island inhabitants.

Other OPFOR groups. Other groups include a militant, conservative, religious group with an extreme interpretation of religious law. The involved criminal clan was one of seven major criminal clans in the southeastern border area that controlled the coastal area of Red. Their goals were to gain upward mobility for the regional followers in the southern provinces of Red and to use illicit activities to fund social programs. No objectives for any of these additional OPFOR groups were measured.

OPFOR Credibility

OPFOR Credibility. The OPFOR was tasked to be a credible adversary against the Blue force. This required an OPFOR that was aggressive, adaptive, and capable of achieving its own objectives through a variety of diplomatic, information, military, and economic actions. Resources and exercise rules of engagement limited the OPFOR capability. Though the experiment was limited in the robustness of some OPFOR operations, the impact on the actual concept assessments appeared to be minimal. Throughout most of MC02, the OPFOR was successfully able to identify and test failure modes of Blue operational concepts. Success at stressing Blue was measured both as the OPFOR attacked RDO concept vulnerabilities and as the OPFOR responded to Blue actions.

While the experiment ran around the clock, significant military activity was limited to the period between 0900 and 2100 hours. The reduction in hours was a result of limited manpower levels among the components. The OPFOR was allowed to re-position forces at night, but not allowed to execute a major attack. This restricted the OPFOR from conducting 24/7 operations, but had minimal impact on stressing the Blue staff ability to execute the concepts during the scheduled exercise period.

Rules of Engagement (ROE). The exercise ROE placed overall bounds on the type of activities that would be allowed to be played by both Red and Blue. Modifications to the ROE were published by the JECG several times during the experiment.

Operational Limits. The ROE did constrain the OPFOR from using unconventional warfare weapons (IE, no WME play) in order to keep the experiment play within measurable

parameters. Though the ROE limited the OPFOR from using all its weapon capabilities, it did not appear to unduly skew results or hinder the experimental hypothesis.

ROE Updates. As is common during exercises, the ROE was changed twice — early on. These changes brought about some confusion and potentially provided Blue operational advantages.

29 July 2002 ROE update included:

- **"Red forces will not initiate combat but Blue may."**
- **"Red may conduct night [Defensive Counter Air] DCA but not [Offensive Counter Air] OCA."**
- **"Red will not 'stalk' Blue Ships or reposition so that Blue Ships at rest come in range."**

Master Scenario Event List (MSEL). Some of the experimental events were pre-determined and documented into a MSEL. This list helped to direct the OPFOR play, set the conditions to test the experimental hypothesis and achieve the overall objectives. The MSEL was a living document that required numerous injects to be created during the experiment. The injects helped guide the exercise play, while other planned MSEL injects that deviated from experimental objectives were not executed. The MSEL injects allowed for more free play early in the experiment than toward the end. By the end of the experiment the MSEL injects scripted the endgame situation to allow transition operations to be examined and bring some closure to the exercise. Major MSEL injects were adjusted to reflect scenario deviations by either Blue or OPFOR forces. By the end of MC02, 688 MSEL injects were executed.

White Cell. The Joint Experimentation Control Group (JECG) or White Cell served as the experimental control that monitored game play by both Blue and OPFOR, assessed the impacts or effects of various actions, and determined what feedback was provided back to Blue and OPFOR units. Following each significant engagement the White Cell would adjudicate the results to counter experiment artificialities and to ensure the experimental assessment could continue. At times this adjudication resulted in selected forces being reinstated to the playing field on both sides.

Game limitations and artificialities. Certain limitations or artificialities existed during MC02 that required work arounds in the OPFOR to ensure successful game play. These work arounds are common during large-scale exercises. The most significant adjustments included lack of anti-access play, simulating time constraints with the models, determining detection capabilities by the OPFOR, and effects assessment. At the start of MC02, when the simulations were initiated, the first 15 days of Blue, force flow had already arrived in the JOA. This artificiality prevented the OPFOR from fully exercising its anti-access campaign to stem the initial flow of Blue resources into the region. Much later in the exercise, the OPFOR was authorized by the JECG to launch some limited anti-access efforts. The delay was attributed to real-world commitments associated with TRANSCOM's TPFDD processing system.

Free play. The OPFOR was initially allowed a greater degree of free play in its warfighting operations, including being allowed to strike first and to follow-up an initial strike with a second wave. Subsequent to those efforts, OPFOR operations became more directed. These limitations occurred primarily to support the simulation interface for Blue live play operations and to ensure the experiment had an opportunity to explore all the objectives. Two examples are described below.

Live Ship To Objective Maneuver (STOM). During the 30 July STOM attack, Blue had not properly prepared the simulated battlefield before emplacing troops. This resulted in the attacking force being fixed by OPFOR ground elements and subsequently attrited to a combat ineffective state. OPFOR was directed by the JECG to cease its attacks and allow the Blue element to be extracted. The involved Blue forces were then regenerated for future use to support experimental objectives.

Live Airborne Drop. To ensure the live airborne operation could proceed, the JTF Commander required that the battlefield be prepared properly. This required elimination of OPFOR air defense assets along an air corridor and in the vicinity of the objective. The OPFOR was directed by the JECG to position its air defense assets in the area such that they could be destroyed by Blue. Those that were not destroyed were then directed not to engage Blue assets passing through their area. Had this live event not occurred so early in the scenario these actions may not have been required.

As the exercise progressed the OPFOR free play was eventually constrained to the point where the end state was scripted. This scripting ensured a Blue operational victory and established conditions in the exercise for transition operations.

Model Limitations. Generally, the models appeared to operate well from the OPFOR perspective. Most instances of anomalous results were adjudicated by the JECG. Some unusual results were allowed to stand as modeled and resulted in a reduced OPFOR capability. One example was that the Blue models did not always appear to see incoming OPFOR missiles but were still successful in shooting them down. This limitation is considered to have minimal impact on the experimental results.

Organizational Structure for Players. The OPFOR staff consisted of approximately 90 personnel. This reduced intelligence collection, planning, and analysis capability was not equal to the over 350-person Blue JTF. One significant shortcoming faced by OPFOR was the lack of an economic player to help explore Blue's ability to influence the economic element of national power. This ended up not being a serious shortfall in that Blue interagency efforts were more focused on organization than actual scenario play. Maintaining close coordination with the JECG generally compensated for these organizational shortfalls.

OPFOR Persona. The JTF-S commander and the Supreme Leader of the Government of Red were expected by the JECG to play scenario-based personas. A lack of clarity in the definitions of these personas caused some confusion during game play. The JFCOM J9 had developed the leadership backgrounds for these roles and placed it in the ONA. OPFOR leaders with regional expertise were hired to play these roles, but at times were considered by the JECG to have stepped out of their defined roles.

Blue Post-2007 capabilities. Though MC02 was based in a 2007 timeframe, the Blue force played a variety of post-2007 capabilities. OPFOR capabilities were held to the 2007 standard. While this did not have an adverse effect experimentally, it did have the potential to unduly influence exercise play. Most of these post-2007 capabilities were required for service experiments. Some examples of post-2007 capabilities played included DDX land attack

destroyers, SSGN submarines, high speed vessels, an advanced deployable system theater-deliverable acoustic surveillance system, Standard Missile-3 Block 1B, Theater High Altitude Air Defense (THAAD), and airborne laser (ABL). The inclusion of these systems may have given Blue additional operational capabilities for exercise purposes, but it did not hinder the assessment of planning and executing RDO in a 2007 environment.

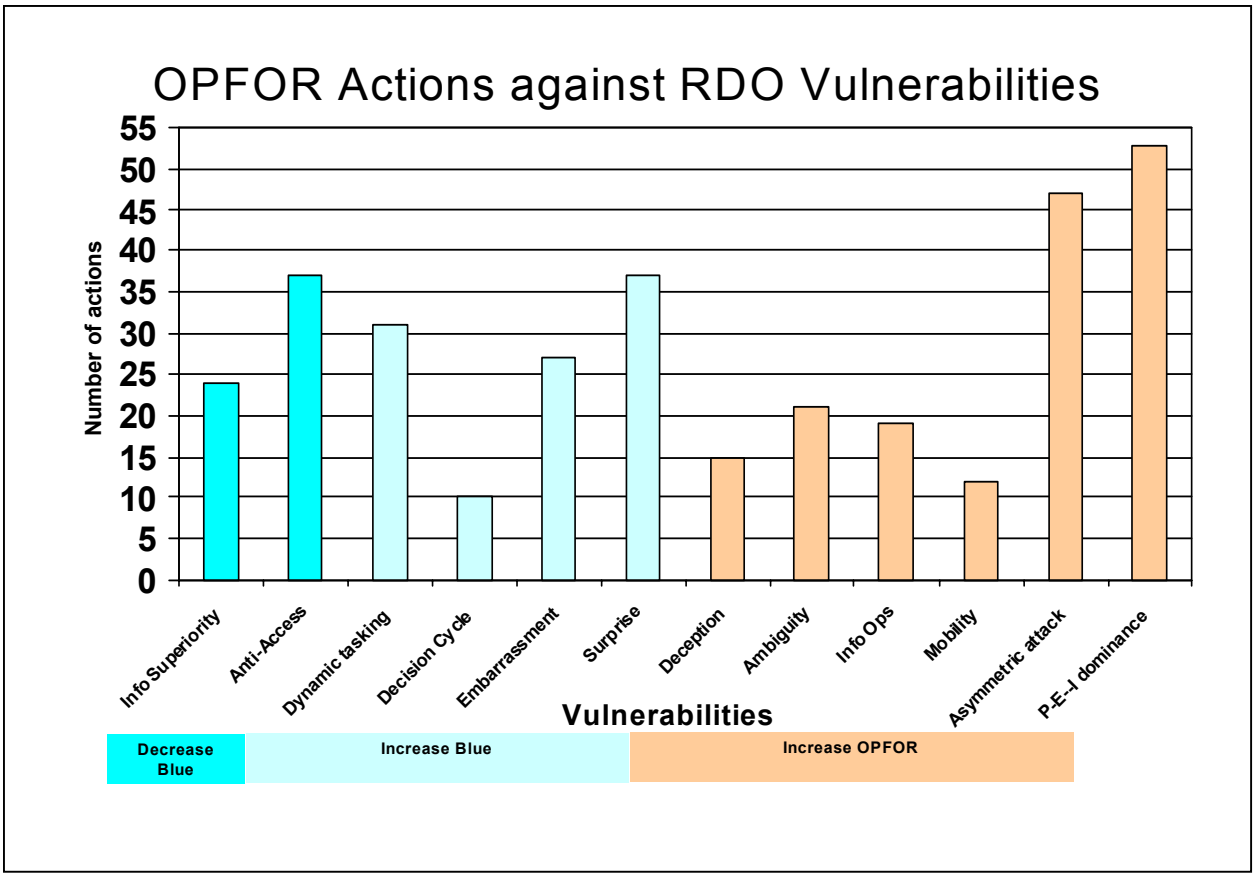


Figure 201: Each RDO Vulnerability was address by multiple OPFOR actions

Real World System Links. Several simulation models were tied to real-world systems. At times this could have hindered the OPFOR ability to employ its systems freely. One example was the limitation on Theater Ballistic Missile (TBM) play. All simulated TBM play was restricted to specific pre-defined time frames so it could be coordinated through the Global Command and Control System at USSPACECOM/NORAD. This methodology has been used since 1996 and was not viewed as a limiting factor by the JFCOM J7 JWFC Support Team.

Blue/Neutral Country Infrastructure. The lack of modeling for Blue and neutral country infrastructure limited OPFOR's ability to directly attack these facilities and disrupt Blue operations throughout of the JOA. Additionally, not including other country systems prevented playing all diplomatic and economic effects of Blue actions.

Simulating Time Constraints. The models did not accurately reflect timelines associated with some actions. Two examples are discussed below.

- OPFOR Communications. The OPFOR was able to maintain communications through non-standard, non-electronic methods such as couriers, face-to-face meetings, smoke, flags, and

religious sermons. Timelines associated with these forms of communications could not be reflected in the game models during MC02, but were approximated by game participants.

- Logistical Resupply. Blue maritime missile resupply timelines were not modeled. These assets faced no capability degradation after firing a full load of missiles.

RDO Vulnerabilities Addressed. The MC02 Joint Experiment Analysis Plan (JEAP) documented two primary assessment tasks that contained 23 warfighting challenges. The first task (contains 12 warfighting challenges) focused on JTF HQ planning processes; none that could be impacted by the OPFOR. The second assessment task (Assess the capability of the experimental RDO concepts to impact JTF actions against a determined 2007 adversary) encompassed the remaining 11 warfighting challenges within the five MC02 objectives. The OPFOR confronted Blue forces in an ambiguous, non-cohesive, and determined manner that stressed the operational concepts by attacking critical RDO vulnerabilities within these 11 warfighting challenges of the five MC02 objectives. The vulnerabilities either decreased Blue's strengths, increased Blue's weaknesses, or increased the OPFOR's ability to hinder Blue. The OPFOR conducted 114 actions that were measured against those RDO vulnerabilities. The figure below shows the distribution of actions that addressed each of the RDO vulnerabilities.

Decrease Blue Information Superiority

One of the premises of RDO and an objective of the MC02 experiment was to establish and maintain information superiority over the adversary. Information superiority is critical to maintaining an accurate ONA and to developing effective and efficient operations. The OPFOR campaign plan addressed actions to gain its own information superiority and to deny information to Blue, thereby attacking this vulnerability. During the experiment, the OPFOR executed 24 actions that were measured to hinder Blue in achieving information superiority. Some significant events were:

Use of satellite windows. The OPFOR observed time windows when satellite coverage was not available and made every attempt to execute movement and firing of missiles during those windows of opportunity. This made it difficult for Blue to initially see or detect incoming missiles while also giving the OPFOR time to hide missile launchers following the attacks.

Movement of WME. The OPFOR moved WME weapons from storage sites to disperse the warheads and to make it difficult for Blue to find and destroy the inventory. This dispersal required Blue to establish information superiority in order to detect the warhead locations. By the conclusion of MC02, not all WME assets had been located by Blue.

Decrease Blue Access. A premise of RDO and MC02 experiment objectives was to assure access into the battlespace to provide sufficient freedom of action. The OPFOR focused its efforts to decrease Blue's access to the battlespace through asymmetric attacks and access denial capabilities. Although Blue access to the region was scripted and conducted prior to STARTEX, the OPFOR still was able to take 37 actions against Blue to limit their access in the region. Some significant events were:

- The OPFOR placed mines in the straits prior to execution and then continued to mine during MC02. This hindered Blue and White shipping that operating in the mined areas and resulted in several ships striking mines. This included mining of a strategic canal, which resulted in temporary blockage and limited access to the straits by the Blue navy.

- Numerous terrorist attacks against Blue hindered access to include fuel contaminations and disruptions, strategic lift aircraft shoot downs, the attack on a Blue oiler in port, and regional attacks on public officials.

Increase Blue Dynamic Tasking. The RDO concept requires Blue to have information superiority on its adversary. This may require Blue to dynamically task its resources to take maximum advantage over the OPFOR's vulnerabilities. OPFOR actions that caused dynamic tasking of Blue resources impacted the operations and knowledge elements of RDO and Blue's ability to achieve MC02 experiment objectives. Dynamic tasking requires integrated planning and execution to effectively accomplish high priority missions. During the experiment, the OPFOR took 31 actions that provided Blue the opportunity to dynamically re-task resources. Some significant events were:

- Swarm boat tactics were employed by JTF-S forces to attack Blue naval vessels and hinder Blue operations when possible. Fast moving boats would attack when the opportunity existed but were vulnerable to Blue air and naval assets.
- Red missile attacks on Blue naval vessels and the country of Green required rapid dynamic tasking of defensive weapons to shoot down the incoming missiles. This action sometimes left Red mobile launchers vulnerable to counter-attack when Blue resources were dynamically re-tasked.

Increase Blue Decision Cycle. The RDO concept requires Blue to think and act faster than its adversary. To be successful, the Blue decision cycle needs to be shorter than the OPFOR. Actions by the OPFOR to hinder or disrupt the Blue decision cycle attack an RDO vulnerability. The decision cycle impacts the operations element of RDO and the ability to accomplish MC02 experiment objectives. During the experiment, the OPFOR took 10 actions against Blue's decision cycle. Some significant events included:

- The OPFOR was able to move ground forces to position themselves to defend against Blue attacks on WME sites. The OPFOR also took advantage of its central position to use interior lines for repositioning forces in country. This action hindered Blue in establishing superior operational maneuver and in positioning joint forces for decisive operations.
- Daily movement of the JTF-S Commander made it difficult for Blue to pinpoint his location and set conditions to attack the OPFOR leadership. This resulted in several attempts to locate the CJTF-S and one unsuccessful attack on the JTF-S command train. That attack resulted in significant damage to a major tunnel and the primary rail lines leading into the southern part of Red.

Increase Blue's Embarrassment. The OPFOR extensively used diplomatic, information, military, and economic actions to embarrass Blue and to dissuade the public from further Blue intervention. OPFOR actions that resulted in embarrassment impacted the operations element of RDO and Blue's ability to achieve MC02 experiment objectives. During the experiment, the OPFOR took 27 actions to embarrass Blue resulting in a credible Information Operations campaign against Blue. Some significant events were:

- The OPFOR publicized the secondary effects of Blue taking out the power grid in one locale to include the accidental release of a fatal chemical gas and the total loss of power in area hospitals, both resulting in extensive loss of life. Though this was a deceptive effort, the information warfare opportunity was exploited.

- The OPFOR maneuvering of troops around WME site #1 resulted in heavy fighting and the eventual withdraw of assets by Blue. The OPFOR used information operations to advertise the success of the JTF-S commander and their ability to stop the Blue military.
- The OPFOR information campaign painted Blue as preventing supplies from reaching the islands resulting in suffering and death. When the JTF-S commander successfully sent a supply boat to the island, he publicized his success at breaching the blockade and providing humanitarian relief to the island inhabitants.

Increase Surprise on Blue. The OPFOR ability to surprise Blue is contrary to Effects-Based Operations and accomplishment of MC02 experiment objectives. With superior knowledge and proper planning, Blue should be able to minimize surprise and be able to more often anticipate OPFOR actions. During the experiment, the OPFOR conducted 37 actions in an attempt to surprise Blue. In some cases, the OPFOR was successful in their actions. Some significant events were:

- The initial air and missile attack on Blue was a total operational level surprise that resulted in the annihilation of Blue naval assets inside of the gulf. This action was taken by the OPFOR in response to the ultimatum that Blue had given the CJTF-S. Additional missile attacks later in the experiment also had some element of surprise, however, were not as successful in reaching their intended targets.
- The small boat attack on the Canadian warship and its success tended to surprise Blue. This action did seem to increase Blue's vessel security and render some future small boat attacks unsuccessful.
- The last air attack by the OPFOR appeared to surprise Blue and may have been based on the opinions that the OPFOR could not repair their airfields to launch the aircraft. Although unsuccessful, with all but one OPFOR aircraft shot down, this was a surprise attack on Blue.

Increase OPFOR Deception. Deception attacks the knowledge element of RDO and hinders the achievement of MC02 experiment objectives. Deception leads to false information in the ONA and may ultimately lead to indecisive operations. The OPFOR use of jamming, camouflage, decoys, and concealment were all taken in an attempt to deceive Blue. During the experiment, 15 OPFOR events were observed that attempted to deceive Blue. Some significant events were:

- The information operations campaign claiming Blue's action to cut electrical power resulted in a chemical release killing thousands. This campaign continued until Blue was able to refute it with evidence to show there was no release of hazardous gas and no deaths from this.
- The OPFOR used decoys with CDCM launchers, convoys, and SA20 emitters. With limited success, the decoys were all destroyed by Blue.
- The OPFOR gave daily orders to reduce the electronic signature of military hardware in an attempt to deceive Blue.

Increase OPFOR Ambiguity. Ambiguity impacts the knowledge element of RDO and the ability of Blue to achieve MC02 Objective 1. Ambiguity adds to the fog of war by placing uncertainty with information superiority and in use of the ONA. The OPFOR took actions to increase ambiguity in not only tactical operations but also in effects assessment. During the

experiment, 21 events were recorded where the OPFOR acted to increase information ambiguity. Some significant events were:

- The relationship between the GOR and the JTF-S commander was ambiguous in that the GOR would tell Blue their desires to rid themselves of the CJTF-S, but then support the CJTF-S when he was successful against Blue.
- The GOR mobilization of forces along the northern border of the southern region was presented to Blue as preparations for taking control of the southern region. However, GOR had indicated some interest in supporting the CJTF-S if Blue did not clarify its intent regarding the disputed islands.
- The relationship between the JTF-S, the Gulf Fisheries Company and the terrorist organization were ambiguous and not clearly defined to hinder Blue in understanding how to attack their command and control.

Increase OPFOR Information operations. The OPFOR conducted an extensive information operations campaign against Blue to impact its operations and ability to achieve MC02 experiment objectives. Through diplomatic and information capabilities, the OPFOR was able to stress Blue capabilities within the JOA. During the experiment, 19 events were recorded where the OPFOR conducted information operations. Some have already been discussed with other RDO vulnerabilities (chemical release, power grid, retreat of Blue at WME #1). Some additional events were:

- The JTF-S media claimed that Blue used WME against them on two occasions. One incident involved reports of Blue troops around public wells with local citizens getting sick afterwards. The second report was related to the chemical release and the claim that Blue has used WME instead.
- The JTF-S media reported that several Blue Special Forces personnel were captured and were to be tried as spies. The media also reported that Blue military forces were raping and murdering citizens as they went through the country and encouraged citizens to resist Blue.

Increase OPFOR Mobility. OPFOR mobility makes it difficult for Blue to maintain information superiority and to target high value assets. OPFOR mobility impacts the knowledge and operations elements of RDO and affects Blue ability to accomplish MC02 experiment objectives. During the experiment, 12 events were recorded where the OPFOR increased its asset mobility. Some significant events were:

- The OPFOR moved assets, C2 nodes, and the CJTF-S nightly to avoid detection by Blue and to stay ahead of Blue in their information superiority. This included movement of TBM assets (actual and decoy), WME warheads, and the senior JTF-S leadership. The OPFOR was able to extend the life of these high value assets and made it difficult for Blue to find and attack time sensitive targets.
- Major military units moved at night to reposition themselves for counter-attack against Blue. The OPFOR was able to move two brigades over 200 km to take up positions near WME sites. This movement occurred without attrition.

Increase OPFOR Asymmetric attack. OPFOR asymmetric attacks disrupted Blue's ability to set the conditions of the JOA, assure unimpeded access to the region, and to carry out effects based operations. Asymmetric attacks negatively impacted the operations element of RDO and MC02 experiment objectives. During the experiment, 47 OPFOR asymmetric events were

recorded against Blue's conduct of RDO. Military attacks included missile shots against Blue and neighboring country assets, however most attacks were terrorist in nature in order to disrupt rear area operations. Some significant events were:

- The explosion aboard a boat near a Navy oiler at a port in Green damaged the Blue vessel and hindered refueling operations for several days.
- The shoot down of a 747 and a C-5 by MANPADS stopped military airlift for a short period as well as limited future operations.
- A biological agent was inserted at a Blue airbase that hindered future operations at the site.

Increase OPFOR DI-E dominance. Blue's overwhelming military capability could not be matched by the OPFOR, so dominance in the diplomatic, information, and economic arenas needed to be achieved to minimize Blue's military usefulness. The OPFOR seemed to divide the D, I, and E up between its components where the GOR conducted most of the diplomatic play while the JTF-S conducted most of the military and information play. There was little economic play by the OPFOR (or Blue) primarily because there was no one on the OPFOR staff that was available to present the economic impacts of Blue actions. It should also be noted that the Blue interagency effort was more focused on organizing efforts than in game participation. During the experiment, 53 OPFOR events were recorded in the diplomatic, information, or economic areas to further OPFOR dominance in those systems. Some significant events were:

- The GOR played the diplomatic realm to limit Blue's attack on the country of Red. In these efforts, it attempted to minimize Blue's destruction of Red infrastructure, was able to negotiate the safe escort of one of JTF-S kilo subs, and was working to negotiate a peaceful settlement of the islands.
- The JTF-S led media did an excellent job in the information realm criticizing Blue for every inappropriate action they took. They used deception and lies to make Blue look bad to the people of Red, regional sister-states and to the world.

Appropriateness of OPFOR Actions to Blue Actions. The RDO white paper portrays the OPFOR as a highly adaptive, forward thinking regional power that has asymmetric capabilities to attack BLUE forces, allies, and interests. To accurately assess RDO and its supporting concepts, the OPFOR must appropriately respond to Blue actions consistent with its capabilities and the scenario. The response must take into account exercise constraints and work-arounds to ensure a credible adversary:

- Timeliness. OPFOR actions were evaluated to ensure they were timely to current events and to the scenario. All 114 actions recorded on the OPFOR were determined to be timely to the experiment.
- Realistic. OPFOR actions must be realistic to the scenario in terms of its culture, doctrine, and capabilities. Maintaining realism during the experiment is essential to ensuring the OPFOR acts as a credible adversary. Each OPFOR action was evaluated by the Threat Impacts Analysis team for realism. OPFOR actions were generally viewed as being realistic for the scenario though there was some confusion over the application of desired personas vs. expected actions as viewed by regional experts.

OPFOR Mandates. With any experiment, the direction of play is controlled by the JECG in order to meet experimental objectives. Sometimes this required the JECG to mandate or limit certain actions by the OPFOR. Examples include the prohibition on the use of chemical weapons

and the pullback of forces against the Blue STOM attack. Mandates were primarily directed through the ROE for both the OPFOR and Blue.

Findings and Recommendations.

Assured Access Play. The assured access play was not exercised by Blue. All TPFDD movements were flowed in an unimpeded fashion between Spiral 3 and MC02. The OPFOR was not able to execute its counter-access strategy until well into the MC02 play. OPFOR anti-access efforts that were played late in MC02 did demonstrate a significant potential impact though most were adjudicated.

Recommendation: Focus future Limited Objective Experiments on the assured access fight to explore how assured access can be constrained and how best to operate when assured access cannot be achieved.

Attrition Fight vs. Focused, Noncontiguous RDO. From the OPFOR view, RDO did not appear to be substantially different from current attrition based operations. For example, the broad frontal preparatory air attacks against OPFOR ground assets seemed to suggest a large coastal landing operation was being prepared. The perception was that entire systems and organizations were destroyed vs. only attacking the assets when and where needed to create the desired effect.

Recommendation: RDO should dominate time and space where needed to accomplish the desired objective.

Blue Deception. It did not appear to the OPFOR that Blue used deception to support its operations. The only potential deception operation observed by the OPFOR was the protracted island negotiations with the Government of Red.

Recommendation: Employ deception operations to mislead OPFOR assets and help achieve desired effects.

Blue IO campaign. There did not appear to be an aggressive Blue IO campaign to gain regional and world support for Blue efforts or to counter the OPFOR's extensive IO efforts.

Recommendation: Use all national elements of power including interagency capabilities to attain campaign objectives.

Blue Mandate to Islands. Blue issued a mandate to military forces on the disputed islands notifying them that they had one chance to surrender. This mandate was received by the OPFOR as a "surrender or die" option. Blue appeared to provide only one opportunity for OPFOR elements to surrender or risk being eliminated. A negative effect may be a force that fights to the bitter end.

Recommendation: Mandates must be thoroughly reviewed for content and intent before being issued.

Blue Predictablity of OPFOR Actions. Throughout MC02, the JTF-S commander was able to seize the initiative and disrupt Blue operations; examples included initial preemptive attack, follow-on attack, and relocation of WME assets. It appeared that the Blue-Red cell in the JTF was almost continuously tied up in IWS sessions and had little opportunity to think ahead of current operations.

Recommendation: The JTF Blue-Red Cell must have adequate opportunity to monitor all Red indicators to more accurately assess what the OPFOR leadership will likely do next.

Commercial Aircraft on Non-standard Routes. Early in MC02, the OPFOR started flying a commercial aircraft throughout the JOA in a reconnaissance role. This aircraft overflew Blue forces, APODS, SPODS, and monitored their activities. It was even successfully landed at a Blue APODS. These activities allowed the OPFOR to collect invaluable intelligence on Blue forces and activities throughout most of MC02. Additionally, these aircraft could have been turned into weapons platforms for direct attack.

Recommendation: Unusual activities by commercial air traffic in the JOA should be investigated for potential enemy activity.

Exercise Classification. The overall classification of the experiment was SECRET. However there were capabilities employed on the Blue side that had higher security classifications. Use of more highly classified capabilities created problems in discussing their effects on the adversary as many personnel were only cleared to the SECRET level. Consideration should be given on the use of such highly classified capabilities in classification-limited exercises such as MC02. If there is a need to exercise these more highly classified capabilities in a future experiment, then the resulting effects should be adjudicated within an appropriately cleared control group. The results should then be published to the Blue and OPFOR commands at the appropriate game classification level.

Recommendation: Either limit actions to that of the exercise classification level or ensure effects on more highly classified actions are adjudicated in an appropritaely cleared control group with representatives from both the Blue and OPFOR sides. Results should then be published at the exercise classification level.

Force Protection vs. Terrorist Actions. The lack of a rear area operational control element made it difficult for Blue to coordinate counter-terrorism operations in its vulnerable rear. The OPFOR terrorist cell felt that it had ready access to target virtually any rear area asset it desired.

Recommendation: Establish a Joint Rear Area Operations Command and Control center with planning assets and security resources to coordinate all rear area security operations in the JOA.

Grey Cell. Experimenting on the use of DIME elements of national power requires determining effects on world opinion. This includes the U.S. populace, world populace, foreign allies, and other foreign governments. The effects Blue and OPFOR actions have on these third party entities should be played in order to fully understand the cause and effect of diplomatic, information, and economic actions. For example, Blue's actions in MC02 resulted in oil price jumps and stock market drops that affected the entire world's economy. The pressures on Blue to resolve the situation would be great and third party actions or injects would add realism to the scenario.

Recommendation: Establish a Grey Cell that acts as an independent group to inject third party effects and reactions to Blue and OPFOR events.

Lack of Blue DI&E Play. Throughout MC02 it did not appear that Blue was able to support play in non-military arenas. The game organization provided for a Government of Red

Cell that was positioned to exercise Blue diplomatic, information, and economic efforts. This cell attempted to inject a variety of non-military events. On multiple occasions Blue was unable to respond to OPFOR diplomatic, information, economic efforts. Another example was that while Blue was trying to locate CJTF-S, no effort was made to take advantage of Government of Red willingness to assist and provide information.

Recommendation: Ensure Blue has sufficient resources available to exercise all elements of national power and can respond in a coherent fashion.

Live Play Impact. The timing of the live force operations drove many of the issues that caused the JECG to limit OPFOR operations. The best example of this was the limited time available to set the battlefield conditions properly for the live airborne drop. Since Blue was not able to eliminate all air defense assets along the air corridor, the OPFOR was directed to reposition its air defense assets such that they could be destroyed. Those that were not destroyed were ordered to be turned off so the airdrop could occur in a benign environment.

Recommendation: Delay integration of live operations until later in the experiment or segregate the live operations such that Blue has sufficient time to prepare the battlefield properly. This would also allow time for non-military D, I, and E elements of national power to be used.

Operational Pauses. Red took advantage of multiple operational pauses to recover and reposition assets for future attacks. This was most apparent following the initial OPFOR attack when OPFOR forces were able to recover their attacking assets, reposition them to prevent their destruction, and attack again two days later. A second example was the relocation of WME assets before Blue could destroy them. While these movements were not totally effective, they did allow some WME assets to be retained through ENDEX.

Recommendation: Ensure OPFOR forces remain off balance without operational pauses that allow for the regeneration of forces or repositioning of critical assets.

OPFOR Attendance at Senior Mentor Groups. The OPFOR senior mentors did not have adequate opportunity or time to present their views on the experiment and concept capabilities. Although the views may be contrary, it is important for the senior mentors to understand what is being observed by the OPFOR leaders and to to discuss possible corrective actions when required. In addition, the After Action Reviews (AAR) should schedule time for the OPFOR senior mentors to present their general plan, intent, and to discuss any issues.

Recommendation: Include all OPFOR senior mentors in the senior mentor in-focus sessions and AARs. Schedule time at the AARs for the OPFOR to present its campaign plan, goals, intent, and recommendations.

OPFOR Control. During MC02, the JECG control over OPFOR actions gradually became more constricting to the point that the end state was scripted from 5-10 August, 2002. This resulted in confusion over the potential impact on experimental results. Such confusion could have been avoided if a clear set of experimental limits were defined prior to execution. Both sides would then have been able to use their STARTEX resources within these constraints to attain their desired objectives. The JECG would then only step in to limit activities that are in violation of the initial constraints or would prevent experimental objectives from being obtained. Player activities would not be directed by the JECG; only constrained to remain within experimental limits. The ultimate victor is not critical to the assessment of key concepts.

Recommendation: Establish a control mechanism that allows more "free play" type activity by both sides with the JECG only limiting player operations to remain within experimental bounds.

OPFOR DI-E Capabilities. The OPFOR IO campaign can often be overlooked in experimentation. However, to fully test Blue DIME capabilities, the MC02 OPFOR posed a credible adversary by establishing an IO campaign against Blue. The OPFOR team all agreed that the resources and attention given to IO helped to make this effort successful. An economic person had been planned for the OPFOR and would have been able to inject economic issues in the game scenario. However, a shift in resource needs prior to execution pulled this person away and severely limited economic play by OPFOR assets. The Government of Red DoD Adaptive Red Team (DART) resources and the Ambassador successfully established a credible adversary in the Diplomatic realm.

Recommendation: Ensure adequate personnel are available to represent all elements of DIME as a part of the OPFOR.

OPFOR Rules of Engagement. OPFOR Rules of Engagement and personas of OPFOR senior leadership were not well defined prior to execution. This resulted in differing views on what was allowable during game play. As a result there were conflicting views between Blue, Red, and the JECG as to what could and could not be executed during the experiment. These conflicts impacted the OPFOR's ability to execute certain planned events (night attacks, anti-access) while also adding artificiality to the game scenario. A second key issue with ROE was the disagreement on the personas of the senior OPFOR leadership. The OPFOR senior players (regional and operational experts) acted in a manner that they felt was consistent with the expectations of a true regional adversary. Their actions and viewpoint were not shared by the Blue and JECG players and were considered inappropriate to the scenario. For example, the JTF-S felt he was forced to conduct an initial attack. It was adjudicated as not realistic.

Recommendation: Hold JECG/OPFOR focus sessions prior to execution to discuss allowable ROE and game play so all players understand the rules coming into the experiment.

Predictability of Blue Actions. The OPFOR was readily able to predict Blue's objectives and apparent campaign plan. As such, critical assets (e.g., CDCM, TBM, and WME) were protected through a combination of decoys and movement. Though not completely successful, the OPFOR was able to retain a sizable portion of each of these assets through ENDEX. Multiple operational pauses and a fairly clear understanding of Blue's intent enhanced this capability. Note that the in-depth understanding the OPFOR players had of Blue doctrine and operations may have driven this result.

Recommendation: Rapid decisive operations must be executed in a manner that does not allow the enemy to have time to readily predict what the next operational objective will be and take preemptive actions. Strikes must be decisive such that Blue is able to achieve what it wants before the OPFOR can respond.

Preparation of the Battlefield. At the beginning of the MC02, simulation Blue forces were initially positioned within range of OPFOR offensive assets. This positioning resulted in a significant vulnerability to initial OPFOR attacks.

Recommendation: Blue must ensure that OPFOR offensive capabilities are neutralized or closely monitored and its forces protected when moving into a JOA during a pre-hostilities period.

Realism of Experimental Play. The experiment was to be based on a year-2007 scenario with capabilities and tactics that would be available to play a realistic scenario against a credible adversary. Many actions, events, and outcomes were played that were not realistic for the timeframe and that may have been counter productive to measuring new concepts. This tended to be exasperated by the desire to have intelligence and operations drive the experiment, not logistics and force planning. Some instances of this include Blue naval and air assets being instantaneously replenished without loss of combat time, using capabilities that are questionable for 2007 deployment, having unlimited bombing and missile capabilties, and no degradation in capabilities when resources were attacked (fuel, airfields, etc).

Recommendation: Ensure adequate, well trained resources are available to the JECG that monitor and adjudicate capabilities and actions to maintain realism within experimental game play.

Synchronization of DIME Actions. An opportunity was lost by Blue to retake the islands diplomatically and avoid a military seizure. Days before Blue assaulted the islands, the Government of Red proposed a solution to remove all JTF-S military forces from the islands peacefully. This proposal was provided to Blue. Had this offer been accepted, the transition process could have been initiated earlier and an island attack avoided.

Recommendation: Blue must take full advantage of all elements of national power to accomplish its objectives.

TST Campaign Effectiveness. The Blue TST campaign attacked over 200 targets throughout MC02. As executed, this effort appeared to have minimal impact on the OPFOR. The OPFOR was not aware of any noticeable impact by this campaign.

Recommendation: TST target lists should be evaluated to ensure that they reflect critical targets that will significantly degrade an enemy's ability to execute the fight.

Use or Lose. The Blue ultimatum forced the OPFOR to focus on the military option of launching the initial attack instead of using other elements of national power. Upon receiving this ultimatum, the OPFOR found itself in a "use or lose situation" against a deploying Blue military force that employed RDO doctrine. The result was an initial preemptive attack designed to send a signal to Blue about its actions in the region.

Recommendation: All elements of national power must be used in a coherent manner to provide an adversary an acceptable option to avoid preemptive military action.

WNN Media Coverage. WNN did not appear to be objective in representing both the Blue and OPFOR views in the experiment. Most of the focus tended to be representative of Blue actions, intentions, and effects. There was not equal reporting on the OPFOR side. WNN was envisioned by the experimental design group to represent both the Blue and OPFOR views on events and actions. Although this initially appeared to be the direction of the media, it became one-sided about half way through the experiment and tended to focus on Blue actions and expected effects. In some cases this caused incorrect reports on effects against the OPFOR (what

was reported as effects was not what was observed by the OPFOR as effects). The WNN focus tended to target a U.S. audience, not a world audience. Had there been a cell that represented third party interests (European nations, regional nations, public opinions), the effects of the WNN broadcasts may have been recognized as counter to blue interests.

Recommendation: Ensure WNN is representative of both sides in an experiment. Consider the possibility of having two opposing news network reports.

Conclusion

The OPFOR acted as a credible adversary by taking actions to attack the vulnerabilities of RDO. Of the 114 actions observed by the assessors, the OPFOR attacked RDO the most with political, information, and economic dominance. The least attacked RDO vulnerability was against Blue's decision cycle.

There are fundamental differences between exercise and experimental play. Exercises should be conducted in a free play environment in order to maximize training opportunities. Experiments require a greater degree of control to direct play towards testing experimental concepts. MC02 had a combination of exercise and experimental objectives that required careful control of the scenario play. Some actions were needed to set the stage for exercise play while resource adjudication was required to experiment on RDO concepts.

The Government of Red was successful in achieving its campaign objectives, while the JTF-S commander was not able to meet his objectives. The GOR was able to retain most of its DIME capabilities though there was some degredation to GOR PMESII systems, particularly involving Infrastructure and Economic systems. The JTF-S DIME and PMESII were degrated across all areas of capability and systems.

Future experiments should provide more time to test DI-E elements of national power in order to fully test RDO concepts and capabilities. The early scheduling of live military exercise operations forced the scenario to develop into a military campaign without fully exploring the D, I, and E elements of national power.

There are some issues with the OPFOR (e.g., ROE, 2007 capabilities, IO, etc.) that are addressed, but that had minimal impact on the ability to examine the RDO concepts.

Annex G — Range Integration Results

Since 1998, DoD has issued a number of policy documents directing Joint Forces Command to find ways to improve distributed joint training. The Joint Warfighting Center (JWFC) demonstrated this concept during MC02, in the form of an integrated multi-Service test and training range network of live force activity on selected Service ranges. The intent was to tie instrumented live force activity into one comprehensive picture shared by each range site and USJFCOM. The main objective of the MC02 range integration effort was to define user requirements for future linking of test and training ranges in support of test, training, and experimentation objectives. This in turn supported the USJFCOM role to "…articulate the joint operational requirements to support the creation of a joint battlespace environment to support training, experimentation and testing."

The specific MC02 exercise objectives considered are:

- Demonstrate potential linkage of Western Ranges to show feasibility for the purposes of joint training and experimentation.
- Demonstrate integration of live and simulated actions in an environment that feeds situational awareness at the operational level.

Joint Forces Command's Joint Warfighting Center and an MC02 Western Range consortium, consisting of participating ranges, pursued the concept development and systems design of a range integration package to demonstrate a Joint Exercise Control Group (JECG) view of the live forces participating in MC02. This effort supported the Commander's Intent that "…the live portion of the event will…demonstrate the ability to link existing ranges within a joint event…"

The instrumented data fusion points at each range delivered participant track data to software gateways. The software gateways, which were developed to standardize the various data formats, fed the data through a computer network to the JTASC, where the live data was fused with the picture from the model federation and COP data derived from the components. This process was designed to provide a seamless "ground truth" picture of the combined live and virtual joint forces participating in the event. This display, available at the JTASC or any other designated site on the network, provided the capability to view live action at any range, with any instrumented participant viewable selectively through a CROP-type display. Additionally, collaboration tools to coordinate range activities were included in the design. The exercise objectives were mapped to required operational capabilities, which were used to generate a system architecture.

The system components fall into three categories:

- Instrumentation (Live Range Sensors) and Testing
- Connectivity (Network Infrastructure)
- Software

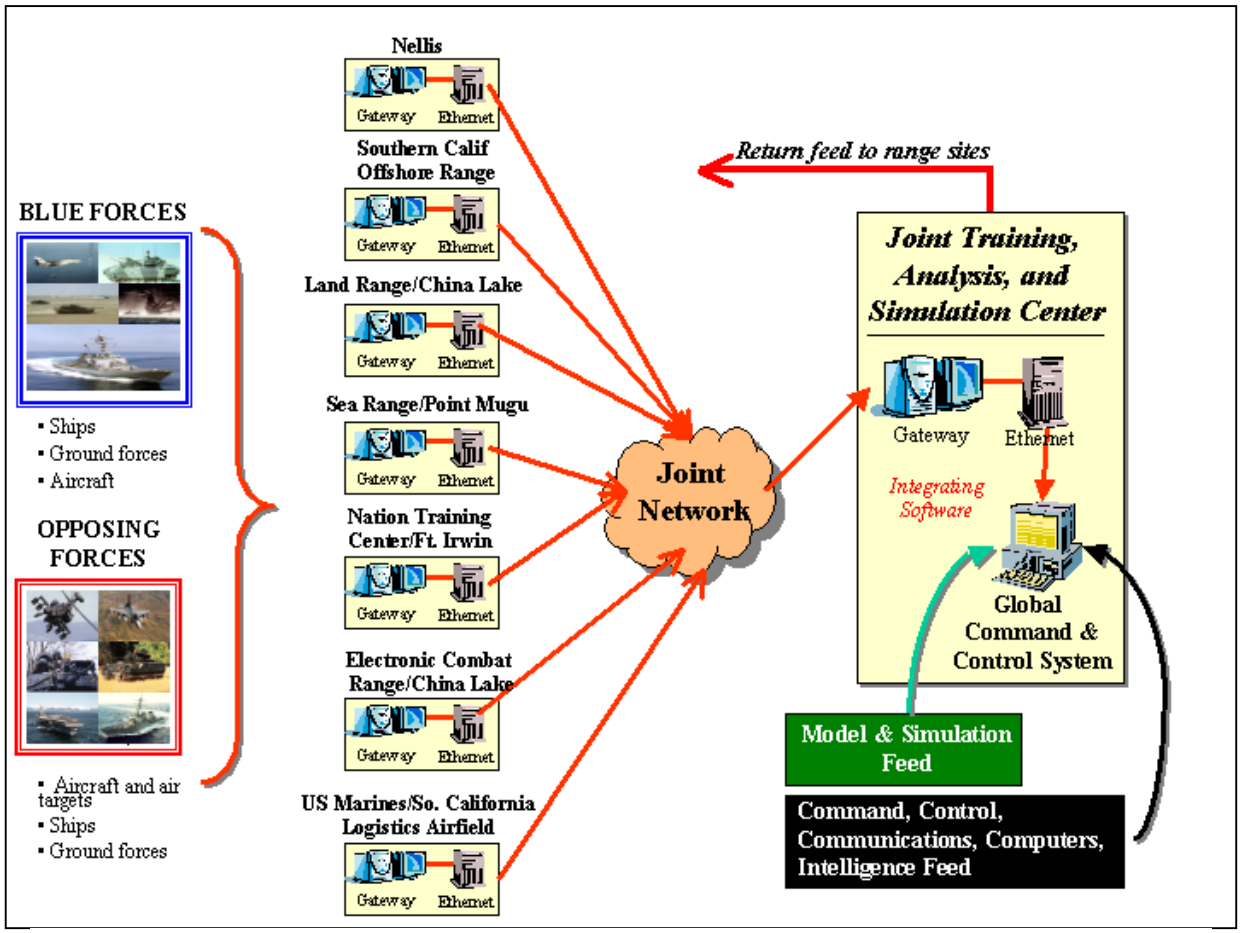


Figure 202: Network connectivity of the Range Integration demonstration during MC02 rehearsals and the final execution. There were actually two parallel networks. The first was provided by DISA –

To the greatest extent possible, the design leverages existing range instrumentation and connectivity capabilities, as well as ongoing efforts at providing data standards and data exchange capabilities. Network connectivity was accomplished by leasing commercial (DISA acquired) T-1 circuits. The circuits came through the Defense Research and Engineering Network (DREN).

This effort provided the following legacy products:

- An initial Integrated Range Capability, with dedicated assets, suitable for reuse during follow-on experimentation and joint training events.
- A proof-of-concept of live and constructive event control, providing the first steps toward a Joint National Training Center (JNTC) capability and the resulting requirements.
- The potential capability to support future joint interoperability testing, training, and experimentation events.
- Insight and lessons learned on requirements and how to engineer more comprehensive live and live/simulated joint force training events and experiments.

Communications is critical to the success of range integration. USJFCOM envisions that in order to properly develop the joint Warfighter, a full integration of modeling & simulation, experimentation, live training, distributed education and test & assessment is required to achieve the expected level of Joint readiness. In order to ensure this capability, a robust, networked data

communications system is required. Test and training ranges provide an impressive array of live and simulated event scenarios to the Warfighter, and therefore are critical in their contribution to a realistic training environment. Fully cognizant of the expense required to establish a networked training communications system, USJFCOM advocates leveraging existing communications or data systems operating outside operational military command and control networks—these include those communications and data systems currently used by the test and training community. By combining existing or emerging networks within the training, research and development, and experimentation community, ranges will be able transmit range data through a high capacity environment and provide services to training and experimentation without interfering with real world, operational networks.

The integration of ranges is vital to the successful development of a joint training program that incorporates the full spectrum of live and virtual systems. Once developed, this system will enhance joint force readiness.

Background and Concept of Operations

MC02 was conducted over four development and integration test spirals and an execution event. The integration and test spirals progressively included more systems and maturity of the respective systems in MC02 and examined progressively greater levels of scenario complexity, integration and interoperability.

The MC02 Range Integration team included participants from the JFCOM J791, NAWC-WD and FI2010. The NAWC-WD staff led the development of the test plan for MC02 range integration and spiral testing. The Live Range integration CONOPS support requirements from the JFCOM analyst community and training After Action Review

There are several views of the Range Integration CONOPS:

- The requirements development, engineering and integration perspective:
- The execution perspective, and:
- The post execution analysis or After Action Review perspective.

Requirements Development and Integration CONOPS

The initial requirements development and integration concept of operations was to have the participating ranges' representatives provide a coherent design, integration and test plan to integrate the respective range sensors and data into a common format for distribution among the range facilities and the JTASC, and supporting coordination of range instrumentation assets from the JTASC MC02 JECG cell. Initial contact was made with JFCOM analyst community, but few analysis requirements were levied on the Live Range Integration effort. This was largely due to relatively less focus on the live activities than on the Joint headquarters activities at the JTASC. Most of the live activities were Service- focused events within the MC02 context. While the role providing a combined cooperative live ground truth and operational sensor perception "picture" on a common system was identified for support to JECG live operations, most of the range integration CONOPS focused on providing an initial proof of concept for range data integration and distribution. The result of this focus was that less dialog and insight was established between the operational participants, the JECG staff and the range integration staff than was desirable. The limited understanding and coordination resulted in a proof of concept that was technically very successful, but severely underused by the event operational control staff and analytic staff. A lesson learned from hindsight here is that the live forces integration requirements and

capabilities followed the "chicken and egg" syndrome. Had the operational staff been more involved in the requirements process, the Range Integration systems would have been used to a greater extent. Moreover, had the range integration staff been more proactive in involving the operations staff, the operations staff would have understood the Range Integration capabilities and may have been more involved. Clearly, more dialog must occur between the event operations staff and the Range Integration providers, and it should occur as frequently as possible.

While the technical capabilities could support range systems control and coordination from the JECG, the execution operations did not occur as anticipated. The JECG did not use these capabilities to any effect — although on balance, the proof of principal was established and these capabilities could be used operationally in the future, given that they are incorporated into the JECG operations.

Execution CONOPS

The execution concept of operations differed the most between the initial expectations and the actual event. Initially, the execution CONOPS was that the ranges would coordinate to provide with the services on schedule and provide instrumentation assets, and "truth data" in the common distribution format. Additionally, the ranges would take advantage of video and other targets of opportunity to provide other data sources to the JTASC JECG. Initially, relatively little emphasis was given to providing "real-time" briefings and to support various visitors and event observers at the JTASC and at other locations. The initial execution CONOPS included provisions to coordinate range systems operations via voice-over-IP (VoIP) capabilities designed into the range integration architecture. The live range data provided to the JTASC was intended to be concurrently merged with live operational sensor data and simulation "truth" data on a common display in the JECG — providing the JECG insight into the live participants' physical position and dynamics "truth" and the operations sensor perceptions of those participants.

As it turned out, relatively few of the actual live participants were instrumented. Data obtained from the instrumented participants was good, but there were significantly fewer participants reported through the range integration network than were actually in the scenarios. This was due to the methods used to instrument the live participants (only one aircraft of a flight may be instrumented, many aircraft (C130, AWACS, Tankers, helicopters, etc.) were never planned to carry instrumentation from the operational concept. The lack of understanding of percentage of instrumented participants (and thus available for range integration reporting) and the affects on the range integration system implementation was due largely to the limited dialog between the range integration staff and the operational planning staffs (issue mentioned above). Also, alternate methods (versus fixed range sensors, aircraft IFF transponders, and participant tracking pods) to obtain cooperative instrumentation on a greater percentage of participants (LINK-16 PPLI reporting, Army forces VMF reporting, etc.) were not investigated in the scope of the MC02 effort. In addition, coverage from fixed range sensors were not comprehensively analyzed against the MC02 operations scenarios. This resulted in some data dropouts for reasons such as terrain masking, and range sensor coverage being significantly less that the entire MC02 live operations geography. This resulted in a difference in operating "philosophy" between the test ranges, assets and the training community operations; where test missions are usually much smaller in scope and much more controlled for participants' routes and maneuvers, while training events are relatively more dynamic and not as subject to rigid geography constraints within general boundaries.

Post Execution and Analysis CONOPS

This phase of the operation held to the initial expectations. There was little operational post event analysis planned other than a "self critique". Consequently, post event Range Integration operations were conducted as expected. During the event, all Range Integration participants kept notes and logs of anomalies, problems, and ideas to improve the process.

Range Integration CONOPS Findings and Recommendations

- Future Joint interoperability events involving live participants and live range integration need early and continuing involvement with analysts and operations staff. This involvement is critical during range integration requirements definition and should be continued during testing to allow the development of a clear understanding of range integration capabilities and how to utilize them during execution.
- Establish clear RI naming conventions and protocols for radio sites, chat program names, and voice communications and chat protocols Not much formality is needed but enough to look professional and emphasize the site and function rather than the person. Remember, its not just the local range anymore.
- Establish and maintain good working relationships with the local sites' communications , networking and security staff – always a good idea. Have these staff names and contact info in the event POC list and available to the range integration staff so that all understand who to call for help when its needed.
- Determine "quick look" measures for analysis of the on-going operations. Put the results of these "quick look" analyses in the daily logs or chat/whiteboard files and also be ready to brief them to analyst staff. Distributed operations always have a flavor of "real time" analysis – this is a big plus for this type of operation.
- During testing phases and execution, use a network chat and/or whiteboard to publish and maintain : 1) the next days plans/schedules, and 2) a running status of any metrics gathered. This allows each distributed site to easily report and provide impromptu briefings and discussions to visitors and to better coordinate among themselves. This also alleviates the need for daily status reports – as the daily status reports are just cut and paste from the running status log. Establish this format before the event. The form for the "next days plans" should migrate to the current day's status on a daily basis – also making status reporting easier. Make this available for manager and other functional staff to access so their understanding of the systems' capabilities and operations are enhanced by direct use to obtain information.
- Coordination with event operations (Air Tasking Order - ATO distribution, land forces operations distribution, maintaining operational entity naming conventions, etc.) is critically important to the range integration operations as this information may be very fluid over the course of the event. This is a key recommendation as this is felt tobe a significant omission from operations in MC02.
- The audio coordination tool was used to good effect but an on-line chat service would have been beneficial (this is similar to chat tools used in other live and simulation events like JCIET, JEFX, etc..). The chat tool provides persistence of the coordination messages, (people don't have to be on audio all the time), provides a "running log" of the operations, and is a convenient way to document anomalies and problems. The chat tool can be very helpful in reconstructing sequences of events and in coordinating actions and operations.

- Establish a POC log and have it distributed to all range integration staff and placed on-line.
- Establish a clear POC responsibility understanding by all participants. Annotate the POC log (phone book) with responsibilities.
- Establish an on-line repository (with at least file transfer protocol – FTP - capabilities) for log files and code distributions.
- Establish a clear daily schedule of preparations and log them: get current ATO, put relevant section on the chat/whiteboard, put any DV time on the whiteboard, discuss / document any changes to the system and fixes made during the night.
- Document any changes to the systems / networks / systems configurations etc. on the chat and whiteboard.

Annex H — Model and Simulation Federation

Preface

The Millennium Challenge 02 (MC02) modeling and simulation (M&S) federation is the largest, most complex High Level Architecture (HLA) federation ever attempted. Technical and operational tests have proven that large HLA events are possible, albeit with difficulty. A dedicated band of developers and users, working in concert over the months of design, development, and testing surmounted the challenges. The purpose of this handbook is to provide a small flavor of the complexity of the federation and an understanding of the functionality of the federation and its component parts. It will also provide an appreciation for the richness and robustness of the virtual battlespace environment.

There are three basic components of the federation. First are the core simulations. These simulations comprise the minimum essential set of simulations required to create a full and robust environment sufficient to meet the experimental objectives of MC02. The second piece consists of the Services' tactical and operational simulations necessary to also satisfy their unique experimental requirements, while still participating within the overall framework of the MC02 battlespace. Finally, there are a set of special-purpose, stand-alone simulations, simulators, and tools, which fulfilled a variety of necessary supporting roles, for both joint and Service experimentation.

This virtual environment will support over 30,000 battlespace entities distributed over 17 operating locations coast-to-coast, including one site afloat on the USS CORONADO, operating off the coast of Southern California.

A bottom-up development process, with Service-input, requirements-driven was used to create the simulation environment The Services selected the best simulations to represent their capabilities; USJFCOM funded the improvements and integration necessary to form the HLA federation. All participating simulations have adopted some changes, which resulted in a significant leave-behind capability to support future Service events. While requirements drove the build process, some ideas were too late to the table; the primary focus was therefore concentrated on the high priority capabilities vital to success of the overall MC02 experiment.

Actual development, including code changes, was completed within a year, while members of the development team (drawn from joint, Service, agency, and industry partners) supported other Service exercises in the process. Over 400 trouble reports were opened and closed during the ensuing year of testing.

The federation provided superb battlespace functionality based on predicted 2007 joint and Service capability. It included similarly enhanced supporting environments for terrain, joint intelligence, surveillance, and reconnaissance (JISR), jamming and communications, logistics, theater ballistic missiles (TBM), and infrastructure. The federation represents an unparallel, cooperative effort by a diverse uniformed, civilian, and industry cross-discipline team that fully supported both the joint and Service experimentation objectives.

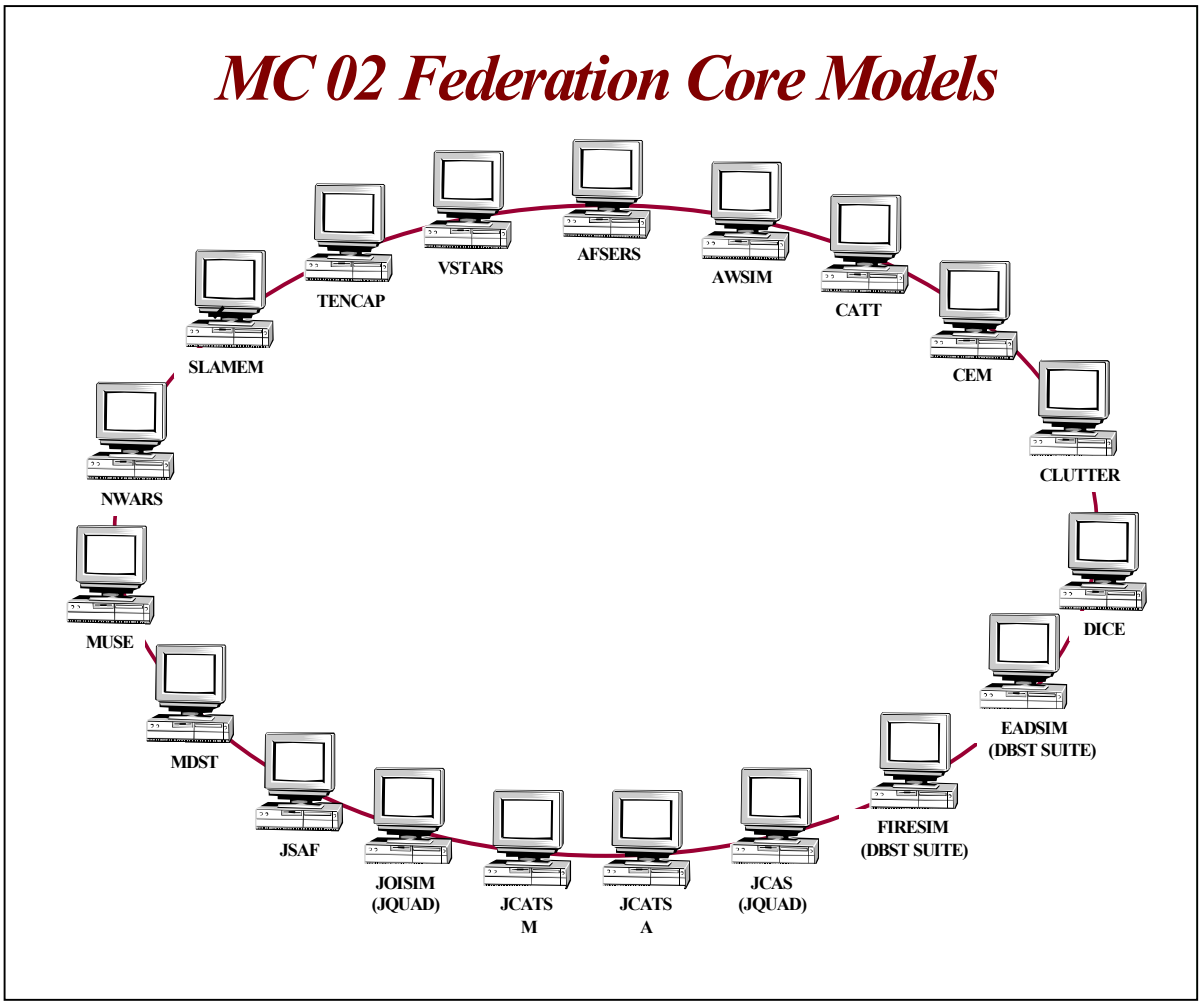


Figure 203: MC02 Federation Core Models

Air Force Synthetic Environment for Reconnaissance and Surveillance (AFSERS)

SPONSOR: Air Force Agency for Modeling and Simulation (AFAMS)

Various sensor packages can be uploaded into the AFSERS simulator, which provides multiple UAV simulations. This is a human in the loop (HIL) simulation, which can produce both video (RS170 format) and Reconnaissance Exploitation Reports (RECCEXREP). RECCEXREP contain information from any air breather flown in AWSIM against JCAS fixed targets, JGG fixed or mobile targets, ships and ASWIM air bases. AFSERS is DIS-compliant. AFSERS is the Air Force specific version of the Multiple UAV Simulation Environment (MUSE). AFSERS Video will be provided to the CAOC floor.

Air Warfare Simulation, AWSIM

SPONSOR: Air Force Agency for Modeling and Simulation (AFAMS)

AWSIM is the official U.S. Air Force theater-level wargaming model. The purpose of AWSIM is to provide a training capability for the air warfare environment. In fulfilling this purpose, AWSIM represents the air component of commander-level battle staff training for Air Force conducted exercises, and the air portion of joint training exercises. AWSIM is an interactive and prescriptive, computer-driven, time-stepped simulation of a theater air warfare

environment. AWSIM is latitude and longitude based and simulates day and night operations, and limited weather conditions over a smooth earth (no terrain). It supports a two-sided scenario where opposing sides define, structure, and control their forces. Modeled features include aircraft, air bases, surface-to-air missiles, short-range air defense systems, ships, and radar sites. AWSIM results include success of individual aircraft missions, munitions consumption, and the systematic playing out of a scenario based on kill algorithms that determine the outcome of many separate aircraft interactions.

C2 Analysis and Targeting Tool (CATT)

SPONSOR: Air Force Information Warfare Center (AFIWC)/453 EWS

CATT is a high fidelity simulation of an Integrated Air Defense System (IADS). It is capable of simulating all levels of the IADS including the Command Control and Communications (C3) centers; Early Warning (EW), Acquisition (ACQ) and Target Tracking (TT) radars; Ground Control Intercept (GCI) and Surface-to-Air Missile (SAM) engagements. CATT's uniqueness is its ability to implement the C2 algorithms of an IADS and to provide operator-in-the-loop capabilities with manned consoles or unmanned operation with synthetic operators. Other features include the capability to provide radar emissions and communications in the DIS/HLA environment for stimulation of ISR sensors. The Air Force Flight Test Center (AFFTC/EW) and the Air Force Information Warfare (AFIWC/453 EWS) Center jointly developed CATT. It is currently undergoing validation by the AFFTC.

Civil Environment Model (CEM)

SPONSOR: U.S. Air Force ESC/CXC

CEM is a model that is being developed as part of the National Air and Space Model (NASM), and was used in MC 02 to produce effects of attack on strategic civil targets and infrastructure. The CEM is the part of JSIMS that simulates the flow of commodities to the battle space. In a typical exercise, Petroleum Oils and Lubricants (POL), electric power (EP), food, water, munitions and communications bandwidth are the commodities modeled. Each commodity has storage, transmission, production, and consumption facilities associated with it.

Clutter/JSAF

SPONSOR: USJFCOM, J9

Clutter provides a large number of entities from a relatively few number of boxes. Three thousand moving entities on a 733Mhz machine with 750Mb ram is normal. Clutter was used to represent civilians, and background military traffic. It’s focus was to confuse sensors and provide background clutter in the simulation for things like collateral damage play and road clogging. Varying types of vehicles available: Blue/Red/Green, military combat and supply, civilian.

Digital Battlestaff Sustainment Trainer (DBST)

SPONSOR: National Simulation Center (NSC)

DBST is a federation of constructive Distributed Interactive Simulations (DIS) and other state-of-the-art-technology that, collectively, simulate military operations. Primary models used in DBST are FIRESIM and EADSIM. It uses information produced by the simulations to stimulate C4ISR systems in a unit's tactical operations center including: GCCS, GCCS-A, MCS, ASAS-RWS, AFATDS, AMDWS, FBCB2, JSWS, UAV, TCSS and IFSAS, BCS, FDS, MCS/P, ADOCS, and FAAD-EO. DBST facilitates battlestaff collective training by requiring the staff to

react to incoming digital information while executing the commander's tactical plan. The targeted training audience is brigade and battalion battlestaffs, including functional command post (CP) training and full CP training. Battlestaffs of higher echelons may also employ DBST to achieve limited training objectives. DBST is a system of systems simulation federation that includes a Ground Maneuver Simulation (JCATS and/or JANUS, SELS), interfaces from simulation to tactical systems (EPIU, ETSIU), a field artillery simulation (FireSim), and an air defense model that incorporates sensors modeling (EADSIM). Because DBST uses standard simulation protocols, HLA/DIS, any of the models in the Federation can link with other simulations using these protocols. The DBST sensors being played in EADSIM can "sense" the presence of other entities from any federate on the simulation LAN. For MC02, DBST stimulated various Army Tactical systems by sensing entities from entities in the MC02 Federation.

Distributed IW Constructive Environment (DICE)

SPONSOR: Air Force Information Warfare Center (AFIWC)/453 EWS

DICE simulates threat integrated air defense system sensors, weapons, and communications. DICE provides an RF environment as input for intelligence collection simulations. It has the capability to provide standoff jamming against threat IADS.

Extended Air Defense Simulation (EADSIM)

SPONSOR: Space and Missile Defense Battle lab.

EADISM was used in the DBST Federation to provide Air Defense models, radars, Fixed Wing Aircraft and various ground and air based sensors. EADSIM is linked to Tactical Simulation Interface Unit (TSIU) to provide C4I messages.

Fire Simulation (FIRESIM)

SPONSOR: Depth and Simultaneous Attack Battlelab (DSABL)

The DBST Federation used FIRESIM to provide high-fidelity field artillery simulation for Red and Blue, including artillery battlefield radar systems. It is linked to the Army Field Artillery Tactical Data System (AFATDS) via Protocol Interface Unit and receives fires from C4I systems, provides feedback and is a primary simulation of the DBST suite.

JQUAD (JCAS and JOISIM)

SPONSOR: USJFCOM Joint Information Operations Center (JIOC)

Joint C2W Attack Simulation (JCAS) simulates and produces bomb damage assessment (BDA) on a wide array of fixed targets using the Joint Munitions Effectiveness Manual (JMEM) data, with the required designated mean point of impact (DMPI) level fidelity. JCAS also uses a point-to-point interface with the Portable Space Model (PSM) +/Nav simulation to simulate both the capabilities and limitations of employing Global Positioning System (GPS)-guided munitions.

Joint Operations Information Simulation (JOISIM) simulates the collection and reporting of intelligence information from various air and space-based sensors. JOISIM produces real-world USMTF intelligence messages, Tactical Information Broadcast Service (TIBS), Tactical Digital Information Link (TADIL), and Tactical Related Applications (TRAP) data. The real-world message formats stimulate real-world C2 systems.

Joint Conflict and Tactical Simulation (JCATS) (A = Army / M = Marines/SOF)

SPONSOR: USJFCOM, Joint Warfighting Center (JWFC), JW500 (M&S)

JCATS is a multi-service, multi-sided, interactive, entity-level, object oriented simulation used by military and security organizations as a tool for joint training, analyses, experimentation, planning and mission rehearsal. Current limits tested up to 25,000 plus entities on configurations as large as 60 workstations. DIS links with VSTARS, CGS, DBST's FIRESIM, EADSIM and TSIU for U.S. Army Tactical C4I and operational information systems.

Joint Semi-Automated Forces (JSAF)

SPONSOR: USJFCOM, J9/Naval Warfare Development Center (NWDC)

Entity-based simulation of military units (all ground / sea / air and some space)

JSAF is a simulation system that generates entity level platforms, interactions, and behaviors in a robust Synthetic Natural Environment. All interactions within the battlespace are resolved at entity level, whether the entity in question is an infantryman, a tank, a ship, an airplane, munitions, a building, a sensor, or terrain modifications like tank ditches. The individual entities are task organized into appropriate units for a given mission and can be controlled as units or individual entities using a simulation interface.

Figure 204: **The Pacific Ocean, Jul. 25, 2002** — Sailors assigned to the Very Shallow Waters Mine Counter Measures Command (VSWMCM) unhook a Battlespace Planning Autonomous Underwater Vehicle (BPAUV) during mine hunting and ocean mapping exercises conducted off the coast of California during the Navy's portion of *Millennium Challenge 2002*. BPAUV is an unmanned underwater survey vehicle and operates without any guide wires or umbilical. Certain mission requirements are inputted and the vehicle follows those instructions. U.S. Navy photo by Photographer's Mate 2nd Class Dawn C. Montgomery. [020725-N-2354M-016] Jul. 25, 2002

Missile Defense Space Warning Tool (MDST)

SPONSOR: Air Force Agency for Modeling and Simulation (AFAMS)

MDST simulates current and future space-based launch detection. It includes the capability to receive threat input messages from external simulations and to generate output messages in operational formats to external sites for exercise purposes.

Multiple Unified Simulation Environment (MUSE)

SPONSOR: Maritime Battle Center – Naval Warfare Development Center (NWDC)

The MUSE/AFSERS model consists of a payload visualization system, air vehicle and datalink simulation, and a configurable ISR ground station surrogate with tactical messaging capability. The visualization system generates synthetic payload scene Electro-Optical (EO), Infrared (IR), Synthetic Aperture Radar (SAR) video and/or imagery of the 3-dimensional battlefield with simulated static and mobile ground, sea and air targets. The Six Degree of Freedom (6-DOF) air vehicle and datalink model simulates the dynamics of the ISR air vehicle and associated sensors controlled by operators at the surrogate or tactical ground station. Tactical Unmanned Aerial Vehicle (TUAV), generates 3D graphics display of unmanned aerial vehicle electro optical sensor output based on multiple data feeds from various simulations. The generated image is exported as video for distribution to other C4ISR systems.

National War Gaming System (NWARS)

SPONSOR: National Reconnaissance Office (NRO)

NWARS simulates the collection, reporting, and dissemination of intelligence from national assets by providing realistic reporting on simulated ground truth. NWARS was developed in 1989 to allow the warfighter to exercise the use of NRO systems without expenditure of valuable, real world resources. It simulates both IMINT and ELINT collection. It can work in either a stand-alone mode or incorporated into RTI or Aggregate Level Simulation Protocol (ALSP) configurations. NWARS operates in a SCIF environment due to the realism maintained through its use of accredited high-fidelity models and accurate orbital data.

Simulation of the Location and Attack of Mobile Enemy Missiles (SLAMEM)

SPONSOR: National Reconnaissance Office (NRO)

SLAMEM is a simulation designed to study C4ISR and attack effectiveness for locating and destroying mobile surface targets. SLAMEM was designed for analysis and can model attributes and interactions of the battle-space: Mobile and stationary targets, geographical features, sensors, and attack platforms. However, for MC02, SLAMEM was used to model a notional 2007 national architecture and simulated the entire Tasking, Collection, Processing, Exploitation, and Dissemination (TCPED) intelligence cycle. SLAMEM operators received tasking from the collection management cell and loaded it into SLAMEM where a NRO developed notional 2007 architecture collected on the MC 02 federation targets. SLAMEM uses classification matrices jointly developed by NRO and NIMA to determine probability of detection and target identification. SLAMEM then generates target identification and geo location messages in USMTF format for dissemination to the end user.

Tactical Exploitation of National Capabilities (TENCAP)

SPONSOR: Army Space Program Office

The TENCAP MUSE simulation system is part of a collaborative effort with the Army and the Air Force to create a virtual Intelligence, Surveillance, and Reconnaissance (ISR) simulation. The Department of Defense uses it for command and staff level training for joint

services and stand-alone Army warfighting exercises. TENCAP MUSE emulates the Army's Tactical Exploitation System (TES) and correspondingly, the model is configured for the ISR system being simulated, air vehicle and data link, and a visualization system used for payload sensor scene generation. TENCAP MUSE can emulate capabilities of systems such as the U2, Global Hawk, P-3, and national systems for use in constructive exercises. The "parent" of TENCAP MUSE is the MUSE, a UAV simulation capability developed by JTC/SIL, Redstone Arsenal. MUSE and TENCAP MUSE emulates virtually every imagery ISR and MTI system the Army receives data from in exercises. The TENCAP MUSE can operate as an embedded or stand-alone ISR system trainer communicating directly with the actual ISR ground system. The simulation can also emulate or feed other service TES-like systems such as the Navy's TES-N and the AF ISR-M, modeling each of the service's inherent ground system capabilities such as mission planning, dynamic re-tasking, imagery exploitation, and dissemination of reports and exploited imagery of the ISR platforms being exercised. The simulation allows exploration of different CONOPs to enhance the capabilities of ISR platforms available to a theater commander. The model uses the service standard National Imagery and Mapping Agency (NIMA) products, such as Digital Terrain Elevation Data (DTED) and Controlled Image Base (CIB) as the primary source data for terrain visualization. The TENCAP MUSE derives target entities from the constructive simulation and translates these entities in its libraries to create a virtual view of the battlefield. While primary emphasis is on ground targets, cooperation between the services is creating a data library including aircraft, fixed structures, and naval vessels.

MC02 Technical Integration Database (MC02 TID):

SPONSOR: USJFCOM, J9

The MC02 Technical Integration Database (TID) is a distributed web-enabled administrative database developed by the Joint Forces Command (JFCOM) Joint Futures Lab (J9) Experimentation Engineering Department (EED) during MC02 to assist with Configuration Management (CM) and development of the MC02 C4I, XC4I and M&S Federation. The Unclassified version of the database is located at URL http://mc02db.je.jfcom.mil. A Classified version of the database was located on the MC02 Experimentation Local Area Network (LAN) and could be accessed remotely by MC02 participants during the experiment. The Core Modules of the database are **Systems, Sites and Points of Contact**. These modules link systems to sites to points of contact for each system and site used during MC02. Additional modules added to the Database are: **Trouble Report Module** provides a collaborative environment for OPFOR testers, C4I, XC4I and M&S Developers, and Systems/Simulation users to identify and document federation development issues/problems; **Change Requests Module** is used by the Configuration Control Group to manage federation changes; **Platforms, Munitions, and Firing Matrix Modules** are used for Enumerations development; **Rules and Workarounds Module** is used by the OPFOR testers to describe Rules and Workarounds for Order of Battle scenario play beyond the capabilities of the federation models: **Personnel and Personnel Groups Modules** are used to capture Joint Manning Document (JMD) personnel information to produce an electronic personnel locator and phone directories.

Virtual Surveillance Target and Attack Radar System JSTARS (VSTARS)

SPONSOR: Air Force C2TIG

The VSTARS workstation "stands in" for the Joint STARS aircraft on the virtual battlefield. It provides the same coverage area and radar model specifications (FOV, Pd, CEP,

etc.) as the real Joint STARS aircraft. The VSTARS workstation provides the virtual ground battle picture by providing Moving Target Indicators (MTI) and Synthetic Aperture Radar (SAR) images (created from DTED database). The VSTARS receives DIS Protocol Data Units (PDUs) over a computer network, processes through the radar model and creates MTI reports. The VSTARS can interface with other nodes through simulated SCDL, NATO-EX protocol, and a limited set of JTIDS messages over a local area network (LAN).

Airborne Laser Simulation (ABL)

SPONSOR: ABL Program Office

The ABL Operator in the Loop (OTL) simulation ran from the Theater Air Command and Control Simulation Facility (TACCSF), Kirtland AFB, NM. The TACCSF at Kirtland, AFB developed the ABL simulator, under the direction and guidance of the ABL System Program Office, there. This simulation combines sensors, reporting technology, and a high-energy laser, and is used in TBM boost phase defense. The simulation accurately represents the weapons class laser (multi-megawatt chemical oxygen, iodine laser - COIL) aboard a modified Boeing 747-400 series freighter aircraft with the capability to destroy ballistic missiles (BMs) shortly after launch. The Boeing 747 ABL platform models laser fuel usage. It is sensitive to cloud deck, target aspect, IR signature, and range. The simulation uses ISAAC model for laser propagation and timelines, models laser fuel usage, contains a data analysis capability, and is sensitive to cloud deck, target aspect, IR signature, and range. The system also adheres to Real-world Datalink (TADIL-J) implementation.

Automated Scriptor Simulator Exercise Trainer (ASSET)

SPONSOR: National Reconnaissance Office (NRO)

ASSET allows an operator in the control group to script friendly and enemy force movement and then simulate Signals Intelligence (SIGINT) and Imagery Intelligence (IMINT) collection against those forces based upon the scenario script. The ASSET system enables users to graphically specify the activity of fictitious military forces and associate intelligence events with them. ASSET transforms intelligence events into messages of a standard protocol and provides chronologically based injections of messages directly into Tactical Data Processors (TDPs) or through the Tactical Related Applications (TRAP) Data Dissemination System (TDDS).

ATLOS

SPONSOR: U.S. Naval Research Laboratory (NRL)

ATLOS simulation uses real-time ocean environment and acoustic propagation to model short & long-range performance of sonar's.

Airborne Warning and Control System (AWACS)

SPONSOR: Theater Air Command and Control Simulation Facility (TACCSF)

The AWACS simulator models all surveillance and control functions of the AWACS. The simulator models the AN/APY-2 radar, in both the pulse doppler (PD) and beyond the horizon (BTH) modes. The AWACS simulator also models the AN/APX-103 IFF interrogation system for Modes 1, 2, 3, and 4. There are 14 multipurpose consoles – Block 30-35 systems. The simulator is TADIL-J data link capable. The Plexsys AWACS Mission Training Center (MTC) resident at the Theater Aerospace Command and Control Simulation Facility (TACCSF), Kirtland AFB, is a 14-console Block 30-35 system identical to training system used by the AWACS operators at Tinker AFB, OK. The AWACS MTC is a warfighter-in-the-loop, virtual simulator that offers a realistic operator interface, simulated TADIL-J datalink implementation with distributed capability, and TADIL-J Theater Missile Defense (TMD) message receive capability. The AWACS fleet maintains simulator currency.

Battle Force Tactical Trainer (BFTT)

SPONSOR: PMS-430

The BFTT system provides simulation-based training support for Navy shipboard personnel. BFTT connects fleet training facilities ashore with ships stationed in various homeports, allowing them to train in a realistic tactical environment on actual shipboard combat systems. It uses distributed network connectivity to provide this simulated environment to ships via the DIS. At each ship, the BFTT shipboard component, Simulator/Stimulator/On-Board Trainer (OBT), serves as an interface between this DIS simulated data and input signals that drive shipboard combat direction and fire control systems. Its functions include system control, problem geometry, tactical data simulation, signal generation, environmental simulation, and performance monitoring/fault localization. The BFTT Operator Processor Console (BOPC) normally provides simulation management for the BFTT system. JSAF provided the primary simulation engine for BFTT during MC02/FBE-J.

The BFTT Simulator/Stimulator/OBT sends and receives a wide range of DIS PDU's. These include standard DIS PDU's (i.e., Entity State, Fire, Detonation, Collision, etc), BFTT specific PDU's (BFTT Chaff, BFTT Jammer Data, etc), and various

Figure 205: The first production A-10A was delivered to Davis-Monthan Air Force Base, Ariz., in October 1975. It was designed specially for the close air support mission and had the ability to combine large military loads, long loiter and wide combat radius, which proved to be vital assets to America and its allies during Operation Desert Storm. In the Gulf War, A-10s, with a mission capable rate of 95.7 percent, flew 8,100 sorties and launched 90 percent of the AGM-65 Maverick missiles. (U.S. Air Force photo

experimental PDU's. Processing these PDU's, the shipboard system can generate simulated radar targets, clutter, and ECM displays for air and surface search radars. It also simulates fire control tracks; Identification Friend or Foe (IFF) simulations for the IFF sections of air and surface search radars; acoustic simulations and signal generation to stimulate hull mounted, towed array, and sonobuoy sonar sensors. Additionally, it simulates helicopter functions, problem environment, and associated tactical functions; simulated effects of fire control functions and weapon firing functions; and simulated communications and ESM signals. As the shipboard user operates controls in the actual equipment, the BFTT shipboard system models the resulting actions and updates the primary simulation of the action via the DIS protocol.

The FBE HLA federation was the primary simulation engine driving the Simulator/Stimulator/OBT during MC02/FBE-J. Because this federation uses the HLA protocol, an HLA-DIS Gateway translated between the two simulation protocols. Federation data flowed via the FBE Ku-band satellite network to each of the BFTT-equipped ships, USS BENFOLD (DDG-65) and USS FITZGERALD (DDG-62). An HLA/DIS gateway was located on both the BENFOLD and FITZGERALD to translate the HLA protocol to DIS. This DIS data then entered the shipboard BFTT network.

Cobra Ball

SPONSOR: U.S. Air Force

The Cobra Ball simulator combines sensor and reporting technologies, which can be applied to Theater Missile Defense (TMD). The advanced sensor is interfaced via DIS to the simulated environment. This sensor system provides sensor detection and tracking data via TIBS to the CAOC. The BIG SAFARI Program Office manages the COBRA BALL simulator.

CV-22

SPONSOR: U.S. Special Operations Command (USSOCOM)

Bell-Textron, Fort Worth, TX, operates the CV-22 virtual simulator. It will fly high fidelity missions in support of special operations forces (SOF), primarily to assist the Blue Force Tracking initiative. The CV-22 is DIS compliant, and is integrated into the larger MC 02 M&S federation via a T-1 to TACCSF in Kirtland AFB, NM. The CV-22 Tactics Development simulator incorporates all unique, specified enhancements over the MV-22. Mission enhancing upgrades include a greatly enhanced survivability suite (More flare and chaff, enhanced infrared and radar jamming capability), terrain following/ terrain avoidance radar, zero visibility approach to a precision TOT landing in a target LZ, Dual digital map, and Near-Real-Time intelligence presentation to the cockpit crew. The incorporation of a flight engineer in the cockpit as an integral crewmember is another CV-22 specific upgrade. Enhanced situational awareness displays allow the crew to penetrate a high threat environment at terrain following altitudes down to 100' AGL in adverse weather. Exercise national asset and simulated broadcast threat inputs and are fed via T-1 line to the aircrew for NRT planning, threat avoidance, and mission execution/re-tasking.

Carrier Weapon Handling System (CWHS) [WARCON]

SPONSOR: U.S. Navy

CWHS models the build-up and transport of weapons within a Nimitz Class aircraft carrier. Like the FDO model, it is a discrete event simulation implemented in Pro-Model. It is

responsible for publishing the state of all individual weapons and for handing over weapons to the FDO model.

Dynamic Communications Environment (DCE)

SPONSOR: Air Force Information Warfare Center (AFIWC)

The DCE system models the communications environment for an experiment or exercise, and interfaces with IWEG to represent the effects of both lethal and non-lethal attacks on the communications infrastructure. DCE maintains a mapping between logical communications networks and the physical infrastructure. The DCE operator monitors "game truth" inputs, and maintains status of the physical communications infrastructure. The IWEG system evaluates the effects on the physical systems when physical attack or non-lethal engagements are detected. The IWEG issues appropriate commands to CATT and/or DICE to alter communications within their logical networks in response to such engagements.

Information Warfare Effects Generator (IWEG)

SPONSOR: U.S. Air force

The IWEG system models the communications environment for an experiment or exercise, and represents the effects of both lethal and non-lethal attacks on the communications infrastructure. IWEG uses a Dynamic Communications Environment (DCE) to maintain a mapping between logical communications networks and the physical infrastructure. IWEG interoperates with CATT, DICE, JQUAD and RJMT via DIS protocols. The DCE operator monitors game truth inputs and maintains a current status of the physical communications infrastructure. When physical attack or non-lethal engagements are detected, the IWEG system evaluates the effects on the physical systems and issues appropriate commands to CATT and/or DICE to alter communications within their logical networks. CATT and DICE react to the network change and RJMT can exploit and report these changes.

Flight Deck Operations (FDO) [WARCON]

SPONSOR: U.S. Navy

FDO represents operations on a Nimitz class flight deck. The model is a discrete event simulation implemented using the commercial Pro Model modeling package. It is federated into the overall WARCON Joint Synthetic Battlespace using the DoD HLA. It receives weapons from and returns weapons to the CWHS. It also launches aircraft, which are created and flown in JSAF, and receives them back when they land.

Integrated Modeling Platform for Advanced Computational Technologies

SPONSOR: Defense Threat Reduction Agency (DTRA)

IMPACT uses weather, terrain database and agent release inputs to model dispersion of the chemical/biological cloud across a geographic area overtime. It incorporates state-of-the-art physics based models to provide estimates of dosage, deposition, and concentration for urban, suburban and rural areas.

LOCAAS Engagement Analysis Program Simulation (LEAPS)

SPONSOR: Naval Undersea Warfare Center, Division Newport RI

LEAPS is a real-time Distributed Interactive Simulation (DIS) system that simulates the operational concept of the LOCAAS weapon system delivered to the threat area via a sub-

launched cannisterized TACMS. LEAPS consist of three major simulation components: 1) Mission Planner, 2) Launcher Interface, and 3) Vehicle Simulation. The Mission Planner (MP) provides the operator with a fast and easy way to plan LOCAAS missions in response to planning requests received from LAWS. It contains maps, threat and tactical overlays, terrain analysis tools, point-and-click interfaces, and 3-D flight preview capability. Within the MP, an automated Mission Generator calculates the recommended dispense location, vehicle formation, search location and pattern, and threat attack priorities. The operator can modify and/or approve the suggested mission. The Mission Planner also doubles as a Target Contact Receiver capable of receiving and displaying LOCAAS target reports and images. The second component, the Launcher Interface (LI), stores the LOCAAS missions sent by the MP and automatically signals carrier missile launches to the third component, the Vehicle Simulation, upon receipt of Indigo Firing Reports from LAWS. The Vehicle Simulation (VSIM) provides real-time simulation and visualization of the carrier missiles and LOCAAS vehicles as they perform their missions on a virtual 3D battlefield. VSIM combines aerodynamics, LADAR seeker functionality, communications, and visual modules to accurately simulate multiple vehicles operating simultaneously in all phases of flight, including carrier missile fly-out, LOCAAS dispense, stabilization, search, redirection, and endgame attack. Of the three LEAPS components, only the Mission Planner requires an operator. With LEAPS, the naval community can explore the utility of future autonomous wide area search munitions such as LOCAAS and explore the tactics, techniques, and procedures required to employ these weapons in the battlefield.

Logistics Simulation (LOGSIM)

SPONSOR: Air Force Agency for Modeling and Simulation (AFAMS)

LOGSIM is a computerized logistics model designed to place realistic constraints on the operations tempo of the Air Warfare Simulation (AWSIM) during computer-assisted exercises (CAX). The United States Air Forces Europe (USAFE) Logistics Directorate conceived LOGSIM for use in Joint Forces Air Component Commander (JFACC) and the Joint Task Force (JTF) training exercises at the Warrior Preparation Center (WPC) in Einsiedlerhof, Germany. LOGSIM was designed using actual Air Force historical data and responds to maintenance requirements during exercises, much like operational Air Force wings, repairing aircraft as critical resources allow. In AWSIM, aircraft break or incur damage and, using LOGSIM, require maintenance and spare parts as in actual flying operations. Mission planners take into account losses and delays due to maintenance. Logistics personnel monitor aircraft and equipment status, including spare part stocks, while providing status reports to their leadership. LOGSIM continually updates a comprehensive set of reports that detail the current maintenance status of AWSIM aircraft and equipment in LOGSIM. LOGSIM can operate in a stand-alone mode allowing use in exercises where AWSIM is not employed. In this mode, LOGSIM retains its original capabilities, but does not actively constrain air operations in an air model. LOGSIM functions primarily as a report generator, but also continues to offer those processes such as aircraft problem identification and equipment failure and repair, which are unique to LOGSIM.

Multi-LINK System Test and Training Tool (MLST3)

SPONSOR: Naval Warfare Development Command (NWDC)

Link System Test and Training Tool (MLST3). The output of the MLST3 provides MIL-STD LINK-11A/B (TADIL B) and LINK-16 (TADIL J) digital outputs. The TADIL input/output is suitable for input/output to a Class II Joint Tactical Information Distribution

System (JTIDS) terminal. The ability to inject simulated representations based on the reporting of live assets over a LINK 16 network is also possible Link data can be transmitted from the simulation to C4I systems over SIPRNET or via serial connection. For FBE-J, LINK-16 will be the primary data link with possible Link-11 from P-3 to TSC. The JSAF simulation will create the Link data. MLST3 injects into the Link 16 network via the FCTC-Pacific CCD-16 to the ADSI system at Nellis Air Force Base. The figure below depicts the complete Link 16 architecture. Navy Link16 data enters into the GCCS-M MTC module at FCTCPAC. The module filters out air tracks prior to CST'ing with other GCCS systems. GCCS-M displays the simulated link picture for C2 purposes and the link track information interfaces with the GCCS-M Track Database for use by other C4I devices (such as LAWS.) The link picture will be an aggregated air and surface picture based on the location of both real and simulated radar assets. All link tracks will display a common Joint Unit (JU) as the originating C2 unit. As discussed, Link data will be produced and injected into the exercise GCCS-M. Live link information will be used by C3F Ships, supporting live flight operations. The simulated Link-16 and live link 16 will be interfaced, so that the experiment audience will see a merged picture consisting of both real and constructive tracks. The Link 16 air and surface picture will be produced and forwarded in an aggregated state to the GCCS-M, representing the forwarding of a Link 16 air and surface picture from constructively simulated Link units. The operational or experimental staff assigned JU identification numbers to all units. Additionally, all constructively generated simulation units were marked with an easily identifiable set of IFF codes (provided via the experiment ATO). C3F provided the codes so that the simulated units were easily identified on GCCS-M. Specific track block numbers were assigned to the simulated Jus IAW the OPTASK LINK.

Ocean Atmosphere Space Environmental Services (OASES)

SPONSOR: Defense Modeling and Simulation Office (DMSO)

OASES distributes 4D meteorological state data, to include clouds, wind, air and ocean temperatures, sea state, salinity, and currents to the HLA federation. OASES is an HLA federate that consists of a suite of applications for creating and updating run-time objects that encapsulate the state of the ocean, atmosphere and space environments. Five separate applications comprise the OASES system.

Environmental Data Ingestor (EDI)

The EDI imports environment forecast and now-cast data provided in either the World Meteorological Organization (WMO) Gridded Binary (GRIB) format or the Synthetic Environment Data Representation and Interchange Specification (SEDRIS) transmittal format, as generated by a numerical atmosphere, ocean or space model. The EDI converts the input model data to the common geodetic coordinate system used internally by OASES, standardizes the units of the data, and stores the data in a run-time-optimized format that is used by all of the OASES applications.

Environmental Data Transformer (EDT)

The EDT uses a configurable and extensible set of transformation algorithms to augment an existing OASES database with the derived environmental parameters required by client simulations, but not provided directly by a numerical ocean, atmosphere or space model. The EDT supports chaining of transformation algorithms such that the outputs of one transformation may be the inputs to another transformation within the same program execution.

Environmental Tailoring System (ETS)

The ETS is a GUI-based application for editing the contents of an OASES database. The ETS provides two editing algorithms: 1) replacement at a point with Gaussian spatial and temporal blending, and 2) the Pressure Field Modification (PFM) algorithm for editing atmospheric environments while preserving correlation between temperature, pressure, wind and relative humidity.

Personal Computer - Shallow Water Acoustic Toolkit (PC-SWAT)

SPONSOR: Naval Warfare Development Command (NWDC)

PC-SWAT uses real-time ocean environment and acoustic propagation to model short and long-range performance of sonar.

Portable Space Model Enhanced/Navigation (PSM+/NAV)

SPONSOR: U.S. Air Force

PSM+/NAV links through point-to-point interface with the JCAS portion JQUAD. PSM+/NAV will inject simulated GPS data into the impact location, if GPS-guided munitions are launched in AWSIM. PSM+/NAV constellation status, exercise weather, space environment, and jamming events. PSM+/NAV data is based on the Satellite-Based Navigation Accuracy Performance Model (SNAPM) GPS model augmented with Total Atmosphere-Ocean -Space Services (TAOS) weather and space environment information.

Rivet Joint Mission Trainer (RJMT)

SPONSOR: U.S. Air Force

RJMT will provide a high fidelity ground trainer for RC-135 RIVET JOINT reconnaissance compartment personnel, using aircraft hardware and software. The trainer will be equipped with signal generators to create and display a full range of radar and communications signals to the reconnaissance crew. A complex, synchronized signal environment is presented to the crew, permitting coordination and exploitation of these signals. The trainer is equipped with Link-11, Link-16, and TIBS data links to train aircrew to effectively interact with other battle management assets. The trainer is Distributed Interactive Simulation-capable, permitting RIVET JOINT participation in large-scale exercises such as MC02.

Simulation C4I Interchange Module for Plans, Logistics, & Exercises (SIMPLE)

SPONSOR: Space and Missile Defense Battle lab

The MC02 DBST architecture uses the Sim-C4I Interchange Module for Plans, Logistics & Exercises (SIMPLE) to provide database synchronization between the tactical digital systems and the DBST federate simulations. SIMPLE provides the unit level logistics roll-up and provides the JVMF logistics message threads to CSSCS and FBCB2. SIMPLE also provides K05.1 Position Reports for Blue SA to the MCS and FBCB2. The SIMPLE operator can manually inject other JVMF messages. SIMPLE also replicates J-STARS sensors and provides moving target indicator (MTI) data feeds directly to the J-STARS Common Ground Station.

Unattended MASINT Sensor (UMS)

SPONSOR: Air Force Technical Application Center (AFTAC)

Steel Rattler and Steel Eagle unattended ground sensors are simulated by UMS. UMS is capable of discriminating specific types of ground vehicles, and is useable at any depth within an area of operations. It is adaptable, even after deployment, to new intelligence collection requirements and tasking. The UMS simulation is DIS compliant and was used to support time-critical targeting. UMS output was distributed onto the TIBS network via STU III dial-up to the TIU/PC located at the AFC2TIG, Hurlburt Field, FL. The UMS model was located at the AFC2TIG.

Virtual Submarine (VSSGN)

SPONSOR: Naval Undersea Warfare Center, Newport, RI

The virtual SSGN functioned as a sensor, mensuration, and fires node in support of the Joint Digital Fires Network.. It was used to explore and support submarine provided preplanned and time critical Joint Fires during rapid decisive operations. The Warfare System Presentation Facility (WSPF), located at the Naval Undersea Warfare Center, Newport Rhode Island, developed vSSGN. A Modernized Trident Control Room (CR), Navigation Center (NC), and Missile Control Center (MCC) mock up was created there. It was equipped with a range of tactical system capabilities, and manned by a military crew of approximately 10 submarine-qualified officers and enlisted men.

The vSSGN functioned as a stealthy and survivable close-in force provider of land attack weapons, including Tomahawk (TLAM), Tactical Tomahawk (TTLAM), Advanced Land Attack Missile (ALAM), and LOCAAS. Networked with the Joint Task Force, it had the capability to survey the land battle space using UAV's, precisely locate targets, conduct preplanned and time critical attacks against designated targets, conduct battle damage assessment and restrike as directed/required.

The VSSGN crew has the following tactical information system capabilities: LAWS, GCCS-M, GISRC, RPM, PC-MDS, TTWCS, IKA, Electronic Officer of the Deck Log, Virginia Onboard Team Trainer (OBTT). Additionally, emulation of expected vSSGN communication capabilities (notional combination of Multifunction Buoyant Cable Antenna, SubHDR, Ku-band Common Data Link, Global Broadcast System) were implemented using a Packeteer network management capability and appropriate profiles to configure the connection speed and message passing.

The vSSGN used the interfaces inherent in the provided systems. One notable exception was the unique Tomahawk route message generated by the vSSGN, which includes both over-water and over-land waypoints. The uniqueness is in the fact that the vSSGN is providing it, and how it is processed in LAWS and in the JSAF simulation and not in the message format itself. The vSSGN entity simulation was linked to the JSAF simulation through the NWDC HLA/DIS gateway and connected to the FBE Architecture through an encrypted SDREN network link.

Weapons Analysis Lethality Toolset (WALTS)

SPONSOR: Defense Threat Reduction Agency (DTRA)

WALTS is a HLA federate that models damage of weapons impacts based on government-defined munitions models using physics-based calculations. It consists of two components: the Virtual Interactive Target (VIT) and the Attribute Server. The Virtual Interactive Target, or WALTS Physics Engine, provides a physics-based simulation of weapons effects, by calculating structural damage to targets and weapons of mass destruction (WMD) expulsion. These effects are passed to the CUSP simulation for downwind propagation. The

Attribute Server provides the HLA interface to the VIT module. The module receives weapons impact data from weapon fly-out simulations (i.e. JSAF), and publishes WALTS results to the federation. WALTS-VIT runs on a Silicon Graphics Octane computer with a 300 MHz IP30 processor and at least 640 MB of RAM. The WALTS Attribute Server runs on an Intelx86 platform with 800mhz processor, with 512MB memory and an OpenGL accelerator graphic card w/ 32MB on board memory. During FBE-J, WALTS interacted primarily with OASES, CUSP, and JSAF. In a typical scenario, OASES published weather information, while JSAF published entity information. CUSP subscribes to weather information and any entity information with regards to sensor objects. JSAF also publishes munitions detonation information, which WALTS subscribes to with regards to targets that it is modeling. WALTS then publishes agent release information. CUSP subscribes to this agent release information, and upon receiving an agent release interaction, begins to model the dispersion of the agent. When a consumer exists, CUSP will provide updates for sensor models, 2D and 3D visualization.

Tools & Stand-Alone Models:
C4I Gateway (C4IGW)

SPONSOR: Naval Warfare Development Command (NWDC)

The C4I Gateway acts as a communication gateway between JSAF and multiple C4I systems via USMTF and OTH Gold message formats. It provides two-way communication through direct TCP/IP socket connections and via email, allowing JSAF to stimulate real C4I systems such as LAWS and GCCS-M, as well as allowing these systems in turn to stimulate JSAF entities to perform actions directed by the C4I systems. The C4I gateway is a JSAF-based application that interfaces JSAF with real-world C4I systems using USMTF and OTH Gold formatted messages. It simulates the function of reporting units entering reports into the GCCS-M C4I system. It establishes a two-way interface with the LAWS weapon-target pairing tool, simulates reporting unit functions for injection of mine detection and neutralization MCMREP reports into MEDAL, and simulates reporting unit functions for dissemination of TACELINT reports. To interface with these systems, C4IGW produces USMTF and OTH Gold format messages, such as Extended Contact Reports (XCTC), INDIGO FIRING REPORTS, and TACELINT reports. The C4I Gateway communicates with JSAF via a TCP/IP connection to a JSAF Proxy machine.

The JSAF Proxy machine contains “Headquarters” emulating entities, which act as a communications conduit for C4I messaging. Other Blue JSAF entities communicate over simulated radio communications with the headquarters entities within the JSAF simulation. The JSAF Proxy then forwards these radio messages to the C4I Gateway for injection into real-world C4I systems. Asset tasking into the C4I Gateway follows a similar path where the C4I Gateway injects the message into the JSAF Proxy and the simulated headquarters unit transmits the message to the intended recipient over simulated radio communications. The C4I Gateway communicates with GCCS-M via TCP/IP, and with LAWS via SMTP. Each Blue surface and subsurface entity issues a XCTC report reflecting that unit’s position. XCTC reports update friendly/Blue surface, subsurface, and tactical Tomahawk unit positions in GCCS-M. The TACELINT reports are generated based on simulated flight paths and sensors of reconnaissance aircraft, such as the EP-3E. TACELINT reports are injected into the Tactical Data Dissemination System (TDDS) broadcast and Tactical Information Broadcast Service (TIBS) or sent directly to GCCS-M via socket connections.

Chicken Little-Global Positioning System (CL-GPS)

SPONSOR: U.S. Air Force

CL-GPS is a PC used to convert GPS position data from Nellis Range vehicles into DIS entity state PDUs that can be used by VSTARS and AFSERS UAV simulations to detect vehicles on Nellis Range complex.

Compact Terrain Data Base (CTDB)

SPONSOR: USJFCOM J9

In simulation federations, a number of players such as JSAF use CTDB data that is typically a polygonal terrain surface and is constructed in a real world (curved earth) spatial reference frame (SRF). In MC02 a critical federation member is JCATS, which typically uses a surface derived from bilinear interpolation of gridded elevation data in augmented UTM space. In order to achieve high levels of correlation, a series of developments in both the terrain database production process and in the simulation environment were required. A set of data products integrating the requirements for JCATS and CTDB correlation were produced, a regularly triangulated terrain surface for the CTDB and a series of elevation posts in the same SRF for JCATS, and near perfect terrain correlation was achieved. Special methodologies were developed to ensure that the representation of features in both data sets were as consistent as possible, further enhancing interoperability. The special terrain was integrated with the larger CTDB for the entire MC02 play box. A seamless database with its special high correlation insert became the foundational data product for the federation. A series of surrogate DTED data was produced from the combined terrain surface. This process ensured that terrain representation was consistent across participants, and that users outside of JCATS and JSAF remain highly correlated.

Digital Collection, Analysis, and Review System (DCARS)

SPONSOR: U.S. Army Electronic Proving Ground

DCARS is a collection, fusion, and delivery system of data coming from simulations, C4I systems, and live systems. Its purpose is to provide near real-time availability of data from target systems and analysis tools to compare and/or analyze them. Capabilities include normalizing data, graphical and textual displays, and database ready files. DCARS roles include exercise/event STARTEX condition confirmation, in process reviews, incident analysis, and post event analysis.

High Level Architecture / Distributed Interactive Simulation Gateway

SPONSOR: Defense Modeling and Simulation Office (DMSO)

HLA is a standard framework that supports simulations composed of different simulation components. Traditional simulation models often lack two desirable properties, reusability and interoperability. The HLA provides a common high level simulation architecture to facilitate the interoperability of all types of models and simulations among themselves and with C4I systems. The Main Purpose of HLA is to provide interoperability between systems for the reuse of existing simulations. HLA is composed of three parts: HLA Rules, an HLA Interface, and the Object Model Template. DIS Gateway - A federate that provides an interface to DIS simulation components, especially interfaces to C4I systems such as MLST3.

HLA RESULTS

SPONSOR: USJFCOM, J9

HLA is a federation data collection, playback, and analysis system for the High Level Architecture (HLA). Further, it is a comprehensive data management system used to collect, store and understand federation data. It provides all the functionality included in the standard HLA Data Collection Tool (DCT), plus interfaces to additional database vendors and playback support. HLA provides a very comprehensive playback capability for the federation. It can create playback tracks that contain only the data wanted to support integration testing, analysis, and demonstrations. HLA easily switches between tracks that cover the periods, data types, and data with specific values needed to support the playback requirements. It is also designed to offer federation analysis during execution, and provides for a complete analysis capability.

Joint Medical Semi Automated Forces (JMEDSAF)

SPONSOR: Space and Naval Warfare Systems Command (SPAWAR) / USJFCOM, J9

The Joint Medical Operations-Telemedicine (JMO-T) ACTD has enhanced the Joint Semi Automated Forces (JSAF) simulation environment to include medical capabilities for a medical mission planning and rehearsal capability. It is also referred to as JMEDSAF. A comprehensive representation of Army, Air Force, Marine, and Navy medical treatment behaviors, it provides medical mission planning and rehearsal capabilities. It works at the Component/Joint Task Force/CC level. Specific capabilities developed include:

Medical entities: hospital ships, a variety of medical treatment facilities, host nation facilities, refugee/IDP camps, ambulances, helicopters, and individuals capable of being wounded or sick.

Medical behaviors: combat injuries based on weapon/casualty type pairings and defined medical patient codes, disease and non-battle injuries determined on percentage of population at risk, medical facilities with staff, equipment, holding capacities, and evacuation assets. Casualty evacuation based on patient condition, time to treat, and nearest facility with the appropriate assets.

Medical C2 reporting: a medical C2 message interface to the medical command and control systems –Naval Medical Watchboard (NMW) and Medical Disease Surveillance System (MDSS). These systems use the simulation data to provide Annex Q reports (medical reports section of an OP Order), disease trend analysis, and detailed patient information.

JMEDSAF has been previously demonstrated at Kernel Blitz '99 in conjunction with the Enhanced Littoral Battlefield (ELB) ACTD (April 1999), in the Pacific Warrior Exercise CPX (November 1999), in Cobra Gold 2000 (May 2000), Cobra Gold 2001 (May 2001), and Cobra Gold 2002 (May 2002).

Multi-Host Automation Remote Control & Instrumentation (MARCI)

SPONSOR: USJFCOM J9

MARCI is a highly automated system that uses a graphical user interface tool to manage distributed simulation systems and resources, and enhance technical support capabilities. The application allows non-technical operators to run and execute distributed simulations systems with minimal technical support. MARCI starts and stops multiple applications automatically, queries federates, and collects and records event data. Key features of MARCI include the ability to start multiple applications on multiple computers at multiple sites across the country from a single location, and to monitor the status of each of those applications and computers. MARCI

communicates with each machine across a Local Area Network (LAN) or Wide Area Network (WAN), and is able to monitor network connectivity. Starting the software from a centralized location guarantees the correct software and parameters are being used. MARCI provides the ability to pause, save, resume, and restore the entire federation.

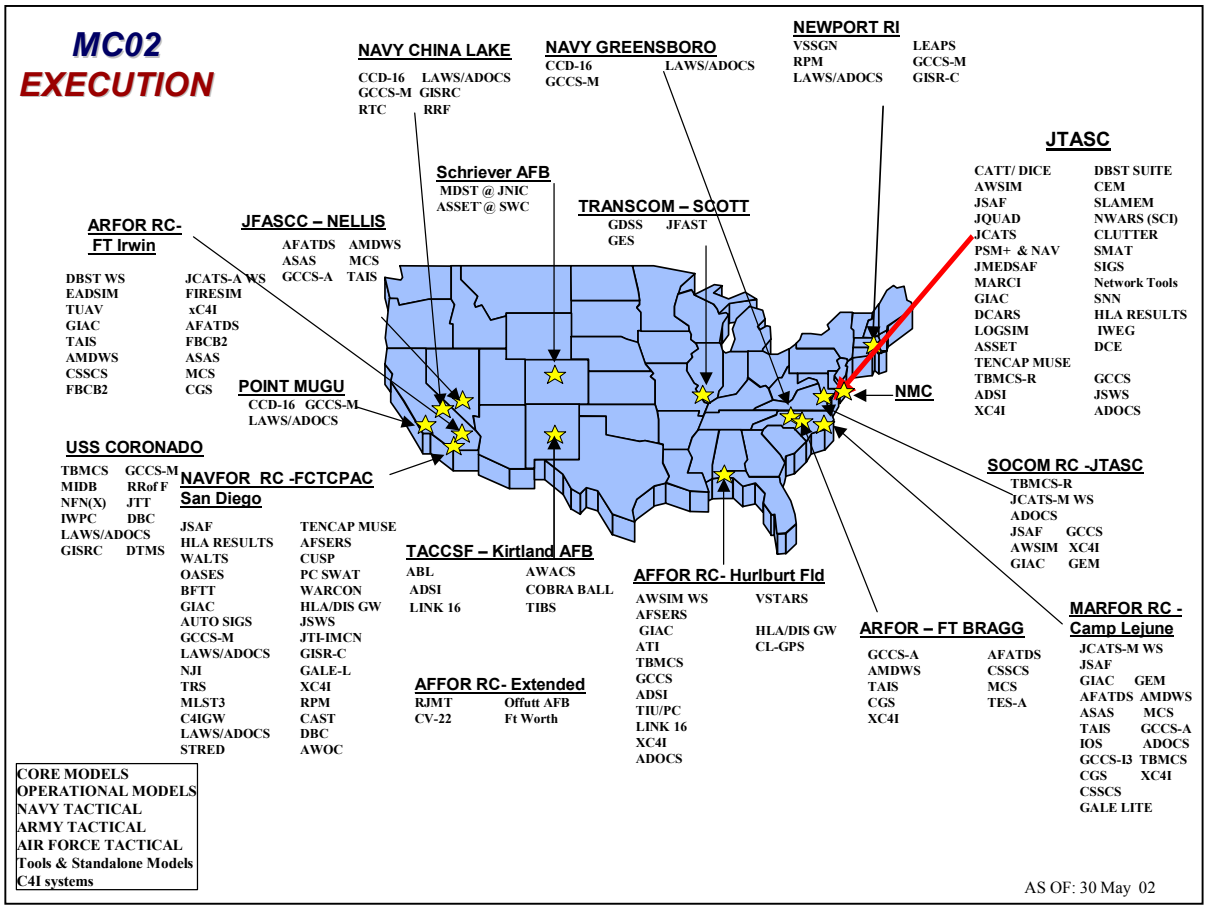


Figure 206: MC02 Simulation Sites

Run Time Infrastructure (RTI)

SPONSOR: Defense Modeling and Simulation Office (DMSO)

RTI 1.3NG is a full implementation of RTI services based on competitive industry designs and development. The Phase I RTI 1.3NG software design contract began immediately following the HLA Baseline Definition in August 1996, and culminated in the award of a Phase II RTI 1.3NG software development contract to SAIC in September 1997. STRICOM has been the procurement agent for the design and development effort, and a technical advisory team, which includes representatives from various DoD user organizations, is supporting this activity. RTI 1.3NG supports HLA Specification 1.3.

Validation and Verification (V&V)

The Johns Hopkins University Applied Physics Laboratory conducted V&V of the MC 02 Joint Experimentation Federation in strict compliance with Department of Defense Instruction 5000.61 (final draft). The final V&V report was completed 19 July 2002 and is available at the

following website via this hyperlink. (hyperlink to V&V report). The Director for Joint Experimentation, United States Joint Forces Command accredited the Joint Experimentation Federation for use in MC02 on 24 July 2002. (hyperlink to Accreditation letter).

Annex I — Sponsored Joint Initiatives

INTRODUCTION

The MC02 Joint Initiatives process was established to provide a systematic, objective review and evaluation of proposed joint initiatives in experimentation from the various governmental and service sponsored proposals. The process provides a multi-level review of initiatives with command-wide involvement supplemented by interagency and service representation. The initiative approval process objectively compared each proposed initiative to the overall experiment objectives as well as applicability to the joint environment. Additionally, the process provided continuous tracking and addressing of associated issues throughout preparation for the event. The Joint Initiatives process provided a two-way communication between the individual initiative sponsors and the MC02 Experiment planning and integration teams.

The review process provided for three examination sessions with each being progressively more detailed and requiring higher-level endorsement for proceeding. Phase I was the initial review by subject matter experts from the functional and experimentation communities that screened submissions against Rapid Decisive Operations (RDO) objectives and MC02 joint environment objectives. As part of Phase II, "Council of Colonels" was formed to review the recommendation of the operational/technical panels and forward its findings to the third stage (Phase III) – a General Officer/Flag Officer panel.

Many service proposed initiatives were not approved for joint integration due to their singular, service-oriented nature. These initiatives may still be evaluated at the service level during the MC02 experiment, though they have not been integrated into the Joint Experiment Analysis Plan. This prototype initiative process is planned for use in future, major experiments to ensure a standard and formal procedure exists for vetting new ideas and technologies into the Joint Experimentation process.

Joint Experimentation Initiatives Statistics:

- One hundred four total Initiatives proposed by 24 separate organizations. (Combatant Commanders/Services/Agencies) for inclusion in MC02 were reviewed.
- Twenty-five separate initiatives were recommended for integration into MC02
- Twenty of which were incorporated as Joint Experimentation initiatives.
- Five of which remained at the Service Level.
- Seventy-nine initiatives were not approved or were withdrawn after initial approval due to failure to meet basic eligibility requirements (did not match objectives, funding, or initiative readiness for experimentation)

The 20 Joint Experimentation Initiatives are:

1- Command and Control for Space, Information Operations Forces (C2 Space, IO Forces)
2- Global C2 System - Integrated Intelligence and Imagery (GCCS-I3)
3 – Global Strike Task Force (GSTF)
4 – Collaboration Tool Suite (InfoWorkSpace 2.5 (IWS 2.5))
5 – Joint Automated Single Guard Solution (JASGS)
6 – Joint Automated Target Folders (JATF)

7-Joint Enroute Mission Planning and Rehearsal System-Near Term (JEMPRS-NT)
8- Network Security Management Correlation & Display (NSMC&D)
9 – Joint Fires Initiative (JFI) Automated Deep Operations Coordination System (ADOCS)
10 – Joint ISR Management Tools (JISR Tools)
11 - Joint Public Affairs Ops Group (JPAOG)
12 - JSOTF Reachback/Special Operations Mission Planning Environment (SOMPE)
13 – Logistics Tools Suite (LTS)
14 – Maneuver Control System-Tactical Combat Operations (MCS-TCO)
15 - National Imagery and Mapping Agency (NIMA) Initiative
16 – Network Security Management Correlation & Display (NSMC&D)
17 – Theater Medical Integration Planning-Joint (TMIP-J)
18 – Unmanned Sensor Support to Special Reconnaissance (US support to SR)
19 – ONA Tool Suite
20 – Automatic Network Information Flow (ANIF)
21 – Joint Special Technology Operations (STO)

C2 of Space, IO Forces

Description

US Space Command (USSPACECOM). In January 2001, USSPACECOM and JFCOM co-sponsored a seminar on how to transform Space/IO C2 into RDO. Space/IO C2 involves experimenting with a space cell embedded in the Joint Force Headquarters with reachback to USSPACECOM for planning, coordinating, and executing space control and space force enhancement. Additionally, USSPACECOM will demonstrate its C2 for Computer Network Operations (CNO), defined as Computer Network Defense and Computer Network Attack. Unified Command Plan 99 assigned these two missions to USSPACECOM on 1 Oct 99 and 1 Oct 00, respectively, and the Command has just completed development of a C2 structure to be used among all the CINCs, Services and Agencies.

The USSPACECOM MC02 Experimental Hypothesis can be stated as follows: If … a Space/IO C2 element is embedded in the Joint Force command structure with reachback capabilities to USSPACECOM for planning, coordinating and executing the Space/CNO/IO campaign plans with the Joint Force Commander's campaign plan… Then.., the Joint Force Commander will increase: unity of effects, battlespace awareness, lethal and non-lethal overmatch, knowledge superiority and force protection across the Joint Force through coordinated, synchronized Space/IO effort. The value added for the joint force includes but is not limited to:

- Increases accountability to Joint Force Commander
- Increases representation of Space/IO effects at Joint Coordination Board
- Injects Space/IO weapons and enablers into EBO
- Synchronizes Space/IO relationships across the Joint Force
- Refines resident Space/IO relationships across the Joint Force
- Integrates Theater Campaign Plan with Global Space/IO Campaign Plan.

Overall Assessment Results

The MC02 experiment proved the value added by the Space and Information Operations Element (SIOE), both on the Combatant Commander's and on the CJTF staffs based upon feedback from surveys received and Senior Mentor input. Space Planners and Operators within

the JTF Staff were readily assessable, and Space play within the experiment was more visible than it was in Unified Vision 2001. The SIOE Chief, at the Combatant Commander level, and the Information Operations (IO) Supervisor, at the JTF level, ensured the integration of Special Technology Operations (STO), Computer Network Operations (CNO), Psychological Operations (PSYOPS), Electronic Warfare, Physical Destruction, Information Assurance, Public Affairs, and they horizontally and vertically integrated Component Planners into this process. IO gains were accomplished because the JTF Commander recognized the importance of IO as a force multiplier, and moved the IO Supervisor out of the Information Superiority Group into a principle staff position. Additionally, prior planning by USSPACECOM ensured viable representation on the Joint Coordination Board which provided the opportunity to elevate the consideration of Space/CNO/IO effects to the same level as kinetic options offered by Air, Land and Sea components. MC02 has provided a good step off point for USSPACECOM forces as they plan for participation in the Pinnacle Pathway series of experiments.

Methodology

C2 of Space/IO was evaluated by users during MC02. Users were questioned regarding the integration of Space and Information Operations (USSPACECOM inserted an 18 person Space and Information Operations Element (SIOE) into the Joint Task Force). In addition, USSPACECOM inputs were considered to better evaluate the utility of C2 for Space/IO. The combined analysis indicates potential for providing significant key enabler support to the SJFHQ.

Key experimentation issues were as listed:

- Space/IO relationships w/in JTF HQ
- Space/IO relationships w/Component Commanders
- Space/IO representation at Joint Coordination Board (replaces JTCB)
- Synchronization of Space/IO with other Fires
- Space/IO representation comparable to Air/Sea/Land
- Reachback required for Space// IO issues

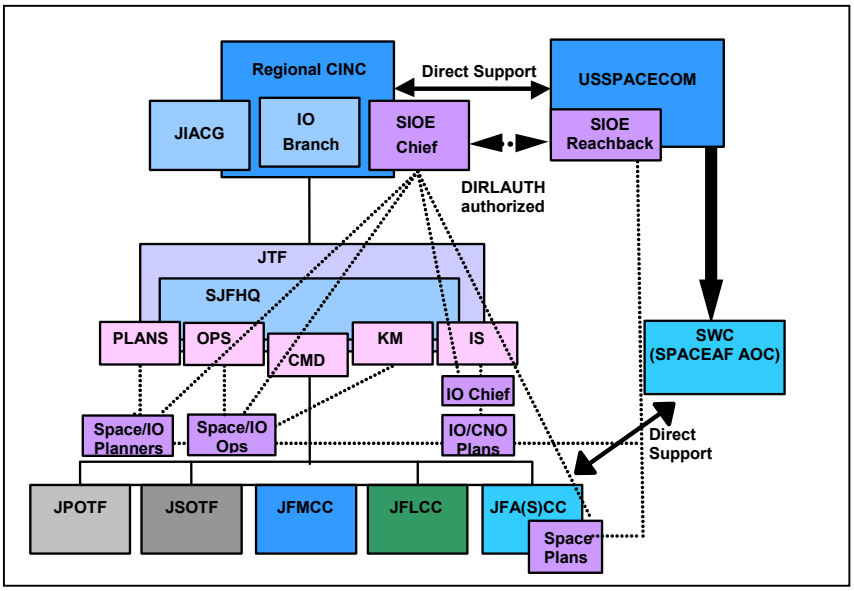


Figure 207: Experimental C2 Structure

Numerous challenges faced *previous* C2 constructs. There was no single point of contact for Joint Force/JTF Commanders on Space/IO issues. Space/IO component inputs were stove-piped and uncoordinated. Previous C2 constructs also lost opportunities for coordination, synchronization, and deconfliction of efforts. There was a lack of a single coherent voice representing Space/IO at the targeting board. There was also no "clearinghouse" for relevant Space/IO information.

USSPACECOM objectives for this experiment were to validate the SIOE concept in support of RDO and EBO in a collaborative environment, refine a way ahead for Pinnacle Pathway, expand USSPACECOM visibility within the Joint Experimentation Process, provide the Supported Commander a focal point for Space/IO, and centralize C2 for disparate USSPACECOM elements. Additionally, it was key that USSPACECOM interests were represented at the Joint Coordination Board and that Space, and IO were synchronized with traditional Fires. USSPACECOM wanted Commanders to be presented Space/IO effects equivalent to that of Air, Land and Sea. MC02 explored a variation of the SIOE concept. Specialized expertise was provided for synchronization at the JTF and JFASCC. Space/IO were focused on EBO to accomplish RDO and Joint Coordination Board input was provided to synchronize effects.

Observations

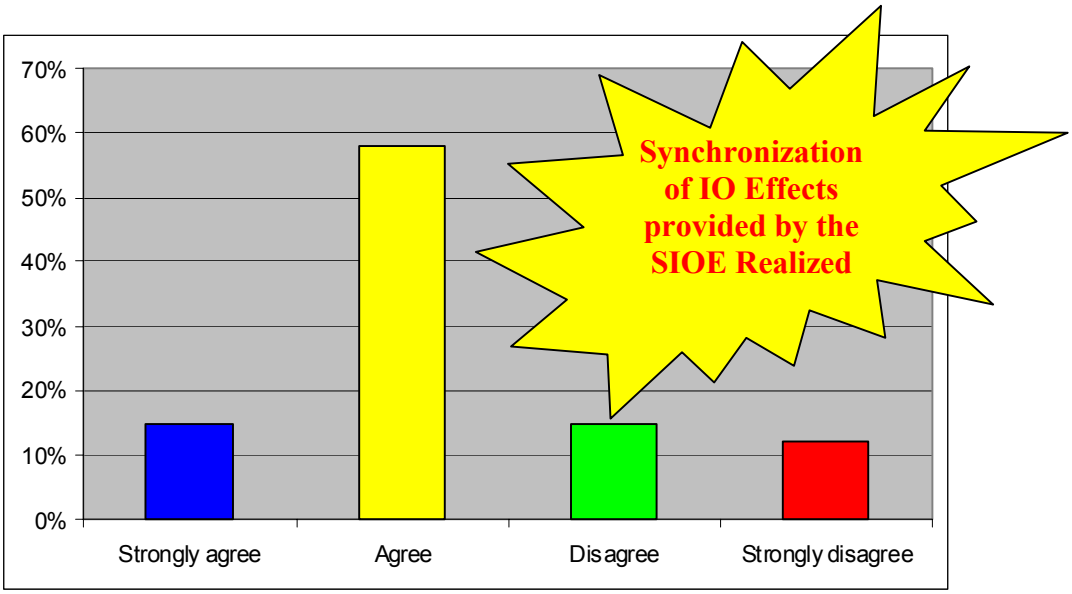
The actual experiment proved the value added by the SIOE, both on the Combatant Commander's and on the CJTF staffs. Space Planners and Operators within the JTF Staff were readily assessable, and Space play within the experiment was more visible than it was in Unified Vision 2001. The Space and Information Operations Element (SIOE) Chief, at the Combatant Commander level, and the Information Operations (IO) Supervisor, at the JTF level, ensured the integration of STO, and IO, (PSYOPS, Electronic Warfare, Physical Destruction, Information Assurance, and Public Affairs were the key IO focus points during the experiment), and they horizontally and vertically integrated Component Planners into this process. IO gains were accomplished because of the JTF Commander utilized IO as one his main tools for EBO. Additionally, prior planning by USSPACECOM ensured viable representation on the Joint Coordination Board which *provided the opportunity* to elevate the consideration of Space/IO effects to the same level as kinetic options offered by Air, Land and Sea components; this issue fell short of the mark. MC02 has provided a good step-off point for USSPACECOM forces as they plan for participation in the Pinnacle Pathway series of experiments.

The way ahead suggests a restructuring of SIOE support to the JTF based upon lessons learned during MC02. Senior Mentors and senior experiment officials agreed that IO is a combat multiplier that warrants elevation to Joint Information Operations Task Force (JIOTF) status. Future planning for Pinnacle Challenge must have more robust Information Operations play at all levels, up to and including Interagency. Although, despite the fact that experiment planners prior to MC02 MAINEX did not consider IO a focal point, IO became important early due to CJTF emphasis. Internally, USSPACECOM / USSTRATCOM should begin preparations at the HQ's level and the Component level for the next series of experiments. Great strides have been made toward Pinnacle Challenge, yet improvements in player training, funding, and planning remain. Finally, USSPACECOM/USSTRATCOM must take care that the gains in Space/IO experimentation do not disappear in the turmoil of the upcoming merger.

Combatant Commander level IO play not developed –

Early on in MC02 planning, JFCOM made the decision to limit IO play. They made it as a funding decision, but the experiment proved that IO is an integral and growing facet of current warfighting capability. This resulted in a lack of fidelity in the IO play at the Combatant Commander level. The background to answer the JTF's IO RFI just wasn't available and this resulted in ad hoc or inadequate answers.

Despite this lack of IO emphasis, the graph below shows that 60% of respondents realized the synchronization of IO effects that the SIOE provided. Although a first step in IO support architecture, the SIOE's personnel, embedded within the JTF, became the focal points the unexpected emphasis on IO. Future experimentation must refine how IO expertise and support is presented at the JTF and Combatant Commander levels.



Space & IO personnel increased the sync of Space, CNO, & IO at the JTF level & below.

Improving interfaces among the JTF, SIOE, and Space/IO reachback element to make it more useful to the JTF.

Comments provided pointed towards enhanced synchronization between ISR, IW, and space based systems within the SCIF and with combat operations. SIOE facilitated improved integration of IW effects into the overall JAOP spell out, AOD spell out, and ATO spell out. Comments also indicated a CINC level SIOE is needed to work those national issues if you are going to have a JTF SIOE.

The embedded USSPACECOM personnel brought relevant and needed expertise to the JTF staff, which allowed increased consideration of Space/IO effects. However, lack of experimental emphasis on Space/IO decreased the ability to achieve increased synchronization. Synchronization of Space/IO was further inhibited by lack of appropriate organizational constructs. For example, all space play (limited) was performed at the JFACC level. This limited visibility among the other components of the JTF and the JTF staff. Embedded space planners at the JTF Operations level were effectively synchronized with JFACC space operators, largely due to pre-existing personal relationships (In some cases, space planners at the JFACC level felt that JTF assigned space planners interfered with tactical planning and execution). This begs the question of the role of space planners at the JTF level. If the JFACC has responsibility

for space operations as well as air operations, then it is not obvious that space planners embedded at the JTF level are necessary.

One result of the JFACC's assumption of all space activities (JFASCC) was decreased visibility of space at the JTF level. Despite continuous efforts, there was no space status presentation within the JTF commander's update or the JCB.

On the other hand, situational awareness for the Spell out (CJTF) on STO initiatives was excellent. The CJTF was briefed on a near daily basis.

For IO, significant synchronization was achieved collaboratively because the IO cell held daily online sessions with all elements of IO at the Combatant Commander, JTF and component levels. This collaboration greatly increased awareness of plans and capabilities, but there is/was no accepted means of command and control of these capabilities. While the IO supervisor evolved *de facto* to become a principal member of the JTF staff, and the CJTF gave a number of missions to the IO supervisor, he had no authority for command and control of the forces to accomplish these missions. For example, PSYOPS – a component of IO, was organized separately as a component commander, and reported JPOTF actions to the CJTF and staff, somewhat independently of the IO supervisor (synchronization between JPOTF and IO supervisor increased as experiment progressed).

MC02 highlighted the need for an effective organizational construct for IO. Leveraging full spectrum IO to benefit the JTF may require a Component Commander (JIOTF) who has responsibility for IO. In MC02, the IO Supervisor had no authority or resources to accomplish his mission. The concept of a JIOTF should be tested in both Limited Objective experiments (LOE's), and large-scale joint experiments, such as the upcoming Pinnacle Series.

CNO was not actively played in the game. CNO planners embedded in the JTF staff were able to propose and begin planning potential CNO actions, but there was no ability to follow through on the planning. There was no ability in the experiment to simulate the effects of a CNO action, nor was there an ability to effectively simulate the coordination and approval process for CNA.

When developing Effects Based Operations within the JTF, were the JTF Commander and his Staff presented with valid Space and IO planning factors for increased unity of effects and Battle Space awareness?

The consensus here was "yes." Space Planners were readily accessible and well informed. Most of the staff does not understand what Space brings to the fight. From an IO standpoint, the answer was a resounding "yes". The JTF IO Supervisor provided leadership and direction in the integration of all aspects of IO.

The SIOE-provided IO supervisor provided the JTF commander a focal point for IO. However, the organizational construct of having IO embedded under the Information Superiority Group suppressed this representation until the CJTF effectively lifted the IO supervisor up to the JTF staff level. In addition, the construct used a JPOTF component commander, which further diminished synchronization. As space was much embedded under the JFACC, the JFACC provided the focus for space, rather than the SIOE.

The SIOE Director, located at the Combatant Commander level, provided a focal point for the JTF commander (and for COMM Blue) for all STO activities.

Effectiveness of the Space and Information Operations personnel embedded within the JTF HQ Staff in increasing the planning and execution of RDO.

A majority of the comments provided indicated the Space and Information Operations personnel were very effective. Each cell lead stated that SIOE personnel were invaluable in providing needed planning and execution input. They were completely accordant with the JFACC.

Embedding the expertise of the SIOE personnel into the JTF was essential in the conduct of RDO/EBO in the IO arena (including STO actions). The expertise provided by SIOE personnel to the JTF staff was essential. Whether deployment of this element is the correct long term solution or not, in the near term it is the only way to get the subject matter expertise embedded in the JTF staff. The necessity for up front planning for effective IO application leads one to the conclusion that significant IO planning capability must be embedded in the SJFHQ staff, either by deploying the support, or by assigning the people directly.

Placement of the JTF Information Operations Supervisor and Information Operations personnel under the Information Superiority Group

Membership on the JCB provided an excellent opportunity to synchronize Space/CNO/IO with maneuver and fires.

The JTF IO supervisor was effective in representing IO effects at the JCB. However, as the staff worked to minimize time spent in JCB sessions, the level of IO visibility was again reduced. In addition, as the campaign progressed, the IO supervisor was increasingly co-opted to be the principal public affairs spokesperson.

The SIOE Director, as the Combatant Commander's principal Space/IO coordinator, supported the CJTF in the STO level equivalent to the JCB. Limitations of STO did not allow effective collaboration of STO with the JCB; in an integrated operation, where only those cleared for STO activities have the full picture and STO billets were limited, integration of STO and non-STO activities was difficult.

It is not clear that IO effects were integrated in the targeting process; the need for horizontal integration between IO/CNO and other fires is critical. (It appears that this integration took place to some extent within the JFACC, but not necessarily with the other components).

Finally, the commander-centric nature of this JTF diminished the role of staff, and their voice in the JCB. This organizational construct provides further rationale for having IO represented by a component or task force commander. JPOTF as a Component Command, although representing only a small part of the IO spectrum, received more attention at both the JCB and the daily Commander's Update, as well as the closed commander's huddle sessions (to which staff were not invited). If IO is a combat multiplier, it must be represented at the Combat Commanders' table in a commander centric operation. Also, membership on the JCB provided an excellent opportunity to synchronize Space/IO with maneuvers and fires.

Recommendations

The way ahead suggests a restructuring of SIOE support to the JTF based upon lessons learned during MC02. Senior Mentors and senior experiment officials agreed that IO is a combat multiplier that warrants elevation to Joint Information Operations Task Force (JIOTF) status. Future planning for Pinnacle Challenge must have more robust Information Operations play at all levels, up to and including Interagency. IO was not considered a focal point by experiment planners prior to MC02 MAINEX, but became important early due to CJTF emphasis. Internally, USSPACECOM / USSTRATCOM should begin preparation at the HQ's level and the Component level for the next series of experiments. Great strides have been made toward

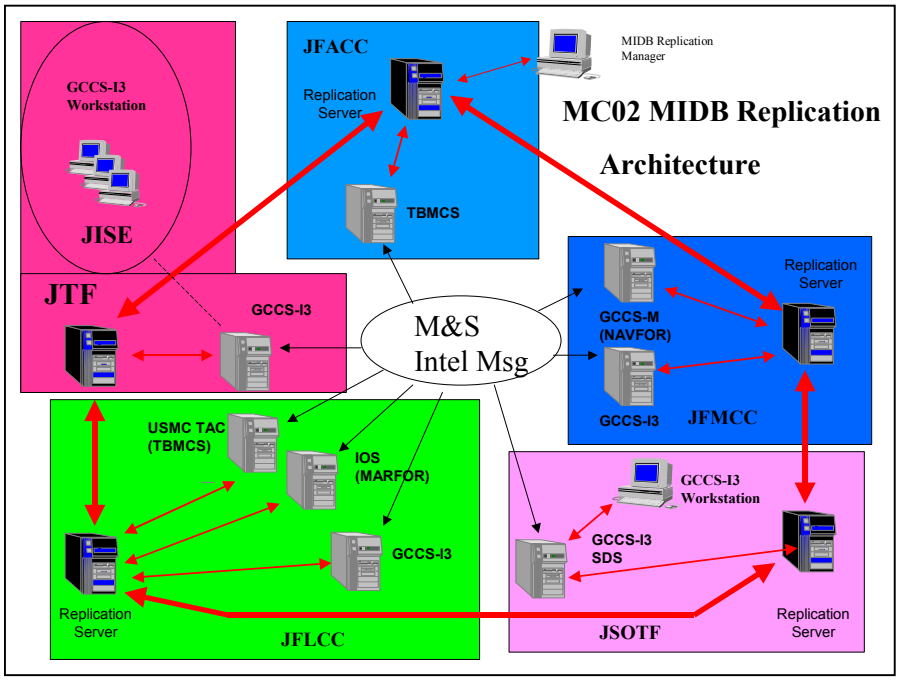
Pinnacle Challenge, yet improvements in player training, funding, and planning remain. Finally, we must take care that the gains in Space/CNO/IO experimentation do not disappear in the turmoil of the upcoming merger.

Global C2 System Integrated Imagery and Intelligence (GCCS-I3)

Description

Sponsor: GCCS-I3, sponsored by Joint Experimentation/Command, Control, Communications, Computers, and Intel (C4I) Team, is a tightly integrated set of intelligence applications and tools intended to provide integrated intelligence support to the GCCS COP. It provides surveillance and reconnaissance information and access to global intelligence sources as well as data on the precise location of dispersed friendly forces. The GCCS-I3 applications build the intelligence portion of the COP by integrating imagery with intelligence reference data (Modernized Integrated Database (MIDB), Characteristics and Performance (C&P)) and with the tactical track picture. GCCS-I3 provides C2 users the capability to receive, process, display and maintain current geo-locational information on threat and neutral land, sea, and air forces integrated with intelligence, imagery, and environmental data in multi-media formats.

GCCS-I3 gives users direct access to MIDB data, weapon systems' characteristic and performance (C&P) information, and national and tactical imagery. GCCS-I3 also allows users to integrate locally collected tactical imagery and other intelligence with national and theater-produced intelligence. Intelligence information can be plotted directly on operational/tactical displays in conjunction with continuously updating operational and operational-intelligence information, thereby providing operators, planners, and intelligence analysts vastly improved knowledge of the battlespace. The illustration shown depicts how GCCS-I3, as part of the MIDB Replication architecture, supports the component commands in disseminating relevant Model & Simulation (M & S) Intel information.



Overall Assessment Results

Initial surveys and interviews conducted during MC02 indicated a lack of knowledge or use of this initiative during MC02 exercise. Personnel with more significant knowledge or experience felt this warfighter tool was useful. Based upon the MC02 network setup and user feedback, GCCS-I3 was integral to joint warfighter operations and targeting functions because it was the backbone to the Joint Automated Target Folders Database

and Joint Fires Initiative element. However, feedback from personal interviews during MC02 revealed a lack of adequate training and/or focus of user applications of GCCS-I3, particularly with mission needs.

Methodology

GCCS-I3 was evaluated by 40 users during MC02. These users were comprised of GCCS operators and targeting personnel. Initial surveys issued to the warfighters early in the MC02 exercise indicated either a lack of knowledge or usage of GCCS-I3 in support of MC02. Soon after, a revised survey sent to a selected list of warfighters from all components repeated this trend. Personal interviews held later during the exercise providing more details of user feedback indicated a lack of adequate initiative training and/or a true understanding of the user applications during the exercise. Subject Matter Expert insights also played a major role in all of the observations presented in this report.

Observations

The overall assessment of GCCS-I3 indicated a lack of adequate training and/or a true understanding of the user applications during MC02. This was emphasized particularly with GCCS-I3 trainer 'user needs'. One experienced user said GCCS-I3 is very critical to joint warfighter operations and targeting because it provided the backbone to the Joint Automated Target Folders Database and Joint Fires Initiative. Those individuals with more significant knowledge or experience with GCCS-I3 felt it was useful in their needs and will benefit the warfighter effort as a whole. These same users still experienced some problems with connectivity and information coordination among the different warfighter components. The most crucial functional problems affecting the warfighter occurred when imagery intelligence information could not be relayed to or properly coordinated between different warfighter components in 'real-time'. The sponsor technical lead pointed out that the lack of adequate warfighter user training contributed to the majority of the respondents' "lack of knowledge and understanding of the functionality of initiative" and low confidence with GCCS-I3 in supporting the MC02 warfighter objectives. Additionally, the dissemination of imagery products from the service components and from the M & S Imagery sector did not follow the Imagery CONOPS. The only M & S tool that provided imagery to GCCS-I3 was SIGS and JMUSE. That imagery was processed and provided to the JTF by the GCCS-I3 Imagery Transfer Sector.

GCCS-I3 was evaluated against the key enablers of the Standing Joint Force Headquarters (SJFHQ). GCCS-I3 provides the means for the potential Knowledge and Information Superiority aspect of SJFHQ by providing the tools to access current military intelligence that is embodied in the local MIDB updated by the functional components. GCCS-I3's functional capabilities directly supports the components in rapidly setting conditions for Decisive Operations, assuring access into and through the battle space, and

conducting decisive Effects-Based Operations by being employed at the CINC, JTF and component level to synchronize and update the process' in developing/establishing target sets.

With imagery technology available, GCCS-I3 provides a number of fused assessment and battlespace visualization capabilities to the joint warfighter via the Common Operational Picture/Common Relevant Operational Picture (COP/CROP). The initiative was intended to provide to warfighters the enhanced intelligence operations infrastructure in support of the Operational Net Assessment (ONA) and Effects Based Operations (EBO). GCCS-I3 enhances

the operational commander's situational awareness and aids track management duties with a standard set of integrated, linked tools, and services that maximize commonality and interoperability across the tactical, theater, and national communities. The initiative supports and improves the decision process in target nomination and the COP/CROP picture. Furthermore, this initiative provides improved intelligence information flow, which is essential to allow the Commander to set the conditions necessary to achieve Dominant Maneuver and Precision Engagement for RDO. All of the above observations were based primarily upon subject matter expert insights and interviews.

	Supports	**Potentially Supports**	**Did not provide significant support**
Establish Information/Knowledge Superiority		X	
Rapidly Set Conditions for Decisive Operations	X		
Assure Access Into and Through the Battlespace	X		
Conduct Decisive Effects-based Operations	X		
Sustain the Force			X

Relationship to Other Objectives

The analysis and findings for the GCCS-I3 initiative have impacts on the JFCOM ONA assessment area as well as the Joint Intelligence, Surveillance and Reconnaissance (JISR) Tools, Joint Automated Target Folders (JATF) , and The Joint Fires Initiative – Automated Deep Operations Coordination System (JFI ADOCS) joint initiatives. These impacts primarily relate to the performance of the tools employed in the initiative. Performance regarding these tools may impact the findings of the other assessment areas or joint initiatives.

Recommendations

Based on the inputs from the user surveys and personal interviews, there was not enough conclusive data collected to accurately assess the impact GCCS-I3 had on the goals set for MC02. No correlation could be made in regards to technological deficiencies and the lack of both adequate user training and/or understanding of implications of the GCCS-I3 system.

It is recommended that all GCCS-I3 users be given more extensive training emphasizing a greater understanding of user applications associated with the mission needs.

Global Strike Task Force (GSTF)

Overall Assessment Results

The Global Strike Task Force joint concept initiative successfully demonstrated the capabilities required to address an anti-access scenario, as created for MC02. As one framework for coordinating joint forces, GSTF demonstrated the synergy that can be achieved when a Joint Task Force addresses assured access in a coherent way. In addition, the results from this experiment indicate that further development—in terms of CONOPS and TTP, education and training, procurement, and leadership development—is warranted.

Description

GSTF CONOPS demonstration was an Air Force-sponsored joint initiative for MC02. This demonstration was also part of the Air Force's Joint Expeditionary Force Experiment (JEFX 02). GSTF was the only concept initiative for the MC02 experiment, and was the first time that this concept was demonstrated in a large-scale environment. The hypothesis was that GSTF CONOPS would help achieve all five of the MC02 objectives (Establish Information Superiority, Set Conditions for Decisive Operations, Assure Access, Conduct EBO, and Sustain the Force). Both live and constructive elements demonstrated GSTF capabilities to confront a determined adversary in the 2007 timeframe. For MC02, the goal for the GSTF CONOPS was to examine the Air Force's concept in a joint experimental environment to further refine the concept, demonstrate how the concept can contribute to future joint operations, and to stimulate joint development efforts. Information that is more specific can be found in the MC02 CONOPS for GSTF.

As one in a series of seven Air Force transformational Task Force CONOPS, GSTF CONOPS employs joint power-projection capabilities to counter adversary anti-access systems and create the conditions required to gain and maintain access to the battlespace for joint air and space, land, and maritime forces in the conduct of Rapid Decisive Operations (RDO). GSTF CONOPS "first-wave" attack capability affords US and coalition follow-on forces freedom from attack, as well as freedom to attack. GSTF CONOPS leverages America's asymmetric technological advantages by balancing the capabilities of stealth, standoff, precision, information, and space. Prior to the conflict, GSTF CONOPS employs persistent, all-weather Intelligence, Surveillance and Reconnaissance (ISR) elements, focused by the process of Predictive Battlespace Awareness (PBA), to monitor adversary actions, identify, locate and track targets and threats, and develop and update plans for countering anti-access strategies and capabilities. At the start of operations, the GSTF CONOPS employs a relatively small number of low observable, standoff systems, supported by focused electronic, and information attack. These GSTF CONOPS capabilities will "kick down the door" into denied battlespace by rapidly neutralizing adversary anti-access capabilities, and at the same time, hold high value targets (HVT) at risk. By neutralizing adversary anti-access capabilities and attacking HVTs, GSTF CONOPS allows the CJTF to employ persistent follow-on forces and create war-winning effects. There were two elements to the GSTF initiative: Constructive and Live Fly. This included a live fly rehearsal on 26 July, constructive play 28 July to 1 Aug, and live fly execution on 29 July.

M&S Constructive Modeling

The constructive entities that participated included two Airborne Laser (ABL) aircraft, two squadrons of F-22s, as well as a full complement of USAF, US Navy, and Special

Operations forces that are already fielded. Information that is more detailed can be found in the Constructive Force List for GSTF. The original plan was for constructive GSTF to occur only two days (28-29 July); however, as the scenario actually played out, anti-access activities occurred beyond those two days. The reason for this was that pockets of anti-access continued to be prosecuted through 1 August when JOA air access dominance was achieved. In practice, GSTF operations will continue until the JTF commander feels that the air access dominance objective has been met.

The same constraints that M&S placed on assessment of all other areas applied to assessment of the GSTF CONOPS demonstration as well. Deciding which weapon systems will be in place in 2007, and the specific capabilities of those systems, is difficult at best. More specific information regarding the limitations of M&S for this experiment can be found in the M&S Annex.

Live Fly

The live GSTF demonstration employed 30 platforms operating on or above the Nevada Test and Training Ranges (NTTR) during a two-hour period (2000-2200Z) on 29 July. Specific live assets employed included two B-2 aircraft, SOF forces, SEAD assets, Space/IO, as well as traditional C2ISR, support and strike aircraft. More information can be found in the GSTF Live Fly Overview. All sorties were flown from home station. In preparation for the GSTF live fly event, a live fly rehearsal was conducted on 26 July. Each flying period consisted of ATO sorties designated for dynamic targeting (XINT) as well as pre-planned fixed targets. More specific information regarding the live fly can be found in the GSTF SPINS for Live Fly.

Analysis Methodology

GSTF was the only joint concept initiative assessed during this experiment. There were three categories of data collected to provide an assessment of this unique initiative: player questionnaires, results extracted from M&S and C4I systems, and subject matter expert and senior leader inputs.

The first category—player questionnaires—was the primary source of data used to establish findings and draw conclusions. During the course of Main Execution, four web-based questionnaires were administered, to four different groups of players. The first questionnaire was directed at planners across the JTF, asking about planning considerations prior to the assured access phase. The next set of questionnaires was administered to planners, operators, and intelligence specialists after access had been achieved. The result of these questionnaires was used to gain perspective on the contribution of the GSTF CONOPS to the RDO warfighting challenges.

The second category of data was used to provide an objective basis for validating the subjective inputs collected via questionnaires. The specific information to be collected was framed in terms of 3 analytic questions, and a series of supporting tasks and sub-tasks. Limitations of the federation of models and simulations and the experimental construct, and the resulting problems with discovering "ground truth," hindered the ability to draw accurate conclusions based on this source of data.

The final category provided a "sanity check" for the use of the other results. Based on general observations, interviews, meeting minutes, and informal analyst discussions, senior leader perspective was captured. These "senior leaders" primarily included the JTF and component commanders and their principal staffs, and the experiment senior mentors (retired

general and flag officers.) In addition, specific subject matter experts were consulted and their inputs were captured via web-based observations and analyst notes.

In addition to the three analytic questions for the GSTF assessment, preliminary analytic work was completed identifying which of the warfighter challenges to Rapid Decisive Operations GSTF CONOPS addresses. Specific information regarding this linkage can be found in the GSTF Warfighter Challenges Matrix.

Live Fly Results

The full results of the live fly period can be viewed in the Live Fly Results Brief. In general, the results were very successful, as indicated in these highlights:

- Both GSTF pushes executed as planned except for a five- minute Rolex on the first push
- Four Red Air were killed on each push without Blue losses
- Five High-Speed Anti Radiation Missile (HARM) shots taken on first push; six taken on second push
- All preplanned targets hit
- Three TSTs successfully prosecuted on second push

Analysis Questions

Three analysis questions address critical assessment areas for the GSTF CONOPS. Each of these questions is addressed in this section.

- What assured access effects were demonstrated by the GSTF CONOPS?
- Created initial access. Only the F-22 was employed within enemy anti-access threat areas during first 16 hours of campaign to perform sweep and to attack anti-access targets. According to the JFASCC, "We could not have done the operation without the F-22."
- Created air dominance ("kicked down the door"). GSTF CONOPS enabled operations such as the Stryker Brigade Combat Team (SBCT) insertion and Ship to Objective Maneuver (STOM) to attack Weapons of Mass Effects (WME) facilities. Achieved air access dominance for the entire JOA by D+5.
- Created war-winning effects through targeting HVTs. The successful targeting of such HVTs as SA-20s, Air Defense HQs, CRCs, and airfields allowed follow-on operations to be employed and helped cutoff the adversary's C2. Besides these high value air access targets, other HVTs where prosecuted to achieve maritime access. Maritime access HVTs included CDCMs, small boat storage and hovercraft facilities and mine ordnance depots,. These maritime access HVTs threatened military as well as commercial ships, producing severe political ramifications as Freedom of Navigation (FON) suffered and oil prices increased. The successful neutralization of these maritime access HVTs helped create maritime access.
- What current and projected capabilities were required by the GSTF CONOPS to achieve those effects?
- The current version of the GSTF CONOPS specifies the current and projected capabilities that are required to achieve the effects demonstrated by GSTF CONOPS during MC02.
- What other war-winning effects did the GSTF CONOPS demonstrate?
- Due to limitations of the experimental construct, not all areas of the anti-access scenario were examined. For example, there was no consideration for possible threats to friendly forces during the deployment phase. GSTF CONOPS may be helpful in countering this threat. This is an area for further examination during future experiments, exercises, and wargames.

Support to Standing Joint Force Headquarters

Global Strike Task Force CONOPS demonstrated the capability to support future Joint Task Forces in achieving four of the five-warfighting objectives. The fifth objective—Sustain the Force—is an area for future experimentation and wargaming relative to the GSTF CONOPS.

	Supports	Potentially supports	Did not provide significant support
Establish Information / Knowledge Superiority	X		
Rapidly Set Conditions for Decisive Operations	X		
Assure Access into and through the Battlespace	X		
Conduct Decisive Effects-Based Operations	X		
Sustain the Force		X	

Establish Information / Knowledge Superiority

GSTF CONOPS forces must coordinate IW operations with appropriate national and theater authorities to deny information to the enemy and achieve other offensive battlespace effects. In the conduct of ISR missions, data and information from space-based, land-based, and sea-based ISR forces and assets are integrated to achieve information superiority. Defensive IW operations must be employed in the pre-conflict stages to protect and defend friendly information and information systems. Offensive IW operations must also be employed to influence adversary situational awareness and decision-making processes. If the enemy can be dissuaded, conflict may be deterred. If conflict is not avoided, then IW operations can be used to shape the battlespace for other joint operations.

Rapidly Set Conditions for Decisive Operations

The ability to rapidly deploy and employ airpower globally to create war-winning effects for the JFC is at the heart of the Air Force's core competencies. These inherent capabilities along with airpower's flexibility helps enable the JFC to rapidly set conditions for decisive operations.

Assure Access into and through the Battlespace

The GSTF CONOPS will allow the JFC to employ joint power-projection forces to counter adversary anti-access systems and create the conditions required to gain and maintain access for follow-on joint forces. The GSTF CONOPS will also seek to exploit, neutralize, disrupt and/or destroy critical opposing capabilities in the initial stages of crisis or conflict to more rapidly create war-winning effects and enable JFC objectives to be achieved.

Conduct Decisive Effects-Based Operations

The primary effect achieved by the GSTF operations was access. Without access, follow-on operations would not have been possible, and national security objectives would have been unattainable. With access, the GSTF forces continued to produce a variety of war-winning effects such as air superiority, degraded adversary C2, and reduced threats from WMD. Planning for the effects achieved by GSTF forces were the very first step in a well-executed Effects-Based Operation.

Sustain the Force

The same capabilities that allow GSTF CONOPS to create access to the battlespace for deployment and employment also enable maintaining access for joint activities required to sustain the joint force.

DOTMLPF Findings:

Doctrine

The services are independently pursuing concepts for confronting the "anti-access" scenario. GSTF is the AF concept; the Navy and other services have similar ideas. There is not a single, integrated Joint Assured Access CONOPS to leverage those access capabilities that each service brings to the fight. Establishing common terminology is key to developing cohesive documentation and language references for staffing and operational clarity in execution.

Training

As evidenced by GSTF Warfighter Survey Results (Graphs), GSTF Warfighter Survey Results (Comments) and the perception by some personnel is that GSTF is its own force rather than a set of capabilities presented thru the AEF as part of the ASETF. A small minority of personnel thought of GSTF in terms of F-22s and B-2s only rather than a set of capabilities required gaining and maintaining access to the battlespace. Overall, the Air Force and other services require more training on the GSTF concept.

Materiel

There is potential for near-term development efforts for technologies associated with GSTF CONOPS. The requirement for the F-22, Small Diameter Bomb (SDB), increased sensor fusion (including non-traditional sensors), and Multi-Sensor Command and Control Aircraft (MC2A) must be further examined. Specifically, as noted by the JFACC, the F-22 was instrumental in achieving initial access. In addition, non-traditional sensors also played a key role.

Leadership

During MC02, senior leadership was aware of the contribution of the JFACC to achieving access for the joint force. Future leaders—both within the Air Force as well as other services—must continue to develop an appreciation of the challenges associated with achieving and maintaining access, as well as the contributions that each service can make to this effort.

Way Ahead

ACC hosted a Capabilities Conference 21-23 August that focused on the challenges for operationalizing the GSTF CONOPS. The minutes of this conference point to the way ahead for bridging the gap between capabilities and programming.

AFEO, in coordination with ACC/XPS, will develop and submit a GSTF Information Paper based on the results of this experiment and other activities related to GSTF CONOPS.

The next version of the GSTF CONOPS is being developed and will be published on the Air Force CONOPS web page when complete.

Global Engagement VI, to be held in November 2002, will further examine the contribution of the GSTF CONOPS to assured access.

ACC/DRYF continues to conduct modeling and simulation that will further refine the capabilities and force structure required for the GSTF CONOPS.

Successes

GSTF was successfully introduced to the joint community during this experiment. This was the first time a service concept was examined in this forum. Although more training is required, the awareness of GSTF and the challenges associated with the anti-access scenario was

increased across the functional and joint communities. In addition, the GSTF TF CONOPS was further refined.

Recommendations

Doctrine

The joint community must continue defining a *joint context* for assured access. Specifically, USJFCOM should develop an Assured Access CONOPS that clarifies the contributions that each component makes. Moreover, Tactics, Techniques, and Procedures must be developed that specify the means of coordinating each component's assured access activities in a way that supports this critical warfighting challenge.

Training

The Air Force must continue educating both its own personnel, as well as those in the joint community, on the issue of access, and the specific contributions of the GSTF CONOPS. Specifically, the AFC2TIG should incorporate the GSTF CONOPS into the curriculum of training courses for AOC personnel.

Collaboration Tool (InfoWorkSpace (IWS) 2.5)

Description

Collaborative Tools development supports the Assistant Secretary of Defense (ASD) response to Congress and OSD/JS issues on collaboration interoperability between combatant commanders, services, agencies, and coalition forces. The collaborative tool is a pilot service endorsed by the Office of the Secretary of Defense and Joint Staff (OSD/JS) designed to satisfy operational needs across echelons, joint mission areas and national boundaries for Joint Crisis Action Planning, Deployment and Targeting; and from the National Command Authority (NCA) to deployed elements. During MC02, the IWS collaborative tool suite was sponsored by Joint Forces Command J9 Joint Experimentation/Command, Control, Communications, Computers, and Intel (C4I) Experimentation Systems Team. IWS was used to collaborate at all echelons of the experiment. The IWS tool suite proved itself to be a flexible suite for war planners and warfighters.

Collaborative tools are engineered for commands that work in or are deployed to multiple locations. It is intended to revolutionize the way command groups and individuals perform day-to-day operations and ad hoc mission planning. A collaborative suite of technologies allows an organization to reconstruct their dispersed environment into a virtual model and operate in that model regardless of geographical dispersion. As the graphic indicates, users, join a virtual conference center where a single speaker controls the presentation and files for operations are accessible to the audience that needs them. Using the internal instant messaging or the COTS Microsoft Instant Messenger

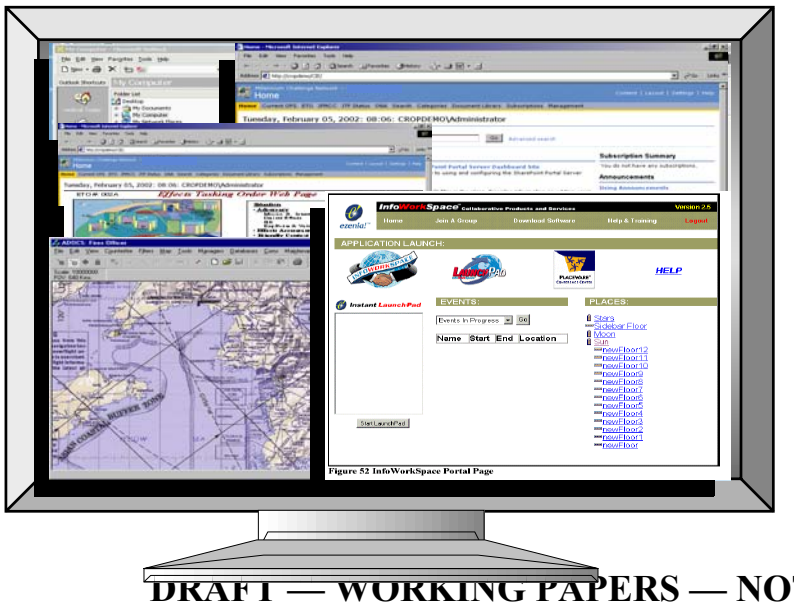


Figure 52 InfoWorkSpace Portal Page

allows side discussions to further refine in real-time what the plan is.

Overall Assessment Results

In the network centric environment, the planners can expect to receive a significant amount of data as web enabled tools put data at the warfighters fingertips. Users were asked specifically about the quality of both oral and visual information. It is a strong vote of confidence for an experimental tool to receive the confidence of 96% of the respondents with respect to quality. Collaboration clearly let data from a diverse group be synthesized into information that could be used to support execution of current and future missions.

Users demonstrated, through extensive use of and participation in collaboration, that the SJFHQ will benefit from effectiveness of these tools. Collaborative tools will provide the information superiority that combatant commanders, services, agencies, and coalition forces require during planning and execution phases of an exercise. Collaborative tools strongly support the functionality required by the SJFHQ.

Methodology

IWS was evaluated by 487 users during MC02, spanning the entire spectrum of participants. Additionally, interviews and subject matter expert insights were used in this evaluation. Users were questioned regarding their use of IWS throughout the exercise. From the positive responses provided by exercise participants, it is clear that future warfighters and planners will benefit from a common collaborative tool suite. IWS has been evaluated to provide significant support of the key enablers of the SJFHQ.

Observations

IWS 2.5 was evaluated against the following key enablers of the SJFHQ and supports those enablers as indicated. IWS was deemed to provide support in all of the key enablers of the SJFHQ.

	Supports	Potentially Supports	Did not provide significant support
Establish information/ Knowledge Superiority	X		
Rapidly Set Conditions for Decisive Operations	X		
Assure Access Into and Through the Battlespace	X		
Conduct Decisive Effects-based Operations	X		
Sustain the Force	X		

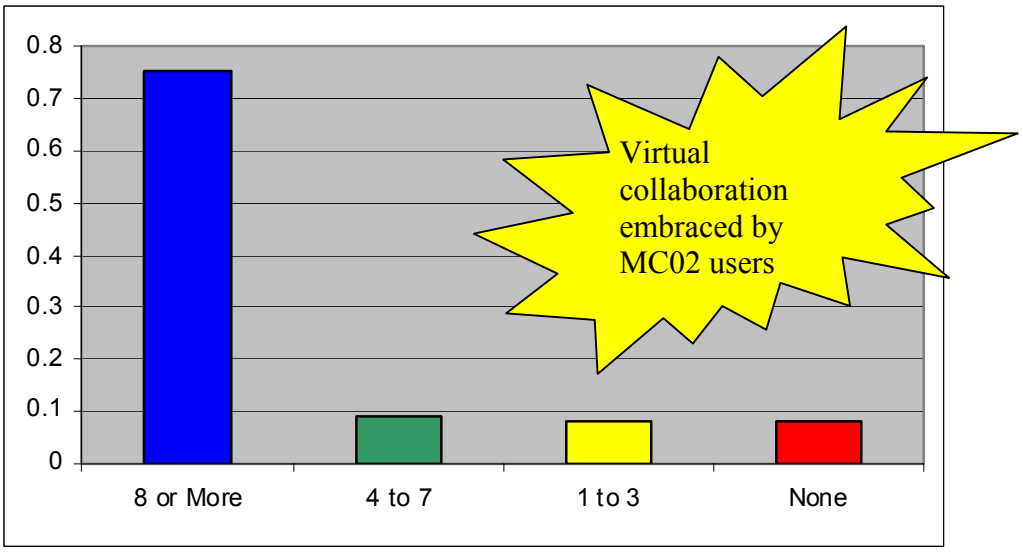
Based on the resources available and user feedback it is clear that collaborative tools support the previously identified requirement for collaborative tools in the SJFHQ. The tool was thoroughly tested during Millennium Challenge 2002. There were two separate categories of reviewers that evaluated collaborative functions during MC02; senior leaders and operators.

The first category, senior leaders (mentors, commanders and senior planners) informally evaluated the tools by voicing opinions during their after action reviews. Their overwhelming comments indicated collaborative tools were "combat multipliers" for operational planners. This senior group was able to envision the potential of collaborative planning. The audio conference rooms with synchronized graphics and documentation allowed them to envision critical coordination to be done. In contrast to face-to-face meetings that took time to arrange, collaborative tools with file sharing, audio and desktop video will reduce the risk of key leaders traveling to mission briefs and reduce the time latency associated with the delay of having to get from the meeting site back to subordinate headquarters. There were three comments that received agreement by the senior leader panel:

- No standards – No Collaboration. There was a deep understanding that as we begin to utilize collaborative tools, we cannot afford for organizations to use the collaborative tool of their respective choice. The panel understood that in MC02 the same tool was used and that contributed to the "universal" use of the product.
- Commanders cannot get tied to the tool – "HMMV hood meetings are important to leaders". There was a concern voiced that a collaborator deep in the rear or outside the area of operation could be caught up in the fight and influence decisions made by the mission commander. Additionally, leaders need to understand that the tool should not replace face-to-face opportunities rather compliment them. Finally, the tool needs to be robust enough to travel with the key leaders so that continual collaborative processes can occur.
- Collaboration limits. In a collaborative centric environment the commander risks losing control of mistakes. Where a staff centric environment can brief and provide counsel to the commander the collaborative environment can facilitate a bad decision to get out faster, subordinates to react quicker and errors become compounded by routinely briefing the staff with the command.

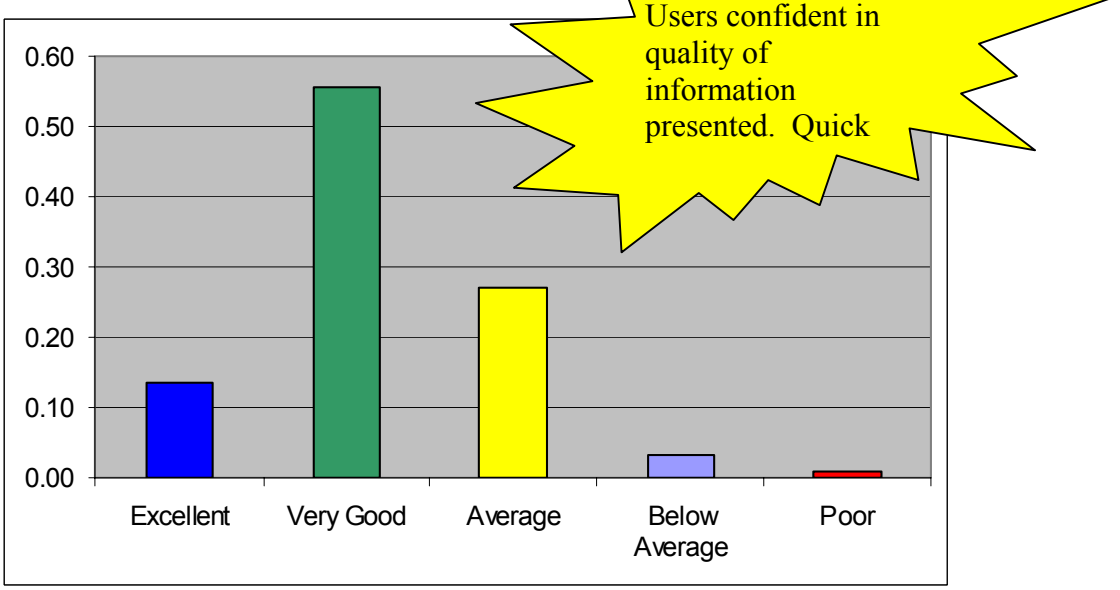
Comments suggest collaboration is indeed a significant tool to keep the team focused. Commanders need to balance collaborative sessions with the staffs and coordination with the "team". During MC02, users were questioned on the amount of time spent in informational verses collaborative sessions. Users indicated that they spent 48% of their time in collaborative sessions and 43% of their time in informational briefings. Based on senior leader comments, we might conclude that this balance is exactly what they meant by their concern. Leaders indicated that they balanced their time between collaborative sessions and information briefs. Informational sessions on a collaborative infrastructure might be just as important as collaborating on a plan. The central question we must consider is will the quest for intelligence and information find warfighters listening in on every broadcast conference instead of using the tool to collaborate with other team members to execute the mission. It is not uncommon for users to want to virtually attend every conference. Follow up experiments should attempt to determine how much of the time users spend getting information detracts from the mission focus and preparation.

The second category of reviewer was the operator. Operators vigorously used collaboration during MC02. The sample survey consisted of 487 user and their responses showed significant use of collaborative tools during MC02.



Collaborative Sessions Opened

In addition to the heavy use of collaboration during this experiment, it was also important to determine how the user community internalized data. In the network centric environment, the planners can expect to receive a significant amount of data as web enabled tools put data at the warfighters fingertips. Users were asked specifically about the quality of both oral and visual information. It is a strong vote of confidence for an experimental tool to receive the confidence of 96% of the respondents with respect to quality. The 96% indicates all respondents that rated the quality of visual and oral information as average or above. Collaboration clearly let data from a diverse group to be synergized into information that could be used to support execution of current and future missions.



Rating of the quality of visual & oral information

The intense use of collaboration tools and the synergizing of data into information lead to the question of value added to the SJFHQ and the accomplishment of mission. The graphic below demonstrates the significant potential of collaboration. MC02 users sent a strong and clear message with respect to a collaborative tool suite. The message from 90 to 95 percent of the users is that collaborative tools are effective. More importantly, this effectiveness supports the horizontal and vertical coordination efforts necessary to synchronize the visualization of the battlefield via the Common Operational Picture and Common Relevant Picture.

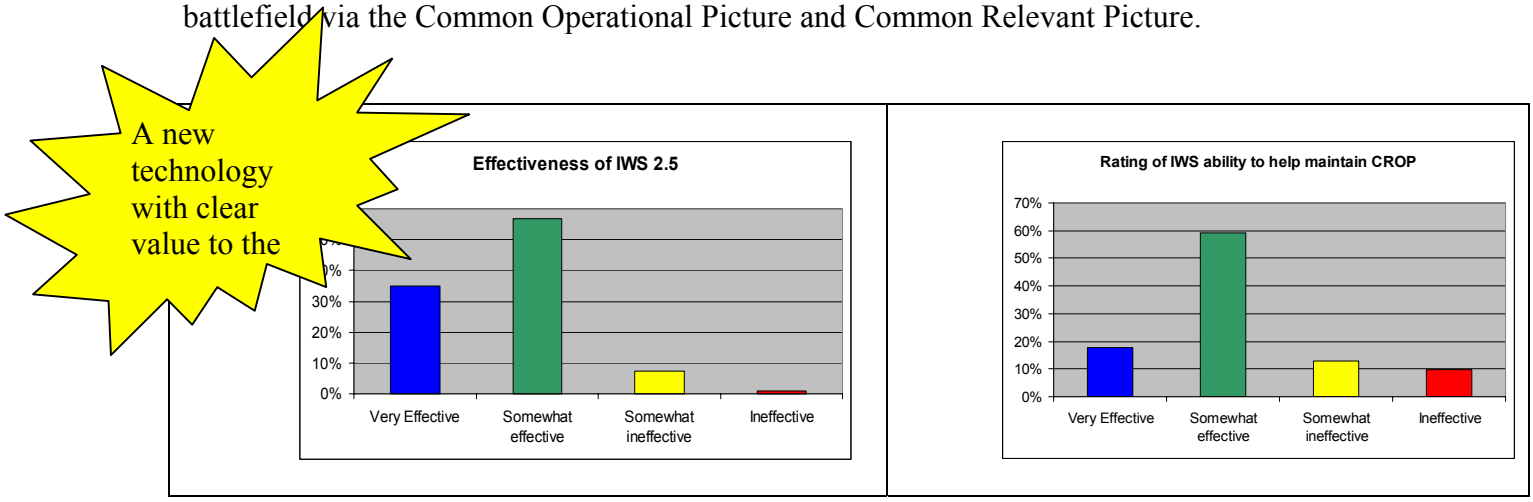


Figure 208: Effectiveness of IWS and its ability to help maintain CROP

Many responses in this category were caught up in the "button-ology" of IWS. Their focus was how the tool functioned "today" and this focus blurred how they envisioned it would work in the future. Strong configuration management and future developments in a Joint collaborative tool suite will mitigate many of their concerns. Planners and developers should be aware of the single thread that the minority voiced as a concern – training. Users continually commented on how their level of training influenced their ongoing activities. Users who attended Spiral 3, and received training, felt IWS was easier to use during this exercise. Users with prior experience with IWS at their home command were trumpeting the benefits of collaboration. Some users reported that once they became familiar with IWS, then they experienced significantly fewer problems. As joint collaborative tool suites are fielded to the services, their common "look and feel" should significantly reduce the learning curve experienced with this tool. In addition to training, server stability and network control were voiced by users as areas needing improvement. As the JFCOM Commander said in a press conference, we were lucky in MC02 that all users had the same tool. If we enforce COE standards, we will see common look and feel graphic environments. Users will understand the tools if it is the one used at home station or the one first seen joining a JTF.

The combined use of collaborative tools such as IWS, MSN messenger and the SPPS portal significantly enhanced the positive outcome of Millennium Challenge 2002. Key leadership and users alike touted the benefits of rapidly collaborating with key personnel to focus on the mission. The need for a joint collaborative tool suite was reinforced by all leaders and mentors. Users demonstrated through extensive use of and participation in collaboration that the SJFHQ will benefit from effectiveness of these tools. Collaborative tools will provide the information superiority that combatant commanders, services, agencies, and coalition forces require during the planning and execution phases. Collaborative tools strongly support the functionality required by the SJFHQ.

Relationship to Other Objectives

As the primary collaborative tool for MC02, IWS can be linked to every other area evaluated within this experiment.

DOTMLPF Linkage

IWS results support the DOTMLPF package by confirming that users found the collaborative information environment (CIE) were a transformational capability in comparison to current operations.

Recommendations

Many users were caught up in the "button-ology" of IWS. Their focus was how the tool functioned "today" and this focus blurred how they envisioned it would work in the future. Strong configuration management and future developments in a Joint collaborative tool suite will mitigate many of the users' concerns. Planners and developers should also be aware of the single thread that the minority voiced as a concern – training. Users continually commented on how their level of training influenced their ongoing activities. In addition to training, server stability and network control is also an area that needs improvement.

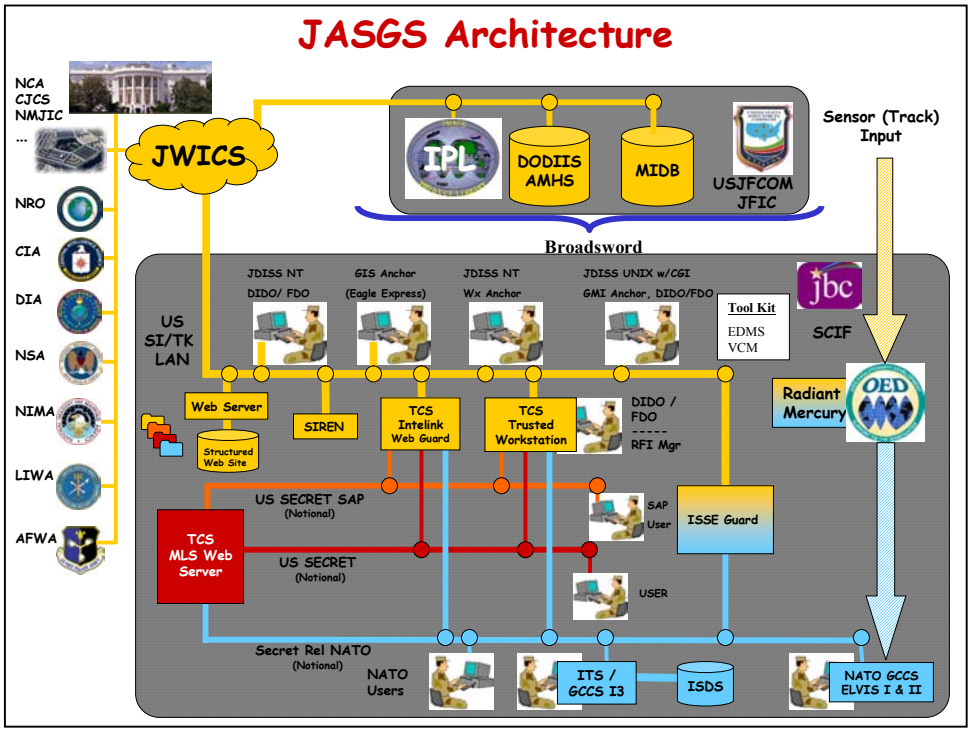
Users reported the IWS was very effective to somewhat effective as a collaborative tool in support of RDO and the CROP. The collaborative tool must include the following capabilities found in IWS during MC02:

- Online Detection & Instant Messaging – instant messenger capability enables users to locate people connected to the system, chat with them instantaneously and/or invite them to join a virtual conference.
- Virtual Work Space – complete virtual meeting facility where users can meet and collaborate, store projects and review archives. The majority of users indicate that they used 8 or more collaborative sessions.
- Collaboration Tools –includes a full range of collaboration tools such as multiparty message chat, multiparty audio conferencing, video web casting, advanced white boarding capability, application casting and shared viewing, persistent storage of meeting minutes, online voting and polling, and much more. Users reported IWS quality of visual and oral information being between excellent and very good.
- Video Conferencing – provides support of standards-based video conferencing (IP H.323 & ISDN H.320) and offering "one click" access to video meetings in addition to the full suite of collaboration features.

Joint Automated Single Guard Solution (JASGS)

Description

JASGS, sponsored by the Joint C4ISR Battle Center, is a composite Multi Level Security (MLS) solution that offers the Unified Commander and Joint Task Force Headquarters (JTFHQ) warfighters a single, common interface to share information among security domains in accordance with existing policy, procedures and standards. It offers a shared view of multi-level security data including unformatted data and General Military Intelligence (GMI). When operational, the SJFHQ can expect to use JASGS to exchange properly marked information among US SI/TK (JWICS), US Secret (SIPRNET) and multi-national secret environments through a single, common web-enabled interface. As the DoD emphasis on web-centric operations grows, JASGS will be positioned to enhance our security posture.



JASGS has two primary information exchange capabilities between multiple security domains. The first capability is the movement of releasable information prepared by users on the JWICS network and passed through the Trusted Web Guard to the MLS Web Server located on a closed U.S. Secret network. This capability enables information to be posted to the MLS Web Server and provides users the ability to access and view directory structures based upon their authorized level of access. The second capability supports Operational Net Assessment users on the JANET Unclassified network in moving OSIS information through an appropriate guard called the Trusted Gateway System to a selected server on the MC02 U.S. Secret network.

Overall Assessment Results

No assertions can be made based upon the MC02 survey results on JASGS as the technology and capability was not sufficiently exercised during MC02. Connecting JWICS and NIPRNET to the operational SIPRNET could have been overcome by simulation of each network throughout the exercise. JASGS may support a previously identified requirement for multi-level security, but that requirement was not thoroughly tested during MC02. In future operations a SJFHQ can expect to deal with a variety of "plug and play" units like JASGS, thus a simple and intuitive multi-level security platform is needed to meet dynamic data exchange requirements. Indications are that JASGS supports an identified requirement for multi-level security, but the level of support to these requirements was not fully evaluated by JASGS during Millennium Challenge 2002.

Methodology

JASGS was evaluated by seven users from the Joint Task Force (JTF) during MC02. These users were questioned through surveys about their use of JASGS. Joint Battle Center (JBC) resources were also surveyed to better evaluate the utility of JASGS. The combined analysis indicates a potential for providing significant key enabler support to the SJFHQ.

Observations

The proliferation of data on our three primary networks (NIPRNET, SIPRNET and JWICS) requires seamless data exchange between these networks based upon the need to support Operational Net Assessments. As we attempt to establish information and knowledge superiority, we need a mechanism to move the data between systems to develop the entire COP and CROP picture. As we establish a persistent collaborative environment across echelons of command, interagency participants, and Centers of Excellence, the use of JASGS should enable formal and informal collaborative sessions based upon capabilities inherent within this system.

JASGS is also poised to support the assured access into and through the battlespace required by the SJFHQ. The initial phases of a "Come as you are war" requires the warfighter to have the ability to plug a JASGS configured laptop, PDA (Personal Digital Assistant) or other mobile device into the GIG (Global Information Grid) while ensuring synchronized security and force protection. Findings presented in the final report prepared by the JBC indicate there is little question that JASGS will provide a fast, efficient and effective mechanism to move data between networks. However, the results of MC02 cannot conclusively be used to determine the operational viability of JASGS in an operational environment because planners elected not to inject JASGS play throughout the exercise.

Of the seven people surveyed on the existence of requirements to move information from an Unclassified network to a Secret network, only two users indicated that they were qualified to answer a requirements based question; therefore, no assertions can be made from the survey. The survey results indicate only 50% of the users during MC02 felt there was a requirement within their organization to move information between classified networks. This is clearly not the case based upon the intense real world interest in a JASGS type product to support coalition and joint warfighters as evidenced by the stated requirements within the technical and functional communities with an interest in this type of functionality. A possible explanation for the unfavorable survey results may be that JASGS was not properly presented or utilized during MC02 (to include lack of sufficient training). Injecting information at specific times of the exercise would have presented the small user community with a reservoir of information that would force them to move data as appropriate. The concern of connecting JWICS and NIPRNET to the operational SIPRNET could have been overcome by simulation of each network throughout the exercise. (A SIPRNET enclave could have been designed and connected to the network. The enclave could have been designed to meet all SIPRNET requirements and the designer could have put "SECRET EXERCISE ONLY DATA" on that local area network. All data coming into and out of the exercise SIPRNET enclave could have been examined for evaluation. This could have been duplicated for a MC02 NIPRNET. Significant information and insight could have been gained regarding how data is perceived and what gets passed between networks.) In future operations a SJFHQ can expect to deal with a variety of "plug and play" units like JASGS, thus a simple and intuitive multi-level security platform is needed to meet dynamic data exchange requirements. Indications are that JASGS supports an identified

requirement for multi-level security, but the level of support to these requirements was not fully evaluated using JASGS during MC02.

Recommendations

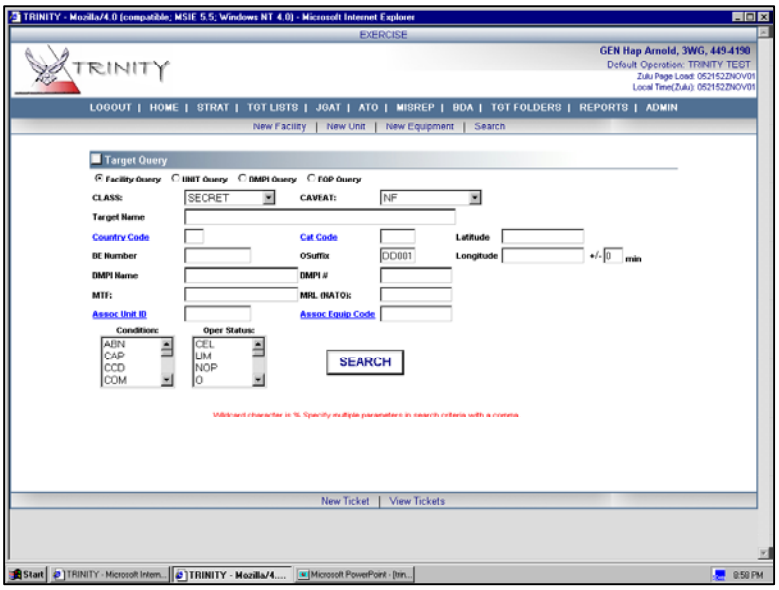
More experimentation that is specific needs to be conducted on JASGS and related technologies in order to draw conclusive recommendations. Indications are that JASGS supports an identified requirement for multi-level security, but the level of support to these requirements was not fully evaluated by JASGS during MC02. JASGS usage should be tailored to support an identified requirement for multi-level security, and that requirement be thoroughly tested during the next applicable experiment/exercise.

Joint Automated Target Folders (JATF)

Description

Joint Automated Target Folders, JATF, is an immature tool, which was recently developed for concept demonstration during MC02 and was sponsored by Joint Forces Command Joint Experimentation Division, J9. The JATF database is a dynamic repository of targeting information and products that reside in a web-based environment accessible through a service member's commercial off-the-shelf web browser. Using a trusted client relationship with the services and CINCs, the JATF can be dynamically updated in real time to reflect the most current data on a threat target in the Joint Operations Area (JOA). It is maintained centrally, but can be exported to distant and isolated locations/headquarters as appropriate. This capability is a logical evolution in target folder development given technological leaps forward in information technology.

JATF is a component of the Joint Targeting Toolbox (JTT). The goal of the JATF is to provide timely targeting information, situational awareness, demonstrate weapon target pairing, and the value of horizontal coordination among and across components, NATO allies and coalition forces during the prosecution of Time Sensitive Targets (TSTs). JATF has the capability to execute virtual target development with the targeting support products using the JATF database (DB), to dynamically update the targeting JATF DB as target updates are required. JATF will also provide the capability to use the JATF to collaborate with NATO allies participating in coalition environments. JATF DB will interface with GCCS supporting the CROP at selected nodes, and will communicate with the Advanced Field Artillery Tactical Data System (AFATDS), the Theater Battle Management Core System (TBMCS), and the ADOCS/Land Attack Warfare System (LAWS) as normal. Communications with AFATDS and TBMCS will be via Simple Mail Transfer Protocol (SMTP). Figure 1 depicts the JATF website.



Overall Assessment Results

JATF concepts were well received by the operators as evidenced by the respondent comments to survey questions. However, we must point out that JATF is an immature tool, which was recently developed for concept demonstration during MC02. Findings based on the results from the assessment questionnaires completed by operators follow:

- Twenty-nine out of forty-six operators responded "Yes" when asked if JATF helped reduce the targeting cycle time assessed (see Figure 2).
- Most operators assessed JATF as having positive impact on the JTF performing actions on: Developing Courses of Actions (COAs), Maintaining High-Value Targets (HVTs), executing rapid targeting and re-targeting, receiving and providing target information, modifying and adjusting planned missions, conducting dynamic planning, performing Command and Control (C2) of assigned units, and coordinating fires among services.

Because of the immaturity of JATF, an observation for the need of a consistent database replication/overlays across the participating units is emphasized. The CROP display was not consistent among GCCS, AFATDS, TBMCS, ADOCS and LAWS.

Methodology

The JATF was evaluated by users that dealt specifically with targeting. A series of survey questions were submitted to the users for evaluation. Users were also interviewed. The JATF was reviewed in light of the fact that it is an immature tool used for concept demonstration only.

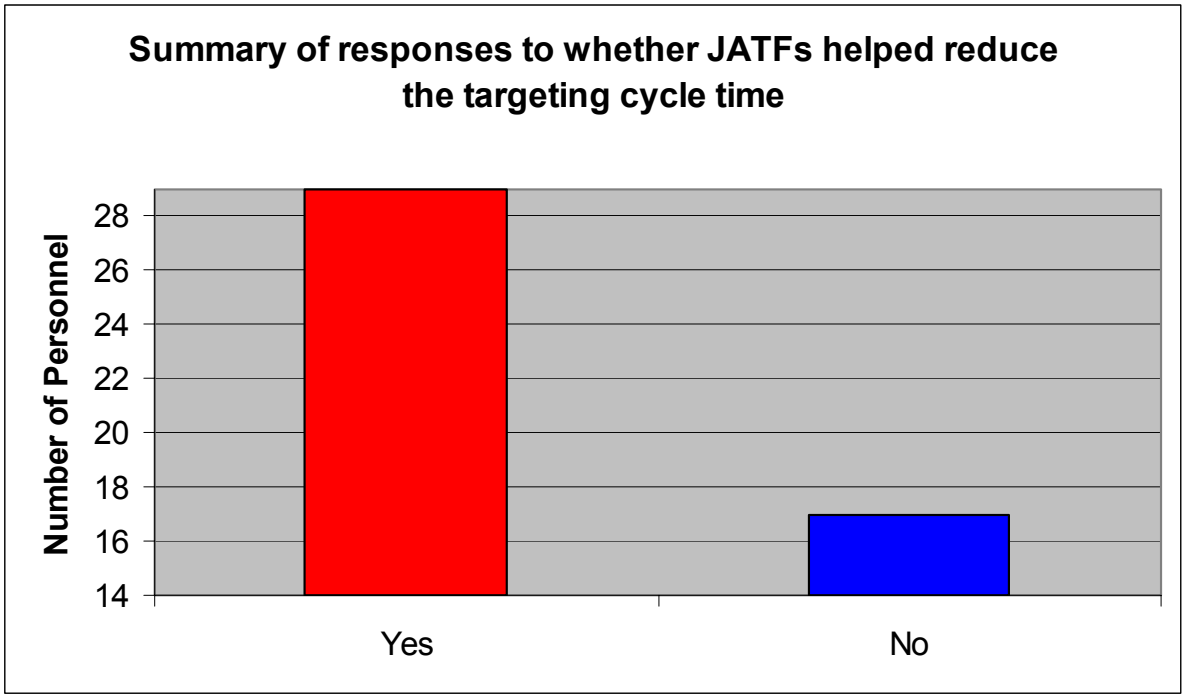
Observations

JATF provides for the following SJFHQ key enablers.

	Supports	Potentially Supports	Did not provide significant support
Establish Information/Knowledge Superiority	X		
Rapidly Set Conditions for Decisive Operations	X		
Assure Access Into and Through the Battlespace	X		
Conduct Decisive Effects-based Operations	X		
Sustain the Force			

JATF demonstrated the support of the SJFHQ key enablers as follows**:**

- Established Information/Knowledge Superiority by:
- Providing target information to the CROP
- Conducting target planning, execution and assessment in a collaborative environment
- Establishing a collaborative environment for target information
- Rapidly Set Conditions for Decisive Operations by:
- Providing target information in the conduct of effects-based planning
- Synchronizing target information for Joint Actions
- Assured Access Into and Through the Battlespace by:
- Providing target information to optimize positioning to maximize operational



reach

- Provide target information available for en-route planning C4

- Provide target information for en-route force protection
- Conduct Decisive Effects-based Operations by providing target information used in the:
- Development of effects-based tasking orders
- Reachback capabilities to enhance the targeting process

The figure above depicts the results to the question if JATF helped reduce the targeting cycle time. Twenty-nine operators responded "yes"; 17 operators responded "no". This indicates that the JATF developed for the MC02 experiment was better than average in reducing targeting cycle time.

- Developing Courses of Action (COAs) - based on 33 responses
- Maintaining High Value Targets (HVTs) - based on 31 responses
- Executing rapid targeting and re-targeting - based on 32 responses
- Receiving and providing target information – based on 39 responses
- Modifying and adjusting planned missions – based on 24 responses
- Conducting dynamic planning - based on 26 responses
- Performing Command and Control (C2) of assigned units - based on 23 responses
- Coordinating fires among services - based on 26 responses

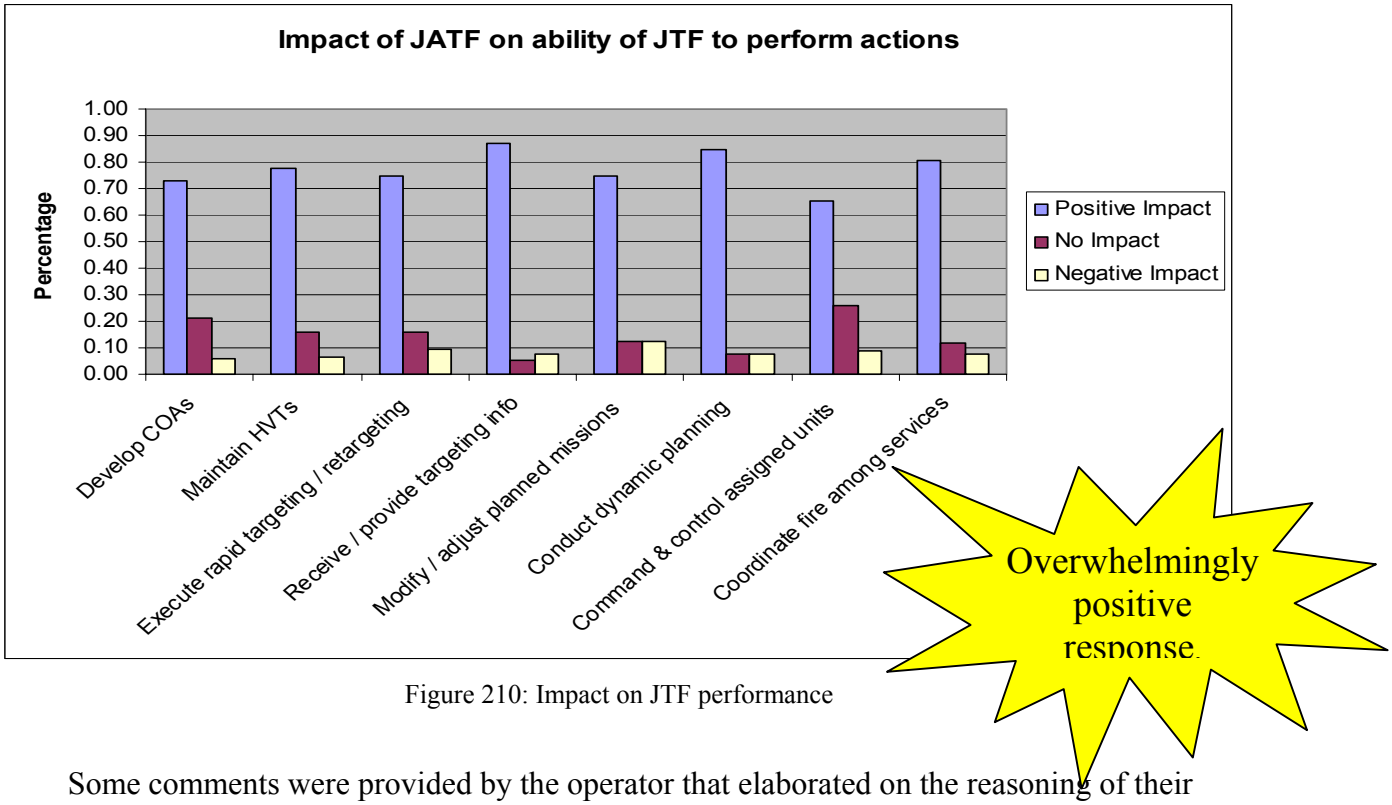


Figure 210: Impact on JTF performance

Some comments were provided by the operator that elaborated on the reasoning of their rating. Some of the highlights of those comments on JATF follow:

Positive feedback

Respondent comment:

- It helps us with our collection decks, supplementing what we are not always getting from analysts. I think the tool has some use at least.

- Excellent tool in providing targeting information, however, it needs to utilize standardized format to be used throughout all firing units and all of the information in the folders be maintained current.

Needs for improvements

Respondent comment:

- Because of the immaturity of JATF, it was observed, the need for consistent database replication/overlays across the participating units. The CROP display was not consistent among GCCS, AFATDS, TBMCS, ADOCS and LAWS.
- No apparent way to relay TSTs to JATF and to MIDB information.
- No indication that the folder contained the latest of the target information.
- There is a need of more JATF training/familiarity for the operator in support of MC02 CONOPS. Due to the lack of training, a number of operators did not use JATF and this resulted in incomplete target folders.
- There is a need to standardize required target information to be included in the folder. Lack of standards causes confusion, inconsistent data information from one folder to the other, and in some cases, volumes of information including old data. Because of the dynamic insertion of information, the picture being generated changes with time, and that causes confusion.
- There is a need for JATF have a backup process/system in case the server, which contains all the JATF information, crashes.

Recommendations

More experimentation needs to be conducted in the area of Joint Targeting Toolboxes. A consistent database is needed across the participating units. The CROP display was not consistent among GCCS, AFATDS, TBMCS, ADOCS and LAWS. A method is also needed to relay TSTs to JATF and to MIDB information. Additionally, the JATF also needs some way of indicating that the folder contains the latest information. There is also a need to standardize required target information to be included in the folder. Lack of standards causes confusion, inconsistent data information from one folder to the other, and in some cases, volumes information including old data. Last of all, there is also a need for JATF to have a backup process/system in case the server, which contains all the JATF information, crashes.

Joint Enroute Mission Planner – Near Term (JEMPRS-NT)

Description

Joint Task Force Commanders require a robust and secure Command, Control, Communications, Computers, and Intelligence (C4I) information system to support mission planning with Component Commanders while enroute to and from an area of operations.

The JEMPRS-NT program sponsored by the Joint C4ISR Battle Center, identified, integrated, and assessed technologies to support a mobile C4I information system. The JBC leveraged lessons learned from JC2S, EMPRS/SECOMP-I, JCF-AWE, and JEFX initiatives and put together commercial off-the-shelf products to provide secure voice, video, application sharing, whiteboard and text chat, digital dashboard, email and file transfer, web service, common operational picture (COP) and network access to Command and Control (C2) and intelligence systems.

JEMPRS-NT enables global collaboration using the Defense Collaborative Tool Suite (DCTS) or in the case of MC02, InfoWorkSpace (IWS). It does this by utilizing the International Maritime Satellite Radio High Speed (INMARSAT HSD) service and through accelerating and compressing the data.

JBC increased the INMARSAT data rate four to ten times the initial rate and transformed a 64Kbps (Kila bite per second) link into a virtual 256Kbps. These enhancements allow more effective use of limited bandwidth to increase speed of data and enable the use of common collaborative tools.

Overall Assessment Results

During MC02 the JTF Commander and staff utilized 13 workstations loaded with IWS collaborative tools, ADOCS, and email to participate in the Joint Targeting Board (JTB) briefs and maintain good situational awareness while transiting to and from the AOR. Each flight aboard the SOLL-II C-17 lasted approximately 5 hours. Connectivity was lost 4 times going to California and 16 times coming back to Virginia due to turbulence or altitude changes. Each time connectivity was lost it took approximately five to ten minutes to log back on to IWS. ADOCS came back much easier.

The bottom line: JEMPRS-NT enabled the JTF to accomplish all necessary tasks during flight, which supported all key enablers for the SJFHQ.

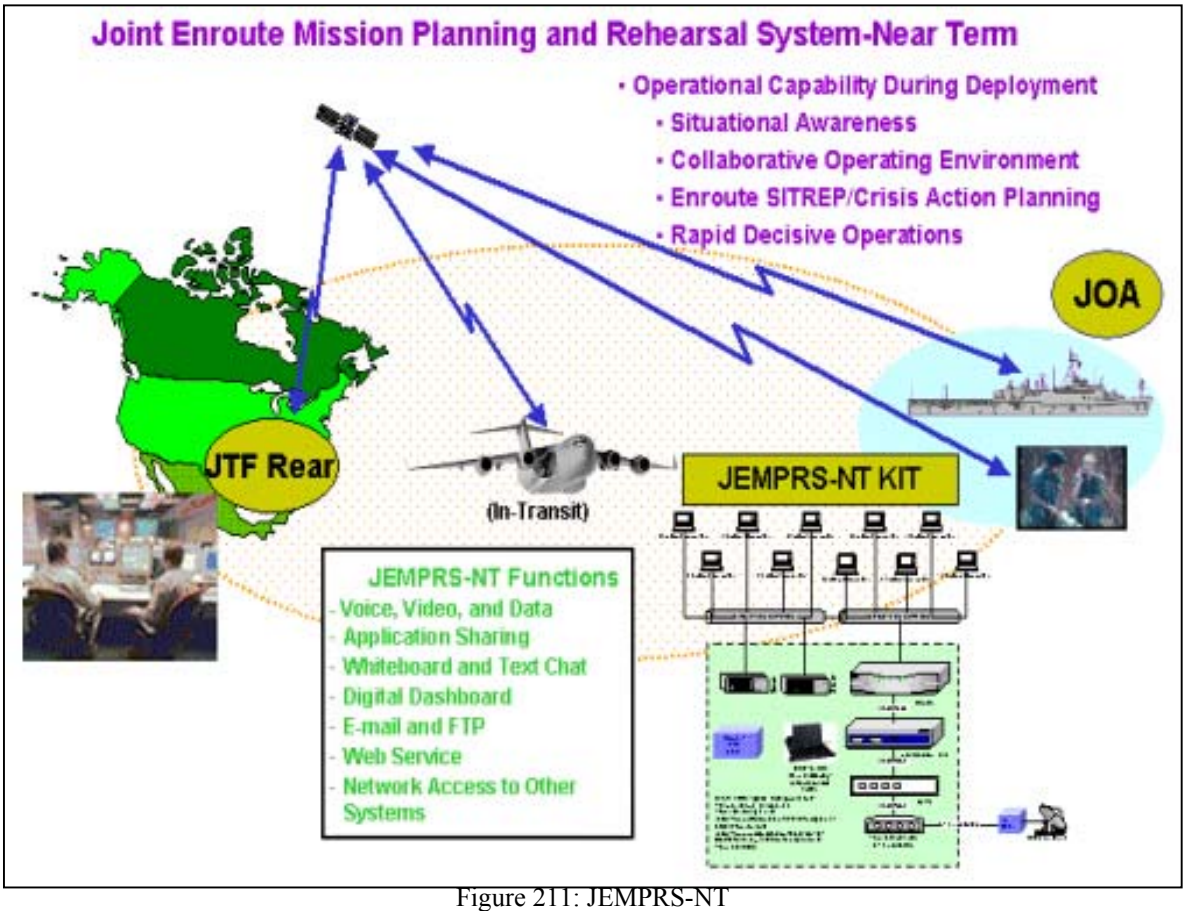


Figure 211: JEMPRS-NT

Methodology

JEMPRS-NT was evaluated by 18 users during MC02. These evaluators consisted of Operations, Plans, Intelligence, and Knowledge Management Officers, as well as JEMPRS-operators. The JTF Commander and staff utilized 13 workstations loaded with IWS collaborative tools, ADOCS, and email to participate in the Joint Targeting Board (JTB) briefs and maintain good situational awareness while transiting to and from the AOR. Each flight aboard the SOLL-II C-17 lasted approximately 5 hours. This assessment was written using warfighter surveys, comments, interviews and personal observations. This assessment methodology, although not scientific, showed that JEMPRS-NT supported all the key enablers of the Standing Joint Force Headquarters (SJFHQ).

Observations

Eighteen users were surveyed regarding JEMPRS-NT warfighter utility during MC02. Over 60% of those surveyed said the capability to access the JTF collaboration system using JEMPRS-NT while enroute to an AOR was good or excellent. Less than 25% said this capability was adequate or less than adequate. One person mentioned they were unable to access the JOC but that was due to server problems and was not related to JEMPRS-NT. Another commented that more workstations were needed and some staff members were only able to listen in. It was explained that the number of workstations, was limited in order to manage bandwidth. If there were more workstations they would have been reduced capabilities on each (i.e. they would only have email and web access and not collaborative tools.)

Over two-thirds of the warfighters surveyed strongly agreed that enroute collaboration, and transferring, sending, and receiving files between deploying personnel and the JTF Rear via a reachback link is an important capability. The survey response to the current capability to transfer/send/receive files was mixed due to the slow load time for graphic files/maps. This problem can be solved by increasing bandwidth or to transfer smaller files. One comment was that it took one minute to download a 33Kb file.

Information access through HTTP was a problem for some users aboard the C-17. This could have been due in part to graphics posted on some pages causing long download times. This may be an issue for the KM/KMO ROE. Some web pages had graphics, which did not provide value-added information. Ninety-nine percent of the users agreed (61% strongly agreed) that information through HTTP access was important.

Eighty-three percent of JEMPRS-NT users agreed (61% strongly agreed) that access to common operational picture (COP) while the JTF is on the move is important.

Most users agreed or strongly agreed that JEMPRS-NT should be fielded. It was commented that this capability does not have to be installed on a C-17. Most any INMARSAT equipped platform will do. One drawback, according to users, is communication data rates. Thirty-seven percent rated the data rate partially adequate, 17% said they were adequate, 28% percent rated the data rate as good, and only 5% said they were excellent.

Most of the warfighters surveyed approved of the ability of JEMPRS-NT to perform the required tasks (it was rated excellent by 17%, good by 44%, and adequate by 22%). In addition, most users agreed that the JEMPRS-NT flyaway kit supported situation awareness (SA) while the JTF battle staff was enroute (61% said it was good, 17% said it was excellent and only 11% said it was adequate).

JEMPRS-NT enabled the JTF to accomplish all necessary tasks during flight, which supported all key enablers for the SJFHQ. JEMPRS-NT supports all the SJFHQ key enablers by allowing the JTF Commander and his battle staff to collaborate using voice, video, application

sharing, whiteboard, text chat, file transfer, and digital dashboard. This is accomplished over an encrypted 64Kbps INMARSAT links which gives to the JTF Commander freedom to plan missions with the CINC and Component Commanders from anywhere in the world. When the system was up it approached excellent, but data speed is still an issue. During MC02 limited bandwidth restricted use of all applications by some users aboard the C-17. It is projected that in two years INMARSAT will increase speed to 400Kbps, which may relieve some of these restrictions.

	Supports	Potentially Supports	Did not provide significant support
Establish Information/Knowledge Superiority	x		
Rapidly Set Conditions for Decisive Operations	x		
Assure Access Into and Through the Battlespace	x		
Conduct Decisive Effects-based Operations	x		
Sustain the Force			x

DOTMLPF Linkage

USJFCOM, working with other CINCs and services as required, is developing a DOTMLPF synchronization plan and the interface should be fielded after JITC certification tests.

Recommendations

The Joint Task Force (JTF) headquarters requires a collaborative mission planning capability between aircraft, ship, and mobile ground forces while deploying to an Area of Operations (AOR). JEMPRS-NT enables this using collaborative tools, Command and Control, and Intel systems across enhanced global reachback links. For Millennium Challenge 2002, the JTF Commander based in Suffolk, VA used JEMPRS-NT to enable mission planning via InfoWorkSpace (IWS) and ADOCS while enroute to and from Naval Air Station North Island, California while aboard a Special Operations Low Level (SOLL-II) C-17.

The SOLL-II C-17 was chosen because it has an International Maritime Satellite Radio High Speed Data (INMARSAT HSD) antenna that could be used to connect with the ground station at Suffolk, VA. Bandwidth optimization technologies allowed more effective use of IWS collaborative tools across the secure satellite link by transforming a 64Kbps link into a virtual 256Kbps link.

JEMPRS-NT leverages commercial off-the-shelf technology and is technically mature enough to transition to a program management office (PMO). USJFCOM, working with other CINCs and services as required, is developing a DOTMLPF synchronization plan and the interface should be fielded after JITC certification tests.

Joint Fires Initiative–Automated Deep Operations Coordination System

Description

Sponsored by the Naval Warfare Development Center and the Joint Precision Strike Demonstration Office

The Joint Fires Initiative – Automated Deep Operations Coordination System (JFI ADOCS) identified technologies within Millennium Challenge 2002 that demonstrate near term potential. JFI provides a common tool set, architecture and automated processes for the Joint Force Commander, all Component Commanders and supporting tactical level forces to conduct operational and tactical level "fires" across the entire engagement spectrum from planning to execution for pre-planned and time sensitive targeting (TST). The tool set used was the Automated Deep Operations Coordination System (ADOCS) for the Army, Air Force and SOF. The Navy and the Marine Corps used the Land Attack Warfare System (LAWS). ADOCS/LAWS integrates a broad range of Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) systems, enabling horizontal and vertical integration of information and command and control actions.

JFI enables Time Sensitive Targets (TSTs) coordination across components and the Joint Task Force (JTF) Headquarters.

ADOCS, provides an integrated set of tools for data management and analysis, and mission planning, coordination, and execution. It was originally developed for deployment at the Army Corps level, but has since migrated to both higher and lower echelons. ADOCS is a distributed system supporting a wide number range of workstations that are typically located at multiple echelons. This enables ADOCS to provide horizontal coordination within each echelon, as well as vertical coordination among echelons.

The use of this system's functionalities allowed the MC02 team to engineer bridges to Service systems (Theater Battle Management Core System, Advanced Field Artillery Tactical Data System, Global Command and Control System Integrated Imagery and Intelligence, Master Imagery Database (TBMCS, AFATDS, GCCS-I3, MIDB)) which helped automate the Time Sensitive Target (TST) process. The focus of effort was on TST management functionality. A code bridge was established, that automatically connects the TBMCS Dynamic Target List (DTL) to the JDTL in ADOCS. Another code bridge automatically connected AFATDS mission manger to the ADOCS mission manager, passing fire missions. A JDTL also established a common targeting knowledge base for engaging TSTs.

ADOCS and LAWS are synonymous terms because they are essentially the same system. The ADOCS/LAWS provides the joint warfighter a common set of situational awareness tools and capabilities in the fires, targeting, weapons, operations, and intelligence disciplines.

The Presentation Tool of ADOCS identified technologies participating within MC02 that demonstrate near term potential and supports the Unified Command's requirement for an effective way to manage their information to rapidly assess the emerging situations with a focus on optimizing decision-making through enhanced situation awareness. The technology provided a common display toolset across the MC02 infrastructure to gain situation awareness across the Unified Command, Joint Task Force (JTF) Headquarters and Component Staffs. The assessment determined a successful architecture that could be institutionalized as a common Joint Fires Integration Management Tool; and/or as a presentation and situational awareness tool.

Building upon the JFI concept, the JFI mission is enhanced by the CROP toolsets providing the users with the same information, same results, and ensures consistent horizontal integration of information across components.

Overall Assessment Results

Based upon the results of the experiment, a common operational picture was created and maintained by utilizing the common tools. During the scenarios, the operators were successful in their ability to maintain and distribute timely, accurate and relevant integrated pictures of JTF units, locations, and status for the JFI missions. The operators succeeded in creating and maintaining a shared awareness and collaboration to synchronize our forces. This supports the operational tempo and prevents surprises by the adversary. Therefore, the JFI, as a concept, was proven to enable the creation of a common picture, based upon the toolset (ADOCS and IWS in this instance), utilizing common information formats (ADOCS displayed USMTF (U.S. Message Text Format) and, in some instances, TACFIRE formats), codified by a common set of procedures (the JFI TT&P). This is vital to our telling of the story and moving the "CONCEPT" of JFI forward in future events and out to the warfighting CINCs and the forces they have operating under them.

The following summarize the major findings obtained from user feedback.

- Future JFI tools should include the following functions:
    - Alerts of duplicate targeting.
    - Simultaneous horizontal coordination.
    - Rapid access and exchange of target info.
    - Easy to use displays/functions.
    - Accurate/timely identification of available strike assets.
    - Future JFI tools should include effective target-handoff.
    - Support rapid execution of TST.
    - Support automated handoff to service systems.

- Future JFI tools should support situational awareness with the following functions:
    - Display of Red and Blue forces.
    - Create, share and display overlays.
    - Display maps for coordination.
    - Visualization of terrain (2D, 3D).
    - Display imagery for TST.
    - Display fire-coordination measures.

Methodology

JFI was evaluated by 52 users during MC02. The survey respondents included Targeting Personnel from the each of the components and the JTF Targeting Staff. This group was supplemented by three Subject Matter Experts, which brings the total respondent number to 55. A series of different questions were periodically submitted to the users for evaluation throughout the exercise to obtain responses that measured the maturing perspectives of the users as familiarity and functionality increased during the operational tempo. This methodology also supports the design of future training for the operators based upon the feedback received on surveys. The users were asked questions related to key JFI functions and capabilities. Specifically, the users were asked about collaboration/coordination capabilities, target handoff capabilities, situational awareness, ATO/ACO requirements and the effectiveness of CONOPS/TTPs for successful mission execution. The findings presented below are based upon actual user feedback.

Observations

The below picture provides a snapshot of the functional elements that are consolidated onto one operational screen. It emphasizes the importance of generating a dynamic common picture for TST collaboration and coordination.

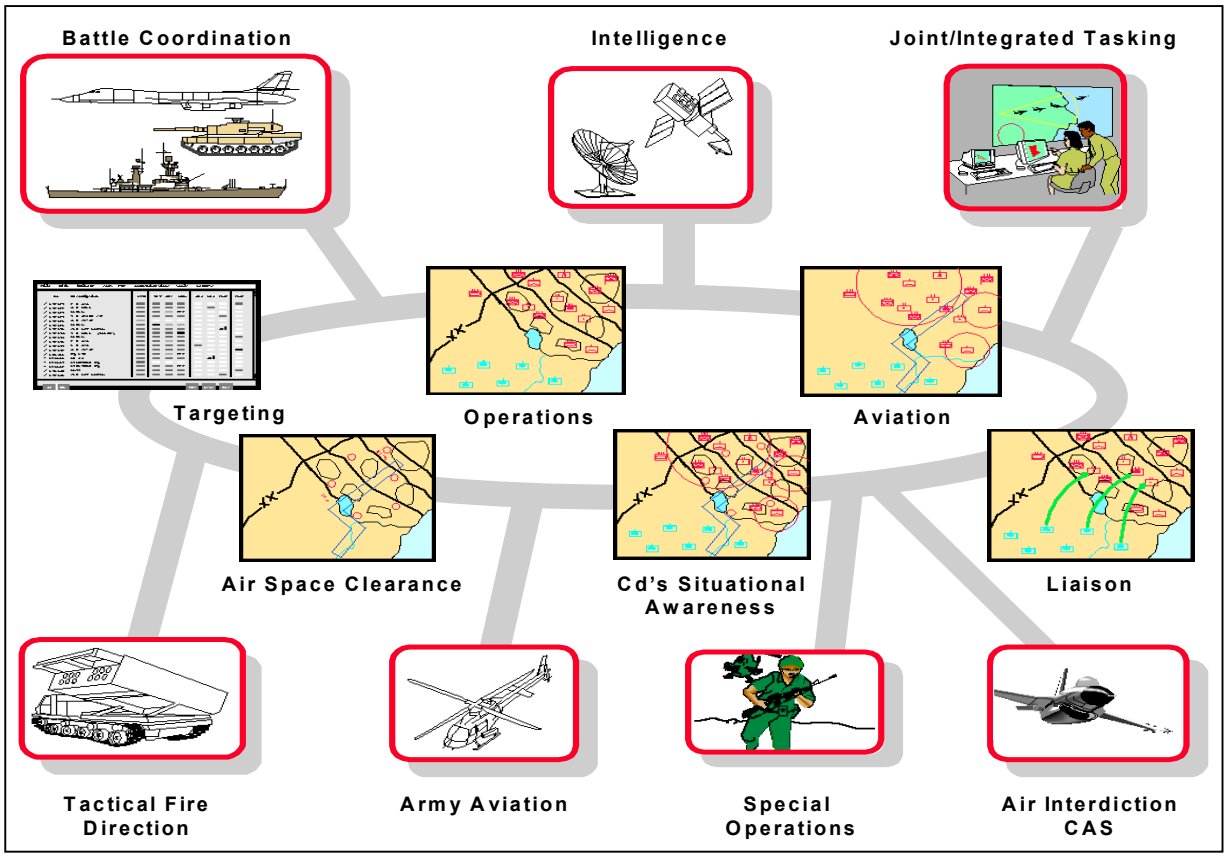


Figure 212: The JFI communications grid ensures critical information is shared with the people who need to know, when they need to know it

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    - Rapid access and exchange of target info.
    - Easy to use displays and functions.
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    - Create, share and display overlays.
    - Display maps for coordination.
    - Visualization of terrain (2D, 3D).
    - Display imagery for TST.
    - Display fire-coordination measures.

Operators recognized the need to include all the functionalities in the situational awareness set of capabilities to support TST coordination. The neutral responders either did not use the tool or were not sure of the benefits. When assessing terrain visualization, some operators doubted the significance of the 2D or 3D utility in the successful coordination and execution of TST operations.

JFI concepts of operation and tactics, techniques, and procedures. More than 60% of the operators agreed that the JFI concept of operations and TTPs were adequate to support real-world joint operations.

The operators who disagreed did so based upon lack of knowledge or training regarding the CONOPS/TTPs or a concern that the TTPs were not sufficiently mature for real-world operations.

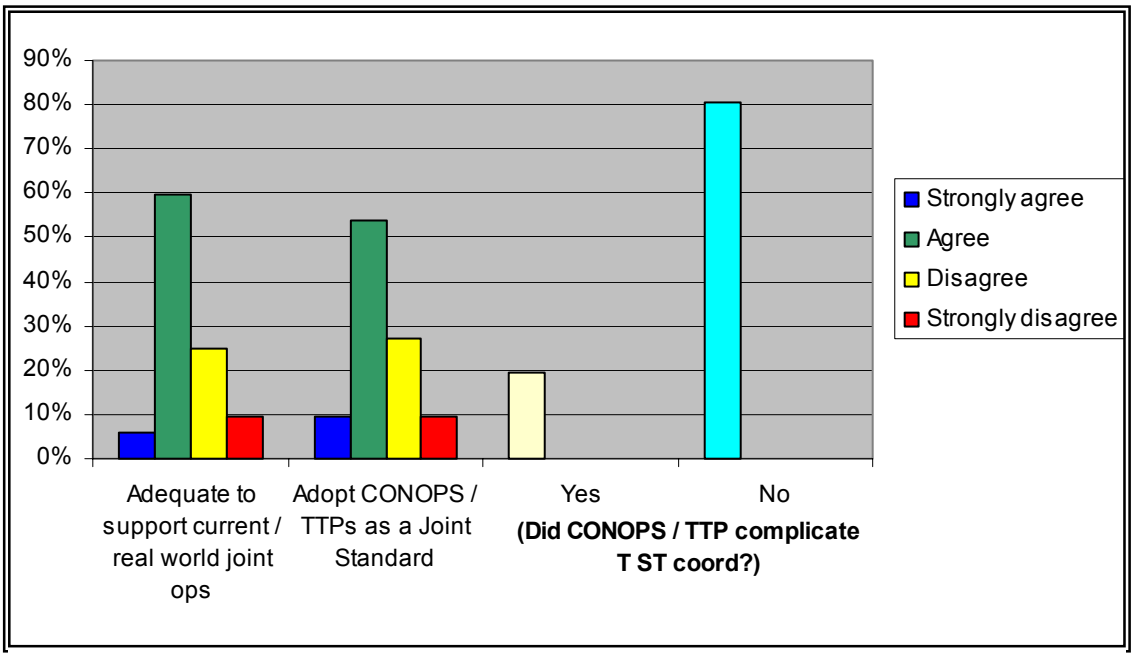


Figure 213: Effectiveness of JFI Concept of Operations and TTPs

Eighty percent of the responders did not believe that TST cross-component coordination and decision-making complicated the mission. However, 20% believed there is a need to improve the concept of operations and TTPs. Specifically, the TTPs need to delineate clearly between critical targets and time-sensitive targets and how they are prosecuted.

Operators indicated that there should be an acceptance of a joint standard for CONOPS/TTPs. They also indicated that the CONOPS/ TTPs contributed to mission success.

JFI demonstrated that it could support the key enablers of the SJFHQ in the following areas based upon warfighter observations. Within each area, users identified the JFI elements as significant in their contribution to Rapid Decisive Operations:

Enabler	Supports	Potentially Supports	Did not Provide Significant Support
Establish Information Knowledge Superiority	X		

Rapidly Set Conditions for Decisive Operations	X		
Assure Access Into and Through the Battlespace	X		
Conduct Decisive Effects-Based Operations	X		
Sustain the Force			X

(1) Establish information and knowledge superiority:

(a) Displays the GCCS database portion of the Common Operational Picture
(b) Develop the "Relevant " information portion of the CROP regarding TST's.
(c) Conduct Planning, Execution and Assessment in a Collaborative Environment.
(d) Establish a persistent Collaborative Environment across echelons of commands, Interagency Participants, and Centers of Excellence enabling formal and informal collaborative sessions.

(2) Rapidly set conditions for decisive operations

(a) Show position of combat-configured joint forces for decisive operations
(b) Manage cross-domain processes

(c) Protect the joint force (including support systems and capabilities)

(d) Synchronize application of joint actions

(3) Conduct decisive effects-based operations (EBO)

(a) Assess the contribution of actions to the desired end-state based on the measures of performance

(b) Conduct joint tactical actions

(c) Support EBO with precision-strike capabilities

(d) Use reach-back capabilities to enhance the targeting process

(e) Conduct precision engagement collaborative planning

(f) Integrate kinetic, non-kinetic, lethal and non-lethal weapons to shape the battlespace

(g) Conduct precision engagements against time-sensitive targets

(h) Achieve coordinated DOD and non-DOD actions

Contributions to Rapid Decisive Operations (RDO). In addition to MC02, findings from other experiments and venues support ADOCS or ADOCS-like capabilities in support of RDO.

The Information Superiority – Command and Control Workshop II final report states: "The Time Sensitive Targeting (TST) problem is one of the most difficult challenges we face today. To be successful the TST process must merge planning and execution. The commander must carefully monitor the battlespace to constantly coordinate among possibly conflicting priorities that could impact the planned and desired effects."

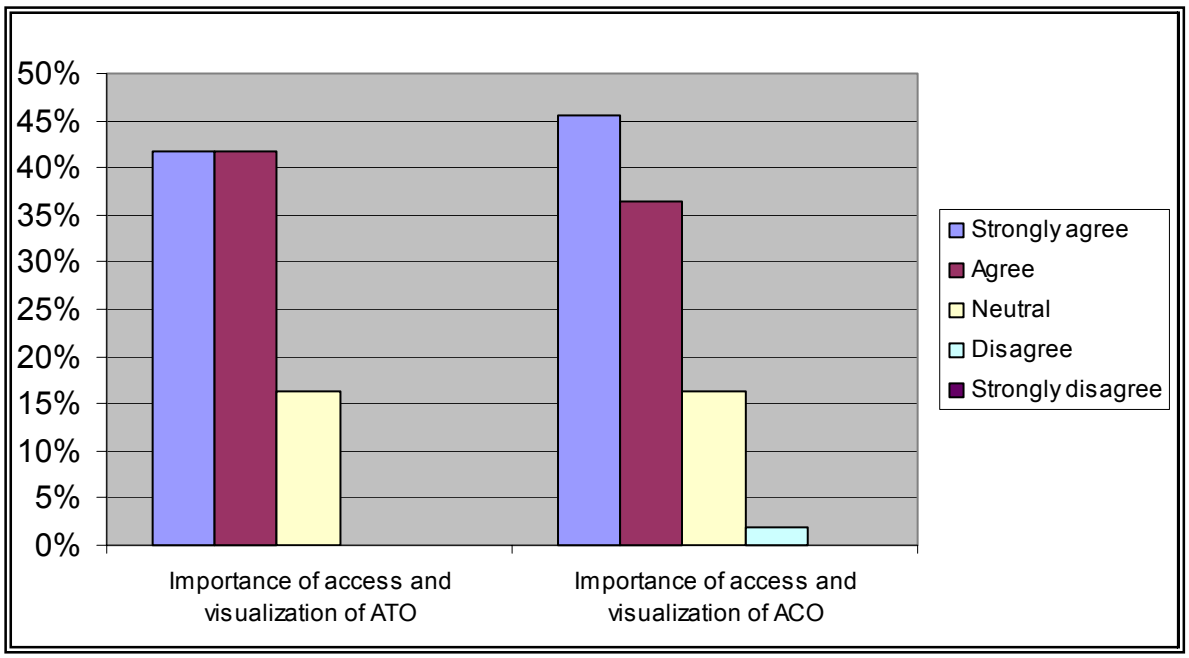
Fleet Battle Experiment DELTA found: "The LAWS-ADOCS network improved cross-service coordination and situational awareness resulting in improved CSOF execution."

A finding from Fleet Battle Experiment HOTEL observed: "Synchronization must be accounted for within the planning process and facilitated by a planning tool that rapidly aggregates, modifies and integrates the individual warfare commander's plans to digitally identify and assist in rectifying conflicts while synchronizing multi-mission platforms and multiple plans toward a single plan." It further stated: "Engagements and the Dynamic Target List needed to be coordinated or integrated. A list of deliberate targets not engaged due to TST tasking was required to simplify re-strike planning. This process should be automated within the web-based tools and/or JFMCC planning tool to ensure visibility on those deliberate targets not engaged due to modifications to the plan as a result of time critical targeting operations."

The Coherent Joint Fires Report observed: "The coordination and engagement process for immediate targets is fragmented across the joint force. Streamlining an operational architecture oriented toward immediate targets will facilitate the efficient integration of targeting—including relevant aspects of joint intelligence preparation of the battlespace (JIPB)—and engagement of this type of target."

The Center for Army Lessons Learned identified a lesson learned from Afghanistan: "Strategic, operational, and tactical targeting responsibilities and concerns may overlap and must be coordinated." The ADOCS answers the need for coordination.

A joint TST coordination tool must have the ability to access and visualize the Air Tasking Orders (ATO) and Airspace Control Orders (ACO). The operators who expressed strong agreement highlighted the importance of the ability to sort and display the ATO.



Relationship to Other Objectives

The analysis and findings for the JFI initiative have impacts on the assessment of IWS 2.5, GCCS-I3, JISR Tools, and JATF joint initiatives. These impacts primarily relate to the performance of the tools employed in the initiative. Performance regarding these tools may impact the findings of the other assessment areas or joint initiatives.

DOTMLPF Linkage

The analysis conducted on JFI supports the DOTMLPF package by providing direct input regarding the importance of training and materiel in the success of performing Rapid Decisive Operations.

Recommendations

Based upon the major findings obtained from the user feedback, the following recommendations are given:

- Future JFI tools should include the following functions:
  - Alerts of duplicate targeting.
  - Simultaneous horizontal coordination.
  - Rapid access and exchange of target info.
  - Easy to use displays/functions.
  - Accurate/timely identification of available strike assets.
  - Future JFI tools should include effective target-handoff.
  - Support rapid execution of TST.
  - Support automated handoff to service systems.

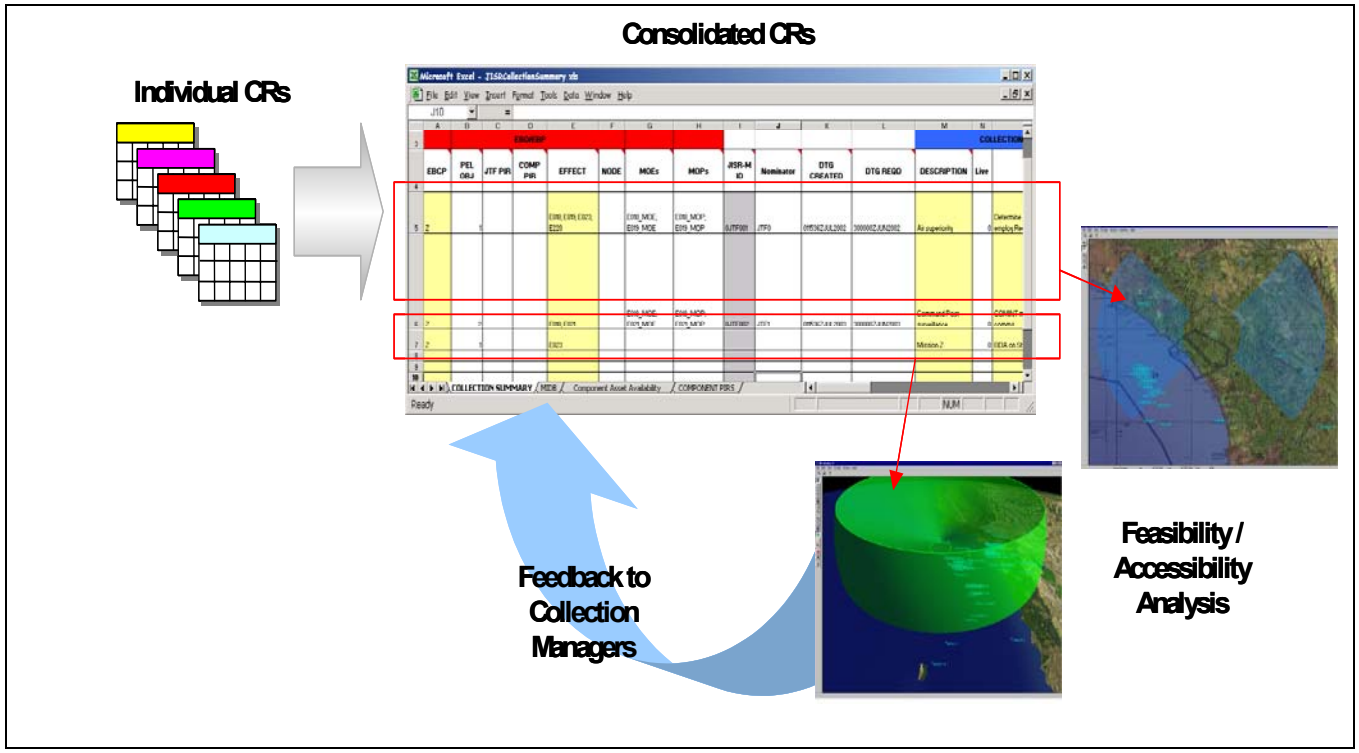
- Future JFI tools should support situational awareness with the following functions:
  - Display of Red and Blue forces.

- Create, share and display overlays.
- Display maps for coordination.
- isualization of terrain (2D, 3D).
- Display imagery for TST.
- Display fire-coordination measures.

Joint Intelligence, Surveillance and Reconnaissance/ Collection Management

Description

The JISR Module, sponsored by the Joint Experimentation/Command, Control, Communications, Computers, and Intel (C4I) Team, is a network-centric approach to the management of available ISR platforms and sensors to better support the quick-paced demands of Effects-Based Operations (EBO). JISR Module supports ISR Planning through collaboratively developing an "Effects-Based" ISR Collection Plan and ISR Synchronization Matrix. JISR Module supports ISR Execution through collaboratively executing the ISR plan and adjust resources (dynamic re-tasking) as necessary.



Overall Assessment Results

JISR Module is an immature tool that was recently developed to demonstrate in MC02 the validity of the capability it offers to enable "Effects-Based" ISR Collection Plan and ISR Synchronization Matrix. Findings were based on the results from the assessment questionnaires that were sent to operators. Most operators assessed JISR Tools to be "some what effective" in displaying ICSAS visualization information, in operating in ADOCS, SPPS, and IWS

environment, as well as in the use of MIDB/ADOCS data. Most operators rated JISR Tools as "enhancing JISR planning".

Methodology

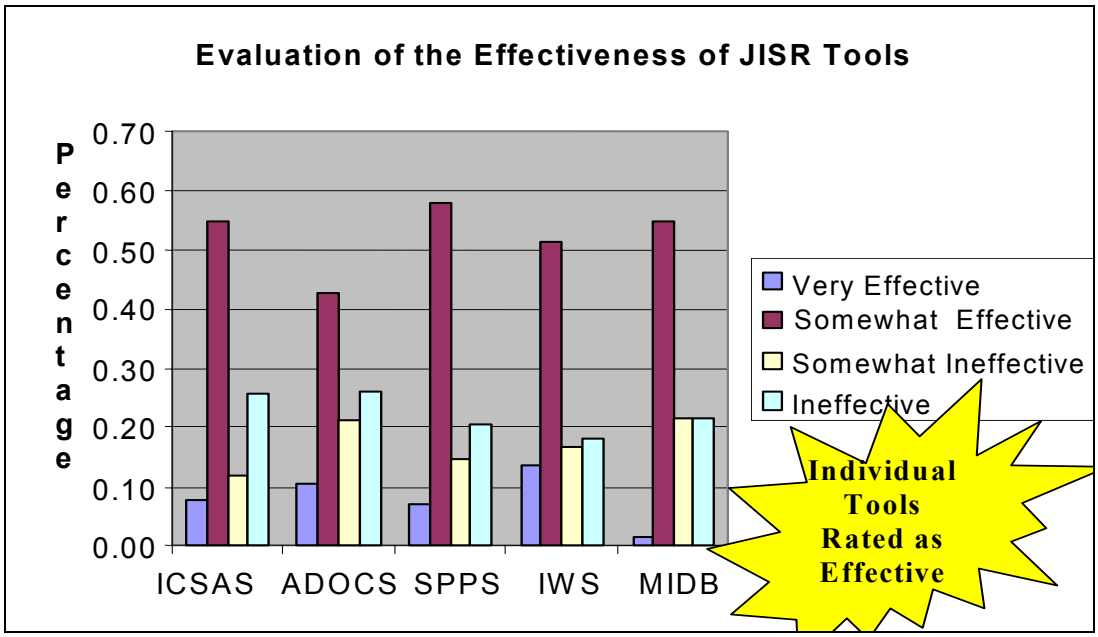
Surveys were distributed to 149 personnel on the JISR Module. All people surveyed were directly involved with the Joint Intelligence Support Element (JISE). This assessment was written using war fighter surveys, comments, interviews and personal observations. This assessment methodology, although not scientific, showed that JISR Module supported key enablers of the Standing Joint Force Headquarters (SJFHQ).

Observations

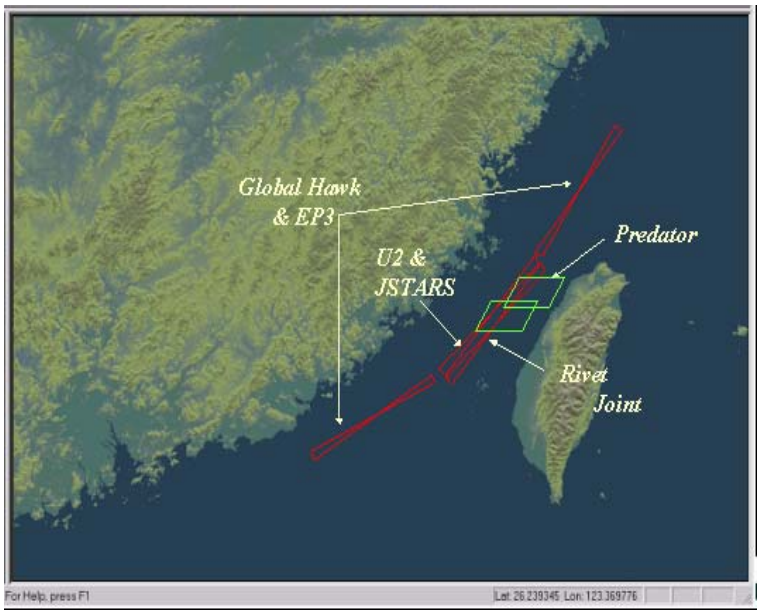
JISR Module is an immature tool that was recently developed to demonstrate in MC02 the validity of the capability it offers to enable "Effects-Based" ISR Collection Plan and ISR Synchronization Matrix. Findings were based on the results from the assessment questionnaires that were sent to operators. Most operators assessed JISR Tools to be "some what effective" in displaying ICSAS visualization information, in operating in ADOCS, SPPS, and IWS environment, as well as in the use of MIDB/ADOCS data and most operators rated JISR Tools as enhancing JISR planning. The following are JISR Module's relationship to MC02 objectives and key enablers of the SJFHQ:

	Supports	Potentially Supports	Did not provide significant support
Establish Information/Knowledge Superiority	X		
Rapidly Set Conditions for Decisive Operations	X		
Assure Access Into and Through the Battlespace	X		
Conduct Decisive Effects-based Operations			X
Sustain the Force			X

- JISR demonstrated support of the SJFHQ key enablers as follows:
  - Established Information/Knowledge Superiority by:
  - Providing ISR assets situational awareness
  - Managing collection of ISR information
  - In conducting ISR requirements definition and ISR asset allocation in a collaborative environment
  - Rapidly Set Conditions for Decisive Operations by:
  - Deploying and integrating JISR System
  - Managing cross-domain ISR collection processes
  - Assured Access Into and Through the Battle space by:
  - Integrating ISR Capabilities



ICSAS indicates that JISR Tool was somewhat effective in displaying Integrated Collection Situational Awareness System (ICSAS) visualization information for collection management (51 operators responded). The following is a screen capture demonstrating the capability to visualization of ISR missions and sensors coverage.



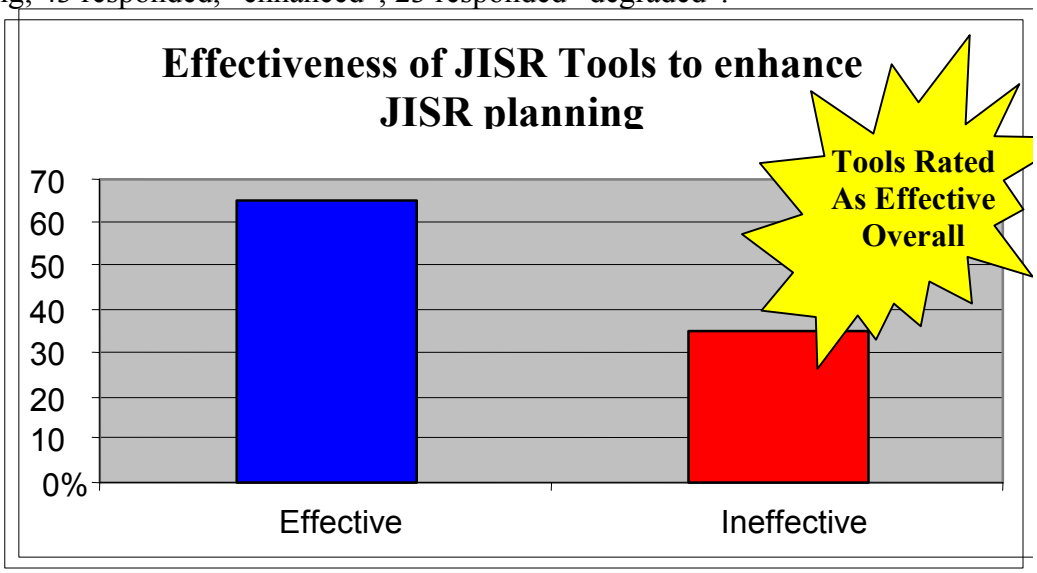
ADOCS indicates that JISR was somewhat effective in operating in the Automated Deep Operations Coordination System (ADOCS) environment by providing a centralized location for registering ISR Collection Requirements (66 operators responded).

SPPS indicates that JISR was somewhat effective in the MC02 Share Point Portal Software (SPPS) environment (e.g. share documents, manage documents, exchange files, collaborate, search, etc.) (69 operators responded). The MC02 SPPS (SPPS) provides the gateway to the supporting information environment. The portal is the vehicle by which the user accesses and stores information products and applications supporting the JTF. Critical databases and tools required by JISR participants include the RFI tool, the Blue ISR Database, ONA Information Systems, and Joint Automated Target Folders (JATFs). It is also, where critical plans, orders, reports, and briefings are posted. An ISR page has been created within the ISG to provide ready access to the Blue ISR Database, the EBCP, the ISR Synchronization Matrix, and reference materials.

IWS indicates that JISR was somewhat effective in operating in the IWS environment (66 operators responded). IWS provides the primary secure (SECRET NOFORN-level) virtual workspace for JTF collaborative planning and execution. Instant messaging, white boarding, screen sharing, and text chat are among the array of collaboration tools included in IWS. JISR activity took place in two primary locations on IWS: the JCMC and the JOC.

IWS indicates that JISR was somewhat effective in the use of Modernized Integrated Database (MIDB)/ADOCS data (60 operators responded). JISR allows users to identify new or modify existing requirements, where users can select fixed sites from the MIDB.

There were 66 operator responses to the request to rate how much JISR Tools enhanced JISR planning; 43 responded, "enhanced"; 23 responded "degraded".



Operators that elaborated on the reasoning of their rating provided some comments.

- Some of the highlights of those comments on JISR Module follow:
  - JISR has good potential to provide for effective ISR assets situational awareness.
  - JISR provided a good tool for joint collaboration for ISR assets requirements coordination.
  - JISR provided a good tool for joint collaboration for ISR assets allocation coordination
  - JISR allows for submittal of ISR requirements "adhoc" to the assets managers using the spreadsheet export function. This capability used to be a cumbersome procedure using excel spread sheet and e-mail.
  - During MC02 users comments indicated in some cases lack of effective training, mostly due to lack of time to gain required skills/knowledge of capabilities, and to receive relevant training in support of MC02 operational concepts.
  - JISR could be improved to reflect MC02 "effect based operations". Specifically, JISR should provide for filtering or sorting of ISR requests based on "effects" and tasking of ISR assets that directly relates to the PEL.

- JISR could be improved by having the capability to perform modeling simulation that:
  - "Fly-out" the JISR plan, indicating total ISR coverage over period of time
  - Shows all airborne sensor positions, sensor coverage
  - Indicates what has already been imaged
  - Indicates what images would be lost if ISR assets are moved
  - Provides for dynamic re-task of sensors for any platforms

Relationship to Other Objectives

The analysis and findings for the JISRM initiative have impacts on the JFCOM ONA assessment area as well as the IWS 2.5, GCCS-I3, and JFI (ADOCS) joint initiatives. These impacts primarily relate to the performance of the tools employed in the initiative. Performance regarding these tools may impact the findings of the other assessment areas or joint initiatives.

DOTMLPF Linkage

The analysis conducted on JISR supports the DOTMLPF package by providing direct input regarding the importance of training and materiel in the success of performing Rapid Decisive Operations.

Recommendations

Based upon the major findings obtained from the user feedback, the following recommendations are that JISR tools must include the following functions:

- Operate within the following environment:
  - ADOCS
  - SPPS
  - IWS
  - Web Portal
  - Common Operational Picture (COP)
  - Distributed Planning and Situational Awareness
  - Display ICSAS visualization information
  - Interface seamlessly with MIDB data
  - Provide effective ISR assets situation awareness
  - Provide collaboration for ISR assets allocation coordination
  - Provide "adhoc" ISR requirement submittal
  - Provide sorting of ISR requests based on "effects" and tasking of ISR assets that relates directly to the PEL
- JISR tools must develop the capability to perform modeling simulation that:
  - "Fly-out" the JISR plan, indicating total ISR coverage over period of time
  - Shows all airborne sensor positions, sensor coverage
  - Indicates what has already been imaged
  - Indicates what images would be lost if ISR assets are moved
  - Provides for dynamic re-task of sensors for any platforms

Joint Public Affairs Operations Group (JPAOG)

Description

The JPAOG is an experimental concept designed to be a standing rapid deployment joint public affairs team. Its mission is to plan, coordinate and employ a series of small, mobile teams of public affairs specialists. These teams will provide both forward deployed public affairs resources as well as a reachback support in response to theater or unified combatant commander tasking. This joint force team will also provide command and control of public affairs units and elements from pre-deployment through entry phases of joint operations prior to the establishment of a formal joint information bureau or inter-agency information service.

Communication is global and nearly instantaneous. Tools and tactics for working with media professionals are global and nearly instantaneous as well. The satellite video and data communication system central to the JPAOG experiment is an example of an off-the-shelf technology that can provide immediate information to international media and the global public. MC02 provides the far-reaching environment for the JPAOG experiment. The group deploys a rapid, flexible and transformational communication tool suite to the warfighting commander. It provides three critical assets for operational success:

- Public affairs expertise
- Communication situational awareness
- Ability to design and transmit communication products

The JPAOG provides a self-contained public affairs unit, ready to deploy with the first wave of combatants rather than waiting until the traditional follow-on-forces style of the past. The 31-person team connects news knowledge to the battle space. The Joint Public Affairs Collection Team, deploying with satellite communication tools, provides real-time reachback from remote locations. They provide an environment for reporters to interview commanders and their spokesmen in the combat zone as well as providing near real-time information presence in an operational environment to counter propaganda and disinformation tactics of the adversary.

Military public affairs tasks for 2007 are just what current doctrine predicts: trusted counsel to leaders, global influence and deterrence as well as improved morale and readiness for our own and coalition troops. Commanders will gain immediate public affairs strategies for the information battle space through JPAOG. JPAOG can counter enemy propaganda and disinformation by credibly communicating with combatants in real-time. JPAOG can interact with troops so they feel supported and proud of their achievements. JPAOG connects the information battle space with the combatant commander for rapid, credible service to international media and the global public.

The JPAOG experiment tested operational design and mission effectiveness during a simulated conflict simulation. The value of conducting its operation during MC02was to seek validation and information regarding the enhancement of communication opportunities during transformation experiments conducted by each service. By creating both a forward deployed team as well as a joint task force element, the JPAOG sought to prove the value of augmentation to the Joint Force Commander (JFC). Support included public affairs staff augmentation to the commander's personal staff, JIB manning, improved combat camera coordination, and remote operations using newly developed, portable video teleconferencing and data transmission technology.

The JPAOG team is designed to remain engaged until redeployed – 60 to 90 days after initial deployment. It adds value, providing early entry public affairs capability in an operational environment and complements a SJFHQ element sent to augment a designated Joint Force Commander. Early insertion provides timely, proactive information flow to counter adversary

propaganda and other information warfare tactics. By having real-time access to public affairs staff, media representatives and opinion leaders have access to the battlespace and its leadership.

When not deployed, JPAOG members will be assigned to the Joint Training and Simulation Center (JTASC), U.S. Joint Forces Command (USJFCOM), to conduct joint public affairs training in live exercises and simulated environments. An alternate plan would be to establish a JPAOG at the headquarters of each Unified Commander for deployment within the AOR –in conjunction with the deployment of a JFC because of hostilities.

As currently envisioned with 31 projected billets, the core JPAOG organization will include a director (O-6), training officer deputy (O-5), and an administrative assistant (E-7). Four liaison functions will support them—media analysis, plans, information operations and public information. Additionally, a four-person contractor team would support logistics, communications, computers and media channel integration. A four-person joint task force augmentation team would include a JTF director (O-4/5) two media officers (O-3) and an administrative assistant (E-7). Complementing this leadership team would be a JIB establishment team of ten people. It would be led by a JIB team chief (O-3/4) with a plans officer (O-3), two media officers (O-3), an administrative assistant (E-7), four public affairs specialists [two print, two visual] (E-7), a technical support specialist (E-6) and two deployable active duty teams of seven people per team. The deployable teams would consist of a team chief (O-4/5), NCOIC (E-7), technical support specialist (O-3), media officer (O-3/4), plans officer (O-3), and two PA specialists (E-5/6). Two additional teams may be staffed from within the USJFCOM Joint Reserve Unit.

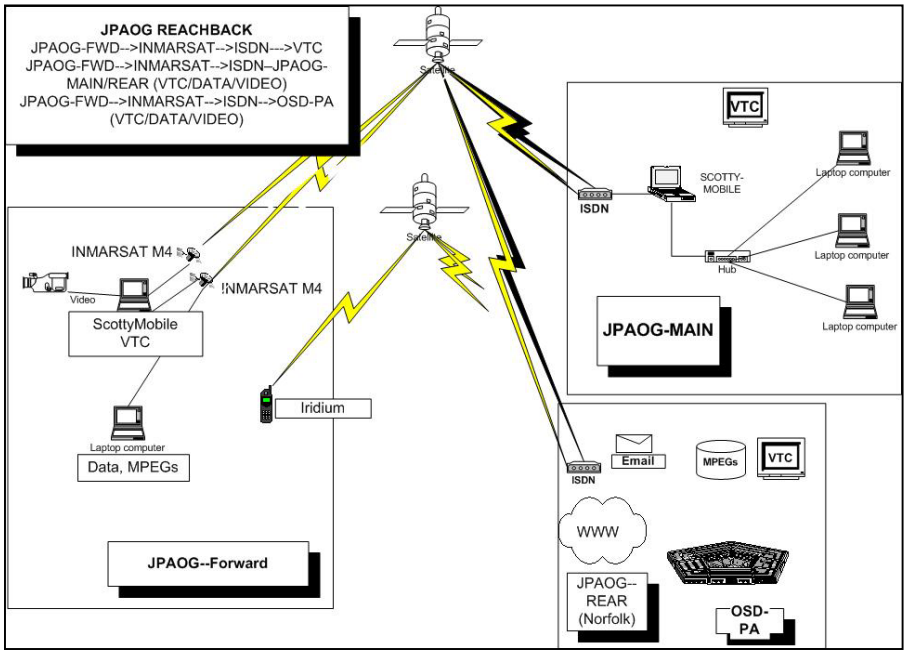


Figure 214: JPAOG Reachback Capabilities

The core JPAOG organization would be supplemented by a combat camera cell (consisting of three people – one digital photographer and a two-person video crew). The total JPAOG unit staffing is estimated to be 31 active duty military personnel, plus combat camera personnel. The unit will be scalable and flexible which could result in the deployment of smaller units or individuals.

Overall Assessment Results

BATTLE TASK 1: Provide Senior Leader media availability via remote VTC into OSD press event

Contemplated Scenario: A combat leader from a remote location is interviewed via the remote VTC/data system with NO hardstand infrastructure. This task would optimally be accomplished by connecting into the Pentagon press briefing room. *Constraints:* Utilizes remote VTC/data system, dual INMARSAT and vehicle power from "In the box"; VTC is "2-way" allowing the leader to receive and answer questions in real time; "B-roll" is provided for the use of the audience to be played on demand. B-roll transferred via Remote VTC/data system.

Implementation: After six months coordination with the OASD/PA Media Operations staff at the Pentagon, an access line was dropped into the DoD media briefing room. Suffolk technical support staff also coordinated a backup VTC facility in case the desired location was unable to be configured during the experiment period.

The remote team coordinated with Marine public affairs staff at the SCLA and provided a spokesperson to the Washington Press Corps for a live, real time interview.

The remote team provided prepared video clips during the VTC to augment the presentation; they were made available to the media representatives via a spare remote system that had been transported and managed by a member of the support staff.

Implications: While the Pentagon conducts VTCs on a daily basis as well as interviews with senior leadership from command locations (such as Gen Franks from CENTCOM headquarters during Operation Enduring Freedom), we believe this is the first time that tactical communications from a simulated battlespace has been accomplished. The opportunity to break into the news cycle with real-time event-driven information will now give military leaders the ability to provide first impressions on events as well as the first explanation of a military operation rather than the first reaction.

BATTLE TASK 2: Conduct coordination and planning of Public Affairs assets for media operations

Contemplated Scenario: Remote team or teams conduct a secure VTC to coordinate media operations in support of the exercise. *Constraints:* Minimum of 2 locations; One site via INMARSAT; Third location is desirable; Utilize Microsoft Net Meeting as a collaborative tool. Net Meeting is included with the Remote VTC/data system Units.

Implementation: Due to access of secure Iridium satellite telephones, the choice was made to use this tool rather than the more text intensive Net Meeting. In addition, due to the cost of INMARSAT time and limited resources to pay for such time, the decision was made to save airtime for live video teleconferencing experiences rather than using the time for text-based chat.

Implications: If the remote forward teams were deployed in a foreign environment, or access to an outdoor phone was not possible or practical, the Net Meeting tool would be ideal for coordination and continued interaction. However, access to the Internet and email and/or Instant Messenger might prove just as useful in point-to-point coordination. Multiple coordination among JTF, unified command and specified command, would make a collaborative tool like Net Meeting the ideal choice.

BATTLE TASK 3: Conduct service member availability via satellite link from a remote location to a local media outlet

Contemplated Scenario: Remote team identifies a service member and arranges with member's local TV affiliate or affiliates for live stand up. Feel good, love from the desert type of interview. Optimally would like to hold a similar event back to Tidewater area.

Constraints: Minimum of one service member could be multiple; Held in a field environment with Q&A's.

Implementation: During the overall experiment, two units (one out of Ft. Lewis, WA, and the other from Ft. Bragg, NC) wanted to clarify stories that had run about their units to their hometown newspapers. The VTC was arranged with the Ft. Lewis station though the media representative chose not to attend. The Ft. Bragg media did not decide to use the opportunity either.

Implications: The ability to redirect a story after an accident or incident is a premiere rationale for the immediacy of VTC capability organic to the remote team. Additionally, the ability to counter propaganda and disinformation is also prime. The fact that the team was able to send night-vision footage of the 82nd Airborne airdrop clearly showed the difficulty soldiers were having in sensing the ground. Having that available to answer questions by media provides credible back up to the reassurances offered verbally.

BATTLE TASK 4: Participate in an experiment VTC from the battlefield (secure transmission)

Contemplated Scenario: An event triggers the need for direct coordination with OSD, the JTF and other participants as available. The JPAOG PACT Team will provide on- the-spot coverage in order to cut through the "fog of war" and provide higher clarity. *Constraints:* Can be MSEL driven; must be secure; Involves OSD or OSD representatives from a location other than Suffolk

Implementation: Ability to conduct live interviews to the exercise location became very powerful for promoting its use to distinguished guests and military leaders who visited Test Bay 36, an unclassified exhibit area. With the generous support of the USJFCOM Chief of Staff, the team at Suffolk was able to project images from the remote VTC equipment onto a large flat panel display. This allowed for guests to MC02 to talk with the team and learn more about the operational value of the system. Due to a defective handset on one of the INMARSAT devices, the team was unable to connect during the visit of the SECDEF and the ASD/PA, Ms Clarke.

Implications: One comment by a visiting general was that such equipment would then lead to micromanagement by senior leadership at the Pentagon or second-guessing by media and other opinion leaders with access to the connections. The counter, provided by another general officer visiting, was that "they already do; this just gives us a chance to do it faster, better and with more intent."

BATTLE TASK 5: Provide video report back to JTF of an experiment event involving media

Contemplated Scenario: An event involving the media occurs in the scenario or related to the scenario that the PACT reports in real-time or near-real-time coverage. *Constraints:* Could be MESL driven--Examples:

Member of the media releases a factually inaccurate story. PACT provides live video to discount the story.

Media member is injured in an incident with an encounter with opposition forces, a VTC is conducted involving the media rep and the JTF PA to ensure what should be publicly released and to ensure media rep of JTF concern and caring for the media.

Media is granted coverage of military operations in a remote area, in order to ensure the story is pushed out, the JPAOG PACT is tasked with supporting the media (on a reimbursable basis).

Story can be fed into WNN as a live or recent feed.

Utilize remote VTC and "b-roll." Live voice-using video shot earlier. Similar to combat camera live footage from Afghanistan but with live voice over.

JPAOG could cover events, and provide for the use of WNN.

Implementation: The constraint was not taken because the decision to make the JPAOG experiment parallel rather than integrated into the overall exercise made it impossible to respond to MESLs. The JTF Public Affairs Team, however, did interact with the JPAOG and responded to exercise events in ways that could have used the equipment and capability of the system. The remote team, in cooperation with JCCC, participated in nearly every physical training range. They provided video footage of the rapid air delivery of the Army's Stryker vehicles. The team adapted the NTC Vulture team's coverage of a mass airdrop at NTC. They participated with the Navy SEALs and the experimental HSV off the coast of California. The Marine's urban warfare event was covered, participated in along with media to get their feedback of the remote VTC system's capabilities as well as providing a live interview with their commander to the Pentagon press corps.

Implications: The participation of the remote team would have provided a great deal more "realism" to the simulations as well as providing more understanding of the interaction between "physically" present events and "virtually" present ones. The system provides a unique way to create proximity to distant events so that more can participate as if they were more physically involved in the overall event.

BATTLE TASK 6: Provide live battlefield coverage of a recent event

Contemplated Scenario: Provide a story from the sight of a recent action for use in WNN or other media outlet depending on the event. *Constraints:* Could be MESL driven; Could include an interview with a local unit member or commander who participated in the action, provided from the actual battlefield.

Implementation: The constraint was not utilized for the reason mentioned above. However, live coverage of events involving all services provided members at the Suffolk campus an opportunity to see and talk with those so linked. Since a live feed was connected to Test Bay 36, the unclassified exhibit area, many visiting opinion leaders, as well as military leadership, had the opportunity to witness the value of such a tool.

Implications: Since it was not connected to the overall video and/or media system for the exercise, the value of the footage was more archival and "proof of concept" rather than providing a sense of immediacy and presence to the "virtually" distant participants in the Test Bays.

There was also no "reverse coverage" with the simulators to have a way to be connected to the events they were seeing on their screens and displays. Doing this kind of coverage would have helped to build a more cohesive shared community of practice.

BATTLE TASK 7: Update story or report to website via satellite link

Contemplated Scenario: From a remote location demonstrate reachback by updating a web page with info. Should be kept small to minimize bandwidth utilization.

Constraint: Could be classified on an unclassified site.

Implementation: Inability to gain access to the military website through the gateway due to constraints on the firewall from DISA. While it was technically feasible to do, the permissions to access through this secure gateway were too difficult to do in the time allowed.

Implication: Peacetime security environment will not be appropriate in a combat one.

BATTLE TASK 8: Provide coverage of a DV event

Contemplated Scenario: Provide video report of a DV event or arrival. Could be used for any media outlet. Could be real world, EXERCISE, or both. *Constraint:* May be MESL driven

Implementation: The constraint was not taken because the decision to make the JPAOG experiment parallel rather than integrated into the overall exercise made it impossible to respond to MESLs. Video reports were created in Quicktime for DV events and arrivals that were later replayed for other guests at Test Bay 36 as well as provided to the in-house WNN producer. The remote team participated in nearly every physical training range. They provided video footage of the rapid air delivery of the Army's Stryker vehicles. The team adapted coverage of the NTC Vulture team's coverage of a mass airdrop at NTC. They participated with the Navy SEALs and the experimental HSV off the coast of California. The Marine's urban warfare event was covered by media, who participated by giving their feedback on the remote VTC system's capabilities as well as providing a live interview with their commander to the Pentagon press corps.

Implications: The power of immediate information about a particular operations or action will provide critical authority to senior leadership during news media interaction. This will be compounded by the insertion of propaganda and/or disinformation about the activities by the adversary in order to weaken or misrepresent our actions. The ability to be able to interact with trusted public affairs staff in the field as well as having that counsel for on-camera spokespersons provides commanders with the ability to exercise the information arm of national power in an unprecedented way—far beyond just having a camera present such as those provided by JCCC.

BATTLE TASK 9: Utilize JPAOG communications capability to push ComCam or other video back to JTF or JPAOG

Contemplated Scenario: Utilize another organization's equipment and material and transfer via the Remote VTC/data system and INMARSAT back to JTF for editing or distribution. *Constraints.* Test interoperability of equipment and personnel. Transfer video or other product to a target location at the JTF (Team 2) via INMARSAT.

Implementation: During the load out of equipment for the forward deployment of the JTF, a camera crew from JCCC filmed inside a C-17 Globemaster III at Langley AFB, VA. The footage was then edited, transferred into a Quicktime file and sent via INMARSAT to the Suffolk location within 90 minutes of starting filming! The team was also able to test the ability to transfer video footage and digital still imagery.

Hypothesis was that different formats would transfer at different speeds, however, results found all formats transferred at same speed of INMARSAT connection rather than due to file format. The rate was averaged at 1MB per minute of content. The speed was then due to the size of the files and the compression of the particular file format. Thus MPEG transferred faster that JPEG, Quicktime: faster than Media Player.

We also discovered that different headquarters have made particular choices on multimedia formats that affected our ability to send files for their review. In MC02, our test of

sending packaged compressed video to ASD/PA were limited not only by the size of email attachments and the security filters of such file formats through its firewall but all by the fact that they had chosen to use the less compressed file formats of JPEG and Media Player rather than MPEG and Quick Time.

Implications: The ability to be able to capture events that might contain classified or sensitive features could still be accomplished by JCCC in their operational, archival function. But having a remote public affairs team in place, provides for release at the source, editing closer to the experience being covered so that operational features and/or force protection issues are clearly known prior to being sent in a protected manner to the headquarters for the commander's use in conducting the information arm of military power. The choice of multimedia file formats made unilaterally by a computer systems engineer needs to be integrated across the services in order to facilitate uniform transfer of multimedia assets in a timely and useful manner.

Collaboration: While the Visual Information Plan (VIP) provided from the JCC ran to nine pages and covered the efforts of over 60 lenses at alllocations, the remote VTC team did not work from a similar video and interactive framework. The ability to better balance the value of the JCCC for media consumption as well as command and internal information might have been better accomplished through closer collaboration and integration. As the JCCC crews better understood the remote team, their imagery was utilized more often instead of creating similar products by the remote team. This allowed the PA staff to provide editing, positioning and "pitching" of the material for use within the experiment as well as to media interested in visuals about the overall exercise.

BATTLE TASK 10: Provide a task order or tasking from the JTF PA to the JPAOG PACT using satellite phone to transfer satellite link data or taskings

Contemplated Scenario: Plan and coordinate the providing of a tasking from TF PA or designee to the PACT. Could be a transfer of an order, memo, or a VTC using shared data.

Constraints. Tests coordination abilities from higher to lower (i.e. Does the PACT team set up its INMARSAT and Remote VTC/data system at regular intervals, on demand, etc.). Tests ability to share, collaborate and transfer data from a ground site to a remote location via INMARSAT.

Implementation: The remote JPAOG team found that radio and print journalists were not as concerned with being able to "see" their interviewees as much as television media. When an accident occurred during MC02 as a result of the night drop of paratroopers, the Ft. Bragg print media conducted the interview with the company representative over the satellite phone. This met their needs, saved valuable satellite connection time and provided a timely, accurate, relevant and useful support of media representatives.

Implications: The ability to interact with MESL injects could have been enhanced through this technology. However, planners need to determine, in advance, any MSEL-driven activity by the JPAOG to ensure complete separation from real-world news media and information documentation of live-exercises activities. A complete communication plan will also benefit from this technology as it seeks to balance coverage of an event with a continuous and varied stream of information, images and interaction for use by media representatives and opinion leaders.

BATTLE TASK 11: Provide an interview opportunity for shipboard interviews to be conducted by Navy staff and/or Army/Marine components being carried

Contemplated Scenario: Plan and coordinate a VTC with members of the Army Stryker unit as they participated with the Navy HSV or with staff aboard the MC02 flagship, USS Coronado.

Constraints: Test the ability of the remote team INMARSAT equipment in proximity to ship systems; test the ability to use shipboard INMARSAT equipment as a substitute for the remote system's set; test the ability to use the remote VTC system while underway.

Implementation: The remote JPAOG team provided several opportunities to fulfill this battle task. They covered the aerial and marine insertion of a SEAL team aboard the Joint Venture high speed vessel as well as provided an interview opportunity aboard the USS Coronado—the experiment's command ship. The Joint Venture piece was recorded and produced aboard for later transmission while the Coronado sought to broadcast the interview.

Implications: The ability to use INMARSAT antennas with the shipboard systems will assist the integration of technologies as well as not interfering with resident systems. Further research is required in order to be certain of the particular vessel's communication setup, the technical requirements needed to connect to them as well as the value of having more mobile INMARSAT antenna choices.

Methodology

Users evaluated the JPAOG experiment during MC02. A series of three questions were periodically submitted to the users for their evaluation of the experiment. In addition to the status report questionnaire, other sources were used to better evaluate the utility of the JPAOG in supporting the needs of the combatant commander's information needs. Using this methodology, the JPAOG has been evaluated to provide significant support for the key leadership of the MC02 staff.

Observations

The key findings include the ability to provide:

- Real-time access to combatant and operational leadership
- High-quality video, audio and still imagery in near real time to potential media outlets and combatant commanders
- Redirection or further clarification on an operational event for interested publics after an adverse incident
- Access to the information battlespace for leadership at all levels of command from the field to the Pentagon briefing room
- Dramatic operational interest in the equipment by other military professionals who value time-sensitive two-way communication processes
- Opportunity to further test the concept and processes in real-world training and exercise environment is underway as well as offers to take the team to Afghanistan within 90 days

Improvement opportunities:

- The name of the experiment is easily misunderstood as a component of the psychological operations mission area, as in JPOTF and 4th POG

- The need to market the group as a building block tool set is key; creating a workable team name as well as an operational framework that could work easily in service contexts would help to create early adoption and integration
- Need to create an integrated communication plan that would have outlined the images, information and interaction that would promote the themes and messages of the experiment's information goals and objectives. Instead, the event continued to be run in a traditional way with media interest creating the images, events and stories rather than having an intentional outcome for these products that could be easily adapted and customized for media use

JPAOG Battle Tasks for MC02	Supports	Potentially Supports	Did not provide significant support
Provide Senior Leader media availability via remote VTC into OSD press event		X	
Conduct coordination and planning of Public Affairs assets for media operations	X		
Conduct service member availability via satellite link from a remote location to a local media outlet	X		
Participate in an experiment VTC from the battlefield (secure transmission)	X		
Provide video report back to JTF of an experiment event involving media	X		
Provide live battlefield coverage of a recent event	X		
Update story or report to website via satellite link			X
Provide coverage of a DV event	X		
Utilize JPAOG communications capability to push Combat Camera or other video back to JTF or JPAOG	X		
Provide a task order or tasking from the JTF PA to the JPAOG PACT using satellite phone to transfer satellite link data or taskings.	X		
Provide an interview opportunity for shipboard interview to be conducted by Navy staff and/or Army/Marine components being carried	X		

Relationship to Other Objectives

The Standing Joint Force Headquarters initiative most closely integrates with the JPAOG experiment. The JPAOG validates the SJFHQ concept by providing a mobile, scalable team of technical and leadership experts as a resource to the supported combatant commander. However, the need to have integration with such a force is critical to both organizations' success. The commander of the JPAOG should be a resource to the SJFHQ organization in order to determine appropriate training and equipping needs of both. It will also provide the leadership using the SJFHQ with the additional resources of the JPAOG especially in the early hours of an operation by having the information, images and interaction for the field that its remote forward team provides.

The JEMPRS-NT experiment is a technical integration tool that could extend its command and control capability with linkage to the JPAOG. Not only is it already using similar technology and communication systems—INMARSAT with mobile computing and videoteleconferencing—but it also provides better situational awareness for the commander using such systems to have public affairs information available at the same time as those generated for intelligence, command and control.

DOTMLPF Linkage

The value of experiments such as those of Millennium Challenge require further testing, validation and extension as a result of the lessons learned. The ability to field a mobile, interactive public affairs team provided vivid evidence of its value to commanders and civilian leaders who participated with its use. However, the battle tasks conducted yielded valuable lessons not anticipated during preparations or the preceding Spiral exercises. Further equipment testing is required, better integration with command and control systems will better extend the value of all such teams. Transforming current public affairs, civil military operations and information operations as well as determining the implications to military broadcasting, psychological operations and diplomatic operations is essential. The DOTMLPF process provides a mechanism to accomplish these and others as they seek to better deploy forces for military success.

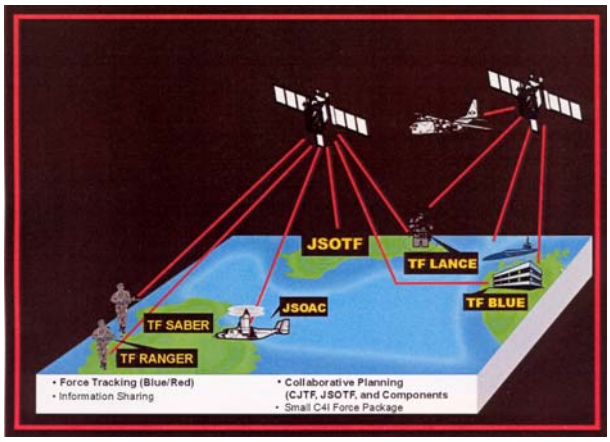
Recommendations

The need to market the group as a building block tool set is key; creating a workable team name as well as an operational framework that could work easily in service contexts would help to create early adoption and integration.

Need to create an integrated communication plan that would have outlined the images, information and interaction that would promote the themes and messages of the experiment's information goals and objectives. Instead, the event continued to be run in a traditional way with media interest creating the images, events and stories rather than having an intentional outcome for these products that could be easily adapted and customized for media use.

JSOTF Reachback Special Operations Mission Planning Environment (SOMPE)

This joint initiative has been expanded in scope since its original submission to USJFCOM. Therefore, the initiative name has been changed from JSOTF/JCPT to that reflected above.



JSOTF Reachback/SOMPE

Description

In a contingency operation, the JSOTF and/or Theater Special Operations Center (TSOC) will require expertise, data, or tools from rear locations to accomplish its mission under RDO tenets. The JSOTF Reachback/SOMPE initiative considers the JSOTF's use of Reachback to support the targeting process, develop effects based tasking orders, and use distributed planning tools. It also focuses on the use of Reachback to support collaboration with out-of-area organizations and centers of excellence. A Reachback capability (see Figure 1) will allow the JSOTF Commander to reduce his forward footprint through the utilization of a support facility located outside the crisis area. The Reachback facility will consist of subject matter experts, staff members, and interagency representatives with access to circuits and networks connected to regional, national, and local sources of operational and intelligence data. The intent is for the Reachback facility to provide battlespace awareness to the warfighter with requisite accuracy and timeliness, collecting data and information from multiple sources, and processing, fusing, transmitting, placing in context, and presenting it in ways that facilitate rapid and accurate decision-making, collaborative planning, and target engagement. This initiative is sponsored by the United States Special Operations Command (USSOCOM).

Overall Assessment Results

The MC02 experiment validated the JSOTF Reachback/SOMPE concept by providing capabilities in two specific areas. The JSOTF used Reachback capabilities to enhance the targeting process. Additionally, the JSOTF was able to develop effects-based tasking orders utilizing Reachback and collaboration. The collaborative tools employed during MC02 significantly enhanced the overall effectiveness of the JSOTF staff, both vertically and horizontally. It allowed for the virtual real time interaction between all components and activities supporting the experiment.

Some Distributed Planning Tools were effectively used via Reachback. The Reachback capability in MC02 was only partially effective in representing the full range of access to information, expertise, and tools. The notional nature of the exercise scenario negated contributions by outside agencies and organizations. Likewise, the full range of tools that would be available in a SOF Mission Support Center (MSC), were not available in MC02. These factors also prevented an accurate assessment of potential reductions in a SOF forward footprint.

Methodology

The MC02 assessment methodology for this initiative employed the use of questionnaires and observations by dedicated Subject Matter Experts (SMEs). The questionnaires consisted of a

series of 57 questions that were submitted to over 1000 SOF participants in the JSOTF and sub-components (e.g. ARSOTF, JFACC/SOLE, NSWTG etc.). Questionnaires considered measures relating to information and tool availability through Reachback; the performance of targeting systems and planning tools accessed via Reachback; the performance of the mission planning process via Reachback; and the reliability and adequacy of Reachback communications. They also provided areas for participant comments. The questionnaires were submitted three times during the experiment.

Questionnaire responses were supplemented by SME observations. These observations were conducted both actively and passively. In an active mode, the SME's conducted small group interviews with participants addressing questionnaire issues. These interviews produced valuable, candid assessments from a users' perspective. In addition to the interviews, passive observations of activities were made throughout the experiment period.

Using this methodology, the JSOTF Reachback/SOMPE initiative has been evaluated as supportive of Rapid Decisive Operations.

Observations

Overall participant responses to the JSOTF Reachback/SOMPE questionnaires reflected a high confidence in the JSOTF/Theater SOC "Reachback" capability. .A significant number of participants adopted a neutral position on this objective. However, the majority of participants evaluated SOF Reachback as "Somewhat" or "Very effective".

Warfighter Challenge One evaluated the Reachback capabilities to enhance the targeting process addressing capabilities primarily relating to targeting information and tools. Although a significant number of participants were neutral on this subject, 60% of the remaining warfighters rated Reachback targeting support as "Somewhat" or "Very Effective". As improvements, participants suggested reduction of the number of web pages, and providing SA and collaborative tools to the Forward Operating Base (FOB) level.

The SMEs noted that the JSOTF utilized ADOCS to support Time Sensitive Targeting (TST). ADOCS provides the ability to share real time targeting information. It also provides the capability of supporting the Common Operational Picture (COP) overlay, supporting necessary combat identification. Accordingly, target nomination, validation, authentication and approval were supported virtually. The MC02 Common Relevant Operational Picture (CROP) CONOPS was drafted as the guidance for MC02. These procedures included TTPs for the COP. The JSOTF adopted some of the standard TTPs and established other TTPs to manage blue and red force track data associated with SOF operations. In some cases, the TTPs met specific local requirements, and in some cases, the TTPs (Tactics, Techniques and Procedures) used were ineffective in managing or distributing information/knowledge to applicable organizations. Some of the ineffectiveness could be attributed to system architecture and technical, interoperability issues. The reliability of the CROP/COP increased daily. Because of technical and procedural issues, the JSOTF often had to confirm that units were where the systems indicated they were. This was attributed to multiple reporting sources. The resolve to these issues are a clearly defined CONOPS and associated TTPs.

The Second Warfighter Challenge concentrated on the JSOTF staff's ability to develop effects-based tasking orders using Reachback and collaboration. Performance measures associated with this challenge pertained to mission analysis and COA development; joint/multinational and interagency coordination, and distribution of battlespace views. An

additional measure of performance addressed the possibility of reducing the forward footprint (personnel adequacy) in light of Reachback capabilities. Participant rating of this challenge was split between confident and not confident. After eliminating the "Neutral" position, 51% opted for a less than confident position regarding the use of Reachback for mission analysis, coordination and distribution. Comments associated with this challenge indicated a belief that the forward "footprint" should not be reduced.

SME observations noted that collaboration via Information Workspace (IWS) and Netmeeting™ provided real time coordination, planning, rehearsal, and execution. Accordingly, modifications and changes to existing plans and orders were facilitated as part of the mission analysis phase of the process. Although a primary focus of the experiment was to evaluate the use of collaborative and distributed planning systems, the operational impact of losing these systems (i.e. through computer network attack) during a campaign was not considered.

Warfighter Challenge Three specifically evaluated the effectiveness of distributed planning tools used for Reachback. Several detailed measures of performance addressing planning tools in terms of their quality, adequacy, timeliness, and general contributions to the planning process were addressed. Nearly 70% of the non-neutral responses gave a high confidence rating to the distributed planning tools employed in Reachback. The remaining low confidence ratings were attributed to a need to consolidate tools, the new ETO process, and problems with the new tools introduced from the JFHQ.

SME's noted that IWS was primarily used between the JSOTF and the JTF to effect coordination, mission rehearsals and daily meetings supporting functional processes. Netmeeting™ was used throughout between the JSOTF and component forces in support of a continuing dialogue sharing critical information, updates, ad hoc situation reports, and in support of execution checklist items. Chats were facilitated via Netmeeting™, private sessions on the IWS and the MIRC. The JSOTF Web Information Center (WIC) was employed to provide situational awareness to JSOTF components. The WIC allows the JSOTF and assigned forces to post and retrieve ("push and pull") operational and administrative data supporting the mission. Components also built their own WIC supporting internal awareness at each echelon. The WIC provided an effective tool for Request For Information (RFI) management and tracking. The RFI manager indicated that as a result of the participation at the DoD, National and Agency level, all RFIs were able to be satisfied within the available collaborative network infrastructure. This, coupled with the availability of the Operational Net Assessment (ONA) demonstrated an advantage of real time coordination and availability via collaboration and distributed planning tools.

In addition to questionnaires, a SOF SME, specifically assigned to this initiative provided the following observations:

The original intent during planning for MC02 execution was for the JSOTF to utilize an established Mission Support Center (MSC), located in Coronado, CA. Since this plan could not be executed, an alternative MSC was established at SOCJFCOM in Norfolk VA. Approximately 70% of the MSC capability was replicated. While the network and system configuration the JSOTF was able to achieve, was consistent with the architecture being employed at the JTF level, several SOF specific planning tools were not included. In addition, since the JSOTF and MSC were in the same location and had access to the same tools and data, the Reachback facility was not serving to support a forward JSOTF headquarters.

Since MC02 was conducted at the collateral Secret classification level, assessment and evaluation of the gathering, fusion, sanitization and dissemination of SCI material to collateral networks was not observed.

One of the objectives of the Reachback assessment was to ascertain if it would/could reduce a forward tactical footprint. Based on the reduced Reachback capability observed in MC02, it was difficult to quantify how much of an actual tactical footprint could be reduced. However, a previous MSC risk assessment estimated a 67% reduction in the deployed force's forward footprint could be achieved using the MSC and Reachback. Until adequate doctrinal changes are considered and Tactics, Techniques and Procedures (TTPs) are developed, reduction of a deployed force utilizing the JSOTF Reachback concept may not be as significant as that demonstrated during the MSC assessment.

The JSOTF Reachback/SOMPE evaluation in relation to the RDO key enablers:

	Supports	Potentially Supports	Did not provide significant support
Establish Information/Knowledge Superiority	x		
Rapidly Set Conditions for Decisive Operations	x		
Assure Access Into and Through the Battlespace	x		
Conduct Decisive Effects-based Operations	x		
Sustain the Force		x	

Relationship to Other Objectives

The analysis and findings for the JSOTF Reachback/SOMPE initiative have impacts on the JFCOM ONA assessment area as well as the IWS 2.5, GCCS-I3 and JFI (ADOCS) joint initiatives. These impacts primarily relate to the performance of tools employed in the initiative. Performance information regarding these tools may impact the findings of the other assessment areas or joint initiatives.

DOTMLPF Linkage

This assessment does not support any pending DOTMLPF change recommendation packages. However, with the validation of the JSOTF Reachback/SOMPE concept, to include Collaborative Environment and Collaborative Tools, some significant changes to doctrine, organization, training, materiel, leadership, personnel, and facilities (DOTMLPF) will likely evolve.

Recommendations

The following recommendations were derived from SOF participant comments and SME observations. Recommendations include: Doctrine: Develop doctrine to address the collaborative process. Organization: Organizational impact should be none. Training: Establish policy and plans for joint training. Materiel: Expedite the materiel technology

insertions and Program Objective Memorandum (POM) initiatives. Leadership: Cultural changes associated with the collaborative environment require senior leaders to possess familiarity and functionality with the collaborative processes that enhance warfighter capability. Personnel: Skill sets and duties must be realigned and integrated into personnel development systems in time to provide long-term sustainability. Facilities: The Reachback concept may require additional facilities.

JSOTF Reachback facilities should be established at the regional TSOC locations. A JSOTF Reachback provides the capability to collect process and disseminate an uninterrupted flow of specific information to forward deployed SOF forces. In concert with ongoing efforts to provide each regional Combatant Commander with a Standing Joint Force Headquarters (SJFHQ), placement of a JSOTF Reachback at regional locations, is appropriate. The regional concept will allow for planners and technical specialists who are subject matter experts in Special Operations and their regional area of expertise, the ability to collect, process, distill and disseminate timely and useful information and participate in planning and collaboration activities.

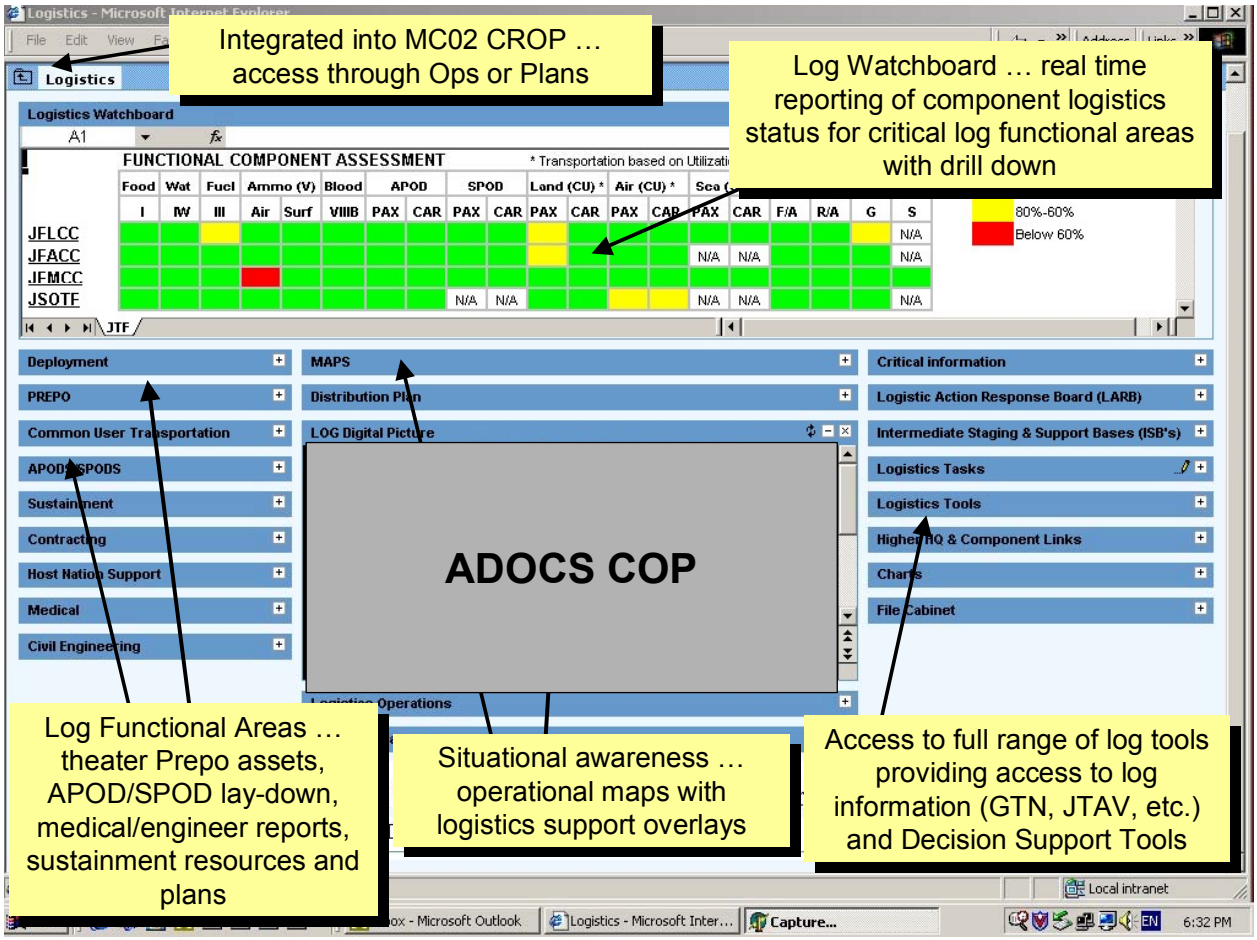
Doctrinal and TTP issues need to be addressed by HQ USSOCOM with regard to implementation and utilization of Reachback facilities. Final communications architecture requirements to support each facility need to be identified, ensuring interoperability and integration with ongoing DoD initiatives in support of JTF level collaboration and mission planning requirements. The Reachback initiative should be incorporated under the HQ Mission Planning Environment effort. The JSOTF Reachback/SOMPE concept and infrastructure proposal must be included in the Mission Planning Environment ORD, and approved by the Special Operations Command Requirement Evaluation Board (SOCREB). This will ensure that material solutions and acquisitions are consistent with DoD programs in which we are currently leveraging, in addition to deployed configuration management considerations and requirements.

USSOCOM needs to continue to stay engaged with ongoing DoD efforts with regard to collaborative tool enhancements. Additional efforts and initiatives need to be pursued to integrate unique Mission Planning tools and applications within the collaborative environment. This effort will allow growth of the collaborative environment beyond that of situational awareness and facilitate actual real time route planning, course of action development, real time effects based operational planning, etc.

Logistics Tool Suite (LTS)

Description

The LTS, sponsored by Joint Experimentation/Command, Control, Communications, Computers, and Intel (C4I) Team, is a compilation of existing and experimental tools that enables planners to collaborate, using common and shared information, on logistical issues in



support of rapid deployment and sustainment objectives. Joint logistics tools also provide decision support assistance in log planning and execution. The tools suite provides a near-real-time collaborative operations and logistics capability, that supports planning and rapid re-planning within a web-based environment using interactive map graphics, tables, charts, schedules, text documents and video applications. It gives the ability to develop, assess, monitor and visually display logistics support.

A snapshot of the logistics watchboard can be seen in the figure above.

Overall Assessment Results

Of the people that used the joint logistics tools, a majority felt that the tools were useful. Findings, based on the results from the assessment questionnaires that were sent to operators, indicate that the tools support the SJFHQ enabler of sustaining the force.

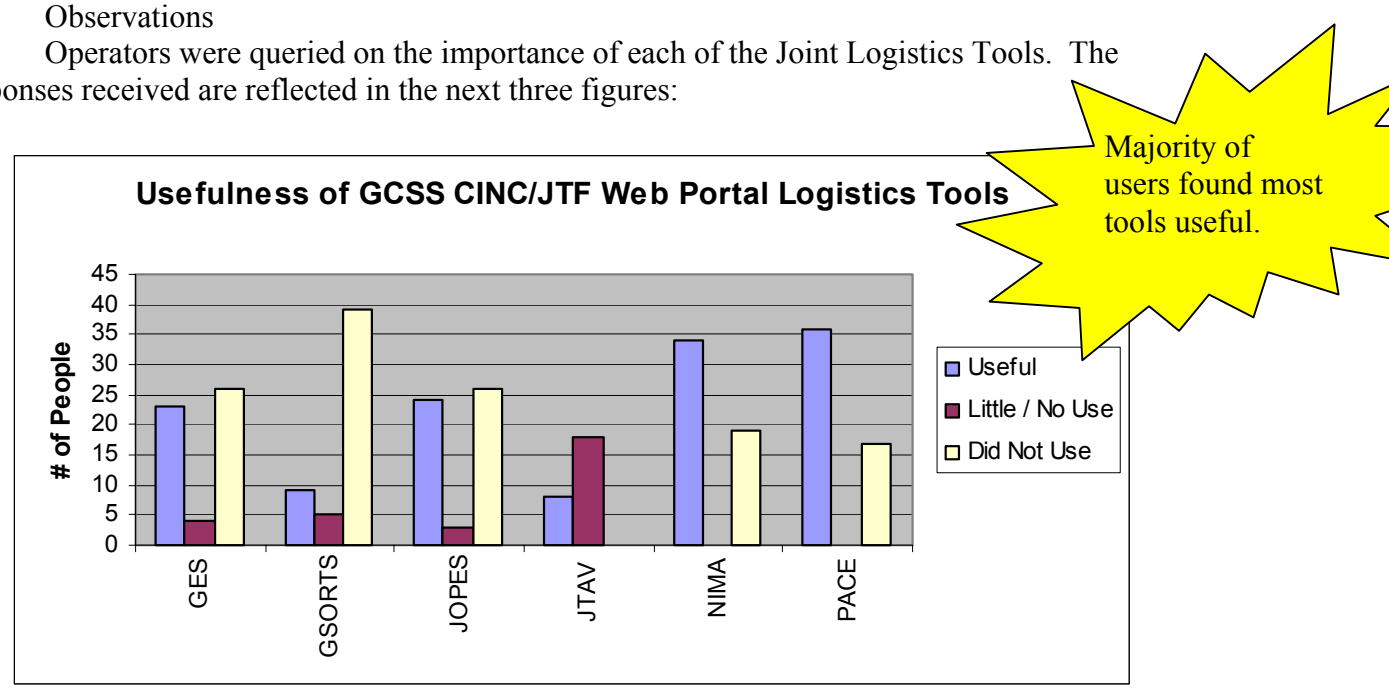
Methodology

LTS was evaluated by 53 logistics personnel during MC02. Users were surveyed regarding their use of the Logistics Tools. In addition to the surveys, interviews and subject matter expert opinions were also considered to better evaluate the utility of the LTS. The

analysis indicates Logistics Tools' has potential for providing significant key enabler support to the SJFHQ. This assessment primarily focused on whether or not the individual tools were useful to the warfighter.

Observations

Operators were queried on the importance of each of the Joint Logistics Tools. The responses received are reflected in the next three figures:



Positive Feedback:

Overall, the Global Transportation Network Exercise System (GES) was a very valuable tool. Having the manifests showing as well as schedules was very useful, particularly, in populating the POD portions of the Watchboard and researching the contents of downed aircraft and delayed ships.

Global Status of Resources and Training (GSORTS) was useful in determining the characteristics of units.

In the area of determining the amount of asset visibility required to divert assets, the Log CROP, Joint Total Asset Visibility (JTAV), provided sufficient visibility of assets to enable JFC to divert PREPO and inbound supplies to satisfy needs elsewhere in the JOA.

The use of NIMA was very beneficial when researching the capabilities of low use island airfields. The Topographic Chief worked closely with NIMA to collectively provide critical data packages for component forces and analysis packages for JTF decision-making.

The Port and Airfield Collaborative Environment (PACE) provided very good imagery and metadata on ports and airfields and was very useful in getting information on Airports of Departure (APODs) and Seaports of Departure (SPODs).

Need for Improvement:

In regards to the use of joint force deployment planning procedures, it was noted that JOPES is an antiquated system. To facilitate scheduling and force deployment, a flexible tool/system is required to allow rapid force selection with CS/CSS elements linked with easy data manipulation to allow for force packaging and includes a sustainment generator to create the combat force packages.

JTAV needs the capability to reflect the asset status of user defined grouping of units.

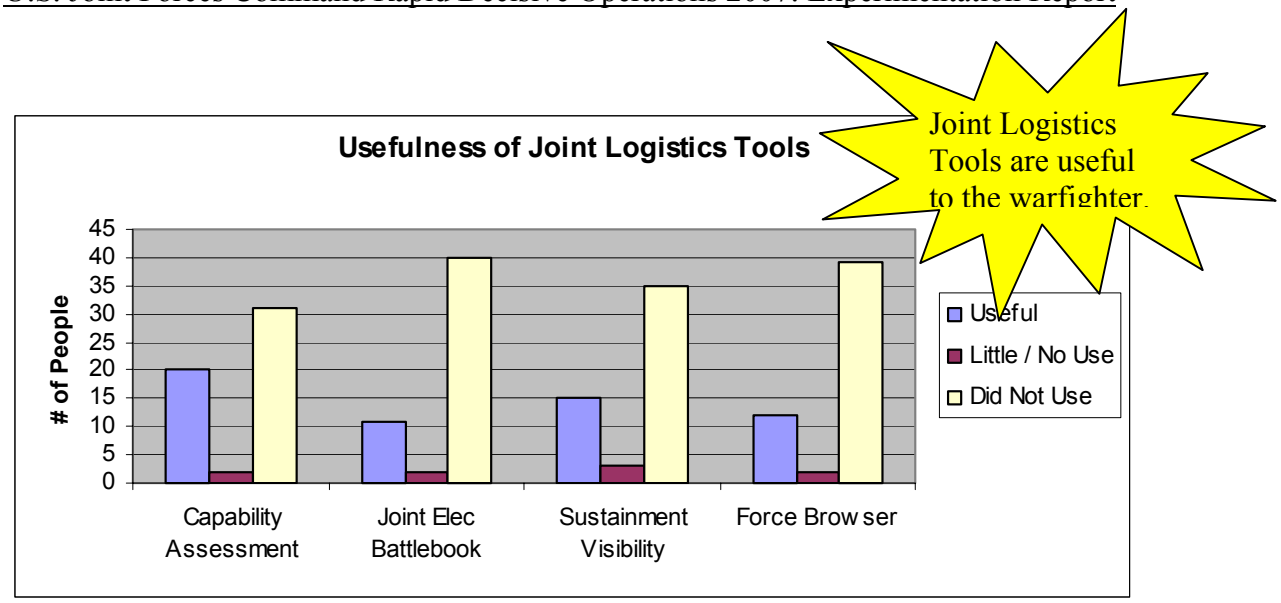


Figure 215 - Usefullness of Joint Logistics Tools

Of the people that used the joint logistics tools, a majority felt that the tools were useful. This covered the areas of capability assessment, the Joint Electronic Battlebook, Sustainment Visibility, and the Force Browser. The Joint Logistics Decision Support Tools (JLDSTs) are very beneficial and appreciated by JTF Log Planners and Operators. They provided necessary data to refine the JTF concept of support. A comment was made by a JTF Logistics Plans member that "logisticians would be lost without JLDSTs". A significant observation emphasized that training on and familiarity of systems is and will be, key to operational sufficiency in JL tools. Capability Assessment is a superb tool, which is very user friendly and flexible. Its capabilities should be incorporated in GCSS. Joint Electronic Battlebook (JEB) should be expanded to include all military units, not just logistics units. Sustainment Visibility was used as a backup to JTAV and GCSS access to JTAV. Force Browser was the most used tool in MC02. It was superb in analyzing the contents of the TPFDD as it developed.

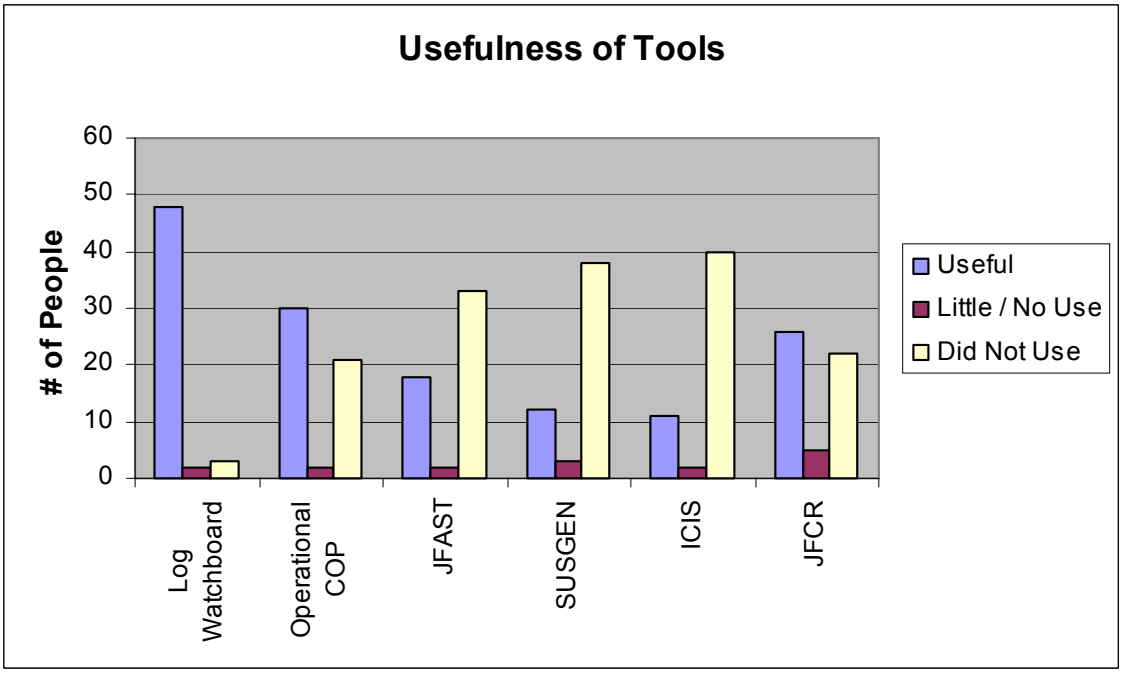


Figure 216 - Usefulness of Tools

Positive feedback:

The Log Watchboard provided good situational awareness to the JTF although there has been initial difficulty with components updating some of the required fields. There were numerous concerns on the data posted on whether it was current. More fidelity is required on engineer information. The Joint Flow and Analysis System for Transportation (JFAST) was a good planning tool for TPFDD validation. Integrated Consumable Item (ICIS) was rated as a superb tool that gave great visibility over projected Service usage of POL products tailored to the TPFDD.

Needs for improvement:

Build a link between JFAST and ELIST so that JRSOI can also be assessed during the feasibility analysis. As with all the tools, the training was minimal. The extended deployment planning beyond Spiral 3 precluded the intended use of the Sustainment Generator (SUSGEN). However, the concept was a good one and could have enabled logisticians to better evaluate the sustainment burden for lift that the JTF and COCOM had to plan. Logisticians could have also avoided a lot of the TPFDD analysis and modification to support the sustainment function later in the game had SUSGEN been run to set aside X amount of lift for sustainment replenishment by each Service by supply class.

ICIS should be improved by adding the capability to manually adjust the operations tempo and logistics factors used to determine requirements. Joint Force Capability Register needs further refinement in the Search capability. Possibly, add a ULN listing for referencing like items.

Relationship to Other Objectives

All of the tools addressed in this section are discussed in some form in other areas of this report.

Recommendations

The following recommendations are derived from the User comments in the Logistics Tool Suite surveys:

A flexible tool/system is required, beyond the JOPES system, that will permit quick force selection with CS/CSS elements linked with easy data manipulation to allow for force packaging; and including a sustainment generator to create the combat force packages.

JTAV needs the capability to reflect the asset status of user defined grouping of units.

A link needs to be built between JFAST and ELIST so that JRSOI can also be assessed during the feasibility analysis.

The extended deployment planning beyond Spiral 3 precluded the intended use of the Sustainment Generator (SUSGEN). However, the concept was a good one and could have enabled logisticians to better evaluate the sustainment burden for lift that the JTF and COCOM had to plan.

In future experiments, the Sustainment Generator (SUSGEN) needs to set aside X amount of lift for each of the components by supply class in order to avoid a lot of the TPFDD analysis and modification to support the sustainment function.

ICIS needs to be improved to add the ability to manually adjust the operations tempo and logistics factors used to determine requirements.

Joint Force Capability Register needs further refinement in the Search capability. Possibly add a ULN listing for referencing like items.

Maneuver Control System – Tactical Combat Operations (MCS-TCO) Interface

Description

Army Battalion through Corps and Marine Corps Regiment commanders need interoperable Command and Control (C2) systems to share Situational Awareness (SA) information when fighting in close proximity to one another. Currently, SA information is routed through higher headquarters and back down to the respective Services' systems. The ability to transfer SA data horizontally between these forces would greatly reduce time delays. Also, real-time C2 information sharing between Army and Marine Corps units is critical to prevent fratricide and to enable Rapid Decisive Operations (RDO) at the Battalion through Corps and Regiment levels. The MCS-TCO interface allows the two C2 systems to interoperate, enabling horizontal sharing of SA information.

The Maneuver Control System, sponsored by U.S. Joint Forces Command Joint Interoperability and Integration, is the central C2 system of record for Army maneuver elements at Battalion through Corps echelons. It consists of a network of computer workstations that integrate information from subordinate maneuver units with those from other Army Battle Command System (ABCS) battlefield functional areas to create a joint common database referred to as the Common Tactical Picture (CTP). Tactical information products such as situation maps and reports allow the display and manipulation of this information. MCS also provides a means to create, coordinate, and disseminate operational plans and orders. Its role in communicating battle plans, orders, and enemy and friendly situations reports makes it a key component of the Army's ongoing effort to digitize the battlefield. MCS can be deployed in two standard configurations, MCS Work Station (WS) (UNIX-based) and MCS Light (Windows-based). MCS WS is the backbone of the MCS system and is used to display and pass near real-time situational awareness and houses the system database. MCS Light (laptop) is primarily

used as a planning tool at the battalion level and above for overlays and targeting. MCS Light can be employed in a stand-alone configuration or integrated into the MCS network.

The Marine Corps C2 system of record is the TCO system. TCO performs C2 functions by building SA through the compilation of data inputs from other Marine Air Ground Task Force (MAGTF) C4I systems. TCO provides operational commanders with the capability to receive and display select information. The functional application involved in the Marine Corps TCO architecture is the Command and Control personal computer (C2PC) (Windows-based) module on the intelligence/operations workstation (IOW). C2PC is a client application that displays tactical track data in the TCO system. This application is the battle staff's primary planning and execution application for display and management for the Common Operational Picture (COP). C2PC supports collaboration, course of action development, and near-real time display of friendly and threat forces on the battlefield.

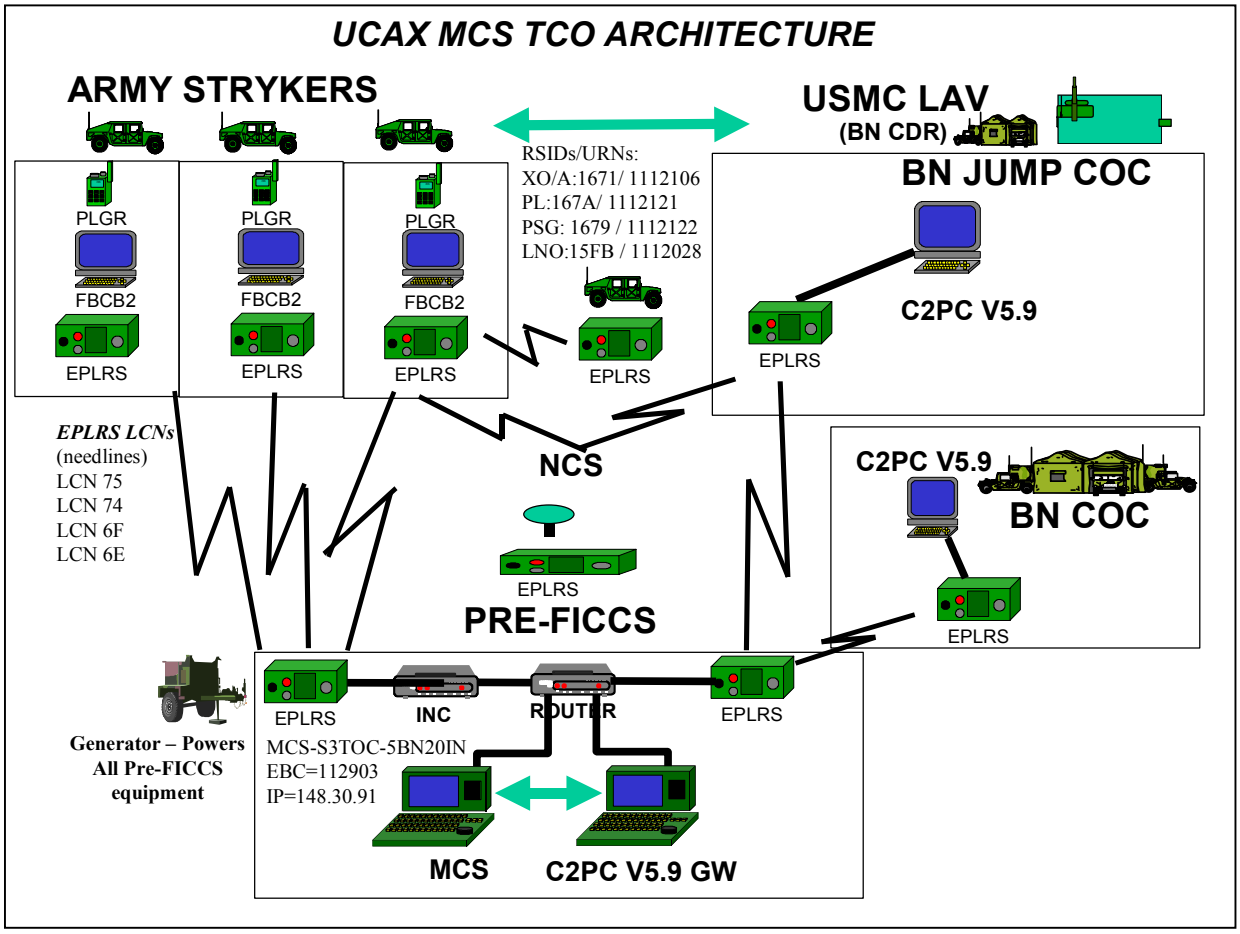
To enable interoperability, ASD (C3I) tasked the Services to plan, develop, and build an interface between the C2 systems. The two Services have developed an interface that shares eight Variable Message Formats (VMF) (Free Text, Basic Weather, SPOT/SALUTE Report, Position Report, Threat Warning, Field Orders, Overlay Message, and NBC Report) in an effort to provide ground SA to the maneuvering commander. The underlying technology of the MCS-TCO interface is the Common Message Processor (CMP). The CMP is designed to support and enhance the interoperability of DoD and associated civilian messaging systems operating in limited bandwidth environments. To date, both services have established three configurations for employing the systems/interface: a Local Area Network (LAN) environment, an Enhanced Position Location Reporting System (EPLRS) network, and an EPLRS gateway configuration.

Overall Assessment Results

Based upon the Joint Battle Center assessment the Command Control Personal Computer (C2PC) and MCS Light successfully exchanged the eight VMF messages. Both systems successfully transmitted and received all message types, to include rendering symbology on a map background as derived from the K5.17 (Overlay) and K5.01 (Position Report) messages. Several operational issues and minor technical deficiencies were identified and documented. Most of these issues will require doctrinal solutions or development of technical/procedural work-arounds. All of the stated initiative's intended functionalities passed and worked as advertised. Both systems are currently used by the respective services.

Methodology

This assessment was written using data collected from surveys, comments, and interviews from warfighters and Subject Matter Experts (SME). Nine system users were surveyed to evaluate the MCS-TCO interface for warfighter utility during MC02. Although it



was not scientific, this methodology showed that the MCS-TCO interface enabled the Standing Joint Force Headquarters (SJFHQ) to conduct decisive Effects-Based Operations (EBO).

Observations

MCS-TCO interface testing for MC02 was conducted during the Marine Corps Urban Combined Arms Exercise 2002 (UCAX02) at the Southern California Logistics Airport. The MCS WS and C2PC utilized the EPLRS and a LAN to exchange data (see figure below).

During MC02, the MCS-TCO integration team successfully established a link between MCS and FBCB2. EPLRS served as the transmission media for passing the VMF messages between the Army and USMC C2 systems with the USMC functioning as the Network Control Station (NCS). To make the Army EPLRS radios active in the USMC Network, RSID's from the Strykers were added to the USMC NCS. The EPLRS network also included two Army-provided relay stations with the added capability of establishing a gateway between Army and USMC independent EPLRS networks if needed.

The Marine Corps Testing Systems Support Activity (MCTSSA) provided 3-7 Infantry Battalion with two C2PC systems with the MCS-TCO software. This ensured C2PC systems in the main Combat Operations Center (COC) and "jump" COC where capable of receiving VMF messages.

The primary systems were installed, operated, and maintained in a LAN configuration inside the USMC Preliminary First In Command and Control System (PRE FICCS) command center. The PRE FICCS was provided as a central location that would serve information between the operational forces involved in the UCAX. A CTP was successfully shared between the Army Stryker Platoon and the Marine Corps Infantry Battalion. Eighty-nine percent of MCS-TCO users rated the ability to establish connectivity between the two systems very good or excellent. No problems were reported with the LAN connection. The ability to accept SA data between MCS and TCO was rated very good or excellent by 89% of those surveyed. Some warfighters suggested further developing the interface to enable updating SA messages automatically. Both systems were able to display MIL-STD 2525B symbology.

Other significant MCS-TCO observations focused on improving future systems and are listed as follows: This is based upon user feedback and subject matter expert opinions.

- The systems should share a common database which will allow them to display other symbols, i.e. No Fire Areas (NFA), Restricted Fire Areas (RFA), Phase Lines, etc.
- The systems should have fully automated SA, a common database to allow complete messaging, and a common implementation of 2525 graphics.
- To maximize use of database replication of exchange data from system to system, minimize message traffic and automate the operation
- VMF message components should be nearly transparent to the user. Full VMF message set should be enabled. Proposed tactical applications should be tested and more thoroughly developed.
- Automatically update both systems when one system receives data from another source. Both systems should use the CMP fully where you have the same capability using the CMP Graphic User Interface (GUI).

This interface has no impact on the SJFHQ but does have Joint Warfighting implications. The warfighter utility of the MCS-TCO interface was assessed against the

following key enablers of the SJFHQ. Based upon the significance of the MCS interfacing with the TCO it was deemed that this initiative supports EBO. The system was also rated as potentially supports establishing information/knowledge superiority, and assuring access into and through the battlespace. It was rated as such because further development of the system to achieve minimum implementation of VMF standards between the Services' C2 systems and to automate data transfer is ongoing. Furthermore, this assessment focused on the utility of exchanging SA data, unit symbology, text messages, threat warnings, and force orders between Army and Marine Corps C2 systems.

ENABLER	Supports	Potentially Supports	Did not provide significant

			support
Establish Information/Knowledge Superiority		X	
Rapidly Set Conditions for Decisive Operations			X
Assure Access Into and Through the Battlespace		X	
Conduct Decisive Effects-based Operations	X		
Sustain the Force			X

DOTMLPF Linkage

USJFCOM is working with program managers to develop a DOTMLPF change recommendation package. The CMP software is planned for incorporation in future versions of both Army and Marine Corps systems.

Recommendations

The US Joint Forces Command (USJFCOM) has helped to define the joint requirements for the MCS-TCO interface, which are specified in a Memorandum of Agreement between the US Army Training and Doctrine Command (TRADOC) and the Marine Corps Combat Development Command (MCCDC). The Army Battalion through Corps and Marine Corps Regiment commanders needed to improve their SA when in close proximity to one another. This assessment focused on the utility of exchanging SA data, unit symbology, text messages, threat warnings, and force orders between Army and Marine Corps C2 systems.

The interoperability of the two systems enabled the leaders of the Army Stryker Platoon and the Marine Corps Infantry Battalion to make tactical decisions using additional SA information. This additional information can be used to conduct precision engagement against a time sensitive target.

Both the MCS and TCO are systems of record. The MCS-TCO interface is technically mature enough to exchange critical SA data in near-real time. The interface is being assessed by JI&I for further development to achieve minimum implementation of VMF standards between the Services' C2 systems and to automate data transfer. This includes exchange of all 133 VMF message types.

National Imagery and Mapping Agency (NIMA) Initiative

This initiative (formerly referred to as National Imagery and Mapping Agency (NIMA) Crisis Action Response Team (CART)) has been expanded since its original submission to USJFCOM. **Consequently, the initiative name has been changed to that reflected above.**

Description—

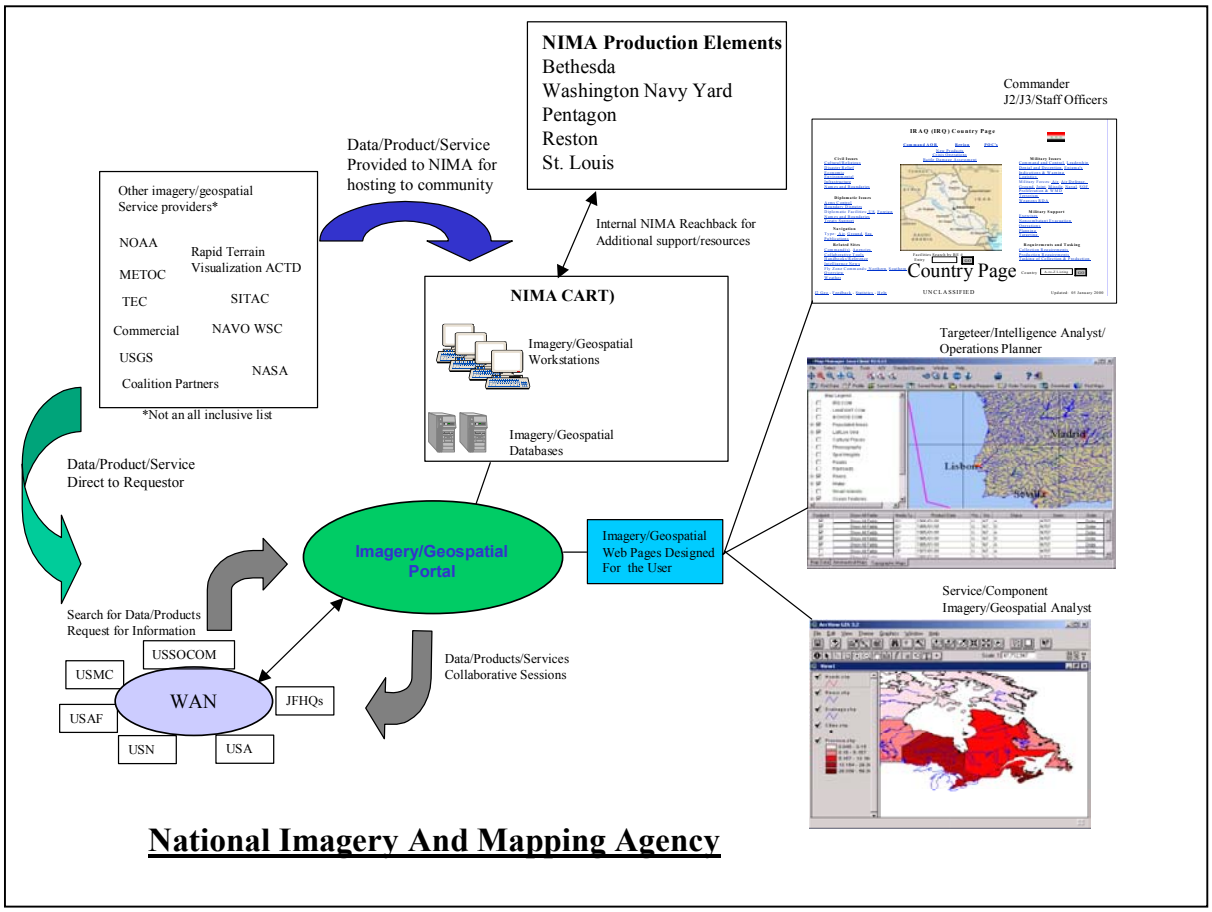
The NIMA initiative, sponsored by the National Imagery and Mapping Agency, consists of a web site supported by a server holding a variety of geospatial intelligence databases that are accessible via query by the warfighter searching for specific data/products. Multiple workstations connected within the lab provide the geospatial analysts the ability to create or

modify products to meet custom requests for support. The site is connected via NIMA's internal networks to other NIMA production centers with additional resources to produce and forward products for further dissemination to the warfighter. A Battle Captain is responsible for managing the operation and allocation of production resources to meet Request for Information (RFI) requests. The following illustration depicts NIMA's interface capability within the support and warfighter level components via the Imagery/Geospatial Portal Servers.

NIMA provides much of the geospatial intelligence that enables the CROP concept reality to support RDO in a collaborative environment. Within the framework of Joint Operational Warfighting, the dynamics of RDO and EBO will demand constant updating of the CROP. The capabilities of NIMA enhance the validity of the CROP's depiction of the battle space picture. CART affords the Joint Task Force Commander web-enabled access to data, products, tools, and NIMA subject matter experts (SMEs). NIMA enhances the Joint Force's battlespace visualization and situational awareness in conducting EBO and allows real-time interaction between the JTF staff and NIMA in planning and conducting RDO. The ONA requires constant updating with the most current geospatial intelligence. While much of this updating will be automated and obtained from various systems such as GCCS, reachback to NIMA provides the capability for analyst-to-analyst collaboration in the generation of products such as support to the ONA.

Overall Assessment Results

Initial responses to surveys issued within MC02 Execution indicate a lack of knowledge/understanding of the initiative or a lack of awareness that NIMA provided the support data during planning and execution. The use of artificial or 'hybrid' geographic imagery terrain and the M&S systems used to run the MC02 experiment models contributed to limitations of the use of NIMA expertise and capabilities throughout MC02. The NIMA mapping product tools proved to be crucial in the operations of all M&S systems as well as providing direct links to the ONA, Joint Automated Target Folders and Air Tasking Orders (ATO's). No graphs are provided because a majority of the targeted audience responded "don't know" in every functional are questioned. This caused the results to be based primarily upon interviews and subject matter expert inputs.



Methodology

Surveys on the NIMA Initiative were sent to 39 people during MC02. In addition to the surveys, interviews and subject matter expert opinions were also considered to better evaluate the utility of the NIMA initiative in supporting the SJFHQ requirements. Using this methodology, the NIMA initiative has been evaluated to provide significant support of the key enablers of the SJFHQ.

Observations

NIMA support was evaluated against the following key enablers of the SJFHQ. As the main Imagery/Geospatial link from its production centers to the joint warfighters at the CINC, JTF and component levels, NIMA provides them the critical information, directly establishing Information/Knowledge Superiority to the warfighter. By demonstrating this key functional capability as the crucial Geospatial Imagery link, NIMA functional capabilities directly support the SJFHQ areas of RDO, required visual battlespace access, decisive EBO for all component command centers.

	Supports	Potentially Supports	Did not provide significant support
Establish Information/Knowledge Superiority	X		

Rapidly Set Conditions for Decisive Operations	X		
Assure Access Into and Through the Battlespace	X		
Conduct Decisive Effects-based Operations	X		
Sustain the Force			X

Normal NIMA interaction is limited within the JTF personnel staff. During MC02 the Geospatial expertise was located in the Plans Group and consisted of a staff of two people, including the JTF Engineer. Both individuals provided positive comments regarding the support provided by NIMA. Though the two-person staff was the primary developer and briefer of geospatial products used by all event participants, there was a definite non-awareness that NIMA provided the support data during planning and execution. This was evidenced by the overwhelming user survey responses of "don't know" to any of the NIMA functionality questions. A couple of MC02 event limitations impacted NIMA support to the exercise. The first was the artificial or 'hybrid' terrain, which limits the amount of support that NIMA can provide to a JTF. NIMA has extensive geospatial intelligence databases; however, they are based on 'real' terrain and over the course of MC02, complete hybrid geography usage limited the level of NIMA support. The M&S systems used to run the MC02 experiment models were the second limitation. These systems were used to maintain, "ground truth" in the event and replicate live collections. Since there were few "live" collection requirements, expertise was limited in support of responses to JTF collection requirements or in support of targeting and Battle Damage Assessment (BDA).

The sponsor initiative technical lead pointed out that even if NIMA had insight into these function requirements, NIMA would not have been able to provide adequate geospatial I&W support to the JTF because the Opposition Forces (OPFOR) was allowed to conduct their activity in an 'intelligence vacuum'. The 'surprise' element to the event participants gave a false impression of the type of geospatial intelligence support that NIMA can provide to a JTF. He made reference to a special mapping product provided by NIMA that was used as the 'underpinning' tool for all M&S systems as well as the CROP before the start of MC02 Execution. Without this special product, he said, "picturing" the battle space would have been extremely difficult for the event participants. During the execution of MC02 NIMA posted many actual imagery products within the home page in response to requests made by JTF and component participants. NIMA also provided adequate provisions for ONA, Joint Automated Target Folders, Air Tasking Orders (ATO's), and Geospatial Intelligence expertise direct links throughout the MC02 Execution exercise.

Relationship to Other Objectives

Performance regarding the NIMA Initiative may impact the findings of the other assessment areas or joint initiatives.

Recommendations

Although the NIMA initiative reflected positive feedback provided by the few participants who actually used the site, full NIMA functional capabilities were not completely put to the test due to the limitations of the MC02 experiment. As an unproven technological

initiative in MC02, NIMA was able to expose the participants to a number of geospatial visualization tools that should be useful to support current and future warfighter operations. Feedback provided on these tools should enable NIMA sponsors to better identify and support future geospatial requirements. Future military efforts involving NIMA need to expose the functional capabilities of geospatial intelligence to the different levels of joint warfighters.

Network Security Management Correlation and Display Systems (NSMC&D)

Description

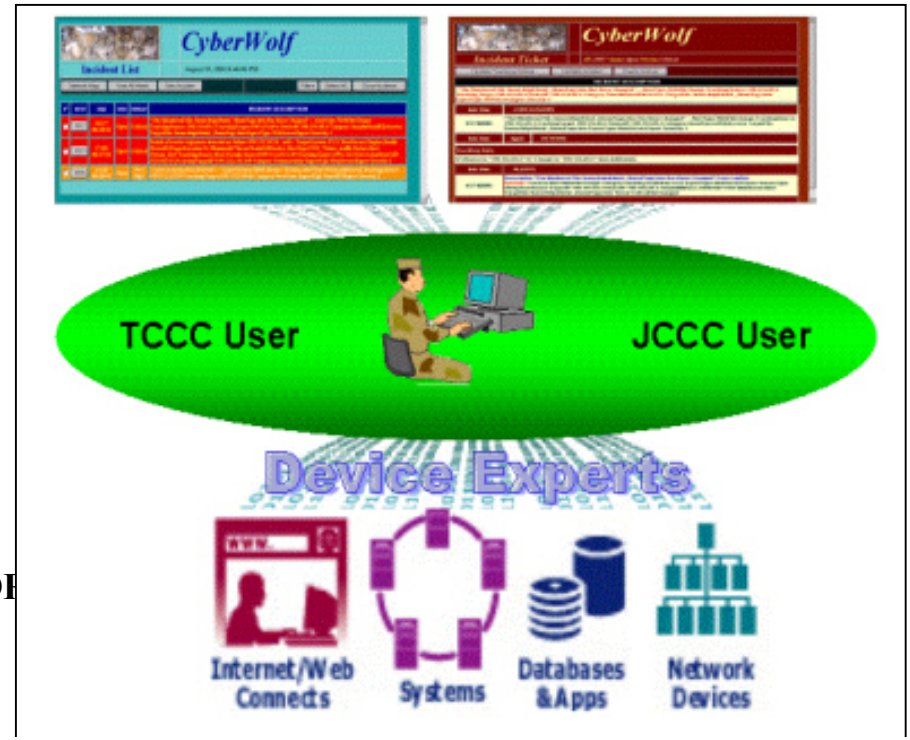
The Network Security Management Correlation and Display Systems (NSMC&D) is a centrally monitored enterprise security management system designed to provide secure and reliable communications from Commercial Off The Shelf (COTS) and Government Off The Shelf (GOTS) network intrusion detection sensors, firewalls, operating systems, and the Hewlett-Packard Open View data element management system.

NSM C&D supports the SJFHQ by providing Information Assurance situational awareness, Consolidating intrusion detection reports and event data input from disparate Information Assurance and network sensors, performing data normalization, correlation, analysis and reporting, and conducting suitable information exchange with Joint Network Management System. NSMC&D is a Joint Battle Center (JBC) project based on Combatant Commander survey requirements from United States Central Command (USCENTCOM), United States Space Command (USSPACECOM) and United States Joint Forces Command (USJFCOM). This requirement supports SJFHQ requirements.

Overall Assessment Results.

The results of Millennium Challenge 2002 data did not conclusively determine the operational viability of NSMC&D regarding the capability to support the defense of the SJFHQ network. Planners elected not to inject NSMC&D play throughout the exercise because of the interference with the experiments and exercise. However, the initiative administrators did conduct some testing during the set up and initial days of MC02.

When asked to rate the effectiveness of the collaborative sessions for combating network attacks, all users rated the tool as average or better. Significant is the activity of security personnel discussing attacks with each other in a collaborative environment, which offers better management of protection efforts for the network. When asked to rate the properties of NSM C&D with regards to its intrusion detection and firewall sensing capabilities, 100% indicated the tool to be very good. Not using NSM C&D in a controlled manner of network attacks throughout the exercise was a missed opportunity. Therefore, based on resources available and utilized,



and the lack of network attack experimentation during MC02; no clear opinion can be formed regarding NSM C&D based upon observations from Millennium Challenge 2002.

Methodology

NSMC&D was evaluated by surveying seven personnel directly involved with the network security during MC02. In addition to the questionnaires, JBC resources were also considered to better evaluate the utility of NSM C&D in supporting the SJFHQ requirements. Using this methodology, NSM C&D has been evaluated to potentially provide significant support of the key enablers of the SJFHQ.

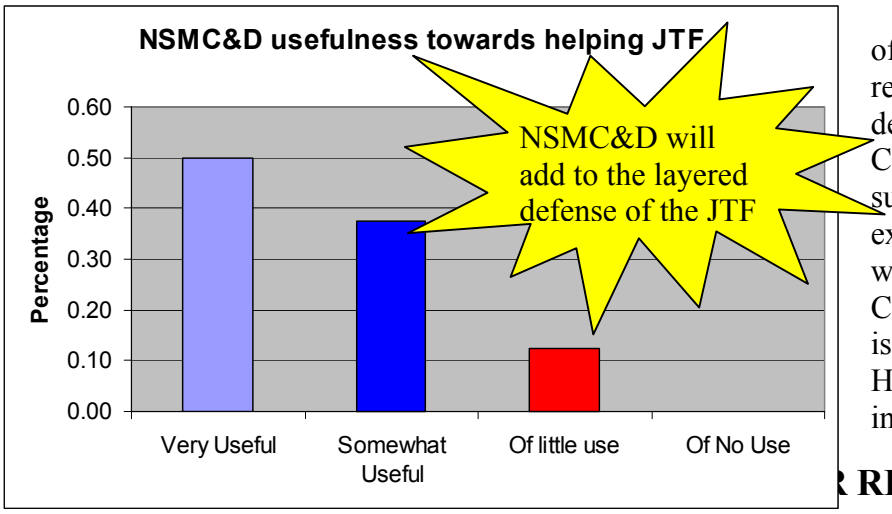
Observations

NSM C&D was evaluated against the following key enablers of the SJFHQ and supports those enablers as indicated.

	Supports	Potentially Supports	Did not provide significant support
Establish Information/Knowledge Superiority		X	
Rapidly Set Conditions for Decisive Operations		X	
Assure Access Into and Through the Battlespace		X	
Conduct Decisive Effects-Based Operations		X	
Sustain the Force			X

The results of MC02 did not conclusively determine the operational viability of NSMC&D with respect to supporting the defense of the SJFHQ network as explained in the introduction above.

There was total agreement that the NSM C&D provides protection to the network. Since there are many good tools available, the survey question asked to users during MC02 was: "Does existing technology support the requirements of a SJFHQ?" As indicated in the graph below it is clear that 85% of the respondents see this technology as not only a good tool, but also one that will fit into the defensive arsenal of the network and security administrators to protect the network.



A comment from one of the "Of little use" respondents clearly demonstrated why NSM C&D deserved more play in such a significant experiment. The comment was, "The process (NSM C&D) seemed to be a side issue to the actual mission. Had it been actually incorporated there should

have been more players in key position to give data about incidents". As we move forward with a network centric warfare model, commanders at all levels will need to understand the risk associated with not having a strong network security posture. In a battle, position commanders can survey their domain and see their weaknesses. Commanders must learn to fight with their network domains in mind. Not using NSM C&D in a controlled manner throughout the exercise was a missed opportunity. Based on resources available and the lack of experimentation on NSMC&D during MC02, no clear opinion can be formed regarding NSM C&D as a result of MC02.

Recommendations

A purposeful and focused effort should be made in the next experiment/exercise to obtain data that conclusively determines the operational viability of NSMC&D regarding the capability to support the defense of the SJFHQ network. Planners must inject continuous, and system stressing NSMC&D play throughout the experiment/exercise and fully incorporate the anticipated interference with the overall experiment/exercise.

Theater Medical Information Program - Joint (TMIP-J)

Description

The Theater Medical Information Program – Joint (TMIP-J), sponsored by Joint Forces Command, J02M, was introduced as a tool to develop and demonstrate the medical portion of the CROP and to experiment with tools to better enable the warfighter to receive the expected level of care throughout the Joint Operations Area (JOA). Expanded distance and limited footprint require the use of technology and enhanced monitoring to provide the best available health service support. The goal of TMIP-J is to move the right medical capabilities to support deployed forces at the right time and right place. TMIP-J integrates medical information systems to capture the medical record data while linking care from the Theater of Conflict to a sustaining base for enhanced medical care. It allows Medical and Health Sciences environment surveillance to minimize casualties and help maintain a healthy force. TMIP-J also improves medical intelligence gathering and potential threat mitigation on chemical and biological threats and attacks.

There are three tools used for the automated medical record data capture and medical intelligence gathering. Global Expeditionary Medical System (GEMS) is a hand-held palm pilot-like, paperless, data linked tool for the front line medic to record and track individual patient assessments and is used by the Air Force. Shipboard Non-Tactical Automated Medical System (SAMS) is a paperless, hand-held tool used extensively on ships to record and track individual encounter data and medical readiness status. It is also used to reorder medical supplies for maritime commands and is used by the Navy. Medical Communications for Combat Casualty Care (MC4) is a hand-held tool, providing commanders with timely medical situational awareness. The MC4 provides casualty/patient tracking; trend analysis of health care encounters, medical command and control, medical surveillance, medical treatment, and medical logistics data across all levels of care and is used by the Army.

TMIP-J provides an integrated, automated theater medical information system addressing the functional areas of:

- Command and Control (C2) (including medical capabilities assessment/sustainability analysis, and medical surveillance)
- Medical Logistics (including assemblage management and blood product management)

- Health care Delivery (including medical threat, surveillance and health care delivery)

Overall Assessment Results

Medical personnel were asked about the effectiveness of TMIP-J in its functional areas. TMIP-J did not play a substantial role in MC02. Based upon survey feedback received, TMIP-J can be rated at best as unproven. Actual patients in the experiment did not match the patients in TMIP-J. However, TMIP-J was able to integrate Medical Information Systems to capture the medical record data using scripted data based upon medical personnel feedback. TMIP-J is a powerful tool and with more substantial testing has the potential to provide significant key enabler support to a SJFHQ in the future.

Methodology

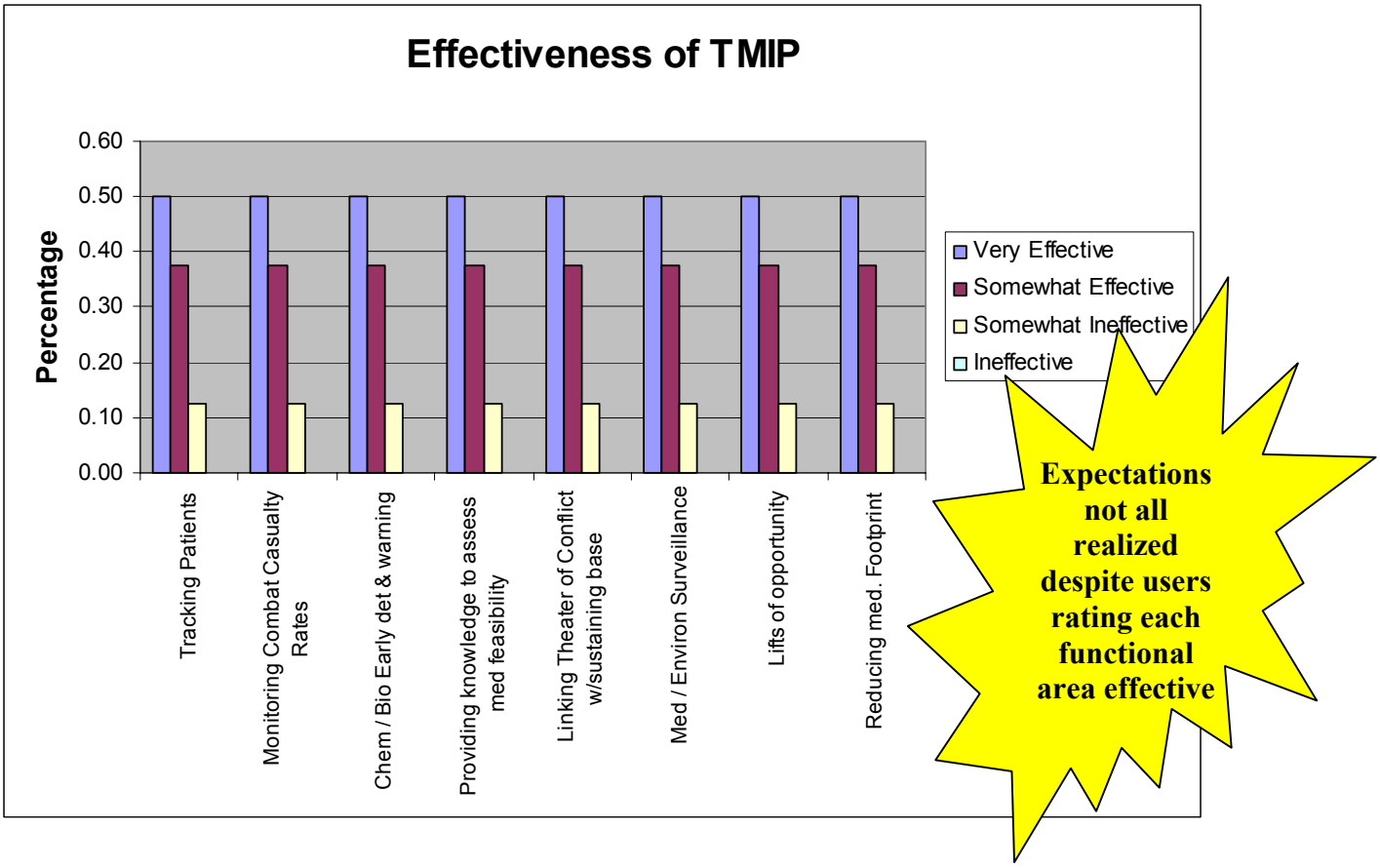
TMIP-J was evaluated by eight professional medical personnel during MC02. These users were surveyed regarding their use of TMIP-J tools. In addition to the surveys, interviews and subject matter expert opinions were also considered to better evaluate the utility of the TMIP-J. The analysis indicates TMIP-J's potential for providing significant key enabler support to the SJFHQ. This assessment primarily focused on the warfighter's rating of the effectiveness of each functional area of TMIP-J. A more in depth view can be obtained from section 5 of this report.

Observations

TMIP-J was rated as possessing the capability to potentially provide significant key enabler support to the SJFHQ. This was because TMIP-J did not play a substantial role in MC02. More extensive testing is needed. If the experiment was expanded to include a medical scenario with actual patients, then the assessment would be able to be expanded. Subject matter experts indicated that TMIP-J has the potential, when it is properly designed, tested, fielded and deployed, to provide valuable information for clinicians and statisticians to detect trends, provide visibility to the service and provide health service support status, which may be used by the JTF Surgeon.

	Supports	Potentially Supports	Did not provide significant support
Establish Information/Knowledge Superiority		X	
Rapidly Set Conditions for Decisive Operations		X	
Assure Access Into and Through the Battlespace			X
Conduct Decisive Effects-based Operations			X
Sustain the Force		X	

Findings based on the results from the assessment questionnaires obtained from the eight medical personnel follow below. All of the functionalities were rated the same across the board by all users surveyed despite the fact that TMIP-J was not successful in tracking patients.



The expectations of the TMIP-J initiative were not all realized during the execution, even though TMIP-J was rated as being effective in each functional area by medical personnel queried. The JTF Surgeon and staff chose not to use TMIP-J because of its immaturity and inability to provide any useful information supporting the medical operations. The ability to access whether service play solidified the TMIP-Service is needed to support TMIP-J was not available since the service boxes did not have their service specific patient encounter modules (e.g. CHCS II for Army, GEMS for AF, SAMS for USN and USMC). Additionally, there was not enough data to look at patient data trending outcomes. Observations indicated that the information from previous spirals should have been run in Joint Medical Semi-Automated Forces (JMedSAF) and transferred to the TMIP-J.

TMIP-J was able to integrate Medical Information Systems to capture the medical record data through the use of scripted data. However, there were discrepancies in the casualty reports. This was primarily due to lack of SOP and early coordination between the exercise controllers at JTASC and the lack of Manning Roster Management. Despite the advances in war fighting efforts with the application of SJFHQ concept, medical support and execution had not benefited from the concept. There were no medical planners or medical intelligence representatives on the SJFHQ. The SJFHQ had limited "reachback" capability to support request for medical intelligence and planning. This issue was magnified because the JTF Surgeon's staff had to start from scratch in their medical planning process.

The lack of early planning and knowledge of what assets were already in theater slowed the delivery of focused medical support services. For example, a Blood Supply Unit was not placed on the Time-Phased Force and Deployment Data (TPFDD), resulting in "make-shift"

creation of a BSU-like unit in the host nation hospital severely limited support. In another example, dedicated assets for medical evacuation (Army Air Ambulance Company) had an arrival date of C+37, well after the warfighters main effort was over. The late arrival of the Air Ambulance Company made it necessary for the services to use organic assets for casualty evacuation (CASEVAC) within the JOA. These lift-of-opportunity assets may be few and hard to obtain during an actual contingency.

Overall, there was a lack of medical information. Pre-hostility patient data was not available to flow into TMIP-J at the beginning of MC02 execution. A work around was created to feed information to the JTF Surgeon and Staff on the Medical Portal. This work-around was created because the funding was not available to provide the TMIP-J boxes to all medical personnel within the JTF.

Relationship to Other Objectives

All of the tools addressed in this section are discussed in some form in section 5 of this report.

Recommendations

The recommendations, made below, are based upon subject matter expert input and warfighter recommendations. As with all of the other logistics tools, additional in-depth training is recommended. The lack of sufficient training could directly be attributed to the observation that information in MEDSITREPS was never consistently sent forward to response cells.

The experimentation should be expanded to link actual patients to patients in the TMIP-J. More data is also needed in order to look at patient data trending outcomes. The Level 1 medical facilities should be simulated in future experiments in order to generate casualty numbers that are realistic and linked to the Manning Rosters. This data should then be tied into the combat scenario. Additional information should also be scripted in order to show the evacuation, additional visits/patient encounters… In addition to the above, more data should be made available to assess Disease and Non-Battle Injuries and incidents of potential disease outbreaks. Additional information also should be scripted in the experiment in order to show the evacuation, additional visits/patient encounters, etc.

To avoid or reduce missing essential medical force structures; to insure pre-deployment force health protection posture; and to facilitate and expedite the RDO/EBO or ETO planning process; sufficient embedment of medical personnel in the SJFHQ structure/organization are recommended. The revised SJFHQ organization should be capability-based to meet mission requirements and to insure that planning and coordination for those assets, capabilities, and personnel in the Joint Operations Area (JOA) occurs. A Medical representative should be required in the SJFHQ where medical operations and health services support is key to mission accomplishment. The medical representative will ensure, and help provide, continuity in medical planning, operations, intelligence or ONA, surveillance, casualty evacuation, and reachback coordination for the JTF. If the number of personnel on the SJFHQ is limited, then there should be at least two (three are recommended) medical plans/operations skilled representatives on the staff. A Medical Plans/Operations Officer is required for medical planning, operations, intelligence (ONA), surveillance and casualty evacuation coordination. A Medical Logistics Planner is required for coordination of medical resupply and biomedical maintenance, blood support and host nation and contracting medical support. Additionally, a

Preventative Medicine Officer should be embedded in the Information Superiority Cell to provide medical intelligence and surveillance (ONA).

Level 1 medical facilities should be simulated in future experiments as well. The medical simulation did not generate casualty numbers that were realistic and tied into the combat scenario. No assessment could be made whether those medical units in the JOA were capable of providing adequate care to the JOA ,(i.e. requirements to supply/availability.

All end-to-end testing should have been completed prior to the end of Spiral 3. Additionally, including a module in the Spiral 2 Academic Training on the medical systems and their significance in medical support to RDO/EBO would have been very beneficial to both the medical types and the warfighters. This should be done concurrently with the other automated tools training being given for continuity and cross-referencing. Provide adequate funding to ensure that the proper hardware is available to support the exercise.

Unmanned Sensor (US)

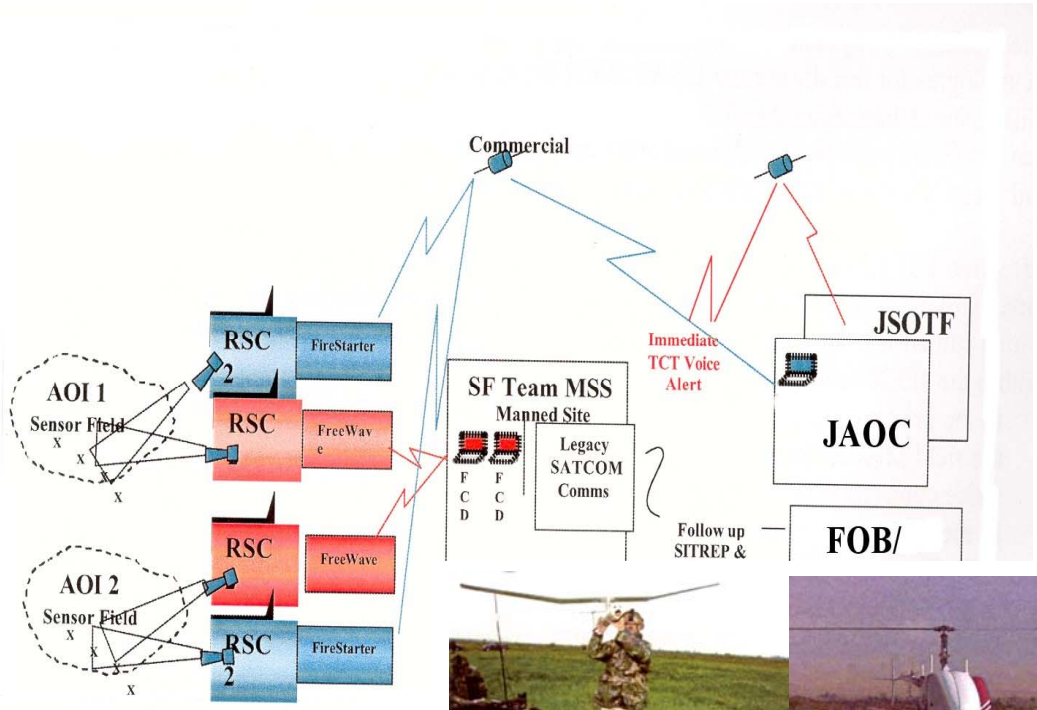
This initiative (formerly referred to as Unattended Ground Sensor (UGS) support to SR of TBM) has been expanded since its original submission to USJFCOM. The initiative now includes both UGS and Unmanned Aerial Reconnaissance (UAV) support to Special Reconnaissance. Consequently, the initiative name has been changed to that reflected above.

Unattended Ground Sensors

Description

The Unattended Sensor (US) initiative incorporates the use of UGS and UAV's to support Special Operations Forces (SOF) performance of Special Reconnaissance (SR) missions. Both types of unattended sensors were employed and assessed in MC02.

The UGS portion of the initiative concentrated on two suites of Unattended Ground

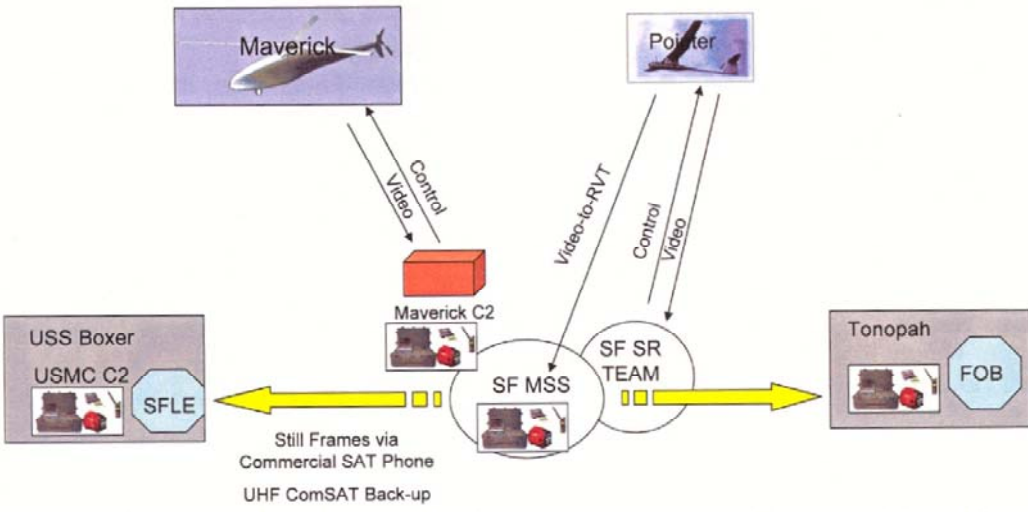


UGS Empl

UAVs

Sensors (UGS) and Remote Sensor and Camera Controller (RSC2) relays to help locate, classify and identify TBM targets for immediate strike. Simple Sensors (see Figure 1) used to track targets and cue camera systems are emplaced along the roads approaching a key intersection or Named Area of Interest (NAI). These sensors transmit their alert data to a nearby Remote Sensor and Camera Controller (RSC2). The RSC2 is collocated with a Common Electro-Optical Sensor (CEOS) remotely operated digital camera. The RSC2 serves as a relay and controller, transmitting sensor alert data to a distant station, tracking the transit of targets through the sensor field. Based on prior programming, when cued, the RSC2 initiates the CEOS image capture. It can be remotely reprogrammed in response to mission changes. The UGS can be employed in two architectures (see Figure 2): In the primary architecture (referred to as Free Wave ((FW)), the UGS alerts and imagery are transmitted to a nearby Mission Support Site (MSS) which, in turn passes target identification and location information (via voice) to the JSOTF or JOAC for action. In the second architecture (referred to as Firestarter ((FS)), the UGS alerts and imagery are transmitted directly to the TST cell in the JFACC. This downlink uses analog phone lines for display on a laptop C2PC Portal system.

The UAVs examined in this experiment were the fixed-wing Pointer, and the larger rotary wing Maverick (see Figure 3). Pointer is a man-portable, hand-launched, electric, low-cost, fixed wing reconnaissance UAV. Its payload consists of either a high-resolution color camera (daylight) or an inferred thermal imager (night) for real-time, high-resolution video imagery. Maverick will be an A160 Hummingbird which is a developmental rotary wing UAV that is currently undergoing ground testing. A surrogate, the "Maverick," is a Robinson R-22 sport helicopter configured as a UAV to test flight-control systems. Maverick weighs about 4,000 pounds, is powered by a commercial piston engine, and has a payload capacity of more than 300 pounds. Payloads include EO/IR imaging and SAR sensors. The UAV employment architecture is as shown. Pointer was launched and controlled by a SOF SR team in the vicinity of the objective while Maverick was launched from a Special Forces Mission Support Site (MSS) located away from the objective. Generally, Maverick was launched first to fly an advanced reconnaissance of the area providing images used in developing the R&S plan. Once deployed, Maverick provided security for the launch and recovery of Pointer. Pointer was



UAV Employment Architecture

launched once the area was secure. Video outputs from Pointer were passed to both the SR team as well as the MSS. Still frames from both UAV's were passed to the USS Boxer (with a JSOTF Forward) as well as the SOF Forward Operating Base (FOB).

Both elements of the US initiative were used to support SOF SR missions. The UGS sensors were primarily employed to support SR of Theater Ballistic Missiles (TBM) while the UAV'Ssupported SR of Weapons of Mass Effects (WME) sites. The US initiative is sponsored by the United States Special Operations Command (USSOCOM).

Overall Assessment Results

The US initiative provided a proof of concept for UGS and UAF enhancement of SOF ground team SR mission. Sensor information was passed to JSOTF & JAOC TCT decision makers. The unattended sensors provided "eyes on target" information throughout TST process.

Both UGS dissemination architectures for the RSC2 system worked, allowing tracking and image capture of multiple targets. High value targets transiting the Areas of Interest (AOIs) were identified and reported to higher HQ expeditiously, in most cases in less than five minutes. This capability demonstrated the utility of UGS to support SR.

MC02 provided an opportunity to identify procedural as well as technical issues in the employment of UGS and the RSC2 Architecture. It also allowed for an analysis of the systems tactical utility as viewed from the operational users' perspective.

Using UAV's SOF teams passed real time information to operational level headquarters as part of SOF SR missions.

MC02 demonstrated the advantages of both UAV platforms operating individually as well as in tandem.

Methodology

The assessment methodology employed in this initiative involved the use of an unbiased Subject Matter Experts (SMEs) deployed from HQ USSOCOM to observe the UGS and UAV activities. The SMEs conducted interviews with technical representatives of the systems, Special Forces participants who employed the systems, and recipients of sensor products. A second USSOCOM SME also spent three days evaluating the intelligence potential of UGS and passed findings to the primary SME. Using this methodology, US have been evaluated as supporting SOF Special Reconnaissance.

Observations

US observations are based upon participant interviews supplemented by SME findings.

The UGS portion of the initiative began with the emplacement of EMIDS/MIDS magnetic, seismic and passive infrared (PIR) sensors along road intersections at two Areas of Interest (AOI). Placement of the sensors was conducted by SOF Operating Detachment – Alpha personnel under stealth conditions. These sensors cued Remote Sensor and Camera Controllers (RSC2) and digital cameras to capture and transmit images of targets transiting these areas.

Both architectures for the RSC2 UGS system worked, allowing tracking and image capture of multiple targets.

The FW architecture quickly provided images and sensor alerts to the SF team in the field MSS (within one minute of target transit), allowing the team to rapidly transmit voice alerts to the rear. An added bonus provided by the team in the field was the ability in some cases to visually follow targets after they left the sensor field, continuing to report, direct strikes, and

provide BDA. The voice reporting chain (through the JSOTF) appeared somewhat cumbersome and slow. The team found itself attempting to report and respond to multiple headquarters (JSOTF, FOB and JAOC) while simultaneously directing aircraft overhead. This proved daunting and in many cases, after an initial report, the team ended up communicating exclusively with inbound aircraft attacking the TBM.

The FS architecture provided images and sensor alerts directly to a workstation in the JAOC SOLE. This architecture was slightly slower than FW (2-5 minutes from target transit), but allowed insertion of the alerts and images, once received, into the MC02 C3 network. The workstation was originally scheduled to be adjacent to the SOF LNOs at the TST/TCT cell on the combat operations floor of the JAOC, rather than in the SOLE. Reporting was limited to sensor system feeds and corresponding pictures, with no follow-on ability to visually track targets once they exited the sensor field.

Most elements of the UGS/RSC2 system, including the EMIDS/MIDS sensors, RSC2, CEOS day cameras, and FS communications link, performed as advertised. The FW link and display software required some troubleshooting and should be further refined to make them more robust and user friendly.

Feedback was generally positive and supportive of the use of the system for SR. Strengths included ease of system emplacement, sensors simple and effective, and programmable software. Weaknesses were noted in the display/communication software being challenging to operate and troubleshoot, FW communications link being "sensitive", and the inability to automatically transfer sensor data onto SIPRNET.

The risk to the SF team is reduced since they do not have to remain in the denied area to monitor the sensor field. The team, however, is also not available to follow up on reports, so identification of additional ISR assets to track identified high value targets once they leave the sensor field is desirable.

Additional observations from the second USSOCOM SME are shown in Table 1:

Table 1 SME UGS Observations

Subject	Sustain	Improve

Freewave (FW) Reporting	* "SPOT" reports are of immense benefit to cross-queue ISR assets to confirm or deny Time Sensitive Targets. * Operating from a Mission Support Site provides the JTF Commander a true voice on the ground. Optimally, a MSS could "service" up to three or four NAIs (necessity for eyes-on would limit the number of NAIs that could be serviced).	* MSS is limited to voice reports. Providing a dial-up thumbnail capability for the team to send photographic evidence would greatly assist the decision maker in placing bombs on target. * A redundant communications capability (for voice reporting to the JSOTF) is critical to ensure reporting is successful (i.e., SATCOM and SAT-Phone). During the first day's TST live-fly the ODA's communications capability with the JSOTF (for passing of TST data) was lost for unknown reasons. This resulted in the team not being able to pass data for prosecution of TST. A potential "fix" (other than the use of a SAT-Phone) is to take advantage of the Global Personnel Recovery System (GPRS). On days one and three, the team was capable of passing targeting data via this medium. Unfortunately, at this time, GPRS does not allow for traffic termination at the JSOTF and is only available over the continental US.

Firestarter (FS) Reporting	* Direct reporting greatly reduces the decision timetable for the JAOC by providing complementary data (spot report – with photographic evidence) to the decision maker. * Limits vulnerability to ground force elements. * Allows for dynamic tasking of photographic evidence (i.e. JAOC UGS operator can respond to requests for photographic evidence in a near-real time manner).	* Remote Sensor Camera requires operator to delete stored thumbnail photos. Possessing a large number of thumbnails can slow/ preclude the capability to obtain a high-resolution photo. * Lack of ISSE Guard capability for feeding C2PC. ISSE Guard will allow the JAOC UGS operator to more rapidly feed critical decision making data to the TST cell (in the JAOC). * Reliance on commercial telephone lines for the transmission of data to the JAOC (from the remote sensor camera) poses a potential compromise of collected data (during the course of transmission). * JAOC UGS operator should have the capability to alter camera operations without loss of data collection capability. Camera cannot transmit collected photographs while UGS operator is deleting files or altering operating parameters
General	* Co-locating a Special Tactics Team (STT) member with ODA provides the ground element the capability to "drive the shooter" to the target (i.e. talk him in). * UGS has significant benefit to the ISR community. * Both architectures (unmanned {Firestarter} direct to JAOC and manned {Freewave} voice reporting to JSOTF) provided adequate data to support SR activities.	* A lone JAOC UGS operator has difficult time managing data flow. The single operator uses three separate computers to receive/analyze/transfer data for exploitation/ use. Manning a JAOC (or other suitable C2 entity) with two operators would allow one operator to focus on the NAIs while the second one can process alert notifications or pass photographic data. While this was not a serious problem for the JAOC UGS operator during MC02, future operations with personnel not as astute on its operation could have data/task overload.

In the UAV portion of this initiative Maverick flew an advanced reconnaissance of the area providing images used in developing the R&S plan. Once deployed, Maverick provided

security for the launch and recovery of Pointer. Pointer was launched once the area was secure. Launch and control of the UAV was performed by the SR team. Although not necessary, the team practiced hand-off of Pointer control from person to person. Photos from Pointer were captured and sent to a LNO on the USS BOXER via commercial SAT phone and UHF Com SAT back-up. From the BOXER, images were sent to the unit planning the mission. As a side benefit, the photos were shared with the MEF onboard the BOXER. Coordination and mission selection between the two UAV's were demonstrated.

As part of Naval Special Operations participation in MC02, the Pointer UAV was also flown from aboard the KNM Skjold to conduct reconnaissance of an offset target in Chesapeake Bay, MD. The Pathfinder ACTD team aboard the KNM Skjold successfully launched the Pointer UAV from the KNM and landed/recovered it ashore repeatedly over a two day period, recording videos of these flights from the Ground Control Unit aboard the KNM Skjold for inclusion in MC02.

MC02 proved useful in refining the Tactics, Techniques, and Procedures (TTPs) for the employment of Pointer and Maverick and identified areas for further exploration. Because the maneuver area was significantly confined, the potential for compromise of the ODA by enemy forces during a launch of the Pointer UAV was significant. The ODA's security was tremendously increased by employing Maverick early and focusing on key avenues of approach to the ODA's launch and recovery sites. This overwatch capability, combined with communications and the means to engage threats if necessary, could provide a positive impact on future SOF reconnaissance missions. MC02 demonstrated the advantages of both platforms operating individually as well as in tandem. During some missions, Pointer conducted an area reconnaissance followed by the employment of Maverick on targets spotted by Pointer that needed greater clarity. This required, however, direct communications between the ODA employing the Pointer and the C2 node for Maverick. This was accomplished through commercial means for the exercise.

The UAV communications architecture for MC02 was a unique solution for exercise use only. While a derivative of this architecture may become the solution for the "hub" that ties Pathfinder systems together, it was intended only as a baseline solution. The indigenous primary, secondary, and contingency means of military radio communication between the ODA, Forward Operating Base (FOB), and the Special Forces Liaison Element (SFLE) on the USS Boxer failed during portions of the exercise. The communications node (COMMNODE) provided the only means of steady communication until tactical satellite (TACSAT) communications were established well into the exercise. Although originally designed as a means of passing images, it became the primary means of communicating message traffic between the elements. Tasking received to obtain images of certain target areas was quickly processed and targets were programmed within hours. However, real-time coverage would have been possible if the SFLE had real time direct communications with the FOB and Maverick C2 nodes.

The ODA had a unique task organization for some of its Pointer missions. Rather than co-locating the Ground Control Unit (GCU) with the Remote Video Terminal (RVT), the ODA in some cases split these off. This provided for increased security for uploading and downloading images while the GCU continued to provide terminal guidance. In other cases, the Launch Team was initially co-located with the GCU and RVT elements, and then the latter was split off to a remote site or put in a mounted roving mode. Additionally, the ODA exercised the hand-off capability of Pointer on several occasions, launching it from one site and handing control off to

another. They successfully conducted several iterations with distances between sites of up to 5 Kms under both day and night conditions.

Currently, command and control of the Maverick UAV is separated using two trailers for the flight control system and the mission commander. There is presently additional engineer equipment in the flight trailer to monitor the systems that will not be present upon delivery. This separate arrangement was found to be adequate, but not ideal for command and control of the system. There is adequate space for the mission commander between the pilot and copilot. A second separate viewing capability would be beneficial for other observers, thus allowing the crew to concentrate on the Maverick flight. However, separating the mission commander from the crew does not allow for proper C2 of the system.

While the differences in cost and complexity between Maverick and Pointer UAVs are understood, there are currently no SOF personnel trained to operate the Maverick UAV. A Combat Controller from the 720th Special Tactics Group participated in MC02 as the mission commander for all flights. His leadership, experience and skill in tower procedures and airspace management significantly enhanced Maverick operations. Training SOF personnel to fly Maverick is the next logical step in this program.

The following chart is an evaluation of US support to SR as it relates to RDO key enablers.

Unattended Sensors	Supports	Potentially Supports	Did not provide significant support
Establish Information/Knowledge Superiority		x	
Rapidly Set Conditions for Decisive Operations	x		
Assure Access Into and Through the Battlespace		x	
Conduct Decisive Effects-based Operations	x		
Sustain the Force			x

Relationship to Other Objectives

This assessment does not impact other assessed joint initiatives or assessment areas.

DOTMLPF Linkage

The US initiative does not support any pending DOTMLPF change recommendation packages.

Recommendations

Unmanned Sensor recommendations are based on participant comments and SME findings.

MC02 provided an opportunity to demonstrate the potential utility of UGS systems to a SOF element conducting SR and to the JTF with direct sensor data feed into the ISR fusion element. Clearly these tools can be useful, extending the reach of the SR element over distance and time, while reducing risk to the operator, as well as providing near real-time sensor data for ISR fusion.

In the UGS Freewave (FW) reporting architecture, communications procedures between the deployed team and higher HQ must be fully coordinated. Streamline reporting will avoid layers that create delays unacceptable in a TST/TCT mission. The team cannot simultaneously report and respond to multiple command levels within TST/TCT timelines. In addition to establishing efficient reporting systems, command relationships should be clearly established to support mission accomplishment. Clear mission guidance to the deploying team, based on thorough IPB and pre-designated target strike decisions, is required to maximize mission value.

In the UGS Firestarter (FS) reporting architecture, OPCON/TACOM of this asset must be delineated along with procedures to process the data by the controlling authority. With that said, an effective processing of the resulting data evolved over the course of the experiment. Additionally, the lack of an automatic means of inputting the unclassified sensor data onto SIPRNET and into the TCT process delayed the near real-time capability of the system. To alleviate this current limitation, the output of this architecture can be monitored by a series of "Client" displays located at dispersed nodes if desired and planned. For example, the JSTOF HQ monitored the display for two days of the MC02 live fly, however, its integration into the TCT decision process is unknown.

MC02 served to help develop and refine UGS employment TTPs with input from the operators. At the front end, selection of appropriate targets for these limited assets is critical. A thorough IPB must be conducted, factoring in the strengths, limitations, and capabilities of the UGS system. UGS are best used at critical choke points with relatively light traffic. Another critical requirement is detailed coordination of communications to the correct organization/individual, including frequencies, call signs, and cryptography (whether using the FW or FS architecture). Reports must flow directly to the appropriate decision-making HQ to preclude delays. Pre-mission training should be thorough and include detailed rehearsals. Ideally users should become familiar with the UGS system prior to deployment, through its integration into training and exercise programs. SMEs can be used to further refine expertise on the system during isolation or prior to employment. The monitor site should be established prior to sensor field emplacement, so that system communications links can be tested and confirmed as the sensors and RSC2 are emplaced. Sensor field emplacement team can be split to work the target site, minimizing time on target. Camera aim at night remains a challenging emplacement task, requiring careful planning and rehearsal.

While the current operational UGS prototypes can be further improved, the capability they provide, even now, is significant. As these systems mature, they should have a significant impact on how SOF and the JTF can more effectively conduct SR. Specific operator recommendations are:

- Reduce size/weight, and increase endurance.
- Consider alternative power sources.
- Integrate night camera and night sighting for day camera.
- Add pan/tilt camera control capability.
- Provide a guard that allows automatic transfer of unclassified sensor data onto SIPRNET.

Establish a common system configuration for US systems to include a tactical communications link between elements employing UAVs, UGS, and Unattended Ground Senators (UGVs).

Develop a training plan and determine prerequisites for selection of military personnel for training on operating UAVs.

Conduct additional experiments to explore TTPs for the employment of UAVs and other reconnaissance assets.

Operational Network Assessment (ONA) Tool Suite

Description

The ONA Tool Suite, sponsored by the Joint Experimentation/Command, Control, Communications, Computers, and Intelligence (XC4I) Team, is a suite of tools providing information collection, storage, processing, sharing, and display functions supporting the National Command Authority (NCA), Combatant Commander, Commander Joint Task Force (CJTF), and war fighters in accomplishing EBO. The following applications: Genoa, Analyst Notebook and Arcview/ArcIMS have been chosen to make up the suite for the initial functionality testing within Millennium Challenge 02 (MC02).

The Operational Net Assessment (ONA) views a potential adversary as an interdependent system of systems, all of which contribute to some degree toward his will and capability to pursue a course of action inimical to US interests. The ONA supports the Effects Based Operations (EBO) concept, which requires that all levels, strategic to tactical, collaborate to plan and execute synchronized operations to produce a desired effect upon the adversary's capability to conduct operations. The ONA goes far beyond traditional intelligence assessments. It is an action-oriented process that provides a continuous stream of knowledge from adversary vulnerabilities to effects to tasks. As such, ONA represents a philosophy that drives a process to produce a product. The process builds situational awareness and understanding. The product supports plans and execution of operations.

A number of tools were evaluated or developed to support ONA implementation. Genoa, Analyst Notebook and Arcview/ArcIMS were selected for investigation based on their expected functionality. To maintain commonality with the SJFHQ, Share Point Portal Server (SPPS) was used as a knowledge portal. Finally, the ONA database was developed in-house by J9 and was specifically designed to mirror and support the ONA and EBO processes.

Genoa structures argumentation methodology for decision support. The entire Genoa suite has 17 components, of which three of the fully developed segments were selected for use in MC02:

- SEAS – Structured Evidential Analysis System
- CIM2 – Critical Intent Model
- SIAM – Situational Influence Assessment Module

These tools were primarily used very early, prior to the exercise in support of pre-crisis development of the Operational Net Assessment (ONA) assessment. (Many of the Spiral 3 and Execution survey respondents were never exposed to these tools.) According to expert statements, the tools were useful for understanding and building the baseline ONA, but were not extensively used during the execution phase due to complexity, time and manpower requirements.

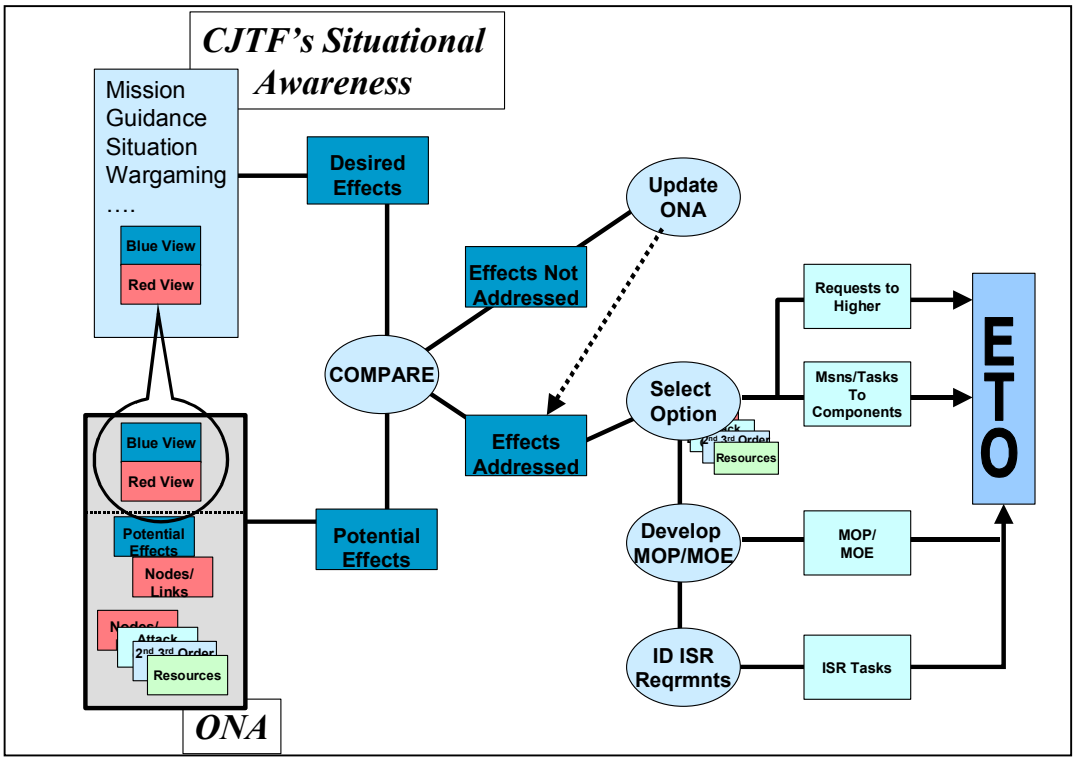
The ONA database for MC02 evolved focusing on the nation, region and situation within the combatant commander's AOR for the experiment within an exercise. The ONA database was the most extensively used of the ONA Tool Suite. This tool provides a structure that mimics the ONA process. This is something that has never been accomplished before MC02. The ONA database was developed and tailored to meet the specific needs and architecture of the ONA

process. Two principle modules made up the ONA database: the knowledge base and planning support. Requirements to capture effects, nodes, actions, resources, secondary effects and their link associations and rationale guided the ONA knowledge base module. Support to effects based planning drove the development of the EBO planning support module. These two modules were used extensively throughout the preparations and execution of the event.

Analyst Notebook (data visualization and analysis) and ArcView/IMS (geospatial/graphic data generation) were utilized early on and throughout; particularly by the System of Systems Analysis (SOSA) cell. Both these tools are manpower intensive as well, however,the visualization products were powerful in presenting information to the staff and commander.

SPPS provided a web like portal that supported the net assessment executive summary and ONA matrix with a drill down ability to greater detail. It provided the links to political, military, economic, and social, information, and infrastructure (PMESII) summaries, focus of diplomatic, information, military and economic (DIME) actions, as well as links to regional country assessments. Red views using the same PMESII/DIME construct were also presented. The web approach provided summaries while allowing users to drill down to the level of fidelity desired. An in-depth view of the SPPS can be viewed in the CIE section of this report.

The ONA tools used were to support the process illustrated in the figure below generating the Effects Tasking Order (ETO):



Overall Assessment Results

The ONA Tool Suite was especially enhanced through the IWS collaborative capability; enabling as many as 50 simultaneous users on a shared view to corroborate on effects, nodes, actions and resources as well as their link associations in the planning tool. The ONA tools provided valuable shared view and insight into the AO and adversary's infrastructure but not explicit situation awareness. The tools are not intuitive enough to be learned quickly and require

considerable training. Though favorably received and tested in this joint exercise, many comments were provided for improving these tools. The overarching theme was for enhanced automation, simplifying the ONA tools into one, and interfacing with other C4ISR systems like the ADOCS display, so that the ONA Tool Suite is more robust with more embedded, updated, collaborative information.

Methodology

The ONA suite of tools was evaluated by 70 users during MC02. Two surveys were submitted in the middle of the Execution phase asking for comments on the ease of operation, functionality, and effectiveness of the tools as they support ONA's EBO objectives and the key enablers for RDO. In addition to surveys, interviews and subject matter expert insights were also used in order to evaluate the ONA Tool Suite.

Observations

An in-depth analysis of how the ONA Tool Suite (Genoa, Analyst Notebook, and Arcview/IMS) supports the key enablers of the SJFHQ cannot be given due to the lack of user feedback in this area. The ONA Tool Suite developed the pre-crisis view of the adversary's strengths, weaknesses, vulnerabilities, interdependencies and environment. This would point towards establishing information for rapid planning and conducting EBO. Furthermore, one could argue that developing the pre-crisis view would set the conditions for decisive operations and establish information superiority.

Figure 1 indicates that the ease of operation and functionality of the ONA Tool Suite for providing understanding and Situational Awareness were favorably received by a majority of the respondents. Approximately 80% of the respondents rated the ONA Tool Suite "average" to "very good" (39 of 49). The below average and poor responses indicated that it was a complex system to manipulate and find data. There were also indications that the system needs better user interface, search capability and means for updating the database.

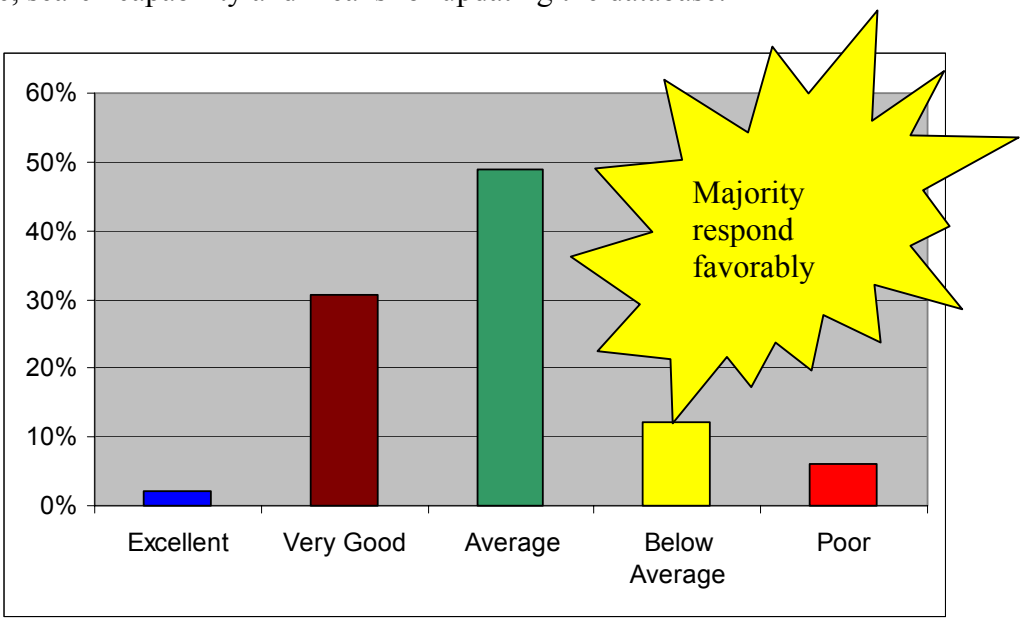


Figure 1: Ease of use and functionality for understanding and SA

Figure below shows that 39 of 48 placed a rating of "Average" to "Very Good" on the effectiveness of the ONA Database as a collaborative, updated information tool. The ONA database offered an extensive reporting function where all aspects of the ONA database content were available as user selectable fields for generating reports. However, the actual intelligence and the database did not match in some instances based strictly upon comments received by the surveys.

While there were disconnects, it is useful and necessary to clarify what the differences were, why that was the case, and the probable source for them. ONA is about in-depth understanding of the adversary to identify the relationships required for effects based operations. The number and disposition of tanks, aircraft or artillery shells is only of cursory interest to ONA but an integral part of JIPB. ONA is not designed to supplant JIPB; they are complementary. The ONA was necessarily constructed from real world information due to high fidelity requirements. The modifications to the real world to accommodate the experiment scenario was the source of numerous disconnects between geography, intelligence, ONA and situational awareness. ONA was just one casualty.

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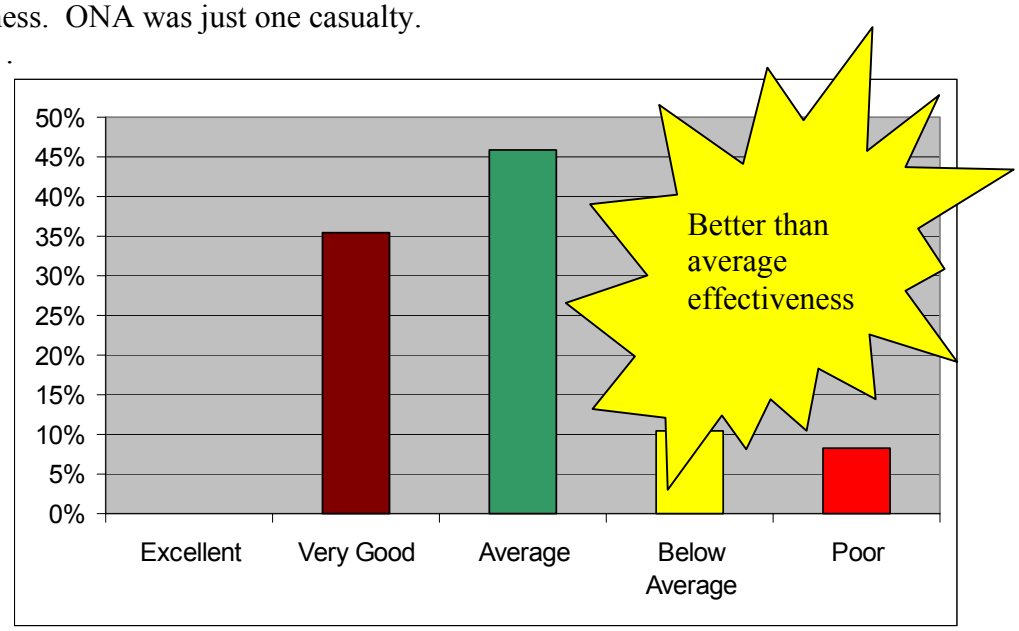
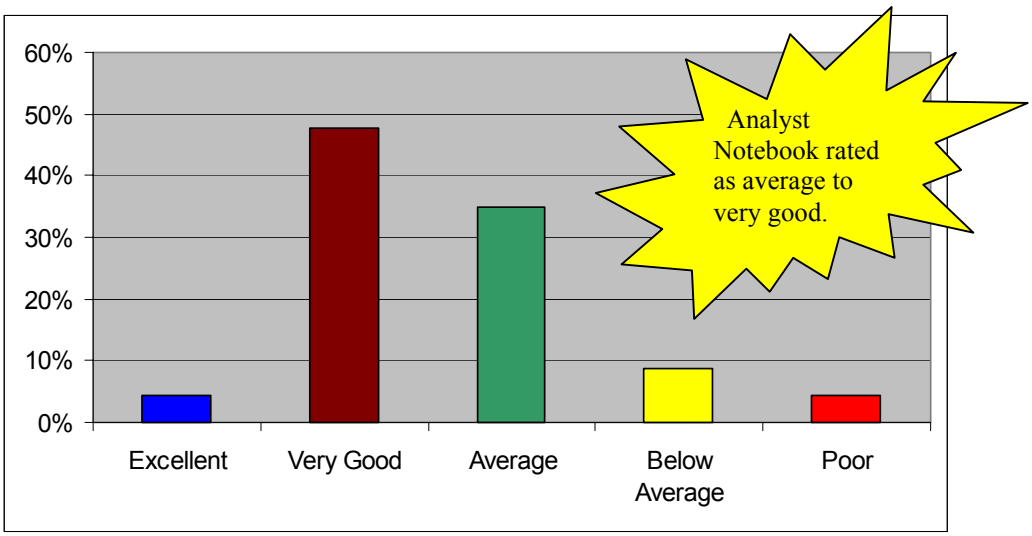


Figure 2: ONA Database Effectiveness as a collaborative, updated information tool

Figure 3 shows that respondents reported 19 of 23 times that the Analyst Note Book was "Average" to "Very Good" for illustrating the adversary's political infrastructure. However, users need the ability to step out to a URL from Analysis Notebook.



Analyst Notebook effectiveness providing visualization for analysis of the adversary's political infrastructure

Shows that the ArcView response rate was 15 of 19 "Average " to " Very Good" for functionality in providing geospatial information for planning and situation awareness.

Figure 4: ArcView/IMS functionality in providing geospatial information for planning and SA

Many of the Spiral 3 and Execution survey respondents were not exposed to these tools. According to expert statements, the tools lend themselves for buildup of the ONA and are not extensively used during an execution phase. The tools are primarily used for initial planning. Comments were summarized based upon the insight gained by users that had exposure to the tools.

Overall, the ONA Tool Suite provides background understanding for a developing situation. Planners indicated that the tools were used to refine node-action-resource linkages in

collaboration sessions. However, the ONA Tool Suite should be more visually intuitive. More training needs to be provided along with a better search engine.

Relationship to Other Objectives

The ONA Tool Suite assessment may have an impact upon the ONA Concept and the CIE Sections of this report. These impacts primarily relate to the performance of the tools employed in the initiative. Performance regarding these tools may impact the findings in the other assessment areas or joint initiatives. Other key tool in the ONA arsenol such as SPPS and IWS are covered in other sections of this report.

Recommendations

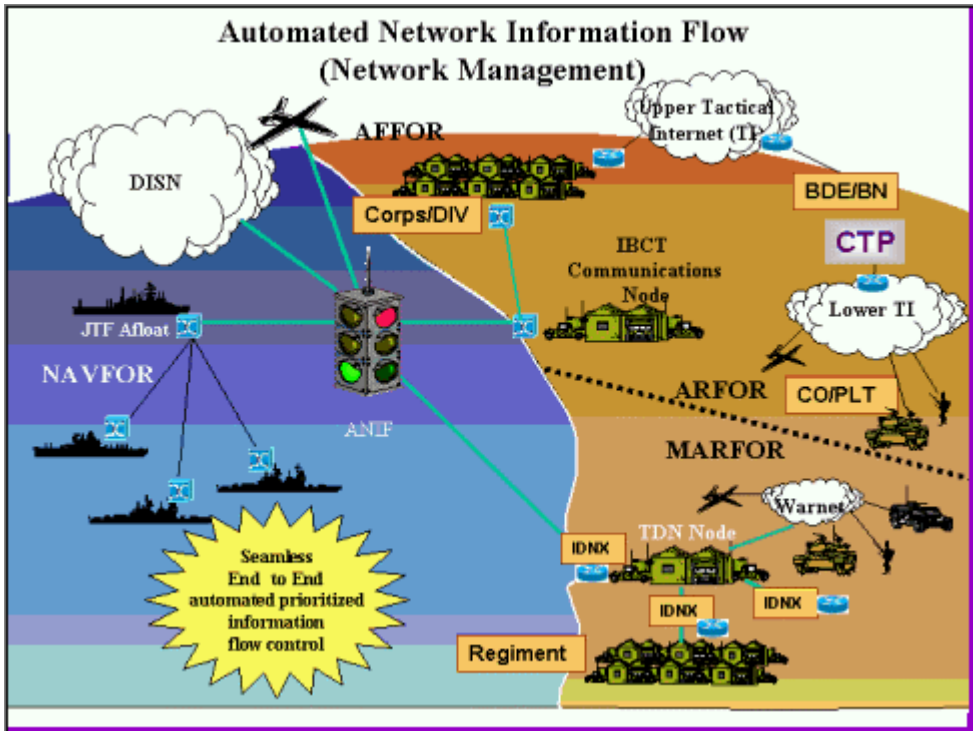
All recommendations are based upon the user and subject matter expert input. Overall, the recommendations support that major enhancements and integration with other C4ISR systems are required for the ONA Tool Suite. This capability would probably come in some other COTS products. Some of the described capabilities and features were 3D graphics, ability to graphically depict locations easily, and greater availability of metadata and file indexing. The data accuracy and metatags also need to be improved. The search and report features need to be more flexible, allowing the user to define the search in free form and select fields to view each record.

The tools could be improved visually by creating the ability to graphically and distinctly depict locations easily. The ONA and "picture" displays need same target names and geo-locational data as well. A 3D graphic portrayal for key node relationships between PMESll systems should also be included. The ONA Tool Suite should also have a multiple link capability for Effects/Nodes/Actions/Resources. The tools should be linked to target and other planning, collection, effects, and assessment tools. They should have greater data accuracy, metadata availability and file indexing.

Automated Information Network Flow (ANIF)

Description

The Automated Network Information Flow, sponsored by the Joint C4ISR Battle Center, is an integration of several emerging advanced technologies that can enable the warfighters to take advantage of the data transfer capabilities of new internetworking technologies while at the same time retaining the information prioritization feature of older legacy technologies. ANIF concentrates on identifying selected technologies that can provide the SJFHQ with the ability to install networks that are capable of providing the users with end to end prioritized Quality of Service (QoS) and give the commander's information managers the ability to dynamically reapportion bandwidth. As the DoD emphasis on network operations continues to increase, ANIF will be positioned to enhance our network bandwidth management and QoS reliability. ANIF is a JBC project based on Combatant Commander survey responses from the United States Pacific Command (USPACOM) and the United States Strategic Command (USSTRATCOM) representatives. This high priority requirement supports SJFHQ requirements. A conceptual network schema follows:



Overall Assessment Results

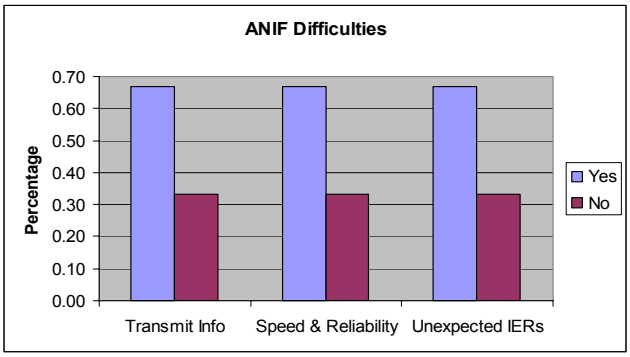
The results of Millennium Challenge 2002 cannot conclusively be used to determine the operational viability of ANIF in an operational environment because planners elected to integrate only limited ANIF play throughout the exercise. Users evaluated one of the four technologies that make the ANIF suite during MC02. Users were questioned regarding their use of or familiarity with ANIF. In addition to the questionnaires, the Joint Battle Center (JBC) resources were considered to better evaluate the utility of ANIF. Using this methodology, ANIF has been evaluated to potentially provide significant support of the key enablers of the SJFHQ.

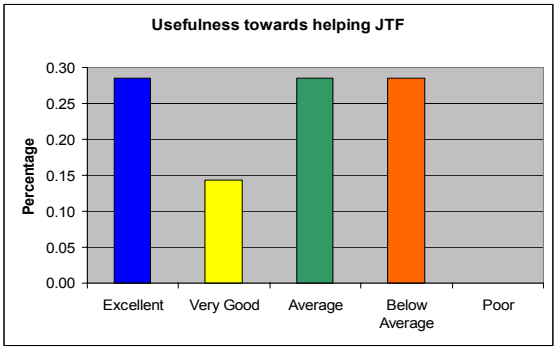
Methodology

ANIF was evaluated by 7 technicians during MC02. These evaluators consisted of 2 JDIICS Operators, 4 Software Engineers, and a Network Administrator. This assessment was written using warfighter surveys, comments, interviews and personal observations as well as the Joint Battle Center (JBC) resources.

Observations

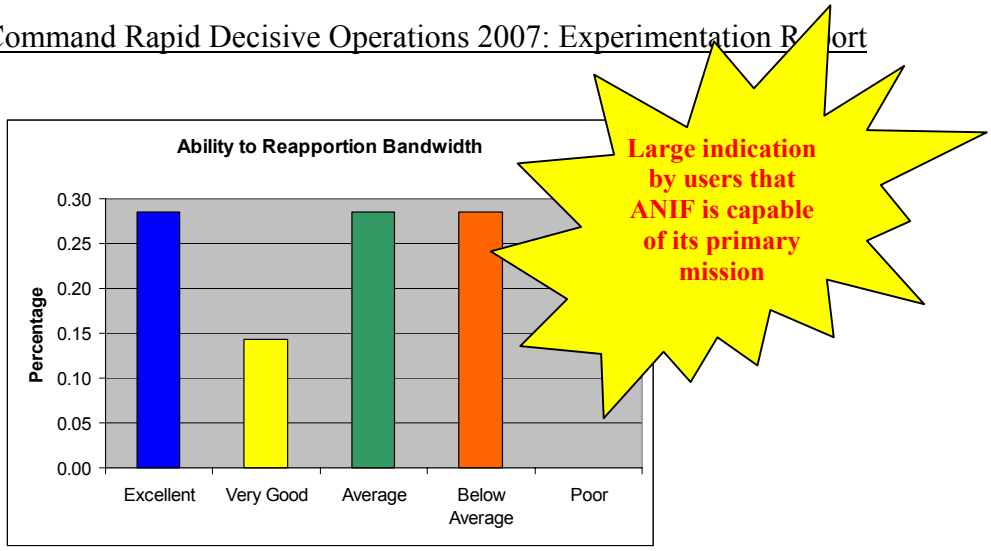
The results of Millennium Challenge 2002 cannot conclusively be used to determine the operational viability of ANIF in an operational environment because of the limited ANIF play throughout the exercise and the low user feedback. Even though ANIF received program status, only one of the four technologies was used during the initial MC02 exercise setup in order to cause the least amount of disruption to the experimental construct. MC02 participants that commented on this limited use stated that ANIF had difficulties in transmitting information, speed and reliability, and unexpected information exchange requirements two-thirds of the time. However, these same participants felt that ANIF was useful towards helping the SJFHQ a majority of the time.





Planners elected to integrate only limited ANIF play throughout the MC02 experiment. The planners felt that prototype programs injected into the operation could result in adverse effects on the entire program. This program has been evaluated by the Joint Battle Center – receiving favorable findings based upon the Spirals leading up to MC02. The JBC findings recommended Combatant Commanders, Services and Agencies consider the minimal $150,000 price tag to combine four technologies that enhance network performance. One comment of users working with the InfoWorkSpace collaborative environment during MC02 was that network congestion slowed down the collaborative process. JBC findings report a 70% reduction in time when ANIF principals are implemented. Controlled experiments could have been injected during slower periods of the MC02 execution phase, thereby giving network administrators a better understanding of how ANIF would work under a moderate operational load.

Where the earlier data indicated that difficulties existed with ANIF, the data below indicates three-fourths of the respondents indicated that it was fully capable of reapportioning bandwidth – its primary objective.



Based upon resources available, the limited use of ANIF, and the lack of significant user feedback, no conclusion can be made regarding ANIF's ability to manage the operational load of a SJFHQ. This initiative was not thoroughly tested during Millennium Challenge 2002. However, solely considering the complete JBC evaluation that took place during the Spirals, ANIF does support all of its identified requirements.

Recommendations

Based upon the favorable evaluation by the Joint Battle Center, the Combatant Commanders, Services and Agencies should consider the use of ANIF and related technologies and capabilities to enhance network performance. It is recommended for future experiments to include controlled vignettes whereby ANIF could be injected during slower periods. This experimentation will offer network administrators a better understanding of how ANIF will work under a moderate operational load. MC02 Joint.

Special Technology Operations (STO) Initiative

Description

The introduction of STO activity into MC02 occurred late in spiral development following Spiral 1. Based on opportunities provided via the Joint Expeditionary Force Experiment 2002 (JEFX02) and resource availability, the decision was made to proceed with limited objectives to analyze both the ability to conduct STO activities in experimentation and development for future operations. The objectives for this initiative were categorized based on operational focus to manage classified and compartmentalized objectives for oversight and reporting within security constraints. This effort allowed the Service level objectives that were already in development within JEFX02 to be bridged with the Joint Staff Objectives through the MC02 Joint Task Force (JTF) structure. This bridging allowed for an end-to-end assessment to be conducted, as a supplement to results, while providing experimentation observations on STO incorporation into experimentation venues. In particular, an examination of the STO processes, policies, and operations links nontraditional methodologies and programs to traditional operations in the future.

Due to STO classification challenges, limited experimentation objectives were established to ensure oversight of program access and data for the programs was maintained. The end-to-end study accompanying the three levels of effort were to capture the associated issues and potential findings important to adequately evaluate experimentation demands for Services, CINCS, DOD and interagency participation in highly classified operations.

MC02 SCOPE OF INTEGRATION

The STO initiative was separated into three focus levels:

-Air Force Level: JEFX02 support through the Air Force Command and Control Training and Innovation Group (AFC2TIG) focused on execution of STO package options to be approved by national authority played at the Joint Chiefs of Staff (JCS) level and processed through the JTF staff in MC02.

-MC02 at JTF staff focused on procedural issues and configuration impacts associated with actions as the Standing Joint Force Headquarters (SJFHQ) transitions into a JTF for operations.

-JCS level focused on examining the decision-making of national authorities for STO operations, particularly the potential need for procedural and policy changes to improve the interoperability of STO programs among the Services and other United States Government (USG) agencies in an RDO environment.

MC02 STO integration occurred during Spiral 2 with injection of activities commencing in Spiral 3. To incorporate STO activities into scenario timelines, script modifications were provided to MC02 Joint Experiment Control Group (JECG) and Master Scenario Events List (MSEL) teams to synchronize activities for Spiral 3.

Overall Assessment Results

Assessments were based on two categories of objectives: Experimentation Framework and Operations.

Experimentation Framework Objectives:

- Identify staff positions and security levels required to manage STO oversight for concept and experimentation development
- Requirement for Senior Mentor roles and missions in STO experimentation
- Permanent staff STO billets by staff positions
- Requirement for surge capability for experimentation manning
- Evaluate the requirement for JFCOM access to multi-service STO programs to support experimentation development and execution (both interim and permanent billet access)
- Policy and procedure modifications required granting interim access for experimentation venues
- Oversight for billet management and granting authority for access
- Establish list of modifications to facilities to support STO experimentation, including Sensitive Compartmented Information Facility (SCIF) requirements, mobile equipment, and communication infrastructure
- Development of assessment formats and protocols for multi-level reporting (collateral to compartmentalized) and Doctrine, Organization, Training, Materiel, Leadership, Personnel, and Facilities (DOTMLPF) packages and information papers. (Appendix 1)
- Incorporate assessment formats and surveys into JFCOM automated systems and plans.
- Standard archive plan for reports and data to enable cross-reference between different security levels

- Examine timelines for STO integration to experiment venues by Spiral development

Operations Objectives

- Identify transition issues associated with end-to-end STO operations in a Rapid Decisive Operations (RDO) environment based on establishment of a SJFHQ structure
- Discern STO activities required prior to JTF activation and associated timeline
- *Identify handoff and parallel actions required to transition from deliberate planning to crisis action planning*
- Need for reconfiguration of Service specific programs to group or tier programs into access levels to facilitate future joint STO operations
- Review decision-making of national authorities for STO execution to identify potential procedural and policy changes to improve interoperability in a collaborative environment in SJFHQ and JTF configurations
- Identify SJFHQ core competency required for STO activities and CINC and theater specific competencies and activities required for contingency planning in pre-JTF status.
- Mission qualification training, including levels and understanding of Joint Operation Planning and Execution System (JOPES)
- Identification of deliverables by echelon (one up and one down)
- Define STO organization, manning and equipment requirements to enable full integration of STO activities in theater effects based planning and operations.
- Development of Operations Plan (OPLAN) annex and matrix to correlate Service/program with potential effect by objective (matrix Service/program/level of single and combined effects)
- *Identify battle rhythm issues associated with synchronization of Program Element (PE) and Program Objective Memorandum (POM) process with contingency planning in a collaborative environment*

Methodology

More than 20 users, consisting of STO, IO and space subject matter experts evaluated STO. A series of qualitative questions were periodically submitted to the users for evaluation. In addition to the questionnaires, interviews and summary reports on observations and lessons learned were used to better evaluate the utility of STO in supporting the JTF organization. Using this methodology, STO was evaluated to provide significant support to the key enablers of the SJFHQ. Appendix 1 outlines the specific Warfighter Challenges, Tasks, and Sub-Tasks that STO enables. Specific classified experimentation results were annotated on the JFCOM classified system for archiving of data (contact JFCOM/J39 for additional details.)

Findings

STO was evaluated against the following key enablers of the SJFHQ.

	Supports	Potentially Supports	Did not provide significant support
Establish Information/Knowledge		**X**	

Superiority			
Rapidly Set Conditions for Decisive Operations	X		
Assure Access Into and Through the Battlespace		X	
Conduct Decisive Effects-based Operations	X		
Sustain the Force		X	

TOPIC: Integrating all Services STO Operations into JTF Operations.

Operational Application: Ensures the JTF Commander has full visibility into these programs and allows integration of these operations into the Commanders Plan.

Operational Utility

Near-term. The majority of experiments, exercises and war games today do not exercise this process from the component to the CINC, or cross component, for integration and interoperability. It was operationalized for the first time in an experiment in the context of MC02. Given the time constraints and the late arrival of the concept, only the Air Force presented STO capabilities for use by the Joint Force Commander for planning and execution during MC02. The success of the concept was based on the solid foundation provide by the Air Force in JEFX02. Other Services were offered the opportunity to participate, but they had not baselined the capability within their Service exercise/experiment. This caused the integration of STO activities to be only vertical vice horizontal across all the Service Components. Additional effort was required to further baseline these activities and define the level of interaction required of the Standing Joint Force Headquarters for this process to succeed in MC02. None of this could have been achieved without the tremendous support from the Joint Force Air and Space Component Commander (JFACC) himself and the efforts of JFCOM and JCS.

Other Services will need to be encouraged to participate to expand the scope of these operations and provide future JTF and component commanders training and experimentation venues in preparation to achieve full capability for real-world events. Joint Concepts of Operations (CONOPS) for integrating these activities exist, but require consensus among Services and oversight from Joint Staff J39 to provide STO capabilities to JTF Commanders.

JFCOM envisioned the SJFHQ making constant strides to synchronize their efforts with the components' planning process. This lack of maturity in synchronization of collateral efforts between the JTF and components could have further exacerbated the ability to synchronize STO. However, the foresight of the JFACC and JFCOM J39 minimized the STO expectations in MC02, thereby mitigating much of the complexity. Hesitancy is advised at this point to avoid the proclivity of the JTF commander to husband these capabilities. This could both defeat the intended potential while placing them in the High Demand Low Density (HDLD) domain. What is preferred is a pre-approved toolbox of these applications, which will require extensive collaboration within the military and other elements of national power. The full application of STO will require even greater rigor in synchronization, which could have a positive impact on integrating other planning and execution efforts. It was only in Main Execution of MC02 that the JTF had a battle rhythm. Battle rhythm synchronization is always difficult due to time zones, and location of commanders and facilities. However, the STO battle rhythm is one of the best tools for allowing the JTF commander to think beyond 96 hours. The ad hoc use of STO

operations is not prudent stewardship; coordination must occur to properly exercise these capabilities. This "chessboard mentality" leads beyond current operations and future plans into planning. This long-range perspective provides the JTF commander and his components the additional benefit of centralized JTF control and decentralized component execution, a mantra of the Services.

An integrated effort to facilitate awareness, assessment, integration, synchronization, policy, doctrine development, apportionment, planning, and execution of STO is essential. To continue STO participation in joint experiments and exercises, USJFCOM will require permanent facilities and a cadre of trained and experienced STO personnel. This cadre would then serve as the cornerstone for the lengthy, detailed preparation to enter an event with these capabilities. JTF STO validation by JFCOM can only be secured with the requisite cleared and trained personnel in place.

Long Term. The strong STO baseline used by the Air Force in JEFX/MC02 can be used for expansion to other Services. Upon consensus of the Services to participate in the planning and execution of these applications, it becomes apparent that these activities support effects based operations. STO by its nature is joint, forcing integration. There is agreed upon documentation available once other Service buy-in is achieved. The level of collaboration required to conduct and obtain clearance for these activities will require formatting and extensive ongoing interaction with the potential participants. Language in the Defense Planning Guidance directing the integration of these activities will be required to insure policy matches STO capabilities. Rules of Engagement centered on military activity will require the full understanding and participation by other elements of national power. Due to the nature of these activities and the crossing of military boundaries, clear relationships within the CINC's purview and the JTF commander's realm need to be developed. Roles and responsibilities of the CINC and CJTF, functional component commanders, the SJFHQ and their respective staffs are not yet well understood and will need clarification.

Technical Feasibility. Secure Space within each of the components participating in the STO operation is a prerequisite. Portable equipment is available to process the planning and execution of these capabilities. Communications Security (COMSEC) and Operations Security (OPSEC) issues can be minimized by the dedicated and deployable secure facility. Commonality of clearance requirements and difficulty getting people cleared will remain an issue. Training between the JTF and components is critical and cannot be overemphasized. Timely and accurate information for this activity is even more important than in collateral activities. The complexity of the assessment of these activities is by its nature effects based and therefore even more obtrusive to the casual assessment process. To best facilitate these activities, not only is a robust Operational Net Assessment (ONA)—beyond Predictive Battlespace Awareness (PBA)—required, but equally important is a dedicated System of Systems Analysis (SOSA) so that these valuable resources will not be wasted on less important objectives. Although STO operations are about effects based operations, vice message traffic generation, full Service participation will require greater bandwidth. Because STO is about effects based operations, it becomes a matter of applications vice platforms, which require constant and secure communication between commanders at all levels.

Affordability is based mainly on having the right billets identified and manned for the use of this application. Training in OPSEC and COMSEC procedures must be sufficient to apply the capabilities with the greatest hope for success and integration.

Other Observations and Findings

- Need for modifications in access for key personnel supporting experimentation (joint and Service level) on an on-going basis
    - Senior mentor access is highly desired to ensure the insight of former senior leaders from multi-service backgrounds
    - Reconfiguration of Service specific programs into tier/group programs to improve accessibility for joint collaboration among Service programs with like tier/group designation. (Similar to AF approach)
- Impact of SJFHQ on overall STO processes for future operations
    - Increased, but selective access for SJFHQ personnel to Service specific programs for early engagement in RDO environment, particularly in the pre-conflict phase
- Establishment of adequate SCIF facilities and mobile equipment to support experimentation and field use of STO programs
    - Development of a collaborative environment with ability to transfer data between classified and unclassified systems through 2-way guard technology applications

Relationship to Other Objectives

STO integration and synchronization with several Information Operations (IO) and space efforts is essential for seamless operations. Those areas within MC02 were limited in scope and interaction.

DOTMLPF Linkage

Modifications to JCS 3-13 and IO guidance (DoD 3600.1) should consider assessments from MC02. STO experimentation results are related to SJFHQ, EBO, Joint Fires Initiative and Time Critical Targeting (JFI/TCT), Joint Intelligence, Surveillance, Reconnaissance (JISR), and Air Tasking Order (ATO) development efforts within JFCOM. Similar relationships for IO also exist within JEFX02 efforts with the Global Strike Task Force and Predictive Battlespace Awareness initiatives. Within the Navy's Fleet Battle Experiment-Juliet (FBE-J), the need for IO synchronization and development has also been annotated.

Recommendations

- Modify program access to STO across services
- Expand use of IJSTO system for joint access to service programs
- Establish IO as a key area in ALS and Special Operations
- Establish a collaborative environment with STO operations, to include application of guard technology transfers for both high to low and low to high data Develop Measures of Effectiveness (MOE) for incorporation into planning and execution processes, to enable Intelligence Preparation of the Battlefield (IPB) and Battle Damage Assessment (BDA) assessment.
- Formalize training and leadership development for IO and STO operations for officer and enlisted personnel.

Annex J — Participating Organizations

Agencies/Labs and Organizations involved MC02 and Service Experiments

12TH AIR FORCE

422ND TEST SQUADRON -- PART OF AIR WARFARE CENTER

46TH TEST SQUADRON

605TH TEST SQUADRON -- PART OF AIR WARFARE CENTER

8TH AIR FORCE

AIR FORCE AGENCY FOR MODELING AND SIMULATION (AFAMS)

AIR FORCE COMMAND AND CONTROL INTELLIGENCE, SURVEILLANCE, RECONNAISANCE CENTER (AFC2ISRC/IN/DO/LG/SC/AFEO)

AIR FORCE COMMAND AND CONTROL TRAINING AND INNOVATION GROUP (AFC2TIG)

AIR FORCE COMMUNICATIONS AGENCY (AFCA)

AIR FORCE DOCTRINE CENTER (AFDC)

AIR FORCE OPERATIONAL TEST AND EVALUATION CENTER (AFOTEC)

AIR FORCE/XI (AIR STAFF)

AIR MANEUVER BATTLE LAB, FT. RUCKER, AL

ARMY FORCES COMMAND (FORSCOM)

ARMY SPECIAL OPERATIONS BATTLE LAB, FT BRAGG, NC

ARMY TEST & EVALUATION COMMAND (ATEC)

ARMY TRADOC COMBINED ARMES CENTER (CAC)

ARMY TRAINING AND DOCTRINE COMMAND (TRADOC)

ASSISTANT SECRETARY OF THE NAVY RESEARCH, DEVELOPMENT & ACQUISITION ((ASN (RDA) CHENG))

AWFC (AIR WARFARE CENTER)

BATTLE COMMAND - BATTLE LAB, FT. LEAVENWORTH, KS

BATTLE COMMAND BATTLE LAB, FT. GORDON, GA

BATTLE COMMAND BATTLE LAB, FT. HUACHUCA, AZ -- "PROVIDES VERTICAL AND HORIZONTAL INTEGRATION FOR INTELLIGENCE, SURVEILLANCE, AND RECONNAISSANCE SUPPORT TO INFORMATION OPERATIONS"

BATTLE LAB INTEGRATION, TECHNOLOGY & CONCEPTS DIRECTORATE, FT. MONROE, VA

CENTRAL TECHNICAL SUPPORT FACILITY (CTSF), FT HOOD, TX

COMBAT SERVICE SUPPORT BATTLE LAB, FT. LEE, VA

COMBINED AIR OPERATIONS CENTER EXPERIMENTAL (CAOC-X)

COMMAND AND CONTROL BATTLELAB

COMMANDER, OPERATIONAL TEST AND EVALUATION FORCE (COMOPTEVFOR)

DEFENSE ADVANCED RESEARCH PROJECTS AGENCY (DARPA)

DEPTH & SIMULTANEOUS ATTACK BATTLE LAB, FT. SILL, OK

DISMOUNTED BATTLESPACE BATTLE LAB, FT. BENNING, GA

FLEET COMBAT TRAINING CENTER PACIFIC (FCTCPAC)

FLEET INFORMATION WARFARE CENTER (FIWC)

HEADQUARTERS AIR MOBILITY COMMAND (HQ AMC/DOP)

HEADQUARTERS ELECTRONIC SYSTEMS CENTER (HQ ESC)

HQ ACC/DOJ/XPS/INX/INY/SC (HEADQUARTERS AIR COMBAT COMMAND)

HQ AIR INTELLIGENCE AGENCY (AIA)

JOINT COMMAND AND CONTROL INTELLIGENCE SURVEILLANCE RECONNAISANCE JOINT TEST AND EVALUATION (JC2ISR JTE)

JOINT INTEROPERABILITY TEST COMMAND (JITC)

JOINT VENTURE DIRECTORATE

MANEUVER SUPPORT BATTLE LAB, FT. LEONARD WOOD, MO

MARINE CORPS WARFIGHTING LAB (MCWL)

MOUNTED MANEUVER BATTLESPACE LAB, FT. KNOX, KY

NATIONAL DEFENSE INDUSTRIAL ASSOCIATION (NDIA)

NATIONAL IMAGRY AND MAPPING AGENCY (NIMA)

NATIONAL RECONNAISSANCE OFFICE – OPERATIONAL SUPPORT OFFICE (NRO-OSO)

NATIONAL SIMULATIONS CENTER (NSC)

NAVAL AIR SYSTEMS COMMAND (NAVAIR)

NAVAL AIR WARFARE CENTER (NAWC)

NAVAL OCEANOGRAPHIC OFFICE

NAVAL POST GRADUATE SCHOOL

NAVAL SEA SYSTEMS COMMAND (NAVSEA)

NAVAL STRIKE AIR WARFARE CENTER (NSAWC)

NAVAL SURFACE WARFARE/WEAPONS CENTER (NSWC)

NAVAL UNDERSEA WARFARE CENTER (NUWC)

NAVAL WAR COLLEGE

NAVY PACIFIC METOROCCEN (NAVPACMETOCEN)

NAVY RESEARCH LABORATORY (NRL)

NAVY WARFARE DEVELOPMENT COMMAND (NWDC)

OFFICE OF NAVAL RESEARCH (ONR)

OPERATIONAL TESTING COMMAND (OTC)

PROGRAM EXECUTIVE OFFICE - COMMAND, CONTROL, AND COMMUNICATIONS - TACTICAL (PEO C3T)

PROJECT DIRECTOR, COMBAT TERRAIN INFORMATION SYSTEMS (CTIS)

PROJECT MANAGER, FORCE XXI BATTLE COMMAND BRIGADE AND BELOW (FBCB2)

PROJECT MANAGER, GROUND COMBAT COMMAND AND CONTROL (GCC2)

PROJECT MANAGER, INTELLIGENCE FUSION AND EFCCS

PROJECT MANAGER, TACTICAL RADIO COMMUNICATIONS SYSTEMS (TRCS)

PROJECT MANAGER, TOC/AIR & MISSILE DEFENSE COMMAND AND CONTROL SYSTEMS (TOC/AMDCCS)

PROJECT MANAGER, WARFIGHTER INFORMATION NETWORK - TACTICAL (WIN-T)

SAN DIEGO FLEET AIR/AREA CONTROL & SURVEILLANCE FACILITY SAN DIEGO (FACSFAC)

SPACE AND MISSILE DEFENSE BATTLE LAB, HUNTSVILLE, AL AND COLORADO SPRINGS, CO

SPACE WARFARE CENTER

SPACE WARFARE SYSTEMS COMMAND (SPAWARSYSCOM)

SURFACE WARFARE DEVELOPMENT GROUP (SWDG)

THEATER AIR COMMAND AND CONTROL SIMULATION FACILITY (TACCSF)

TRADOC ANALYSIS COMMAND - (TRAC)

TRADOC PROGRAM INTEGRATION OFFICE ARMY BATTLE COMMAND SYSTEM (TPIO-ABCS):

Annex K — Experiment Lessons Learned

Many assessments and lessons learned will be documented and published as a result of the success of MC02. A hybrid mixture of lessons learned, comments, observations, and recommendations were received giving a healthy constructive criticism of the experiment. All lessons learned presented here were placed into the Joint Universal Lessons Learned Format for standardization. Due to the substantive nature of the Spiral 3 comments, they are also included in this report. The MC02 Execution comments are left in a "Raw State" to offer the reader a clear perspective of what the provider is trying to articulate by his/her comment.

Title: OPFOR Rules of Engagement (ROE)

Exercise/Operation: MC02

Date Time Group of Observation: 8/13/02

Observation: OPFOR ROE and personas of OPFOR senior leadership not well defined prior to execution resulting in differing views on allowable game play.

Discussion: OPFOR ROE were not identified and agreed upon prior to execution. This caused conflicting views between Blue, Red, and the JECG as to what could and could not be executed during the experiment. The result was that it impacted the OPFOR's ability to execute certain planned events (night attacks, anti-access) while also added artificiality to the game scenario. A second key issue with ROE was the disagreement on the personas of the senior OPFOR leadership. The OPFOR senior players acted in a manner that they felt was consistent with the expectations of a true adversary. Their actions and viewpoints were not shared by the Blue and JECG players, and therefore were considered inappropriate to the scenario. For example, the JTF-S felt he was forced to conduct an initial attack. It was adjudicated as not realistic.

Lessons Learned: Blue and Red ROE and character personas need to be discussed and agreed upon prior to execution to minimize differences in views of game play and impacts/effects of Blue actions on the adversary.

Recommendation: Hold JECG / OPFOR focus sessions prior to execution to discuss allowable ROE and game play so all players understand the rules coming into the experiment.

Comments:

Title: Video Media Objectivity

Exercise/Operation: MC02

Date Time Group of Observation: 8/13/02

Observation: The WNN (simulated media network) did not appear to be objective in representing both the Blue and OPFOR views in the experiment. Most of the focus tended to be representative of Blue actions, intentions, and effects, not on OPFOR actions, intent, and effects.

Discussion: The WNN was envisioned by the experimental design group to represent both the Blue and OPFOR views on events and actions. Although this initially appeared to be the direction of the media, it became one-sided about half way through the experiment and tended to focus on Blue actions and Blue expected effects. In some cases this caused incorrect reports on effects against the OPFOR (what was reported as effects was not what was observed by the OPFOR as effects). The WNN focus tended to target a U.S. audience, not a world audience. If there was a cell that represented third party interests (European nations, regional nations, public opinions), the effects of the WNN broadcasts may have been recognized as counter to Blue interests.

Lessons Learned: Media must meet the needs of both the Blue and OPFOR.

Recommendation: Ensure WNN is representative of both sides in an experiment. Consider the possibility of having two opposing news networks.

Comments:

Title:Experiment Play Classification Level

Exercise/Operation: MC02

Date Time Group of Observation: 8/13/02

Observation: The overall classification of the experiment was SECRET. However, there were capabilities employed on the Blue side that had SCI classification.

Discussion: Use of SCI capabilities created problems in discussing their effects on the adversary as many personnel were only cleared to the SECRET level. Consideration should be given on the use of such highly classified capabilities. If there is a high probability that these capabilities will be utilized in an experiment, then effects should be adjudicated within a controlled group, and published for the Blue and OPFOR to avoid discussions that may require personnel that do not possess proper clearance.

Lessons Learned: Use of highly classified capabilities created problems with adjudicating and discussing effects in Effects-Based Operations.

Recommendation: Either limit actions to the exercise classification level or ensure effects on highly classified actions are adjudicated in a controlled group with representatives on both the Blue and OPFOR sides.

Comments:

Title:Experimental Play Realism

Exercise/Operation: MC02

Date Time Group of Observation: 8/13/02

Observation: There were many actions, events, and outcomes that were not realistic to capabilities and real world scenarios.

Discussion: The experiment took place in the 2007 time frame with capabilities and tactics that would be available in the future to play a realistic scenario against a credible adversary. However, many actions, events, and outcomes were played that were not realistic and were counter productive to measuring new concepts. This tended to be exasperated by the desire to have intelligence and operations drive the experiment, as opposed to logistics and force planning. Instances included:

- Blue naval and air assets being instantaneously replenished without loss of combat time
- High success in tagging Kilos, using capabilities that are questionable for 2007 deployment
- Having unlimited bombing and missile capabilties
- No degradation in capabilities when resources were attacked (fuel, airfields, etc.)

Lessons Learned: To maintain the integrity of the experiment and the assessment design to measure new concepts, exercise realism must be observed throughout the entire experiment.

Recommendation: Ensure adequate well trained resources are available to the JECG that monitor and adjudicate capabilities and actions to maintain realism with experiment game play.

Comments:

Title: Third Party Grey Cell

Exercise/Operation: MC02

Date Time Group of Observation: 8/13/02

Observation: MC02 required use of all the elements of DIME (Diplomatic, Information, Military, and Economic). To fully understand and play those elements of national power, a Grey Cell may be required that plays the role of third party entities (Blue allies, regional governments, world public opinion, and U.S. public opinion).

Discussion: Experimenting on use of DIME elements of national power requires determining effects on world opinion to include the U.S. populace, world populace, foreign allies, and other foreign governments. The effects Blue and OPFOR have on these third party entities should be played in order to fully understand the cause and effect of DIME actions. For example, Blue's actions in MC02 resulted in oil price jumps and stock market drops that effected the entire world. The pressures on Blue to resolve the situation would be great and third party actions or injects would add realism to the scenario.

Lessons Learned: Need to incorporate third party injects into the exeriment to fully play the cause and effects of DIME actions.

Recommendation: Establish a Grey Cell that acts as an independent group that injects third party effects and reactions to Blue and OPFOR events.

Comments:

Title:OPFOR DIME Capabilities

Exercise/Operation: MC02

Date Time Group of Observation: 8/13/02

Observation: The OPFOR was able to succesfully execute an Information Operations (IO) campaign that took full advantage of every situation that Blue presented, acting in a credible manner that required Blue to aggressively act to counter the campaign. The Government of Red successfully played the Diplomatic realm of DIME. There was limited economic play in the experiment.

Discussion: The OPFOR IO campaign can often be overlooked in experimentation. However, to fully test Blue DIME capabilities, the MC02 OPFOR posed a credible adversary in establishing an IO campaign against Blue. The OPFOR team agreed the resources and attention given to IO helped to make this successful. An economic person had been planned for the OPFOR and would have been able to inject economic issues in the game scenario. However, a shift in resource needs prior to execution pulled this person away from the task, and severely limited economic play. The Government of Red DART resources and Ambassador successfully established a credible adversary in the Diplomatic realm.

Lessons Learned: OPFOR resources in each element of DIME must be available to act as a credible adversary against Blue DIME capabilities.

Recommendation: Ensure adequate personnel in all elements of DIME are part of the OPFOR.

Comments:

Title: OPFOR attendence at Senior Mentor Groups

Exercise/Operation: MC02

Date Time Group of Observation: 8/13/02

Observation: The Senior mentor group discussions did not have adequate OPFOR representation and time to present the OPFOR view and interpretation of events and concepts as they were being tested in the experiment.

Discussion: The OPFOR senior mentors did not have adequate opportunity and time to present their views on the experiment and concept capabilities. Although the views may be contrary, it is important for the senior mentors to understand what is being observed on the OPFOR to discuss possible corrective actions. In addition, the After Action Reviews (AAR) should schedule time for the OPFOR to present their impressions and to discuss the issues as seen by the OPFOR.

Lessons Learned: Present both the Blue and adversary views of the experiment to the senior mentors so they can discuss the issues surrounding the concepts in an unbiased manner.

Recommendation: Include all OPFOR senior mentors in the senior mentor focus sessions and AAR's. Schedule time at the AAR's for the OPFOR to present its opposing views and recommendations.

Comments:

Title: Blue Predictablity of OPFOR Actions

Exercise/Operation: MC02

Date Time Group of Observation: 8/10/02

Observation: Appeared that BLUE was not able to get into the mind of OPFOR commanders to predict their actions.

Discussion: Throughout MC02 the JTF-S commander was able to seize the initiative and disrupt BLUE operations. Examples included: initial preemptive attack, follow-on attack, and relocation of WME assets. It appeared that the BLUE-RED cell in the JTF was almost continuously tied up in IWS sessions and had little opportunity to think ahead of current operations.

Lessons Learned: The JTF BLUE-RED Cell did not have sufficient time available to monitor indicators in order to predict OPFOR future actions.

Recommendation: The JTF BLUE-RED Cell have a better opportunity to monitor all aspects of RED indicators to more accurately assess what the OPFOR leadership is going to do next.

Comments: Perspective as seen by an MC02 OPFOR assessor.

Title: Commercial Aircraft in Non-Standard Routes

Exercise/Operation: MC02

Date Time Group of Observation: 8/10/02

Observation: Commercial aircraft could be observed flying both standard and non-standard routes in the JOA.

Discussion: Early in MC02, the OPFOR started flying a commercial aircraft throughout the JOA. This aircraft flew over BLUE forces, APODS, SPODS, and monitored their activities. They even successfully flew into the APODS. These activities allowed them to collect invaluable intelligence on BLUE forces and activities throughout most of MC02. Additionally, as demonstrated on 9/11, these aircraft can be turned into weapons for direct attack.

Lessons Learned: Commercial air traffic can pose either a direct or R&S threat to military operations worldwide.

Recommendation: Commercial air activities should be monitored by the JTF for abnormal operations throughout the JOA.

Comments: Perspective as seen by an MC02 OPFOR assessor

Title: Joint Rear Area Operations Center

Exercise/Operation: MC02

Date Time Group of Observation: 8/10/02

Observation: There was no coordinated effort to counter terrorist operations in the JOA rear area.

Discussion: Throughout the experiment terrorist activities were readily played in the JOA rear area. Generally, these events were met with a limited response if any by BLUE forces. Additionally, there appeared to be little action taken to increase security on the increased threat. A rear area command and control element would have been helpful to coordinate rear area security and response forces.

Lessons Learned: The JTF needs a centralized command and control element for coordinating security and counter-terrorism activities in the JOA.

Recommendation: Consider establishing a Joint Rear Area Operations Command and `Control Center with planning assets and security resources to coordinate and secure all rear area operations in the JOA.

Comments: Perspective as seen by an MC02 OPFOR assessor

Title: Simulation-Live Event Tie-in

Exercise/Operation: MC02

Date Time Group of Observation: 8/10/02

Observation: As sequenced, early live events tied in with the simulation models disrupted the JTF planning process.

Discussion: The early tie-in of live events, such as the airborne drop, caused a multitude of unrealistic events to occur, and the JTF was unable to prepare the battlefield properly. Since sufficient time was not available to prepare the battlefield, OPFOR was directed to reposition IADS assets or turn them off so that the airborne drop could occur in a benign environment. There was not sufficient time available for the JTF to properly set the conditions. Similarly, this caused inadequate time to be available for the JTF to apply all possible diplomatic, information and economic elements of national power.

Lessons Learned: Live events should be tied-in to the scenario at a later time, such that all elements of national power can be employed to allow the JTF time to set the conditions for the live event to occur in proper context. Alternatively, live events could be played but disconnected from the scenario.

Recommendation: Schedule all live events to occur at a later point in the scenario play.

Comments: Perspective as seen by an MC02 OPFOR assessor

Title: Red and Blue Daily MESL Processes

Exercise/Operation: MC02

Date Time Group of Observation: 8/20/02 1600

Observation: Analysts did a great job talking through the Red and Blue MESL each morning during the Analysts' Rally

Discussion: This type of daily MESL review provided the Analysts and SMEs a focus for the day.

Lessons Learned:

Recommendation: Continue this type of morning briefing in future experimentation.

Comments:

Title: Boil Down Conducted in the Form of Workshops Process

Exercise/Operation: MC02

Date Time Group of Observation: 8/20/02 1600

Observation: The Boil Down conducted in the form of workshops at the conclusion of the MC02 was excellent.

Discussion: The logisticians had representation from the JTF and the Functional Components at our workshop which provided a face-to-face opportunity to discuss the high points and low points of the experiment. It was used as a time to talk through the horizontal and vertical roles, including the relationship among the HQ log staff and the components. It went into a second day with a discussion of processes which will be documented in future TTPs.

Lessons Learned:

Recommendation: Do it again.

Comments:

Title: The Logistics OTs / SMEs from J7 and Other Soucres.

Exercise/Operation: MC02

Date Time Group of Observation: 8/01/02 1600

Observation: The Logistics OTs / SMEs from J7 and other soucres were very good.

Discussion: The OTs/SMEs had a good knowledge of the concepts, objectives and enablers. They were told at the beginning of the experiment to stay in their lanes, observe only, and not coach. There were times during the experiment when their expertise could have been used to the benefit of the participants as well as the overall objective of the game. Case in point, during effects-based planning mission analysis there was a lack of process understanding (capabilities to tasks) that was observed among the logistican's participant, where the OTs/SMEs could have provided assistance. Additionally, being advocates for the Log tools would have helped.

Lessons Learned:

Recommendation: In the future OTs/SMEs should be given some latitude to assist the participants.

Comments:

Title: Survey Administration

Exercise/Operation: MC02

Date Time Group of Observation: 8/13/02

Observation: Early push of survey questions to SMEs via JDCAT led to survey completion and submission much earlier than desired.

Discussion: A number of surveys were pushed to SMEs at the outset of the experiment with specific instruction text to not complete the form until a certain date. This was so the SMEs would have a frame of reference to issues as they observed experiment play. Despite the instructions, a sizeable portion of the surveys was completed days early. For example, the ENDEX questions were pushed on 24 July and had a submission back the next day. Some of this is due to JDCAT, which makes the survey due as soon as it becomes visible to the assigned respondent; however, some is due to failure to read instructions. The SMEs were briefed that some surveys would be pushed early and to hold completion until the date indicated.

Lessons Learned: If JDCAT is used again, and the due date cannot be adjusted from "DUE ON RECEIPT", then questions that need to be seen early, will be provided as a handout. The JDCAT survey should not be pushed until the day before the intended date for that survey to be completed.

Recommendation: Investigate potential to modify JDCAT program to allow other than "DUE ON RECEIPT" visibility of surveys.

Comments: None.

Title: Analyst Battle Rhythm

Exercise/Operation: MC02

Date Time Group of Observation: 8/13/02

Observation: Bringing analysts in early (by approx 0300) to get a head start on the synthesis of what the previous day's comments and survey results said, worked well.

Discussion: I started two of my four persons at 0300 each day to digest the incoming data and charged them to tell me when I arrived at 0645 how the data looked, in general what it said, and to tell me the "SO WHAT?" of the results. I also did this to keep them out of the fray of data collection execution and provide them a quieter environment to absorb the large quantity of input received. Several advantages resulted from this decision: (1) I noticed it was much less frantic than Spiral 3 to produce meaningful results for presentation at the mid-day bucket drill. (2) It provided a convenient venue for the concept writers to come over at 0700 and get a look at how the data looked. (3) It put me ahead of the power curve so I could institute mid-course corrections to SMEs at the Daily Rally.

Lessons Learned: I will continue this practice. You do not want to start your people any earlier than 0300 because time has to be allowed for the database folks to have the data ready for the analysts. You also need your analysts to have sufficient legs to reach the mid-day Bucket drill since their input is critical.

Recommendation: Continue this practice.

Comments: None.

Title: Survey Review

Exercise/Operation: MC02

Date Time Group of Observation: 8/13/02

Observation: Survey execution was much less stressful in Execution than in Spiral 3.

Discussion: I believe getting the surveys approved by the Analysis Division Chief prior to the start of Execution made for a much easier ride in Execution than in Spiral 3. Granted, Spiral 3 was somewhat of a rehearsal, and we knew more of the Boss's desires going into Execution. Also, not having to jump the survey hoop the day before launch time and then react to any modifications in a rushed manner made life much easier. Instead of reacting to the Boss's changes, I was better able to get somewhat ahead, in Execution, and institute my own changes based on experiment play. These changes were also easier to be approved because I wasn't competing with every other survey going out the next day for the Boss's attention.

Lessons Learned: Achieving early approval of surveys from the Approving Authority paid dividends.

Recommendation: Continue this practice.

Comments: None.

Title: Surveys-Participant Overload

Exercise/Operation: MC02

Date Time Group of Observation: 8/13/002

Observation: Experiment participants were "surveyed-out".

Discussion: It appeared our participant survey data might have contained a sizeable amount of "cheerless compliance" in survey completion, due to the fact we did not crosscheck surveys across each other's analysis lanes, the high demands on the staff to respond to the Commander, and because of the battle rhythm. This certainly impacts the quantity and quality of the participant responses.

Lessons Learned: Remember, this is supposed to an experiment first and exercise second. Time needs to be allowed for assessment reviews and survey completion as part of the battle rhythm. I know we tried to build this in for MC02, and were squelched, but we have to try even harder next time. Anything less, could have a huge, adverse impact on our analysis effort and the transformation effort.

Recommendation: Establish assessment and survey completion time in the battle rhythm as an absolute show-stopper requirement. Remember, it's an experiment-we have to take stuff out of people's heads. We aren't trying to put stuff in their heads like during a training exercise.

Comments: None.

Title:JDCAT Manning Document

Exercise/Operation: MC02

Date Time Group of Observation: 7/24/02-8/10/02

Observation: Increased survey participation particularly among off-site groups.

Discussion: Data collection percentages were greatly enhanced with the decision to send J9 Analysis representatives to off-site locations tasked to fully engage participants in survey submissions. Many manning document changes were identified as a result of this involvement, which in turn, resulted in a more accurate JDCAT Manning Document/collection pool.

Lessons Learned: It is essential to establish a "real" survey pool as soon as possible for optimum analysis/survey results.

Recommendation: Task J9 Analysis representatives several days/weeks before the exercise with manning document issues. Likewise, send the J9 representatives to the off-site locations earlier to engage participation from the earliest.

Comments:

Title: Senior Mentor Shadows

Exercise/Operation: MC02

Date Time Group of Observation:

Observation: Senior Mentor Shadows

Discussion: The one thing that we must have are shadows for the Senior Concept Developers (SCD). Not only will this give insights as to what will go into the QL report, it gives you the opportunity to track down leads early because the SCD synthesize data in their heads quickly. You can pick up data elements from surveys, but rarely synthesized insights. The reason we need the shadows is to be ahead of the power curve, not being pushed by it. As you can see from the current QL report, the vast majority is based on SCD insight. At least from my perspective, we got that second hand. The shadows from Unified Vision (UV) were very helpful. We don't need shadows from every SCD, but certainly for the key ones.
Shadows for select Senior Mentors during UV01 were most beneficial. Having a dedicated data collector for each to shadow and write a daily synopsis provided wonderful material for the Senior Mentor portion of each of our findings. In one case particularly, the JTF Commander (the Senior Mentor) made sure his shadow was with him as he quickly and frequently moved about the test bays. The shadow knew the background on any issue or decision he was working. We absolutely cannot get this by asking questions later, it needs to be captured as it occurs. I believe I overlooked this issue when I provided you my Lessons Learned, but that is why I surround myself with experts. He is dead on the mark, we should always have one of our own shadowing the key Senior Mentors.

Lessons Learned: Establish and Maintain Shadows for Key Senior Mentors

Recommendation:

Comments:

Title: MC02 ONA Observations

Exercise/Operation: MC02

Date Time Group of Observation:

Observation:
As implemented for MC02, ONA was challenging to manipulate for most participants. The potential benefits of ONA were recognized, and it was beneficial to the Blue force. There was not a common understanding of ONA. Command levels have different requirements for ONA and it needs to be defined and focused for implementation.

Discussion:

Lessons Learned:

Recommendation:

Comments:

Title:XC4I Lessons Learned

Exercise/Operation: MC02

Date Time Group of Observation:

Observation:

Discussion:

Lessons Learned: XC4I Lessons Learned
The need for rapid access to current, relevant, and accurate information is at an all-time demand especially for military operations. Combined with the increased need for information is the need for constant communication and coordination between the JTF and all supporting organizations to research information and develop a position on specific topics. These requirements dictated the MC02 capabilities implemented in the Collaborative Information Environment (CIE) first used in MC02. The CIE provided a synchronous and asynchronous environment in which to conduct MC02 not only for the Blue participants but also for the technical groups supporting the JCCC, the experiment control group and the assessors and analyst groups.
MC02 focused on a Rapid Decisive Operation (RDO) and the specific concept objectives necessary to carry out an RDO. An operational architecture supporting the unique organizational structure of a Standing Joint Force Headquarters (SJFHQ) that plugs into a Joint Task Force (JTF) supported by the joint functional components was developed and used to map the system capabilities required to allow the operator to exchange information. A process driven methodology that incorporates organizational design, business process design, infrastructure, information technology, and cultural change management was used during the design, integration, and implementation of the XC4I tool suite. This methodology is called the Process Driven Change framework because it

focuses on the analysis of processes, which defines data, organizational, and information-flow requirements. It was imperative that the XC4I tool suite was designed to meet experimental process requirements, although, it would have been easier to allow technology to drive the design.

The one area where this methodology was not implemented was in the design and implementation of the communications infrastructure. Each spiral event leading to execution experienced numerous communications problems which in some cases went unsolved because of the lack of network monitoring tools and network analysis personnel. Participation in Spiral 3 by III Corps's network experts provided expert network troubleshooting that was not perversely available at the JTASC. Lessons learned from the spirals were not incorporated into the design and maintenance of the final C2 communications infrastructure. Although services monitored various data packets including multicast groups across their LANs, the JTASC was unable to provide adequate network monitoring for the spirals and execution across the WAN and LAN. The loss of information that could have been collected concerning bandwidth utilization and optimal bandwidth is tremendous. Such information would conceivably have two effects: (1) Ensure optimal bandwidth usage across shared media as new applications were introduced, and (2) Provide incentive to developers to render their applications more bandwidth efficient. M&S management implemented their own network monitoring tools staffed with network analyst to monitor the simulation network. This should be a lesson learned for J9 for future events that implement C4I capabilities. New Information Technology (IT) tools were introduced in the MC02 experiment. The new tools, along with some pre-released versions of legacy tools, provided the joint capabilities required to support the experimental planning and operational processes. A key objective for MC02 was to obtain empirical data as to the effectiveness of both a synchronous and asynchronous environment on the planning, execution and assessment process, and to identify and define enhancements that would allow these capabilities to transition to the warefighter in a more effective process than exist today.

MC02 achieved dramatic success in several areas. For this discussion I have focused on the XC4I tool suite that employed state-of-the-art technology and management tools to enhance the efficiency of the tools. In most cases, our management tools consisted of published business rules that identified not only the process and procedures of the tools, but also workarounds for limitations identified through test and spiral events. The enterprise architecture implemented in MC02 provided not only the joint capabilities, it also provided the functional component baseline CIE architecture.

The Common Operational Picture (COP), a subset of the Common Relevant Operational Picture (CROP), was never perfected for MC02. During spiral events leading to execution,the COP was treated as an after thought, and therefore the COP architecture, nor the COP Management Plan, was adequately tested prior to execution. One of the major objectives of MC02 was the development and buy-in of a Joint Top COP Management Plan. However, during the first days of execution, the management plan had not been accepted by the components. Lack of buy-in caused many process problems that when combined with the GCCS system problems, impacted the ability to provide adequate situational awareness of the battlefield. CINCs and Services have identified these issues to DISA over the past 5 years. Most major experiments and exercises continue to identify the same COP issues and today the GCCS system remains

unchanged. Promising is the ability for ADOCS, the situation awareness capability implemented in MC02, to take tactical feeds from service systems to provide an integrated view of the battlespace.
Many assessments and lessons learned will be documented and published as a result of the success of MC02. Additionally, new limited objective experiments (LOEs), and many follow-on experiments, reviews, and assessments will be identified as a "required" task to ensure that capabilities used in MC02 meet warfighters needs. The functional requirements represented by the capabilities integrated in MC02 to provide the Experimental C4I (XC4I) tool suite are not new requirements. Each functional requirement implemented through a specific capability has been identified in detail by the CINCs and Services for the past 5 years. A large number of these capabilities have been developed and assessed in the Advanced Concept Technology Demonstration (ACTD) projects to meet warfighter capability requirements. Many capabilities exist in the commercial off-the-shelf products that are easily integrated in commands' day-to-day operations. However, many have not yet made it to the operational forces.
It is very clear that the future holds the promise of decision superiority through increased understanding provided by a CIE. What is unclear, is the transformation path that will implement this environment for the warfighter who must meet the future challenges. There is a lack of effort in the joint community toward technology insertion and technology improvement for the Joint Command and Control system. The Joint Staff, US Joint Forces Command, and other CINCS must implement a process to allow integration of commercial off-the-shelf software and specialized tools developed in other joint initiatives to be made accessible to the warfighting community. Acquisition policies have been revised to allow timely implementation of technology, and to make sure it is mature enough to meet warfighter needs. We need new or re-engineered, not reorganized, agencies that can solve new problems and new processes that focus on transformation of these capabilities to the warfighter. Now is the time for the leadership to recognize that continuing "business as usual" is not a viable option and ensure that groups responsible for even the smallest transformation effort overcome trends of the past and ensure our military will be prepared to meet emerging challenges of the future.

Recommendation:

Comments:

Title: Administrative Support for Remote Analysts

Exercise/Operation: MC02

Date Time Group of Observation:

Observation: Administrative Support

Quality Control (QC) Analysts deployed to remote locations require a dedicated workspace, dedicated computer support; SIPR and NIPR, and continuous access to a

telephone in order to provide optimum support. QC Analysts cannot be relegated to a situation where they are forced to be dependant upon other entities to provide support. QC Analysts deployed to remote sites require to be involved in the developmental stages of exercises as the QC Analysts will serve as a conduit for the Component Command Group to J9. The QC Analysts need to be cognizant of the organizational and manning structure of the Component. This will facilitate the development of proper surveys, proper survey questions, and appropriate recipients of the surveys.
QC Analysts deployed to remote sites require to have input into the creation of the Manning Document from the Components. This enables the QC Analysts to maintain a contiguous working relationship with the Personnel Section (G-1, N-1, etc) by assisting in the identification of positions, position requirements, and providing J9 interface.
QC Analysts need to establish a working point of contact (POC) with the Component Command well in advance of the exercise in order to facilitate the Component Command's requirements. If possible, it would be advisable for the QC to visit the Component Command site and/or to attend conferences where the Component Command would be in attendance in order to facilitate the working relationship.

Discussion:

Lessons Learned:

Recommendation:

Comments:

Title: Accuracy in Manning Roster

Exercise/Operation: MC02

Date Time Group of Observation:

Observation: Requirement for Accurate Manning Roster

Discussion: Survey Administrators must have an accurate manning roster, whoever owns responsibility for it. We may have to go out and coordinate it ourselves if the components and J7 can't get it done. Analysts need an accurate roster to pick the groups to whom they intend to send surveys. Analysts need to coordinate their choices with pre-arranged POCs from the components. Component POCs may be able to determine whether or not the person they are sending the survey to has access to the data collection system. This will prevent grading ourselves down for making poor choices in the first place. It might be useful to send the surveys to a line number initially, until you get the first contact survey back in, and then switch to names. However, if you have to go names, you need to coordinate with people ahead of the event. Or, alternatively, as we did for MC02, fix it over 10 days of the exercise (this latter may be more painless, just don't grade ourselves while we are fixing it). We need to do our surveys a little earlier. They need a very good content scrub, then a form QC. At this point, we should send

drafts of the surveys to the component POCs with our take on who should get them, by name. This lets the components tell us that some choices are not good and we can change them. We should always have the flexibility to do last minute surveys to leverage insights or redress holes, but these should be clear exceptions.

Lessons Learned: Establish and Maintain an Accurate Manning Roster

Recommendation: Command Emphasis

Comments:

Title: MC02 Spiral Three Hotwash

Exercise/Operation: MC02

Date Time Group of Observation:

Observation:

Discussion:

Lessons Learned: MC02 Spiral Three Hotwash

Processes

- Met with concept developers. They are working on the following for execution:
  - A check list to assist players in organizing and executing collaboration sessions.
  - A methodology for reducing the scheduling problem for collaboration sessions.
  - An improved RFI management process.
- Use of shift change log books (Admin, Analysts, Database, SME).
- Establish roaming secure email account for use at DC nodes.
- Establish IWS crash procedure (audio between DC/Suffolk was poor).
- The morning rally is a good avenue for information exchange, but during execution, it needs to focus more on experiment issues (e.g., MESL items, significant events) than administrative issues.
- Declassification procedures?

People/Organization

- People-need janitorial staff to empty trash and perform general housekeeping chores in the test bays.
- Manning roster management, particularly at remote locations. Recommend continuation of the role of support staff to contact roster managers and continue clean-up/synchronization of the rosters.
- The analysis Division organization/chain of command needs clarification.

- Need to look at manning for 24 hour ops.
- We may need different SME assignments based on the shift from planning to operations and what we learned from who and how people were positioned in Spiral 3.
- Fittorubt reqyurenebts established prior to 24 June laydown-faces and places. Who sits at which computer and when are they working there?

Data Collection

- Synch data collection requirements fro Red with those of Blue. Not much done here during Spiral 3, but it became apparent that we need to coordinate the two efforts to ensure we are correctly addressing both sides of the issues (e.g., Red intent, objectives, DIME, PMESII, etc). will also want to synch the data collection tools/methods.
- Business rules on data capture and management should be established and adhered to.
- Survey completion from certain components is a problem.
- Need Spiral 3 IWS data in a usable form to determine what we can get from execution. Need a process to collect this data (if usable) on a regular basis.
- Request that IWS Conference Center recording capability be turned on for our use.
- Drop JECMT from planning and development for execution. Insufficient man-hours available to complete.
- Don't apply survey completion pressure to SMEs. If we send them "over-all" thoughts or items of interest for the entire execution in a survey on day one, it really doesn't need to be "completed" until the event is over.
- Continue to emphasize to the SMEs that we aren't necessarily interested in check list completion info; rather we want the "what" and "why" things occurred. It's an emphasis thing.

Data Management

- Processes-I believe that we need a Data Management Plan as part of the JEAP.
- Development of and adherence to a Data Management Plan withing the JEAP.
- Establishment of a Change Control Board (CCB) for Data Management and Data Base Changes. The board should have a relatively significant role within the policies and changes to processes affecting the data base and data management. Of course the Chief of Analysis Division would have overriding authority of the implementation and execution of the CCB remommendations.
- The comments/recommendations data base needs a Key Word Sting Search capability.
- Need to think harder on time and process for overnight receipt of data and production of graphs. I'm afriad the boss thinks this is justa a matter of someone reasonably competent with Excel plugging and chugging, but I think the person who is doing this needs to be pretty much in the head of the Lead Analyst because these graphs tell a story line. I'm already considering using an anlyst to do this for me in Execution.

- We need to be able to cross reference and link WinNT user id, Manning Doc (line number, position, group), and JDCAT user id for survey collection assessment.
- Need an application for MC02 Execution that tracks web page hits metadata (ONA Today, ONA Matrix, etc).
- The overall survey response rates should be calculated automatically.
- Response rates for data, especially for data that is presented during the azimuth check, is not as relevant as the confidence level. We used a confidence level for insights but not for hard data (player surveys). Analysts should focus on confidence level and DB personnel on response rates.
- SMEs requested we adopt a new survey naming convention. Preferably one that is related to the content of the survey.
- Database tools?
- Analysis Division Chief review of Q's early and FINAL.

Data Analysis

- Overall, good. Pretty labor intensive, took a lot of effort to have high quality stuff for 1230 meeting. I don't think any of us lead analysts understood LTC Mains' desire for Excel architecture to catch data and produce charts until 1st day of Spiral 3, but we learned fast. For those Excel templates to be time savers, we need to make sure changes to Data Categories (columns, such as JFMCC, JPOTF) and Variables (rows, such as Yes, No, DK) are minimized. A seemingly small change to the choices scale on a survey can leave big ripples on the formulas imbedded in the spreadsheet. My opinion: we are light years ahead of what we did in MC00 and UV01 for "in-event" analysis.
- Need a "Web Trends" type web analyzer to be purchased and installed prior to execution-about $2500-KMO also need this with training.
- Need to lok at email produced from Spiral 3. do we have access as a type of data?
- Need someone with cross service military experience and knowledge to train as a DCARS operator/data collector/analyst.
- Final report writing must start now.
- JIACG survey questions do not lend themseles to histograms (sample size is limited: n=~20 (13-8).

Scheduling

- SMES: Need to synch SME/Analyst schedules for MC02. SMEs for Spiral 3 were on their own schedule (13 hr. days). Also, (probably a quirk) they were doing both Red and OPS for Spiral 3. This was a conflict at times.
- The Daily Analysis Battle Rhythm was about right.

SME Coordination

- My lash-up with the Logistics SMEs was super.

- I won't say it didn't work, but we need to better synch our requirements on the J7 SME bubbas.
- Pretty good. If I was going to be here in the morning, I'd run throught the SME survey results closer. I may have a few more Don't Knowss than I would have hoped to see, but I'm not ready to assert that just yet. Also, I've got a concern on SME-Analyst pairing that I've mentioned, that's enough said on that in this forum. I will work with SME Management to resolve my concern.
- Collaboration with SMEs/OTs.
- Access to senior JIACG participants.
- Good working relationship between J-9 analysts and SMEs, but will need better colletive interaction during execution.

Recommendation:

Comments:

ANNEX L — Service Input

Annex M — Index

Annex N — Distribution List

AC2ISRC LANGLEY AFB
ADC MAXWELL AFB
AFC2TIG HURLBURT FLD
CDR82DABNDIV
CDRFORSCOM
CDRIIICORPS
CDRJCSE
CDRJITC FORT HUACHUCA AZ
CDRTRADOC
CDRUSAEPG FORT HUACHUCA
CG I MEF
CG II MEF
CG MCCDC
CG MCWL
CIA
CINCLANTFLT
CINCPACFLT
CJTFCS
CMC
CNO
COMCARGRU EIGHT
COMCARGRU THREE
COMDT COGARD
COMMARFORLANT
COMMARFORPAC
COMNAVAIRSYSCOM
COMNAVAIRWARCENWPNDIV CHINA LAKE
COMNAVWARDEVCOM
COMSECONDFLT
COMSOCJFCOM
COMTHIRDFLT
DA
DIA
DIRNSA
DISA
HQ 12AF
HQ ACC
HQ USAF
    J02
    J1
    J2
    J3
    J4

J5
J6
J7
J8
J9
JBC
JFIC
JFMO LANT
JITC WASH OPS INDIAN HEAD MD
JOINT STAFF
JPRA
JWAC
JWFC
NAVAIRWARCENWPNDIV PT MUGU
NAVWARCOL
NDU-INST FOR NATIONAL STRATEGIC STUDIES
NGB
NIMA RESTON
NRO
PEO THEATER SURFACE COMBATANTS WASHINGTON DC
SPAWARSYSCEN SAN DIEGO
STATE DEPT
USCINCCENT
USCINCEUR
USCINCJFCOM
USCINCPAC
USCINCSO
USCINCSOC
USCINCSPACE
USCINCSTRAT
USCINCTRANS