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U.S. JOINT FORCES COMMAND JOINT CONCEPT DEVELOPMENT AND EXPERIMENTATION'S CONCEPT PRIMER

Effects-Based Operations (EBO)

Introduction

Our contemporary thought on effects-based operations began to emerge during the first Gulf War. Three important new capabilities—advanced sensors, precision munitions, and stealth aircraft—appeared for the first time in significant numbers on the battlefield.

The advanced sensors helped to identify key targets in exceptional detail. Precision munitions allowed us to strike those targets accurately, using considerably fewer rounds, and with much less undesired, collateral damage. Stealth technology enabled our aircraft to penetrate sophisticated air defenses undetected, to strike throughout the battlespace, and to hit the highest payoff targets early and hard, without “rolling back” the enemy’s air defenses.

Combined with increasingly accurate “nodal analysis” of the enemy, these warfighting tools enabled air planners to identify key points that could create powerful, cascading effects on the functioning of enemy systems, disintegrating them with unprecedented speed. The ability to strike deeply, throughout the battlespace, with the right capability at the right time, paralyzed the enemy’s ability to operate or to adapt.

The next step in the development of an effects-based approach occurred during the 1999 campaign against Serbia. Here, we moved deliberately beyond the tactical nodal targeting of Operation Desert Storm, to a more comprehensive, effects-based campaign. In the first weeks, we directed a precision air campaign at the Serbs’ conventional military capabilities, a tactic that had worked well in Desert Storm.

However, the enemy had adapted to these techniques and thus reduced our ability to identify and engage critical targets. Initially, we expended thousands of precision munitions against conventional Serbian military forces and their supporting infrastructure. The Serbs recognized that, if they couldn’t be found, they couldn’t be hit. They dispersed and stopped moving, reducing their visibility to most of our advanced sensor systems. They also effectively employed deception and decoys. While our air attacks suppressed the fielded military forces and significantly curtailed their maneuverability, the attack had little effect on Serbia’s operational ability, and perhaps more importantly, on the Serbian leadership’s willingness to continue the fight.

Later in the campaign, the Kosovo Liberation Army (KLA) introduced close ground combat, firing directly on stationary and hidden targets and forcing the Serbs to respond in self-defense. Consequently, our sensors could again detect them, and our precision targeting again became effective. Thus, the actions of this irregular force resulted in a major breakthrough that enabled us to affect Serbia’s military capabilities, as well as the regime’s will to resist.

A second breakthrough came when analysts at the Joint Warfare Analysis Center (JWAC) expanded the understanding of “nodal analysis,” conducting an early form of *operational net assessment* to successfully map the regime’s diplomatic, economic, informational, and “crony” networks essential to the Serbian leadership’s ability to retain power. The JWAC’s operational-level analysis of these systems identified where we could apply joint military capabilities—not only against the regime’s military system, but also against the financial and industrial incomes that supported the functioning government. As the effects of these strikes mounted, compounded by effective diplomatic actions to deny the regime its external support, the Serbian leadership began to understand the hopelessness of its situation. The continuous pressure from concurrent military and diplomatic activity ultimately broke the Serbs’ will to resist.

Throughout military history, commanders have striven to achieve the greatest effects on the enemy. They have combined available information, maneuver capability, and fires to the fullest extent. Modern technology now allows us to understand the battlespace, previously unimaginable maneuver capabilities, and powerful fires—all which combine to fiercely affect the enemy’s ability to operate. Operations Desert Storm and Allied Force demonstrated the application of these capabilities within current operational constructs, as well as how new such constructs could increase their effectiveness on the battlefield.

In an effort to further the understanding of the effects-based approach and to develop the concept of effects-based operations, joint experiments, such as Unified Vision 2001 and Millennium Challenge 2002, built on the lessons learned from the operations of the 1990s, particularly those that integrated all instruments of government action, as well as joint forces, at the tactical level of war. At the operational level, the campaign construct of these experiments applied the full range of our diplomatic, information, economic, and military capabilities against the political, economic, military, social, information, and infrastructure systems of the enemy. The experiments also built on the insights gained from the ground actions of the KLA in Kosovo. The campaign construct employed joint forces, integrated at the tactical level, in a distributed operation throughout an extended battlespace. The construct arranged the joint tactical actions geographically to create specific effects.

These experiments further demonstrated how integrated interagency action at the operational level of war can affect the enemy’s warmaking ability to a greater extent than military action alone. New capabilities that emerged include the concepts of a standing joint force headquarters, an operational net assessment, a collaborative information environment, and a joint interagency coordination group. These concepts are becoming prototype capabilities in our combatant commands, as the effects-based approach begins to take hold in our warfighting thinking.

Operations Enduring Freedom (OEF) and Iraqi Freedom (OIF) employed many of the emerging principles of effects-based operations. In OEF, strategic and operational planners combined military action against Taliban and Al Qaeda forces in Afghanistan with a global attack on Al Qaeda’s global financial network to disrupt the terrorist network’s ability to restructure and adapt. Planners understood that Al Qaeda would attempt to reorganize following its defeat in Afghanistan by redistributing functions globally. The integrated actions to defeat the Taliban and Al Qaeda’s operational capability through direct military action and to defeat their ability to adapt through financial action seriously disrupted the terrorist network’s operations.

OEF also further advanced the techniques of joint tactical action. In the Kosovo campaign, the ad hoc air-ground tactical action employed little direct interaction between allied air and indigenous ground forces. In OEF, well-integrated action between globally projecting bombers and indigenous close-combat forces, supported by U.S. and allied special forces, devastated the enemy. Striking across great distances in synchronized but physically unconnected attacks, allied forces presented the Taliban with far more challenges than its command-and-control system could address. Close combat forces directed heavy precision air fires to where they could be most effective. Air fires opened additional maneuver opportunities and inflicted heavy casualties on the enemy. The synergy between close combat and globally projecting forces resulted in a rapid collapse of the enemy's coherence and quick attainment of allied operational objectives.

In OIF, the concept of joint tactical action in a distributed battlespace to create overwhelming effect advanced even further. Allied ground forces conducted a widely distributed ground attack, supported by closely integrated air fires and focused primarily to achieve the collapse of the regime in Baghdad. Although many of our actions were done in sequence, from the enemy's standpoint, they were simultaneous. The enemy was under constant, relentless pressure from every angle—military, information, diplomatic, and economic. On the military front, coalition forces moved rapidly to generate operational-level effects to deny the enemy all options, as well as its ability to make war.

For example, a surprising first strike captured key oil fields, preventing the Iraqis from torching them, as they had in the first Gulf War, and thus from creating major economic and environmental effects. While the oil fields were being secured, allied forces drove to Baghdad on widely separated axes, shattering Iraqi operational coherence. The axes were connected through an effective knowledge network that provided allied forces a tremendous maneuver advantage. The boldness, speed, and precision of the attack reached well inside the Iraqi decision cycle. Before the Iraqis could organize a coherent defense in Baghdad, the city fell, and major combat operations were successfully completed.

Concept Description

The effects-based approach to operations has four components: knowledge superiority, an effects-based planning process, dynamic and adaptive execution, and accurate and timely effects-based assessment.

Knowledge superiority to support an effects-based approach requires the ability to develop a knowledge advantage sufficient to enable precise and bold action through *battlespace understanding* and *situational awareness*.

Battlespace understanding is a detailed knowledge of how the enemy operates; of the nature of the networked, extended battlespace; and of how our joint, interagency, and multinational capabilities may be applied therein to create desired effects. Specifically required is an understanding of how the enemy's political, military, economic, social, infrastructure, and information systems work, and how he integrates them to make war.

The process by which the joint force builds this understanding is called *operational net assessment* (ONA). ONA is both a product and a process. As a product, it maps the enemy's key national and military systems. It identifies the key physical points, as well as the interaction among processes, where the coherence of these systems is most vulnerable.

Like physical systems, functional systems also contain intersections where disrupted interactions could cause the systems to fail. The ONA identifies these points and how they may be affected to cause such system failure. This detailed understanding of the battlespace and of how the enemy operates within it is the key underpinning of the effects-based approach to operations. The continuous and dynamic ONA process begins well in advance of military action, evolves during operations, and continues not only until the conflict successfully ends, but also until the underlying confrontation is resolved.

Sufficient situational awareness, the second key element of knowledge superiority, is a snapshot of the conditions of the battlespace at a particular moment. Effective situational awareness requires a common, relevant operational picture (CROP), and a joint intelligence, surveillance, and reconnaissance system (JISR). The CROP enables all elements of the joint force to see the battlespace the same way. The “relevant” feature of the CROP permits each user to access critical information and to tailor it to support his decision process. The same information is available to all CROP users, although each may apply it differently.

A JISR capability networks all of the information-gathering systems of the joint force, feeds collected information into a common repository, and fuses information into common, actionable knowledge. Situational awareness enables a decision-maker to interpret the ONA at any moment in the operation, comparing current reality against the outcomes anticipated in the ONA. Similarly, the ONA enables the decision-maker to extend his current awareness to anticipate how the enemy might behave and the effects that may result from further action.

The artful use of ONA and situational awareness can give a joint commander a significant knowledge advantage over the enemy. The concept of knowledge superiority is difficult to define and is often misunderstood, but an effective commander will know when he has it. In the 3rd Infantry Division’s drive to Baghdad in Operation Iraqi Freedom, a massive sandstorm reduced visibility of the battlespace to near zero. However, while visible surveillance was nearly impossible, electronic situational awareness systems continued to operate, providing U.S. commanders with an accurate awareness of friendly and enemy positions and movements. The enemy had no such systems.

The 3rd Infantry Division’s commanders used this superior knowledge to continue operations, in spite of the sandstorm, and effectively out-maneuvered the “blinded” enemy forces. Battlespace understanding and sufficient situational awareness combined to create the knowledge superiority that enabled allied commanders to make better decisions faster than the enemy could. Hence, knowledge superiority doesn’t mean perfection; but the knowledge must support bold decisions, and it must be more accurate than that available to the enemy.

An operation’s initial ONA is a product of a standing joint force headquarters (SJFHQ) that resides in each regional combatant command. A command-and-control organization, the SJFHQ reports to the combatant commander, develops ONAs for situations that he believes may lead to military action, and provides the core of a joint task force to plan and control such operations. The SJFHQ consists of joint planners who are trained and equipped to work together as a coherent body, with all the skills and processes necessary to plan and conduct complex joint operations. When the SJFHQ is committed to an operation, it brings an understanding of the enemy, the battlespace, and the effects desired by the combatant commander, as well as the joint skills and joint team proficiency necessary to plan and conduct an effects-based operation.

The **effects-planning process**, the second major element of effects-based operations, develops a campaign plan that matches strategic aims with theater and operational objectives, with the effects needed to achieve those objectives, with the joint actions that create the effects, and with the joint, interagency, and multinational capabilities needed to execute the actions.

An effects-based campaign connects strategic aims to tactical actions through a series of engagements or battles that accomplish campaign objectives. The campaign strategy stresses clearly the nature and timing of the effects the commander wishes to create, rather than specific actions that component commanders should take. Whereas those specific effects are fixed, component commanders have great latitude to determine how to generate those effects.

Strategic effects describes the desired change in the enemy's behavior, often a coercion, deterrence, destruction, or stabilization. *Operational-level effects* describes changes in the enemy's ability to operate coherently, i.e., the denial of the enemy's ability to use key capabilities or the elimination of the enemy's operational options. *Tactical effects* describes the way we affect key enemy systems, i.e., the reduction of the enemy's integrated air defense systems to independent, uncoordinated, individual platforms through disrupted connections to target acquisition radars.

Additionally, the graphics used to describe operations within an effects-based campaign plan exceed those of its conventional predecessors. Traditional joint campaign plans typically divide the joint operational area into distinct air, sea, and land areas of operation. Other linear control measures, such as fire support coordination lines, resolve conflicts among service components' efforts to permit all combat power to be brought into the fight, while reducing the possibility of cross-component interference and fratricide by physically separating those service components.

Currently, the presence of a CROP enables limited use of linear control measures. Instead, key tactical engagements are distributed throughout the battlespace. The CROP identifies a sequence of operational-level effects distributed in space and time throughout the battlespace. The plan may not assign component areas of operation, but rather may describe how component actions will be integrated during engagements. To describe the effects to be achieved, the joint force commander issues an "effects tasking order" that contains broad, mission-type orders to his components. Subordinate commanders collaborate across component lines to integrate the joint capabilities needed to create the assigned effects.

A collaborative information environment (CIE) is key to the development and execution of an effects-based plan. The CIE links together key decision-makers to help them to understand the mission, to achieve the allocation of forces necessary to conduct actions, and to share the information necessary to ensure unity of purpose and coherent actions.

An effects-based plan also recognizes that a quantitative and a qualitative relationship exist between the knowledge and the mass required for success. In traditional operations, our leaders have built a physical superiority of at least three-to-one before engaging the enemy. An effects-based approach stresses that, the better we understand how the enemy operates and where his vulnerabilities are, and the more accurate our situational awareness is, the more precisely we can apply our capabilities to achieve the greatest possible effect on the enemy. Such precision reduces, but does not eliminate, the physical force required to achieve the desired effect. Similarly, the warfare constants of ambiguity and "fog" are reduced but not eliminated. With more knowledge, greater precision is possible. Thus, we may act faster, improving our chances of defeating the enemy.

Understanding the relationship between knowledge and mass, the risk and opportunities knowledge presents, and the ability to decide and act quickly may become the most important elements of the art of command in 21st-century operations. Developing leaders who fully comprehend this may be our most critical challenge.

Further, whereas a traditional plan matches our capabilities against those of the enemy using air-to-air, maritime-to-maritime, ground-to-ground symmetry within air, sea, and land areas of operation, an effects-based plan is asymmetrical, integrating the capabilities of the joint, interagency, and multinational forces at the point of action. Component commanders may use resources from all domains to achieve the desired effects.

In addition, an effects-based plan is ***dynamic and adaptive in execution***. Components support each other with the specific capabilities needed to conduct joint tactical actions to win each engagement. Interoperable joint forces quickly assemble, enter the collaborative environment, and synchronize their activities at the point of action. Upon successful completion of a joint tactical action, the forces return to their parent components to prepare for their next task.

Within this continuous, flexible execution, plans and orders are issued as situations emerge from friendly or enemy action. Such effects-based operations require highly interoperable forces with the equipment, processes, and training necessary to make such complex actions routine.

Accurate and timely assessment is the fourth and possibly most challenging element of effects-based operations. Unlike measuring the percentage of a target destroyed, our forces have had difficulty determining the operational effect of an action. Building this capability requires a concentrated, multidimensional effort to integrate imagery, signal intelligence, human intelligence, and other sophisticated technologies and operations to provide rapid sensing, fusion, and assessment. We already have extraordinarily effective sensor systems; however, our current information fusion systems are insufficient to execute the complex task of effects-based assessment. Possible solutions may include a joint force ISR component or task force, as well as integrated, cross-component information fusion capabilities. These concepts will be an important focus area for experimentation and prototyping in the next few years.

The effects-based approach does work, as evidenced by the progressive successful growth of its principles in operations ranging from Desert Storm to Iraqi Freedom. Much work remains to bring the idea to its full potential and then to develop the capabilities necessary to maximize its power. The prototyping work underway in the combatant commands to field initial versions of the SJFHQ, CIE, JIACG, and ONA represents significant steps to move from concepts to warfighting capabilities.

Future experiments will continue to refine and expand the idea into globally integrated effects-based operations. Other experiments will determine how we may integrate not only the capabilities of the interagency and multinational sectors, but also appropriate private-sector organizations, including industry, nongovernment, and private volunteer groups. Further, concept development and experimentation has begun to determine how to apply the effects-based approach to other missions, such as stability operations, homeland defense, and strategic deterrence.

The effects-based approach is no longer merely interesting and untried theory. It is an emerging construct that is already contributing to battlefield success. Just three years ago,

skeptics argued that the concept's key features—knowledge-enabled operations, joint tactical action, and dynamic tasking—were neither possible nor desirable. Today, they have become simply the way we do business.