

*Report of the
Defense Science Board Task Force
on
Discriminate Use of Force*



July 2003

*Office of the Under Secretary of Defense
For Acquisition, Technology, and Logistics
Washington, D.C. 20301-3140*

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BOARD

OFFICE OF THE SECRETARY OF DEFENSE
3140 DEFENSE PENTAGON
WASHINGTON, DC 20301-3140

28 July 2003

MEMORANDUM FOR ACTING UNDER SECRETARY OF DEFENSE
(ACQUISITION, TECHNOLOGY, AND LOGISTICS)

SUBJECT: Final Report of the Defense Science Board Task Force on Discriminate Use
of Force

I am pleased to forward the final report of the DSB Task Force on the Discriminate Use of Force (DUF). As the report points out, the need to use military force in a discriminate manner is now being complemented by an emerging capability to do so. Ample evidence of the potential of DUF has been provided by the recent campaigns in Afghanistan and Iraq. The report first identifies enablers of DUF and then focuses its recommendations on two of them:

1. Create a capability to do campaign planning at the strategic/operational level that would approach the standards of detail, coherence, and comprehensiveness of current U.S. military operational/tactical-level campaign planning.
2. Make a long-term commitment to develop leaders for the discriminate use of force and effects-based operations, a commitment that will require changes to DoD personnel practices and professional military education.

These are tough issues, neither lending itself to easy implementation, and many details remain to be filled in. Nevertheless, they need to be tackled since advances in technology and weapon systems alone are necessary but insufficient to realize the promise of DUF. I endorse the Task Force's recommendations and propose that you review the Task Force Co-Chairs' memorandum and report.

A handwritten signature in black ink that reads "William Schneider, Jr." with a stylized flourish at the end.

William Schneider, Jr.
Chairman





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21 July 2003

MEMORANDUM FOR THE CHAIRMAN, DEFENSE SCIENCE BOARD

SUBJECT: Final report of the Defense Science Board Task Force on the Discriminate Use of Force (DUF)

Within a short time there has been markedly greater acceptance of the doctrine of governing military campaigns by *discriminate use of force*. Until very recently derided by some as an oxymoron, it has now been put forward by the President. As he said in his remarks aboard the U.S.S. *Abraham Lincoln*, "With new tactics and precision weapons, we can now achieve military objectives without directing violence against civilians."

Our concept of DUF strongly aligns with much of the current thinking about effects-based operations (EBO). The coming of age of these concepts is influenced both by *opportunity* and *need*.

- DUF brings new concepts for collaboration and massing of effects, which are joint in character and integrated among joint force echelons and components. It is enabled by new weapons; improved intelligence, surveillance, and reconnaissance; shared situation understanding; improved individual and collaborative training; greater agility; smaller footprints; and other emerging capabilities of the U.S. military that allow more timely and precise use of force than heretofore possible.
- *The need* is driven by the nature of current military campaigns. A striking feature of these campaigns is tension among multiple strategic and operational objectives: cause regime change, destroy a terrorist organization, decapitate leadership, *but* preserve infrastructure, don't wage war on a people, do hold an international coalition together, etc.

This report identifies DUF's critical enablers (beyond new tactics and precision weapons) and some of the challenges to its wide-scale operationalization.

We offer two recommendations intended to mature and promote DUF toward a new way to wage war.

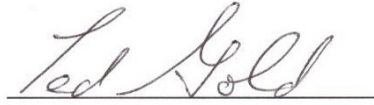
1. Create a capability to do campaign planning at the strategic/operational level that would approach the standards of detail, coherence and comprehensiveness of current United States military operational/tactical level campaign planning. Specifically we recommend the creation of a *Strategic Campaign Support Center* to institutionalize a strategic focus on the broad array of potential threats to the United States and its allies, similar to the focus that led to success during the Cold War. The Center's primary mission would be to develop "strategic campaign plans" for future contingencies. To this end, it would account for potential strategic and operational contexts (including U.S. objectives), invent concepts of operations involving all the instruments of U.S. power, and game alternative courses of action.

2. Make a long-term commitment to develop leaders for the discriminate use of force and effects-based operations, a commitment that will require changes to DoD personnel practices and professional military education. The planning and conduct of effects-based campaigns place great demands on military commanders—to balance multiple and competing objectives, to invent effects that tie tactical actions to strategic objectives, and to develop metrics for assessing effects. Changes to five areas of professional development may be needed to enhance substantially our ability to implement DUF: promotions, retirement, Foreign Area Officer programs, Foreign Officer Exchange programs, and professional education. We recognize that other factors besides DUF and EBO are driving changes in professional military development. Thus, we propose that the department commission a study to identify ways to incorporate the specific challenges that DUF and EBO present within the larger task of transforming professional military development.

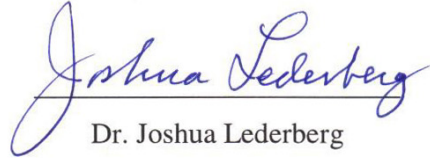
During the time that the task force was deliberating on the theory of the discriminate use of force, a small group of American military officers and their civilian superiors were putting it into practice. The planning and conduct of two military campaigns—Operation Enduring Freedom (OEF) and Operation Iraqi Freedom (OIF)—demonstrated how multiple strategic objectives could be served by new capabilities to use force discriminately. The military officers who planned and conducted these campaigns are a precious resource in several respects. From our perspective, their groundbreaking experience in effects-based campaigning would be invaluable in helping restructure military professional development to prepare future commanders and their staffs to conduct effects-based operations.

Military planning is understandably focused on the destruction or neutralization of the adversary's forces. The post-conflict turmoil in Iraq reminds us of the importance of further attention to the fruits of victory; the maintenance of order, civil behavior, and minimal levels of public services following disruptive hostilities; and the reconstitution of the adversary's political, social, and economic systems to meet the mutual interests of the former combatants.

We have relished the experience of working with the task force's talented and diverse group. We acknowledge the important contributions of the Executive Secretaries: CAPT Kathleen McGrath, CDR Mike Pease, and LtCol Mark Arbogast, and note with great sadness the death of CAPT McGrath. We also thank the SAIC support staff for their administrative and editing help.

Handwritten signature of Ted Gold in blue ink, written over a horizontal line.

Dr. Ted Gold
Co-Chair

Handwritten signature of Joshua Lederberg in blue ink, written over a horizontal line.

Dr. Joshua Lederberg
Co-Chair



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I. INTRODUCTION

In the terms of reference, the Under Secretary of Defense for Acquisition, Technology, and Logistics directed the task force “to conduct a comprehensive study of the ends and means of precision compellence, or the nuanced use of force, in concert with coalition partners, to achieve political, economic and moral change in countries affecting US interests.” Real-world events have since underscored the need for such a study; indeed, the U.S. military applied key elements of a measured, nuanced approach in both the Afghanistan and Iraq campaigns. We are pleased to note this evolution in operations and a parallel evolution in the thinking of the combatant commands and Services. Because of this evolution, it is no longer as necessary as it once was to sell the fundamental objectives of what we term here the *discriminate use of force* (DUF).¹

The notion of using military force in discriminate fashion goes back at least to the teachings of Sun Tzu. In the past, however, the military tools available to political and military leaders rarely supported such an approach. As recent events have shown, this situation is changing. New precision and “non-lethal” weapons and emerging capabilities such as information dominance now enable the discriminate use of force.

These emerging capabilities exist within a political context that requires the use of discriminate force. Moreover, destructive power alone is not sufficient to reach many U.S. goals, and it must be properly applied. Efficiency is one motivation. More significant is the need for discriminate use, particularly when multiple strategic and operational objectives are in tension. This is clearly a challenge, one that—in the same campaign—may require U.S. forces to roll back an aggressor, effect a regime change, and destroy a terrorist organization while minimizing casualties (theirs and ours), preserving infrastructure, maintaining international coalitions, not waging war on a people or a religion, and even not waging war on much of the adversary’s military forces.

DUF is about more than the limited use of force. When competing objectives exist, attacking the “wrong” target can wreak more damage to America’s interests than not attacking the right one. The intent is to apply force discriminately in order to achieve the desired and avoid the undesired. In fact, overwhelming force may be appropriate in some situations. Thus, DUF is largely about military effectiveness in the face of competing objectives and the inevitable frictions of war. In most cases the desired effect is a change in behavior. Physical effects (e.g., destruction of targets) can produce an automatic effect in reducing adversary capabilities, but more often are a means to the end of influencing behavior.

¹ Few civilized combatants in the modern era would associate themselves with the indiscriminate use of force. The antonym of discriminate is the inability to meet the complex strategic and political objectives of warfare, especially when the technical means exist for economy in force and the minimization of gratuitous collateral damage.

The task force's concept of the discriminate use of force harmonizes with some contemporary thinking about effects-based operations (EBO). We say *some*, because there are a number of differing articulations of EBO.

- Some emphasize *efficiency*—a way to avoid waste of munitions, sorties, and lives by attacking an adversary's center of gravity.
- Others emphasize *comprehensiveness*—a way to use all the elements of national power (diplomatic, informational, military, and economic—DIME) together in concert against an adversary.
- Still others emphasize *speed*—a way to impose the will of the United States on an adversary quickly, in order to halt aggression, stop the killing, or prevent the use of weapons of mass destruction (WMD).

The EBO construct we associate with most is the systematic and explicit attempt (in planning and executing a campaign with competing objectives) to assess for and adapt to the effects from kinetic and other actions. This includes military and non-military effects, desired and undesired effects, and expected and unanticipated effects. (See Appendix D for summaries of a number of papers that reflect the evolution in thinking about EBO over the past decade.)

The task force's recommendations focus on how the Department of Defense (DoD) can (1) implement DUF or EBO more consistently, and (2) achieve the needed institutional and organizational changes, particularly in career structures.

II. CRITICISMS OF DUF (AND EBO)

The task force encountered several strongly held criticisms of DUF that challenged the study's rationale. These include the following:

- "DUF is not new—we are already doing this." As this report shows, however, a number of factors prevent DoD from executing DUF to the extent possible and the degree necessary.
- "We shouldn't plan for or encourage DUF—restraint in the use of force will be seen as weakness." To this we reply that DUF is not about restraint; it is about the clarity of objectives and attention to achieving multiple and often competing objectives.
- "DUF is too difficult to actually use."
 - Some point out that quick and bloodless campaigns are not possible. We agree, but we have no such expectations. DUF is not about assuming away friction and the fog of war.
 - Others point out that most sought-after effects reside only in the enemy's mind and will never be fully known. We see this as a challenge worth pursuing. Our nation must improve its ability both to assess the enemy's capabilities and intentions and to adapt to them. We cannot simply dub as important what's most easily assessed.

- “DUF is too big for DoD—it does not own all the assets needed to conduct discriminate campaigns and other government agencies need to play important roles.” The ultimate solution may be to reengineer the nation’s national security processes, but in the meantime we offer some recommendations for how DoD can itself do better.

III. ENABLERS

The capability for discriminate use of force does not flow automatically from the desire to do it. The task force identified five “enablers” that are critical to discriminate force use in a wide range of circumstances.

1. *Understanding the adversary as a complex adaptive system.* The need here is not to rapidly develop the ability to predict an adversary’s actions and reactions during a contingency, as desirable as that would be. Rather, the real need is for a comprehensive, long-term, and coherent effort to understand adversaries in a systemic way, to enable the nation in a contingency to exploit decision superiority to pursue an effects-based campaign. This puts great demand on intelligence and the fusion of contradictory, fragmented, and dispersed information—in peacetime and in a contingency.

Doing this requires creating models of the adversary that account for not only the physical dimensions (e.g., those associated with military forces and infrastructure) but the “softer” dimensions as well (e.g., those associated with human networks). Substantial capabilities and experience exist in synthesizing and using models of the physical dimensions (transportation, power, telecommunication, and so on). The Joint Warfare Analysis Center (JWAC), for example, is a leader in this area. However, capabilities and experience with the softer networks are much less mature and far more difficult. Both will need to be tied intimately to operational planning and execution

2. *Military capabilities conducive to DUF.* While recognizing that all instruments of national power—DIME—should be used in a campaign, the task force focused on the military instruments that could contribute most to DUF. New military capabilities of particular interest—exploited extensively in Operation Enduring Freedom (OEF) and Operation Iraqi Freedom (OIF)—are precision standoff weapons and “non-lethal” weapons, coupled to delivery platforms able to penetrate defenses to weapon delivery ranges.

A key enabler for these weapons is comprehensive and persistent intelligence, surveillance, and reconnaissance (ISR), to support

- Targeting (in its broadest sense), and
- Assessment of the actual effects, physical and other (military and political)—or battle damage assessment (BDA) writ large.

Special forces are trained and increasingly used as both precision weapons and as ISR, in situations (e.g., urban areas) where remote weapons and traditional ISR are

less effective. Finally, offensive information operations (including psychological operations) offer the potential for providing desired effects with little or no physical damage.

3. *Robust collaboration in a contingency among key participants.* Planning, executing, and assessing should involve the coordinated use of all elements of national power. As noted above, the United States does not have standing mechanisms for doing this. So for now the burden often falls on the joint force commander (JFC)—often the regional combatant commander—to bring it all together.

The JFC's collaboration should extend to the leaders of the key U.S. agencies (e.g., State, the Intelligence Community, the Department of Homeland Security (DHS), Commerce), coalition partners, military subordinates, and experts on the adversary as a complex adaptive system. The objective of these collaborations is to move beyond instantaneous sharing of information, through discourses to the higher cognitive level of shared understanding, and over time to a shared knowledge:

- To develop and pursue an adaptive campaign against an adaptive adversary, given the needs of allies and the concerns of other key countries and international organizations (including non-governmental organizations, or NGOs).
- To deal with the friction, uncertainties, and ambiguities inherent in any military campaign (recognizing that plans are less important than the process of planning).

4. *Peacetime preparation—intellectual and cultural—for the collaborative planning and execution of an adaptive campaign.* Peacetime preparation is essential for wartime collaboration. Part of the preparation is organizational, some outside the control of DoD. But a larger part is creating a culture—within DoD and the interagency process of which DoD is a part—which values the following:

- Achieving synchronization and unity of effort of all the elements of national power (DIME);
- Considering the full range of possible effects (military and other, desired and other, expected and other, primary and other) from the use of national powers; and
- Working together collaboratively, over time, to develop the basis for shared knowledge of the implications of these effects.

Part of the preparation involves developing a greater capability to surge the peacetime 9-to-5 activity into a wartime 24/7 activity.

5. *Anticipatory instead of reactive strategic orientation to adversaries.* The preparation of information and modeling for discriminate use of force has to begin long before the contingency begins. It is a difficult job to continuously collect and analyze information related to a wide range of potential adversaries. An anticipatory orientation also puts a burden on the potentially affected regional combatant

commanders to use the results of the intelligence community's efforts (1) to plan the military campaign and (2) to actively involve the interagency in developing a synchronized DIME plan.

IV. FINDINGS

The good news is that across all five enablers there is either a substantial effort already underway (e.g., precision weapons, collaborative environments) or widespread agreement of the need to improve (e.g., to transform low-density, stovepiped ISR assets into a more pervasive integrated network of sensors). There are also outstanding relevant recommendations from other DSB task forces and study groups (e.g., recommendations regarding intelligence fusion, non-lethal effects, and understanding adversaries as complex adaptive systems).

However, important issues have yet to get the attention they deserve. These include:

- **Observing, assessing, and adapting to actual effects.** Adaptive planning fosters adaptation in execution.
- **Conducting “battle damage assessment” writ large.** Assessing physical damage has been a long-standing problem. Assessing all effects—military, political economic, other—from the use of military force is harder. Assessing campaign-level effects from combinations of instruments of national power (again taking account of “all” effects) is harder yet.
- **Examining in peacetime a broader range of countries and contingencies to prepare for “surprises.”** (A few hot issues tend to get almost all the attention).
- **Integrating “all” available information to provide a more robust foundation for planning and conducting effects-based campaigns.**

We offer two recommendations that would help address all these needs.

The first is to create a capability to conduct campaign planning at the strategic/operational level that would approach the standards of detail, coherence, and comprehensiveness of current U.S. military operational/tactical-level campaign planning.

The second is to make a long-term commitment to develop military leaders for effects-based operations, a commitment that will require changes to DoD personnel practices and professional military education. The planning and conduct of effects-based campaigns place great demands on military commanders: to balance multiple and competing objectives, to invent effects that tie tactical actions to strategic objectives, and to develop metrics for assessing effects.

V. RECOMMENDATIONS

1. Establish a Strategic Campaign Support Center. The United States needs a strategic focus on the broad array of potential threats, similar to the focus that led to success during the Cold War. The task force recommends establishing a Strategic Campaign Support Center. The center's primary mission would be to develop "strategic campaign plans" for future contingencies. As part of its responsibilities, the Center would account for potential strategic and operational contexts (including U.S. objectives), invent concepts of operations involving all the instruments of U.S. power, and game alternative courses of action. The Center would focus beyond current hot spots—these are already getting the necessary attention; rather, it would direct its attention toward several dozen or so possible future threats, chosen on the basis of likelihood and consequence.

The Center would attempt to do at the strategic level what joint force commanders and their staffs do at the operational level (and what their subordinates do at the tactical level). Its texture should be perceived as too diplomatic for DoD, too military for State, too oriented to open-source information for the intelligence community, and too transnational for anyone. The Center would work closely with the intelligence community and other sources of information and focus on JWAC-like efforts that develop systemic "models" of possible adversaries.

Products of the Center would be offered for consideration to the Deputies Group and other national leaders. In response to a potential crisis, the Deputies Group could quickly expand preferred options into a draft interagency tasking order coordinating all elements of national power. The appropriate combatant commander would use the tasking to develop military plans that support an integrated national response. Other agency heads would use the tasking order similarly to guide their efforts.

The Center would complement, not replace, responsibilities and authorities of regional combatant commanders. It would be useful to combatant commanders in peacetime by providing a strategic campaign context for the command's operational level plans. The Center's scope would be broader than a combatant commander's in that it would provide strategic planning options and formulations for the departments of State, Commerce, Treasury, Transportation, Homeland Security, and others. Consequently, the center's products would help coordinate America's diplomatic, informational, intelligence, and economic actions prior to the need for military force.

Where should the Center be located, organizationally and geographically? We do not have a definitive answer—perhaps it should be part of a new Federally Funded Research and Development Center (FFRDC) in the Washington, DC, area. But we do suggest that in the first steps the focus be on working with the combatant commands that have new global responsibilities: Special Operations Command (SOCOM) and Strategic Command (STRATCOM). These commands need to prepare for operations in any part of the globe to integrate military operations within a broad strategic campaign plan. While full implementation could take years, we

believe that a center working with SOCOM and STRATCOM would have substantial early payoffs.

2. Make a long-term commitment to develop leaders for the discriminate use of force and effects-based operations, and identify and implement the needed changes to DoD personnel practices and professional military education. The nature of DUF calls for military leaders who are able to plan and execute military operations within a larger strategic context. The task force concluded that it will be difficult for these concepts to be integrated into military practice unless changes are made in the education and preparation of military and civilian professionals.

We appreciate that considerations of DUF are not the sole drivers of change to DoD personnel practices and thus need to be examined in a context broader than this study. We also are aware of ongoing activities aimed at effecting substantial change to personnel practices. We suggest that the needs of DUF should be major considerations in these activities. As a first step, we recommend mining the experiences and lessons of recent campaigns, particularly Operation Enduring Freedom and Operation Iraqi Freedom, which provided real-world laboratories for DUF.

During the Cold War the United States could deter its major adversary even though it could not defeat it. By contrast, the post-Cold War world has seen several cases in which the United States and its allies had both the ability and the willingness to defeat the other side, but were unable to successfully practice deterrence and compellence. Recent instances are the campaigns against the regimes in Serbia, Afghanistan, and Iraq. Given American capabilities and previous behavior, the adversary “should” have known that if it did not give in, the United States would successfully use force to gain its objectives. Why the adversary did not is open to conjecture. The crucial question is how the United States can extend deterrence and compellence further in future contingencies. It is likely that the answer lies with more knowledge, not more weapons.

A study group should be established to examine the DUF experience and lessons from OEF and OIF—accomplishments, shortfalls, adaptation—in order to identify changes to DoD personnel practices (and other initiatives) that would make DUF a more powerful tool in future operations. Participants in these operations should have a strong presence on the study group.

Changes to five areas of professional development may be needed to enhance substantially our ability to implement DUF: promotions, retirement, Foreign Area Officer programs, Foreign Officer Exchange programs, and professional education. (There may be other leverage areas as well that could be included in this study.)

Service personnel systems are still unduly influenced by World War II-era mobilization assumptions and governed by legislation from the 1940s and 1950s. With the demands of “up or out” and the requirements of a military career, there is precious little time to provide the education that would lead to a more intellectually agile officer corps able to deal with the complexities of the emerging strategic environment.

This “up or out” process forces Service members to seek a relatively limited set of assignments to be competitive for promotion or resign themselves to an early exit from active military service. Consequently most officers “fill the squares” they perceive as competitive for promotion, while many talented people leave their Service prematurely, people who, for whatever reason, fail to “fill the squares” and hence see themselves as doomed to failure in the military.

Many assignments that would prepare officers for DUF are not found on the “squares” deemed essential for advancement in today’s military. As the variety of challenges facing America’s military has grown, so has the need for people with expertise in foreign cultures, history, sociology, economics, psychology, and a broad range of other disciplines. Such expertise can be attained in several ways, e.g., by service as an instructor at one of the nation’s Service academies, in graduate education, by participation in one of the Services’ Foreign Area Officer programs, or in the Foreign Officer Exchange program. Unfortunately, these assignments are not valued by Service promotion boards, at least as compared to operational command or duty on a senior Service or joint staff. They simply do not “fill the square.”

The practice of packing many “squares” into a relatively short career has adversely affected the career development process. Most noticeable is the compression of tour lengths to where it is common for mid-grade officers to serve in assignments for less than 2 years. At the other end of the spectrum, the lack of retirement vesting until 20 years of service undoubtedly encourages some to serve longer than either they or their Service would desire. Allowing longer careers and lengthened tours of duty in key assignments would promote stability of leadership as well as accountability for performance.

A number of studies, ranging from the Hart-Rudman Commission to the National Defense Panel, have called for major changes in how the services develop the intellectual framework of their officers. Many officers hold advanced academic degrees, but few hold degrees that are relevant either to the duties they will assume or to the unique requirements of the military services and DUF. Professional military education (PME) is an important “square” for senior rank, but curricula reinforces existing Service or joint doctrines rather than promote a deep intellectual inquiry into the art and science of modern warfare.

Understanding the implications of effects-based operations, a world of complex-adaptive systems, the increasing use of unconventional forms of force, and the tension of competing strategic objectives will demand a broader and more rigorous system of education. Caution must be exercised to avoid the temptation to centralize the PME institutions and thereby limit the breadth and diversity of approaches which can make them so valuable.

The United States needs military and civilian professionals who understand the historic and strategic contexts of areas throughout the world, the cultures and religious influences that guide popular thinking, and the nature of human conflict, past and present. This will require more breadth and diversity than the current PME institutions provide: namely, graduate schools, language schools, and foreign military exchange programs at staff and war colleges.

A. TERMS OF REFERENCE



ACQUISITION,
TECHNOLOGY
AND LOGISTICS

OFFICE OF THE UNDER SECRETARY OF DEFENSE

3000 DEFENSE PENTAGON
WASHINGTON, DC 20301-3000

19 MAR 2002

MEMORANDUM FOR CHAIRMAN, DEFENSE SCIENCE BOARD

SUBJECT: Terms of Reference - Defense Science Board Task Force on Discriminant Use of Force

You are requested to form a Defense Science Board (DSB) Task Force on Discriminant Use of Force. The Task Force will conduct a comprehensive study of the ends and means of precision compellence, of the nuanced use of force, in concert with coalition partners, to achieve political, economic and moral change in countries affecting US interests.

Achievement of US political objectives has not always followed either American dominance on the battlefield or continuing peacekeeping activities thereafter employing US forces.

The US should then seek alternatives, other than, or in addition to bringing the full, massive destructive power of our military to bear against a belligerent state, in order to effect change in the intentions and capabilities of authoritarian regimes. The means we do elect will be under the critical scrutiny, and moral sensitivity of our own citizenry as well as our military-political coalitions, and of other major world actors, with particular focus on the minimization of collateral damage to non-culpable subjects.

The study will then systematically survey the focused use of force so as to alter regimes' behavior, and in ways that are most promising to isolate regimes of concern from their populations and supporting organs and bureaucracies. This will include the means to acquire a well-founded conceptual delineation of targets critically important to the diplomatic, economic and military dominance of the regime. A regime's values and vulnerabilities are of course highly idiosyncratic, and the panel should select some concrete case studies for exploration in depth. These might include current rogue states, terrorist organizations, and future potential adversaries. Of particular relevance are the cleavage planes, where the discriminating use of force might divide the interests of different strata, political, ethnic or religious groups, or even personal rivalries.

Beyond your substantive recommendations will be those of process: how to assess and enhance the department's means of planning for and implementing this style of



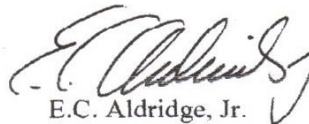
warfare, aimed at achieving political ends short of total surrender. You will be expected to review:

- a. Country specifics;
- b. Historical doctrine, training, and planning for conceptual targeting;
- c. Intelligence capabilities and requirements, especially for exotic cultures;
- d. Legal constraints and Rules of Engagement (ROE)-policies relevant to "Discriminant Use of Force."

Your Task Force should draw on the findings and recommendations of the DSB Task Force on Managed Information Dissemination and the 2001 Summer Study on Precision Targeting, which span the conflict spectrum and provide useful anchor points to your Task Force.

The Task Force should produce a final report by September 2002. The Study will be co-sponsored by me as the USD (AT&L), USD (Policy), and S&TS. Dr. Joshua Lederberg and Dr. Ted Gold will serve as co-chairmen of the Task Force. Commander Kathleen McGrath (Institute for Defense Analyses) and Major Mark Arbogast (S&TS) will serve as Executive Secretaries. Lieutenant Colonel Roger W. Basl will serve as the Defense Science Board Secretariat representative.

The Task Force will operate in accordance with the provisions of P.L. 92-463, the "Federal Advisory Committee Act," and DoD Directive 5105.4, the "DoD Federal Advisory Committee Management Program." It is not anticipated that this Task Force will need to go into any "particular matters" within the meaning of section 208 of Title 18, U.S. Code, nor will it cause any member to be placed in the position of acting as a procurement official.



E.C. Aldridge, Jr.

B. TASK FORCE MEMBERSHIP

CHAIRS

Dr. Theodore Gold *Institute for Defense Analyses*
Dr. Joshua Lederberg *Rockefeller University*

MEMBERS

Dr. Ruth David *ANSER, Inc.*
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National Security Policy*
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Dr. George Whitesides *Harvard University*

GOVERNMENT ADVISORS

VADM Art Cebrowski, USN (Ret) *Director of the Office of
Force Transformation*
Mr. Daniel Franken *USJFCOM*
Dr. Paul Kozemchak *DARPA*

EXECUTIVE SECRETARIES

LtCol Mark Arbogast *OUSD(AT&L)/S&TS/MW*
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CDR Michael Pease *Joint Advanced Warfighting Program*

DSB SECRETARIAT

LtCol Roger Basl

Defense Science Board

SUPPORT

Mr. Matthew Amitrano

SAIC

Mr. Jay Dutcher

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C. BRIEFINGS RECEIVED

Name and/or Organization	Topic	Date
BG J. Scott Gration	Information operations concepts	Jun. 2001
C.J. "Heater" Heatley	Effects-based targeting, strategic influence, and using all instruments of national power to achieve U.S. political objectives	Jun. 2001
Dr. Wick Murray, IDA	Learning from the past	Jun. 2001
Vince Vitto, Draper Labs	Managed information dissemination	Jun. 2001
Maj. Gen. David A. Deptula, HQ/USAF	EBO	Jun. 2001
Maj. Gen. David A. Deptula	EBO	Jan. 2002
Robert Maggi, U.S. Dept. of State	The State Department's political and military perspective	Jan. 2002
Steve Hosmer, RAND	Influencing foreign leaders and the effects of air operations	Jan. 2002
Rich Engel, CIA	Character of future warfare and new technologies to leverage opponents	Jan. 2002
Edward Luttwak	National strategy	Jan. 2002
Michael Dziubinski, JFCOM	The theory of conflict and the need for balance between delivery and assessment	Feb. 2002
BG Wayne M. Hall, USA (Ret.)	Knowledge action center	Feb. 2002
Gen. Larry Welch, USAF (Ret.), IDA	Afghanistan, the latest case study in compellence	Feb. 2002

Name and/or Organization	Topic	Date
Dr. Thad Brown, Dr. Ronnie Mainieri, and Earl Rubright; the Institute for Physical Sciences	Unfolding network dynamics	Feb. 2002
Chris Hunsaker and Marty Westphal, JWAC	JWAC command overview and strategic assessment methodology (classified briefing)	Feb. 2002
Dr. Richard P. Wishner, DARPA	IXO programs in precision strike	Mar. 2002
ADM John M. Poindexter, USN (Ret.), DARPA	Aids to human reasoning	Mar. 2002
MGEN John R. Landry, National Officer for Conventional Military Issues	Precision compellence: foreign views and intelligence implications	Mar. 2002
GEN Keith B. Alexander, Commanding General, U.S. Army Intelligence and Security Command	INSCOM vision	Mar. 2002
Dr. Stephen M. Younger, DTRA	Threat anticipation	Mar. 2002
Dr. John Hamre, CSIS	Discussion	May 2002
Brian Shaw, Deputy National Intelligence Officer for Science and Technology	DUF in cyberspace	May 2002
COL Mark Volk, Chief, Strategic Leadership Division and LTC Grady Reese, Chief, Personnel Command, FAO Branch	Army Foreign Area Officer, PEP, strategy officer, and other programs	May 2002
VADM Patricia Tracey, Director, Navy Staff	Manpower and personnel—Service wide	May 2002
Dr. Wick Murray, IDA	Professional military education and effects-based operations	May 2002
LTC Antulio Echevarria, Principle Researcher, SSI	A critique of effects-based operations	May 2002

Name and/or Organization	Topic	Date
COL Kevin Cunningham, Dean, U.S. Army War College	U.S. Army War College curriculum overview	May 2002
Col. Anthony Aldwell, Chief, International Airmen Division and Lt. Col. Thomas Nolta, Chief, Foreign Area Officer Branch	Air Force Foreign Area Officer, PEP, and other programs	May 2002
ADM Joseph Prueher, USN (Ret.)	CINC perspective	Jul. 2002
ADM James Ellis, USN (Ret.)	CINC perspective	Jul. 2002
INSCOM briefings	Various	Sep. 2002



D. EFFECTS-BASED OPERATIONS: A SYNOPSIS OF PAPERS AND POSITIONS

As an explicit concept, effects-based operations (EBO) is relatively new. It has been promoted and argued about for more than a decade. But we now realize that there are a number of military campaigns that can be considered effects-based operations. Proponents of EBO understand this and have focused their efforts on making what has been historically rare and exceptional to being more prevalent, even routine in modern-day operations.

Within the past few years, EBO appears to have evolved from an air power-centric notion to having much broader relevance to modern military operations. This appendix will review the viewpoints and themes of several of the papers that contributed to its evolution and relevance. We examine the following sources here:

1. *Gulf War Air Power Survey, Volume II: Operations and Effects and Effectiveness*. Washington, DC, 1993.
2. “Effects-Based Targeting: Another Empty Promise?” Maj. T. W. Beagle, School of Advanced Airpower Studies, Air University, Maxwell Air Force Base, Alabama, June 2000.
3. “A Concept Framework for Joint Experimentation: Effects-Based Operations.” Version .5 (Draft) Joint Forces Command, J-9, 2001.
4. *Effects-Based Operations: A Grand Challenge for the Analytical Community*. Paul K. Davis, RAND, 2001.
5. “New Perspectives on Effects-Based Operations: Annotated Briefing.” Dennis Gleeson, Gwen Linde, Kathleen McGrath, Adrienne Murphy, Williamson Murray, Thomas O’Leary, and Joel B. Resnick. Joint Advanced Warfighting Program, Institute for Defense Analyses, June 2001.
6. “An Historical Perspective on Effects-Based Operations.” Dr. Williamson Murray, Thomas O’Leary, Dennis Gleeson, and Col. Gwen Linde (USAF). Joint Advanced Warfighting Program, Institute for Defense Analyses, October 2001.
7. “Effects-Based Operations: A New Operational Model?” Lt. Col. Allen W. Batschelet, USA, U. S. Army War College, Carlisle Barracks, PA, April 2002.
8. “Effects-Based Operations: Theory, Application and the Role of Airpower.” Lt. Col. Brett T. Williams (USAF), U. S. Army War College, Carlisle Barracks, PA, April 2002.
9. “ACC White Paper: Effects-Based Operations.” ACC/XP, Air Combat Command, Langley Air Force Base, May 2002.
10. “Thinking Effects: Effects-Based Methodology for Joint Operations” Col. Edward C. Mann (USAF, Ret.), Lt. Col. Gary Endersby (USAF, Ret.), and Thomas R. Searle, College of Aerospace Doctrine, Research and Education, Air University, Maxwell Air Force Base, October 2002.

11. “Effects-Based Operations: Building the Analytic Tools,” *Defense Horizons*, No. 19, Center for Technology and National Security Policy, National Defense University, Desmond Saunders-Newton and Aaron B. Frank. October 2002.
12. *Effects-Based Operations: Applying Network Centric Warfare in Peace, Crisis, and War*. Edward A. Smith, Command and Control Research Program, November 2002.
13. “Effects-Based Operations (Draft) Joint Forces Command,” J-9, February 2003.

1. *Gulf War Air Power Survey: Volume II, Operations and Effects and Effectiveness (1993)*. This survey is one of the earliest contemporary works on EBO thinking. It focuses on “what Coalition air power accomplished at the operational level and above relative to the military and political objectives for which the war was waged (p. 1, Part II).” While the phrase “effects-based operations” had not yet been coined, the questions the survey asks also appear (in some form) in later writings on EBO.

- “What were the effects of Coalition air power on the will and capability to fight of the Iraqi field army in the KTO [Kuwaiti Theater of Operations], as well as on other forces deployed there, prior to the beginning of the ground campaign on 24 February 1991? How were these effects achieved, and how did they accumulate over time?”
- “Does the combination of technological capabilities embodied in advanced strike platforms such as the F-117, together with the operational concepts used to structure the air campaign, reflect a revolutionary advance in warfare? In Desert Storm the ability to deliver ordnance with great precision at night from medium altitudes, combined with operational concepts such as great emphasis on targeting for functional effects rather than physical damage, produced remarkable results against entire target categories, often in very short periods of time. Should such success be attributed to the continuation of earlier trends and the unique circumstances of this particular war, or to fundamental changes in the nature or efficacy of air power?”
- “What limits to strategic air attack with modern, survivable delivery systems, if any, are suggested by Desert Storm? Various forces and factors—among them, enemy reactions and countermeasures, foreign and domestic political constraints, and the recurring frictions of war—limited the effectiveness of Coalition air efforts in ways that suggest parallels to earlier strategic bombing campaigns, including the Anglo-American bomber offensive against Nazi Germany during World War II. To what extent did comparable problems recur in Desert Storm?”

- “Finally, what can be concluded about air power as a political instrument from the Gulf War? Desert Storm air commanders and planners hoped that air power might be able to force some fundamental change of the regime in Baghdad; they also hoped that air power might be able to achieve the political aim of forcing the Iraqis out of Kuwait without requiring a ground campaign. Were such goals feasible even in circumstances as unconstrained and conducive to the effective application of air power as existed in this particular conflict?” (GWAPS, p. 11-12, Part II)

The *Survey* appears to be concerned with effects on enemy capability and decision-making, timing of effects, an adaptive enemy, and dimensions of the war broader than military objectives, and how those all related to the application of air power in that war. The articulation of these themes in the survey, along with works by Gen. David Deptula (USAF), is one reason that some in other services have labeled EBO as an “Air Force-centric” concept. This categorization has been used to dismiss the concept as simply a buzzword created by the Air Force to garner more budgetary dollars. But with continued evolution and refinement of EBO theory, that initial rejection seems to have faded away.

2. “Effects-Based Targeting: Another Empty Promise?” (June 2000). Major T. W. Beagle of the School of Advanced Airpower Studies wrote a thesis on *effects-based targeting*, following a path similar to that of the Gulf War Air Power Survey. His focus is on the relationship between effects-based targeting and air power, specifically, on the planning and assessment portions of effects-based operations.

Beagle defines effects-based targeting as a means of directing “airpower against targets in ways that produce specific, predetermined, military and political effects” (p. vi), and as “identifying and engaging an adversary’s key capabilities in the most efficient manner to produce a specific effect consistent with the commander’s objectives” (p. 5).

Beagle is most interested in examining “how effectively...the US Air Force [has] incorporated the concept of effects-based operations into its procedures for targeting and combat assessment” (p. vi).

Beagle’s paper incorporates

“...the historical development of effects-based targeting theory and then conducts a focused comparison of four major air operations—Pointblank, Linebacker II, Desert Storm and Allied Force—in order to survey US airpower’s actual combat experience with regard to effects-based operations. This study determines that senior decision makers have always been interested in creating specific effects rather than simply destroying targets; however, as a whole, the USAF has been inconsistent in employing effects-based operations across the spectrum of conflict. American airpower has accomplished its most significant improvements at the tactical level of war, but is less reliable in

creating operational and strategic effects. In a similar vein, airpower has become very effective at producing direct, physical effects, and it is becoming increasingly capable of creating certain widespread systemic effects” (Beagle, p. vi).

In sum, Beagle argues for getting away from traditional destruction-based operations as the ultimate end and focusing on generating effects, rather than destruction, to achieve political, military, and strategic goals.

3. “A Concept Framework for Joint Experimentation: Effects-Based Operations” (2001). This paper was designed to link rapid decisive operations (RDO) with EBO to illustrate their relationship, and to demonstrate that RDO is “predicated upon effects-based operations” (JFCOM 2001, p. E-ii). EBO is examined as a subset of another concept—RDO—and is also defined as a “basic cornerstone for concept experimentation” (JFCOM 2001, p. E-ii).

Understanding the adversary is the major focus area for this paper. The means of understanding the adversary can be found through the following:

1. U. S. interagency cooperation, as well as cooperation among other agencies;
2. The ability to “predict” the intentions of the adversary; and
3. The ability to shape the environment through political-military interface through internal U.S.-organization cooperation.

The assessment portion of EBO is also given emphasis in this paper:

“Effects-based operations demand an assessment process that can quickly take into account a comprehensive understanding of the adversary, the results of the collaborative planning process which established the current course of action, the tactical actions taken to date (both Blue and Red), and the effects which were created by these actions to measure the level of success achieved in order to facilitate decisions by commanders on whether or not to adjust the current course of action” (p. E-iii).

Therefore, understanding the adversary is really the overarching concept that will drive the conduct and execution of effects-based operations.

4. *Effects-Based Operations: A Grand Challenge for the Analytical Community* (2001). As the title makes clear, this book by Paul Davis on effects-based operations focuses on the challenge it poses to the analytical community. His work seeks out new methods of analysis and modeling to represent EBO. Davis’s motivation in producing his work appears to be “the belief that analysis methods need to be improved so that they can be useful in studies and operations undertaken from an effects-based perspective.” (Davis, p. xviii)

Davis defines EBO as “operations conceived and planned in a systems framework that considers the full range of direct, indirect and cascading effects, which may—with different degrees of probability—be achieved by the application of military, diplomatic, psychological and economic instruments” (Davis, p. 7).

Davis discusses EBO in terms of the type of modeling requirements the concept will generate.

“Because much of EBO is tied to affecting decisions and behaviors of people and organizations or the operation of complex systems and organizations, much of the related modeling should be organized around adaptive systems for command and control and other matters, rather than around the mass and physical characteristics of forces. This implies emphasis on the concepts and technology of *agent-based modeling* (albeit in many variations), as well as on system engineering” (Davis, p. 80).

5. “New Perspectives on Effects-Based Operations: Annotated Briefing” (June 2001). The Joint Advanced Warfighting Program (JAWP) at the Institute for Defense Analyses in Alexandria, Virginia, studied EBO from the perspective of the *future joint force commander*. It examined historical examples, developed a description and definition of EBO, and explored the idea of discourses as essential to its execution. The annotated briefing focuses on

“...effects-based operations and the military instrument of national power (in the form of a joint force). More than just linking planned actions to strategic outcomes, there must be an operational assessment and feedback mechanism. Adversaries must be viewed as complex, adaptive systems of systems in dimensions beyond just the physical. Staffs must provide their commanders with courses of action that are not only executable, but also where the intended effects are observable. The emerging notion of information superiority is powerful, but decision superiority is of crucial importance.” (abstract, JAWP internal website).

This JAWP paper discusses the relationship of EBO to the emerging capabilities associated with DoD’s force transformation.

“US forces will not gain the significant benefits of these new capabilities unless the precision of the systems are matched with precision of thinking: analyzing, planning, executing and assessing the effects of the systems. These new capabilities offer the opportunity to achieve an efficiency of effects that past commanders could never realize” (JAWP Annotated Briefing, p. 5).

6. “An Historical Perspective on Effects-Based Operations” (October 2001). This paper compares campaigns from the Civil War and World War II. The authors

argue that effects-based operations are not new and stress the adaptive nature of effects-based operations, to include adaptation of the adversary and ourselves. Here, effects-based operations are defined as “a systematic approach to the operational cycle of analysis, planning, execution and assessment that results in the focused application of military and other capabilities to realize specific, desired effects at all the levels of war and in the face of friction, ambiguity, uncertainty and adaptive adversaries” (abstract, JAWP internal website). The authors write:

“Military leaders must understand the enemy well enough to gain real insights into his structure and processes, characterize what is important to him and why, and conduct operations in which they aim their actions at producing effects that will contribute to or realize outcomes. A successful commander is willing to alter his prewar preconceptions and assumptions when confronting tactical and operational realities. *This is the essence of effects-based operations: assessing and adapting operations to suit actual conditions before those conditions dramatically change*” (JAWP Historical Perspective, p. ES-1).

Surprisingly enough, these historical examples also reveal the length and difficulty of the learning curve for adaptation. In both the Civil War and World War II examples, the learning took years, with a great cost in lives. Today military officers, analysts, and decision makers study and seek to gain real-time experience in effects-based operations in order to shorten the learning curve and adaptation process down to days or even hours.

7. “Effects-Based Operations: A New Operational Model?” (April 2002). This paper draws heavily from the 2001 JFCOM White Paper on EBO. The language and focus are similar, but Batschelet seeks to define EBO while examining the utility of the concept for future operations. He takes a Service-specific approach, determining the implications for the U. S. Army should EBO be institutionalized. However, despite a Service-centric focus, Batschelet takes on the interesting question of whether EBO can serve as a common conceptual denominator for the U. S. forces.

“Implementing effects-based operations in the Army should prove relatively easy. However, leading the transition to effects-based operations in the joint community is likely to be problematic and will require a culture change within all the services. Perhaps the most explicit challenge will be to overcome service parochialism and the rejection of the concept due to the ‘not invented here’ prejudice. Changing the culture will take many years as leaders and staffs become familiar with the concept and effects-based thinking becomes inculcated in service and joint educational programs and institutions” (Batschelet, p. 14).

Batschelet discusses the necessity of change in education. His paper serves as a reminder that at some point, grappling with that issue must occur as the next part of the EBO evolutionary process.

8. “Effects-Based Operations: Theory, Application, and the Role of Airpower” (April 2002). This paper is a thesis from the U. S. Army War College, written by Lt. Col. Brett Williams (USAF). It seeks to dispel the idea that effects-based operations rely on the unattainable concept of “perfect information,” ignoring the fog and friction inherent in war, and thus are not useful. Specifically, Williams argues that

“...effects-based operations does not depend on information dominance, high-end warfare, or even precision strike to make it useful and as a theory, it is applicable across the spectrum of conflict. The paper defines effects-based operations theory and explains how it helps develop and assess strategy within the constraints of information analysis and acceptable risk. It describes how to use effects-based operations at the operational level with emphasis on interagency coordination, effects-based mission planning, and continuous assessment. Finally, the paper addresses how the Air Force should use effects-based operations to define airpower’s role in joint warfighting, employ airpower in a gradual context, and develop better joint air operations plans” (Williams, p.iii).

The role of airpower with respect to EBO appears to be a common theme, due in part to USAF Major General David Deptula, who has been prolific on the subject and on the larger concept of EBO. As EBO means so many different things to different people, it only makes sense to bound the research using a particular theme. However, there is still a need to answer broader questions. Airpower is not the only element that can benefit from using EBO. Those studies that look to improve joint operations of all sorts are necessary as well as the more narrowly focused papers.

9. “ACC White Paper: Effects-Based Operations” (May 2002). The Air Combat Command (ACC) White Paper emphasizes an EBO methodology in order to plan, execute, and assess operations “designed to attain specific effects required to achieve desired national security outcomes...this methodology improves our ability to use all elements of national power to achieve national policy goals” (ACC White Paper, p. iii). A methodology is needed (1) to fight against inconsistency when effects-based thinking is applied to military operations, and (2) to legitimize EBO so EBO becomes accepted into joint and Service doctrine. This paper argues that failure to codify EBO in doctrine can explain why EBO has not been prevalent throughout the history of warfare.

The paper discusses a proposed EBO methodology whose purpose is to examine causal linkages and, as a first step, to develop planning processes for EBO.

“The EBO methodology takes the objectives-based process a step further, allowing planners and commanders to examine conditions and causal linkages through which actions lead to objectives...”

“Causal linkages explain why planners think the proposed actions will create desired effects.”

“Not only does this type of analysis help to understand why a given action may work, it is also likely to reveal the fact that historically relevant actions may not work in a particular case. This is true, once again, because it is not the action itself that achieves the effect, but the relevance of the causal linkages activated by the action, in light of the current situation, that determines whether or not the effect is achieved” (ACC White Paper, p 5-6 and 8).

10. “Thinking Effects: Effects-Based Methodology for Joint Operations” (October 2002). This paper discusses the effects of transformation and how transformation will affect how the military thinks and operates. Effects-based operations are the means by which this new thinking and operating will be conducted.

This paper draws from the Air Combat Command White Paper of May 2002. Both papers state that “EBO is not focused on conquest or necessarily even warfare as traditionally defined” (Mann, Endersby, and Searle, p. 1). The authors create a methodology to address the concerns raised when creating effects and conditions, and to better assess the results of military actions. The main problem the authors identify is that of out-thinking and out-adapting competing organizations, and they believe that the EBO methodology is a means of solving it. They also seek to create a common language so that various, disparate concept thinkers can better understand EBO.

The paper argues that the new security environment created by the end of the Cold War era is the impetus behind the development of this thinking on EBO.

“Our nation’s armed forces need to move to a new paradigm; one based not on conquest, which is almost never the goal today, but on achieving success across the entire spectrum of engagement whether political, military, humanitarian or some combination thereof...This study proposed correctives to incorporate EBO in USAF and joint doctrine through an effects-based lexicon, theory and process” (Mann, Endersby, and Searle, p. 4-5).

This paper has a strong Air Force focus. It discusses the steps the Air Force has taken to implement changes in education to facilitate a learning environment conducive to EBO.

The strongest challenges to successful implementation of the EBO methodology are identified as *anticipatory assessment* (the ability to anticipate outcomes) and *high-order analysis* (rigorous and accurate analysis).

11. “Effects-Based Operations: Building the Analytic Tools,” (October 2002). In this paper, Desmond Saunders-Newton and Aaron Frank argue for the development of new analytic tools to operationalize the EBO concept. They note, for example, that

“...the lynchpin of EBO ultimately will be the development of conceptual tools that link military operations with strategic effects. In the context of EBO, assessments require considering the second-, third-, fourth-, and nth-order effects of actions and how these effects may propagate through time.”

According to Saunders-Newton and Frank, this requires a more complete understanding of “friendly and adversary systems,” which in turn requires the development of eight different information sets: technical, geographic, infrastructure, organizational, sociopolitical, psychological, context, and dynamics. Taken together, and embedded within a dynamic framework designed to model adversary behavior, these information sets will help analysts and decision makers better understand our nation’s adversaries as complex adaptive systems.

They further note the importance of interagency cooperation and suggest the development of interagency analytic centers. These centers would tap into a set of “skills and organizational resources” broader than those possessed by DoD alone. This, they believe, will challenge the DoD and require it to reorganize in such a way that it becomes capable of “coordinating its operations with all relevant governmental agencies to ensure that military operations are synchronized with other forms of national power.”

12. *Effects-Based Operations: Applying Network Centric Warfare in Peace, Crisis, and War* (November 2002). This book discusses EBO in the context of the *network-centric warfare* (NCW) concept; within the larger context of the changed security environment after 11 September 2001; and with regard to technological revolutions in sensors, information technology, and weapons.

“...effects-based operations are not new. Their roots can be traced back for centuries and are what good generals and statesmen have always attempted to do. When combined with network-centric thinking and technologies, however, such an operational approach offers a way of applying the power of the network to the human dimension of war and to military operations in peace and crisis, as well as combat. In essence, effects-based operations represent an opportunity to use networked forces to achieve non-linear impacts and to expand the scope of action across the entire spectrum of conflict” (Smith, p. xxiii).

Smith takes a concept that has already been written about extensively (network-centric warfare), and uses it to illustrate the complementary nature of NCW in partnership with EBO. The changed security environment provides the impetus for his book.

13. “Joint Forces Command Paper: Effects-Based Operations” (February 2003). JFCOM says that EBO

“...brings decision superiority to the conduct of national security. This decision-making capacity spans the entire range of human activity from cooperation to conflict. However, conflict and its antecedents remain the principal concern of national leaders because their consequences normally yield clear winners and losers. Moreover, those who can outthink their competition are most likely to prevail. Yet, this capacity to triumph is not based solely on the wisdom of the contenders, but the ability to translate decisions into actions to achieve the desired effects: faster and better than an opponent. In short, the nation that is able to use its instruments of power in a deliberate, coherent, precise and timely manner will dictate the policy effects—whether managing cooperation or conflict” (JFCOM, p. 1-2).

More than the other papers reviewed here, this paper emphasizes the need for interaction between all levels and elements of government. The DIME concept (diplomatic, informational, military, and economic) is a major point of discussion within the paper and illustrates the meaning behind the phrase “all elements of national power.” The political and military aspects are discussed in equal detail. The commander and his battlespace are given mention but not priority.

JFCOM also makes an argument for preemption as an acceptable course of action. The paper argues that “improved thinking and new capabilities must be developed and instituted to ensure that the nation can take actions that will achieve explicit policy aims while mitigating unanticipated or unintended consequences” (JFCOM 2003, p. 1).

E. ACRONYMS

ACC	Air Combat Command
BDA	Battle damage assessment
CSIS	Center for Strategic and International Studies
DIME	Diplomatic, informational, military, and economic
DHS	Department of Homeland Security
DoD	Department of Defense
DSB	Defense Science Board
DUF	Discriminate use of force
EBO	Effects-based operations
FAO	Foreign Area Officer
FFRDC	Federally Funded Research and Development Center
GWAPS	<i>Gulf War Air Power Survey</i>
IDA	Institute for Defense Analyses
INSCOM	(U.S. Army) Intelligence and Security Command
ISR	Intelligence, surveillance, and reconnaissance
JAWP	Joint Advanced Warfighting Program
JFC	Joint force commander
JFCOM	Joint Forces Command
JWAC	Joint Warfare Analysis Center
KTO	Kuwaiti Theater of Operations
NCW	Network-centric warfare
NDP	National Defense Panel
NGO	Non-governmental organization
OEF	Operation Enduring Freedom

OIF	Operation Iraqi Freedom
OSD	Office of the Secretary of Defense
PEP	Personnel Exchange Program
PME	Professional military education
RDO	Rapid decisive operations
ROE	Rules of engagement
SOCOM	Special Operations Command
STRATCOM	Strategic Command
WMD	Weapons of mass destruction