REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. REPORT DATE *(DD-MM-YYYY)*	2. REPORT TYPE	3. DATES COVERED *(From - To)*
03-05-2010	FINAL	

4. TITLE AND SUBTITLE
Effects-Based Operations: Useful or Useless

5a. CONTRACT NUMBER

5b. GRANT NUMBER

5c. PROGRAM ELEMENT NUMBER

6. AUTHOR(S)

LCDR Ryan M. Dick

5d. PROJECT NUMBER

5e. TASK NUMBER

5f. WORK UNIT NUMBER

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)

Joint Military Operations Department
Naval War College
686 Cushing Road
Newport, RI 02841-1207

8. PERFORMING ORGANIZATION REPORT NUMBER

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)

10. SPONSOR/MONITOR'S ACRONYM(S)

11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION / AVAILABILITY STATEMENT
Distribution Statement A: Approved for public release; Distribution is unlimited.

13. SUPPLEMENTARY NOTES A paper submitted to the Naval War College faculty in partial satisfaction of the requirements of the Joint Military Operations Department. The contents of this paper reflect my own personal views and are not necessarily endorsed by the NWC or the Department of the Navy.

14. ABSTRACT

Recent developments in the Joint arena have encouraged Joint Staffs to "shelve" the EBO planning concept. This may well prove to be a premature decision. Proper analysis could reveal the utility of Effects-Based Operations (EBO) planning at the operational level. The application of Effects-Based Operations in the Joint planning process requires the redefining and resolution of conceptual terms and improvements in current prediction models. This paper argues that despite some confusion to date, future work to redefine and resolve EBO conceptual terms and the promised technological improvements to decision support models will prove that effects-based thinking could provide operational planners and commanders with a valuable consequence identification tool. It further argues that System of Systems Analysis (SoSA) is beneficial in helping to identify the linkages between centers of gravity and critical vulnerabilities, and the consequences of actions taken against those linkages. Finally, this paper draws conclusions on the validity of EBO and makes recommendations on the direction the American military should proceed with regard to EBO as an operational planning tool.

15. SUBJECT TERMS
Effects, Effects-Based Operations

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE			19b. TELEPHONE NUMBER *(include area code)*
UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED		28	Chairman, JMO Department 401-841-3414

Standard Form 298 (Rev. 8-98)

NAVAL WAR COLLEGE

Newport, R.I.

Effects-Based Operations: Useful or Useless

by

Ryan M. Dick
LCDR, USN

A paper submitted to the Faculty of the Naval War College in partial satisfaction of the requirements of the Department of Joint Military Operations.

The contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College or the Department of the Navy.

Signature: _____

03 May 2010

Contents

Figure Title Page

Abstract

Recent developments in the Joint arena have encouraged Joint Staffs to "shelve" the EBO planning concept. This may well prove to be a premature decision. Proper analysis could reveal the utility of Effects-Based Operations (EBO) planning at the operational level. The application of Effects-Based Operations in the Joint planning process requires the redefining and resolution of conceptual terms and improvements in current prediction models. This paper argues that despite some confusion to date, future work to redefine and resolve EBO conceptual terms and the promised technological improvements to decision support models will prove that effects-based thinking could provide operational planners and commanders with a valuable consequence identification tool. It further argues that System of Systems Analysis (SoSA) is beneficial in helping to identify the linkages between centers of gravity and critical vulnerabilities, and the consequences of actions taken against those linkages. Finally, this paper draws conclusions on the validity of EBO and makes recommendations on the direction the American military should proceed with regard to EBO as an operational planning tool.

McPherson's command, with Logan in front, had marched at seven o'clock, and by four reached Hovey and went into camp; Crocker bivouacked just in Hovey's rear on the Clinton road. Sherman with two divisions, was in Jackson, completing the destruction of roads, bridges and military factories. I rode in person out to Clinton. On my arrival I ordered McClernand to move early in the morning on Edward's station, cautioning him to watch for the enemy and not bring on an engagement unless he felt very certain of success.

-Ulysses S. Grant (1822–85) Personal Memoirs[1]

> *Some days after, the Roman mine reached the sources of the spring and diverted its flow. The barbarians, considering this to be an act of gods and not of men, for they had deemed the spring unreachable, were compelled both by fear and thirst to surrender.*
>
> *- Caius Julius Caesar's Capture of Uxellodunum (51 BC)*[2]

Introduction

Recent developments in the Joint arena have encouraged Joint Staffs to "shelve" the EBO planning concept. In a memorandum dated 14 August 2008, Commander, United States Forces Joint Command (USJFCOM), Gen J.N. Mattis declared, "Effective immediately, USJFCOM will no longer use, sponsor, or export the terms and concepts related to EBO, ONA, and SoSA in our training, doctrine development, and support of JPME."[3] A plethora of arguments exist over the usefulness and validity of EBO as an operational planning tool. An agreed upon, comprehensive definition of EBO and associated terminology is non-existent. Further adding to the demise of EBO is the continued failure of computer engineers and programmers to produce adequate and accurate prediction models.

---

[1] Grant, *Personal Memoirs of U.S. Grant*. Chapter XXXV.
[2] Dodge, *Cæsar: A History of the Art of War Among the Romans Down to the End of the Roman Empire, With a Detailed Account of the Campaigns of Caius Julius Caesar*. 332.
[3] Mattis, "Assessment of Effects Based Operations" (Commander, U.S. Joint Forces Command for U.S. Joint Forces Command, August 14, 2008), 6.

However, the decision to dismiss EBO may be premature. This paper argues that despite some confusion to date, future work to redefine and resolve EBO conceptual terms and the promised technological improvements to decision support models will prove that effects-based thinking could provide operational planners and commanders with a valuable consequence identification tool. It further argues that System of Systems Analysis (SoSA) is beneficial in helping to identify the linkages between centers of gravity (COG) and critical vulnerabilities, and the consequences of actions taken against those linkages.

This paper discusses the relevance and importance of EBO, redefines concepts and terms associated with EBO while constructing a framework from which Joint planners can link objectives to centers of gravity across the full spectrum of military operations. Additionally, it addresses the applicability of computer prediction models and their relevance in the Joint arena. Finally, this paper draws conclusions on the validity of EBO and recommends the direction the American military should proceed with regards to EBO as an operational planning tool.

Conception of EBO

Effects-Based thinking is not a new concept nor is it uniquely American. Its roots can be traced back to the Romans.[4] GEN Ulysses S. Grant's memoirs suggest he, too, utilized effects-based operations in the later stages of the American Civil War in an effort to attack the will of the Confederate south.[5] Further evolution of effects-based operations was encouraged by airpower theorists such as Giulio Douhet, Hugh Trenchard, and William

[4] Gleason et al., *New Perspectives on Effects-Based Operations: Annotated Briefing*, 12.
[5] Ibid., 25-27.

"Billy" Mitchell.[6] Identifying the need for an alternative to attrition warfare, early airpower theorists championed the theory that direct attacks against an enemy's population centers, infrastructure, and logistical centers would lead to capitulation.[7]

More recently, the modern EBO model has been shaped from the experiences of U.S. Air Force officers who served during Vietnam.[8] Driven by civilian leadership decisions, these officers experienced firsthand the inability of American forces to achieve desirable outcomes through the aimless destruction of seemingly random targets. They recognized a need to affect an enemy's systems through the application of discriminate force on specific targets intended to achieve a desired effect.[9] Furthermore, Charles Kamps, a former U.S. Army and U.S. Navy officer and current professor of war gaming at the Air Command and Staff College proposes that Colonel John Warden, USAF, retired, massaged this concept through the development of his concentric rings and SoSA theory.[10,11] Colonel Warden would eventually apply his concentric rings theory during Desert Storm.

What Joint Operation planners see today is the end result of almost 2000 years of evolution combined with a new SoSA concept. Although it is centuries old, it remains

---

[6] Kamps, "Effects-Based Operations," 18.
[7] Ibid.
[8] Davis, "Effects-Based Operations: A Grand Challenge for the Analytical Community", 2.
[9] Ibid.
[10] Kamps, "Effects-Based Operations," 18.
Kamps writes, "After an institutional hiatus in strategic thinking during the nuclear dominated Cold War, the application of airpower in a conventional EBO role reemerged in the 1980s in the writings of John Warden and later under his protégé, David Deptula. This reemergence of EBO invoked the advantages promoted by early airpower visionaries; however, the emphasis shifted away from populations and industry toward targets such as electrical grids and command and control networks. The Warden model of analyzing the enemy as a "system of systems" has become a definite factor in Air Force planning thought since the Gulf War of 1991."
[11] Warden, "Air Theory for the Twenty-First Century." In *Challenge and Response: Anticipating U.S. Military Security Concerns*, 351-57.
Colonel Warden views the enemy as an interdependent system of concentric rings. Beginning with the outer-most ring and continuing inward, they are as follows: fielded military force, population, infrastructure, system essentials, and leadership. He theorizes that by understanding the enemy as concentric rings, military planners can more adequately decide where to apply pressure to create strategic and operational paralysis.

undefined and to some critics at the operational level, it is thought of as a useless concept.

What is EBO?

Defining EBO is at the crux of the EBO dilemma. A clear and agreed upon definition of EBO is non-existent within the Joint arena. Webster defines effect as "the power to bring about a result."[12] Joint Publication 3.0(JP3.0) defines effect "as a physical and/or behavioral state of a system that results from an action, a set of actions, or another effect." Neither the JP 3.0 nor JP 5.0 defines EBO. The Joint Publications do, however, state that "the use of effects during planning is reflected in the steps of JOPP as a way to clarify the relationship between objectives and tasks and help the JFC and staff determine conditions for achieving objectives".[13]

The Air Force Doctrine Document 1(AFDD1) defines EBO as "actions taken against enemy systems designed to achieve specific effects that contribute directly to desired military and political outcomes."[14] Air Force Brig Gen David Deptula further writes in *Effects-Based Operations: Change in the Nature of Warfare*, EBO "is the exploration of control—creating the necessary effects so that an adversary operates in accordance with our national security objectives."[15] Led by Colonel Warden and General Deptula and coined by the Air Force Directorate of War Fighting Concepts Development, Air Force proponents of EBO developed EBO theory to include the concept of parallel warfare.[16] General Deptula describes parallel warfare as being "based upon achieving specific effects, not absolute

---

[12] Webster's II New Riverside Dictionary Rev. Ed., 221.
[13] Chairman, U.S. Joint Chiefs of Staff, *Joint Operation Planning,* Joint Publication (JP) 5.0, III-12.
[14] U.S. Air Force, *Air Force Basic Doctrine,* Air Force Doctrine Document (AFDD) 1, 21.
[15] Deptula, "Effects-Based Operations", 4.
[16] *Effects-Based Operations: Change in the Nature of Warfare*, Defense and Airpower Series, 3.

destruction of target lists."[17] The theory declares that through the development of technology, militaries no longer need to attack targets sequentially in order to achieve a desired objective. Stealth, precision guided munitions, improved Special Operations Force capabilities, and advanced intelligence capacity allow for commanders to secure multiple objectives simultaneously. General Deptula neatly summed up parallel warfare in *Effects-Based Operations: Change in the Nature of Warfare* when he remarked:

> The successful prosecution of parallel war requires more than compressing sequential attacks into one simultaneous attack. Parallel war exploits three dimensions—time, space, and levels of war—to achieve rapid dominance.[18]

Parallel warfare and EBO should not be used interchangeably with Rapid Decisive Operations (RDO) as they are different concepts. For clarification purposes, RDO is the end result of parallel warfare and EBO.[19]

In 2001, a second explanation for EBO was developed by the Institute for Defense Analyses report, *New Perspectives on Effects-Based Operations: Annotated Briefing*. It states, "EBO attempt [sic] an explicit and comprehensive linking—from planning through execution to assessment—of actions (military and others) to strategic ends in a campaign."[20] The report further acknowledges that effects may be positive, negative, direct, indirect, intended or unintended.[21] The study suggests that if American war fighters want to simply destroy the enemy, then "dumb bombs" would be adequate.[22] One of the most important aspects about EBO conveyed by the study is a list of things EBO is not. EBO is not strictly

---

[17] Ibid., 3.
[18] Ibid., 5.
[19] Ibid.
[20] *New Perspectives on Effects-Based Operations: Annotated Briefing*, 48.
[21] Ibid.
[22] Ibid., 5.

about airpower, precision munitions, and kinetic effects nor is it limited to targeting nodes and high-value objects.[23] These last two points are typical points of contention between EBO believers and non-believers.

Paul Davis of the RAND Corporation asserts in his monograph, Effects-Based Operations: A Grand Challenge for the Analytical Community, that EBO "are 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."[24] This definition, Davis contends, "is an attempt to reflect what others discussing EBO have had in mind."[25] Clearly this statement is proof that EBO means different things to different people. Davis explains the word "probability" was injected into his definition "because explicitly including it enriches discussion and reveals common ground for people with different initial attitudes about EBO—people who often talk past each other because of cognitive disconnects."[26] However, the word "probability" may create more confusion amongst consumers of EBO than it clears-up.

Regardless of the definition one chooses to associate with EBO, some basic concepts remain constant. First, each definition assumes that EBO needs to be applied within a systems framework. It assumes that linkages can be drawn between critical factors and the center of gravity. Second, these definitions assume that commanders and planners can generate adequate intelligence in order to define the enemy as a system. Third, they touch

---

[23] Ibid., 13.
[24] Davis, "Effects-Based Operations: A Grand Challenge for the Analytical Community," 7.
[25] Ibid.
[26] Ibid.

upon the importance of identifying linkages and second and third order effects or consequences (Figure 1). Lastly, and most importantly, they are grounded in the requirement for a clear desired end state and objective. *New Perspectives on Effects-Based Operations: Annotated Briefing* states "effects-based thinking requires the explicit and comprehensive linking of all actions to operational and strategic outcomes."[27]

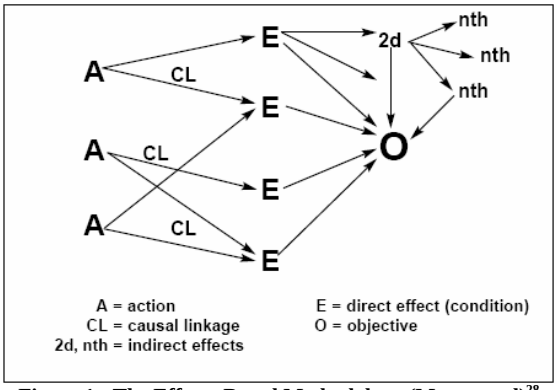

Figure 1: The Effects-Based Methodology (Mann et. al)[28]

In order to reduce this confusion, it is proposed that the term Effects-Based Operations is deleted, as General Mattis has suggested, and it should be replaced it with the term Consequence Identification. With a few adjustments of Paul Davis' definition of EBO, Consequence identification can be defined as "a process which augments the commander's judgment and expertise by considering the full range of consequences of the direct and indirect application of military, diplomatic, psychological, and economic instruments."[29] Consequence Identification does not require staffs to predict effects created by action or inaction, but rather only to conceptualize them. EBO, as it exists, appears to advocate

---

[27] *New Perspectives on Effects-Based Operations: Annotated Briefing*, 6.
[28] Mann et al., "Airpower, Afghanistan, and the Future of Warfare," 49.
[29] Davis, "Effects-Based Operations: A Grand Challenge for the Analytical Community," 7.
Davis defines EBO as "Effects-based operations are 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."

identifying only desired effects. Consequence Identification, by definition, would require staffs to identify both positive and negative results of a desired course of action (COA).

An obvious argument against Consequence Identification would be that it is impossible to foresee all likely first, second, and third order effects of an action. Milan Vego, a Joint Military Operations Professor at the Naval War College notes:

> The mix of tangible and intangible elements, combined with ever-present uncertainties, friction, and the unpredictability of the human element, makes the effects-based approach largely irrelevant.[30]

The idea of Consequence Identification, however, is not to identify all outcomes, but rather to establish as many plausible positive and negative consequences possible which may occur during an operation. The 1989 invasion of Panama which utilized two, separately planned operations, can be used to illustrate how effects-based thinking, or more appropriately Consequence Identification, could have significantly improved the results of the reconstruction effort. Operation BLIND LOGIC was the post conflict restoration plan while Operation JUST CAUSE focused on the use of military force.[31] Richard Shultz's critique of Operation BLIND LOGIC notes that had planners adequately understood the history and culture of Panama, the operational staff could have developed a more "realistic postconflict [sic] reconstruction effort."[32] Then USSOUTHCOM commander, GEN Maxwell Thurman, agreed with Shultz's assessment stating, "Blind Logic was not suitable for the reconstruction of Panama because it did accurately assess the dimensions of the

---

[30] Vego, "Effects-Based Operations: A Critique," 56.
[31] Shultz, *"In the Aftermath of War: U.S. Support for Reconstruction and Nation-Building in Panama Following Just Cause"*, 16.
[32] Ibid., 68.

task."[33] It is conceivable that had planners understood the governmental history of Panama at all, they would have recognized that the immediate removal of GEN Manuel Noriega would lead to the creation of a power-vacuum and lawlessness. General Thurman and his staff could have identified these possible consequences with the information provided in history books.

SoSA and Decision Support Models

Continued improvements in technology and a shift in the nature of warfare from conventional to asymmetric are not only allowing operational commanders to employ non-military assets, more precise munitions, and more effective non-kinetic fires, but also demanding operational commanders be discriminate in their application of force. EBO is a tool to help operational commanders and planners identify critical factors and link them to the COG. Additionally, EBO supporters propose that decision support models can predict outcomes with a certain degree of probability.

Joint Publication 3.0 defines the COG as "the source of power that provides moral or physical strength, freedom of action, or will to act."[34] Proponents of EBO argue that in order to accurately identify the COG the definition must be expanded and based on SoSA.[35] A SoSA is a framework through which planners can theoretically view the battle space as a complex system comprised of individual subsystems such as economic, infrastructure and intelligence. Joint Publication 5.0 refers to this framework as the Interconnected Operational Environment (Figure 2). The theoretical value in developing SoSA models is that through such models, nodes and links can be identified as critical factors (critical capabilities or

[33] Ibid., 69.
[34] "Joint Publication 3-0," GL-7.
[35] Umstead, "Effects-Based Decision Making in the War on Terror," 5.

critical vulnerabilities) and subsequently attacked (Figure 3).

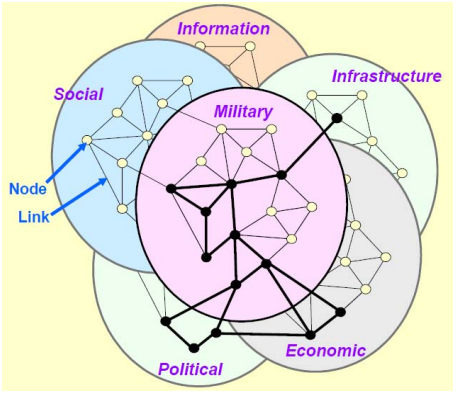

Figure 2: Interconnected Operational Environment (JP 5.0 2006)[36]

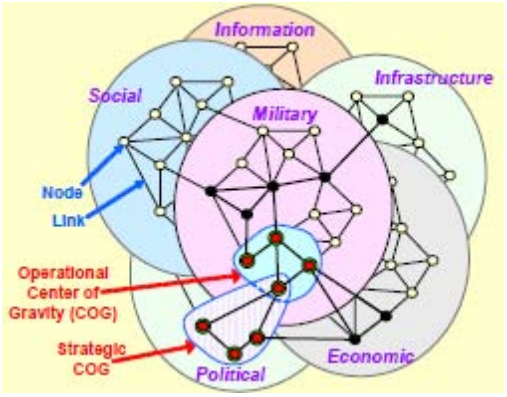

Figure 3: Identifying Centers of Gravity (JP 5.0 2006)[37]

Computer based decision models are being developed in support of EBO with the idea to help commanders identify consequences through the application of effects. With direction from the Air Force, Thomas Triscari and William Wales generated a report identifying four, major decision support paradigms (Figure 4). Support paradigms are abundant but only the following will be addressed: autonomous, directive, predictive, and emergent.

Predictive Paradigm	Directive Paradigm
Causal Analysis Tool Fusion for EBO Holistic C4I Human Factors Modeling Tool Effects-based Wargaming Simulation Adv. Modeling for Dynamic CoA analysis Dynamic CoA Development	
Autonomous Paradigm	**Emergent Paradigm**
Center of Gravity Analysis Tool Target Systems Analysis Athena	Strategy Development Tool (loosely) Effector (loosely)

Figure 4: EBO Tools by Predominant Paradigm (Triscari and Wales, 2005)[38]

The Autonomous Paradigm, through computer software, suggests that certain tasks

---

[36] "Joint Operation Planning," III-17.
[37] Ibid., IV-11.
[38] Triscari and Wales, "Supporting Effects-Based Operations (EBO) With Information Technology Tools: Examining Underlying Assumptions of EBO Tool Development Practices," 10.

may be fully automated.[39] Autonomous paradigm models pose obvious risk by removing the human aspect completely. It does not account for human experience or other intangible leadership qualities. It does, however, remove human error from the portion of the decision cycle which is controlled by the computer.[40]

Triscari and Wales describe the Directive Paradigm as follows:

> The directive paradigm of decision support is characterized by machine centered guidance of either human decision makers or other technological components. This paradigm may be represented by limited interaction, machine centered decision support systems: for example, case based reasoning techniques and other forms of prototypical expert systems.[41]

Similar to the autonomous paradigm—in that the final decision is made by the computer—this paradigm allows for the human to input information and perform minor analysis in order to set conditions for the decision.[42]

The Predictive model appears to be the most predominant paradigm. Triscari and Wales write, "the predictive paradigm derives its validity from the axiom that *many events in the world are dependent upon one another*."[43] One of the most relevant predictive models is the Bayesian model. A Bayesian model attempts to develop a representative image of the unpredictability of the world and eventualities through acumen and observation. These models do require humans to engage in "probability estimation"—an activity we are historically bad at,[44] most likely due to the amount of variables involved.

The following paragraph is a summation of the Emergent paradigm by Triscari and

---

[39] Ibid., 5.
[40] Ibid.
[41] Ibid., 6.
[42] Ibid.
[43] Ibid., 7.
[44] Ibid.

Wales.

> The emergent paradigm by nature is meant to improve the strategic decision maker's appreciation for the vast uncertainty surrounding future events. The paradigm focuses tool development efforts on aiding the human expert to observe and reflect rather than to formulate and estimate. Example approaches are based upon scenario generation, planning, and analysis.[45]

Emergent technology does not require the commander or planners to predict the future, but rather to create multiple, future scenarios through variable inputs (political, economic, military, etc.) in order to generate a scenario similar to the current adversarial environment.[46] It encourages leaders to look at an exhaustive amount of scenarios and from those models, previous experience, and judgment, develop an applicable COA. In short, it is a way to generate—not predict— plausible outcomes through war-gaming.

Opponents of EBO argue that the level of knowledge of the enemy system and the probability of desired outcomes generated from the previous mentioned decision support paradigms for EBO to be successful are inadequate. Human systems are Complex Adaptive Systems. Interaction between components of an enemy system is dynamic and unpredictable.[47] Furthermore, affected changes may not be measurable immediately, if at all.[48] In a Joint Force Quarterly article, Milan Vego asserts, "the effects-based approach to warfare is heavily dependent on mathematical methods for predicting and measuring effects."[49] In effect, Vego and other opponents of EBO feel that it removes the "art" from Operational Art.[50] In short, computers currently do not possess the capacity to predict, to

---

[45] Ibid., 9.
[46] Ibid.
[47] Davis, "Effects-Based Operations: A Grand Challenge for the Analytical Community," 26.
[48] Ibid.
[49] Vego, "Effects-Based Operations: A Critique," 51.
[50] Ibid.
Vego writes, "This increasing trend toward using various metrics to assess essentially unquantifiable aspects of warfare only reinforces the unrealistic views of many that warfare is a science rather than both art and science."

any acceptable degree of probability, the linkages and the end result a specific action taken against these linkages will generate.

SoSA analysis, however, is not limited to computer prediction models. Insurgencies often consist of multiple groups with varying ideologies and motivating factors working together. As Dr. Waghelstein and Dr. Chisholm suggest, insurgencies can be "treated from a systems perspective"[51] and "absent reasonable accuracy in assessing the problem's structure, no courses of action developed will solve that problem."[52] Their approach to the SoSA framework places emphasis on the biological aspects of the system rather than the physical features of the insurgency.[53] This concept requires intimate knowledge of the insurgency and all its components developed through a detailed comparative analysis between various historical insurgencies.[54] This method they write:

> … allows highlighting characteristics common to all or most of them and demarcating those factors peculiar to specific insurgencies becomes possible only with an appropriate analytical framework. In turn, such comparison and analysis must rest upon a solid foundation of the appropriate practical questions about insurgencies; absent such a common metric, no comparisons can be effected[sic].[55]

When dealing with operations across the full spectrum of warfare, planners could utilize the several categories of questions developed by Dr. Waghelstein and Dr. Chisholm to "exploit critical vulnerabilities."[56] To help with this, military leaders should employ the services of social scientists to develop an accurate systems model. Understanding a culture, ideologies,

---

[51] Waghelstein and Chisholm, "Analyzing Insurgency," 5.
[52] Ibid., 2.
[53] Ibid., 5.
[54] Ibid.
[55] Ibid., 5-6.
[56] Ibid., 6.

and history would minimize the risk of cultural mirror imaging by U.S. forces. It would also help to reveal exploitable seams that exist between separate, but cooperating groups within an insurgency. Furthermore, consideration should be given to pursuing the Emergent decision support model. Using a decision support model with the capacity to create similar, complex adaptive systems, in conjunction with the Dr. Chisholm and Dr. Waghelstein approach to constructing a SoSA, could prove invaluable to augmenting a commander's experience and judgment. War games currently conducted by the Naval War College provide leaders with priceless insight at zero cost in blood and treasure. Extending these War Games to include economic, psychological, diplomatic, and cultural dimensions would enhance the way military leaders assess potential future operations.

Words Matter

Led by General Mattis and Lt Gen Paul Van Riper, USMC, retired, the EBO concept has received much negative and public attention. Both men raise accurate and understandable concerns. First is the confusion generated by the Ends naming convention EBO applies (Figure 5) as compared to the traditional naming convention (Figure 6). Each feels this change in thinking has hindered our ability to determine "ends" and link them with "means". General Mattis wrote that EBO "uses confusing terminology and is difficult to understand".[57] General Van Riper is baffled at the JP 3-0 author's decision to remove intent while adding effect.[58] As a result, General Van Riper contends that the EBO approach to

[57] Mattis, "Assessment of Effects Based Operations," 4.
[58] Van Riper, "EBO: There Was No Baby in the Bathwater," 84.

Joint Planning has "diverted resources"[59] while General Mattis believes it has caused "inefficiency and confusion."[60]

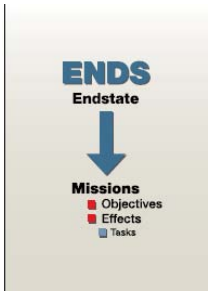

Figure 5: EBO Naming (JFQ Jan. 2009)[61]

Figure 6: Traditional Naming (JFQ Jan. 2009)[62]

The simple cure for this dilemma is to return to the traditional Objectives naming convention. This would reduce confusion and encourage commanders and staffs to focus on the objective. It is not necessary to list desired effects to be achieved, but rather only identify the plausible consequences of proposed tasks. Combining judgment, experience, and identified consequences, commanders could then choose a COA to best support the objective.

EBO Success at the Operational Level

EBO can be applied to the full spectrum of military operations. Its application should not be limited to conventional wars like Desert Storm nor should it be dismissed during Counter Insurgency Operations (COIN). EBO has been proven successful by Desert Storm operational planners and in Afghanistan by CJTF-180 planners.

Critics and proponents alike think of Desert Storm when the term EBO is uttered. Air operations, which kicked off the Gulf War, were planned using Colonel Warden's Concentric

---

[59] Ibid.
[60] Mattis, "Assessment of Effects Based Operations," 3.
[61] Van Riper, "EBO: There Was No Baby in the Bathwater," 84.
[62] Ibid.

Rings Theory. Operational planners deferred from the standard approach of servicing target lists and instead concentrated on applying force to the enemy from every direction in a manner which directly contributed towards achieving the military objective.[63] For example, initially only two Iraqi Sector Operations Centers (SOC) were identified. Sixteen F-117s would be required to destroy the SOCs (8:1 aircraft to target ratio). Eventually, two additional SOCs were identified and planners needed to figure out how to achieve the desired effect of disrupting the Iraqi Integrated Air Defense System (IADS) with the same amount of assets available. Planners finally surmised that only partial destruction was needed to achieve the desired effect in support of the operational objective of neutralizing Iraqi defenses.[64] Eventually, the decision was made to attack the SOCs with a 2:1 aircraft to target ratio. Wording of the OPLAN also suggests planners were focused on effects rather than destruction from the outset.[65] Planners used terms like disruption, isolation and loss of confidence to describe desired outcomes.[66] Operations were planned to be conducted both jointly and with coalition partners as described below:

> …special operation forces were to destroy intercept operations centers on the Iraq-Saudi border, resistance forces were to disrupt key communication sites in Kuwait and Iraq, while naval forces were to initiate sea control and countermine operations in the Gulf. And finally, under the cover of the air campaign, ground forces were to move into attack positions for the final phase of Desert Storm…[67]

Desert Storm was not without issues. In a thesis for the School of Advanced Airpower Studies, Air Force Maj T.W. Beagle Jr. concludes:

---

[63] Beagle, "Effects-Based Targeting," 61.
[64] Deptula, *Effects-Based Operations: Change in the Nature of Warfare*, 12.
[65] Beagle, "Effects-Based Targeting," 62.
[66] Cochran, *Gulf War Air Power Survey*, 1:5.
[67] Ibid.

> For example, the 25 percent effectiveness BDA ascribed to a Desert Storm sortie, because bombing had destroyed only 25 percent of the intelligence headquarters building, ignored the effect subsequently created by personnel evacuation, which fully achieved the "functional kill" that planners intended. Likewise, this error was repeated in Allied Force when analysts appraised a target as "not destroyed" because there were still one and a half walls standing after the strike.[68]

The problems faced by planners during Desert Storm with regard to EBO still remain a major concern for critics of EBO. Effects cannot artlessly be measured by counting bombs dropped or rounds fired. When dealing with EBO, standard battle damage assessment (BDA) will not always suffice. Measuring the effectiveness of an operation will remain difficult regardless of whether it was planned under the EBO construct or through the use of a traditional planning model. Opponents who criticize EBO for being too hard to measure should consider the operations during World War I and Vietnam. Attrition was easily measured but a high body count did not necessarily correlate to success of the operation.

Metrics should be created using the framework developed by the Institute for Defense Analyses Joint Advanced War Fighting Program. They devised three areas of inquiry to guide Commanders in the development of metrics. See Annex 1 for a brief description of each and the associated questions the Operational Commander and Staff should ask.

CJTF-180 planners successfully applied EBO concepts during Operation ENDURING FREEDOM. They were effective at employing lethal, non-lethal and non-military fires in support of the CJTF-180 Commanders' line of operation "Deny sanctuary and counter terrorism."[69]

CJTF-180 Joint Effects Working Group (JEWG) assessed that lethal attacks on

---

[68] Beagle, "Effects-Based Targeting," 100.
[69] Herndon, et al., "Effects-Based Operations In Afghanistan: The CJTF-180 Method Of Orchestrating Effects To Achieve Objectives," 29.

specific enemy personnel would have a desired disruptive effect on the belligerent C^3 networks.[70] Non-lethal effects were created by PRTs, who, after the attack entered the area to provide aid packages, rebuild infrastructure, and win the general support of the locals.[71] This single operation was successful at developing adequate intelligence, identifying the necessary elements to be employed, and synchronizing them to achieve a desired effect in support of the operational objective.

Conclusion

To be candid, EBO is confusing because no single definition exists. Ask a hundred different people to define it and a hundred definitions will be given. EBO, as the Joint Publication authors describe it, encourages planning staffs to focus on the effects rather than the objective. EBO is a method by which commanders and planners should try to identify consequences through constant analysis.

The benefit of EBO is not necessarily in having the ability to predict outcomes or generate identical computer models of an enemy's complex adaptive system. The benefit of EBO lies in its ability to convince planners and commanders to think creatively. Operational leaders need to be able to consciously ask "What If?" Joint Staff members need to be able to manage consequence; positive and negative. EBO planning concepts require staffs to constantly analyze and reassess the operation. Therefore, effects-based thinking is useful in identifying plausible outcomes. These plausible outcomes can be used to generate branches

[70] Ibid.
[71] Ibid., 30.

or sequels for an operation. They may identify decisive points or decision points by encouraging planners to take a unique look at an old situation.

Although SoSA is not a required component to conduct planning, it could prove valuable. It is extremely complex and time consuming but it does not require computing power to a degree far beyond that which currently exists. As a targeting method for closed systems (such as an Integrated Air Defense System) these models have been successful at helping to identify key nodes of infrastructure and defense systems. These closed systems are often related directly to a center of gravity and if attacked, can have great effect on weakening it. Relying on them to develop an accurate prediction of cause and effect relationships may yet be too unreliable to consider. However, certain models may identify causal linkages between a center of gravity and critical vulnerabilities that would have otherwise been overlooked.

Computer-based cultural or psychological prediction models need much improvement before they can be integrated into the planning process. However, as Dr. Waghelstein and Dr. Chisholm suggest, a systems framework based on historical analysis would be useful in understanding an insurgency and developing a COA.

Effects-based thinking and planning is about consequence identification. Effects-Based planning concepts could provide operational planners and commanders with a valuable planning apparatus.

Recommendations

There is no substitute for experience or judgment. However, commanders and planners should not disregard EBO in its entirety simply because some aspects—near perfect

intelligence and reliable decision support models—have not been adequately developed. Individual concepts and ideas relating to EBO should be maintained by the USFJCOM.

First, incorporate SoSA into the operational design cells within the geographic combatant command and JTF staffs. Include social scientists, anthropologists, and cultural specialists to facilitate operational design cells with SoSA development. The use of social scientist during the design stage would be invaluable in framing and understanding the problem, setting the paradigm, and developing assumptions about an enemy's system. Social scientists could also provide insight to operational staffs on how beliefs, religion, and culture influence a specific group's decision process. Once a SoSA has been developed, it should be forwarded to the Joint Planning Group for use during the Mission Analysis and COA development phases of planning.

Second, in-depth Consequence Identification should begin during the Mission Analysis phase. A concerted effort should be made during the COA Development and COA Analysis stages of planning to assess the validity of proposed direct and indirect actions against specific portions of the enemy system. Consequence Identification should continue throughout planning and during operations.

Third, in order to reduce confusion created by the terms tasks, effects, and objectives, Joint doctrine should return to the traditional Objectives naming convention. This would allow staffs to focus on objectives and tasks vice effects, while allowing them to identify possible consequences of a proposed action. A desired effect is as General Van Riper concluded, "the past tense of a verb that traditionally would be the task."[72]

---

[72] Van Riper, "EBO: There Was No Baby in the Bathwater," 84.

Lastly, research and development for Emergent decision support models should be encouraged in both the civilian and military sectors. Although Emergent technology is not currently at a level where it can effectively augment the planning process, computer processing power is rapidly improving and could soon be able to support a complex, variable driven war gaming system.

Annex A

Context- Overarching political, diplomatic, economic context.

- What is the desired strategic outcome?
- What is the enemy's objective? What strategy might he employ?
- What changes in the environment could change the nature of the National objective or the Joint Operation?

Process- Determine the Joint Force success at conducting ongoing analysis.

- What indicators are important for measuring effectiveness?
- Are prewar assumptions valid?
- If not, has the Joint Force adapted?

Outcome- Are the effects achieving the desired outcome?

- What reasons does the Joint Force have to believe they are being successful?
- What other factors could be creating the desired outcomes?

Questions to Develop Metrics (*New Perspectives 2001*)[73]

[73] *New Perspectives on Effects-Based Operations: Annotated Briefing*, 44-45. Developed from pages 44-45.

Bibliography

Beagle, T. W. "Effects-Based Targeting: Another Empty Promise?" Air University Maxwell AFB, Al School of Advanced Airpower Studies, 2000. http://www.au.af.mil/au/awc/awcgate/saas/beagle.pdf.

Chairman, U.S. Joint Chiefs of Staff. "Joint Operation Planning." (Washington, DC: CJCS, 26 December 2006), 218. http://www.dtic.mil/doctrine/new_pubs/jp5_0.pdf.

———. "Joint Publication 3-0: Joint Operations." (Washington, DC: CJCS, 17 September 2006, Incorporating Change 1, 13 February 2008).

Cochran, Alexander. *Gulf War Air Power Survey*. Edited by et al. Vol. 1. 7 vols. Washington, DC: Department of the Air Force, 1993.

Davis, Paul K. "Effects-Based Operations: A Grand Challenge for the Analytical Community." RAND, 2001. http://www.rand.org/pubs/monograph_reports/2006/MR1477.pdf.

Deptula, David. *Effects-Based Operations: Change in the Nature of Warfare*. Defense and Airpower Series. Arlington, Virginia: Aerospace Education Foundation, 2001. http://www.aef.org/pub/psbook.pdf.

Deptula, David. "Effects-Based Operations." *Air & Space Power Journal* 20, no. 1 (April 1, 2006): 4-5. http://www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA493217&Location=U2&doc=GetTRDoc.pdf.

Dodge, Theodore A. *Cæsar: A History of the Art of War Among the Romans Down to the End of the Roman Empire, With a Detailed Account of the Campaigns of Caius Julius Caesar*. Boston and New York: Houghton Mifflin Company, 1892.

Gleeson, Dennis J.; Linde, Gwen; McGrath, Kathleen; Murphy, Adrienne J.; Murray, Williamson. *New Perspectives on Effects-Based Operations: Annotated Briefing*. ALEXANDRIA, VA: Institute For Defense Analyses Joint Advanced Warfighting Program, June 2001.

Grant, Ulysses S., *Personal Memoirs of U.S. Grant*. New York: Charles. L. Webster, 1885. http://www.bartleby.com/br/1011.html.

Herndon, Robert, John Robinson, James Creighton, Raphael Torres, and Louis Bello. "Effects-Based Operations In Afghanistan: The CJTF-180 Method Of Orchestrating Effects To Achieve Objectives." *Field Artillery Journal*, no. January-February (January 1, 2004): 26-30. http://www.au.af.mil/au/awc/awcgate/army/ebo_afghan.pdf.

Kamps, Charles Tustin. "Effects-Based Operations." *Air and Space Power Journal*, no. 2 (Summer 2004): 18.

Mann, Edward C., Gary Endersby, and Thomas R. Searle. "Thinking Effects, Effects-Based Methodology for Joint Operations." Air University, Maxwell AFB, AL.: College of Aerospace Doctrine, Research and Education Paper No.15, 2002.

Mattis, J.N. "Assessment of Effects Based Operations." Commander, U.S. Joint Forces Command for U.S. Joint Forces Command, August 14, 2008. http://smallwarsjournal.com/documents/usjfcomebomemo.pdf.

Shultz, Richard H., Jr. "In the Aftermath of War: U.S. Support for Reconstruction and Nation-Building in Panama Following Just Cause." Maxwell AFB, AL.: Air University Press, 199.

Triscari, Thomas and Wales, William J. "Supporting Effects-Based Operations (EBO) With Information Technology Tools: Examining Underlying Assumptions of EBO Tool Development Practices." Air Force Research Laboratory Information Directorate Rome Research Site Rome, New York, May 2005. http://www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA435007&Location=U2&doc=GetTRDoc.pdf.

U.S. Air Force. "Air Force Basic Doctrine, Air Force Doctrine Document (AFDD) 1." Washington, DC: Department of the Air Force, November 17, 2003. http://www.dtic.mil/doctrine/jel/service_pubs/afdd1.pdf.

Umstead, Robert K. "Effects-Based Decision Making in the War on Terror." Wright-Patterson AFB, Ohio: Air Force Institute of Technology, 2005. http://www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA435165&Location=U2&doc=GetTRDoc.pdf.

Van Riper, Paul K. "EBO: There Was No Baby in the Bathwater." *Joint Force Quarterly*, no. 52 (January 2009): 82-85. http://www.ndu.edu/inss/Press/jfq_pages/editions/i52/17.pdf.

Vego, Milan. "Effects-Based Operations: A Critique." *Joint Force Quarterly*, no. 41 (2006): 51-57.

Warden, John A., III. "Air Theory for the Twenty-First Century." In *Challenge and Response: Anticipating U.S. Military Security Concerns*. Edited by Karl P. Magyar. Maxwell AFB, Ala.: Air University Press, August 1994. 351-374. http://aupress.maxwell.af.mil/books/Magyar_Challenge/PDFs/challenge.pdf.

Waghelstein, John D., and Dr. Donald Chisholm. "Analyzing Insurgency." Naval War College, February 2006.