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Colonel Charles S. Dunston, USMC

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14. ABSTRACT

Effects-Based Operations (EBO) is one of the new Joint warfighting doctrines being developed by United States Joint Forces Command (USJFCOM) to better advantage the U.S. military in the 21st century environment. Its origins began in the Second World War to analyze and identify critical enemy infrastructure for strategic bombing to target. Since then this concept has evolved to encompass application for all military operations with the potential to be used at the strategic, operational and tactical levels of war. EBO is a very useful tool for targeting by operational fires and U.S. interagency functions, but it has limited application when it is applied against a determined enemy whose will to fight will not be deterred no matter what the consequences. The concept is particularly fraught with danger when there is difficulty in acquiring accurate and timely intelligence. This is not to say that EBO shouldn't be pursued, but just like the application of air power theory, military planners must understand that in certain circumstances and environments it has limitations and therefore should not be embraced as a warfighting doctrine, but rather a targeting tool that can be

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JOINT MILITARY OPERATIONS

"EFFECTS BASED OPERATIONS HAS LIMITATIONS"

by

Colonel Charles S. Dunston, USMC
Seminar 7
Cubicle 2136

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: _____

17 May 2005

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Professor Patrick Sweeney, PhD	**Captain Sandy Neville, USN**

INTRODUCTION

You may fly over a land forever; you may bomb it, atomize it, pulverize it and wipe it clean of life - but if you desire to defend it, to protect it, and keep it for civilization, you must do this on the ground, the way the Roman legions did, by putting your young men into the mud.

T. R. Fehrenbach, This Kind of War, 427

Effects-Based Operations (EBO) is one of the new joint warfighting doctrines being developed by United States Joint Forces Command (USJFCOM) to better advantage the U.S. military in the 21st century environment. Its origins began in the Second World War in an attempt to analyze and identify critical enemy war making infrastructure for strategic bombing targets. Since then, this concept has evolved to encompass application of all military operations with the potential to be used at the strategic, operational and tactical levels of war. EBO is a very useful tool for targeting by operational fires and U.S. interagency functions, but it has limited application when it is applied against a determined enemy whose will to fight will not be deterred no matter what the consequences. The concept is particularly fraught with danger when there is difficulty in acquiring accurate and timely intelligence. This is not to say that EBO shouldn't be pursued, but just like the application of airpower theory, it has limitations and therefore should not be embraced as a warfighting doctrine. It is best used as a targeting tool which can be very effective given the right circumstances.

BACKGROUND

Effects-Based Operations (EBO) is defined by USJFCOM as, "Operations that are planned, executed, assessed, and adapted based on a holistic understanding of the operational environment in order to influence or change system behavior or capabilities using the integrated application of selected instruments of power to achieve directed policy aims." [1] EBO has its origins in the Second World War European strategic bombing effort. A group of civilian analysts organized by the Office of Strategic Services (OSS) conducted detailed research to identify strategic German economic targets that would cripple the Nazi war machine. The Committee of Operations Analysts, and the Enemy Objectives Unit in London identified ball bearings and oil production as critical vulnerabilities that would bring German military manufacturing and sustainment to a halt. This led to large air raids on the ball-bearing factories in Schweinfurt and the oil refineries in Ploesti at great cost in U.S. bombers and aircrew.

As the allies were preparing to invade the European continent in 1944, General Eisenhower insisted that the strategic bombers shift their targets to the German Army's ability to rapidly attack the Normandy beachhead with armored reserves in France and forces that could be transferred from the Eastern Front. The strategic target-analysts studied the task and recommended targeting the Western European rail system, which was the most efficient way to move heavy armor and troops. The analyst further identified that the easiest way to cripple the rail system was to attack rail bridges and rail yards. Of the two targets, rail yards were considered the most lucrative targets, because they were a sufficiently large target to compensate for the inherent inaccuracy of heavy bombing from high altitude. In the interim, however, the tactical Air Forces had become

very adept at attacking bridges. Consequently, the strategic bombers attacked rail yards and the tactical air forces destroyed the bridges. Targets were chosen throughout Western Europe to prevent disclosure of the invasion site at Normandy and interdict the rail system in depth. As a consequence of the intelligence and operational fires employed by the Allied air forces and the French Resistance, the Allies successfully prevented the German reserve armored divisions from interfering with the establishment of the Allied beachhead at Normandy. [2, 3, 4]

After the war, the U.S. conducted a Strategic Bombing Survey (USSBS) to evaluate the effectiveness of U.S. airpower and specifically strategic bombing. Albert Speer was questioned about the effectiveness of Allied strategic bombing on German war making ability. Speer related that neither the bombing of ball-bearing factories or oil refineries ever came close to stopping the German war making effort. However, he also stated that Allied air interdiction of the rail yards effectively cut coal transportation that fueled Germany's factories, and the interdiction of coal came closest to bringing the Nazis war machine to a halt. By serendipity, U.S. strategic bombing was striking the right target, but for the wrong reasons. [5]

Since the Second World War, the U.S. has become much more capable at technology-driven intelligence collection and precision fires. Consequently, the U.S. Air Force continues to pursue airpower theory to advance the visions of Douhet, Trenchard and Mitchell. After Vietnam, Colonel John Warden argued in his book, *The Air Campaign*, that airpower could bring about effects to secure strategic objectives. More recently, Brigadier General David A. Deptula, in his article "Effects-Based Operations: Change in the Nature of Warfare" suggests that the U.S. security establishment should

incorporate effects-based operations as the foundation of its security strategy. Previously U.S. airpower was too imprecise, intelligence too weak, and command and control too cumbersome. Technology is now mature enough to make airpower a leading U.S. military capability in certain phases of a conflict. Experiences since Operation Desert Storm, the Kosovo Air War and Operation Iraqi Freedom illustrate the exponential advances in U.S. airpower that some argue will enable the U.S. to adopt EBO as a central element of U.S. joint warfighting doctrine. [6, 7]

Advances in U.S. technology have caused the defense establishment to pursue advanced concepts and capabilities. United States Joint Forces Command (USJFCOM) is leading this effort for the Department of Defense (DOD) in what has been termed transformation experimentation. Since 2000, USJFCOM has been conducting a series of joint experiments to develop new doctrinal concepts and tactics, taking advantage of emerging technological advances in command and control, intelligence, fires and maneuver. USJFCOM's overarching experimental concept is Rapid Decisive Operations (RDO). Some argue RDO was proven successful by the tactics that resulted in the quick fall of Afghanistan and Iraq. RDO used precision airpower and limited numbers of exceptionally well trained ground forces that were deployed from around the globe. U.S. ground forces hit the ground in the attack with little if any preparation time.

The cornerstone and most successful part of the RDO concept is EBO. However, unlike the Air Force's fires-centric concept, USJFCOM has advanced the concept to mean the employment of all elements of national power by pin-pricking an adversary's critical nodes and links, which directly affecting an adversary's strategic and operational center(s) of gravity. The attack of these nodes and links, by both kinetic and non-kinetic military,

interagency, and multinational capabilities, uses a series of joint tactical actions. This attack will theoretically have the effect to force an adversary to bend to U.S. will. Advances in command and control, and intelligence technology will further allow the U.S. to exponentially increase the tempo of combat operations faster than an adversary can counter U.S. joint tactical actions. [8, 9, 10] As a result of joint experiments and recent high tempo combat operations, USJFCOM describes their EBO doctrinal prototype as, "the most comprehensive (warfighting doctrine) ever developed at USJFCOM [with] the potential to affect many facets of joint operations." [11] Figure 1 illustrates the USJFCOM EBO construct.

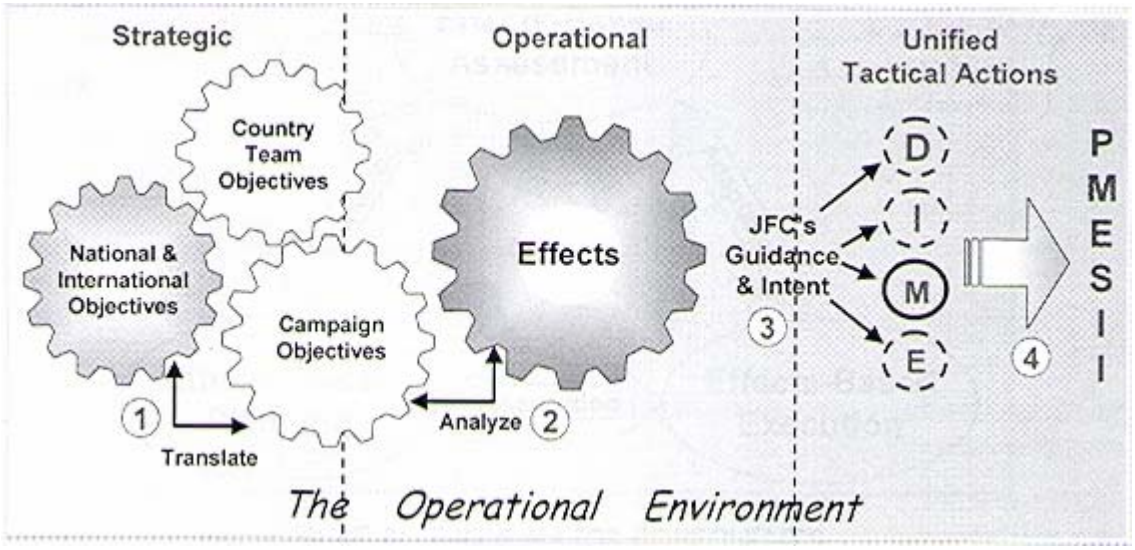

Figure 1: An Effects-Based Approach

EBO is grounded in the growing global interconnection by a network of complex adaptive systems that extend beyond the domain of historic military operations and geographical battlespace. This complex adaptive system of networks has come to be referred to as a system-of-systems that can be analyzed as never before, creating a "systems of systems analysis" or SoSA. Operational command and control can reach-back with electronic collaborative tools to intelligence, think-tanks, academics and

centers of excellence. These organizations can analyze an adversary, and identify all manner of information linked to center(s) of gravity, which can be used for precision fires that are both kinetic and non-kinetic. The knowledge base that is assembled about adversary, neutral and friendly SoSAs has been termed the operational net assessment ONA. A higher level of nodal analysis, the ONA will be directed by a Combatant Commander at certain regions or countries that are potential flash points. More specifically, the ONA attempts to identify political, military, economic, social, infrastructure and information (PMESII) nodes and links that are tied to an organization's center of gravity. (See Figure 2) A shortcoming of ONA is that there are limited resources, so there will have to be priorities to develop and maintain the knowledge base. Once the critical nodes and links have been identified, measures of effectiveness (MOE) and measures of performance (MOP) will be developed to determine if the selected joint tactical action is having the predicted effect. In order for EBO to work, both the ONA and MOE/P have to be observable, accurate and timely.

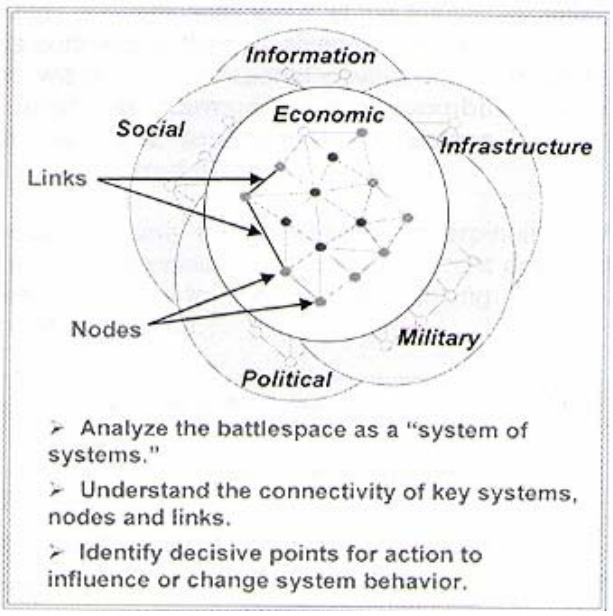

Figure 2: A System-of-Systems (PMESII)

The alternative to EBO is destruction-based operations (DBO), which heretofore has been the American way of war. DBO is attrition-based targeting that identifies targets based on type (command & control, air defense, artillery, etc.) and hits them according to an established priority in the hopes of destroying enough of the target to thus bring about the enemy's collapse, surrender or negotiated settlement.

LIMITATIONS OF EBO

War is a contest against an animate force that resists our efforts at every turn.
Clausewitz, On War, 77.

EBO aims to promote synchronized, near-simultaneously executed joint tactical actions that are integrated with interagency and multinational partner effects in order to influence, or change, system behavior or capabilities using all elements of national soft and hard-power. Using superior knowledge (ONA), precision weaponry, and the increased speed of electronic command and control capabilities, EBO attempts to render an adversary incoherent, and thereby force him to accede to U.S. demands. EBO also attempts to avoid the attrition-style annihilation warfare that has traditionally been the U.S. military's forte. The adversary is assumed to be rational and is susceptible to changing behavior based on cause and effect. But what if the adversary has a very strong will, or is motivated by religious, ideological or other forms of zealotry? How then will EBO affect him, if he will not be deterred no matter what the consequences? What if the adversary is not acting rationally? An irrational enemy has confounded superior militaries throughout the ages. The word *zealot* comes from a group of first-century independence-minded Hebrews who refused to surrender to the Romans at Masada. We

found the same thing in the Second World War with the Germans and Japanese, and we are finding this today with the followers of Osama Bin Laden and other insurgents who are not deterred by fire-power demonstrations like the "shock and awe" demonstrations in Baghdad at the beginning of Operation Iraqi Freedom. The Iraqi conventional forces collapsed, but the regime did not give up. Unfortunately, Saddam Hussein's regime planned and organized an asymmetric insurgency that the U.S. is battling today. Success or failure will likely determine U.S. power and influence in the world for years to come.

Non-state actors are particularly irrational and often do not act in the best interests of their followers. They may not be susceptible to leverage by the diplomatic, information, military or economic (DIME) national and coalition elements of soft and hardpower. At a November 2004 Australian Strategic Policy Institute presentation it was stated that, "The problem is that insurgency and terrorism is, at its very heart, attrition warfare. It's based on a long-term strategy to wear down an opponent." [12] Current events in Iraq serve to illustrate that just because an adversary is physically defeated, it does not mean that he is defeated morally. The war is not over until the losing side in a war decides to give up, or is compelled to surrender or negotiate by total destruction. In Fallujah, U.S. forces used overwhelming force (DBO) to clear an enemy from his stronghold. The leadership ran, but many of the insurgents decided to stay and become martyrs rather than surrender.

EBO attempts to offer decision-makers a menu of soft and hard-power effects to change the behavior of an adversary. Put another way, EBO desires to present a scalable, flexible menu of options ranging from deterrence to coercion to kinetic effects to compel the adversary to conform to the U.S.'s desired end-state. This is predicated on an

adversary allowing those things that are connected to his center of gravity to be exposed to the U.S. intelligence and precision fires. "Even if we could reduce the enemy to a system-of-systems and target the enemy with great precision, all but the most primitive, incompetent enemies will react and adapt. The enemy can usually find the means to avoid, absorb, wait out, or defeat the attack." [13] Again, in order to defeat an adversary, both his physical power and his will to resist must be destroyed. Put another way, Clausewitz stated,

> *If our opponent is to be coerced you must put him in a situation that is more oppressive than the sacrifice you call on him to make. The hardship of that situation must not be of course be merely transitory - at least in appearance. Otherwise the enemy would not give in but would wait for things to improve… The worst of all conditions in which a belligerent can find himself is to be utterly defenseless.*
>
> Clausewitz, On War, 77.

Given that, "EBO relies on a comprehensive system-of-systems understanding of the operational environment." [14] EBO is information intensive. Accurate and timely intelligence about the adversary is critical to EBO. "EBO thinking requires strategic intelligence, which is notoriously unreliable - and not for lack of effort or resources." [15] The EBO construct uses ONA to provide the actionable intelligence to targeteers. But what if the ONA is inadequate, flawed or misleading? There are numerous examples in the last 70 years where the U.S. has been strategically surprised because of flawed, deceptive or inconclusive intelligence. Intelligence is never 100% accurate or timely, and perfect intelligence is fleeting. (See Figure 3)

Strategic Intelligence Failures since WW II:
Pearl Harbor (US)
Hitler's Attack on the USSR (Stalin)
Japan's assessment that the U.S. would tire of war
North Korean invasion of South Korea (US)
China's entry into the Korean War in Dec 1951 (MacArthur)
Khrushchev's assumption that the U.S. would accept Cuban missiles
The Vietnam War was winnable using conventional military means (US)
The fall of the Shah of Iran (US)
Saddam Hussein's invasion of Kuwait in 1991 (US)
Failure to detect and destroy Saddam Hussein's WMD during the Persian Gulf War (US)
Saddam Hussein would be overthrown quickly after the Persian Gulf War (US)
Sanctions would deter Saddam Hussein (US)
Slobodan Milosevic's failure to capitulate quickly in the Kosovo Air War
Failure to identify asymmetric threats leading to 911 (US)
Saddam Hussein's possession of WMD prior to OIF (US)

Figure 3: Strategic Intelligence Failures since WW II

Current U.S. fires accuracy and volume are unprecedented in the history of the world. Yet, again, it requires precise intelligence to effectively target those things needed to conduct EBO. Precise intelligence is a requirement to match precision fires. The U.S.'s technology-driven intelligence apparatus is well suited for symmetric warfare against conventional forces; however, it has been challenged by the insurgencies in Iraq and Afghanistan. Human intelligence becomes the greatest requirement to point our vast array of sensors, satellites and drones that cover the modern U.S. battlefield. Human intelligence can be provided by Special Operations Forces (SOF) and other conventional forces on the ground to locate the enemy. This process may be more like police work than the modern high-tech and high tempo operations espoused by EBO, and are fraught with uncertainty and ambiguity that would severely test ONA's requirement for accuracy.

An interesting phenomenon since the Kosovo Air War is that the U.S. has had the ability to kinetically service more targets than there may exist on a given battlefield. This was the case in the Kosovo Air War. From this perspective, the U.S. can afford to hit all of the available targets several times over and not have to worry about finding the golden egg that will have the desired effect. We can now hit everything that we see and then continue to search for new targets. However, in asymmetric warfare, the enemy blends in with the population and disadvantages U.S. strengths in technology-driven intelligence, precision fires and very well trained troops on the ground. Today, if you are facing U.S. or U.K forces on the battlefield and you can be seen - you can be killed. This fact is not lost on our enemies and potential adversaries.

Asymmetric warfare also requires good intelligence, but most important is human intelligence. The U.S. has invested and trusted in technology, and shunned human intelligence since at least the Vietnam War. But, in our current asymmetric environment, technology driven intelligence has a hard time identifying nodes and links without cueing from human intelligence or troops on the ground in-contact with the enemy. Similarly, the insurgent blends in with the population and often requires undercover police tactics to identify, locate, and learn their methods and details of the support infrastructure. Adversaries may also choose to operate in jungles, mountains or urban areas in order to avoid detection. In the current situation in Iraq and Afghanistan, EBO appears to offer no advantages over traditional destruction-based operations. The most recent successes in Iraq, such as Fallujah and the Syrian Border battles, have all been based on DBO vice EBO.

Observe, observe, observe… that you see reality for what it is, and realize that the game you are in keeps changing so that it's up to you to figure out the current rule of the game as it's being played. [16]

M. Mitchell Waldrop

EBO is all about cause and effect, but, cause and effect is not a perfect science for a variety of reasons. Mirror imaging, rationality, adaptation, redundancy and alternatives are all things that complicate accurate prediction of second- and third-order effects. The term "unintended consequences" has become common because of failures to predict results from a given action. It is doubtful ONA can provide the fidelity and battlespace awareness required to conduct EBO in all types of operations and environments.

After an element of national power has been used against an adversary, EBO uses assessment to determine if the desired effect is being achieved. As stated above, the two primary criteria to measure success and failure are the MOE and MOP. There are two

problems with assessment that one should consider when attempting to employ EBO. First, choosing the right MOE and MOP is critical. Just like predicting human reactions, choosing the right measures is complicated by what can be observed, complexity, and the need for trial and error. The second problem of assessment is that the adversary may try to conceal, deceive or confuse attempts to get accurate and timely feedback from attacks against his center of gravity. Indeed, the enemy will likely disguise and protect his center of gravity so that we are thwarted in this effort and have to hunt and peck to find any pressure-points.

The last limitation is time to develop the ONA and assess the implementation of an action against a node or link in the complex system. This is an inherent weakness that USJFCOM recognizes. With respect to time, the development and maintenance of the ONA requires significant man-hours. Some of this can be offset by employing reach-back to centers of excellence to tap into the wealth of knowledge at our universities, think-tanks and intelligence institutions. However, if an adversary is not anticipated due to strategic surprise (see figure 3), then the ONA may be undeveloped or immature. Certainly anything is better than nothing, but planners and decision-makers should recognize there are limitations to the intelligence resources to study a given scenario. In fact, the tremendous information requirements central to the EBO/ONA process may render it impossible to achieve the level of accuracy and ground truth in all situations.

A second aspect of time is that once hostilities commence, the ONA and assessment may not be able to keep up with the tempo of operations. This is very likely since the U.S. war machine is built to conduct high-tempo operations generating maximum destruction, breaking the enemy's cohesion and war making ability, i.e., DBO

against a symmetrical or conventional force. It is very likely that after the initial set of EBO targets are serviced, there will be a lag in feedback or identification of new EBO-style targets, that will in turn lead commanders to strike traditional DBO targets in order to maintain initiative and momentum. Another aspect of this phenomenon is that once hostilities start, planning staffs, and particularly intelligence staffs, will be so focused on the current battle that they will not be able to conduct the level of analysis required to maintain the ONA during the execution phase of operations. In effect, planners may not be able to see the forest for the trees, because John Boyd's Observe Orient Decide Act (OODA) Loop is spinning too fast. Therefore, reach-back to centers of excellence will be critical for ONA generation and maintenance during execution of high-tempo operations. If time becomes a limitation of EBO during execution, commanders will default to DBO.

DESPITE ITS LIMITATIONS - EBO HAS POTENTIAL

We must expand our thinking and disengage ourselves from stale notions of warfighting to seize the opportunities at hand. [17]

BGen Deptula, USAF

There is significant momentum within the Air Force and USJFCOM to make EBO an integral part of the joint staff planning and execution process. Proponents of EBO would argue that EBO has the potential to achieve new levels of military efficiency. By identifying and targeting an adversary's critical nodes which are connected directly to the adversary's center of gravity, EBO would economize and therefore reduce force levels required to achieve the desired end-state in a given situation. The most promising aspect

of EBO would incorporate non-military aspects of national and multinational power that in most cases would be appropriate in non-kinetic operations.

The most revolutionary idea of EBO is that it would apply across all levels of war down to the tactical level. Not just a concept for targeting at the strategic and operational levels of war, EBO would replace current concepts of operational design that are nested within current operational art. Proponents argue that EBO would fit nicely with maneuver warfare, decentralized operations, and emerging distributed operational concepts. EBO could be employed across the full range of military operations including Military Operations Other Than War (MOOTW) and conventional war. EBO also seeks to understand not just the enemy, but also the friendly and neutral forces that are in play in a given situation. This superior knowledge would foster economies in forces employed, collateral damage, adversary casualties and infrastructure damage, and would help to prevent fratricide. In essence, EBO would conform to the new lighter, leaner and more agile force structure that transformation advocates suggest are possible in the 21st century.

Critical to EBO is information technology that enables staffs and commanders to data-mine more than was previously available just a few years ago. By networking with think-tanks, academics and national/multinational intelligence organizations with emerging collaborative tools, EBO is sustained by a reach-back staff that will enable forward staffs to remain lean. Currently, the network tools are lacking, but it is expected that mature systems will emerge in the not too distant future.

There is no doubt that aspects of EBO are being employed in our current wars in Afghanistan and Iraq. This is particularly true in the areas of precision targeting,

information operations, humanitarian operations, and the overall intelligence effort. However, the Muslim extremists we are fighting are particularly effective insurgents and are taking maximum advantage of asymmetric warfare. While EBO is being used, we are no better off than we have been in other counter-insurgencies where numbers of troops on the ground generate stability and cueing for our precision fires. The early days of the insurgency clearly highlighted that the ONA and MOE/Ps that drive EBO take time to develop. You will often not know until after the war what was effective and what wasn't as you try to target everything that can be detected and hit.

The U.S. is also finding that even though the Jihadists are no match for U.S. forces in a standup fight, in the asymmetric arena they are very adept - especially since many are willing to die as smart weapons. Despite the tremendous communications and sensor apparatus, the insurgents continue to match or exceed U.S. information operations. The U.S. military is working hard and doing what it can, but the interagency piece has not been mobilized for war. The U.S. military is engaged in a counterinsurgency that often defaults to DBO because the ONA and MOE/Ps are not providing sufficient targets. Iraq and Afghanistan, like most insurgencies, are manpower-intensive and a prolonged test of wills for the allegiance of the people. "Iraq demonstrates that in the current insurgent war the U.S. faces, technology and information are no substitute to having the adequate numbers of boots on the ground." [18]

CONCLUSION

Satellites can't peer into the human soul. Computers can't predict what an enemy will do impulsively. Nor will any machine do so in our lifetimes, despite the extravagant promises of the apostles of technology. [19]

Ralph Peters

EBO is a doctrinal concept that is limited by its reliance on ONA, MOE/Ps and time to analyze critical adversary infrastructure and sources of power. Adversaries are sure to resist this effort as we are currently seeing in the wars in Afghanistan and Iraq. Technology can only go so far. The enemy might not be affected by "shock and awe" fire power demonstrations. The precision strikes that were supposed to decapitate Saddam Hussein's regime failed to deliver and the insurgents show no signs of changing their behavior. It is therefore important for military decision-makers and planners to realize that EBO has limitations. A more useful implementation of EBO is to recognize its shortcomings and use what works and discard the elements that are wrongheaded, or don't work in a particular type of operation and environment.

EBO will be challenged by adversaries who are not deterred due to a fanatical ideology where the enemy is willing to become a martyr for his beliefs. No amount of deterrence or destruction could have changed the minds of Hitler, Tojo, or those like them who would choose total destruction of their people and nation rather than negotiate or surrender.

EBO has merit as a targeting tool. While EBO may not be perfect because of the difficulties in affecting the will of the enemy to resist and the difficulty in human predictability, there is no reason why EBO should not be incorporated into targeting doctrine. The main obstacle to achieving EBO in the operational fires area is the ability

of the ONA and assessment cycles to keep up in the execution phase when the intensity of operational-tempo is so fast that U.S. forces will run out of targets. U.S. adversaries are well aware that if they can be seen, they will be targeted. Hence, barring the emergence of another superpower that challenges U.S. military hegemony, our likely adversaries will employ asymmetric strategies and tactics that are designed to thwart U.S. intelligence and overall military superiority. Increasingly, U.S. precision fires alone are limited without troops on the ground to stimulate enemy targets.

EBO is a good planning tool for integrating U.S. and multi-national interagency contributions to the war-making effort. Short of full mobilization for war, the U.S. has failed to take advantage of employing all elements of national power to reinforce current military operations. If EBO can be the mechanism to leverage this capability, then it is worth pursuing. However, the main obstacle to harnessing interagency capability may be the cost of increasing their manpower and communication capabilities. Prior to the insurgency in Iraq, the bill payers were going to be the ground forces that are now in short supply because of the manpower intensity of counter-insurgent warfare.

What EBO should not become is a doctrinal replacement for proven operational art doctrine and the operational design that is used to determine identify objectives, critical vulnerabilities, and centers of gravity. It is well and good to identify the desired effect, but this is already accomplished in our doctrine through identification of the objective at every level of war and for every unit in an operation. Critical elements of the objective that point directly to the desired effect at every level of warfare are the in-order-to phrase in the mission statement, commander's intent in the concept of operations, and commander's intent for fires.

For all of its potential, the credibility of EBO is at times compromised by advocates who appear more interested to realize the advantages of strategic airpower theory to make warfare cleaner and more surgical than in coming up with a truly transformational concept to replace existing doctrine. The folly of this view was demonstrated in the 1990's when Al Qaeda was not deterred by surgical air strikes in Sudan and Afghanistan. The strikes did little more than play into Al Qaeda's information and recruiting strategy by painting the U.S. as a paper tiger with no stomach for an ugly war on the ground against determined Jihadists. The "effects" of these particular operations were clearly not those anticipated by planners.

In conclusion, EBO as a joint warfighting concept has too many shortcomings to be employed in all situations on the battlefield. Its inherent is the time and effort required to acquire the amount of data to produce near perfect intelligence. Even if you get the intelligence right, the second shortcoming is to determine the right MOE's to determine what will have the desired effect on a determined adversary - especially an enemy that is willing to sacrifice the lives of its fighters and civilians. Measuring the will of the enemy is difficult at best. Because of American aversion to casualties, there is danger in making assumptions that mirror image the level of sacrifice an adversary will endure to achieve their objective. EBO has its place as an integrating tool for the embryonic interagency process, but it should not be embraced as a joint warfighting concept because it is requires the right circumstances to be effective in war.

NOTES

[1] United States Joint Forces Command "Joint Warfighting Center Joint Doctrine Series Pamphlet (17 November 2004), 2.

[2] Glenn, Kevin B., Maj USAF "The Challenge of Assessing Effects-Based Operations in Air Warfare" Air & Space Power Chronicles, 24 April 2002.

[3] Fayette, Daniel F. "Effects-Based Operations" Air Force Research Laboratory <http://www.afrl.af.mil/techconn/index.htm> [June 2001].

[4] Mellinger, Phillip S., Col USAF (Ret) "The Origins of Effects-Based Operations" Joint Forces Quarterly Issue 35: 116-122.

[5] Ibid. 121-122

[6] Deptula, David A., BGen, USAF "Effects-Based Operations: Change in the Nature of Warfare" Aerospace Education Foundation, Arlington, VA, 2001.

[7] McCrabb, Maris "Effects-based Coalition Operations" ppt. Brief to KSCO Symposium, 23 April 2002.

[8] United States Joint Forces Command "Joint Warfighting Center Joint Doctrine Series Pamphlet (17 November 2004)

[9] U.S. Joint Chiefs of Staff "Memorandum for Record - Effects-based Operations (EBO) Mini-forum" 11 March 2005.

[10] Deptula, David A., BGen, USAF "Effects-Based Operations: Change in the Nature of Warfare" Aerospace Education Foundation, Arlington, VA, 2001.

[11] United States Joint Forces Command "Joint Warfighting Center Joint Doctrine Series Pamphlet (17 November 2004), 3.

[12] Borgu, Aldo "Network Centric Warfare and Military Operations Other Than War: Counterinsurgency in the 21st century." Australian Strategic Policy Institute presentation to the Nework Centric Warfare 2004 Conference "Meeting the Challenges of Warfare in the Information Age" Australian Defence Force Academy, 24-25 November 2004, 4.

[13] Reese, Timothy R. LTC USA, "Precision Firepower: Smart Bombs, Dumb Strategy" Military Review, (July-August 2003): 48.

[14] United States Joint Forces Command "Joint Warfighting Center Joint Doctrine Series Pamphlet (17 November 2004), 9.

[15] Davis, Paul K Effects-Based Operations (EBO): A Grand Challenge for the AnalyticalCommunity. Rand Publication Database 2001 <http:www.rand.org/publications/MR/MR1477/>, 22.

[16] Waldrop, M. Mitchell Complexity: The Emerging Science at the Edge of Order an Chaos (New York: Simon & Schuster, 1993), 11.

[17] Deptula, Brigadier General David A. Effects-Based Operations: Change in the Nature of Warfare, 21.

[18] Borgu, Aldo "Network Centric Warfare and Military Operations Other Than War: Counterinsurgency in the 21st century." Australian Strategic Policy Institute presentation to the Nework Centric Warfare 2004 Conference "Meeting the Challenges of Warfare in the Information Age" Australian Defence Force Academy (24-25 November 2004), 6.

[19] Peters, Ralph "A Grave New World - 10 lessons from the war in Iraq" Armed Forces Journal (April 2005), 34.

FIGURES

"Figure 1: An Effects-Based Approach", United States Joint Forces Command, The Joint Warfighting Center Joint Doctrine Series Pamphlet 7, (17 November 2004), 7.

"Figure 2: System-of-Systems (SoSA)", Ibid, 10.

"Figure 3: Strategic Intelligence Failures since WW II", Davis, Paul K Effects-Based Operations (EBO): A Grand Challenge for the Analytical Community. Rand Publication Database 2001 <http:www.rand.org/publications/ MR/MR1477/>, 23.

BIBLIOGRAPHY

Barnett, Roger W. "Book Review <http://www.nwc.navy.mil/press/Review/2004/Spring>" Effects Based Operations: Applying Network-centric Warfare in Peace, Crisis, And War by Smith, Edward A., Jr., Washington D.C.: Department of Defense Command and Control Research Program, 2002.

Batschelet, Allen W., LTC USA FA "Effects-Based Operations for Joint Warfighters." U.S. Army Professional Writing Collection. <http:www.army.mil/professional writing/volumes/volume1/june_2003/6_03_3.html> [May-June 2003]

Borgu, Aldo "Network Centric Warfare and Military Operations Other Than War: Counterinsurgency in the 21st century." Australian Strategic Policy Institute presentation to the Nework Centric Warfare 2004 Conference "Meeting the Challenges of Warfare in the Information Age" Australian Defence Force Academy, 24-25 November 2004.

Davis, Paul K Effects-Based Operations (EBO): A Grand Challenge for the Analytical Community. Rand Publication Database 2001 <http:www.rand.org/publications/MR/MR1477/>

Dawen, Choy, CPT Singapore Air Force "Effects-Based Operations: Obstacles and Opportunities." Journal of Singapore Armed Forces, Volume 30, 2004 <http://www.mindef.gov.sg/safti/pointer/back/journals/2004/Vol30_2/3.htm>

Deptula, David A., BGen, USAF "Effects-Based Operations: Change in the Nature of Warfare" Aerospace Education Foundation, Arlington, VA, 2001.

Fayette, Daniel F. "Effects-Based Operations" Air Force Research Laboratory <http://www.afrl.af.mil/techconn/index.htm> [June 2001].

Glenn, Kevin B., Maj USAF "The Challenge of Assessing Effects-Based Operations in Air Warfare" Air & Space Power Chronicles, 24 April 2002.

Herndon, Robert B., MAJ USA, Robinson, John A. CWO-3 USA, Creighton, James L. COL USA, Torres, Raphael, LTC USA, Bello, Louis J. MAJ USA "Effects-Based Operations in Afghanistan" Field Artillery (January-February 2004): 26-30.

Hoang, Joshua, Ho How, LTC Singapore Navy "Effects-Based Operations Equals to Shock and Awe?" ." Journal of Singapore Armed Forces, Volume 30, 2004 <http://www.mindef.gov.sg/safti/pointer/back/journals/2004/Vol30_2/7.htm>

Jane's Defense Weekly Editor, "Effects-Based Air Operations - Cause And Effect" Jane's Defence Weekly, (June 18, 2004).

Kaplan, Fred "The Flaw in Shock and Awe - Rumsfeld's theory of warfare isn't working, at least so far." <http://slate.msn.com/id/2080745/> [March 26, 2003].

King, Craig, Lt-Col MBE, CD "Effects Based Operations: Buzzword or Blueprint?" Canadian Forces College <http://wps.cfc.dnd.ca/papers/amsc7/king.htm>[October 2004].

Lasswell, James A., Col USMC (Ret), Book Review <http://www.mca-marines.org/Gazette/0405lasswellBR.html> Effects Based Operations: Applying Network-centric Warfare in Peace, Crisis, And War by Smith, Edward A., Jr., Washington D.C.: Department of Defense Command and Control Research Program, 2002.

McCrabb, Maris "Effects-based Coalition Operations" ppt. Brief to KSCO Symposium, 23 April 2002.

Mellinger, Phillip S., Col USAF (Ret) "The Origins of Effects-Based Operations" Joint Forces Quarterly Issue 35: 116-122.

Peters, Ralph "A Grave New World - 10 lessons from the war in Iraq" Armed Forces Journal (April 2005) 34.

Reese, Timothy R. LTC USA, "Precision Firepower: Smart Bombs, Dumb Strategy" Military Review, (July-August 2003): 46-53.

Smith, Edward A. Effects Based Operations: Applying Network-centric Warfare in Peace, Crisis, And War. Washington D.C.: Department of Defense Command and Control Research Program, 2002.

United States Joint Forces Command, The Joint Warfighting Center Joint Doctrine Series Pamphlet 7, 17 November 2004.

U.S. Joint Chiefs of Staff "Memorandum for Record - Effects-based Operations (EBO) Mini-forum" 11 March 2005.

Vego, Milan N. Operational Warfare. Naval War College Pub 1004. Newport, RI: 2000.