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EFFECTS-BASED OPERATIONS: NOT SIMPLE, BUT NECESSARY

By / par

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Abstract

Related to current views of fundamental transformation or 'revolution in military affairs' (RMA), the concept of effects-based operations (EBO) has been proposed as a means to transcend the focus on the destruction of enemy forces that is implicit in current attritionist or annihilation-oriented approaches to warfare. This paper proposes that the limitations inherent in current targeting doctrine can be overcome through an evolved concept of EBO.

After a brief assessment of targeting issues evident from operations Desert Storm and Allied Force, the paper examines some of the fundamental and practical challenges to the EBO concept through the perspective of the analytical framework that would be integral to any implemented EBO theory. The complexity of the required analysis effort is recognized as the most fundamental challenge to the implementation of an effects based concept. EBO is emphasized as an extension of (as opposed to a replacement for) direct military operations and the instruments used therein. The EBO concept is then discussed in the context of military transformation and the associated doctrinal gap that currently exists between the army and the air force. The paper concludes by arguing that the EBO concept can serve as a vehicle to overcome this gap and thereby strengthen the development of joint doctrine.

EFFECT-BASED OPERATIONS: NOT SIMPLE, BUT NECESSARY

INTRODUCTION

Background

It can seem so simple. Whether following an ‘attritionist’ approach directed against the enemy’s forces or an ‘annihilation-oriented’ approach directed against the enemy’s cohesion and will, the concepts of manoeuvre are applied to either destroy the opponent’s physical means to resist or to destroy his capability to resist.¹ Of course such a simplification masks the sophisticated theoretical foundations upon which the more practical aspects of operational concepts, doctrine and supporting processes are constructed. Further, technology exerts a fundamental influence on this construct, constantly challenging both the theory and the practice of warfare. This influence is particularly pronounced at times of rapid technological change where, as proposed in various concepts of revolution in military affairs (RMA), developments in or a confluence of socio-political, organizational or technological drivers can alter the very nature of warfare. In his book ‘Technology and War’, Martin Van Creveld provides a vivid description of the relationship of technology and war: “...planning, preparation, execution, and evaluation; operations and intelligence and organization and supply; objectives and methods and capabilities and missions; command and leadership and strategy and tactics; even the conceptual framework employed by our brains in order to think about war and its conduct, not one of these is immune to the impact that technology

¹ CFC 106 (3). CJ SOH Canadian Forces College Combined and Joint Staff Officer’s Handbook. 6 June 2001. II-1-8/17, 18.

had and does have and always will have.’² The emerging concept of effects-based operations (EBO) is very much a product of the capabilities afforded by current and emerging technology, and as such, clearly supports Van Creveld’s assertion regarding technology’s inevitable impact on warfare today and in the immediate future.

Effects-Based Operations

Related to current views of fundamental transformation or RMA, the concept of EBO has been proposed as a means to transcend the focus on the destruction of enemy forces that is implicit in current attritionist or annihilation-oriented approaches to warfare. The genesis of the EBO concept can be traced to the Gulf War and the subsequent (but certainly not universally accepted) contention that air power had finally demonstrated the potential to deliver the strategic impact promised by early air power theorists such as Giulio Douhet, William ‘Billy’ Mitchell, and Hugh Trenchard. A member of the Gulf War ‘Black Hole’ targeting planning team, MGen David A. Deptula (then LCol) became an early proponent and promoter of the EBO concept, and his 1995 paper *‘Firing for Effect: Change in the Nature of Warfare’* has been a catalyst for much of the conceptual development and debate that has ensued over the last several years.³ Deptula framed EBO as a tool to support parallel attacks on critical targets to cause paralysis in the enemy’s ‘system of systems’ with the desired effect of *controlling* an enemy by

² Martin Van Creveld. Technology and War. The Free Press, New York, 1989. P. 1.

³ Col David A. Deptula. “Firing For Effect: Change in the Nature of Warfare”. Defense and Airpower Series. Arlington, VA: Aerospace Education Foundation, 24 August 1995. This initial paper has subsequently been expanded upon in the updated paper cited below. To clarify this and future references to rank, it should be noted that Deptula held the rank of LCol during his time with the ‘Black Hole’ team and has since been promoted through to his current rank of MGen.

eliminating his capability to employ forces (emphasis added).⁴ This shift of focus from destruction does not imply a complete absence of the use of lethal weapons or of ‘destructive’ attacks. Fundamentally, it is the broader *intent* of any form of attack that would be altered within an EBO concept. An effects-based strategy would still see attacks on individual targets (albeit not necessarily destructive attacks), but the intent of such attacks would be viewed more in the context of their contribution to the enemy’s overall ability to control its vital functions and overall war fighting capability. This may seem to be a fine distinction; however, when viewed at the operational and strategic levels of war, it is a distinction with potentially dramatic implications on the way war will be waged.

Deptula has linked his concept of EBO to the emerging operational concept called Rapid Decisive Operations (RDO) and a broader theory of warfare referred to as ‘parallel warfare’. Parallel warfare is described as the “simultaneous application of force (time) across each level of war uninhibited by geography (space)”.⁵ The object of parallel war is to achieve effective control over the set of systems relied on by an adversary for power and influence; namely, leadership, population, essential industries, transportation and distribution, and forces.⁶ In Deptula’s construct, therefore, EBO are linked to the theory of parallel war by the implicit contention that force can be used to effectively control a

⁴ BGen David A. Deptula. “Effects-Based Operations: Change in the Nature of War”, Aerospace Education Foundation, 1501 Lee Highway, Arlington VA, 2001, (available on the Air Force Association Web Site (www.afa.org)). This perspective of definition is also cited by Williams, LCol Brett T. “Effects-Based Operations: Theory, Application and the Role of Airpower”, Strategy Research Paper, US Army War College, Carlisle Barracks, PA 17013-5050. USAWC Class of 2002. EBO is a notoriously difficult concept to define and this is by no means meant to be a comprehensive definition; further development and refinement of the definition is attempted later in this paper.

⁵ Ibid. P 5.

system, in order to achieve specific effects rather than to destroy the system. Although a detailed discussion of EBO in the context of parallel warfare or RDO (or of attrition or annihilation warfare, for that matter) is beyond the scope of this paper, the point must be made that the concept of EBO encompasses much more than just a new approach to targeting or the facilitation of any specific operational approach. As such, this paper takes the view of EBO as an overarching theory for employing power in any scenario and as a transforming concept with broad implications across all levels of warfare.

Even when placed in the context of this broad definition and scope, development of the EBO concept can be seen as a means to expand on the capability afforded by the enabling technologies associated with the overall targeting process. Deptula refers to the “leverage that stealth, precision, rapid and secure information transfer, ready access to accurate positional information, and other cutting edge technological systems can provide”.⁷ Further, he points to emerging technologies associated with “non-lethal weapons, information warfare, miniaturized highly accurate munitions, and space-based systems” that have the potential to achieve “the ultimate application of parallel war [that] would involve few destructive weapons at all”.⁸ While acknowledging the general improvement in capability afforded by both current and emerging technologies, other more skeptical observers refer to the inevitable fog and friction of war and question the extent to which these technologies will ever achieve the promised levels of effectiveness.

⁶ Ibid. P 6.

⁷ Ibid. P 22.

⁸ Idem.

The EBO concept, however, does not rest solely on technological or mechanistic improvements. Fundamental to the implementation of an EBO approach is the need to develop organizations and doctrine that can fully exploit these enabling technologies. At the heart of the EBO proposition, therefore, is a belief that current doctrine is underpinned by a targeting philosophy that is too narrowly focused on the destruction of enemy forces, and consequently, does not allow full value to be leveraged from advances in capability afforded by current and emerging targeting technology.

Given its direct link to the capability for precision attack, a prominent role for air power in exploiting the concept of EBO is inevitable. Consequently, it is not surprising that EBO has generated considerable debate and consternation amongst the surface forces, most notably within the army. Although risking a generalization, it can be said that the army tends to see EBO as another example of the air force's over-reliance on technology (specifically, the need for 'perfect information'); at best, just another empty promise of air power's ability to deliver strategic effects or a thinly veiled attempt to seize more of the budget, and at worst, a dangerous concept that threatens overall war fighting capability. This debate in itself highlights a growing doctrinal and cultural gap that exists between the services that is hindering progress in the development of effective joint doctrine and operational concepts.

This paper argues that the limitations inherent in current targeting doctrine can be overcome by an evolved concept of EBO. Implicit in this argument is a contention that current targeting doctrine and operational concepts are, indeed, limiting factors. The

fundamental and practical challenges to the EBO concept must be examined through the perspective of the analytical framework that would be integral to any ‘implemented’ EBO theory. Finally, development of the EBO concept could serve as a vehicle to overcome the doctrinal ‘mud-slinging’ (and army apprehension) that is currently limiting the development of joint doctrine.

THE LIMITATIONS OF CURRENT DOCTRINE

A New Concept?

It would certainly be inaccurate to suggest that current targeting doctrine and operational concepts completely disregard effects during the planning and conduct of the overall targeting process. The potential effects of the application of airpower in general, and of aerial bombardment in particular, have been at the center of air power theoretical and doctrinal debate from the earliest days of flight. A link to an effects-based philosophy can be seen in Douhet’s concept of using air power to *control* an enemy (the ultimate desired effect) through a strategy of attacking the population’s moral resistance and resolve to fight (although he did see the destruction of vital, strategic infrastructure as a key means to this ends). Similar attention to effects, although again not always aligned with principles of control versus destruction, are equally prominent in the writings of other early theorists such as William ‘Billy’ Mitchell and J.C. Slessor, as well as in more recent ideas proposed by Col John Warden and Robert Pape.⁹ Warden’s now well-known conceptual construct of five concentric rings representing the essential

components of an enemy's 'system' is perhaps the most relevant to the concept of EBO.¹⁰ In framing his concept of parallel warfare and EBO, Deptula builds on Warden's characterization of the enemy 'system', but with a greater focus on paralyzing the entire system through simultaneous attacks (not necessarily destructive) on all associated components, as opposed to achieving a similar ultimate effect through sequential destruction of targets within each component.¹¹

Stepping away from the airpower perspective, a similar recognition of the importance of effects is also prominent in individual service and joint doctrine, most notably as a manifestation of synchronization. But EBO is not just another form of synchronization. As an overarching operational concept of joint doctrine, synchronization certainly deals with many of the same issues as EBO. However, within the current 'attritionist' or 'annihilation-oriented' approaches to warfare, synchronization is very much related to the ultimate destruction of enemy forces. Colonel Stephen Kirin characterizes synchronization as "both a *process* -- the arrangement of military actions as to time, space, and purpose -- and an *effect* -- maximum relative combat power at a decisive place and time."¹² From this perspective, successful synchronization would ensure the orchestration of "every element of operational art -- deception and surprise, flexibility, intelligence, air support, engineering, the use of reserves, risk, imagination,

⁹ For an excellent examination of effect-based thought from past and current airpower theorists, see Beagle, T.W. "Effects-Based Targeting: Another Empty Promise?" Thesis for the School of Advanced Airpower Studies, Maxwell Air Force Base, Alabama, June 2000. P 16-24.

¹⁰ Ibid. P 22.

¹¹ Deptula (2001). Op Cit. P 3-4.

¹² Stephen J. Kirin. "Synchronization", Naval War College Review. 49 no. 4 (Autumn 1996): 7-22 (Periodical-Periodique / IRC-CIS) p1.

leadership and focus on the objective.”¹³ Accordingly, the concept of EBO should not be viewed as a re-invention of, or rival to, the concept of synchronization; indeed, it seems certain that synchronization would remain an important and complementary enabler of an effective EBO strategy – albeit with a concomitant shift of focus from destruction to effect.

A more limited view of synchronization, however, is relevant to the issue of current targeting doctrine and operational concepts as they pertain to EBO. While acknowledging the imposition of a somewhat limited scope on the concept, synchronization can also be related specifically to the integration of processes involved in the overall targeting process - intelligence preparation of the battlespace, generation of target lists and assignment of assets (including information operations), and the subsequent assessment of success or effect (through bomb damage assessment (BDA) and broader intelligence analysis). These processes represent the practical aspects of ‘implementation’ that will enable an EBO approach to take place.

Proponents of EBO generally contend that a form of effects-based strategy has in fact been implemented in recent conflicts, albeit in an ad hoc manner and without the benefit of any formal effects-based doctrine. More skeptical observers see evidence of the inexorable limitations of targeting technology and processes, and consequently, point to the impracticality of developing and implementing an overarching effects-based approach. Although there is no concurrence regarding the practicality or desirability of

¹³ Ibid. P 5.

EBO as a 'solution', a brief examination of some recent conflicts will expose some common ground regarding a degree of dissatisfaction with current targeting doctrine.

Desert Storm

Although Deptula is clearly positive regarding the degree to which an effects-based approach was implemented during the Gulf War air campaign, he also acknowledges the necessity of further development of the concept and its associated enabling technologies. He states that, "...while the aircraft/PGM match of the 1990s was orders of magnitude beyond the systems used during World War II, it is crude compared to the ideal means for the conduct of effects-based operations."¹⁴ A starting point for such development can be found in the philosophy underlying the overall air strategy. Deptula contends that initial attack planning in the Gulf War was based on a "traditional destruction-based methodology" that reflected a lack of emphasis on "development of air strategy or providing tools for the planning of air strategy" since the time of Vietnam.¹⁵ Recognition of the resultant weakness in the initial concept of operations for the air campaign (Instant Thunder) led the JFACC to establish the special planning group that became known as the 'Black Hole':

The architects of the air campaign did not limit themselves to the 'servicing a target list' approach. The design of the air campaign grew out of a mindset questioning how to impose force against enemy systems to achieve specific effects that would contribute directly to the military and political objectives of the Coalition. Planning was based on a center of gravity approach. It began with a critical examination of potential strategic centers of gravity, their constituent operational systems (operational centers of gravity), and led to identifying the set of individual targets making up each system (tactical centers of gravity). Assessment of whether to continue or stop attacks against a particular system's target set was dependent on achieving the effects desired on the system. Individual targets only became important if the system was still operating. If the effects desired were achieved, it did not matter that individual targets may not have been hit.¹⁶

¹⁴ Deptula (2001). Op Cit. P 22.

Other assessments of intelligence and targeting operations in the Gulf War are not as positive regarding the efficacy of Black Hole operations, nor of their effectiveness in support of the overall air campaign (as distinguished from their support of the purported effects-based approach). In describing theatre-level intelligence processes, one after action report contends, "...the Black Hole was a compartmented operation with little resident intelligence experience, that ...neither fully appreciated nor properly availed itself of the imagery tasking and prioritization system."¹⁷ On the other hand, it is acknowledged that the Black Hole team did have "ready access to targeting intelligence from national intelligence agencies" that ensured they got "expert intelligence more rapidly than otherwise might have been the case".¹⁸ While the degree to which these processes negatively affected the overall targeting strategy is open to debate, there is general agreement that a critical inadequacy was evident in the associated area of bomb damage assessment (BDA).¹⁹ The degree to which any single aspect contributed to the overall BDA failure is not universally agreed upon; however, the shortfall is generally attributed to a combination of organizational, procedural and technical issues. Again, the compartmentalization of the Black Hole team has been identified as causal to these problems as they "were unfamiliar with the procedures for ordering data collection", and as a result, "people not involved in planning the air campaign and unaware of its direction determined each day's reconnaissance requirements".²⁰ Whatever the cause of the BDA failures, the lack of confidence in the process led to "using the number of air strikes

¹⁵ Ibid. P 12, 13.

¹⁶ Ibid. P 14.

¹⁷ Thomas A. Keaney and Cohen, Eliot A. "Revolution in Warfare? Air Power in the Persian Gulf", Naval Institute Press, Annapolis, Maryland. (Revised edition of Gulf War Air Power Survey, 1993.) P 113.

¹⁸ Ibid. P 114, 115.

against a target, not bomb damage assessment, as [the] prime indicator of enemy combat effectiveness”.²¹ This foundation for assessment is certainly less than ideal, whether from a destruction-based or an effects-based approach.

Allied Force

While acknowledging that, “because of political and military challenges and limitations, Allied Force was by no means a pure example of parallel warfare”, Deptula still contends that “the air war over Serbia evidenced the potential of advanced technologies with effects-based warfare”.²² Certainly the incorporation of many technical advances and new systems (such as the Joint Surveillance, Target Attack Radar System (JSTARS), the Predator Unmanned Air Vehicle (UAV), and the Airborne Command and Control Center (ABCCC)) represented a significant improvement over the capabilities available during the Gulf War. Unfortunately, these technical and procedural improvements do not appear to have translated into a better targeting process nor better BDA or intelligence analysis.

The philosophy that would underlie the overall air strategy in Allied Force was subject to significant debate at the political and military strategic levels. The result was a strategy of gradual escalation that initially called for a limited air and missile campaign striking at fixed military targets such as headquarters, communications facilities and

¹⁹ Ibid. P 120.

²⁰ Ibid. P 121.

²¹ Ibid. P 122.

²² Deptula (2001). Op Cit. P 24.

ammunition and supply depots.²³ Even within this general strategy, however, there was little agreement on how the campaign should actually be conducted. SACEUR, General Wesley K. Clark, promoted balanced attacks on key strategic and interdiction targets and Serbian forces in the field in Kosovo.²⁴ Lt Gen Michael Short, NATO's JFACC, favoured a campaign that focused on an intensive strategic bombing campaign that would strike hard at the targets of most value to the Serbian leadership, halt its ability to communicate with its people, starve all military operations from the rear, and cripple the Serbian economy.²⁵

In the event, and even while recognizing the political constraints that inhibited the operation, the rather timid application of airpower drew sharp criticism. At the end of a week of ineffectual bombing (where only 100 targets had been approved), Gen Clark received approval from the North Atlantic Council for a much-expanded set of targets, which in turn led to a call to his planners to meet a new 'goal' of generating 2,000 targets.²⁶ But even with this expanded target list, and with the commencement of an associated target development process, NATO seemed to be lacking any clear picture of the operational impact of its activities. General John Jumper, commander of US Air Forces Europe during Allied Force, referred to the campaign as "random acts of violence" and the targeting process as "campaign-by-target-list management," whereby planners simply took a list of approved targets and managed them on a day-to-day

²³ Anthony H. Cordesman. "The Lessons and Non-Lessons of the Air and Missile Campaign in Kosovo", Praeder Publishers, 88 post road, Westport, CT 06881. 2001.

²⁴ Ibid. P 166.

²⁵ Idem.

basis.²⁷ Describing the targeting process and the associated assessment of the effectiveness of strategic bombing in Kosovo, Anthony Cordesman proposes the “need for a far better way of assessing the impact of strategic strikes on military production and supply facilities, the required targeting, and the proper method of battle damage”.²⁸ In summary, the Allied Force air campaign lacked clear consideration of overall operational impact, and as with Desert Storm, the foundation for overall assessment was less than optimal.

Technology, Doctrine and Strategy

Whether viewed as being in support of an extant, ‘traditional’ approach to targeting, or in support of the rudimentary steps toward EBO perceived by Deptula, it does not appear that the targeting doctrine employed during these conflicts produced the results that had been hoped for. In particular, although the incorporation of new technology and systems led to many ‘mechanistic’ improvements, intelligence analysis does not appear to have favourably influenced the overall air strategy before the fact, and was not effectively incorporated into the overall targeting process during actual operations. That technology in itself did not deliver all that might have been expected should come as no surprise; the importance of the underlying philosophy that governs the development of doctrine and the subsequent employment of systems and technology has long been recognized. This immutable interaction between technology and doctrine is central to the development of the EBO concept. On the one hand, although technology is

²⁶ Benjamin S. Lambeth. “NATO’s Air War For Kosovo: A Strategic and Operational Assessment”, Published 2001 by RAND, 1200 South Hayes Street, Arlington, VA 22202-5050. P 199.

²⁷ Ibid. P 201 and note.

clearly an important enabler for EBO, the opportunities afforded by this technology cannot be leveraged without an accompanying shift in organization and doctrine. On the other hand, and perhaps more-fundamentally, a strategy based on traditional concepts of attrition and annihilation precludes the development of organizations and doctrine that can exploit an effects-based approach.

EFFECTS-BASED OPERATIONS – CHALLENGES

Even if some attempts have been made to acknowledge or apply effects in the design and conduct of recent operations, they have clearly not been underpinned by an accepted or comprehensive effects-based strategy or doctrine.²⁹ The development of such a doctrine implies the capability for implementation; namely, to plan for and subsequently analyze the effects desired, as well as to incorporate this analysis into the operational level decision cycle in order to influence the ongoing targeting process. In this light, and before tackling the subject of doctrinal development in more detail, some fundamental and practical challenges to EBO implementation deserve mention. Given the apparent limitations of current intelligence analysis discussed previously, these challenges must be examined through the perspective of the analytical framework that would be integral to any ‘implemented’ EBO theory.

²⁸ Cordesman. Op Cit. P 180.

²⁹ Edward Mann, Gary Endersby, and Tom Searle. “Dominant Effects: Effects-Based Joint Operations”, Aerospace Power Journal, Vortices, Fall 2001. P 2. Note 6. “The Air force Doctrine Center is making a concerted effort...to write EBO into all service doctrine, and EBO terminology is being written into select segments of joint doctrine...Judging by responses from service representatives at a recent Joint Forces

An Analytical Framework

It is important to emphasize the view of EBO expressed at the beginning of this paper as an overarching theory for employing power in any scenario, across all levels of warfare. In this sense, although important, tactical-level actions such as the delivery of weapons and the physical destruction of targets are less significant than the ultimate ‘higher-level’ effects achieved at the operational and strategic levels.³⁰ Figure 1, reproduced from Paul K. Davis’s excellent monograph on the challenge presented by EBO analysis, provides a useful structure for conveying the full scope of the EBO concept.³¹ In this depiction, the negative x-axis represents the instruments of force employed; the positive y-axis depicts the scope of physical targets (including cyberspace targets); the positive x-axis depicts the nature of direct military operations; and the negative y-axis represents targets in the cognitive and behavioral domains.³² In addition, the lines making up the various triangular shapes represent the proposed ‘current’, ‘state of the art’ and ‘goal’ states of modeling and analysis. The dashed line portions of the triangles indicate where the analysis tends to be weak with respect to indirect effects.³³

Command/J-39 conference on the subject, the Navy is well on board, but the Marine corps seems skeptical and the Army at least mildly opposed to incorporating these concepts into doctrine.”

³⁰ Ibid. P 4.

³¹ Paul K. Davis. Effects-Based Operations: A Grand Challenge for the Analytical Community. RAND, 1200 South Hayes Street, Arlington, VA, 2001. P 7.

³² Ibid. P 8, 9.

³³ Ibid. P 9.

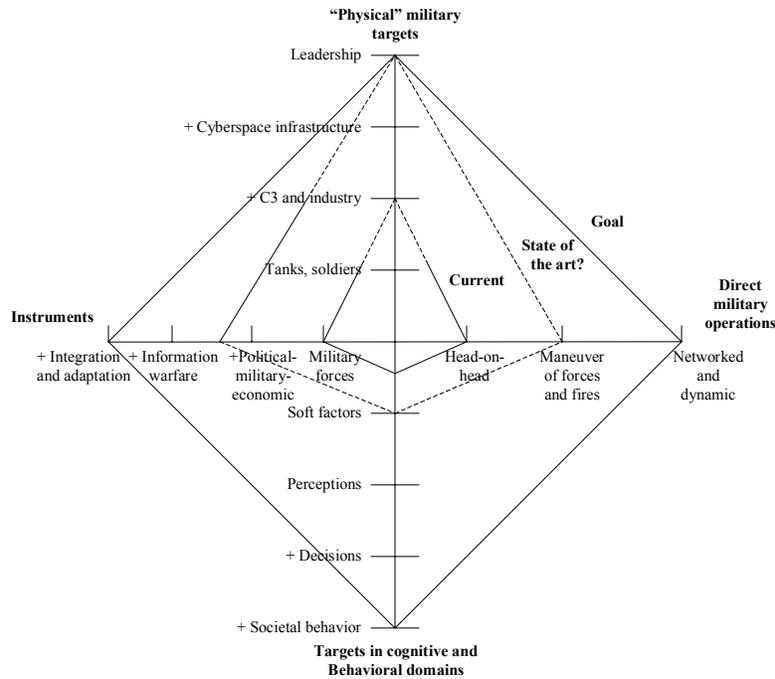


Figure 1.³⁴

Although developed to characterize the state of analysis and modeling as it relates to EBO, the lines indicating ‘current’ and ‘state of the art’ also present a fairly good illustration of the state of actual conduct and capability. In terms of instruments, for example, the use of military forces and political/military/economic measures (such as embargoes) are relatively well developed. The effect of these instruments against ‘physical’ targets, however, is less certain, and against targets in the ‘cognitive and behavioral domain’ even less so. The psychological factors that determine the decisions of leaders are difficult to understand and even more difficult to control, and operations intended to break the will and morale of populations have often done precisely the

³⁴ Idem. (Figure 2.2 – “Characterizing the Baseline, Current State of the Art, and Goal.”)

opposite.³⁵ Perhaps most importantly, the ‘goal’ of being able to achieve effects along the spectrum of these ‘cognitive’ targets (which, arguably, relate very much to the enemy’s ‘cohesion and will to fight’) implies a concomitant expansion of ‘instruments’ beyond that normally associated with the ‘destruction’ of enemy forces.

Effects

Implicit in the view of EBO as an expansion of the scope of military operations and instruments is the principle of achieving systemic effects. Examples of using non-destructive attack and the concept of systemic effects can be seen in Deptula’s explanation of the rationale behind attacks on Iraqi air defence sector operations centres (SOCs) and Baghdad’s electrical system:

Postulating that a 2000 pound bomb could go off in the other end of the building in which the air campaign planners were working, one of the planners made a case that while the planning group might survive, if so they would abandon the facility to seek shelter. The point was that the SOCs...did not require destruction. Targeting only had to render them ineffective, unable to conduct operations through the period of the ensuing attacks by non-stealthy aircraft.³⁶

Because all the targets in the primary and secondary electric target set were not destroyed or damaged to a specific percentage, the analysis concluded the objective had not been met. In actuality, the electric system was not operating in Baghdad, and the power grid in the rest of the country was not much better off. The effect desired in attacking this system was not destruction of each of the electric sites, it was to temporarily stop the production of electricity in certain areas of Iraq.³⁷

Although useful for expressing the basic connotation of the term ‘systemic effect’, these relatively straightforward examples mask the complexity that is inherent to conceiving, planning for, achieving, and assessing such effects. Acknowledging this complexity, Davis refers to the idea of a systems framework and to a related range of

³⁵ Ibid. P. 12.

³⁶ Deptula (2001). Op Cit. P. 12.

³⁷ Ibid. P. 11.

effects and instruments in his definition of 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.”³⁸ In this sense, effects are defined as the physical, functional, systemic, and/or psychological outcomes, events or consequences that result from specific military action. They may occur at all levels of employment and can produce or trigger follow-on outcomes.³⁹ Direct effects refer to first-order effects (weapons employment results etc.) that are the result of military actions with no intervening effect or mechanism between act and outcome.⁴⁰ Indirect effects are created through an intermediate effect or mechanism, producing a final outcome or result which may be functional, systemic or psychological, and which tend to be delayed and harder to recognize than direct effects.⁴¹ Cascading effects are indirect effects that ripple through an enemy system, often influencing other systems and nodes critical to multiple systems, most often flowing from higher to lower level of operations.⁴² Other taxonomies include further definition of physical, functional, systemic and psychological effects (the details of which are not important for the purposes of this paper) and distinguish effects in a variety of ways (for example, by time

³⁸ Ibid. P 9.

³⁹ Mann, Endersby, Searle. Op Cit. P 6. (Modified from Air force Doctrine Document 2-1.2, “Strategic Attack”, draft, 1 January 2000.)

⁴⁰ Idem. (Modified from Joint Pub 3-60, “Joint Doctrine for Targeting”, 6 June 2000, preliminary coordination draft.)

⁴¹ Idem. (Modified from Joint Pub 3-60, “Joint Doctrine for Targeting”, 6 June 2000, preliminary coordination draft.)

⁴² Ibid. P 7. (Modified from Joint Pub 3-60, “Joint Doctrine for Targeting”, 6 June 2000, preliminary coordination draft.)

and location - instantaneous/delayed; or by duration; level - strategic, operational, tactical; and by type – direct, systemic, psychological etc.⁴³

An important consideration is that both desired and undesired effects as well as predicted and unpredicted effects may occur. In other words, the very nature of indirect and cascading effects implies that desired and predicted outcomes may generate subsequent effects that are completely unpredicted and/or undesired. For example, shutting down an electrical grid may have the desired and predicted effect of precluding the operation of key components of an air defence system, thereby enabling friendly forces to attack other key targets. As well, such action could have a desired (and possibly predictable) effect on enemy leadership, perhaps generating a perception of increased vulnerability to air attack in other areas. Conversely, electrical failures could unexpectedly disrupt the power supply to a nearby hospital, resulting in the deaths of a number of infants or precluding the treatment of civilian casualties. In turn, such a tragedy could have the undesired (though perhaps predictable) effect of strengthening the population's resolve or of increasing their resistance to any post-conflict agreements.

On the other side of the equation, the 'targets' of EBO must also be considered, and as with effects, can also be distinguished in a variety of ways. Davis offers two categories of target distinctions – by location (collocated/separate, discrete/hierarchical/networked); and by the nature of the system (static/dynamic etc.).⁴⁴ Terrorist or insurgent organizations are examples of separate, networked 'target systems',

⁴³ Idem. For a detailed discussion of these taxonomies see also Beale, Op Cit. P. 5 – 11.

that are particularly challenging to quantify; although it may be possible to differentiate amongst the various component parts of the system, identifying or isolating those parts for attack (destructive or otherwise) will not always be straight-forward.

In summarizing the difficulties presented by EBO, Davis describes war, operations other than war, and even foreign affairs as occurring “in a *complex adaptive system* (CAS)”, that is by nature an unpredictable and mysterious entity.⁴⁵ The principal factor characterizing a CAS in this context is human involvement. In addition to the word ‘destroy’, therefore, the operative words associated with EBO include those such as, ‘reduce’, ‘limit’ (functionality or capability), ‘degrade’ (effectiveness), ‘confuse’, ‘divert’, ‘demoralize’, and ‘influence’ (decisions and attitudes).⁴⁶ The influence that any particular action (whether large or small) may have on an individual or group is subject to countless, intangible elements. Davis concludes that when operating in a CAS, “salvation comes not so much in prediction as in adaptation”.⁴⁷ Far from being unique to an effects-based approach, this requirement for adaptation is completely consistent with both the theory and experience of the more ‘traditional’ approaches to warfare. It does, however, highlight the need for a significantly broadened analysis and planning effort as the foundation for any such adaptation.

⁴⁴ Davis. Op Cit. P 19.

⁴⁵ Ibid. P. 24.

⁴⁶ Davis. Op Cit. P 20.

⁴⁷ Ibid. P. 28.

Challenges

When the wide range of effects, the inevitability of unpredicted effects and the chaotic nature of cascading effects are all considered, the immense complexity of the associated intelligence analysis effort becomes evident.⁴⁸ Clearly, any associated analysis must go well beyond BDA and the extant capabilities for intelligence analysis. Exploiting systemic or psychological effects will require extensive research on the targets, the specific reaction desired from the target systems, the methods of inducing that reaction, and the means of collecting and analyzing data that indicate progress.⁴⁹ The complexity (and some would say the impossibility) of this task embodies the fundamental challenge to the acceptance of the effects-based concept.

Other challenges relate to more practical issues of achieving the level of ‘perfect information’ that critics insist is intrinsic to the conduct of EBO. Sensors will fail; weather will affect operations; and bombs will inevitably miss their targets. As they always have, enemies will adjust and adapt to the technologies and tactics employed against them to inhibit attacks and protect vulnerable points. The dispersal of forces in urban centers or in mountainous regions already complicates the sensing and targeting process. In particular, networked terrorist organizations operating without critical nodes present a significant challenge in this respect.

⁴⁸ For an excellent description of the requirement for analysis once combat operations are underway, see Williams, Brett T. “Effects-Based Operations: Theory, Application and the Role of Airpower”, Strategy Research Paper, U.S. Army War College, Carlisle Barracks, PA 17013, 2002. P 10.

⁴⁹ Mann, Edward, Endersby Gary, Searle, Tom. Op Cit. P 4.

That these challenges are real and significant is not disputed. An interesting aspect, however, is that the same challenges are just as relevant when placed in the context of the ‘traditional’ attrition or annihilation-oriented approaches. The fog and friction of war apply equally to efforts to ‘destroy’ as to ‘effect’. The enemy will take action to reduce his vulnerability to a destructive attack just as diligently as he would to counter an effects-based attack. The changing nature of war is already challenging the relevance of applying destructive force in certain circumstances. For example, how is destructive force to be applied to the al-Qaeda terrorist network? Even in a more traditional conflict, the difficult challenge of analyzing the effect achieved against an enemy’s will and cohesion remains even if a destruction-based approach is used to achieve that effect.

Ultimately, the apparent dichotomy between destruction-based and effects-based approaches can be moderated by emphasizing the view of EBO as an extension of direct military operations and the instruments used therein. The concept of EBO is not proposed as a whole scale replacement for such operations and instruments. In the words of Paul Davis: “Mindless attrition, destruction, and occupation are to be avoided, but even with the most sophisticated versions of effects-based planning, and even with the advent of precision weapons and cyberwar, some traditional aspects of war will still be necessary.”⁵⁰ Even if an EBO concept is developed, therefore, the conduct of future operations may still require the destruction of certain targets, and in some cases may still be very much focused on the destruction of enemy forces. An effects-based approach,

⁵⁰ Davis. Op Cit. P 15.

however, does provide a sound basis upon which to expand the range of options available to overcome the challenges that will be manifest in any crisis, conflict or war.

A VEHICLE TO IMPROVE JOINT DOCTRINE

As mentioned at the beginning of this paper, opposition to the EBO concept appears to be especially strong within the land forces. Although perhaps not a fair representation of overall army attitudes, a recent paper from the USAWC refers to the “Army’s visceral hatred” of effects-based operations.⁵¹ Similar consternation is expressed when the issue of effects is raised in the context of the related topic of information operations.⁵² In both cases, the greatest unease seems to stem from the higher end of the conceptual construct, namely, the EBO ‘goal’ of being able to produce effects in the cognitive and behavioral domain. Given the lack of rigorous theoretical and practical development that can be offered in support of many key areas of the EBO concept at this point, (the challenge presented by intelligence analysis being the most important), a healthy dose of reservation is perhaps well founded. But even if the full extent of the EBO ‘goal’ is never attained, surely the greater danger lies in the military languishing with institutional or procedural thinking that fails to keep pace with technological capabilities.⁵³

⁵¹ Gary H. Cheek. “Effects-Based Operations: The End of Dominant Maneuver?” Strategy Research Paper, U.S. Army War College, Carlisle Barracks, PA 17013-5050, 2002. P 2.

⁵² The author has witnessed such consternation on several occasions, including during a recent presentation on information operations to Advanced Military Studies Course 5 at Canadian Forces College, Toronto. He is bracing himself for more when this paper is presented in syndicate in the very near future.

EBO, Transformation and RMA

EBO, as an overarching theory for employing power in any scenario, underscores concepts of fundamental transformation and RMA. Firmly placing EBO within the context of RMA is made difficult by the notoriously imprecise definition of the latter term. While no attempt to further characterize the RMA concept will be made here, the generally accepted notion that an “RMA involves a paradigm shift in the nature and conduct of military operations which...*renders obsolete or irrelevant* one of more *core competencies*” is relevant to this discussion of EBO as a vehicle to advance the joint doctrinal development process.⁵⁴ A paradigm shift in this context is defined as a profound change in the fundamental model underlying a segment of military operations, and a core competency refers to a fundamental ability that provides the foundation for a set of military capabilities.⁵⁵ That a fully implemented EBO concept would represent a profound change in the fundamental model underlying targeting strategy seems apparent. Further, given the inevitability of changes to operational concepts and doctrine that would come with such implementation, the EBO theory also appears to challenge one or more core competencies.

Specifically, the EBO concept challenges army core competencies (as well as cultural and organizational aspects of the army). For example, while discussing army-air force doctrinal disputes, Gene Myers asserts, “The genesis of the current spate of doctrinal challenges is that the U.S. Army is finding itself of the verge of becoming

⁵³ Mann, Endersby, Searle. Op Cit. P 2.

⁵⁴ Richard O. Hundley. Past Revolutions Future Transformations. National Defense Research Institute, RAND MR-1029 DARPA, 1999. P 9.

irrelevant as a major contributor in the largest future theater conflicts.”⁵⁶ Resistance from the army in the face of such bold challenges is perhaps understandable; on the surface, such a comment hardly seems to promote a ‘joint’ future. Nevertheless, an associated conclusion that the EBO concept in itself represents a threat or hindrance to the development of ‘jointness’ would be unsound. In describing the ways in which transformation may fail, Richard Hundley makes reference to resistance based on an operational concept being “unacceptable to the prevailing military culture” or requiring “too large a change in existing military organizations”.⁵⁷ But the changing nature of warfare is not a ‘choice’. That the changing political/social environment, the nature of threats such as terrorism and cyberwar, and the potential of emerging technology (for ourselves and our enemies) are coming together to challenge many aspects of military thought is undeniable. That questions regarding the role of a destruction-based philosophy are embedded within such a challenge should not be surprising. However, it is not the alternative concept of an effects-based strategy in isolation that will shape the future of ‘jointness’ for the army. Rather, given the notions of cultural and organizational resistance described above, it will be the army’s response to the EBO concept that will influence their future in joint operations. The army’s full and open engagement in the continuing development of joint doctrine based on a sound understanding of the full scope of the EBO concept is essential.

⁵⁵ Ibid. P. 9, 10.

⁵⁶ Gene Myers. “*The Army-Air Force Doctrinal Disputes: Symptoms or Causes*”, Eaker Institute Papers, Aerospace Education Foundation, September, 1997. P. 1.

⁵⁷ Ibid. P. xv.

Joint Doctrine

There is nothing in the EBO concept that precludes the development of joint doctrine, nor the full engagement of the army in such development. The concept of EBO as an extension of the scope of direct military operations and the instruments used therein is consistently emphasized. In his earliest writings on the subject, Deptula stressed “parallel war through EBO does not exclude any force component in time, space, or level of war at the outset of any political-military challenge”.⁵⁸ Even so, jointness should neither be taken as dogma, nor as a goal to be achieved at all times and at all costs. As expressed by former U.S. Air Force Chief of Staff, General Fogleman, “crisis response and joint warfighting are not equal opportunity enterprises – we must avoid the rush to participate in a given operation just to have our component represented, particularly when such presence violates sound judgment or impedes the overall effectiveness of the joint operation”.⁵⁹ As always, the key will lie in achieving an optimum balance amongst the various options available. In this sense, the development of joint doctrine and development of the EBO concept should be viewed as complementary and supporting efforts.

The development of joint doctrine would benefit from a focus on weapon systems capabilities and effects-based planning rather than on service or employment environment, or on assumptions of destruction related to attrition and annihilation.⁶⁰ Within such a framework, the army would accept the challenges presented by EBO by

⁵⁸ BGen David A. Deptula. “*Firing For Effects*”, [Air Force Magazine Online](#). Journal of the Air Force Association. April 2001 Vol. 84, No. 4. P. 6.

⁵⁹ Gen Ronald R. Fogleman. “*Multinational Joint Doctrine*”, P. 9. (Cited in Myers, Op Cit. P. 4.)

pursuing the means and methods to remain operationally viable in a rapidly changing future. This acceptance could include, for example, a re-thinking of the balance between rapid mobility and the role of heavy armour; the development of new concepts for organic close air support; or the acceptance of ‘service specialization’ and the consequent abandonment of longer-range support weapons such as ATACMS and long-range attack helicopters.⁶¹ Similarly, the air force would recognize that the incorporation of changes to the army’s mission capabilities might require a period of adjustment wherein interim measures are developed to ensure ground forces are adequately supported until their new organic capabilities are fully developed.⁶² Whether or not these examples represent the right choices is open to debate; the critical point is that a strategy of EBO offers a foundation upon which such choices can be made and the supporting joint doctrine can be developed.

CONCLUSION

The nature of threats such as terrorism and cyberwar, and the potential of emerging technology (both for ourselves and for our enemies) are coming together to challenge many aspects of military thought. Current targeting doctrine, grounded in a strategy that is focused on destroying enemy forces, is no longer relevant in many situations. An effects-based strategy offers the potential to transcend the limitations inherent to current targeting doctrine. Although technology is clearly an important

⁶⁰ Deptula. Op Cit. (Air Force Magazine Online April 2001) P. 6.

⁶¹ Myers. Op Cit. P. 4.

⁶² Myers. Op Cit. P. 5.

enabler for EBO, the opportunities afforded by this technology cannot be leveraged without an accompanying shift in organization and doctrine. The fact that an EBO strategy will come with the need for considerable theoretical and doctrinal development and that it challenges some core beliefs and competencies should not be reason to ignore it or to hope that it may go away. There is nothing in the EBO concept that precludes the development of joint doctrine, nor the full engagement of the army in such development. The army's full and open engagement in the continuing development of joint doctrine based on a sound understanding of the full scope of the EBO concept is essential. The limitations inherent in current targeting doctrine can be overcome by an evolved concept of EBO. It may not be simple, but it is necessary.

BIBLIOGRAPHY

Ballard, John R. "JTF (Joint Task Force) Operational Synchronization." *Military Review*. 75 no. 2 (Mar-Apr 1995): 98-101 (Periodical-Periodique / IRC-CIS).

Beagle, T.W. "Effects-Based Targeting: Another Empty Promise?" Thesis for the School of Advanced Airpower Studies, Maxwell Air Force Base, Alabama, June 2000.

Cheek, Gary H. "Effects-Based Operations: The End of Dominant Maneuver?" Strategy Research Paper, U.S. Army War College, Carlisle Barracks, PA 17013-5050, 2002.

Cordesman, Anthony H. "The Lessons and Non-Lessons of the Air and Missile Campaign in Kosovo", Praeger Publishers, 88 Post Road West, Westport, CT 06881. 2001.

Davis, Paul K. "Effects-Based Operations: A Grand Challenge for the Analytical Community," RAND, 1200 South Hayes Street, Arlington, VA, 2001.

Deptula, Col David A. "Firing For Effect: Change in the Nature of Warfare". Defense and Airpower Series. Arlington, VA: Aerospace Education Foundation, 24 August 1995.

Deptula, BGen. David A. "Firing For Effects", Air Force Magazine Online. *Journal of the Air Force Association*. April 2001 Vol. 84, No. 4. (Downloaded from the Internet at www.afa.org/magazine/april2001/0401effect.html.)

Deptula, BGen David A. "Effects-Based Operations: Change in the Nature of War", Aerospace Education Foundation, 1501 Lee Highway, Arlington VA, 2001, (available on the Air Force Association Web Site (www.afa.org)).

Hundley, Richard O. "Past Revolutions Future Transformations", National Defense Research Institute, RAND MR-1029 DARPA, 1999.

Johnston, Paul. "Doctrine is Not Enough: The Effect of Doctrine on the Behavior of Armies", *Parameters*, Vol 30, No 3 (Autumn 2000), pp 30-39.

Keaney, Thomas A. and Cohen, Eliot A. "Revolution in Warfare? Air Power in the Persian Gulf", Naval Institute Press, Annapolis, Maryland. (Revised edition of *Gulf War Air Power Survey*, 1993.)

Kirin, Stephen J. "Synchronization", *Naval War College Review*. 49 no. 4 (Autumn 1996): 7-22 (Periodical-Periodique / IRC-CIS)

Lambeth, Benjamin S. "NATO's Air War For Kosovo: A Strategic and Operational Assessment", Published 2001 by RAND, 1200 South Hayes Street, Arlington, VA 22202-5050

Mann, Edward, Endersby Gary, Searle, Tom. "Dominant Effects: Effects-Based Joint Operations", Aerospace Power Journal, Vortices, Fall 2001. (Downloaded from Internet at <http://www.airpower.maxwell.af.mil...cles/apj/apj01/fal01/vorfal01.html>.)

Myers, Gene. "*The Army-Air Force Doctrinal Disputes: Symptoms or Causes*", Eaker Institute Papers, Aerospace Education Foundation, September 1997. (Downloaded from Internet at www.aef.org/pub/eaker/aafdd.html.)

Poyner, Robert D. "Organic Versus Joint: Thoughts on How the Air Force Fights", Strategic Review, Vol 29, No 1 (Winter 2001), pp 58-62.

Schmitt, John F. "If Not Synchronization, What?" Marine Corps Gazette . 81 no. 1 (Jan 1997) : 54-60 (Periodical-Periodique / IRC-CIS)

Steblin, Mark E. "Targeting for Effect: Is There an Iceberg Ahead", Air War College Air University, Maxwell Air Force Base, Alabama, April 1997.

Sullivan, Gordon R. "Delivering Decisive Victory: Improving Synchronization." Military Review . 72 no. 9, (Sep 1992): 2-11 (Periodical-Periodique / IRC-CIS)

Williams, Brett T. "Effects-Based Operations: Theory, Application and the Role of Airpower", Strategy Research Paper, U.S. Army War College, Carlisle Barracks, PA 17013, 2002.

Vego, Milan. "What Can We Learn From Enduring Freedom?" United States Naval Institution, Proceedings; Annapolis, Jul 2002 (downloaded from internet at <http://proquest.umi.com>).