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**EFFECTS-BASED OPERATIONS:
A View Through the Periscope**

by

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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, the Department of the Air Force, or the Department of the Navy.

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Abstract

The public debate surrounding Effects-Based Operations (EBO) theory is intensifying. At the extremes of the debate, EBO theory is either a fundamentally flawed and overly simplistic theory of warfare or a new theory of warfare that exploits a fundamental change in the nature of warfare resulting from our mastery over new technologies. In reality, EBO theory is neither the revolutionary breakthrough ascribed to it by its most ardent proponents nor is it a totally valueless concept as charged by its most vocal critics. In an attempt to add to the overall debate, this paper explores the difficulty of successfully implementing EBO at the theater-strategic level of war due to the difficulty with a priori determining human behavior. A critical review of the terminology associated with EBO exposes critical flaws in the current definitions and also shows the incompatibility between EBO theory and the operational design process. This is followed by a historical case study that demonstrates the difficulty at the theater strategic level of war with accurately forecasting strategic effects or controlling unintended consequences.

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There's an art and science to war. The science is in support of the art. The science gives you the weapon systems; it allows you to have the communications; it allows you to have all things that support the actual conduct of war. War, as it is fought, is an art. It's not a science. If you try to make it a science, you're bound to be disappointed.

Lt Gen (Retired) Paul Van Riper
Frontline Interview, October 2004

INTRODUCTION

New technology, and, more importantly, success in the battlespace employing this new technology, fueled the development of Effects-Based Operations (EBO) theory. Driven primarily by air power theorists, EBO theory seeks to exploit the United States' asymmetric advantage in stealth, precision, and global surveillance in order to provide a dependable alternative to annihilation and attrition warfare. All wars boil down to coercing an enemy to do your will, and annihilation or attrition of the enemy until he relents usually demands significant costs. EBO theory promises a new way to prosecute war while minimizing the investments of blood and treasure through the disciplined and precise application of kinetic and non-kinetic means. No matter how noble the endeavor, though, EBO theory fails at the theater-strategic level of war.

The principal reason for this failure is that in order for EBO to succeed at the theater-strategic level of war, the operational commander must a priori determine the mix and sequence of kinetic and non-kinetic means necessary to produce the desired effect. EBO theorists propose a system of systems analytical approach to provide the operational commander with this information. The scientific foundation of this analytical process implies exactitude in the products produced. At the core of EBO theory, then, is exactly what Lt Gen Van Riper cautions against, science inserted in place of art.

Moreover, a careful review of history shows that the central tenets of EBO theory are neither new nor revolutionary. The historical landscape is strewn with failed campaigns designed around constructs very similar to those of EBO. The United States' experience in Vietnam demonstrated the difficulties with trying to determine strategic effects from quantifiable results at the tactical or operational level of war. Even the ongoing operations in Iraq shed light on the inherent difficulties of quantifying, much less predicting, emergent effects. This paper offers a detailed analysis of the earliest campaigns employing stealth platforms in search of strategic effects, the German U-boat campaigns of World War I,¹ to further illustrate the difficulty and danger of pursuing EBO based campaigns. Before diving into the case study, though, a review and critique of EBO terms and definitions is in order.

EBO DEFINED

Review of these terms and definitions not only provides a common lexicon from which to embark into the case study analysis, but also helps to set the basis for the argument that EBO as currently defined is incongruent with the operational design process. The first term to define, then, is EBO. The United States Joint Forces Command defines EBO as follows:

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.²

The operations may utilize kinetic or non-kinetic means, they may be undertaken by the military, or they may be undertaken by another national organization wielding a different instrument of national power.³ One of the most appealing aspects of EBO theory is this inherent recognition that all national means remain in play even after the decision is made

to use military force. Furthermore, for the military instrument, this definition appears consistent with the operational design process.⁴ Overall, EBO theory looks remarkably similar to the operational commander's regressive planning method, only expanded to include other national means.

EBO THEORY CRITIQUE

EBO theory, however, is incongruent with the operational design process. A fundamental difference between the operational design process and EBO is that while the operational design process results in the identification of strategic "objectives" to pursue, the EBO process produces a series of actions designed to induce desired "effects". To be fair, the planning in the operational design process is further devolved such that the operational design process, like EBO, ultimately identifies actions or discrete tasks in order to achieve specific objectives. The distinction, then, between "objectives" and "effects" must be significant. The DoD Dictionary of Military Terms defines an objective as:

1. The clearly defined, decisive, and attainable goals towards which every military operation should be directed.
2. The specific target of the action taken (for example, a definite terrain feature, the seizure or holding of which is essential to the commander's plan, or, an enemy force or capability without regard to terrain features).⁵

Where as the same dictionary defines an "effect" as, "a change to a condition, behavior, or degree of freedom."⁶ In other words, a properly defined objective is tangible; an effect is intangible. As a result, then, the nature of an objective is such that an operational commander can determine with certainty whether or not an objective has been met, while the nature of an effect is such that the successful inducement of an effect can almost

never be determined with certainty. Therein lays the incongruence between EBO and the operational design process.

The operational design process translates the ambiguous, the desired end-state, into unambiguous actions. In simple terms, accomplish these tasks to meet these strategic objectives. Operational art bridges the ambiguous to the unambiguous. The operational genius of the operational commander is the key to selecting the right strategic objectives to pursue in order to deliver the desired end state. At the theater-strategic level this process is open and upfront, as evidenced by the terminology used, about the non-scientific nature in moving regressively from desired end states to strategic objectives. However, once a commander identifies strategic objectives, the pursuit of objectives can follow a prescribed path that the operational commander by and large controls. Whether or not the objectives turn out to be the “right” objectives is rooted back in the application, or misapplication as the case may be, of operational art. EBO effects, on the other hand, remain in the realm of the non-specific, and, therefore, the operational commander lacks any real control over the ensuing plan. In EBO, actions are identified to try and induce specific effects with the upfront acknowledgement that unintended effects are also going to be introduced. This fact alone, the acknowledgement by EBO advocates that unintended effects will occur, speaks to the uncontrollable nature of EBO. Of course, EBO advocates offer that the unintended consequences can be avoided, if identified ahead of time, or managed, if a result of prescribed actions.

Finally, the reason EBO fails to transition from the unambiguous to the ambiguous is because of the misapplication of the concept of System of Systems Analysis (SOSA). SOSA is defined as:

An analytical process that holistically examines a potential adversary and/or operational environment as a complex, adaptive system, including its structures, behavior, and capabilities in order to identify and assess strengths, vulnerabilities, and relationships.⁷

The fatal flaw with EBO lays embedded within this definition. The proposition that an analytical process can, in effect, deconstruct a complex adaptive system is a complete non sequitur. Complex adaptive systems by definition are nonlinear.⁸ Analytical processes are by definition linear. According to Tom Czerwinski, author of *Coping with Bounds: Speculations on Nonlinearity in Military Affairs*:

Nonlinearity, which covers such concepts as chaos theory and complexity theory, does not conform to those qualities found in linearity. It is not proportional, additive, or replicable, and the demonstrability of causes and effects are ambiguous...As a result, if you know a little about a nonlinear system, you don't know a lot. We cannot extrapolate, change scale, or project. The lack of predictability frustrates planning and control, as we use the terms.⁹

In other words, there is no possible way for EBO to deliver as promised. The U-boat campaigns of World War I demonstrate the unpredictable nature of complex adaptive systems.

CASE STUDY BACKGROUND

To set the stage, in August 1914 at the outset of World War I, the U-boat's potential as an asymmetric offensive weapon lay beyond the grasp of the German Naval Staff. Initially, German naval plans called for the U-boat to play a strictly defensive role in the projected naval engagements of World War I.¹⁰ The German admiralty expected a classic Mahanian strategy out of the Royal Navy. At the onset of the war the German's anticipated the British fleet steaming into the North Sea in order to seek a decisive battle with the German fleet. Lacking an equal force, the German admiralty planned to exploit the German interior lines by remaining close to German naval bases. As part of the

German strategy, then, the U-boats would provide force protection while operating close to home bases. The British, though, chose a blockade strategy. The Royal Navy planned to keep the German fleet confined to the North Sea, thereby denying the Germans the ability to interdict British maritime trade on the Atlantic Ocean while simultaneously severing Germany's own maritime trade.¹¹ A German strategic reassessment led to the first offensive missions for U-boats in World War I.

CASE STUDY: INITIAL CAMPAIGN

The objective of these initial U-boat missions was location and interdiction of British ships blockading the North Sea. The ultimate objective of the "campaign"¹² was to attrite the British naval forces until such time that the German fleet could initiate an equal force on force engagement.¹³ The British battleships, therefore, represented the primary target for prowling U-boats. The initial U-boat patrols returned without ever locating any British ships, and subsequent U-boat patrols fared only marginally better in that they located and sunk only a handful of obsolete British ships. Although the campaign failed as a result of the U-boat inability to inflict any meaningful level of attrition, the U-boats proved far more capable than anyone previously imagined. First, U-boats succeeded in sinking British merchant vessels for the first time during these initial missions. Second, U-boat missions covered greater distances with longer durations than previously experienced. Third, a single "unsuccessful" mission offered a glimpse of the asymmetric potential the U-boat offered.

On November 23, 1914, U-boat 18 successfully infiltrated the British Naval Base at Scapa Flow.¹⁴ On this day, though, lady luck smiled on the British as all the battleships were taking part in a sweeping exercise of the North Sea. Without targets to

engage, the U-boat attempted to escape undetected but failed, and, in the end, the crew of U-boat 18 scuttled the vessel.¹⁵ U-boat 18's failed mission proved the stealth and asymmetric capability of the German U-boat; the potential number of targets per platform limited only by the number of torpedoes onboard. Amidst tactical failure, strategic implications emerged. The British, completely surprised at the range of the U-boat, temporarily abandoned their blockade positions in the North Sea.¹⁶ This unforeseen temporary effect stirred the creative forces within the German Naval Staff, setting the stage for the first all out German offensive against allied shipping in 1915.

CASE STUDY: THE SECOND CAMPAIGN

The British relied on a combination of British-owned and neutral shipping to feed their wartime economy. In turn, French and Italian dependence on Great Britain to sustain and fuel their wartime economies grew with each passing day. Recognizing these interdependencies, the Germans believed the U-boat held the key to upsetting this economic system. The Germans theorized that if they could chase the British from the North Sea with the threat of U-boat activity, as the U-boat 18 mission proved, then it might also be possible to chase neutral shipping from the Atlantic Ocean while sinking British merchant ships attempting to get into and out of Great Britain. The impact of reduced trade on Great Britain, due to a combination of sinking and diversion through coercion, offered the Germans the opportunity to ensnare Great Britain and her allies in an economic stranglehold similar to the one the British were attempting to place on Germany. At a minimum, a stalemate would ensue allowing the Germans to confidently negotiate removal of the German blockade in exchange for removal of the British

blockade. Potentially, as some of the more optimistic planners hypothesized, a blockade might even compel the British to sue for peace.

The above analysis conducted by the German admiralty eerily parallels the USJFCOM definition for EBO. The internal debate within and between the German military and government leaders surrounding the 1915 U-boat campaign provides even further proof of the EBO-like characteristics of this campaign. Consider the words of German Admiral Reinhardt Scheer in 1920:

Thus the U-boat campaign became almost entirely a question of politics. It was originally suggested by the Navy for military reasons...but all the same the U-boat had proved to be a weapon with which we could inflict direct injury on English economic life...Economic life in England was almost entirely dependent on shipping, and so there was a prospect of our inflicting such material injury upon that island State that it would be unable to continue the war.¹⁷

The same officers who recognized the potential for the U-boat to essentially blockade Great Britain also understood that success called for a change in tactics. German naval regulations, in line with maritime law, required U-boats to surface in order to determine whether or not a merchant ship belonged to a belligerent or neutral country. If the vessel proved belligerent, the crew and passengers needed to be removed from the ship and provided with safe passage before the vessel could be sunk. Neutral ships were off limits. The U-boats themselves were too small to accommodate crews and passengers from target vessels. In addition, lifeboats from the merchant ships proved inadequate for providing safe passage if the interception occurred out of sight of land. The senior leadership in the German navy initially resisted any plans that proposed deviation from these regulations because the senior leadership understood the potential political ramifications resulting from violations of maritime law.

Two events led to the disappearance of these reservations. First, the British declared the entire North Sea a War Zone.¹⁸ With the War Zone declaration the British signaled their intention to capture or destroy all shipping on the North Sea, including shipping bound for countries other than Germany. The net effect of the declaration was a total blockade of Germany. Second, once the British understood the U-boat rules of engagement, the British authorized the operators of British merchant ships to fly the flags of neutrals in an attempt to avoid interdiction.¹⁹ As a result, by late 1914 the leadership of the German navy changed course and proposed that U-boat commanders be extended the authority to sink ships without warning and without regard for the safety of the crew or passengers.²⁰ That the leadership clearly understood the potential of such action to draw neutral nations into the war is clear in the historical record. In line with EBO theory, though, it is also clear that the leadership thought potential consequences, or unintended effects, could be managed or avoided as evidenced by an excerpt from a memorandum from High Seas Fleet Command to the Chief of the German Naval Staff:

As England is trying to destroy our trade it is only fair if we retaliate by carrying on the campaign against her trade by all possible means. Further, as England completely disregards international law in her actions, there is not the least reason why we should exercise any restraint in our conduct of the war...The shipping world can be warned of these consequences, and it can be pointed out that ships which attempt to make British ports run the risk of being destroyed with their crews. This warning that the lives of steamers' crews will be endangered will be one good reason why all shipping trade with England should cease within a short space of time.²¹

The German navy, in turn, successfully convinced the government to approve the 1915 campaign complete with the provisions to employ unrestricted submarine warfare.

The publishing of a warning, alluded to in the above quotation, resulted in a diplomatic hailstorm. The neutral nations, led by the United States, vigorously protested

the German declaration of a War Zone surrounding Great Britain with the intention of attacking and sinking any ship that entered the area. In the end, bowing to threats by the United States to enter the war, the German government agreed to move away from a campaign of unrestricted submarine warfare. In line with the diplomatic concessions, the U-boat commanders received authorization to begin the offensive on February 22 with restrictions against engaging neutral shipping or hospital ships.²² At the same time, however, the commanders were told, “if in spite of the exercise of great care mistakes should be made, the commander will not be made responsible.”²³

The campaign began with an available force of thirty U-boats.²⁴ Although the U-boat commanders demonstrated the ability to increase time on station over the course of the campaign and new boats brought on line increased the average number of vessels at sea each day, the force size proved ineffective for blockading the entire British Isles. Quite simply, the German’s lacked the means to deliver the intended effect. Naval studies prior to the war examined the factor space-force issue of blockading Great Britain, concluding that a successful blockade of the British Isles required a U-boat fleet of over 200 vessels.²⁵ Although the U-boat performance proved far more capable than the performance modeled in these pre-war studies, the actual performance was not enough for only 30 U-boats to successfully blockade Great Britain. To complicate matters, whether or not positive identification prior to attack was the intention of the guidance provided to the U-boat commanders, in practice, the commanders attacked without warning any time they were unable to determine the flag of a merchant vessel. The inevitable sinking of neutral vessels from the start of the campaign only added to the friction. The sinking of neutral shipping re-emerged as a full-blown diplomatic crisis

with the sinking of the Lusitania in May 1915. In the end, the German navy lacked the ability to prevent or control unintended effects.

By September of 1915, after sinking two more passenger liners and under increasing pressure from the United States to either curtail the unrestricted nature of the operations or draw the United States into the war, the Germans halted the 1915 campaign. Like the initial U-boat campaign conducted in the fall of 1914, the 1915 campaign was a strategic failure. The U-boat threat failed to chase neutral shipping from the Atlantic Ocean, and the British economy absorbed the impact of the lost imports. More importantly, owing more to the fact that Great Britain and her allies seized German and Austro-Hungarian merchant ships at the outset of the war rather than the ability to cover losses through new tonnage launched, the total tonnage of merchant shipping available to the British and her allies actually grew from the fall of 1914 until the end of the 1915 campaign.²⁶ This growth occurred despite the fact that the U-boats succeeded in sinking over 480 vessels totaling in excess of 800,000 tons of merchant shipping over the course of the campaign.²⁷ In the final analysis the U-boat campaign of 1915 failed to induce the strategic effects predicted. Just like in the aftermath of the initial U-boat campaign, however, the German navy found renewed hope in the ashes of strategic failure. A detailed strategic analysis ensued, laying the groundwork for the 1917 U-boat campaign.

CASE STUDY: THE FINAL CAMPAIGN

To begin, the German analysis benefited greatly from excellent intelligence on the state of British shipping. The Germans learned that troop movement and re-supply requirements forced the British to divert 20% of their available merchant tonnage from trade activities to direct support of the war effort.²⁸ Due to manpower and material

deficiencies, the Germans capped the British capability to replace lost shipping at 650,000 tons per year.²⁹ Thus, by the fall of 1915 the U-boats reached the point of sinking tonnage faster than the British could replace losses. Over the course of 1916, this information, merged with lessons learned from previous campaigns and accounting for the expanding capability of a U-boat fleet approaching 150 boats,³⁰ provided the basis for a 56-page memorandum from Admiral Holtzendorff, Chief of the German Naval Staff to Field Marshal Von Hindenburg, Chief of the General Staff, summarizing the analysis.³¹

The thoroughness of the analysis is impressive to say the least.³² Based on traffic flow into and out of Great Britain, the German staff determined that Great Britain depended on roughly 10,750,000 tons of shipping.³³ The analysis further segregated this total into 75% hostile tonnage, that is shipping owned by Great Britain or one of the other hostile states, and 25% neutral tonnage.³⁴ Moreover, due to poor wheat harvests in 1916, the analysis showed that approximately 750,000 tons of the total tonnage available to the British needed to support a new requirement, importing grain from India and Australia.³⁵ The analysis projected this new requirement to last until August of 1917 when a new North American harvest would offset the requirement to import grain from India and Australia. Projecting the demonstrated results from the earlier campaigns to a new campaign employing a larger U-boat fleet, the analysis forecast an ability to sink 600,000 tons of shipping per month.³⁶ In addition, by employing unrestricted warfare tactics, the analysis estimated that 1,000,000 tons of neutral shipping would cease trading with Great Britain.³⁷ Therefore, over a five-month period, shipping into and out of Great Britain could be reduced by almost 40%.³⁸ The analysis concluded that Great Britain would be incapable of sustaining the war effort with such a dramatic reduction of resources.

Admiral Holtzendorff's memo went to great length to address both the potential reaction of the United States as well as the likely results if unrestricted submarine warfare was not employed. On the former, Admiral Holtzendorff offered that diplomatic efforts might succeed in keeping the United States out of the war. As a worse case scenario he proposed that the entry of the United States into the war would not impact the outcome of the war because the United States mobilization effort would exceed the five months that the campaign needed to force the allies to surrender. Therefore, he concluded, the United States would be forced to choose between fighting Germany alone or following the lead of the British:

In any case, it is desirable to envisage the consequences least favourable (sic) to us and to realise (sic) what the effects on the course of the war will be if America joins our enemies...Decisive effects need not be anticipated from the co-operation of American troops, who cannot be brought over in considerable numbers...it is probable she would associate herself with the peace concluded by England so as to return to healthy economic conditions as soon as possible.³⁹

On the latter, Holtzendorff determined that restricted submarine warfare could only reduce the British shipping by one-fifth rather than the two-fifths promised through unrestricted warfare.⁴⁰ He argued that the British leadership would rise to the challenge and sustain the war effort through a one-fifth reduction:

I am quite clear on the point that the loss of one-fifth of British shipping would have a very serious effect on their supplies. But I think it out of the question that, under the leadership of Lloyd George, who is prepared to go to all length, England could thereby be forced to make peace...Further, the psychological effects of panic and fear would be lacking.⁴¹

The Holtzendorff memorandum succeeded in convincing both the General Staff and the German government to approve the campaign of 1917. In January, the German navy received formal approval to commence what would become the final U-boat campaign of World War I on February 1, 1917.⁴² The operational results exceeded the

staff predictions. According to German records, the U-boats sunk almost 3,300,000 tons of merchant shipping from February through June 1917; exceeding the 600,000 tons per month requirement.⁴³ Nonetheless, the desired effect on neutral shipping never materialized, nor did the economic panic leading to an end to the war. Even with an additional 2,500,000 tons of merchant shipping sunk from July through December 1917, the Germans never succeeded in inducing the intended effects.⁴⁴ To be sure, the British economy felt the impact of the losses; however, the British adapted and weathered the storm until they stumbled upon convoys as an effective means of negating the U-boat advantage.⁴⁵ Finally, in spite of assurances to the contrary, the German navy proved incapable of preventing the one unintended effect that would lead to strategic ruin for Germany, the entrance of the United States into the war. Once again, a German U-boat campaign proved a strategic failure, though this time the failure was complete.

CASE STUDY: THE FINAL ANALYSIS

The German U-boat campaigns from World War I illustrate the difficulty and danger with pursuing EBO strategies in war. Clearly the Germans designed the 1915 and 1917 campaigns with the intention of inducing multiple order effects. In simple terms the Germans planned to use the U-boat to interdict the maritime trade into and out of Great Britain (action). Intended first order effects included preventing resources from reaching Great Britain and her allies by sinking merchant vessels attempting to steam into the British Isles. Scaring off neutral shipping by demonstrating the ability to repeatedly interdict and sink merchant ships represented an intended second order effect. The desired third order effect, induced due to a combination of resources lost through the first and second order effects, was widespread economic hardship in Britain, France and Italy.

Finally, the desired fourth order effect, the desired end state, saw the economic hardship compelling the British to sue for peace.

Moreover, the level of analysis supporting the campaigns moved successively closer to the analytical rigor implicit in the definition of EBO with each campaign. The Germans developed very detailed measures of performance, the key one being tonnage sunk, that indicated that the actions taken exceeded the standard they chose, but they never succeeded in transitioning from successful measures of performance to successful measures of effectiveness. At the theater-strategic level of war the German military knew precisely how they wanted to make the adversary behave, and, by studying the operational environment in detail, they confidently determined what action to take to induce the desired behavior. Nonetheless, the German strategy failed in that they were never able to turn tactical and operational success into strategic victory.

In at least one area, the Germans actually showed a more complete understanding of effects theory than modern EBO theory. EBO theory only concentrates on the enemy. The German's also realized the importance of effects on neutral nations. Thus, EBO, to succeed, would need to account for multiple complex adaptive systems interacting with each other. In other words, focusing on only the enemy tremendously oversimplifies the real nature of the problem with predicting behavior. The fact that in the end the Germans were unsuccessful in controlling the effects of neutrals as well as adversaries only reinforces the difficulty of the problem at hand.

This is not to say that EBO theory is completely void of utility. Technology affords today's operational commander much greater flexibility in pursuing military objectives than his predecessors enjoyed. For example, the value of parallel warfare

cannot and should not be underestimated. The ability to simultaneously engulf the battlespace in precision fires is certainly an evolutionary, if not a revolutionary, capability. Similarly, the promotion of jointness inherent in EBO theory offers a vision that the United States armed forces must strive to achieve in order to arrive at seamless joint operations. Understanding and acceptance by each service that the individual services need not always play a prominent or equal role in a conflict is vital to moving forward with the true integration of our individual service capabilities. Finally, the inclusion of all means of national power in concert with the military instrument to achieve desired end states is absolutely essential in modern warfare.

LESSON LEARNED

The primary lesson learned from this case study is that military doctrine must account for historical results. Although doctrine need not evolve from historical results, to attempt to promulgate doctrine contradictory to historical experience is fraught with danger. The German submarine warfare campaigns from World War I provide an excellent historical example of the strategic challenges associated with effects-based strategies. In addition, the case study re-enforces the idea that doctrine, no matter the technical advances, must never surrender the need for sound operational art to science. At the very core of the most ardent EBO proponents is the belief that the nature of war changed.⁴⁶ In fact, the nature of war, like the nature of man, does not change. Only the environments within which we wage war, to include the tools, change over time. Again, history helps to illuminate this point. EBO theorists misunderstood a change to the environment as a change to the nature of war. Understanding the potential for effects is important, however, military plans should build in branches to exploit these opportunities

rather than base the success or failure of the main plan on something that really amounts to chance.

RECOMMENDATIONS & CONCLUSION

As the critique of EBO definitions illustrated, word choice and the meanings of words matter. On the surface, terms such as holistic, adaptive, and system of systems resonate with confidence. Below the surface, though, EBO terminology is exposed as a collection of conflicting terms. The result is that EBO, as currently defined, represents an illogical process. As the services and the joint staff debate whether or not to incorporate EBO concepts into doctrine, a necessary first step is to tighten up the EBO definitions so that they are free of ambiguity and incongruence. In addition, though too late for this doctrinal debate, doctrinal debates should remain within the military until the debate is resolved. Draft concepts like EBO offer easy answers to civilian leaders looking for more efficient ways to conduct warfare. The military must ensure new doctrinal concepts are fully vetted prior to presentation outside of military circles lest civilian leaders prematurely act based on untested promises.

The desire to win wars with minimal violence goes back at least as far as Sun Tzu.⁴⁷ No rational leader desires to see blood and treasure needlessly expended on the battlefield. EBO theory is at least a laudable attempt to achieve this end. Even Sun Tzu, however, recognized war as an art. EBO theory fails at the theater-strategic level of war because it crosses that line from art to science. EBO theorists portend a capability to predict how a war will turn out before it is ever fought. The degree of control inherent in this concept, though, is fundamentally incompatible with the nature of war. For as first posed by Carl von Clausewitz, the nature of war is essentially unpredictability.⁴⁸

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- ¹ An argument can be made that the U-boats should be classified as early stealth platforms. They proved relatively immune from detection until the development and deployment of sonar systems.
- ² The Joint Warfighting Center Joint Doctrine Series, *Pamphlet 7, Operational Implications of Effects-Based Operations*, 17 Nov 2004, p 2.
- ³ Joint Publication 1, *Joint Warfare of the Armed Forces of the United States*, 14 November 2000, identifies the instruments of national power as diplomatic, economic, informational, and military.
- ⁴ For a thorough and detailed discussion of the operational design process see Patrick C. Sweeney's paper, *Effects-Based Confusion: The Missing Link with Operational Art*
- ⁵ *DoD Dictionary of Military Terms*, <http://www.dtic.mil/doctrine/jel/doddict/> [accessed 29 Apr, 2006]
- ⁶ *Ibid.*
- ⁷ The Joint Warfighting Center Joint Doctrine Series, *Pamphlet 7, Operational Implications of Effects-Based Operations*, 17 Nov 2004, Glossary, Part 2, Terms and Definitions.
- ⁸ See Tom Czerwinski. *Coping with the Bounds: Speculations on Nonlinearity in Military Affairs*, (Washington D.C.: National Defense University, 1998), 13-24.
- ⁹ *Ibid.*, 13.
- ¹⁰ V. E. Tarrant, *The U-Boat Offensive 1914-1945*, (Annapolis, Maryland: Naval Institute Press, 1989), 7.
- ¹¹ *Ibid.*, 8.
- ¹² None of the source documentation I reviewed referred to these initial missions as a campaign. In retrospect, though, because the synthesis of the effects of individual missions fed into subsequent campaign plans, I chose to refer to these initial missions as a campaign.
- ¹³ Tarrant, 8.
- ¹⁴ Tarrant, 10-11.
- ¹⁵ *Ibid.*
- ¹⁶ *Ibid.*
- ¹⁷ Reinhardt Scheer, *Germany's High Sea Fleet in the World War*, (New York: Cassell and Company, 1920), 224-225.
- ¹⁸ *Ibid.*, 217-219.
- ¹⁹ Tarrant, 13.
- ²⁰ Scheer, 222.
- ²¹ *Ibid.*, 222-223.
- ²² Tarrant, 14.
- ²³ Scheer, 231.
- ²⁴ Tarrant, 15.
- ²⁵ *Ibid.*, 16.
- ²⁶ *Ibid.*, 21.
- ²⁷ *Ibid.*, 148-149.
- ²⁸ *Ibid.*, 21.
- ²⁹ *Ibid.*, 25.
- ³⁰ John Keegan, *The First World War*, (New York: Alfred A. Knopf, Inc., 1999), 353.
- ³¹ David Stevenson, *Cataclysm*, (New York: Basic Books, 2004), 213.
- ³² See Scheer, 248-252 for the actual summary of Holtzendorff's memo to Hindenburgh.
- ³³ *Ibid.*, 248-249.
- ³⁴ *Ibid.*, 249.
- ³⁵ *Ibid.*
- ³⁶ *Ibid.*
- ³⁷ *Ibid.*
- ³⁸ *Ibid.*
- ³⁹ *Ibid.*, 251-252.
- ⁴⁰ *Ibid.*, 251.
- ⁴¹ *Ibid.*
- ⁴² Tarrant, 44.
- ⁴³ Tarrant, 149.
- ⁴⁴ *Ibid.*
- ⁴⁵ Keegan, 353-354.

⁴⁶ David A. Deptula, *Effects-Based Operations: Change in the Nature of Warfare*, (Arlington, Virginia: Aerospace Education Foundation, 2001).

⁴⁷ Sun Tzu, *The Art of War*, Translated by Thomas Cleary, (Boston, Massachusetts: Shambhala, 1988), 67.

⁴⁸ Carl von Clausewitz, *On War*, Translated by Michael Howard and Peter Paret, (Princeton, New Jersey: Princeton University Press, 1976), 01-104.

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