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CANADIAN FORCES COLLEGE / COLLÈGE DES FORCES CANADIENNES
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EXERCISE/EXERCICE NEW HORIZONS

**Fine Wine, New Label:
Effects-Based Operations**

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Abstract

The concept of effects-based operations (EBO) has generated much hyperbole and marketing, with some analysts contending that doctrine published before EBO was akin to the Ptolemaic version of the universe, which saw the ancients believing that the Earth was at the centre of the universe. This paper demonstrates that characterizing EBO as new or revolutionary doctrine is to ignore historic examples of EBO such the Combined Bomber Offensive in the Second World War. It also shows the error in denying a close association that EBO shares with well-established principles of war such as selection and maintenance of the aim and economy of effort. Finally, it shows that the Law of Armed Conflict is replete with principles and examples which demand care and attention be paid to weapons selection and effects in operations. It concludes that EBO is neither radical nor new, but that in view of new technologies and weapons available to effects-based planners, better intelligence will be required.

In a paper written for the United States Air War College, Lieutenant Colonel Allen W. Batschelet proposes a definition for effects-based operations stating that they “represent the identification and engagement of an enemy’s vulnerabilities and strengths in a unified, focused manner, and uses all available assets to produce specific effects consistent with the commander’s intent.”¹

In a strategic-level definition, the United States’ Joint Forces Command glossary offers the following definition:

Effects-Based Operations (EBO): A process for obtaining a desired strategic outcome or "effect" on the enemy, through the synergistic, multiplicative, and

¹ Lieutenant Colonel Allen W. Batschelet. “*Effects-Based Operations: A New Operational Model?*” (U.S. Army War College, Carlisle Barracks. 2002) 5. Available at <http://www.iwar.org.uk/military/resources/effect-based-ops/ebo.pdf>. Internet; accessed 29 April 2004

cumulative application of the full range of military and nonmilitary capabilities at the tactical, operational, and strategic levels.²

Perhaps most simply put, effects-based operations are those which focus on the “effect” one is trying to exert on the enemy, which use all means available and appropriate, and which do not necessarily seek to meet the enemy in a force-on-force battle. Effects-based operations may be able to force an enemy to comply with ones will, without necessarily destroying fielded forces. These kind of operations seem to some to evoke a more cognitive and intellectual approach to combat, and this focus on “effects” contrasts with “objective” based operations, which for many officers will conjure up non-manoeuvrism visions of attrition and annihilation.

In the rush to adopt doctrine, simulation, war fighting, training and perhaps marketing philosophies relevant to the latest and most successful technologies, one of the trendy “revolutions” in recent thinking has been Effects-Based Operations. Many analysts, technologists, and academics, have written about the revolutionary changes that effects-based operations will and must have on the conduct and nature of warfare and military forces. In fact, according to the RAND Corporation, effects-based operations pose a “grand challenge” to defence analysts, and “current methods of analysis and

² Joint Forces Command. “*Joint Forces Command Glossary*” (United States Joint Forces Command, Norfolk, VA.) Available at <http://www.jfcom.mil/about/glossary.htm#E> Internet: accessed 25 Apr 2004

modeling are inadequate.” Furthermore, meeting “the challenge will require changes of mindset, new theories and methods,” and will take years to adapt to.³

In the rush to evangelize the concept, there is even some muddling and melding of concepts such as Rapid Dominance, and Parallel Operations with the Effects-Based Operations concept. According to Major General David Deptula, the wunderkind architect of many Desert Storm successes in 1991⁴, “Effects-based operations have the potential to reduce the force requirements, casualties, duration of conflict, forward basing, and deployment of forces previously required to prevail in war. In short, the parallel approach changes the basic character of war.”⁵

Some smug proponents of effects-based operations compare non-believers to the unenlightened ancients, and compare “pre-EBO” doctrine to the Ptolemaic view of the universe, while holding their effects-based doctrine out as equally as revolutionary as Copernicus’ suggestion that Earth was not the center of the universe.⁶

³ Paul K. Davis, “*Effects-Based Operations (EBO): A Grand Challenge for the Analytical Community.*” (Copyright held by the RAND Corporation, Santa Monica, CA, 2001) page xiii. Available at <http://www.rand.org/publications/MR/MR1477/MR1477.sum.pdf>. Internet; accessed 27 April 2004.

⁴ According to the current biography posted at http://www.af.mil/bios/bio_print.asp?bioID=5213&page=1 the then Lieutenant-Colonel Deptula was from August 1990 - March 1991, the “Principal Offensive Air Campaign Planner for the Director of Campaign Plans, Operation Desert Shield, and Director, Iraq Target Planning Group, Operation Desert Storm, Joint Force Air Component Command, Riyadh, Saudi Arabia”

⁵ Brigadier General David Deptula, “*Effects-Based Operations: A Change in the Nature of Warfare.*” (Aerospace Education Foundation, Arlington VA, 2002) 25. Available at <http://www.aef.org/pub/psbook.pdf>. Internet accessed 25 April 2004

⁶ Ibid. 17

However, notwithstanding the enthusiastic cheerleading and fervour of some writers, it is my assertion that to characterize Effects-Based Operations as a revolutionary military doctrine is to be ignorant of our past, well-established principles of war, and the Law of Armed Conflict.

This paper will demonstrate that effects-based operations are not new or revolutionary by offering historic examples of effects-based operations in both the air, and maritime environments. Further, the paper will link effects-based operations to well-established principles of war,⁷ showing that even though the concept may be labeled differently, it is a familiar wine with which most officers' palates will be immediately familiar. The paper will also show that familiar principles underpinning the Law of Armed Conflict have encouraged EBO-like operations for quite some time. Finally, the paper will conclude that although effects-based operations are not new, due to the precision of the weapons now being employed in effects-based operations, there is a requirement for a greater understanding of an enemy, his culture, and his infrastructure systems.

What this paper will not do is engage in a lengthy treatise on effects-based operations themselves. The paper will neither contest nor seek to show that new technology is enabling more rapid dominance in some environments or concentrate on demonstrating that parallel attack with precision weapons is allowing a greater breadth of simultaneous attacks using fewer resources. These precepts are not critical to, nor are

⁷ Canadian principles of war may be found at B-GJ-005-500/FP-000 CF Operational Planning Process 2002-11-06 (Department of National Defence, Ottawa, 2003) 1-6, 1-7. Available at http://www.dnd.ca/dcds/jointDoc/docs/opsPlanProcess_e.pdf. Internet; accessed 28 April 2004

they necessarily component parts of, effects-based operations. What the paper does aim to do is to dispel much of the single-minded hyperbole that effects-based operations are new, that they are revolutionary, and that massive changes to our fundamental philosophies will be required to adapt to this allegedly new and improved method of warfare.

Notwithstanding the many modern effects-based zealots, there are also many who believe that we have been conducting effects-based operations for quite some time. Indeed, the United States Air Force's Air Combat Command White Paper on Effects-Based Operations endorses the view that the European Combined Bomber Offensive in World War II was focused on the effect of progressively destroying and dislocating "the German military, industrial and economic systems and the undermining of the morale of the German people to a point where their capacity for armed resistance was fatally weakened."⁸ While it may have taken some time to do so, the paper emphasizes that "It is not always easy to figure out the right targets to achieve the desired effects."⁹

However, Marshal of the Royal Air Force Lord Tedder, Chief of Air Staff in 1947 asserts that although there were false starts targeting various industries in Nazi Germany, the Combined Bomber Offensive eventually found the right targets to achieve the desired effects. Following months of bombers focusing on the Nazi transportation networks, Lord Tedder tells us that the system became paralyzed. "Coal piled up at the pits could

⁸ "ACC White Paper: Effects-Based Operations. ACC/XP". (Air Combat Command, Langley Air Force Base, May 2002). 10

⁹ Ibid.

not be distributed and industries all over the Reich began to close down, shipping began to stagnate, electricity plants and gas plants began to close down.”¹⁰

Lord Tedder enlists no less an authority than Albert Speer, the Nazi Minister of Production during the war to endorse the success of this effects-based campaign. Specifically, he quotes Speer as telling Hitler in December 1944 that “The enemy has recognized that systematic attacks on our communications [transportation] may have a most decisive effect in all spheres on our conduct of the war.”¹¹ Then Lord Tedder tells us that following three more months of aerial bombardment, on 15 March, 1945 Speer reported to Hitler:

...that neither the coal supplies for shipping, for the Reichsbahn, for the gas and electricity plants, for the food economy, nor for the armament economy (which occupies the last place) can by any means be assured... The final collapse of the German economy can therefore be counted on with certainty within four to eight weeks....After this collapse even military continuation of the war will become impossible.¹²

As history has shown, Speer’s forecast was remarkably accurate, and in seven weeks, Germany capitulated. This unequivocal statement by the Minister of Production to Hitler points out that not only was the Combined Bomber Offensive conducting an

¹⁰ Albert Speer, as quoted by The Lord Tedder, “*Air Power in War.*” (Hodder and Stoughton, London, 1948 (reprinted 1954)). 118

¹¹ Ibid. p. 119

¹² Ibid.

effects-based campaign, it was also conducting a successful effects-based campaign against the German transportation infrastructure in 1945. This is not to say that the Combined Bomber Offensive won the war single-handedly. According to Batschelet, “what is clear is that simultaneous ground and air attacks prevented the Germans from devoting adequate resources to counter either effectively.”¹³

Earlier in World War II, prior to the Combined Bomber Offensive, the British Mediterranean fleet was threatened by an Italian fleet, including six battleships, that had a numerical advantage over the Royal Navy’s (RN) Mediterranean Fleet in every class of ship except aircraft carriers. The objective sought by the RN was control of the sea in the southern Mediterranean, which required the effective neutralization of the Italian fleet. However, to do so in a direct naval battle or a prolonged series of skirmishes would be fraught with risk to the fleet. Given the advantage that carrier aviation gave the British, as early as 1938 the RN had been developing plans to attack the Italian Fleet at anchor in Taranto Harbour. On the night of 11-12 November 1940, the HMS *Illustrious* launched 24 Fairey Swordfish torpedo-attack aircraft from a distance of 170 miles. The aircraft attacked in two waves over a one-hour period, and while losing only two of their own number, torpedoed three of the Italian battleships. Two of the three battleships would be raised and eventually repaired, but the third would never return to service. Finding their now vulnerable position in Taranto untenable, the remainder of the fleet retreated to Naples harbour, well out of the critical sea lanes between Alexandria and Malta.¹⁴

¹³ Lieutenant Colonel Allen W. Batschelet. “*Effects-Based Operations: A New Operational Model?*” 8.

¹⁴ United Kingdom. “*Royal Navy History: Taranto 1940*”. (Ministry of Defence, London. 2004) Available at <http://www.royal-navy.mod.uk/static/pages/5802.html> . Internet; accessed 28 April 2004.

The effect of neutralizing the Italian fleet was met, and Winston Churchill recalled “By this single stroke the balance of naval power in the Mediterranean was decisively altered.”¹⁵ To be sure, the effects sought by this operation were realized with minimal forces and the RN reaped the benefits of effects-based operations, the potential of which is only now being extolled by Brigadier General Deptula some 62 years later. Indeed, this operation was conducted with reduced force requirements, reduced casualties, a short duration of conflict, and a reduced requirement for the forward basing of forces.¹⁶ An effective operation to be sure, but it is hardly a sign of something that now in the twenty-first century will, as RAND warns, pose a grand analytical challenge that will take years to adapt to.¹⁷ Additionally, the operation (although it was closely studied by the Japanese prior to launching their attack on Pearl Harbour thirteen months hence) is hardly revolutionary, nor is it a new concept that will “change the basic nature of warfare.”¹⁸

Through the examples of the campaign conducted in the Combined Bomber Offensive, and the single operation conducted against the Italian Fleet in Taranto, one can observe successful tactical and strategic operations in our past which would today be termed effects-based.

For the officer studying operations and warfare today, the various curricula on offer are full of change. New organizations and force structures are established. New

¹⁵ Winston S. Churchill. *“The Second World War Illustrated and Abridged”* (TAJ Books, Surrey. 2003) 95

¹⁶ Deptula., *Effects-Based Operations: A Change in the Nature of Warfare*. 17.

¹⁷ Paul K. Davis, *Effects-Based Operations (EBO): A Grand Challenge for the Analytical Community*. xiii

¹⁸ Deptula, *Effects-Based Operations: A Change in the Nature of Warfare*. 17.

weapons are introduced. New enemies must be studied. New allies must be integrated. One must adapt to new doctrine. However, well-established principles of war have remained reasonably constant through decades of change in Canada. Adaptable to broadly different situations and environments, they underpin our basic doctrinal philosophies. Effects-based operations complement and put into practice a number of Canada's principles of war.¹⁹

As the primary principle of war, Selection and Maintenance of the Aim is evidently the cornerstone of effects-based operations. Prior to applying force, one must first be aware of what one seeks to accomplish through its application. The day before bombing started in Operation Iraqi Freedom, Colonel Gary Crowder, Chief Strategy, Concepts and Doctrine at Air Combat Command delivered a background briefing to Department of Defense staff which explained effects-based operations. He noted that once one is aware of the effect being sought through the application of force, one "could then figure out ways of creating that effect more efficiently, more effectively, striking less targets, using less weapons and, quite frankly, mitigating or easing potential concerns for collateral damage and civilian casualties."²⁰

A communications node functioning from an enemy bunker may well be a legitimate target. However, the simple aim of destruction is not the only method of

¹⁹ The ten Canadian Principles of War can be found at "*B-GJ-005-500/FP-000 CF Operational Planning Process 2002-11-06*" (Department of National Defence, Ottawa) 2003 1-6, 1-7. Available at http://www.dnd.ca/dcads/jointDoc/docs/opsPlanProcess_e.pdf. Internet. Accessed 25 April 2004

²⁰ Colonel Gary Crowder, *US DoD Briefing Transcript*, (Department of Defense, Washington D.C. 19 March 2003). Available at http://www.defenselink.mil/transcripts/2003/t03202003_t0319effects.html. Internet; accessed 26 April 2003.

achieving the effect desired, which is most likely the neutralization, or rendering the communications center ineffective. Simple destruction through the use of numerous large high-explosive bombs may create unnecessary collateral damage. The bunker may be located in the midst of a high-concentration of air defence assets, and to attack using a platform that could deliver two or more high-explosive penetrating warheads might place an entire air operations package at risk. Given closer study, it may become evident that if the local electrical grid is disabled, the communications center is unable to transmit. If antennas are removed, it may be possible to sever the link between the antenna and the facility, rendering it equally ineffective. Determining the specific aim of the operation or the effect being sought through the application of force is precisely what must be determined prior to deciding what capabilities are available to service a target (at the tactical level) or to service an entire enemy capability (at the operational level). A well-established principle of war, selection and maintenance of the aim is in fact the cornerstone of the “new” effects-based operations doctrine.

Another well-established principle of war, Economy of Effort “requires that minimum means and resources be expended or employed in areas other than where the main effort against the enemy is intended to take place.”²¹ An example of how this principle is employed in effects-based operations is evident when one considers a desired effect of rendering ineffective or neutralizing an enemy electrical power grid. One need only consider the massive electrical black-out of Thursday, 14 August 2003 in eastern

²¹ Canadian Forces. “*B-GJ-005-500/FP-000 CF Operational Planning Process 2002-11-06*” (Department of National Defence, Ottawa) 2003 1-6, 1-7. Available at http://www.dnd.ca/dcde/jointDoc/docs/opsPlanProcess_e.pdf. Internet; accessed 26 April 2004

North America to understand the vulnerability of a modern interdependent infrastructure system. It may not be necessary to destroy every last power generation plant in order to darken the lights across a country and to achieve second order effects such as shutting down electrical rail networks, or water, fuel and sewage pumping systems. Rather, an elementary study of the system may show that those first and second order effects can be accomplished by destroying a very few power generation plants, and by using non-lethal, non-kinetic technology such as the BLU-114/B carbon-fiber dispensing warheads to disrupt electrical circuits linking other elements of the system.²² Fewer power generation plants being destroyed means fewer warheads deployed, which in turn means that fewer delivery vehicles are required to launch, which in turn preserves those assets to strike at other targets.

Additional economies can be realized by practicing effects-based operations when one considers that were power-generating plants, or any necessary civil infrastructure, to be destroyed in the course of a conflict, scarce assets would have to be dedicated to rebuilding placing and repairing a facility that would clearly be needed to run a newly liberated or occupied nation.

As the example of rendering ineffective an electrical system demonstrates, observing economy of effort reduces force structure requirements, makes forces available for employment elsewhere, reduces the friendly forces exposure to risk, and can assist in a more rapid post-conflict restoration of vital infrastructure. As economy of effort is a

²² Federation of American Scientists. "*CBU-94 Blackout Bomb, BLU-114/B Soft-Bomb*" (Federation of American Scientists, Washington D.C.) 1999. Available at <http://www.fas.org/man/dod-101/sys/dumb/blu-114.htm>. Internet; accessed 28 April 2004

well-established principle of war, it is appropriate that it be recognized as a pillar of effects-based operations.

Other well-established principles of war are also fundamental to the execution of effects-based operations. Reflecting on the intrinsic links between selection and maintenance of the aim, economy of effort, and the effects-based concept should be sufficient to demonstrate that effects-based operations are not a challenge that “will require changes of mindset, new theories and methods,” or one that will take years to adapt to.²³

As a means of conducting warfare, effects-based operations are governed by the Law of Armed Conflict. In the introduction to “The Law of Armed Conflict at the Operational and Tactical Level,” the Canadian Forces are instructed that “the purpose of the Law of Armed Conflict is to regulate the conduct of hostilities and to protect the victims of armed conflict.”²⁴

A further aim of the Law of Armed Conflict is to protect civilians from the hazards associated with armed conflicts, and to protect those fighting from suffering unnecessarily. These aims and themes are evident in the primary concepts and

²³ Paul K. Davis, “*Effects-Based Operations (EBO): A Grand Challenge for the Analytical Community.*” xiii

²⁴ Department of National Defence, “*B-GG-005-027/AF-021 The Law of Armed Conflict at the Operational and Tactical Level*” (Ottawa: DND Canada, 2001). 1-1. Available at http://www.forces.gc.ca/jag/training/publications/law_of_armed_conflict/loac_2001_e.pdf. Internet; accessed 28 April 2004.

fundamental operational concepts underpinning the development of specific documents and treaties comprising the Law of Armed Conflict.

Military necessity is one of the three primary concepts, and it is “related to the primary aim of armed conflict – the complete submission of the enemy at the earliest possible moment with the least possible expenditure of personnel and resources.”²⁵

However, prior to using force to achieve only necessary objectives and effects, themes repeated throughout the codified Law of Armed Conflict remind one that regardless of necessity, ones actions must meet the following preconditions:

- “a. the force used can be and is being controlled;
- b. the use of force is necessary to achieve the submission of the enemy; and
- c. the amount of force used is limited to what is needed to achieve prompt submission.”²⁶

These three preconditions are fundamental to establishing the legality of use of force, and show that the Law of Armed Conflict itself makes it necessary to determine what effects are sought by the use of force. They also regulate the use of force so that additional and unnecessary damage is not done. This concept is not drawn from a new doctrine, this concept is enshrined in the most basic principles governing armed conflict.

²⁵ Ibid.. 2-1

²⁶ Ibid.

In the current body of laws governing warfare, as far back as the 1907 Hague Conventions, bombardment of undefended towns and buildings has been prohibited, and hospitals, churches and cultural objects are offered further special protections.²⁷ This is a result of the operational principle of distinction, and it is codified again in the 1977 Protocol Additional to the Geneva Conventions. The basic rule expressed in Article 48 regarding civilian populations demands that participants “shall at all times distinguish between the civilian population and combatants, and between civilian objects and military objectives, and accordingly shall direct their operations only against military objectives.”²⁸

Article 51 to the same Additional Protocol specifies further protections to civilians and civilian objects, and defines and prohibits indiscriminate attacks, including those “not directed at a specific military objective” or which “strike military objectives and civilians or civilian objects without distinction.”²⁹

Furthermore, in the most poignant statement regarding effects sought by the use of force in operations, Article 57 states that “those who plan or decide upon an attack

²⁷ Articles 25, 27, Annex to the 1907 Hague Convention (IV) Respecting the Laws and Customs of War on Land. Quoted in Department of National Defence “*B-GG-005-027/AF-022 Collection of Documents on the Law of Armed Conflict*”, (Ottawa, DND Canada, 2001) 8. Available at http://www.forces.gc.ca/jag/training/publications/law_of_armed_conflict/loac_collection_e.pdf. Internet; accessed 26 April 2004.

²⁸ Protocol Additional to the Geneva Conventions of 12 August 1949 (Protocol 1). Quoted in Department of National Defence “*B-GG-005-027/AF-022 Collection of Documents on the Law of Armed Conflict*”, (Ottawa, DND Canada, 2001) 160. Available at http://www.forces.gc.ca/jag/training/publications/law_of_armed_conflict/loac_collection_e.pdf. Internet; accessed 26 April 2004.

²⁹ Ibid.

shall...(ii) take all feasible precautions in the choice of means and methods of attack with a view to avoiding and in any event minimizing, incidental loss of civilian life, injury to civilians and damage to civilian objects.”³⁰

It is clear from the above that the principle of distinction enshrined in the Law of Armed Conflict compels commanders and planners to undertake a careful consideration of the effects intended by the use of force, and to be discerning when selecting the weapons and delivery mechanisms to be used. It links the collateral damage caused to a choice of weapons effects made by someone employing force in an armed conflict. This is not a new doctrine or a new requirement, and should not cause analysts any significant new challenges.

The operational principle of proportionality is also upheld throughout the Law of Armed Conflict. Generally, this principle recognizes that some collateral damage will occur in armed conflict, but “implies that collateral civilian damage arising from military operations must not be excessive in relation to the direct and concrete military advantage anticipated from such operations.”³¹

Prior to engaging in a bombardment or in an operation against a legitimate target, commanders and planners must understand what the weapons effects of the particular ordnance they will be employing. This matching of appropriate weapons to targets is a fundamental of targeting. Targeteers understand for example, that while a given high-

³⁰ Ibid.

³¹ Department of National Defence, *The Law of Armed Conflict at the Operational and Tactical Level*, 2-3

explosive, non-precision bomb may not score a direct hit on a target aircraft, the aircraft may nonetheless be rendered ineffective by blast and shrapnel from a near-miss. It is this excess capacity to cause damage beyond the point of impact that can also cause collateral civilian damage. For each legitimate military target then, one must either determine what levels of collateral damage are likely to result from attacks and compare it to the anticipated military benefit, or one must incr

small girls playing in the room beneath Zibri's office. As an unwitting testament to the low level of collateral civilian damage caused, according to a report in the *Christian Science Monitor*, following the attack the girls' mother said "This was an unbelievably close call. I'm amazed my girls came out of this OK."³³

This careful consideration of the proportionality of legitimate and collateral civilian damage caused by weapons effects was in accordance with the principles underpinning the Law of Armed Conflict. The mission above shows that the challenges some writers say will take years to adapt to have already been solved, and again, indicate that effects-based operations are nothing new. The comparative or proportional value judgments made on the effects of each weapon employed or each attack undertaken are not a new concept. They are well-known and well-practiced principles and techniques that war fighters have been employing for some time.

Thus, by examining the concept of military necessity and the principles of distinction and proportionality, it can be seen that effects-based targeting achieves results based on a careful consideration of both legitimate and collateral weapons effects. This consideration is a practice that has been undertaken, and indeed required by treaty, since 1907.

An examination of our past reveals that effects-based operations are not new. Shutting down a nation's wartime economy took many months, and many attacks as part of simultaneous campaigns, but a successful effects-based operation was conducted in

³³ Cameron W. Barr. "Israel takes aim at politicians." *Christian Science Monitor* 28 August 2001. 6. Available at <http://www.csmonitor.com/2001/0828/p6s1-wome.htm>. Internet; accessed 29 April 2004

1945. The battle of Taranto exploited an enemy's weakness to achieve effects beyond the conventional effects of the weapons systems employed.

Effects-based operations are firmly grounded in well-established principles of war such as selection and maintenance of the aim, and economy of effort. Rather than being a revolutionary concept requiring years of adaption, officers trained under previous doctrines will find simply a new lexicon for analyzing, planning, and executing operations: a fine wine with a new label, as it were.

Finally, the Law of Armed Conflict, a venerated body of treaties and documents accumulated over many years is itself based on principles such as distinction and proportionality which very nearly compel planners to conduct effects-based operations. There is little to prove that effects-based operations will represent, in the words of the RAND Corporation, a "grand challenge" that will require military forces to change their "mindsets, methods and theories."³⁴

In the rush to proclaim and popularize a new discovery, effects-based evangelists have disregarded strong connections shared by effects-based operations concepts with our past, with well-established principles of war, and with the Law of Armed Conflict.

What is new, and what will offer challenges to operational planners and analysts is the effect that weapons employed with increasingly greater precision will have on intelligence requirements, plans and target lists. In this paper, we have demonstrated that Commanders and planners have for some time known what effects that they wished to

³⁴ Paul K. Davis, "*Effects-Based Operations (EBO): A Grand Challenge for the Analytical Community.*"
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achieve, but lacking a scalpel with which to excise the tumour, they were forced to cut off the limb. Unable to puncture only the boiler on each Nazi locomotive, the Combined Bomber offensive was forced to destroy entire rail yards to ensure the paralysis of the German transportation network and bring about the collapse of the wartime economy. This imprecision came at the enormous cost of having to dispatch many additional men, machines and weapons required to achieve a sufficient concentration of force to guarantee the desired effect. The same imprecision meant that massive amounts of collateral damage could be expected to civilians and civilian objects.

One of the things that will be required if effects-based operations are to be exploited is a greater understanding of an enemy. Batschelet states “Knowledge of the enemy will enable the commander to determine the effects he needs to achieve to convince or compel the enemy to change his behavior.”³⁵ If, as our examples have shown, we require a detailed understanding of an enemy’s transportation network, or of his electrical grids, intelligence will have to be gained at a much more detailed level than imagery can provide. Still, in the final analysis, success cannot be guaranteed. Achieving desired effects by destroying an individual target, or a target set, or a target system may have other follow-on, cascading, or 2nd, 3rd, or nth level effects. A targeteer can misunderstand the cultural significance or effect of the demolition of certain buildings, or he could guess wrong about the construction materials used locally, and have collateral effects far beyond what was expected.

³⁵ Batschelet. “*Effects-Based Operations: A New Operational Model?*” 2.

In conclusion, given the above analysis and the re-emergent importance of intelligence, Sun Tzu's teaching of more than two-thousand years ago is remarkably applicable to today's effects-based operations. "Know the enemy and know yourself; in a hundred battles you will never be in peril. When you are ignorant of the enemy but know yourself, your chances of winning or losing are equal."³⁶

We can't afford those odds.

³⁶ Sun Tzu, *The Art Of War*, trans. by Samuel B. Griffith (New York: Oxford University Press, 1971), 84.

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