THE EFFECTS-BASED APPROACH TO OPERATIONS (EBAO)

Last Updated: 09 November 2012

The Air Force designs, plans, and conducts operations according to an effects-based approach in order to take full account of the end state and commanders' intent. Commanders should realize that victory in battle does not equal victory in war, understand the operational environment in its totality, integrate all instruments of national power (IOPs) with military efforts, and avoid taking a mechanistic, reductionist approach to war.

EBAO is defined as "an approach in which operations are planned, executed, assessed, and adapted to influence or change systems or capabilities in order to achieve desired outcomes. There are significant commonalities between the guiding tenets of EBAO and the basic aspects of strategy and elements of operational design discussed in other doctrine topic modules (DTMs). This is intentional: **EBAO is not a planning methodology; *it is a way of thinking about operations* that provides guidance for design, planning, execution, and assessment as an integral whole.** More specifically, EBAO is an approach in which:

- Operations are driven by desired ends (objectives and end states), and should be expressed in terms of desired effects, not defined by what available forces or capabilities can do.
- Commanders realize they are dealing with interactively complex problems not solvable by deterministic "engineering" or "checklist" approaches.
- The "human element," "friction," and the "fog of war" can never be eliminated.
- Problems have no "stopping rule"—there is never one "right" solution. Commanders seek solutions that are "better" or "worse" and solving one set of problems often causes others to emerge.
- Commanders try to maximize options available and thus consider integrated use of all available military means and other IOPs to gain continuing advantage within a given strategic context.
- Commanders employ lethal and nonlethal means, through kinetic and non-kinetic actions to create desired effects.

Principles of EBAO

The concepts described in this section are not wedded to the term "effects-based"—they could have as easily been described as an "objectives-," "outcomes-," "results-," "impact-," or "consequence-based" system of thought. Nonetheless, "effects-based" is the term that is most widely recognized in Air Force circles. Further, this approach fully complements and helps reinforce the general considerations for military operations and strategy described in the previous sections. The section below presents a more complete explanation of the body of sanctioned ideas that define EBAO, but also presents general considerations that are often ignored in military literature on strategy, and which should help shape the thinking of commanders and strategists. (The order in which the explanatory paragraphs are presented does not necessarily represent their relative importance or priority—these may change from operation to operation.)

EBAO is comprehensive—it cuts across all domains and dimensions, disciplines, levels, and IOPs. EBAO provides an overarching way of thinking about action that encompasses operational design, planning, execution, and assessment of operations involving all IOPs across the range of military operations (ROMO). It is not directly tied to any specific strategy or type of operation. It should not mandate a particular strategy, such as "parallel attack" or the "indirect approach," but should consider all options in the context of the objectives and end state(s). "All" in this context encompasses:

- **"*All domains and dimensions*"—**Air Force forces possess significant advantages by operating in the air, space, and cyberspace domains, and in time, in ways that other forces do not or cannot. Commanders should consider options from all domains in which the Air Force customarily operates, as well as the domains that it often creates its chief effects within (land and maritime). Commanders should also realize that operations in one or more domains usually have effects in one or more others, and this helps create synergy. It may be easier to defeat adversaries in a domain where they are strong through operations in another domain where they are weak. By exploiting airpower's speed, range, and flexibility, as well as time, commanders can also gain significant temporal advantages over an adversary, as when pacing operations faster than the adversary can adapt to in order to cause psychological shock and paralysis.

- **"*All disciplines*"—**Commanders should consider that their own set of capabilities or "tools" may not offer all, or even the best, options for solving a problem in a given situation. Other functional specialties, components, Services, agencies, or international partners may offer the best prospect for creating particular desired effects.

- **"*All levels*"—**This means breaking down the boundaries between the strategic, operational, and tactical levels of war, realizing, for instance, that events with even a limited tactical impact can have immense strategic consequences.

- **"*All instruments of power*"—**the integration of military power with other IOPs is a natural extension of thinking across all domains, dimensions, disciplines, and levels. This entails conscious integration of all the IOPs the nation controls, such as using the capabilities of the US Departments of State, Commerce, and Homeland Security to complement military operations. However, it also entails using complementary power of partner nations, NGOs such as the International Red Cross and Doctors Without Borders, and even multinational corporations. An effects-based approach can often be more important to non-combat operations, such as stabilization and civil support, because outcomes in these types of operations require integration of many non-military components with military action and are thus more interactively complex than some types of combat operations, requiring more careful anticipation of effects.

EBAO integrates strategy—all design, planning, execution, and assessment efforts—into a unitary whole. These should be inextricably bound together, because effective and efficient execution almost always involves doing the others in some form as well, even if not as part of a formal or "approved" process. Effective operations should be part of a coherent plan that logically supports and ties all objectives and the end state together; the plan to achieve the objectives should guide execution; and that means of measuring success, gaining feedback, and adapting to changes should be planned for and evaluated throughout execution. Strategy encompasses all the means through which courses of action (COAs) are developed and evaluated, such as the Adaptive Planning and Execution (APEX) system at the national level, the joint operation planning process (JOPP) at the joint force commander (JFC) level, and the joint operation planning process for air (JOPPA), formerly known as the "joint air estimate process," at the component level. These are the collaborative, iterative, and adaptive processes that help integrate strategy from national through joint force component levels. The JOPP and JOPPA are integral and complementary to the APEX process. The latter describes force and logistical requirements and the former describe how these capabilities should be employed.

Operational design and planning set the stage for all subsequent planning activities and thus are where sound effects-based principles may have the greatest impact. Execution encompasses the tasking cycle and the ongoing operational battle rhythm, as well as all the individual unit actions that comprise implementation of airpower operations. Execution that is not effects-based often devolves into a "checklist mentality," that becomes excessively process-driven and loses sight of the larger context (such as the objectives and end state). This can negate sound planning, as when focusing too narrowly on one or another aspect of the battle rhythm—for example, air tasking order (ATO) production. Execution that is not effects-based has often devolved into blindly servicing a list of targets, with little or no strategy and little or no anticipation of or adaptation to enemy actions. Assessment encompasses all efforts to evaluate effects and gauge progress toward objective accomplishment. Assessment feeds future planning and is used to adapt operations as events unfold. One should always attempt to measure performance of actions and the effectiveness of those actions in terms of creating desired effects and achieving objectives.

EBAO emphasizes that war is a uniquely human endeavor—a dynamic and often unpredictable process involving the collision of interactively complex, adaptive systems. War is a contest of human wills, a clash of living forces that creatively adapt to stimuli in ways scientists today describe in terms of non-linear mathematics, systems, chaos, emergence, and complexity theories. This has certain implications that have not always been fully understood or exploited in the US approach to warfighting.

Warfare is non-linear and "interactively complex." Classical Western culture and scientific method are based on analyzing and designing "structurally complex" systems, which contain many moving parts,[1] but which behave according to linear and predictable cause and effect relationships ("push throttle forward, jet goes faster"). Interactions of living systems are always "interactively complex," even if "structurally simple" (few moving parts). This means that the interaction of components is "non-linear" and the results are not predictable according to deterministic rules of cause and effect, unlike most machines. In such systems, system components interact with each other dynamically and adaptively, determining overall system behavior and affecting how constituent parts and sub-systems behave and adapt. New and unanticipated behaviors emerge as system elements interact. Adding the element of "will"—the ability of system components to freely make choices—can add orders of magnitude to the complexity of problem solving. Interactive complexity also means that certain relationships Western culture has relied upon to govern scientific inquiry and the design of machines since the Renaissance often do not apply in the "real world" when dealing with actors possessing free will; especially in war. Specifically, the following aspects of structural complexity may not apply:

Proportionality[2] means that system outputs are directly proportional to inputs—small inputs lead to small outputs and large inputs to large outputs. However, in practice, small inputs often lead to unexpectedly large outputs. This insight has been the key to good military practice for millennia: great commanders have always sought ways to have the greatest effect on the enemy for the least expenditure of lives and resources. Conversely, poorly informed choices can lead huge inputs to yield operationally insignificant outputs, as was the case with World War I's trench warfare, a classic example of a needlessly wasteful attritional approach.

Additivity means that the whole equals the sum of its parts, but this is not true of living systems, which are always more complex and greater in output than the sum of their components, just as the joint force working as an integrated whole is usually more effective than its components working independently ("synergy"). The behavior of interactively complex systems often depends more upon the linkages between

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[1] The more "moving parts" a system has, the more "structurally complex" it is.

[2] Use of "proportionality" here refers to its scientific meaning. However, the term also has a very specific meaning as part of the law of armed conflict: "Under the law of war, the balancing of military necessity in relation to collateral damage is known as the principle of proportionality. Limiting collateral damage will not only reduce the requirement to address civilian claims but may help better support friendly and HN actions to influence the population and reduce the magnitude of stability operations required." (Joint Publication (JP) 1, *Joint Operations*)

components than upon the components themselves. In fact, system-wide behavior often cannot be deduced from analysis of the component parts (see "*reductionism,"* below*)*.

Replicability holds that the same inputs always yield the same outputs, as usually seen with machines and controlled experiments conducted by mathematically linear rules, but this is untrue of more complex phenomena. Seemingly imperceptible changes in initial conditions continually make exact replication of results impossible in practice. What worked in the last "similar" operation may provide guidelines for current operations, but no two operations are ever the same. "Sameness" is an illusion, but similarity[3] often yields useful insights. That is why doctrine is authoritative—advocating best practices—but not directive.

Reductionism is the common scientific method of analyzing systems, by "pulling them apart" conceptually and examining how each component operates separately to determine overall system behavior. It has been the main technique behind machine design for centuries, as well as "nodal" methods of "systems analysis" advocated in some current military doctrine. However, reductionist methods most often yield less insight than "holistic" ways of examining systems—analyzing how the system behaves in relation to other systems in its environment, as well as how components of the system interact, and then trying to anticipate how the interaction of these systems may cause new behaviors to emerge. Breaking a complex problem into constituent, structurally complex parts and "solving" each part will not necessarily solve the overarching problem, just as winning every battle does not guarantee winning a war.

Cause and effect can be traced, often via a linear progression, from a particular cause through a chain of logically connected, predictable effects. However, causes and effects are usually hard to trace and harder to demonstrate, since common "linear" rules often do not apply—especially those involving human will. Emphasizing this might seem ironic in an approach claiming to be based on anticipating "effects," but **it is a central insight that warfighters should understand: most cause-effect relationships important to them involve indirect and often intangible, unquantifiable linkages that are normally discerned inductively (through real-world observation), not deductively (by being able to prove a theorized outcome through logic alone)**. In many cases, effects will accumulate to achieve objectives, but progress may not be evident until the objectives are nearly achieved. In other cases, the mechanisms through which they are accomplished may not be readily apparent. Warfighters should be aware of this, seeking ways to increase anticipatory situational awareness and understanding, counseling patience to commanders and national leadership with respect to results. Progress often must be assessed qualitatively, not quantitatively, since it is far more difficult to evaluate unfamiliar, ill-structured, dynamic, and interactively complex problems.

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[3] "Same" and "similar" are often regarded as synonymous in common usage, but for military purposes, "same" denotes "identical," "similar" denotes having many common features, but not identical.

EBAO should account for how all actors, especially the adversary, may respond to planned actions. Good design and planning should anticipate change. All living systems adapt to changes in their environments and any systematic approach to warfare should account for this. An effects-based approach includes processes to account for likely adversary responses and adaptations. Commanders and strategists should also consider that the beliefs, customs, and habits of adversaries not trained in a Western worldview may not respond in ways anticipated by Americans (mirror imaging), potentially creating unanticipated and unfavorable higher-order effects.

EBAO is about creating effects, not about platforms, weapons, or particular methods. An effects-based approach starts with desired outcomes—the end state(s), objectives, and desired effects—then determines the resources needed to achieve them, while identifying critical resource limitations. It does not start with particular capabilities or resources and then decide what can be accomplished with them. It also assigns missions or tasks according to mission-type orders, leaving decisions concerning the most appropriate mix of weapons, units, and platforms to the lowest appropriate levels within a given organization. Air Force commanders should encourage those from other Services, when tasking the air component, to request particular effects from the air component instead of assets (or platforms, or particular units). Further, while EBAO is not about technology, there are new platforms, weapons, and methods that can enable new types of effects. These do not become truly useful to the warfighter until they are joined with appropriate employment doctrine and strategy. Tanks, radios, and airplanes by themselves did not yield *Blitzkrieg*.

EBAO focuses on behavior, not just physical changes. The force-on-force approach to warfare made destruction of the enemy's military forces the leading aim in war, usually accomplished through attrition—wearing the enemy down through fire and maneuver until their losses exhausted them—or annihilation—destroying their main strength directly, resulting in their complete overthrow. These methods accomplish objectives and are still valuable parts of strategy, but EBAO emphasizes that there are alternatives; that the ultimate aim in war is not just to overthrow the enemy's military power, but to compel them to do one's will. Careful examination of all types of effects often suggests more effective and perhaps less costly options than attrition or annihilation. Another aspect of this principle is one can often achieve objectives more effectively (and efficiently) by maximizing the psychological impact of friendly operations upon an adversary—not just on the fielded forces, but on leadership and other critical systems of control as well. One can carefully tailor messages to adversary populations, encouraging cooperation or other desired behavior from them. Finally, affecting the behavior of friendly and neutral actors within the operational environment can often be as important as affecting adversary behavior. When establishing rules of engagement (ROE) that prohibit striking cultural or religious landmarks during operations, for instance, the intended "target" in doing so is likely to be a friendly and neutral audience more than the adversary. As a consequence, the integration of strategic communications themes and IO are vitally important to overall strategy.

EBAO seeks to achieve objectives most effectively, then to the degree possible, most efficiently. Operations should always accomplish the mission, but should seek to provide alternatives to attrition and annihilation, which are often among the *least* efficient means of achieving ends in war. Thorough evaluation of the range of possible effects should lead to COAs that achieve objectives in ways that best support the desired objectives and end state, but do so with the least expenditure of lives, resources, time, or opportunities. The ultimate aim is to be *effective*. The paradoxical nature of effective strategy sometimes requires that *inefficient means* be employed (see vignette). Airpower may often be the most effective means of achieving objectives because it cannot easily be countered, not because it is most efficient, although it may be so, particularly in terms of lives. Sometimes this requires a strategy based on attrition or annihilation, but these should be selected only after careful deliberation has determined that they are the most effective (or only) choices.

EBAO should consider all possible types of effects. Warfare has traditionally focused on direct effects and more immediate indirect effects like attrition. An effects-based approach should consider the full array of outcomes in order to give decision-makers a wider range of options and provide a realistic estimation of unintended consequences. Each type of effect can play a valuable role in the right circumstances and thinking through the full range encourages a flexible and versatile approach to war fighting. Airmen today can offer a wider array of options to commanders than they could at any time during the past. To explore

Effective versus Efficient

Consider an ordinary tactical choice… To move toward its objective, an advancing force can choose between two roads, one good and one bad, the first broad, direct, and well paved, the second narrow, circuitous, and unpaved. Only in the paradoxical realm of strategy would the choice arise at all, because it is only in war that a bad road can be good precisely because it is bad and may therefore be less strongly defended or even left unguarded by the enemy. Equally, the good road can be bad precisely because it is the much better road…more likely to be anticipated and opposed….

A paradoxical preference for inefficient methods of action, for preparations left visibly incomplete, for approaches seemingly too dangerous, for combat at night or in bad weather, is a common expression of tactical ingenuity – and for a reason that derives from the essential nature of war…when there is a live enemy opposite, who is reacting to undo everything being attempted, with his own mind and his own strength.

—Edward Luttwak

Strategy, the Logic of War and Peace

the full range of possible effects in particular contexts, commanders and strategists should also make use of people with in-depth cultural, historical, and regional knowledge, such as foreign area officers, air advisors, mobile training team members, and naturalized personnel. The intelligence community should offer effective federation of intelligence sources from across the United States Government (USG) and multinational partners. Leveraging this knowledge, together with dynamic interaction with the intelligence, surveillance, and reconnaissance (ISR) community, offers the best option for acquiring the requisite information. In assimilating information, another consideration is the abundance of data available to decision-makers, and the inherent difficulty of deciphering useful information. The volume of information itself becomes a form of friction, precipitating confusion, lengthening decision times, and diminishing anticipatory awareness.

EBAO is not new*.* Sun Tzu wrote, "to subdue the enemy without fighting is the acme of skill…thus what is of supreme importance in war is to attack the enemy's strategy." This intuitive application of effects-based tenets was echoed by Napoleon when he said, "If I always appear prepared, it is because before entering on an undertaking, I have meditated long and have foreseen what may occur." History's great commanders approached warfare from an effects-based perspective, though not so named, when they looked beyond mere destruction of enemy forces to the more general problem of bending the enemy to their will, in the process considering the full range of means through which this was accomplished. "Effects-based" is simply a catch-all for some of history's best practices, coupled with doctrine and some recent refinement of concepts, such as complexity, that enables proper employment of many recent capabilities. In many ways, EBAO is an elaboration of the "strategy-to-task" methodology that has guided Air Force planning for decades and is directly analogous to "maneuver warfare" theory advocated by the United States Army and Marine Corps.