



The destroyer USS *Hopper* (DDG 70) launches a Standard Missile-3 as it operates in the Pacific Ocean on 30 July 2009. The missile successfully intercepted a subscale, short-range ballistic missile launched from the Kauai Test Facility, Pacific Missile Range Facility Barking Sands, Kauai, Hawaii. Aegis-class destroyers provide mobile missile-defense capabilities anywhere in the world, creating freedom of action for combatant commanders to pursue regional strategies. (Photo courtesy of U.S. Navy)

Constructive Effects Focus on Capabilities

Lt. Col. Kevin McCaskey, PhD, U.S. Air Force

The U.S. armed forces have a penchant for producing doctrine, capabilities, and force structures based on previous conflicts—perhaps no branch more so than the Air Force—that continually prescribe silver bullets for future conflicts based on the character of the preceding war. This unsurprising tendency is likely rooted in the simple fact that those generals and admirals preparing to command forces in the next conflict for all branches of the Department of Defense (DOD) were typically field grade officers in the preceding conflict who were profoundly influenced, but narrowly shaped, by

their past personal experiences. Consequently, lessons learned from the previous conflict in which they were engaged, both positive and negative, were naturally internalized by and formative for these future leaders who subsequently ascended to positions of influence where presumed lessons learned were incorporated into doctrine, training, and acquisition. For example, the experience of Desert Storm that exposed such officers to an enemy utilizing traditional military force structure, centralized command and control, and a traditional combined-arms-warfare strategy led directly to

subsequent senior U.S. military leader infatuation with concepts such as network-centric warfare (NCW) and effects-based operations (EBO), which have remained largely theoretical and of little value since Desert Storm.

Consequently, with a myopic view fostered largely by personal experience among senior leaders and little broader institutional effort to incorporate fuller appreciation of the wide and unique variant characteristics of subsequent future conflicts as they emerge, services habitually design their doctrine, strategy, force structure, and capabilities on false premises. This article identifies some of these false premises that currently influence force development and argues that—rather than focusing on attempting to inculcate in doctrine exclusive dependence on the largely destructive effects that yielded positive results during Desert Storm (which were achieved under arguably very unique circumstances unlikely to be replicated in the future)—commanders and planners should focus instead on developing the military’s constructive capabilities to promote operational flexibility because these will be less affected by the inevitable fog and friction of war and more likely to yield predictable, value-added results.

Applying Lessons Learned

Since World War II, we have yet to see dogmatically templated lessons learned from one conflict applied in a way that led to a victory in the succeeding conflict. As history has repeatedly shown, what works in one war is often inconsequential in subsequent conflicts. For example, a strategy of daylight high-altitude precision bombing resulting from the “lessons learned” by Billy Mitchell and Giulio Douhet in World War I was institutionalized by



A B-17 Flying Fortress heavy-bomber aircraft formation flying 17 August 1943 over Schweinfurt, Germany, bombs ball-bearing factories in an ineffective effort to indirectly hobble Nazi mechanized ground forces. (Photo courtesy of U.S. Air Force)

the Army Air Corps Tactical School (ACTS). However, this strategy proved simultaneously ineffective (it was unable to effectively destroy targets as predicted) and ill conceived (it failed to account for technological advancements in fighter aircraft, radar, anti-aircraft artillery, etc.) when implemented during World War II. Thus, assumed lessons based on the character of World War I actually slowed effective preparation for the next war as the Army Air Corps invested in force structure, doctrine, and capabilities (such as the Norden bombsight) based on the previous conflict.¹

In another, more recent, example, theoretical constructs based on the presumed lessons learned gleaned from Desert Storm have survived nearly three decades under the guises of NCW, EBO, and the revolution in military affairs (RMA). The experience of planners developing strike missions for Desert Storm led directly to the rapid rise of EBO, thanks in part to articles such as David A. Deptula’s “Effects-Based Operations: Change in the Nature of War.”² Published in 2001, the timing meant that EBO and NCW would play a prominent part early in both Operations Enduring Freedom and Iraqi Freedom. For the decade following, military officers at

varying staff colleges wrote a number of theses, journal articles, and even books on RMA, NCW, and EBO.³

Perhaps not wanting to miss out on the expected future glory that EBO would garner in the Global War on Terrorism, even air mobility pilots were expounding the virtues of effects-based airlift.⁴ This was despite the fact that “the Hump” (World War II resupply operations over the Himalayan mountains), Operation Vittles (the Berlin Airlift), and multiple other examples of innovative airlift and airdrop operations that directly saved thousands of soldiers in the Korean War had already demonstrated that airpower had achieved desired effects on a routine basis, just not necessarily through destructive effects.⁵

The Logical Fallacies of Network-Centric Warfare, Effects-Based Operations, and the Revolution in Military Affairs

The triumvirate of NCW, EBO, and RMA has dominated literature and academic discussion within the DOD, with advocates asserting that this trinity will govern future conflicts and change the nature of warfare, while detractors exhibit skepticism (if not outright hostility).⁶

In theory, NCW and EBO are enabled by a technological RMA and themselves represent their own “embryonic RMA.”⁷ NCW is achieved by advancements in sensor, information, and weapons technology to create an operational environment wherein “the concept of linking all aspects of warfighting into a shared situational awareness and shared understanding of command intent so as to achieve a unity and synchronicity of effects that multiplies the power of military forces.”⁸ From this definition, as a practical matter, one can immediately see that the desired end state of NCW and EBO is neither measurable nor achievable.

The notion that all aspects of any dynamic environment can be understood is patently false, and in direct opposition to the notion of fog and friction as immutable aspects of the nature of war. Furthermore, while a shared understanding of commander’s intent is plausible, there can never be any circumstance where actual situational awareness is shared. Shared situational awareness is an illusion based on the idea that information, data, and images constitute situational awareness. As operators at any level of warfare know, situational awareness is the unique combination of external stimuli combined with internal

observation and experience. Simply, situational awareness is a unique perceptual construct and can never be totally shared. Any number of people can experience the same events, but that does not yield a shared situational awareness; instead, it results in different interpretations of the same event, some widely at variance with each other.

Alongside the dilemma of achieving a shared understanding through shared situational awareness is the idea that all political entities can be represented by a “system of systems.” This is the central assumption of both NCW and EBO, without which the entire construct becomes untenable. The chief fault in system-of-systems analysis (SOSA) is that there is always another system together with another level of analysis conducted in an attempt to achieve perfect knowledge. Thus, layers of seemingly endless analysis have the great potential of readily leading to “analysis paralysis” in executing operations.

Paradoxically, in addition to the overly complex analysis requirements inherent in SOSA, the process also oversimplifies the process for dealing with the complexity of human interactions and cognitive decision-making processes.⁹ This combination of unattainable requirements such as achieving a complete knowledge of opposing systems, historical methods of warfighting that discounted the human aspects of war (including fog and friction), and a general failure to deliver finally led then Joint Forces commander Marine Corps Gen. James Mattis in 2008 to effectively ban NCW, EBO, and the supporting planning tool “system-of-systems analysis.”¹⁰

Although the phraseology of “effects” now permeates in both the 2015 *U.S. National Security Strategy* and joint doctrine, while continuing to be a source of discussion among the military colleges, the actual predictions and expected utility of NCW and EBO have never managed to flourish in the post-9/11 operational threat environment as some expected after Desert Storm.¹¹ This failure of the information RMA and the resulting NCW and EBO constructs can largely be traced to three key logical fallacies embedded within EBO: *straw-man argument*, *transference*, and *linear projection*.

Straw-man argument. A straw-man argument is a rhetorical device wherein an advocate for an argued position intentionally puts up a weak premise in order to knock it down easily with presumed logic and evidence. Such straw-man arguments are often used to justify the immediate implementation of EBO. Consequently, if a defender of EBO can persuade others to accept the



Viewed from above, a Royal Australian Air Force KC-30A multirole tanker transport aircraft connects with a U.S. Air Force C-17 Globemaster III aircraft from the 418th Flight Test Squadron 10 February 2016 during a refueling operation over Edwards Air Force Base, California. Rapid global mobility is a key constructive effect that enables global strike capabilities. (Photo by Christian Turner, U.S. Air Force)

rather nonsensical straw-man assertion that the “old way” of combined arms warfare and operational art was not based on achieving desired effects, EBO immediately may thus be framed as the superior product by comparison. After all, what military officer would be against achieving effects, saving lives, and generally being more efficient? Thus, the straw-man foundation of EBO immediately forces a *false dichotomy* upon officers: choose the new and improved EBO approach; or, remain mired in outdated methods.

The historical record, however, demonstrates that—contrary to the implied EBO premise—the goal of formulating specific plans of action to achieve specific effects is nothing new to the military, but is actually thousands of years old. Crops were not burned and land destroyed during the Peloponnesian Wars because combatants were using olive branches as cudgels that ignited tinder unintentionally. The burning and destruction that occurred was done intentionally for a military purpose—an effect. Similarly, long before EBO was formulated as a concept, the Army Air Corps mounted a bombing against the Schweinfurt ball-bearing factory during World War II because officers had concluded (incorrectly, it turned out) that destroying the German capacity to produce ball bearings would have the desired effect

of degrading mechanized military capability.¹² Not only did the Schweinfurt air raids fail to reduce ball-bearing availability, but at a cost of hundreds of aircraft destroyed or damaged, and causing the Army Air Corps to ditch the same daylight high-altitude precision bombing that ACTS developed in the interwar years.¹³

Setting aside the implied EBO assertion that traditional combined arms warfare had not planned for achieving effects, as long as militaries have existed, they have always attempted to achieve effects through their actions—what has changed is the available technological capabilities to cause those effects.¹⁴

Transference. While the straw man/false dichotomy combination helps explain why EBO gained immediate appeal, transference and linear projection explain why EBO has, to date, failed to deliver. In psychology, transference is the unconscious redirection of feelings toward another individual. Intelligence operators would recognize this tendency as “mirror imaging.” When speaking of military planning, transference is the tendency of a military to assume that its adversary shares the same interests and values, and ascribes the same importance to assumed centers of gravity on both sides of the conflict. NCW, systems of systems, and effects-based targeting are all typical of such American constructs and, as such, all

suffer from American mirror imaging of enemy motives, objectives, and assumed vulnerabilities.

The U.S. military can absolutely be considered a system of systems, and therefore, highly codependent across branches, weapon systems, and capabilities. When these methods were used in Desert Storm, they were wildly successful, not because of the premise that all political opponents are vulnerable to NCW and EBO, but rather, at a unique time and place, the weakened and desperate post-Iraq–Iran War Iraq was vulnerable to this approach. Planners got it right, not because the model was all encompassing and universally applicable. It was just the right model in the right conflict against the right opponent under the right, but very unique, circumstances.

To put it another way, in Desert Storm the strategy of military means with suitable strategic ways to accomplish political ends was successful in large measure due to a host of factors that had little to do with the methodology and theory used to shape planning for the actual military operation.¹⁵

In the future, against a near-peer competitor or a traditional military force, the NCW/EBO model also might succeed. Unfortunately for the model, the U.S. military has not faced such an opponent under the same circumstances since Desert Storm, since before most enlisted personnel and junior officers were born. What our present personnel have known and experienced was asymmetrical and hybrid warfare, which was purposefully designed not to be a system. The very strength of asymmetrical and hybrid warfare from the perspective of our adversaries was that they avoided pitting their vulnerabilities against superior forces.¹⁶

Linear projection. Failure to fully account for the changing character of war since Desert Storm has demonstrated the tendency of the U.S. military to fall victim to the fallacy of linear projection, wherein present circumstances, conditions, and trends are projected into the future while incorrectly accounting for innovation and change occurring among prospective enemies. Occasionally, military strategies, doctrine, or capabilities do account for expected innovation and change but incorrectly result in a reduction of potential benefits. For example, Cold War assumptions on the use of airpower for nuclear war led to U.S. airpower being unprepared for a limited nonnuclear campaign, and eventually to the Air Force fielding F-4 fighter aircraft designed for the Navy and built without guns in Vietnam owing to

incorrect assumptions about the efficacy of air-to-air missiles.¹⁷ Look at any branch of service from Desert Storm forward, and one will see weapons procurement systems and programs based largely upon this same kind of linear projection.¹⁸

Correctly, the DOD will typically organize, train, and be equipped to face the most dangerous threat rather than the most likely engagement. I do not suggest a change in the practice of gearing for a near-peer conflict in deference to preparation for irregular or hybrid warfare. However, it is appropriate to criticize the notion that doctrinal theory underlying NCW and EBO that accompany the high-tech equipment necessary to defeat a near-peer will also be effective against hybrid-, irregular-, or insurgency-style conflict.

On Effects: Constructive Versus Destructive

Aside from the logical fallacies underpinning EBO and NCW, they also suffer from an additional critical shortcoming: a nearly complete disregard for constructive or enabling effects. While neither specifically claims to be focused solely on destructive effects, the clear reality is that each is designed exclusively to destroy or degrade critical nodes in the hypothetical enemy system, supposedly creating the desired effect. Therefore, such theories of system analysis operate largely in a vacuum without consideration of broader dimensions of the conflict apart from measures aimed at destroying targets.

As previously pointed out, there is no such thing as shared situational awareness, and therefore no such thing as complete understanding of enemy forces, their motivations, their influences, or even their own view of what they themselves regard as their centers of gravity. Therefore, because of the inherent fog of war, relying exclusively on a methodology that only seeks to impose and measure destructive effects becomes problematic and unreliable. Certainly, eliminating a given target might result in a near-term effect we desire, but the enemy gets a vote in war and will always have a better understanding of its own capabilities than we will as they relate to its ultimate objectives, many of which may lie outside what can be directly or materially destroyed.

Alternately, constructive effects focus on the development and employment of those weapons and doctrines that do not rely on correctly guessing what effects might take place by materially attacking a target,

but from a solid knowledge of what will take place by creating capabilities. Destructive effects focus on the enemy system—while constructive or enabling effects focus on one's own system, which offers the best prospect for achieving the much sought-after reduction in the fog of war since measuring our own capabilities will inevitably prove more tangible than estimating the enemy response to these said capabilities.

If we consider the primary proponent of EBO—the Air Force—what actually becomes clear is that the vast majority of Air Force capabilities are in fact constructive in nature, with relatively few capabilities actually designed for and capable of destructive effects. While often ignored, capabilities that enable constructive effects are the largest component and backbone of the DOD, and especially of the Air Force. This is a new circumstance, vastly different from the Air Force during the Cold War, wherein the focus was predominantly destructive.

The domains of air, space, and cyberspace are all predominantly focused on constructive effects, the latter two almost entirely. Consequently, nearly everything the Air Force does might rightfully be considered a constructive effect. Such capabilities include global positioning systems and other guidance systems; intelligence, surveillance, and reconnaissance (ISR); cyber defense; rapid global mobility; air refueling; command and control; and combat search and rescue.

Moreover, and perhaps more importantly, those relatively few capabilities for conducting destructive effects always require a preceding constructive effect to positively affect mission accomplishment. This truth has stark implications for how our current military should organize, train, and equip, which eventually will determine how it plans. By refocusing instead on what has traditionally been institutionally marginalized in so-called support roles, the military should become more focused on those things it can control (its own capabilities) and less focused on those things it cannot control (how the enemy responds to a given destructive effect).

Irrespective, desired effects rarely occur independently; whether destructive, or constructive and enabling, they are for the most part the products of preceding tasks. These tasks are in turn dependent upon capabilities. We can depict the process of achieving military objectives (the end of strategy) as follows:

Capabilities → Tasks → Effects → Objectives

This linkage intentionally mirrors operational design and joint doctrine as it currently stands.¹⁹ Thus, choosing to focus on constructive effects does not require a revision of joint doctrine, but simply a cognitive and cultural shift to emphasize those capabilities that lead to constructive effects rather than destructive. Put a different way, constructive effects focus on our own centers of gravity as those things we can control, while downplaying the traditional importance of the enemy centers of gravity, those things that are subject to all of the aforementioned limitations of NCW and EBO.

In *Understanding Centers of Gravity and Critical Vulnerabilities*, authors Joe Strange and Richard Iron offer a model to analyze centers of gravity using four interrelated concepts:

*Centers of gravity are enabled by critical capabilities with critical requirements subject to critical vulnerabilities.*²⁰

Therefore, refocusing on constructive capabilities matches well with the Strange and Iron model. Recalling the Clausewitzian dictum that a center of gravity is that which gives strength (physical or moral), it becomes clear that U.S. centers of gravity are today largely based on constructive effects. This means that communication networks, ISR, rapid global mobility, cyber capabilities, and GPS must now be considered centers of gravity in the current operational environment. Consequently, enemies of the United States may be expected to focus their efforts on targeting such capabilities to mitigate or diminish them in an attempt to reduce American combat efficacy. In contrast to the past, given the choice, what today's enemies will likely not select to target as centers of gravity are those platforms that can deliver destructive capabilities such as fighter or bomber aircraft. Despite the fascination with the "ace" pilot as the epitome of Air Force warrior ethos, very few things could be considered less strategically relevant today from the perspective of our enemies than a reduction of five fighter aircraft. Unlike constructive effects wherein the capabilities are scarce and critical, when considering destructive effects, most capabilities are redundant and therefore not critical capabilities.

In comparison, there are innumerable means to destroy something across each of the services, but very few means to allow the operation of command and control, ISR, or global mobility. Thus, these constructive effects, which are less subject to fog and friction because the



The U.S. Air Force launches the first of a new generation of military communications satellites, the Wideband Global SATCOM, aboard an Atlas V launch vehicle 10 October 2007 at Cape Canaveral Air Force Station, Florida. (Photo courtesy of United Launch Alliance)

enemy gets less of a “vote,” are more likely to yield predictable results than those destructive effects that rely on assumptions about the enemy center of gravity, capabilities, requirements, and vulnerabilities.

The ongoing air campaign against the Islamic State (IS) serves as an example for the focus on constructive effects. While the effectiveness of the bombing air campaign is currently being argued both ways, what is verifiable is the efficacy of those capabilities that has enabled airpower to identify, track, target, and prosecute IS combatants and capabilities. Thus far, the ISR, command and control, aerial refueling platforms, and space and cyber capabilities that continually enable effects (kinetic and nonkinetic) have been arguably the more important

components of the campaign. With these constructive effects, the enabled destructive effect may actually work, but, without them, the destructive effects never happen.

Since the question “Can airpower alone defeat IS?” is largely impossible to answer (the military always pursues a strategy with the means granted by political authorities), the better question is “How can we ensure that airpower has the capability to execute destructive effects on demand?”

The answer to that question is through constructive capabilities and their resultant effects.

Concluding Observations— Implications for U.S. Planning

The chief shortcoming with EBO and NCW is the illusion that American warfighters can ever achieve complete understanding of the battlespace and a truly shared situational awareness. One can analyze the enemy to the *n*th degree and establish as many nodes and linkages as desired. However, all of these connections fall apart if the initial assumptions about what really matters (identification of true centers of gravity perhaps) are erroneous or if the enemy adapts in unexpected ways. Yugoslavian air defenses shot down a U.S. F-117 in 1999 by doing precisely this, behaving in a manner planners had not (and likely could not have) predicted. The enemy learned and adapted.

At the Air Force Academy, I routinely attempt to expose cadets to the challenges associated with applying system-of-systems analysis in the simulated fog of war and uncertainty pervading conflict by dividing them into groups and allowing them to war-game two given sides in a conflict. For example, one team might play the United States while the other team plays IS. Each attempts to come up with their own center of gravity and that of the enemy.

The exercise is intended to acquaint the cadets with the complexity of even this seemingly simple task, and, in theory, each team would identify the same two things. Yet, in no scenario to date has each side actually identified the center of gravity that their opponent claims is essential to carrying out their strategy. Each side actually attacks something the other does not consider critical to their center of gravity or strategy. It is not that a team cannot identify their source of power, but rather that they can almost never identify what the enemy itself regards as its true source of power.

This occurs because the center of gravity does not drive strategy—strategy drives the center of gravity. This exercise helps highlight that without a perfect understanding of how an enemy will fight during a conflict, we can never accurately decide what to eliminate until engaged. Operationally, this is why NCW and EBO have failed against a variety of asymmetrical opponents. In many circumstances, we routinely have little ability to gain insight into knowing what the enemy strategy actually is, or how it will execute said strategy, with anything approaching the level of certainty promised by the information RMA necessary to enable NCW and EBO.

Because complete understanding of the enemy is extremely difficult to attain, we return to the assertion that focusing on management of constructive effects is the wisest course for developing our future strategy and doctrine. Moreover, it is important to acknowledge that complete understanding of battlespace is an illusion. As Clausewitz pointed out, “accurate recognition constitutes one of the most serious sources of friction in war.”²¹ To continue the farce that more information, data, or imagery will allow the United States to cause complete collapse of the enemy system using surgical attacks against centers of gravity is a fantasy, the unfortunate legacy construct of a singular conflict against a Desert Storm enemy overmatched and ill-prepared for the American approach. Consequently, we would be better advised to deal with the inevitable fog and friction of the future that will arise during future conflict by focusing future planning management on our own constructive capabilities.

A strategy of operations built on logical fallacies and anecdotal evidence should not be considered



A Wideband Global SATCOM satellite has the constructive effect of providing roughly twelve times the bandwidth of previous systems. (Photo courtesy of Boeing)

the end-all in planning. Yes, future wars will focus on achieving desired effects to accomplish political and military objectives, just as militaries have always done for thousands of years. However, we will have greater flexibility in preparing to fight our future wars by focusing primarily on managing and developing the capabilities to apply constructive enabling effects that we control rather than those that apply destructive effects the outcome of which is heavily dependent on historically unreliable assessments of enemy responses. ■

Biography

Lt. Col. Kevin McCaskey, PhD, U.S. Air Force, is an assistant professor in the Department of Military and Strategic Studies at the U.S. Air Force Academy, Colorado, where he teaches air, space, and cyber strategy. He holds a BS from the USAF Academy, an MA from American Military University, and a PhD from the Naval Postgraduate School. He is a senior pilot with over one thousand combat hours in support of the Global War on Terrorism.

Notes

1. Robert T. Finney, *History of the Air Corps Tactical School 1920–1940* (Washington, DC: Center for Air Force History, 1992), 7.
2. David A. Deptula, *Effects-Based Operations: Change in the Nature of Warfare* (Arlington, VA: Aerospace Education Foundation, 2001), accessed 12 July 2016, <http://www.ausairpower.net/PDF-A/ AEF-AFA-Effect-Based-Operations-D.A.Deptula-2001.pdf>.
3. The volume of published theses and manuscripts from various professional military education institutions spans services and coalition allies. For two examples of these phenomena, see Allen W. Batschelet, *Effects-based operations: A New Operational Model?* (Carlisle Barracks, PA: U.S. Army War College, April 2002); Donald Lowe and Simon Ng, "Effects-Based Operations: Language, Meaning and the Effects-Based Approach" (paper presented at the 2004 Command and Control Research and Technology Symposium, San Diego, CA: June 2004), accessed 12 July 2016, http://www.au.af.mil/au/awc/awcgate/ccrp/ebo_language.pdf. Effects-based operations (EBO) was the doctrinal *soup de jour* for much of the decade following Deptula.
4. Ravi I. Chaudhary, "Transforming American Airlift: Effects-Based Mobility, the C-17, and Global Maneuver," *Air & Space Power Journal* 21, 1 March 2007, accessed 12 July 2016, <http://www.airpower.maxwell.af.mil/airchronicles/apj/apj07/spr07/chaudharyspr07.html>.
5. William H. Tunner, *Over the Hump* (New York: Duell, Sloan, and Pearce, 1964), chaps. III, IV, and VI.
6. Literature on the technological revolution in military affairs predates the aforementioned Deptula article. Following Desert Storm, works have included Steven Metz and James Kievit, *Strategy and Revolution in Military Affairs: From Theory to Policy* (Carlisle, PA: Strategic Studies Institute, 1995); Norman Davis, "An Information-Based Revolution in Military Affairs," *Strategic Review* 24 (1996); and Congressional Research Service reports such as Theodor W. Galdi, "Revolution in Military Affairs? Competing Concepts, Organizational Responses, Outstanding Issues," *Congressional Research Service*, 95-1170F (December 1995). In addition, some of these works have flowed from military institutions, think tanks, and academics, many of which are ready to declare Desert Storm a turning point in the six millennia history of warfare.
7. Edward A. Smith, *Effects Based Operations: Applying Network Centric Warfare in Peace, Crisis, and War* (Washington, DC: Department of Defense Command and Control Research Program, 2002), 60.
8. *Ibid.*, 61.
9. James A. Mattis, "USJFCOM Commander's Guidance for Effects-based Operations," *Parameters* (Autumn 2008): 20.
10. *Ibid.*, 23.
11. White House, *National Security Strategy* (Washington, DC: White House, 2015), 4, accessed 12 July 2016, https://www.whitehouse.gov/sites/default/files/docs/2015_national_security_strategy.pdf.
12. Tami Biddle, *Rhetoric and Reality in Warfare* (Princeton, NJ: Princeton University Press, 2002), 224.
13. *Ibid.*, 228.
14. Carl Von Clausewitz, "On Strategy in General," chap. 3 in *On War*, eds. Michael Howard and Peter Paret (Princeton, NJ: Princeton University Press, 1989).
15. Colin S. Gray, *The Future of Strategy* (Cambridge, UK: Polity Press, 2015), 10.
16. David Deptula, "How to Defeat ISIL: It's All About the Strategy," Breaking Defense website, 5 September 2014, accessed 12 July 2016, <http://breakingdefense.com/2014/09/how-to-defeat-isil-its-all-about-the-strategy/>. It is worth noting that the even when EBO proves ineffective, airpower advocates refuse to consider that airpower alone cannot accomplish the task. Thus, we see Deptula recommending that force be applied "like a thunderstorm ... against every move of IS forces and personnel." Thunderstorms and every movement are clearly not based on effects, but a return to mass bombing and attrition based warfare that EBO was supposed to supplant.
17. Colin S. Gray, *Airpower for Strategic Effect* (Maxwell Air Force Base, AL: Air University Press, 2012), 172.
18. Office of the Under Secretary of Defense (Comptroller)/CFO, "Program Acquisition Cost by Weapon System, United States Department of Defense Fiscal Year 2016 Budget Request," Under Secretary of Defense (Comptroller) website, 23 January 2015, accessed 12 July 2016, http://comptroller.defense.gov/Portals/45/Documents/defbudget/fy2016/FY2016_Weapons.pdf. A cursory review of the 2016 Defense Budget Program Acquisition cost study reveals services dedicated to the continued pursuit of ever-advanced missile defense, deep-water naval vessels, and advanced strike aircraft. All are necessary components of a successful war against a near-peer competitor, but most programs are designed for their utility in a Desert Storm-type conflict rather than those Balkan, Somali, or Global War on Terrorism conflicts predominant over the last two decades.
19. Joint Chiefs of Staff, *Joint Publication (JP) 5-0 Joint Operation Planning* (Washington, DC: U.S. Government Printing Office, 2011), III-1–III-44. It is also worth noting that, while Gen. James Mattis cited both JP 3-0, *Joint Operations*, and JP 5-0 as the appropriate source of doctrine, both documents are heavily couched in effects. The critique is not that effects are incorrect, but that EBO lacks value for joint operations under the current threat environment.
20. Joe Strange and Richard Iron, *Understanding Centers of Gravity and Critical Vulnerabilities* (Maxwell Air Force Base, Air War College), part II, 7, accessed 12 July 2016, <http://www.au.af.mil/au/awc/awcgate/usmc/cog2.pdf>.
21. Clausewitz, *On War*, 117.