

## **CHAPTER 5**

### **EFFECTS-BASED OPERATIONS: THEORY, APPLICATION, AND THE ROLE OF AIRPOWER**

**Lieutenant Colonel Brett T. Williams**

The concept of effects-based operations is unfairly criticized in the joint community. Critics contend that the concept relies on perfect information, advanced technology, and precise air attack; therefore they argue, it represents an unachievable, narrowly focused warfighting panacea that ignores the fog and friction of war. This chapter proposes an alternative view. Effects-based operations represents a theory that should help determine how to use the various elements of power to attain national security objectives. Effects-based operations does not depend on information dominance, high-end warfare, or even precision strike to make it useful. Additionally, because it is not an operating concept like “Rapid Decisive Operations,” effects-based theory is applicable across the spectrum of conflict.<sup>1</sup> The first section of this chapter defines effects-based operations theory and explains how it helps to develop and assess strategy within the constraints of information analysis and acceptable risk. Section two describes how to use effects-based operations at the operational level with emphasis on interagency coordination, effects-based mission planning, and continuous assessment. The third section addresses how the Air Force should use effects-based operations to better define airpower’s role in joint warfighting. It also argues that effects-based operations is the only way to use airpower effectively in a context of gradual employment.

## **The Theory of Effects-Based Operations .**

Major General David Deptula, an active advocate for effects-based operations, has argued that during Operation DESERT STORM, technological advances in airpower—specifically stealth aircraft and precision guided munitions—enabled the first application of the concept. As the leading air planner in the war, he encouraged the Joint Force Air Component Commander’s staff to change their targeting paradigm and focus on desired effects instead of just on target destruction. For example, achieving air superiority meant disabling the Iraqi integrated air defense system. Traditional operations would have focused on destroying missile launchers, radars, and air defense control centers. Instead of doing this, stealth aircraft, armed with precision-guided munitions, attacked critical links and nodes in the air defense system. The attacks achieved the effect of functional system breakdowns and did so with minimal operational risk and lower cost in terms of sorties and weapons, when compared to traditional methods. Deptula has bolstered his arguments by using results from air operations in Bosnia and Kosovo. Based on his analysis of these operations, he has defined effects-based operations as a tool to support parallel attacks on critical targets to cause paralysis in an enemy’s “system of systems.” The desired effect is to control an enemy by eliminating his capability to employ forces. Effects-based operations improves on current warfighting methods, because it reduces force requirements, casualties, forward-basing needs, and conflict duration.<sup>2</sup> Not surprisingly, Deptula argued precision air attack is the best way to exploit effects-based operations and, therefore, the Air Force should be the decisive element of American military power. Unfortunately, his strong advocacy for airpower caused some critics, notably soldiers, to ignore the valuable insights he offered.

U.S. Joint Forces Command is also a proponent of effects-based operations, particularly at the strategic and

operational levels of war. Like Deptula, Joint Forces Command's focus is on achieving desired effects, not processing through target lists. Effects-based operations, according to Joint Forces Command, is a knowledge-based process that predicts enemy reactions. By predicting enemy behavior and understanding his system, effects-based planning can direct attacks against critical nodes and links that should cause a breakdown in cohesion and destroy the adversary's ability to resist. Put "simply" according to Joint Forces Command, effects-based operations generate strategic effects "through the synergistic, multiplicative, and cumulative application of the full range of military and nonmilitary capabilities at the tactical, operational, and strategic levels."<sup>3</sup> The result should be a quicker, cheaper victory especially when compared against a strategy of annihilation or attrition. Not surprisingly, Joint Forces Command's views have received considerable criticism, especially from land power advocates.<sup>4</sup>

Both Deptula and Joint Forces Command have emphasized the need to use national power to achieve a particular strategic outcome. They also correctly identified the synergies to be gained from integrating military with nonmilitary instruments of power. Problematically, critics have ignored the positive aspects of their arguments because Deptula and Joint Forces Command have linked effects-based operations to the emerging operational concept called "Rapid Decisive Operations."<sup>5</sup> The concept of "Rapid Decisive Operations" evolved from Joint Vision 2020 and has been the subject of sharp critiques. Criticisms have included its narrow focus on high-end, small-scale contingencies; reliance on near perfect information; an enemy that operates as a compensating adaptive system of systems with vulnerable critical nodes; and the assumption that speedy execution will always achieve the political aim.<sup>6</sup> Tying effects-based operations to "Rapid Decisive Operations" has unfairly denigrated the potential benefits of effects-based operations. The concept of "Rapid Decisive Operations" relies on the ability to predict enemy reactions

using effects-based operations, but effects-based operations is more than an enabler for one specific operational method. Effects-based operations provide a general guide for employing national power to achieve strategic objectives in almost any scenario.

Defining effects-based operations as theory is the first step in divorcing it from specific operational concepts. Clausewitz once noted, “The primary purpose of any theory is to clarify concepts and ideas that have become, as it were, confused and entangled.”<sup>7</sup> Additionally, “[t]heory will have fulfilled its main task when it is used to analyze the constituent elements of war...to explain in full the properties of the means employed and their probable effects...”<sup>8</sup> Effects-based operations, correctly explained, fits the Clausewitzian definition of theory. For the purpose of this argument then, effects-based operations theory is a method of determining the correct application and integration of national power to achieve specific effects and outcomes within the bounds of acceptable risk. Effects can physically, functionally, or psychologically impact the enemy and coerce or compel him to change his behavior and eventually lead to desired outcomes.<sup>9</sup> Although effects-based operations can enable strategic, operational, or tactical outcomes, this chapter focuses on strategic and operational outcomes, where effects-based operations offer the greatest advantages over current planning and execution methods.

**Effects-Based Planning and Execution.** A major shortfall of traditional objectives-based planning is that it assumes a linear relationship between action and objective; the correct action executed perfectly will attain the desired objective. (See Figure 1)

### **Figure 1. Traditional Objectives-Based Planning .**

Unfortunately, war is not linear. Instead, it is a nonlinear activity, where military actions produce multiple reactions that are difficult to predict.<sup>10</sup> Current chaos theory captures the nonlinear nature of war. The theory states that within complex systems nearly all inputs will “lead to unpredictable, irregular behavior.” In other words, war is not proportional or additive.<sup>11</sup> Even small, seemingly insignificant actions can cause large and frequently unforeseen effects. In addition, at the same time an action generates effects on one objective, it can produce unpredicted effects on a different objective. Thus, there is not a linear relationship between actions and objectives. Instead, actions produce a variety of effects, and the effects determine whether or not the objective is achieved. Figure 2 adds the concept of effects to the traditional linear planning model.<sup>12</sup>

In the event strategic aims are clear, the enemy is politically isolated, and military force is the dominant instrument, linear planning may succeed. Encountering such a simple environment, however, is unlikely. Instead, a host of complicating military and political factors will nearly always exist. Most adversaries will take advantage of such factors by adapting, substituting, and compensating to overcome operational problems. They will try to change the strategic environment by attacking alliances, manipulating international opinion, or influencing U.S. domestic politics. Saddam Hussein, for example, used messengers to compensate for Iraq’s disrupted

communication system, and he tried to bring Israel into the war in an effort to weaken the U.S.-led coalition. Effects-based operations offer commanders a methodology to cope with the nonlinear nature of war.

The first step in effects-based planning is to determine the effects that will attain the desired strategic outcome. This step begins with the political aim as articulated by the civilian leadership. The Joint Force Commander then develops supporting theater objectives and selects the physical, functional or psychological effects that might generate the desired change in an enemy's behavior. Optimally, the Joint Force Commander and his component commanders will reach agreement on the key strategic and operational effects necessary for success. Typically though, individual experience, service culture, and differences of opinion will lead senior leaders to alternative solutions. Operation ALLIED FORCE provided an example of how debate over desired effects can cause friction at the highest levels.

Operation ALLIED FORCE evolved into a 78-day NATO air operation, in which one of the objectives was to stop Yugoslav President Milosevic from using violence against ethnic Albanians in Kosovo.<sup>13</sup> U.S. Army General Wesley Clark, Supreme Allied Commander Europe, led NATO forces, and U.S. Air Force Lieutenant General Michael Short was the Air Component Commander. The generals agreed on the strategic objective—stop the ethnic cleansing—but they disagreed on the effects needed to achieve that end. Clark wanted a physical effect: attack the armed forces committing the atrocities. Short wanted to generate functional and psychological effects targeted directly at Milosevic. He believed that attacking command, control, and key infrastructure targets would cause Milosevic to accept NATO's demands.<sup>14</sup> The debate was never resolved, NATO attacked both target sets, and Milosevic gave in. Success came from a combination of factors that did not include unity of effort at the highest

levels of command. Above all, the operation highlighted the difficulties involved with determining appropriate effects.<sup>15</sup>

Once the senior staff determines desired effects, planners can begin analyzing potential courses of action. Proper analysis begins with a net assessment of the strategic, operational, and tactical environment and the analysis extends beyond military capabilities. Analysts must consider culture, religion, economics, and diplomacy, as such factors will impact on the conduct of the war as much as the military balance of power, if not more. Other aspects of the assessment must include the objectives of the participants and the value they attach to their objectives. The analysis must estimate enemy capabilities in all four areas of power: diplomatic, economic, information, and military. The military assessment should measure organizational strengths and weaknesses in doctrine, training, leadership, and equipment for both friends and enemies. Finally, the assessment must determine what peripheral allied interests could influence the course of the war.

The quality of the net assessment and the commander's ability to use the net assessment to make decisions will determine the ability to predict effects. Since net assessments depend on collecting and analyzing information, information is a critical enabler for effects-based operations. Critics understand this dynamic and perceive information as a limiting factor, because they think information superiority is a requirement for effects-based operations. Information superiority is a key component of *Joint Vision 2020*, the Department of Defense's roadmap for developing future warfighting capabilities.<sup>16</sup> Information superiority, according to detractors, is not attainable because no amount of technology will deliver complete information. The proliferation of information technology serves the enemy as well as it serves the United States, and even infinite information is useless without quality analysis. These criticisms have merit, but they do not apply to effects-based

operations. Effects-based operations do not require perfect information, information superiority, or information dominance. What effects-based operations require is analysis sufficient to support decisionmaking. Excellent information coupled with superior analysis helps in predicting effects, but limited information and incomplete analysis do not invalidate effects-based theory. Commanders simply need to account for the quality of the net assessment in evaluating courses of action. They need to realize that poor net assessments will lead to a wider variety of unpredicted effects.

Armed with a net assessment, effects-based planners can evaluate courses of action. Planning doctrine requires the selected course of action to be adequate, feasible, acceptable and consistent with joint doctrine.<sup>17</sup> Planners can ensure the selected course of action meets these four criteria only after considering that every action will produce as many as four differing effects: predicted-desired effects, predicted-undesired effects, unpredicted-desirable effects, and unpredicted-undesirable effects. It is also important to understand that a single action will impact the objective at hand as well as other objectives in the campaign. (See Figure 3.)

The Joint Force Commander would like to select a course of action that generates only predicted effects. Predicted effects, even if not desired, make a cost-benefit analysis possible and allow the commander to select courses of action, where advantageous desired effects outweigh undesired effects. Unfortunately, there will always be unpredictable effects; war is inherently unpredictable because it occurs between animate adversaries who interact within complex environments subject to constant friction. Clausewitz correctly observed:

[e]verything in war is simple, but the simplest thing is difficult. The difficulties accumulate and end by producing a friction...This tremendous friction...brings about effects that cannot be measured, just because they are largely due to chance.<sup>18</sup>

There are three sources of friction, one of which is the chaotic, nonlinear nature of war. The second is the unpredictable nature of human behavior, a factor exacerbated by the pressures and dangers of war. The third source is information uncertainty. Useful information is lost in the system noise, incorrectly interpreted or analyzed, and not always available to the commander in time for making decisions.<sup>19</sup> These three sources of friction produce chance events that are a basic reality in war, regardless of advances in technology.<sup>20</sup> The existence of friction and chance does not mean there is no predictability in war; it just means there will always be surprises. The commander must use his intuition, experience, training, and common sense to compensate for unpredictable events because they will frequently determine strategy's success or failure.<sup>21</sup> He can never eliminate friction and chance; instead, his goal is to be less affected by such elements than is the enemy.<sup>22</sup>

Understanding that combat will always be unpredictable helps the Joint Force Commander assess risk. In effects-based operations, risk is measured by the potential for an action to produce unpredicted outcomes. When the probability of unpredicted effects is low, risk is

low. Conversely, when the probability of unpredicted effects is high, risk is high. Allies, coalitions, and wide international interest create complex strategic environments in which the possibility of significant unpredictable effects increases. Military parity also increases risk because the operational outcome is less certain. Additionally, risk is higher when one side is willing to use an asymmetric capability like chemical weapons or direct attacks on civilians. These factors all increase risk because they increase the probability of unpredicted effects. Figure 4 and the following three examples further illustrate the relationship between unpredictable effects and risk.

An example of low risk is Operation JUST CAUSE, the 1989 U.S. invasion of Panama. The strategic environment was benign because international interest in Panama remained limited to regional actors, while events leading up to the invasion put the U.S. on moral high ground.<sup>23</sup> The net assessment was accurate due to similar cultures, as well as long-term U.S. presence in the country. These factors, combined with overwhelming military force and no requirement for allied support, meant the selected course of action would likely produce predictable-desirable effects.

#### **Figure 4. Unpredictable Effects and Risk .**

Operation DESERT STORM is an example of moderate risk. The strategic environment was complex due to wide international interest in the conflict and vastly different cultures among the allies. The spectrum of potential unpredicted effects was wide because of the ongoing Arab-Israeli conflict, the uncertain roles countries like Iran, Syria, Jordan, and Russia might play, and the possibility that Iraq might use chemical or biological weapons. Factors that mitigated risk included extended U.S. involvement in the region, a marked military advantage, a brazen act of Iraqi aggression, and an effective coalition that produced political will, basing access, and a common strategic endstate. The selected course of action, remove Iraqi forces from Kuwait, promised to generate mostly predictable effects and the desired effects outweighed the undesired effects. The array of possible unpredictable effects included coalition problems relating to Israel and the unknown effects that would have resulted from Iraq's use of chemical or biological weapons. The political isolation of Iraq and persistent attacks against weapons of mass destruction facilities kept potential risk from unpredictable effects within an acceptable range.

An example of high risk would have been the continuation of Operation DESERT STORM. Continued operations into Iraq would have increased the potential for unpredicted and undesired effects. Limited Arab support for further offensive operations would have increased risk by threatening the coalition's political cohesion and reducing military and logistic support to forces continuing the attack. Destroying the Iraqi army or taking down the Iraqi regime would have had unpredictable effects on regional stability. Threatening Saddam Hussein's survival might have created a catalyst for Iraqi chemical or biological attacks. More extensive friendly casualties and collateral damage might have turned popular opinion against the operation. In sum, the potential array of unpredictable effects created an unacceptably high risk level, and the United States halted offensive operations.

After the commander selects a course of action that meets the risk criteria, he must establish measures of effectiveness to determine if operations are producing the predicted effects. Measures of effectiveness typically consist of objective data points, evaluated numerically to determine progress. It is sometimes difficult to define useful measures because what to measure is not apparent or the best thing to measure is unmeasurable. Additionally, information is frequently sparse, there is limited time available for analysis, and analysts looking at the same data can reach different results based on personal experience and organizational bias. Additionally, the fog and friction of war introduce “noise” into the system, making it difficult to discern valid data from spurious, random events. Lastly, measuring effects does not always lend itself to numerical evaluation. Nevertheless, commanders must measure something, if they are going to make meaningful adjustments to the campaign plan.<sup>24</sup>

Choosing the correct measures of effectiveness is critical because evaluation against those measures will determine resource allocation, movement between campaign phases, and strategic and operational changes. Commanders must devote personal attention to determining the correct measures as component commanders with the same operational objectives can select different measures of effectiveness. For example, during the Vietnam War, the Army and Marines had the same objective of eliminating Viet Cong and North Vietnamese influence in South Vietnam. The Army measure of effectiveness was dead enemy soldiers, and this drove search and destroy tactics with no long-term presence in any specific area. The Marines measured effectiveness using rice crop production. Increased rice production came from social, economic, and political stability, which was only possible if the villagers were free to live in peace. To drive their measures of effectiveness, Marines established protected positions and long-term presence with small teams to discourage enemy action in their sectors. The theater commander was not

measuring rice production; instead he was counting dead enemy soldiers. The result was the Marines were forced to change their tactics to show progress against the Army measure of effectiveness. This example demonstrates how measures of effectiveness can drive strategy and adversely affect unity of effort. In addition, it demonstrates how the wrong measures of effectiveness can distort the whole operational effort.<sup>25</sup>

Once combat operations are underway, effects-based operations theory facilitates the reassessment process. Reassessment has two components: continuously evaluate combat operations against established measures of effectiveness and adjust strategy as required to generate the desired effects. Good measures of effectiveness allow the staff to evaluate predicted effects, both desired and undesired. Assessing unpredicted effects will be more difficult for several reasons. First, analysts may be slow to recognize unpredicted effects because the post-attack evaluation process will naturally look for indicators of predicted effects. Second, preplanned measures of effectiveness may not be helpful in evaluating unpredicted effects. Third, unpredicted effects may impact not only on the planned objective, but also on other operational or strategic objectives. Finally, the time available for analysis and reaction will always be constrained.<sup>26</sup> These factors call for an adaptive, flexible command structure that can evaluate and react to unpredictable effects. Commanders must take advantage of unpredicted-desirable effects and minimize the adverse impact of unpredicted-undesirable effects.

The presence of second and third-order effects will complicate the process of assessing effects. Such effects are commonly termed indirect effects, because they do not result from direct actions taken, but instead result from the cascading or sequential nature of effects within a complex system.<sup>27</sup> Multi-order effects are hard to evaluate because they occur separately from the action in either time or space, which makes it difficult to determine which action

generated the effect. Without identifying the generating action, it would be impossible to adjust the campaign plan to leverage desirable effects or prevent additional undesirable effects. Planners can predict some indirect effects, but analysis will always be difficult even with accurate measures of merit. Nevertheless, it is essential that commanders account for multi-order effects because they may impact friendly operations as much as they do enemy operations.

The inevitability of unpredicted effects and the chaotic nature of multi-order effects are factors which drive the second component of reassessment: adjusting the campaign plan to achieve the desired outcome. After the commander evaluates results against pre-planned measures of effectiveness and determines the source and impact of unpredicted effects, he must be willing to change the original plan, drastically if necessary. Before he makes major adjustments however, he must have confidence that the post-attack analysis was as specific and multi-faceted as the original net assessment. The analysis must go beyond simple battle-damage assessment and look for the physical, functional, and psychological effects necessary to achieve the desired outcome. If the desired effects are not forthcoming or if it appears operations are exceeding the limits of acceptable risk, the commander must change some component of his strategy. Effects-based operations is a process of net assessment, action, reassessment, adjustment, and action. It is a continual process and, properly implemented, should keep operations oriented on the original aim; not on processing target lists or securing decisive points. In addition, if the cycle is timely, it also will generate a compounding positive effect because friendly forces will act and react inside the enemy's decision cycle.<sup>28</sup>

*Bismarck and Effects-Based Operations.* Effects-based operations do not rely on technology, precision strike, airpower, perfect information or other 21st century warfighting tools. To prove this point, the following case study illustrates how an effects-based campaign, employed

at the strategic level, was instrumental to Prussian victory in the 1866 Austro-Prussian War.

The Austro-Prussian War was the final chapter in the struggle between Prussia and Austria for control of the German Confederation. The German Confederation consisted of 39 states and was formed in 1815 by the five European Powers (England, France, Russia, Austria, and Prussia) following the defeat of Napoleon. The purpose of the confederation was to maintain the European balance of power in two ways. First, the confederation joined Austria and Prussia with the small German states in order to prevent outside powers from annexing German territory for economic and military gain. Second, while Austria and Prussia had the most influence within the confederation, the nature of the governing federal bureaucracy prevented either of them from consolidating political control by dispersing influence throughout the member states. After 1848, Austria and Prussia engaged in a number of attempts to gain control of the confederation by forming alliances among the various smaller states.<sup>29</sup> The war's precipitating event was a disagreement over control of two recently acquired northern provinces, Schleswig and Holstein. Austria and Prussia had gained control of these provinces as a result of the 1864 Danish War.

Otto von Bismarck, Prussia's Chancellor, saw the dispute over Schleswig and Holstein as an opportunity for Prussia to gain complete control of the German Confederation.<sup>30</sup> With the strategic aim established, Bismarck conducted a net assessment of the diplomatic and military situation in Europe. Both diplomatic and military courses of action were available, but Bismarck's assessment led him to select a military option with limited objectives: defeat the Austrian Army and dictate terms. Bismarck determined this course of action could produce significant risk from unpredictable and undesirable effects unless he could do two things. First, he needed to reduce the chances that France or Russia would enter the war on behalf of Austria. He accomplished this through a series of deft

diplomatic maneuvers.<sup>31</sup> Second, Bismarck had to ensure a military advantage for Prussia because an indecisive or prolonged conflict would not have forced Austria's hand. The Prussians had a significant military advantage in three areas. First, they had the world's only true General Staff; its officers were trained, tested, and eminently capable of commanding and controlling large military organizations. Second, the Prussian commander-in-chief, Helmut von Moltke, was militarily superior to the Austrian commander Field Marshall Ludwig Benedek. Moltke was confident, willing to take calculated risks, and had the support of a competent staff. Additionally, Moltke had trained the Prussian army using various war-gaming scenarios that prepared them to take the initiative on the battlefield. In contrast, Benedek was "a hesitant, weak-willed pessimist" who was slow to make decisions and unwilling to delegate authority. Prussia's third advantage came from superior weapons, tactics, and training.<sup>32</sup>

Because Prussia's strengths were not widely recognized, Bismarck was able to enhance Prussia's military prospects by reinforcing the sentiment that Prussia was militarily inferior to Austria. Bismarck further complicated Austria's problems by taking advantage of existing tensions between Austria and Italy. He secured a military alliance with Italy to open a second front along the Austrian-Italian border.<sup>33</sup> Bismarck's proactive approach at the strategic level controlled risk and reduced the probability of unpredictable effects generated by operational actions. His diplomacy allowed Moltke to exercise operational art, and achieve a decisive Prussian victory at Königgrätz.

The victory demonstrated that success as well as failure requires a reassessment process. Prussian King Wilhelm, despite his initial reluctance to attack Austria, wanted to take advantage of the situation and march on Vienna. Moltke, recognizing the need to end the war before Russia or France could intervene, pressed the offensive south towards the Austrian capital. At this point, Napoleon III proposed an armistice that forced a strategic pause. Prussia could not

ignore France's interest in the conflict for fear of French military action against its Rhine provinces—a dangerous proposition with the Prussian army deployed so far east. French intervention also bought the Austrians time and opened up the possibility of an armistice between Austria and Italy that would have freed Austrian forces to move north and participate in the war against Prussia.<sup>34</sup> Finally, disease and logistics began to threaten Moltke's strength.<sup>35</sup> Bismarck conducted a reassessment that covered all military and nonmilitary factors and subsequently convinced Wilhelm that it was time to negotiate a settlement. He argued that further offensive actions would have generated unpredictable effects—most significantly, outside power involvement that might have threatened achieving the original strategic war aims. Bismarck clearly understood that the character of the war had changed and “nearly all the parameters had shifted in ways that were too complicated, diffuse, and basic to be calculated with confidence.”<sup>36</sup> Bismarck had used effects-based thinking to stay focused on the strategic outcome as well as effects.

Bismarck determined an achievable political aim and established supporting objectives. He conducted a net assessment, determined desired effects, evaluated courses of action, assessed risk, and shaped the environment to enable Prussian success. After the initial victory, he reassessed the situation against pre-planned measures of effectiveness and determined there was no need to change the plan. Instead, it was time to declare victory and move on to France. Thanks in large part to Bismarck's use of effects-based operations, Prussia was successful despite its inability to conduct precision air attack under the umbrella of information superiority.

### **Effects-Based Operations in Theater .**

Effects-based operations can help commanders better plan and execute campaigns. To achieve that end, Joint Force Commanders first need a theater-level interagency

coordination element; and second, they must form an Effects Assessment Board to ensure the campaign remains oriented on generating the effects necessary to attain the operational and strategic objectives.

*Interagency Coordination.* The Secretary of Defense noted that the commander of U.S. Central Command was “left alone” by Washington to conduct military operations in Afghanistan.<sup>37</sup> On the surface, such autonomy seems desirable when comparing Vietnam, where there was significant guidance from Washington, with Operation DESERT STORM, where the commander was relatively free to conduct operations. Conflicts since Operation DESERT STORM, however, including those in Somalia, Bosnia, Kosovo, and Afghanistan, have been like Vietnam. Commanders in these conflicts confronted unclear military objectives and discovered that political, diplomatic, and coalition issues heavily influenced operational decisions. By implication, when objectives are limited, the use of force remains constrained and political considerations determine military options. In such cases, the commander has no choice but to work closely with Washington in order to integrate military and non-military actions within a single coherent strategy. Effects-based operations provide the framework to coordinate diplomatic, information, economic, and military actions, but to do so commanders require interagency participation with their staffs.

Recently, several regional commanders have asked for civilian agents to be assigned to their commands to improve interagency coordination.<sup>38</sup> Placing civilian representatives on all combatant staffs is unlikely due to limited manning within civilian agencies as well as organizational barriers. Additionally, there may not be sufficient work for such representatives in day-to-day operations. A better option aligns itself with the Standing Joint Task Force headquarters described in the 2001 *Quadrennial Defense Review*. The review envisions standing headquarters assigned to each of the regional commands. Their mission would be to provide uniform operating procedures, utilize

adaptive mission planning tools, and provide the capability to move expertise among the commands.<sup>39</sup> One element of such standing headquarters should be responsible for interagency coordination. Since assigning an interagency element to each region is infeasible, the Joint Staff could stand up one element in a central location. Joint Forces Command would be a logical place to facilitate interagency coordination, because the element would be in close proximity to joint exercises, experiments, and doctrine development.

The standing interagency coordination element would enhance effects-based operations in three ways. First, it would allow individuals who do not typically work together an opportunity to develop personal relationships, share expertise, and explore innovative ways to combine the elements of national power to achieve operational and strategic effects. This is important because organizations tend to develop new and better ways of doing things when they routinely work together. An example of this occurred when U.S. special forces developed techniques for providing close air support from high altitude bombers in support of Afghan fighters on horseback.<sup>40</sup> The impetus to develop new tactics and techniques would come from the element's second mission, which would be to help develop and review theater war plans. The interagency element would periodically travel to the regional headquarters and actively participate in various stages of planning to include mission analysis, course of action evaluation, and strategic concept development. Additionally, the element would serve as the conduit between the regional headquarters and the interagency element during the plan review and approval phase. Performing these functions would provide the interagency element with regional expertise and ensure each command an equal voice in the interagency coordination process. The third mission of the interagency element would be crisis response. The element would have to be deployable, trained, and able to integrate with the rest of the combat staff in theater. Its mission would be to help

the Joint Force Commander mass effects by integrating diplomatic, economic, and information activities with military force.

The interagency element will only be effective if civilian and military organizations provide capable people and give them the authority to act on behalf of their respective agencies. That authority will have bounds, and on occasion the National Security Council will have to resolve contentious issues that cross agency boundaries. Creating an interagency element that is sufficiently staffed and empowered to perform the mission outlined here is certain to meet numerous organizational roadblocks. However, they must be overcome if Joint Force Commanders are to realize the benefits of effects-based operations.<sup>41</sup>

*Effects-Based Missions.* Using traditional objectives-based planning, the commander analyzes the political aim and develops supporting theater objectives. The staff develops sub-objectives and supporting military tasks that they assign to various component commanders for execution. The process relies on a linear strategy-to-task relationship focused on the intended results.<sup>42</sup> The process can produce “stove-piped” campaigns that do not generate synergistic joint, interagency operations. This traditional approach fails to maximize desired effects, and it allows for the possibility that actions taken by one component may work at cross-purposes to other ongoing military or nonmilitary missions. Effects-based mission planning and execution can correct such shortfalls.

Joint Force Commanders need staff elements that always address effects. During deliberate and crisis action planning, it is not difficult to focus on effects because planners have time to evaluate actions and analyze the possibilities. Once operations begin, a continued focus on effects becomes a challenge. There is a tendency for senior commanders to focus on operations and subsequently equate tactical results with achieving the strategic or operational objective.<sup>43</sup> In Vietnam for example, body count

became the primary focus without connecting that metric to the desired outcome. More recently, during a 1999 war game emphasizing effects-based operations, the Air Force found that planners had a difficult time staying oriented on effects. Once the campaign started, their attention drifted to operational details, and they lost focus on the effects needed to attain campaign objectives.<sup>44</sup> A reoriented and renamed Joint Targeting and Coordination Board could help overcome such tendencies.<sup>45</sup> The board requires reorientation to focus on strategic and operational effects instead of just targeting issues. The Deputy Joint Force Commander should continue to chair the board. Board members typically include senior representatives from the component and functional commands. To assess effects fully, however, the interagency element would need to be represented. Using the joint targeting board as an effects board has two advantages. First, as currently structured, the board has the seniority necessary to recommend major changes to the campaign, if required. Second, the board's activities are already part of the staff's battle rhythm. The joint targeting board should be renamed the "Effects Assessment Board."

The "Effects Assessment Board" would have two tasks: generating effects-based missions and overseeing the reassessment process.<sup>46</sup> In its first role, the board would use effects-based operations theory to generate effects-based missions. These would be broad missions focused on generating high-level operational effects that would directly influence strategic objectives. The board would designate a lead element for each mission, based typically on who controlled the preponderance of force for that particular action. In cases where the selected action is primarily nonmilitary, the supported element may have no military force, but is best positioned to integrate military and nonmilitary actions. The effects board would also allocate forces, and apportion priority for air support to the lead element. Creating effects-based missions would drive

joint force integration and encourage interagency cooperation as the following two examples illustrate.

In the first example, the desired effect might be to isolate the enemy from a third country's logistical support. The land component commander would be the supported element. He would deploy ground forces to block lines of communication, use airpower to interdict choke points, and integrate these actions with diplomatic efforts targeted at those providing support to the enemy. The diplomatic coordination would be critical to determine the acceptable scope of military force. Could the commander direct attacks inside a third country or against outside assets operating within enemy territory? Additionally, coordination would allow optimum timing between military actions and diplomatic activity. The State Department could issue a demarche against providing support in the morning, and that afternoon military forces could destroy a supply convoy that failed to reverse course after being warned. The second example could be a mission to create an effect where the enemy leader is unable to maintain popular support for continued resistance. An information operations cell would be the lead element. It would task military forces to provide humanitarian assistance, destroy selected communication nodes, and conduct attacks to diminish civilian or military morale. Special operations forces would conduct psychological operations in coordination with a State Department public diplomacy campaign. Finally, diplomatic efforts would focus on internationally isolating the current leadership and supporting a replacement regime. Such examples suggest how effects-based operations could generate synergistic effects by integrating and synchronizing military and non-military force applications.

The second function of the Effects Assessment Board would be to oversee the reassessment process. Reassessment determines what mission changes are needed. One reason changes may be a necessity is because actions are not producing predicted effects or actions are

producing unpredicted effects that put the strategic or operational objectives at risk. To rectify these problems, the effects board would look for the causal linkages between actions and effects. In other words, why did a given action produce a particular effect?<sup>47</sup> An example of this concept comes from the World War II combined bomber offensive. British strategic bombing doctrine, at the beginning of the war, called for air attacks against the enemy's industrial centers, economic infrastructure, public utilities, and transportation networks. Air planners hoped these attacks would generate "war weariness" and destroy the nation's will to fight.<sup>48</sup> They also suspected the attacks would generate a popular revolution that might end the war.<sup>49</sup> When it became apparent the Royal Air Force could not bomb with sufficient precision to destroy the original targets, the British took to bombing urban centers, especially worker housing. The intent was to destroy the industrial tools and instill such fear in the workers that they would stay home.<sup>50</sup> In effects-based operations terms, strategic bombing was the selected action and reduced industrial output or popular revolution was the desired effect. Lower morale and war weariness was the postulated causal link between action and effect. While there is evidence that by 1943 the bombing was affecting German morale, industrial output continued to increase and popular discontent focused on the attackers not the Nazi regime.<sup>51</sup> These facts suggest British actions did not produce the desired effects, because they failed to identify the correct causal link.

This analysis is not meant to imply that British strategic bombing did not contribute to Allied victory. The bombing generated unpredictable-desirable, multi-order effects. In an attempt to retaliate against England, the Luftwaffe wasted the majority of its bomber fleet in futile attacks on Britain. In addition, the Germans diverted enormous resources into the V-series rocket program. The rocket attacks had no significant impact on the Allies. Yet the diverted resources could have produced an additional

24,000 German fighters.<sup>52</sup> The end result was British bombing diverted German resources into an area that had minimal impact on Allied operations. The multi-order desirable effects generated by their strategic bombing would have been impossible for the British to predict. The fact that 50 years later historians continue to debate the effects of the Combined Bomber Offensive highlights the difficulties in linking actions and effects.

Although it is difficult, the reassessment process must attempt to identify causal linkages. Identifying causal linkages will help determine why an action failed to generate the desired effect or why it produced an unpredicted effect. The problem could have been in tactical execution or in the integration and synchronization of military and nonmilitary means. It could have been because second or third order effects from seemingly unrelated actions were producing counterproductive effects. Another possibility is that the strategic or operational environment may have changed, and the original course of action is now invalid. Perhaps the original net assessment underestimated the enemy's capability to adapt. Maybe the problem was temporal, and the effect was not evident as quickly as predicted, or maybe it was just the fog and friction of war. These are all possibilities commanders could accept, but there is another significant consideration. Maybe the strategy was ineffective because it was based on invalid doctrinal assumptions. This last case is potentially the most dangerous, because military forces are typically slow to acknowledge poor strategy or doctrine, even in the face of contrary and sometimes overwhelming evidence.<sup>53</sup> Identifying causal links, understanding the nature of indirect effects, and having the courage to admit their doctrine may be wrong will all help commanders make the right adjustments and stay focused on the strategic goal.

## **The Role of Airpower in Effects-Based Operations .**

The Air Force is a strong proponent of effects-based operations and airmen have contributed significantly to the concept's development. Unfortunately, Air Force contributions have been eclipsed by arguments over the source of decisive effects. Airmen must shift the debate from which service is decisive, to airpower's role in effects-based operations. The Air Force must also better integrate effects-based operations into its doctrine. Specifically, the doctrine must acknowledge that effects-based operations are key to making gradual airpower effective.

*Is Airpower Decisive?* Joint Doctrine states “any dimension of combat power can be dominant—and even decisive—in certain aspects of an operation or phase of a campaign,” but victory will come from the commander's ability to synchronize and integrate joint force capabilities.<sup>54</sup> The most important part of this statement is the emphasis on synchronization and integration. Yet soldiers and airmen have a propensity to argue needlessly over which service is dominant, or decisive. Soldiers contend that since people live on the earth, that it is where decisive events occur. Until a force takes and holds ground, marches victoriously through the enemy capital, and dictates terms to the king, the war was not been won, at least not decisively. Thus the Army's contention that its soldiers “fight and win our Nation's wars.”<sup>55</sup>

One problem with this line of argument is that without the other elements of military power, most notably airpower, this scenario will not play out. Another problem is that just because people on the ground make decisions, the Army is not the only element of force capable of compelling or coercing an enemy. Finally, decisive victory is not always the political aim. Since the end of World War II, the United States has not sought to occupy the enemy capital and force unconditional surrender. Instead, military force has provided a means of coercive diplomacy in support of limited strategic objectives. For their part, airmen since World War

I have argued airpower can force enemy capitulation by attacking enemy morale, destroying key industries, and paralyzing enemy systems. Achieving success with these methods relies heavily on second and third-order effects and the ability to identify causal linkages. Since proving the benefits of indirect effects is difficult, airmen are constantly on the defensive trying to link air attack to enemy capitulation.

The debate over decisiveness is counter-productive, and it reinforces the unfair stereotype that airmen think they can win wars alone. It is difficult to find proof that any senior Air Force leader believes this, but the existence of the myth makes advocating effects-based operations problematic. However, senior Air Force leaders could disarm many detractors of effects-based operations by focusing on airpower's role within joint operations. Recent publications reflect an effort to do just that. *Air Force Vision 2020* states that the Air Force is a "partner in our nation's security" and "dominates the aerospace domain to facilitate the effectiveness of the Joint Team."<sup>56</sup> Other support is found in Deptula's writings. His effects-based operations article published early in 2001 was airpower dominant and described the concept mostly within the context of "Rapid Decisive Operations." His more recent article, however, on Air Force transformation, described effects-based operations as the method in which "[a]erospace forces operate as part of a joint, interagency, and coalition team."<sup>57</sup> The best evidence that the Air Force sees the big picture comes from general officers who recognize that airpower advocates can be their own worst enemies by arguing that airpower is the dominant force. In public presentations as well as private conversations, senior leaders are now stressing that the Air Force is only part of a larger effort. They all firmly believe in the tenets of airpower and its ability to be the critical component in many scenarios, but they also argue it is not a stand-alone solution to national security challenges.<sup>58</sup> This attitude will allow airmen to

help promote effects-based operations and properly define the role of airpower in future joint doctrine.

*Effects-Based Operations and Gradual Airpower.* Limiting the use of force traditionally has been anathema to war fighters. Airmen, in particular, despise the concept of limited or gradual airpower.<sup>59</sup> They cite Vietnam's "Rolling Thunder" operation as the perfect example of how airpower was marginalized as a result of political restrictions. How these limitations may have contributed to the failed Vietnam strategy continues to fuel debate, but air operations during Operation ALLIED FORCE suggest gradualism may have warfighting value. From the outset, airpower planners wanted to go "downtown" and "cut off the head of the snake." Post-war analysis suggests such aggressive attacks might have had undesired effects, fractured the NATO coalition, and actually extended the war. One reason is the time element. Early attacks directed at the most valuable target sets might have short-circuited ongoing diplomatic efforts directed at convincing Russia to support NATO. Another reason is that attacking downtown Belgrade from the outset might have convinced many Serb leaders they had nothing further to lose and reduced their incentive to cooperate. In addition, evidence suggests constant air raid warnings had a cumulative effect on civilians that resulted in war weariness and established a political climate that permitted Milosevic to negotiate. Lastly, the potential casualties might have overshadowed the implications of Milosevic's ethnic cleansing in the eyes of international public opinion.<sup>60</sup> Given these are all second and third order effects, causal linkages are difficult to define and gradualism's value is hard to prove. Perhaps one reason gradualism succeeded in Kosovo lies in the fact Milosevic had almost no way to strike back at NATO, militarily or otherwise. Even if Air Force planners do not accept this evidence as a reason to investigate the value of gradualism, it is clear political restraints will force airpower into limited and gradual roles. The only way to leverage airpower's capability in a limited or gradual application is by using

effects-based operations. Limited airpower, combined effectively with other instruments of military and nonmilitary power, can still be a powerful coercive instrument. The Air Force needs to write doctrine for employing airpower in a limited or gradual fashion and the doctrine must be grounded in the theory of effects-based operations.<sup>61</sup>

### **Conclusion .**

Critics who reject the emerging doctrine of effects-based operations do so at their own peril. If they fail to embrace the concept, Joint Force Commanders may be unable to combine all the elements of power effectively. The theory of effects-based operations offers the strategic and operational artist a guide for organizing his thoughts and applying available resources to the challenge at hand. The theory can help commanders evaluate courses of action, analyze risk, and conduct continual reassessment. Implementing effects-based operations at the theater level requires organizational changes to better integrate interagency actions and ensure campaigns stay focused on operational and strategic effects. The Air Force is a logical advocate for effects-based operations because airpower theory rests on many of the same concepts, particularly the ability to generate and leverage second and third-order effects. Unfortunately, overemphasis of airpower's role in effects-based operations has served to alienate portions of the joint community. Air Force leaders must continue to stress airpower as part of a joint, interagency team, and they must update their doctrine to take advantage of effects-based operations. The complexity of today's international environment will continue to challenge the skills of those charged with using American power to protect the nation. Effects-based operations are the key to bringing that power to bear.

## ENDNOTES - CHAPTER 5

1. A Joint Operating Concept in development at U.S. Joint Forces Command.

2. David A. Deptula, "Effects-Based Operations: Changes in the Nature of War," 2001, available from <http://www.aef.org/pub/psbook.pdf>, Internet, accessed January 8, 2002.

3. U. S. Joint Forces Command, "A Concept Framework for Effects-based Operations," Draft White Paper, J9 Concepts Department, Norfolk, VA, August 1, 2001, p. ii.

4. This assertion is based on views expressed by fellow Army War College students. In addition, see Antulio J. Echevarria, *Rapid Decisive Operations: An Assumptions-based Critique*, Carlisle Barracks, PA: Strategic Studies Institute, 2001.

5. The concept of "Rapid Decisive Operations" is defined

as a joint operational concept for future operations. A rapid decisive operation will integrate knowledge, command and control, and effects-based operations to achieve the desired political/military effect. In preparing for and conducting a rapid decisive operation, the military acts in concert with and leverages the other instruments of national power to understand and reduce the adversary's critical capabilities and coherence. The United States and its allies asymmetrically assault the adversary from directions and in dimensions against which he has no counter, dictating the terms and tempo of the operation. The adversary, suffering from the loss of coherence and unable to achieve his objectives, chooses to cease actions that are against US interests or has his capabilities defeated.

See: U.S. Joint Forces Command, "A Concept for Rapid Decisive Operations Coordinating Draft, version 2," available from <http://www.saclant.nato.int/cde/Whitepapers/RDO.doc>, Internet, accessed October 14, 2001.

6. Echevarria, p. vi.

7. Carl von Clausewitz, *On War*, Michael Howard and Peter Paret, eds. and trans., Princeton NJ, 1976, p. 132.

8. *Ibid.*, p. 141.

9. This definition is similar to Joint Forces Command's, but somewhat simpler. The use of "coerce" or "compel" is important. Many see effects-based operations as a tool of coercion where the enemy is

persuaded to change his behavior while he still has the means to resist. In other words, he loses the will to continue. Effects-based operations are equally useful to compel. The enemy is compelled, when he has no choice but to comply with demands, because he no longer has the capability of resisting.

10. Alan Beyerchen, "Clausewitz, Nonlinearity, and the Unpredictability of War," *International Security*, Vol. 17, Winter 1992/1993, p. 73.

11. *Ibid.*, p. 66.

12. U. S. Joint Forces Command, "A Concept Framework for Effects-based Operations," p. 8.

13. Earl H Tilford Jr., "Operation Allied Force and the Role of Air Power," *Parameters*, Winter 1999-2000, p. 25.

14. John A. Tirpak, "Short's View of the Air Campaign," *Air Force Magazine Online*, September 1999, available from <http://www.afa.org/magazine/watch/0999watch.html>, Internet, accessed February 13, 2002.

15. For a balanced analysis of why Milosevic surrendered when he did, see Stephen T. Hosmer, *The Conflict Over Kosovo. Why Milosevic Decided to Settle when He Did*, Santa Monica, CA, 2001; and Benjamin S. Lambeth, *NATO'S Air War For Kosovo: A Strategic and Operational Assessment*, Santa Monica, CA, 2001.

16. Information superiority is defined as the capability to collect, process, and disseminate an uninterrupted flow of information while exploiting or denying an adversary's ability to do the same. It is a key enabler to achieve full spectrum dominance. See Chairman of the Joint Chiefs of Staff, *Joint Vision 2020*, Washington, DC, 2000, pp. 8-10.

17. Chairman of the Joint Chiefs of Staff, *Doctrine for Planning Joint Operations*, Joint Publication 5.0, Washington, DC, 1995, p. x.

18. Clausewitz, pp. 119-120.

19. Barry D. Watts, *Clausewitzian Friction and Future War*, Washington, DC, 1996, p. 123.

20. *Ibid.*, p. 21.

21. Edward N. Luttwak, *Strategy, The Logic of War and Peace*, Cambridge, MA, 1987, pp. 4-5.

22. Watts, pp. 131-132.

23. There had been attacks on U.S. servicemen and their families, and the United States had made a case in the media for Noriega's involvement in drug trafficking and other corruption.

24. Scott Sigmund Gartner, *Strategic Assessment in War*, New Haven, CT, 1997, pp. 1-5.

25. *Ibid.*, pp. 148-149.

26. For other considerations that impact on the ability to evaluate effects, see U. S. Joint Forces Command, "A Concept Framework for Effects-based Operations," pp. 9-10.

27. Cascading effects result from the synergy generated from a combination of effects smaller in scale. Cascading effects ripple through the system usually from a higher to lower level of war. See U. S. Joint Forces Command, "A Concept Framework for Effects-based Operations," p. 9.

28. This phenomenon is referred to as operating inside the enemy's Observe, Orient, Decide, Act (OODA) loop. See Grant T. Hammond, *The Mind of War, John Boyd and American Security*, Washington, DC, 2001, pp. 141-142.

29. Geoffrey Wawro, *The Austro-Prussian War, Austria's War with Prussia and Italy in 1866*, New York, 1996, pp. 36-37.

30. *Ibid.*, p. 41.

31. Richard Smoke, *War: Controlling Escalation*, Cambridge, MA, 1977, pp. 80-146.

32. Arden Bucholz, *Moltke and the German Wars, 1864-1871*, New York, 2001, pp. 104-105.

33. Wawro, p. 42.

34. Bucholz, p. 137.

35. Wawro, p. 276.

36. Smoke, p. 142.

37. Donald H. Rumsfeld, Press Conference, Arlington, VA: Pentagon, November 15, 2001.

38. Eric Schmitt, "4 Commanders Say They Want Civilian Agents," *New York Times*, November 20, 2001, sec. A, p.1.

39. Office of the Secretary of Defense, *Quadrennial Defense Review Report*, Washington, DC, 2001, pp. 34-35.

40. Jim Garamone, "Wolfowitz Shares Special Forces' Afghanistan Dispatches," November 15, 2001; available from [http:// www.defenselink.mil/news/Nov2001/n11152001\\_200111155.html](http://www.defenselink.mil/news/Nov2001/n11152001_200111155.html), Internet, accessed March 4, 2002.

41. The interagency element would not be effective without support from the National Security Council. The National Security Council is typically the focal point for coordinating government actions in the event of a national security crisis. The Chairman of the Joint Chiefs of Staff serves as a statutory advisor and the Vice-Chairman serves on the Deputies Committee. In these capacities, they coordinate the efforts of the warfighting commander with the rest of the interagency. Given the Chairman and Vice-Chairman's scope of responsibility however, it is reasonable to assume they cannot always conduct the necessary coordination for effects-based operations. The Defense Strategy, Force Structure, and Planning Policy Coordination Committee should serve as the link between the interagency element and the National Security Council. A senior Department of Defense official chairs the committee and answers to the Secretary of Defense. During day-to-day operations, the interagency element would elevate issues requiring high-level attention to the committee through the Joint Staff. During crises, the Policy Coordinating Committee would support the interagency element in theater. Because crisis management is not a normal role for the committees, the regional commander's Deputy Director for Plans and Policy should augment the committee. His knowledge of the war plans and familiarity with the region's political issues would facilitate coordination between the Policy Coordinating Committee and the deployed interagency element. See George W. Bush, "National Security Presidential Directive, Subject: Organization of the National Security Council," memorandum for the Vice President, et al, Washington, DC, February 13, 2001.

42. U.S. Joint Forces Command, "A Concept Framework for Effects-based Operations," p. ii.

43. Williamson Murray, "Reflections on the Combined Bomber Offensive," *Militär-geschichtliche Mitteilungen*, Vol. 51, 1992, p. 94.

44. Edward C. Mann III, Gary Endersby, and Thomas R. Searle, "Dominant Effects: Effects Based Joint Operations," Airpower Research Institute Paper, Maxwell AFB, 2001, p. 2.

45. Joint Force Commanders will typically form Joint Targeting and Coordination Boards to review target information, develop targeting guidance and priorities, and prepare and refine joint target lists. See Chairman of the Joint Chiefs of Staff, "Doctrine for Joint Fire Support," Joint Publication 3-09, Washington, DC, 1998, p. I-4.

46. Concept for effects-based missions based on: Robert Schmidle, "Dominant Maneuver Operational Concept," briefing slides with scripted commentary, Pentagon, Joint Staff J-8, 23 October 2001.

47. Timothy J. Sakulich, "Precision Engagement at the Strategic Level of War: Guiding Promise or Wishful Thinking?" Maxwell AFB, 2001, p.14.

48. Phillip S. Meilinger, "Trenchard and 'Morale Bombing': The Evolution of Royal Air Force Doctrine before World War II," *The Journal of Military History*, Vol. 60, April 1996 [database on-line]; available from UMI ProQuest, Bell & Howell, accessed January 23, 2002.

49. Murray, "Reflections on the Combined Bomber Offensive," p. 74.

50. Meilinger, "Trenchard and 'Morale Bombing.'"

51. Murray, "Reflections on the Combined Bomber Offensive," p. 81.

52. *Ibid.*, p. 81.

53. Williamson Murray, "Strategic Bombing, The British, American and German Experiences," in *Military Innovation in the Interwar Period*, Williamson Murray and Allan R. Millett, eds., New York, 1996, p. 143.

54. *Joint Publication 3.0*, pp. III-10-11.

55. "The Army VISION: People, Readiness, and Transformation," available from <http://www.army.mil/vision/default.htm>, Internet, accessed January 17, 2002.

56. "Global Vigilance, Reach & Power, America's Air Force Vision 2020," available from <http://www.af.mil/vision>, Internet, accessed on March 9, 2002.

57. David A. Deptula, "Air Force Transformation, Past, Present and Future," available from <http://www.airpower.maxwell.af.mil/airchronicles/apj/apj01/fal01/phifal01.html>, Internet, accessed on January 17, 2002.

58. These assertions are based on statements by three Air Force generals speaking in a nonattribution environment at the Army War College.

59. Airpower is limited when certain target sets are excluded or the attack intensity is limited by the number of platforms or ordnance made available. Gradualism is pre-planned increases in intensity of air attacks over time in response to enemy actions. The intensity may be in the form of timing, i.e., more frequent attacks or in target types; for example, moving from targets with little civilian impact to those with more potential to produce collateral damage.

60. Hosmer, pp. 128-129.

61. Dr. Phillip Meilinger helped me think through the concept of gradualism following a seminar he led on December 17, 2001, at the U.S. Army War College as part of the Advanced Strategic Arts Program curriculum.