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Mark J. Conversino

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Strategic bombing doesn't matter." With that, Dartmouth political scientist Robert Pape dismissed an entire airpower mission as essentially irrelevant to contemporary, non-nuclear warfare.[1] His book, *Bombing to Win*, a comprehensive examination of the employment of "strategic" airpower, is, however, undermined by his reliance on a flawed and outdated paradigm. Pape continues to view "strategic" in obsolescent terms that relate to the platform employed or the target attacked. He is hardly alone in holding this view.[2]

The concept of strategic bombing, or more appropriately strategic attack, has been central to discussions and arguments over airpower's "proper" role in conventional warfare. Zealots and partisans on both sides of the issue in turn have made this specific air mission synonymous with airpower in general and an independent air force in particular. Meanwhile, airpower's potential contribution to a military decision or other strategic objectives is lost in the din generated in what amounts to arguments over side issues.[3] The strategic employment of airpower has changed, conceptually if not in fact. If we are to fully appreciate airpower's role in national security, it is important that we first understand "strategic" attack.

This article, therefore, seeks to redefine strategic attack to clarify the role of airpower in conventional warfare. The article is not intended to serve as an airpower primer, nor is it a historical overview of what is commonly called strategic bombing. Issues surrounding the employment of nuclear weapons are also beyond its scope. Furthermore, the debate over whether strategic attack "works" or not will probably continue to provide academics and others with a secure source of income for years, and that specific issue is simply too broad for any article to address adequately. Nor do I consider the nonviolent application of airpower, even though missions such as airlift may also generate strategic outcomes. For the sake of time and space, this article focuses exclusively on strategic attack.

Context

One cannot understand the concept of strategic attack in the absence of a definition of the strategic level of warfare. Joint Publication 1-02 defines the strategic level of war as "the level of war at which a nation, often as a member of a group of nations, determines the national or multinational (alliance or coalition) strategic security objectives and guidance, and develops and uses national resources to accomplish these objectives." It is at this level that military planners develop "global plans and theater war plans to achieve those objectives." By definition, then, strategic attacks produce effects that are not limited to a single theater of operations and may also directly fulfill national or multinational objectives. This is a straightforward linkage of an airpower mission to a corresponding level of war. Recognizing the nature of strategic attack, however, will be far more difficult than defining it.

Strategic bombing, in its historical context, has been the subject of dozens of scholarly studies. By 1918, all the major powers had waged strategic air warfare, attacking their enemies' cities and industry first with airships and later with multi-engine bombers. During the interwar period, airmen and theorists from several countries, including the United States, examined the rather slender body of evidence from "strategic" operations in the Great War. From that record of accomplishment, they extrapolated the effects of aerial attack against the populations and economies of modern, industrial states. Often termed "true believers," these classical air theorists, men such as Italy's Giulio Douhet, Britain's Hugh Trenchard, and America's Billy Mitchell, asserted that bomber aircraft could bypass an enemy's surface defenses and strike at the heart of his centers of population and industry, collapsing both his will and ability to continue fighting.[4]

While the classical theorists differed in terms of targeting strategies, as a group they believed that airpower had

fundamentally changed the ways in which major powers would wage war. Long-range bombing aircraft, they maintained, could avoid the awful carnage so recently experienced in the trenches of World War I. Each believed that strategic attacks also had the *potential* to win wars independently through physical destruction inflicted on the enemy nation and, more important, the effects that such unprecedented assaults would have on the morale of the enemy's civilian population.

Early airpower theories of necessity reflected existing technology. In the days before the development of radar, airpower advocates considered a strategic attack difficult to intercept and impossible to stop. Furthermore, by the late 1920s, the state of bomber technology appeared to permit only area attacks against urban (and therefore, industrial) targets. Overestimating the ability of existing bombers to find, hit, and destroy their assigned targets, the true believers of the interwar period confidently predicted that future wars would be intensely violent and bloody but in ways different from that of 1914-1918. Indeed, the supposedly weak morale of the rabble that they assumed inhabited modern industrial cities would collapse quickly under aerial assault. Armies in the field, deprived of sustenance and replacements, would sit uselessly in their trenches while panicked and enraged mobs took to the streets to demand an end to the war. To a world still traumatized by the horrors of the Great War, the theory of strategic bombing offered the means to avoid sacrificing the next generation of young men in the same pointless manner in which the previous generation had perished.[5]

Evolution of the Concept

Unfortunately, much of what passes for informed debate on the utility of strategic attack consists of attempts to either prove or disprove the ideas of the classical airpower theorists, particularly those of Italian Air Marshal Giulio Douhet. While the development and application of American airpower owes as much, if not more, to the theories and writings of Billy Mitchell and the faculty of the Air Corps Tactical School, Douhet has served as a convenient foil for the debate over strategic airpower. Douhet was, in fact, the first to write a comprehensive theory of airpower, a vision characterized by an extreme set of assertions. His book, *The Command of the Air*, first published in 1921, ostensibly for an Italian audience, addressed air warfare in terms theoretically applicable to any industrialized state. "To conquer command of the air," he asserted, "means victory; to be beaten in the air means defeat." Once a state had seized command of the air, it would then unleash its bombers against the enemy's urban and industrial centers. Using a mix of high explosives, incendiaries, and chemical weapons, Douhet's bombers would spread terror and panic throughout the enemy's population. Though terrible to contemplate, he posited, such an aerial assault was actually humane; wars would end quickly, and the grinding carnage of trench warfare would be avoided. In short, a Douhetan strategy involved widespread destruction and the indiscriminate slaughter of the enemy's population.[6]

Douhet's influence on airpower thought and employment, in Italy as well as elsewhere, remains a point of historical debate. Likewise, a consensus does not exist as to the extent of the Italian's influence on the theorists of the Air Corps Tactical School (ACTS). Paradoxically, in 1933 Major Hal George, a member of the ACTS faculty, translated Douhet's manuscript into English. That same year, Lieutenant Colonel Don Wilson took control of the school's curriculum. Wilson considered Douhet's emphasis on massive and indiscriminate attacks on civilian populations "wanton and ineffective." What emerged from ACTS, therefore, was a theory centered on precision strikes against readily identifiable "vital targets."[7] In practice, technical limitations often resulted in significant amounts of collateral damage to civilian infrastructure. But this destruction was just that: collateral and unintended. Indeed, with the exception of the raids on Japanese cities after March 1945, the United States has never followed a Douhetan strategy. More recently, the strategic portion of the air campaign against Iraq was the very antithesis of Douhetan theory. Greenpeace's William Arkin, while questioning the effectiveness of strategic attack against Iraq, proclaimed the air war "clean on a strategic level."[8]

Nevertheless, in the aftermath of Desert Storm, the specter of Douhet loomed over postwar assessments of the strategic campaign. Advocates claimed that the air campaign vindicated Douhet's theories nearly five decades after the airpower experience of World War II seemed to undermine them. At the same time, partisans on the other side of the issue, fearful lest airpower receive undue credit for victory in the Gulf, exhumed Douhet's ideas and, absent victory through airpower over Saddam Hussein, once more proclaimed him "wrong."[9]

Both sides of this argument have missed the point; Douhet is dead, literally and figuratively. Radical changes in

technology and political realities consigned him long ago to the history books. Those who have sought to question the wisdom of strategic attack by invoking his flawed vision are as intellectually stagnant as those who seek support for it from the few elements of his broader theories that remain valid. The essence of Douhet is widespread and *purposeful* death and destruction, a vision an American or allied task force is not likely to share under any foreseeable circumstances. Attempting to "prove" or "disprove" his theories without a recognition of this central tenet of Douhetan strategy is a hollow, useless argument. Air Force Historian Dr. Richard P. Hallion, a clear airpower "advocate," admonished airmen that they cannot afford to "continue to draw our doctrinal and strategic sense from the great airpower prophets of the past--the Douhets, and Trenchards, and Mitchells--men who wrote over 60 years ago."[10] Non-airmen would do well to heed this advice too.

Ironically, RAND analyst Bernard Brodie wrote that the advent of nuclear weapons made Douhet "relevant," despite the experience of World War II. Indeed, the Cold War policy of nuclear deterrence stifled creative thought about strategic airpower; a "strategic" attack was synonymous with a nuclear strike against the Soviet Union. The notion of a conventional strategic attack virtually disappeared. At the same time, according to Air Vice Marshal Tony Mason, the term "tactical" denoted airpower employed "in support of a surface battle in a particular theater."[11]

Only in the late 1980s, coincident with signs of the impending end of the Cold War, did the US Air Force begin to think once again about conventional strategic air attack. For example, in 1988, General John T. Chain, then commander of the Strategic Air Command, wrote an article for *Strategic Review* entitled "Strategic Bombers in Conventional Warfare." The title alone is instructive, implying that the idea of "strategic," that is, *nuclear,* bombers playing a conventional, non-nuclear role might be novel to the journal's readers. General Chain sought to point out that long-range heavy bombers were not exclusively nuclear weapon carriers and that "the terms `strategic' and `tactical' describe actions, not weapons." Nevertheless, as long as the Strategic Air Command's primary mission for its bombers was that of nuclear deterrence, few recognized the wisdom in General Chain's words.[12]

We must recognize, however, that the capabilities of airpower, expressed in terms of lethality, precision, and survivability, have changed so dramatically that Desert Storm must now serve as our benchmark for considering the potential effectiveness of strategic air attack. This is not to suggest that the next and all subsequent wars will resemble Desert Storm. While we cannot continue to judge the likely utility of strategic attack on the basis of campaigns that ended more than five decades ago or upon the (mercifully untested) tenets of nuclear strategy, it is not sufficient to state merely that traditional concepts are now invalid. We must seek to understand the present and future potential of strategic air attack and how that mission will contribute to the goals of the joint force commander.

Toward a Definition of Strategic Air Attack

In defining contemporary strategic attack, it is imperative to understand first what the concept is not. Even though US *Strategic* Command retains primary control of the nation's nuclear deterrent, strategic air attack is not necessarily a nuclear attack. The experiences of Desert Storm and Deliberate Force (the air attacks on the Bosnian Serbs) dramatically illustrate, after decades of Cold War neglect, the renaissance of conventional strategic attack in both theory and practice. Yet many remain unable to separate the notion of "strategic airpower" from old concepts. Dr. Arthur G. B. Metcalf, military editor of *Strategic Review*, wrote in the Spring 1991 issue of that journal that "the manned penetrating bomber" was the "only usable strategic strike force we have" in the post-Cold War, non-nuclear era. Dr. Metcalf's use of the term "bomber," however, plainly referred to the long-range heavies: the B-1, B-2, and B-52. Even the article's title, "Strategic Airpower in Conventional Warfare: Some Considerations," suggests, even in the immediate aftermath of Desert Storm, that "strategic" involves both "bomber" and "nuclear."[13]

Part of the defense community's problem in recognizing the changed nature of strategic attack is the result of terminology. The term "strategic bombing," for example, has lost its utility. It carries a great deal of historical baggage, and many historians and analysts have come to use it in a pejorative sense. Indeed, many who use "strategic bombing" to describe an airpower mission often simply assume its meaning rather than define it. When analysts and authors do attempt to clarify it, they often base their definitions on outdated theories and criteria. Pape, for example, essentially defined strategic bombing by target sets. "Strategic bombing," he wrote, "attacks fixed military, industrial, and civilian targets in and near political or economic centers."[14] But the realities of strategic attack have changed, and we should relegate the term "strategic bombing," too long defined largely on the experience of World War II, to

the history books.

Recent experience shows that the target struck does not necessarily dictate the nature of the attack as "strategic." In variable scenarios for the 21st century, Air Vice Marshal Mason has noted, "the method of attack and specific nature of the target will be irrelevant to the definition." The effects of striking targets relating directly to the enemy's ability and will to succeed by force can define a strategic attack. In Bosnia, for example, ammunition dumps were "strategic" targets because of Bosnian Serb reliance on them to achieve their strategic objectives and their inability, as a result of internationally sanctioned embargoes, to replace them. In the Gulf War, both President Bush and his field commander, General Schwarzkopf, considered Saddam Hussein militarily and politically dependent on the Republican Guard. Air strikes on these elite units therefore constituted a portion of the strategic air campaign. Contrast these perspectives to the past, when airmen and soldiers alike generally considered ammunition dumps and fielded military units as "tactical" targets, struck in support of surface operations already under way.[15]

Current Air Force doctrine acknowledges the need to avoid a prescriptive, "one-size-fits-all" approach to targeting. The 1992 edition of Air Force Manual 1-1, *Basic Aerospace Doctrine of the United States Air Force*, states that it is "the objective sought--an effect on the war as a whole--[that] determines if a target or attack is strategic." Likewise, the more recent October 1996 draft of Air Force Doctrine Document 2-1.2, *Strategic Attack*, declares that "strategic attack is not defined by the weapons or delivery systems used--their type, range, or destructiveness--but by their effective contribution to directly achieving national or theater strategic objectives."[16] Thus, targets will be defined as strategic or otherwise as a function of the nature of the opponent and the political and military objectives sought from attacking those targets.

Furthermore, strategic air attack is not Douhetan "city-busting" or "terror-bombing." As noted earlier, technological limitations, together with weather conditions and enemy defenses, often led to significant collateral damage from strategic attacks in World War II. Today, precision weapons make area bombing only one of many options. Precision weapons, however, offer no guarantees against civilian losses. The strike on the Al Firdos bunker in Baghdad was a "precise" strike. Unfortunately, coalition planners did not know that on the night of 13 February 1991, the Iraqis were using the upper floors of the bunker to shelter families. Despite the fact that the bunker was a legitimate target, the consequent deaths of 200 to 300 civilians resulted in a sharp reduction in strikes against command and control and other leadership targets. General Schwarzkopf himself thereafter reviewed any targets selected for attack in downtown Baghdad.[17] More than four years later, NATO air operations against the Bosnian Serbs were remarkable for the extraordinary efforts undertaken by planners and aircrews alike to avoid collateral damage and civilian deaths. These are hardly the hallmarks of a Douhetan strategy.

The choice of attack platforms also reflects the radical shift in targeting capabilities. Many analysts continue to refer to "strategic bombers" as a separate type of airframe. Certainly, some aircraft types are "long-range, heavy" bombers. Bombing aircraft of an earlier period required a large payload to increase the probability that a single bomb would hit, let alone destroy, the target. Historians noted the first sustained "role reversal" of strategic and tactical aircraft in Vietnam when B-52s flew missions in support of ground operations while F-4s and F-105s flew against targets in the North. In 1981, the Israelis used eight F-16s, each carrying two 2000-pound bombs, to attack and destroy the Iraqi nuclear reactor at Osirak. In 1986, US Air Force F-111Fs, together with carrier-launched A-6s, A-7Es, and F/A-18s, struck targets in Libya. Both raids were strategic in that they advanced major policy objectives of the Israeli and American governments respectively. In the Gulf War, the misnamed F-117 Stealth "fighter," with an unrefueled combat radius of 550 nautical miles, flew only two percent of strike sorties but struck nearly 40 percent of the targets identified as "strategic" by planners and commanders.[18] There is no longer a necessary link between targets and attack platforms. Today, each instance of the specific employment of any aircraft will determine if it is being used in a strategic role.

If many of the traditional hallmarks of strategic air war are no longer valid, how can we define and plan for this vital airpower mission? Contemporary strategic attacks do not aim to undermine the will of the people in expectation of a popular uprising and collapse of the enemy government. Through the enhanced survivability of stealth and radically increased lethality of precision weapons, airpower can attain strategic goals without resorting to massive assaults on urban areas. In an important departure from classical theory, strategic attack now includes strikes against an enemy's fielded forces. When strategic attack plans include infrastructure targets, such as command and control facilities,

electrical power stations, and transportation networks, the specific purpose may be to reduce the ability of an adversary to resist further air and surface operations rather than affect the will of its citizens.

As noted earlier, AFM 1-1 states that strategic attacks seek to achieve an effect "on the war as a whole." Other analysts suggest that effects which are "transformatory" and "game-changing" are inherently strategic in nature.[19] In that sense, the struggle to achieve and maintain air superiority is, in its effects, a strategic attack. Few today would dispute the notion that air superiority--and its more extreme form of air dominance--enables all other missions to take place with reduced costs and greater efficiency, stealthy assets notwithstanding. The side that achieves air superiority and then expands that to dominance gains untold advantages over its opponent. Air superiority, like strategic attack, is not an end in itself. Insurgencies often succeed without it. Nevertheless, air superiority, properly exploited, is indeed "game-changing" in conventional warfare. On that the historical record is clear.

Air superiority is a necessary precondition for further successful strategic air attacks. In an air force composed primarily of non-stealthy platforms, strategic attacks do not necessarily, as some claim, bypass an enemy's "fielded forces." The opponent's integrated air defense system, including its air units, are part of a nation's fielded forces. Military forces may still employ long-range precision munitions, including cruise missiles, against strategic targets before an enemy's defenses have been overwhelmed. But in the absence of air superiority, an air force attempting to mount a sustained strategic attack, using large numbers of manned, non-stealthy platforms, would be forced to endure significant levels of attrition. Most classical airpower theorists realized this; yet in the post-industrial era, when both pilots and aircraft are expensive and increasingly rare commodities, no modern air force could long tolerate the heavy losses such a strategy would produce.

This point is vital to understanding what strategic air attack now means. Surface commanders do not intentionally seek the strongest point in the enemy's position and then hurl their forces against it. While classical airpower theorists recognized the potential for significant losses in the air, they sought nevertheless to avoid a *prolonged* struggle of attrition in the air like that experienced by land forces on the Western Front from 1914 to 1918. The concept of strategic attack is to pit one's strengths against an enemy's weakness, to wage an asymmetrical strategy using our often overwhelming capabilities in the air. Once deprived of an effective air defense, the enemy's forces, however strong on the ground, will have to suffer unremitting attacks. Strikes against the enemy's supporting infrastructure would likewise impose a tremendous strain on his ability to sustain and strengthen his forces in the field.

Strategic-level goals shape the target sets for strategic campaigns. Thus, direct attacks on an adversary's fielded forces will not fulfill every war aim. As in the Gulf War, strategic goals may include eliminating an enemy's capability to produce weapons of mass destruction (WMD). The desired postwar end state may include rendering an opponent incapable of threatening its neighbors. Under these circumstances, attacks against known WMD facilities take on strategic significance. The destruction of certain infrastructure targets such as electrical generating plants would inhibit or at least slow a nation's recovery of regional power status, thereby diminishing for a while the risk of regional conflict.

Surprisingly, JCS Publication 1-02 continues to define strategic air warfare in terms of target systems rather than outcomes. Certainly attacks against "key manufacturing systems," "sources of raw material," or "key agricultural areas" may be appropriate in some situations. In the case of Deliberate Force, however, air planners purposely avoided inflicting extensive damage on Bosnia's infrastructure. Widespread destruction, though within NATO's capability, would have undermined the strategic goal of reconciliation and reconstruction sought by the United States and its allies. Nevertheless, in many instances, defeating an enemy's short-term military strategy or its field armies can create conditions necessary, if not sufficient, to the success of US or allied strategy. Thus, air attacks remain an important means of fulfilling strategic goals. The particular platform or the specific target is not the issue; the effects sought and the linkage of such attacks to national or coalition strategic objectives will define such missions as "strategic."

Early airpower theorists believed that strategic air attacks alone could bring an enemy to his knees and thereby avoid a surface encounter. Indeed, there are doubtless some airmen who continue to view this as a likely, as opposed to a desirable, outcome of a strategic air campaign. As with the 1986 raid on Libya in Operation El Dorado Canyon or the Israeli raid on Osirak, airpower may serve as the sole means employed to fulfill a strategic objective. Still, as Air Vice Marshal Mason has noted, "The concept [of strategic attack] should be extended to include activities which can

subsequently be exploited by ground forces in greatly reduced numbers, with greatly reduced casualties, and greatly reduced costs."[20] Current Air Force doctrine considers that strategic air campaigns serve "the overall war effort, seeking maximum leverage upon the opponent by using the most direct means available."[21] Today, strategic air attacks are not necessarily an "independent" campaign waged in pursuit of "victory through airpower." Arguments over whether air can "do it all" in every situation only produce pointless debates of a non-issue.

Strategic attack also remains a vital part of contemporary operational art. A strategic air campaign provides synergy, defined in Joint Publication 3-0, *Doctrine for Joint Operations*, as applying "force from different dimensions to shock, disrupt, and defeat opponents." It brings "simultaneity and depth" to a campaign by "bringing force to bear on the opponent's entire structure in a near simultaneous manner to overwhelm and cripple enemy capabilities and the enemy's will to resist." Strategic attacks provide "leverage"--that is, gaining, maintaining, and exploiting "advantages in combat power across all dimensions." Depending on the nature of the enemy and our own goals, strategic attack can fulfill these and other characteristics of operational art by itself or as part of a joint force.[22] Those who believe, as Pape does, that "strategic bombing won't matter in the future" base their conclusions on an outdated and invalid understanding of this airpower mission and its place in contemporary joint warfare.[23]

Over the course of eight and a half decades and wars large and small, airmen have developed and refined the theories and doctrine of strategic air warfare. Perhaps the most important element of these theories that has survived the test of time is airpower's ability to achieve strategic effects either independently of or in conjunction with other military forces. Thus, in the post-Gulf War environment, the following definition for strategic attack may be useful: "The offensive employment of airpower assets to allow the joint force to achieve a decision with minimum contact between opposing military forces, by striking targets that most generally and directly relate to the opponent's ability to maintain forces in the field as well as his will to resist. Such operations also directly fulfill national, multinational, or theater strategic-level objectives."

Implications

Given this understanding of the changed nature of air warfare, what capabilities must we continue to pursue and exploit to retain the capacity to employ airpower in strategic attack missions? First, the United States must continue to develop and deploy stealthy platforms such as the F-117 and the B-2, for even though a counter to stealth is likely in the offing, low observability would certainly enhance any airpower mission's chances of achieving surprise and success. The F-117s employed in Desert Storm did not require the large support packages of other non-stealthy aircraft. Furthermore, as Eliot Cohen and Thomas Keaney have noted, the F-117 provided "stealth" to a much larger portion of the coalition's air force by disabling the Iraqi air defense system, thereby making subsequent raids harder to detect and counter. While not all adversaries will have sophisticated integrated air defense systems, pursuit of stealth and low observability technologies will pay dividends through increased efficiency and reduced losses.[24]

Second, we should continue to pursue improvements in precision guided munitions (PGMs). Precision munitions open up to attack all manner of target systems, including command and control facilities located in urban areas, hardened aircraft shelters, and enemy armor formations in the field. These weapons, coupled with stealthy platforms, proved fatal to much of Iraq's command and control network as well as its air defense system. Likewise, considering the political tensions involved and the need to avoid inflicting widespread destruction in Bosnia, only the availability of PGMs made NATO air strikes against the Bosnian Serbs feasible in the first place. The majority of weapons expended by NATO air forces during Operation Deliberate Force were precision munitions. The "thousand-fold increase in destructive power" and the "near-zero-miss-distance accuracies" of PGMs rapidly provided the leverage NATO required to persuade the Bosnian Serbs to negotiate in good faith. The precision munitions employed in both the Gulf and in Bosnia had their limitations; smoke, fog, and overcast skies made laser designation virtually impossible. Yet next-generation munitions like the Joint Direct Attack Munition and sensor-fused "smart" weapons promise to overcome many of these limits.[25] Indeed, long-range precision guided weapons can increase the tempo, intensity, and scope of strategic attack at the outset of a conflict while the battle for air superiority may still be underway.

Other technical requirements of successful strategic air warfare are equally relevant to other airpower missions. The need to process information rapidly and accurately will increase as the amount of data available to planners and commanders increases. In the absence of all-stealthy air forces, suppression of enemy air defense assets remains a vital

component of any air campaign or operation. Future generations of unmanned aerial vehicles, known as uninhabited combat vehicles, will give planners expanded options with minimal risk across the spectrum of airpower missions. High value assets such as air refueling tankers, AWACS, and JSTARS are the types of weapon systems that both enable and enhance the effectiveness of strategic attack and other airpower missions in a variety of scenarios.

Control of the ultimate high ground, space, may become in the future the final arbiter in the success or failure of military operations, including strategic attack. In the Gulf War, for example, coalition forces relied heavily on information provided by space-based systems. These assets, Lawrence Freedman wrote, "identified targets, worked out their coordinates, helped choose the weapons system best placed to attack them, passed on the orders to attack, provided mid-course corrections to ensure accuracy and then checked afterwards to ensure that everything had gone according to plan."[26] Indeed, past failures of air attacks to achieve strategic effects were often the result of faulty or incomplete intelligence. Contemporary air and space-based intelligence, surveillance, and reconnaissance systems offer air planners more accurate target information than was possible even a decade ago. Still, determining the effects of a strategic attack or an enemy's reaction to it remains an inexact science at best.

Many observers proclaimed the Gulf War the "first space war." As demonstrated in Desert Storm, strategic attacks will rely increasingly on real-time data to find and destroy or neutralize non-fixed targets. Effective bomb damage assessment, with data derived in part from space, is essential to ensure that sorties are not wasted against inoperative targets, but are flown against other objectives which the enemy has rebuilt. Clearly, depriving an enemy of "situational awareness" can have strategic effects when such action is coordinated with devastating strikes against infrastructure targets as well as against forces in the field. While the arguments surrounding the militarization of space are beyond the scope of this article, one should bear in mind the importance of space-based assets to surface and aerial combat operations. At some point, however, we must face the prospect that a peer competitor will possess the ability to remove our space-based "eyes" while gaining data from his own systems for use against us. Without friendly access to information from such systems, would Saddam's forces have fared better? Certainly the coalition might have conducted operations differently and arguably with less efficiency.

And what of the much-maligned "strategic" bomber? If a variety of less expensive and more numerous platforms can achieve strategic effects, why retain heavy bombers? The answer to this question is less clear than it might first appear. Consider:

. There can be no assurance that future administrations or joint force commanders will never again require a long-range, heavy platform capable of striking targets from outside the theater.

. We will not always have advance notice of hostile actions or other warnings that will allow us to position short-range assets in anticipation of conflict.

. A future El Dorado Canyon-style strike might require the use of air assets based in the United States, in the absence of permission from other nations to use their soil to launch a one-time raid against a rogue state or even to fly across their territory.

. Our future foes may not all be geographically compact.

. Short-range assets, even with one or two refuelings, may not be capable of hitting targets deep within a large, well-defended nation.

General Chuck Horner, as un-Douhetan an airman as one is likely to find, personally felt the effects of a lack of long-range, heavy, and stealthy aircraft during the first tense days of the Gulf crisis in 1990. Though he clearly recognized that airpower would not "win it all" in the Gulf War, he nonetheless acknowledged the value of assets such as the B-2 which combine payload, accuracy, reach, and low observability.[27] There are sensible reasons why we shouldn't assume the risk of discarding this capability, especially if the decision were to rest on an outdated and flawed understanding of strategic attack. Shrinking capabilities within the defense technical and industrial base also caution

against closing off the long-range bomber option.

Despite the passage of time and enormous technological change, both advocates and skeptics of strategic attack continue to use the vision of interwar airpower pioneers as their benchmark for measuring that mission's success or failure. Ironically, Air Force Manual 1-1 described nearly five years ago much of what this article contains. Still, whether or not strategic airpower "worked" from 1939 to 1991 remains an issue for debate in academic and military journals. What does seem clear is that the discussion of strategic airpower remains mired in theories from 1930 and images from 1945. To address America's defense needs for the next century, we must move beyond academic quibbling and consider instead what assets technology may provide for future strategic attack. The intellectual distance between Operation Desert Storm and Operation Pointblank, the combined bombing offensive against Germany in World War II, is far greater than the five decades that separated them.

NOTES

1. Robert A. Pape, *Bombing to Win: Air Power and Coercion in War* (Ithaca, N.Y.: Cornell Univ. Press, 1996), p. 316.

2. Barry D. Watts, "Reality Ignored," *Security Studies*, forthcoming.

3. This point is argued in Caroline F. Ziemke, "A New Covenant?: The Apostles of Douhet and the Persian Gulf War," in *The Eagle in the Desert: Looking Back on U.S. Involvement in the Persian Gulf War*, ed. William Head and Earl H. Tilford, Jr. (Westport, Conn.: Praeger, 1996).

4. The development of airpower through World War I is chronicled in Lee Kennett, *The First Air War, 1914-1918* (New York: The Free Press, 1991) and John H. Morrow, Jr., *The Great War in the Air: Military Aviation from 1909 to 1921* (Washington: Smithsonian Institution Press, 1993). The two-volume set edited by Air Force historian Maurer Maurer provides a comprehensive look at nascent American airpower. See Maurer Maurer, ed., *The U.S. Air Service in World War I* (Washington: Office of Air Force History, 1978). Included in Maurer's collection are some of the writings of Colonel Edgar S. Gorrell, an American staff officer whose 1917 plan outlined early ideas of "strategical bombing" aimed at German industry and lines of communication. See also George K. Williams, "`The Shank of the Drill': Americans and Strategical Aviation in the Great War," *The Journal of Strategic Studies*, 19 (September 1996), 381-431. For a brief overview of interwar airpower views, see Alan Stephens, "The True Believers: Air Power Between the Wars," in Alan Stephens, ed. *The War in the Air 1914-1994: The Proceedings of a Conference Held by the Royal Australian Air Force in Canberra* (Fairbairn, Australia: Air Power Studies Centre, 1994).

5. See Giulio Douhet, *The Command of the Air*, trans. Dino Ferrari (Washington: Office of Air Force History, 1983). Brigadier General Mitchell was a prolific writer, producing several books as well as dozens of articles aimed at the reading population at large. For an example of his thought and style, see William Mitchell, *Winged Defense: The Development and Possibilities of Modern Air Power Economic and Military* (New York: Dover Publications, 1988). Air Marshal Hugh Trenchard did not leave behind a coherent body of writings, though more of his thought, in the form of speeches and short written works, is beginning to emerge from British sources. For Trenchard's influence on the interwar development of the Royal Air Force, especially the service's view of strategic bombardment, see Neville Jones, *The Beginnings of Strategic Air Power: A History of the British Bomber Force 1923-39* (London: Frank Cass, 1987).

6. Douhet, p. 28.

7. Historian Claudio G. Segre noted that Douhet's ideas failed to take hold even in his native land. Retired British Air Vice Marshal Tony Mason wrote that no evidence exists to suggest that Air Marshal Sir Hugh Trenchard, "father of the RAF" even knew of Douhet's writings. He further pointed out that in the course of personal interviews with two architects of RAF bombing policy between the wars, Marshals of the Royal Air Force Sir John Slessor and Sir Arthur Harris adamantly denied that Douhet's thoughts influenced their own. See Claudio G. Segre, "Douhet in Italy: Prophet Without Honor?" *Aerospace Historian* (Summer 1979), pp. 69-80; Air Vice Marshal Tony Mason, *Air Power: A Centennial Appraisal* (London: Brassey's, 1994), pp. 44-45; Geoffrey Perret, *Winged Victory: The Army Air Forces in World War II* (New York: Random House, 1993), p. 26; Stephen L. McFarland, *America's Pursuit of Precision*

Bombing, 1910-1945 (Washington: Smithsonian Institution Press, 1995), p. 96. McFarland's book is an excellent study of the development of American bombing doctrine and capabilities through the end of World War II.

8. Quoted in Daniel T. Kuehl, "Thunder and Storm: Strategic Air Operations in the Gulf War," in *Eagle in the Desert*, p. 121. Arkin and others, however, calculated the final Iraqi death toll at 111,000, the result of "indirect detrimental health effects" as a result of coalition infrastructure attacks. See Thomas A. Keaney and Eliot Cohen, *Revolution in Warfare? Air Power in the Persian Gulf* (Annapolis, Md.: Naval Institute Press, 1995), p. 64, n. 46; see also "Tactical Bombing of Iraqi Forces Outstripped Value of Strategic Hits, Analyst Contends," *Aviation Week and Space Technology*, 27 January 1992, pp. 62-63.

9. The post-Gulf War assessments favorable to Douhet included John F. Jones (Lt. Col., USAF), "Giulio Douhet Vindicated: Desert Storm 1991," *Naval War College Review*, 45 (Autumn 1992), 97-101; Silvanus Taco Gilbert III (Lt. Col., USAF), *What Will Douhet Think of Next? An Analysis of the Impact of Stealth Technology on the Evolution of Strategic Bombing Doctrine*, MA Thesis, School of Advanced Airpower Studies, Maxwell AFB, Ala., 1993; and Phillip S. Meilinger (Col., USAF), "Giulio Douhet and Modern War," *Comparative Strategy*, 12 (July-September 1993), 321-38. Meilinger notes at length, however, that much of Douhet's theories have not stood the test of time. The "Douhet and therefore the Air Force was wrong" school of thought was reflected in articles such as Everest E. Riccioni (Col., USAF, Ret.), "Strategic Bombing: Always a Myth," *Proceedings*, 122 (November 1996), 49-53, and Richard Linnekin (Capt., USN, Ret.), "Razing the House that SAC Built," *Proceedings*, 123 (January 1997), 56-59.

10. Richard P. Hallion, "The Future of Air Power," in *The War in the Air*, p. 357.

11. Air Vice Marshal Tony Mason, RAF (Ret.), "Characteristics of Aerospace Power," a paper presented at a conference on "Air Power and Space -- Future Perspectives" convened by the Chief of the Air Staff, Royal Air Force, Westminster, London, 12-13 September 1996, p. 10.

12. John T. Chain, Jr., (Gen., USAF), "Strategic Bombers in Conventional Warfare," *Strategic Review*, 16 (Spring 1988), 23-32.

13. Arthur G. B. Metcalf, "Strategic Airpower in Conventional Warfare: Some Considerations," *Strategic Review*, 19 (Spring 1991). A year later, then-Lieutenant Colonel Phil Meilinger lamented the fact that "the concept of conventional strategic air power . . . has been forgotten." See Phillip S. Meilinger, (Lt. Col., USAF), "The Problem With Our Air Power Doctrine," *Airpower Journal*, 6 (Spring 1992), 24-31.

14. Ibid., p. 46.

15. Mason, "Characteristics of Aerospace Power," p. 12.

16. AFM 1-1, *Basic Aerospace Doctrine of the United States Air Force*, vol. 2, March 1992, p. 151; AFDD 2-1.2, *Strategic Attack*, second draft, 10 October 1996, p. 11.

17. Keaney and Cohen, pp. 58-59.

18. Ibid., pp. 13, 222.

19. Thanks to Dr. Ben Lambeth, RAND, for passing on this observation made by Carl Builder in an unpublished manuscript, "Keeping the Strategic Flame," 3 December 1996, p. 2.

20. Mason, "Characteristics of Aerospace Power," p. 13. There are still some "true believers," though their position is not that of the Air Force. In August 1990, for example, Colonel John Warden clearly believed that his Instant Thunder air plan would paralyze Saddam's regime, compelling him to withdraw his forces from Kuwait in a matter of days. Central Command's air commander, General Horner, and his air operations deputy, Brigadier General Buster Glosson, did not accept Warden's view. Though the air plan for Desert Storm incorporated Warden's "strategic" target list, Horner was not banking on defeating Iraq through airpower alone. See Keaney and Cohen, ch. 2.

21. AFM 1-1, p. 150.

22. See Joint Publication 3-0, *Doctrine for Joint Operations*, 1 February 1995, p. xi.

23. Pape, *Bombing to Win*, p. 318.

24. Keaney and Cohen, p. 191.

25. Benjamin S. Lambeth, "Technology and Air War," *Air Force Magazine*, November 1996, pp. 50-53.

26. Lawrence Freedman, "Sanctuary or Combat Zone? Military Space in the 21st Century," a paper presented at a conference on "Air Power and Space -- Future Perspectives" convened by the Chief of the Air Staff, Royal Air Force, Westminster, London, 12-13 September 1996, p. 18.

27. Charles A. Horner, (Gen., USAF Ret.), "What We Should Have Learned in Desert Storm But Didn't," *Air Force Magazine*, November 1996, pp. 52-56.

Major Mark J. Conversino, USAF, is currently Professor of Airpower Theory and Employment at the School of Advanced Airpower Studies, Maxwell Air Force Base, Alabama. He has served as an aircraft maintenance officer in Strategic Air Command and in Air Mobility Command in the United States and Saudi Arabia. A distinguished graduate of the US Air Command and Staff College, Major Conversino holds a Ph.D. in US political history from Indiana University. He is the author of *Fighting with the Soviets: The Failure of Operation FRANTIC*, several articles on defense-related issues, and a chapter in the USAF's official study of NATO air operations over Bosnia.

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