

AIRPOWER



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Flight Lines

MAJ M. J. PETERSEN, EDITOR

The Main Act

IS AIRPOWER fact or fancy? Sideshow or the main act? From Martin van Creveld, who wrote in *MHQ: The Quarterly Journal of Military History* that "in a world where almost all wars are fought not between states, but within them, many if not most of [airpower's] elements have become useless and obsolete," to Gen Frederick Kroesen, US Army, Retired, former commander of US Army Europe, these and other military and nonmilitary thinkers contend that the case for airpower has just not been made. They honestly believe airpower is more promise than fact. General Kroesen wrote in a letter to the *Washington Post*, "None of the great air campaigns of the past has ever been decisive, and many have had contrary results. . . . All were sideshows to the Army and Marine efforts to occupy land and dominate the enemy." Others have suggested that the nation should devote greater resources to Army armor and artillery at the expense of new airpower weapons. It seems that there is still considerable or at least very vocal suspicion about airpower's impact in modern war. This issue of the *Journal* looks at airpower's relevancy to peacekeeping, ground combat, and space, and at its overall position in the post-cold-war world.

We start this issue with Dr. John Hillen, who suggests in "Peacekeeping at the Speed of Sound" that because operations other than war (OOTW) are driven by political imperatives, it is particularly important that airpower doctrine reflect these imperatives. Therefore, he argues that the question under consideration should be the relevancy of airpower doctrine to OOTW and their impact on each other. This is a different question from the relevancy of airpower to OOTW.

In a slightly different vein, Col Jeffery Barnett's "Great Soldiers on Airpower" looks at

the airpower relevancy question from a different angle. Colonel Barnett suggests that since any airpower advocate wearing a blue uniform is routinely dismissed as an "airpower zealot" making a partisan case, it may be helpful to review the insights of nonairmen who have seen the effects of airpower firsthand. He therefore draws on the perspectives of such nonairmen as Generals of the Army George Marshall, Dwight D. Eisenhower, Omar Bradley; Generals George S. Patton, Vo Nguyen Giap, Khaled bin Sultan; and Franklin D'Olier, chairman of the United States Strategic Bombing Survey, to present his contention that airpower is effective and relevant not only in the modern world but was also relevant in the past.

The rationale for the existence of the Air Force is to envision, develop, and apply airpower capabilities. In "Strategic Planning for the Air Force," Deborah Westphal, Richard Szafranski, and Dr. Gregory S. Parnell present two tenets in regards to airpower. The first is their belief that planning for the future of airpower is so critical to the existence of the United States and to that of our friends and allies that it must be done right. To help ensure it is done right, they suggest that much can be gained by examining how planning is accomplished in the fiercely competitive world of "for profit" business. Their second tenet argues that some commercial planning initiatives offer the potential to improve the Air Force planning process. Their article asserts that the institutional planning process should drive the efforts and effectiveness of the Air Force and that it can and must be improved. Before you dismiss this as just another management article, consider this: They are really advocating a return to the vision and boldness that characterized airmen's pre-cold-war planning.

From terrestrial applications of airpower and strategic plans for the future, Lt Col Bruce M. DeBlois takes us out of the atmosphere to consider the near-term implications of weapons in space. He does not see the "militarization/weaponization" question as an all-or-nothing affair. In "Space Sanctuary: A Viable National Strategy," he presents a summary of the case against space weaponization, proceeding from the historical trends of US nuclear and space policy to domestic and international political concerns. He addresses the space weaponization issue by briefly examining adversarial potential (the threat), technological limitations, financial trade-offs, practical considerations of military strategy, and finally the emotional appeal of global security and well-being. DeBlois has staked out a provocative position that we hope will invite debate.

From the weaponization of space debate, Lt Col Larry K. Grundhauser turns our thoughts to the question of whether or not the "sky is falling" because of the developing interest in commercial high-resolution satellites. While none of us can deny the impact that satellites had upon the Persian Gulf War, Grundhauser's "Sentinels Rising" examines the possibility that if the commercial remote-sensing industry is right, there will be over 30 high-resolution commercial satellites in orbit around the Earth by mid-2001. These satellites will be using affordable technologies to provide volumes of imagery to an international clientele with fidelity previously unobtainable by the general public. Thus, is the sky really falling because an adversary will have the ability to purchase high-resolution imagery of our actions? Read on and see what may happen.

And in the spirit of opening the debate, the *Airpower Journal* introduces in this issue what it hopes will be the start of something new—the airpower professional's book club. "The

Mystique of Airpower" introduces our idea that in order to become true professionals, we must know the debate and know not only what is immediately before us but also what has gone on in the past and how our predecessors responded to their unique situations. We have decided to inaugurate a "book club" discussion group not only in the pages of the *Journal*, but also within our on-line journal, *Air Chronicles*. By using both media and your help, we hope to induce you to participate and not only be able to carry on a discussion on a quarterly basis, but on a continuing basis in *Air Chronicles*. So, take a look at your bookshelves and send us your list of the top 10 books that airpower professionals should read.

These are the feature articles of this edition—but don't forget to look at the Way Points and the reviews in Net Assessment. Your Ricochet section is especially lively this time with replies to Maj J. P. Hunerwadel's way point, which was a critical review of *Into the Storm*, written by Tom Clancy and Gen Frederick Franks (see the Summer 1998 edition), and responses to Dr. Grant Hammond's look at the myths of the Gulf War in the Fall 1998 edition.

Is airpower the "main act"? Not necessarily. Military power must be exercised in all of its many forms and for many different purposes, but airpower has arrived as a military force and can no longer be cavalierly dismissed as a mere "sideshow." As we enter the last months of the millennium and prepare for the next, it is within the pages of the *Journal* that we as airpower professionals will shape the course of the debate.

We hope you relish these articles, but remember, this is your professional journal, and it is only as good as you want it to be. So, if you have an idea for an article, put pen to paper (or fingers to keyboard) and send us your thoughts. Enjoy! □

We encourage your comments via letters to the editor or comment cards. All correspondence should be addressed to the Editor, Airpower Journal, 401 Chennault Circle, Maxwell AFB AL 36112-6428. You can also send your comments by E-mail to editor@cadre.maxwell.af.mil. We reserve the right to edit the material for overall length.

INTO THE STORM: MORE BALANCE, LESS BIAS

Will Rogers once offered the opinion that "it's not what you don't know that gets you in trouble—it's what you do know that ain't so." I believe the *Airpower Journal* should publish documents that provide more balance and less bias and stick more closely to relevant facts. In doing so, you will provide your readers with a better grasp of how the United States prosecutes joint and combined operations now and in the future. While I applaud a healthy pride in one's own service, the incontrovertible truth is that no single service can win a modern war alone.

Maj J. P. Hunerwadel ("Into the Storm: A Review Essay," Summer 1998) does not demonstrate a clear and thorough understanding of the operational art. Further, he doesn't know very well the biographies of Gen Fred Franks Jr. or Gen H. Norman Schwarzkopf. General Franks's pre-Desert Storm command and staff duties were not insignificant. At the senior level, he previously commanded the 11th Armored Cavalry Regiment in Germany, served as the assistant commandant of the Army Command and General Staff College, as commanding general of the 1st Armored Division, and then as commanding general of VII Corps in Europe. General Franks had joint duty experience; he was the director, Opera-

tional Plans and Interoperability Directorate, J-7, Joint Chiefs of Staff, prior to his assignment as commanding general of the 1st Armored Division.

Likewise, General Schwarzkopf's developmental assignments were significant and clearly not lightweight. Among General Schwarzkopf's senior assignments were assistant division commander, 8th Infantry Division (Mechanized) in Europe; commanding general, 24th Infantry Division (Mechanized), Fort Stewart, Georgia; commanding general, I Corps, Fort Lewis, Washington; and he was the Army's deputy chief of staff for operations. Those positions are clearly among the most significant developmental jobs for the Army's senior uniformed leaders. General Schwarzkopf had also been the deputy commander in chief during Operation Urgent Fury in Grenada in 1983, a joint combat operation.

General Franks's VII Corps attack may not have always been as swift as General Schwarzkopf and others would have hoped. There were several considerations Major Hunerwadel didn't mention: Much of the ground attack occurred during periods of limited visibility, during rain, and through terrain filled with numerous Iraqi army units. In an effort to swiftly gain depth into the enemy territory, combat elements of VII Corps bypassed many Iraqi units. These bypassed units constituted a very real threat to the corps's rear area. This left a situation of very long and very vulnerable lines of communications behind VII Corps's leading divisions and its armored cavalry regiment. To enable the continuity of combat operations, it is vital for any commander to synchronize his combat forces and support them logistically before closing

with the enemy. In the case of VII Corps, its five divisions were quite literally closing with Saddam Hussein's remaining center of gravity. That center of gravity was the Republican Guard divisions.

While VII Corps didn't achieve every initial objective during the ground war, it wasn't all the fault of either General Franks or VII Corps. Political decisions ended the war early before VII Corps was able to fully dispatch the Republican Guard divisions within their zone. However, when one looks objectively at the numbers of Iraqi combat vehicles which VII Corps units destroyed, you will find significant achievement. What did VII Corps destroy during 89 hours of combat operations? VII Corps destroyed most of 11 divisions (including two Republican Guard Forces Command divisions); 1,350 tanks; 1,224 personnel carriers; 285 pieces of artillery; 105 air defense artillery weapons; and 1,229 trucks. That is not the production of an incompetent general.

General Franks was not too cautious. Major Hunerwadel mistakes synchronization with overcaution and timidity. General Franks had, long before Operation Desert Storm, proven his mettle and personal valor. Don't mistake force protection and synchronization with overcaution. An army must be able to fight tomorrow. No commander may ignore real threats in his rear area or to his lines of communications and expect to continually conduct cohesive operations. If you lose your combat service support to bypassed but still combat-effective enemy forces, you will lose your combat forces next.

The very fact of the matter was VII Corps, under the able command of General Franks, proved with numbers of destroyed Iraqi combat equipment alone the capabilities of a most effective armored corps. I don't wish to take anything away from XVIII Airborne Corps, the US Marine Corps, or any other ground component units fighting in Desert Storm. However, different ground maneuver units were fighting in quite different threat environments in their initial movements to contact. Commanding a mobile corps in combat isn't an easy task, especially when fighting

against an enemy's main effort and when that main effort is essentially the enemy's very center of gravity.

Was the generalship during Desert Storm perfect? No, but it was executed at least as well as in any recent war within this century, and probably far better than most throughout history. Major Hunerwadel may better spend his time reading a wider array of texts on Desert Storm and other military operations throughout history before criticizing the achievements of others. I would encourage him to begin with Richard M. Swain's *Lucky War: Third Army in Desert Storm* (Fort Leavenworth, Kans.: US Army Command and General Staff College Press, 1994). *Lucky War* is an excellent and very detailed account of Third Army's role in Desert Storm. During Desert Storm, another echelon of command existed between General Schwarzkopf and General Franks—Third Army. Major Hunerwadel fails to make any mention of its commander, organization, or role.

One final word on comparing Desert Storm and General Franks's performance with those of the Battle of Antietam fought 17 September 1862. Antietam was the bloodiest single day of combat for the armed forces of the United States; there were over 25,000 casualties on that battlefield. During Desert Storm there were 613 US casualties. Unlike Antietam, the tactical results on the battlefields and in the skies above during Desert Storm were decisive. Strategically, the results may not have been quite as decisive as we'd hoped, but such results come to light with time.

Gen Colin Powell had 13 rules he followed. I believe they will serve others well when perhaps criticizing others. In particular, rules 1, 2, 10, and 12 are helpful.

1. It ain't as bad as you think; it will look better in the morning.
2. Get mad, then get over it.
10. Remain calm. Be kind.
12. Don't take counsel of your fears or naysayers.

Desert Storm clearly illustrated that joint and combined arms operations provide the

Continued on page 103

Peacekeeping at the Speed of Sound

The Relevancy of Airpower Doctrine
in Operations other than War*

DR. JOHN HILLEN



AS WITH MOST of its history, the United States military has recently been involved in many more operations other than war (OOTW) than wars.¹ Since World War I, airpower has been, more or less, an integral part of those many operations. Indeed, earlier this year, the principal military challenge to the United States and its allies was how to respond to Yugoslavia's heavy-handed repression in the province of Kosovo—and airpower has been the military tool of choice thus far. Multinational air exercises were conducted over Albania and Macedonia on 15 June 1998 in an effort to dissuade Yugoslav president Slobodan Milosevic from using more excessive violence on his own citizens. This attempt at coercive diplomacy through the air had to be particularly subtle, because the same signals meant to cow Milosevic were not intended to embolden Kosovar separatist groups such as the Kosovo Liberation Army. This set of signals was quite nuanced—all implicitly coercive and all meant to be received via airpower. It appears at this point that the United States is exhausting its airpower options in Kosovo before considering other types of intervention, not because of airpower's proven track record in coercive diplomacy, but because, as Eliot Cohen has written, airpower, "like modern American courtship, offers instant gratification without commitment."²

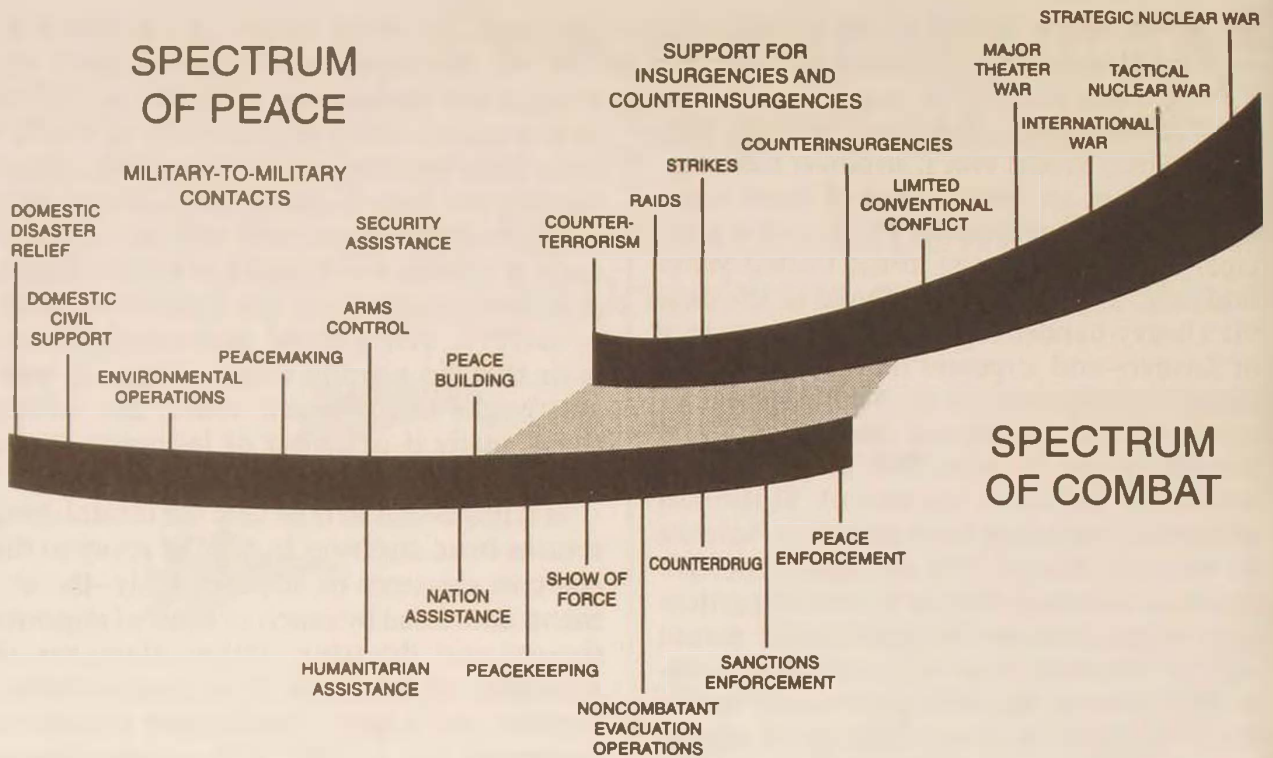
Be that as it may, the application of American airpower does represent a serious commitment and has been an important facet of OOTWs since they were called "small wars" by the Marine Corps.³ The question under consideration here is the relevancy of airpower doctrine to OOTW—the impact or lack thereof of one on the other. This is a wholly different question from the relevancy of airpower to OOTW, although empirical judgments made from those experiences are used throughout this article to inform the first

question. In those instances (airpower in OOTW), the impact of airpower remains significant but becomes less decisive in OOTW as one moves along the spectrum of conflict away from war and towards peacetime uses of the military (figs. 1 and 2). However, to hold to this is not to agree with military theorists such as Martin van Creveld, who are dismissive about airpower in low intensity conflict or OOTW. Van Creveld fantastically maintains that "in a world where almost all wars are fought not between states, but within them, many if not most of [airpower's] elements have become useless and obsolete."⁴

It is important to note that the diminishing returns from airpower in OOTW apply to the coercive elements of airpower only—the elements addressed by much or most of airpower theory and doctrine. Other elements of American airpower, such as transportation, logistics and supply, intelligence collection, command and control (C²), reconnaissance and surveillance, and psychological operations (PSYOP) have proven decisive in many OOTWs in which the United States could not use coercive airpower. For instance, the Air Force's 193d Special Operations Wing (PSYOP), which deployed to Haiti prior to the 1994 invasion, may have contributed more to the initial success of that operation than any other air asset. Nonetheless, for the most part, this article takes the significance of those manifestations of airpower for granted and concentrates instead on airpower doctrine as it applies to the use of force.

In the main, the article finds that airpower doctrine, inasmuch as it exists as a body of doctrine for OOTW, is spare but well balanced and relevant. The problem areas for doctrine are more likely to lie in standard OOTW doctrine, which is either flawed in some way to begin with and many times ignores airpower as well.

¹This article was originally presented as a paper at the Center for Strategic and International Studies (CSIS)/VII Inc. Conference on Dueling Doctrines and the New American Way of War, held in Washington, D.C., 24–26 June 1998. Special thanks to Halley Guren of Duke University's School of Public Policy for research assistance in the preparation of this paper.



Source: Adapted from *Army Vision 2010* (Washington, D.C.: Headquarters, Department of the Army, November 1996), 5.

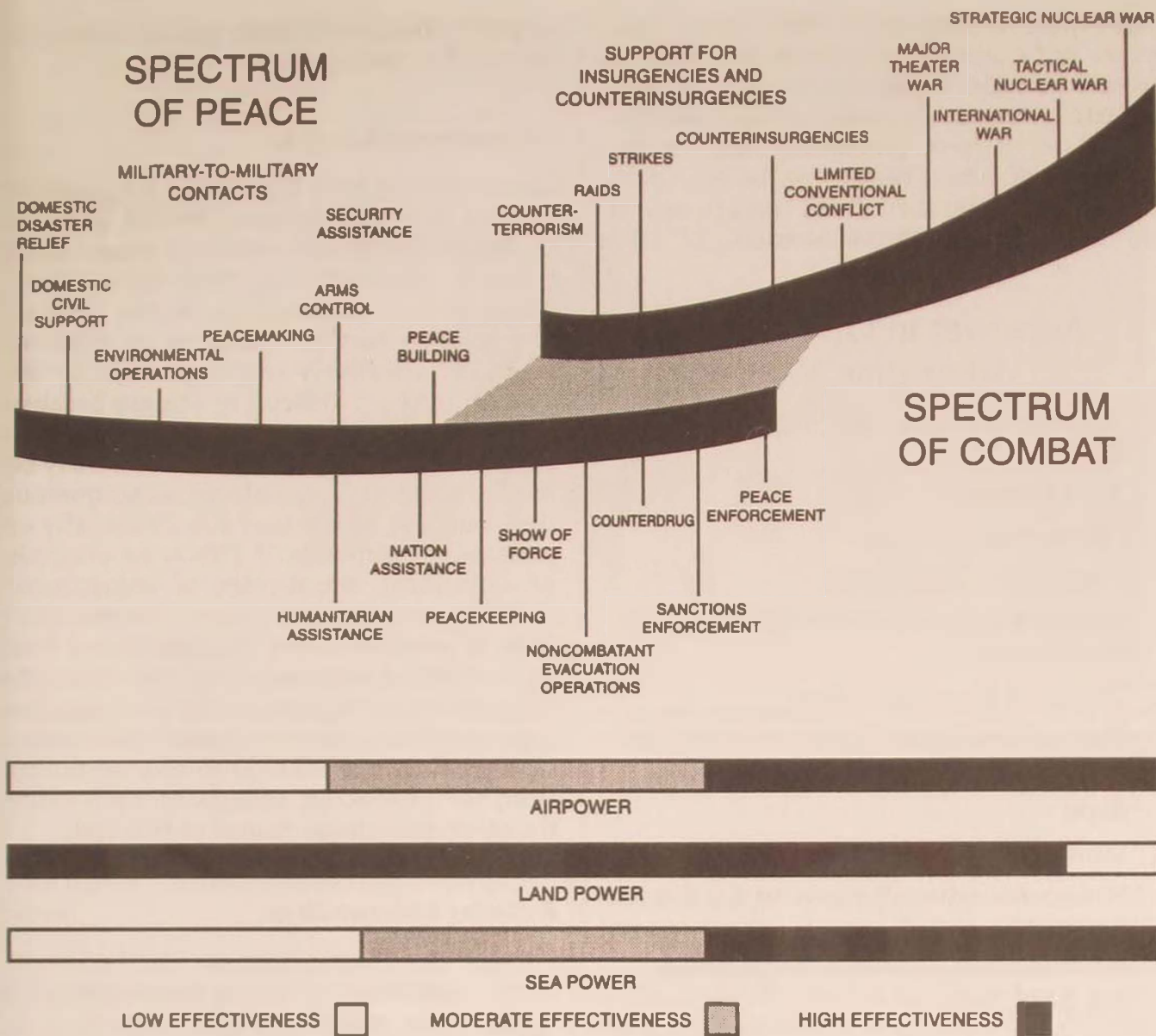
Figure 1. The Military Spectrum of Conflict

Airpower Doctrine

The temptation in an article such as this is to paint a rigid Douhet-redox portrait of airpower doctrine. OOTW would then be portrayed as an impossibly subtle, terrifically nuanced, and tremendously sophisticated diplomatic endeavor that the inflexible application of airpower could never affect in productive ways (e.g., Curtis LeMay solutions to the Brcko corridor problem). Select bits from airpower doctrine, especially Air Force doctrine, would be juxtaposed against the emotive complexities of certain OOTW missions as a demonstration of trying to fit a square peg into a round hole.⁵

In fairness to both sides and with a nod to intellectual integrity, the article does not do this. Instead, one must recognize that airpower, shared as it is by all the services, has

an amorphous doctrine that is flexible and sophisticated enough to have great applicability to OOTW. Moreover, OOTWs are not such a Gordian knot of intensely deep human complexities that the application of coercive airpower in many different ways cannot make a decisive difference in OOTW. In other words, blowing something up from the air (or threatening to) can sometimes make an immense difference—even in a humanitarian relief exercise. This is a fairly rare circumstance, though, and all services (and Special Operations Command [SOCOM]), which together make up and share airpower doctrine to a certain degree, recognize that the principles of OOTW are very different from the principles of war (e.g., restraint, perseverance, and legitimacy as opposed to offensive, surprise, and mass). All services (although some not as much as others) also recognize that airpower



Source: Adapted from *Army Vision 2010* (Washington, D.C.: Headquarters, Department of the Army, November 1996), 5.

Figure 2. Effectiveness across the Military Spectrum of Conflict

plays a key role in OOTW. For instance, the one-hundred-page Army field manual on peace operations mentions airpower only five very brief times, and only two of those references are about the coercive application of airpower.⁶ Given the perceived importance of Apache helicopters to recent peace operations, I would hope that the Army is updating this doctrine.

All this makes for a curious state of affairs in terms of airpower doctrine and OOTW.

The military community seems generally to appreciate the fundamental impact of airpower on OOTW and vice versa. Nonetheless, appreciation is not strategic and operational understanding codified in doctrine. In the main, airpower doctrine applied to OOTW is sound but spread around the services and the joint level in bits and pieces, thereby lacking the coherency that regular OOTW doctrine has achieved. The holes in the doctrine also match in many ways the dilemmas airpower

has experienced in OOTW over the past few years, but causality is tough to pin down. It would be quite a stretch to say that good doctrine formulated before Bosnia and Somalia might have precluded some of the problems discussed below. For the most part, doctrine has learned from experience as much as experience from doctrine.

Airpower in Operations other than War

US joint doctrine specifies 16 different OOTWs:

- Arms Control
- Combatting Terrorism
- Counterdrug Operations
- Enforcement of Sanctions/Maritime Intercept Operations
- Enforcing Exclusion Zones
- Humanitarian Assistance
- Ensuring Freedom of Navigation and Overflight
- Military Support to Civil Authorities
- Nation Assistance/Support to Counterinsurgency
- Noncombatant Evacuation Operations
- Peace Operations
- Protection of Shipping
- Recovery Operations
- Show of Force Operations
- Strikes and Raids
- Support to Insurgency⁷

This article cannot possibly treat the airpower dimension of all these operations in detail but makes some observations on several that are the most relevant to the US military in recent years. Moreover, the article focuses on an extended discussion of peace operations—specifically, the role of airpower in peacekeeping and peace enforcement, areas that have caused much

angst for the United States and its allies over the past five years.

Enforcement of Sanctions

Sanctions have been a popular foreign-policy tool for American decision makers, and it is the military's duty to enforce them. Most recently, airpower has been used extensively to enforce sanctions in the Balkans and the Persian Gulf. Such use of airpower is usually selectively employed, in that "an air quarantine is difficult to achieve because the enforcement is an 'all or nothing' proposition. . . . Shooting down an aircraft may be the only way to truly enforce an air quarantine, but that action may not be morally or politically acceptable."⁸ This is an example of a political intent/rules of engagement (ROE) issue discussed below. Current doctrine is weak on other strategic issues that arise in regard to this mission. These include C² problems with partner states or organizations (unilateral sanctions are rare) and force-management/readiness problems stemming from the protracted, indecisive, and—many times—monotonous nature of this task.

Enforcing Exclusion Zones

"No-fly zones" have been another hot arrow in the diplomatic quiver in recent years. US airpower has established and enforced them in the Balkans, northern and southern Iraq, and elsewhere. Other than some multinational C² issues involved (below), they are not a doctrinal enigma. However, in Bosnia and northern Iraq, the concept of air-exclusion zones was stretched to deny movement on the ground to certain military forces. The heavy-weapon exclusion zones established by the North Atlantic Treaty Organization (NATO) around Sarajevo and Bihac are an example, as is the virtual demilitarized zone established in 1991 north of the 36th parallel in Iraq to protect Operation Provide Comfort. The enforcement of these zones, an implicitly coercive activity, has sometimes compromised the neutrality of peacekeepers on the ground and has caused friction between passive peacekeep-



The business end of an Apache. Spread as it is over many manuals, [airpower doctrine] does not comprehensively cover airpower employment in OOTW. What doctrine does exist, however, is fairly sound but dated (one finds hardly a word about the role of attack helicopters).

ing on the ground and peace enforcement from the air. This is discussed in greater detail below.

Humanitarian Assistance

Suppression of enemy air defenses and other coercive airpower used in coordination with humanitarian assistance operations can be a double-edged sword—and proved so in Bosnia and Somalia. On the one hand, it can protect humanitarian assistance; on the other hand, such protection can politicize the relief aid and compromise its neutrality. A particular weakness yet to be seriously addressed by airpower doctrine is the coordination of airpower supporting humanitarian assistance with the many nongovernmental organizations (NGO)/private voluntary organizations (PVO) or other agencies (such as the United Nations High Commissioner for Refugees [UNHCR]) that will be part of the relief effort. This is also discussed below.

Show of Force Operations/Coercive Diplomacy

One should note the principal doctrinal dilemma. On the one hand, shows of force rely on implicitly coercive signals that are blunt and might not be suited for the more nuanced diplomatic strategies often needed in OOTW. On the other hand (as in the Philippines in 1989), shows of force will often communicate martial intent in a constructive way. The enduring problem is that the initiative of action remains in the hands of the belligerents—although this is no different from other OOTWs. More problematic from a cultural viewpoint is that these operations suggest an overall strategy of indecisive, graduated pressure—a much-maligned way of doing business in the Vietnam War.

Strikes and Raids

Doctrinally, these are the most straightforward of all OOTWs with respect to airpower.

More than any other OOTW listed, standard airpower war-fighting doctrine applies, although a competent body of specialized doctrine exists for these types of operations.



A C-130. Elements of American airpower, such as transportation, logistics and supply, intelligence collection, command and control (C²), reconnaissance and surveillance, and psychological operations (PSYOP) have proven decisive in many OOTWs in which the United States could not use coercive airpower.

Peace Operations

Peacekeeping, for reasons of strategic culture, was for many years an unknown science as far as the American military was concerned. Classically defined, it required impartial and passive troops working with the consent of the belligerents—all qualities for which the US military of the past 50 years was not well known. Nonetheless, its basic tenets have come to be appreciated and even put into practice by the US military in the past several years. The military has also moved forward on putting into practice and formulating a doctrine (in that order) for peace enforcement. Unlike peacekeeping, peace enforcement makes less of the need for all-out neutrality and allows for the measured use of coercive force to shape the behavior of recalcitrant belligerents. Even so, observers such as James Corum maintain that “within the context of a peace-enforcement operation, however, the US military and other air forces have often exhibited a doctrinal vacuum.”⁹

But the search to fill that vacuum has caused a fundamental disconnect between

most of the world and the US military concerning the compatibility of these techniques with one another. For its part, joint and other US military doctrine maintains that peace enforcement and peacekeeping can be used simultaneously or even mixed in the same missions. Joint Pub 3-07, *Joint Doctrine for Military Operations other than War*, states that “noncombat MOOTW may be conducted simultaneously with combat MOOTW, such as HA [humanitarian assistance] in conjunction with PEO [peace enforcement operations].”¹⁰ The Navy War College even created a hybrid sort of operation called an “inducement operation,” in which peacekeepers use coercive force with “the lightest touch possible in the hope that the parties on the ground will, in the end, assent to the UN’s mandate.”¹¹ Most allies, however, vigorously maintain that the use of active force by peacekeepers or air forces operating in support of their mission is a Rubicon that, once crossed, completely compromises the mission.¹² This issue came up constantly in Bosnia from 1993 to 1995, with the United States alone trumpeting its role as enforcer from the air and all other allies greatly resisting the idea of NATO-UN as an air/ground, active/passive team.

This became an especially contentious issue when in the summer of 1995, US air strikes on targets in the Bosnian Serb capital of Pale precipitated the Serb shelling of Tuzla (71 civilians killed) and the taking of hundreds of UN peacekeepers as hostages. It became an article of faith at NATO that peace enforcement and peacekeeping did not mix, contrary to US doctrine. The NATO secretary-general stated, “I do not believe that we can pursue decisive peace enforcement from the air while the UN is led, deployed, and equipped for peacekeeping on the ground. If we have learned anything from this conflict, it is that we cannot mix these two missions.”¹³ The deputy commander of the UN peacekeepers added that “there can be no gray area, no overlap of peacekeeping with peace enforcement.”¹⁴ A similar dilemma was at work in Somalia, where resentment and misunderstanding between American forces and UN

peacekeepers came to a head over the use of US airpower (helicopters and fixed wing) in an active campaign against one side in the Somali conflict.

Many countries in the UN mission in Somalia (the French and Italians in particular) felt that they and other UN peacekeepers would pay the price when the US peace-enforcement effort and heavy use of coercive airpower backfired—which it did. As Dr. Mats Berdal wrote of that mission and Bosnia, coercive force used in conjunction with peacekeeping techniques tended to obfuscate “the basic distinction between peacekeeping and enforcement action . . . and highlighted the particular risks of attempting to combine the coercive use of force with peacekeeping objectives.”¹⁵

Points of Friction

Airpower doctrine, for OOTW and otherwise, has lagged behind fast-moving developments in the US OOTW experience. As a result, it must “grow” to cover certain points of friction.

Strategic Coherency

OOTWs often lack a coherent link between military means and political ends. For instance, in the current attempt at coercive diplomacy over Kosovo, how exactly can the United States apply airpower to bring about the complex political solution desired? As John Bolton said at the CSIS/VII Inc. Conference on Dueling Doctrines in June 1998, the Air Force will have to drop “autonomy bombs instead of independence bombs” on the Kosovars.¹⁶ In other instances, US airpower is asked to assist in the fulfillment of mandates well beyond its control. This was very much the experience in Bosnia, where military commanders grew increasingly frustrated by the gap between mandated ends and the means at their disposal.¹⁷ Wartime commanders usually have the operational freedom to create the conditions under which they will succeed. OOTW commanders do not. They must oper-

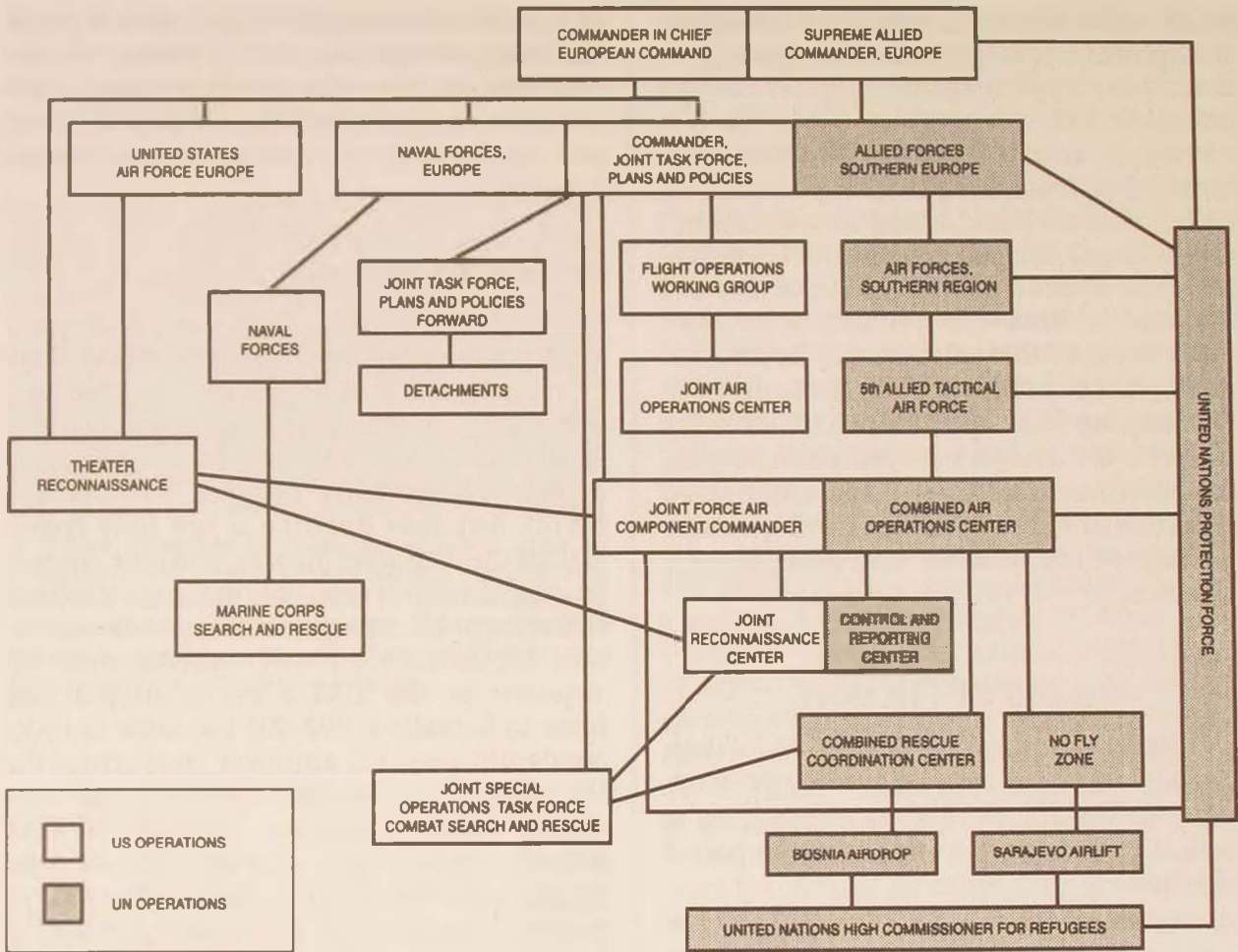
ate in the environment that they are given (although the good ones can shape it somewhat). In addition, the aforementioned argument over the compatibility of peacekeeping and peace enforcement often strains strategic coherence.

Institutional Coordination

Strategic coherence becomes more difficult to achieve when different institutions in charge of various facets of an OOTW are pursuing different political agendas. Adm Leighton Smith has much to say about the coordination of political guidance between the UN and NATO. Airpower doctrine is not fully cognizant of the character, nature, and core competencies of various international organizations with whom US airpower will have an association. For instance, airpower doctrine treats US airpower in the US-led multinational task force to Somalia (1992–93) the same as independently used US airpower supporting the UN mission to Somalia (1993–94). But the wholly different political character of these organizations greatly changed the circumstances and conditions under which airpower was used, even though US air units did not see a sea change in chain of command or operating procedures at their level. These issues go well beyond the C² difficulties discussed below. US doctrine has not fully explored the political character and military competencies of organizations such as the UN and the Organization for Security and Cooperation in Europe in airpower doctrine, as well as the role of NATO or US-led coalitions as airpower subcontractors.

Command and Control

Admiral Smith’s paper for the CSIS/VII Inc. Conference on Dueling Doctrines joined many reports in properly criticizing NATO’s and the UN’s dual-key approach to the C² of NATO air forces operating in support of UN peacekeepers in Bosnia.¹⁸ One report euphemistically referred to the C² system as constructed (fig. 3) as “a shambles.”¹⁹ Other OOTWs (notably Somalia) experienced simi-



Source: David S. Albert and Richard Hayes, *Command Relationships for Peace Operations* (Washington, D.C.: National Defense University Press, 1995), 63.

Figure 3. Command Relationships in Operation Deny Flight

lar C² problems, some caused by institutional coordination, some by "normal" multinational C² difficulties (such as standard control procedures and clear chains of command), and other problems experienced completely within the US military community. For instance, in Somalia the 3d Marine Air Wing found that it did not have the trained personnel or facilities to operate as the airspace control agency for the unified task force that deployed there from December 1992 to May 1993.²⁰

Other Multinational Issues

Differences in force structure, interoperability, training, doctrine, modus operandi, and strategic culture can greatly affect airpower coalitions above and beyond multinational C² issues. Airpower doctrine should not only reflect the flexibility with which US airpower must be prepared to act in many multinational settings, but also indicate that paradigms other than complete US dominance of multinational airpower operations should be explored.

NGO/PVO and Other Agency/Player Coordination

Almost all OOTWs have as players an enormous and diffuse array of national agencies, international agencies, NGOs, and PVOs. Many of these groups are tremendously influential and sometimes are even the lead agency for tasks involving the use of US airpower. Admiral Smith has much to say about his experience with UNHCR in Bosnia in this regard.²¹ The operation to Somalia also uncovered similar disconnects between US airpower authorities and agencies or NGOs with whom they had to comprehensively coordinate operations (such as the International Committee of the Red Cross). This complex area, which land power works extensively through civil affairs and other specially trained units, is not well covered in airpower doctrine at all. Airpower must be prepared to accommodate lead agencies other than the military or even another US government organization. The day may soon come when a Birkenstock-wearing NGO representative is a key member of the joint force air component commander's (JFACC) staff.

Rules of Engagement

ROE issues return to the debate over the mix of peacekeeping and peace enforcement. US doctrine, searching for a way to make the mix work, looks for some criteria of proportionality in the application of coercive airpower to peacekeeping-type operations. By definition, proportionality is relative, and standard ROEs are particularly hard to pin down in complex post-cold-war peacekeeping environments. Even the famously simple "four no's" (no bandits, no technical vehicles with crew-served weapons, no Somali-manned checkpoints, and no visible weapons) ROE in Somalia could not be enforced from the air without considerable and daily debate over

individual cases that, by necessity, often had to be solved by hours of haggling on the ground. Many observers blame the heavy-

Airpower doctrine is hard to pin down completely because it belongs to all services, SOCOM, and the joint level.

handed application of US airpower in pursuit of Somali disarmament for the several dozen UN and US deaths and other troubles that followed for the UN operation in Somalia.

Relevancy, Schmelevancy

Airpower doctrine is hard to pin down completely because it belongs to all services, SOCOM, and the joint level. Spread as it is over many manuals, it does not comprehensively cover airpower employment in OOTW. What doctrine does exist, however, is fairly sound but dated (one finds hardly a word about the role of attack helicopters) and not fully cognizant of some overriding political difficulties that profoundly affect military operations. In other words, to paraphrase Clausewitz, although OOTW and airpower have their own grammar, their logic is the logic of the politics of the various organizations undertaking OOTW. Indeed, joint doctrine for OOTW recognizes the overwhelming primacy of political factors in OOTW—much more so than in war. It is particularly important, then, that airpower doctrine reflect the political imperatives that drive OOTW and that create friction in the areas outlined in this article. □

Notes

1. The Congressional Research Service estimates that the US military has been used in over 250 interventions abroad, of which only five have been declared wars. CRS Report 96-119F, "Instances

of Use of United States Armed Forces Abroad, 1798-1995," 6 February 1996, 1-25.

2. Elliot Cohen, "The Mystique of American Airpower," *Foreign Affairs*, January-February 1994, 16.
3. See NAVMC 2890, *Small Wars*, 1940.
4. Martin van Creveld, "The Rise and Fall of Air Power," *MHQ: The Quarterly Journal of Military History* 8, no. 3 (Spring 1996): 81.
5. On the one hand, in the Air Force case, very little of OOTW is addressed in the following documents: *Global Engagement: A Vision for the 21st Century Air Force* (Washington, D.C.: Department of the Air Force, 1997); and Air Force Doctrine Document (AFDD) 2, "Global Engagement: Air and Space Power Organization and Employment," draft, Spring 1998. On the other hand, the limited space allowed to OOTW offers lucid and coherent doctrine and is supplemented by other doctrine, such as AFDD 2-3, *Military Operations other than War*, October 1996.
6. See Army Field Manual (FM) 100-23, *Peace Operations*, December 1994.
7. See Joint Publication (Pub) 3-07, *Joint Doctrine for Military Operations other than War*, April 1993, ix.
8. AFDD 2-3, p. 8.
9. James S. Corum, "Airpower and Peace Enforcement," *Airpower Journal* 10, no. 4 (Winter 1996): 13.
10. Joint Pub 3-07, p. 1-6.
11. Don Daniel and Bradd Hayes, *Securing Observance of UN Mandates through the Employment of Militia Forces* (Newport, R.I.: US Navy War College, 1995), 6.
12. See the British field manual *Wider Peacekeeping* (London: Her Majesty's Stationery Office, 1995), which wholly, totally, and

- completely takes the opposite doctrinal stance from Joint Pub 3-07 on this issue. Such disagreement is very unusual for close allies.
13. Secretary-General Willy Claes, NATO, statement to the North Atlantic Assembly, Washington, D.C., 18 November 1994.
 14. Maj Gen J. A. MacInnis, presentation to the Application of Law of War Rules Conference, Garmisch-Partenkirchen, Germany, 5-7 December 1994.
 15. Mats R. Berdal, *Whither UN Peacekeeping: An Analysis of the Changing Military Requirements of UN Peacekeeping with Proposals for Its Enhancement*, Adelphi Paper no. 281 (London: Brassey's for the International Institute for Strategic Studies, 1993), 76.
 16. John Bolton, presentation to the CSIS/VII Inc. Conference on Dueling Doctrines and the New American Way of War, Washington, D.C., 24-26 June 1998.
 17. I address this issue in my book *Blue Helmets: The Strategy of UN Military Operations* (Washington, D.C.: Brassey's, 1998), 168-71 and 211-14.
 18. Adm Leighton Smith, USN, Retired, "Relevancy of Air Power in Military Operations other than War" (paper presented at the CSIS/VII Inc. Conference on Dueling Doctrines and the New American Way of War, Washington, D.C., 24-26 June 1998).
 19. Hillen, *Blue Helmets*, 161-65.
 20. Corum, 15.
 21. Smith.

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The logo for "Air Chronicles" is written in a stylized, cursive font. The word "Air" is smaller and positioned above "Chronicles". The letters are thick and have a slight shadow effect, giving it a three-dimensional appearance.

Great Soldiers on Airpower

COL JEFFERY R. BARNETT, USAF

THE ROLE OF airpower in modern war engenders continuous debate. For some military thinkers, the case for airpower has not been made. Gen Frederick Kroesen, USA, Retired, former commander of US Army Europe, believes airpower is more promise than fact. He wrote to the *Washington Post* that "none of the great air campaigns of the past has ever been decisive, and many have had contrary results. . . . All were sideshows to the Army and Marine efforts to occupy land and dominate the enemy."¹ In a similar vein, the Association of the United States Army suggests devoting greater resources to Army armor and artillery at the expense of new airpower weapons, such as the F-22: "Hopefully, proponents of the capability of air power to defeat enemy ground forces will finally be correct; its claimed effectiveness





A view of the invasion forces landing at Omaha Beach, 6 or 7 June 1944. [General Eisenhower] testified to Congress that . . . "unless we had faith in the air power to intervene and to make safe that landing, it would have been more than fantastic, it would have been criminal."

has not yet materialized."² These are far from the only airpower skeptics, but they illustrate a point: there is considerable suspicion about airpower's impact in modern war.

Such suspicion is surprising, given airpower's successful war record. These successes are well articulated by seven experts on modern war, all but one of whom were great soldiers. Their words testify to the decisive character of airpower in modern war.

General of the Army Dwight D. Eisenhower

As Supreme Allied Commander in Europe during World War II, Gen Dwight Eisenhower had a unique perspective. Not only did this career soldier command all Allied ground forces, he also led Allied air forces. He commanded bomber groups that attacked Ger-

man industry. He commanded Allied tactical air forces that interdicted German surface forces, gained air superiority, and flew close air support of surface forces. Eisenhower also commanded ground forces whose scheme of maneuver depended on coordination with air forces. Conversely, he was responsible for forces that withstood German air attacks.³ So Eisenhower saw airpower from both sides. He witnessed both the offensive and defensive effects of airpower at all levels of war. Arguably, Eisenhower had the finest perspective on the effects of airpower during World War II. What did he learn from his experiences?

Based on his wartime lessons, Eisenhower concluded that airpower dominated modern war. He wrote in his memoir *Crusade in Europe*, "Here [the Normandy campaign], as always, emphasized the decisive influence of airpower in the ground battle."⁴ He testified to Congress that

the Normandy invasion was based on a deep-seated faith in the power of the air forces, in overwhelming numbers, to intervene in the land battle. That is, a faith that the air forces, by their actions, could have an effect on the ground of making it possible for a small force of land troops to invade a continent, a country strongly defended, in which there were 61 enemy divisions and where we could not possibly on the first day of the assault land more than 7 divisions.

Without that air force, without the aid of its power, entirely aside from its ability to sweep the enemy air force out of the sky, without its ability to intervene in the land battle, that invasion would have been fantastic.

To a lesser extent that also applied at Salerno. In that operation there were 3 divisions that we had at Salerno, two in the toe of the boot, and there were 19 divisions of the enemy in Italy arrayed against us.

Unless we had faith in the air power to intervene and to make safe that landing, it would have been more than fantastic, it would have been criminal.⁵

As Army chief of staff in 1948, Eisenhower wrote a sweeping endorsement of airpower. In his annual report to the secretary of the Army, Eisenhower stated that "the Army supports the theory that air power occupies a dominant position in modern warfare."⁶ That is a uniquely strong endorsement of another service by a service chief. It is difficult to imagine a US Army general saying similar words today, a half century after Eisenhower's service as Army chief of staff. However, Eisenhower did more than simply put his endorsement of airpower on the record. He also took extraordinary steps to implement his beliefs.

As president, Eisenhower gave his highest priorities to the Air Force. During his presidency (1953-61), the Department of the Air Force received 46 percent of military spending. The Army and Navy/Marine Corps received 26 percent and 28 percent, respectively.⁷ The high-water mark occurred in 1957, when the Air Force received 48 percent of total military spending. In constant (1998) dollars, Department of the Air Force outlays in 1957 equaled \$120 billion, which is 60 percent *greater* than

1996's Air Force outlay figure of \$75 billion.⁸ This money funded a rapid expansion in theater weapons, such as the "century" series of fighter planes.⁹ It also funded strategic systems, such as bombers and missiles.

That the Air Force surged during Eisenhower's administration is well known. What is less well known, however, is the priority given the Air Force versus the other services by the Eisenhower administration. This ex-Army general—in fact, one of the greatest Army generals in American history—gave almost twice as much money to the Air Force as he gave to the Army. He also named Air Force generals as chairman of the Joint Chiefs of Staff (Nathan Twining, one of only three Air Force generals ever named chairman) and Supreme Allied Commander Europe (Lauris Norstad, still the only Air Force officer to hold this position). These pro-Air Force priorities reflected General Eisenhower's highly credible judgment on the decisive nature of airpower.

Gen George S. Patton

In December 1944, Lt Gen George Patton's Third Army prepared to attack the Saar. Indications of a German offensive towards the north, in the Ardennes, concerned Patton. But the weather bothered him more. The skies were overcast. Incessant rains turned the ground into mud. Heavy fog and freezing temperatures made the environment miserable. In typical fashion, Patton tried an "alternative" solution. He ordered his chaplain to write a now-famous "weather prayer" to "restrain these immoderate rains." Why did Patton want good weather? For his armor and logistics? For better conditions for his troops? Of course Patton wanted these things—but there was another important reason.

Patton wanted good weather to get Allied air forces into the fight—because he understood airpower. Patton realized that effective air attack denied the Germans operational-level mass, maneuver, and logistics. In the face of massive air attack, enemy forces couldn't mass, move, or efficiently resupply. Without such capabilities, any military force

was ineffective against a competent, aggressive foe.

Patton recognized the dilemma that Allied airpower forced on the German army. Whenever the Germans massed, Allied air attacked that concentration. Whenever the Germans tried to protect themselves by dispersing, Patton's armor pierced the thinned defenses. When the Germans tried to maneuver in force, Allied air detected and killed major movements before they came to bear. This is why Patton told Brig Gen Otto P. Weyland, commander of 19th Tactical Command, "I am going to depend on you to protect my right flank with your airplanes."¹⁰ Patton seized on his advantage in the air to defeat a very competent enemy who possessed superior ground numbers and had the advantages inherent to defenders on their home territory.

After the Germans attacked through the Ardennes with 17 divisions on 16 December 1944, they enjoyed seven days of poor flying weather. Allied air superiority was ineffective for a week due to fog and clouds. Ninth Air Force, with 1,550 planes, flew only eighteen hundred sorties that week in the battle area,

most of which were aerial-combat sorties.¹¹ With clear weather, however, the fighter-bombers went back to work. On Christmas day alone, Ninth Air Force flew 1,920 sorties in the battle area—more sorties in one day than in the entire preceding week.¹² The official US Army history of World War II summarizes the impact of this air offensive: "The morning of 23 December broke clear and cold. 'Visibility unlimited,' the air-control posts happily reported all the way from the United Kingdom to the foxholes of the Ardennes front. To most of American soldiery this would be a red-letter day—long remembered—because of the bomber and fighter-bombers once more streaming overhead like shoals of silver minnows in the bright winter sun, their sharply etched contrails making a wake behind them in the cold air."¹³ It's too bad that current military writing fails this standard of prose.

This pattern wasn't limited to the Battle of the Bulge. Patton saw the same model during the Normandy breakout: "I was convinced our Air Service could locate any groups of enemy large enough to be a serious threat, and that I could also pull something out of the hat

A P-47 overflies a Third Army tank column. After the breakout in France, [General] Patton told Brig Gen Otto P. Weyland, commander of 19th Tactical Command, "I am going to depend on you to protect my right flank with your airplanes."



to drive them back while the Air Force in the meantime delayed their future advance."¹⁴

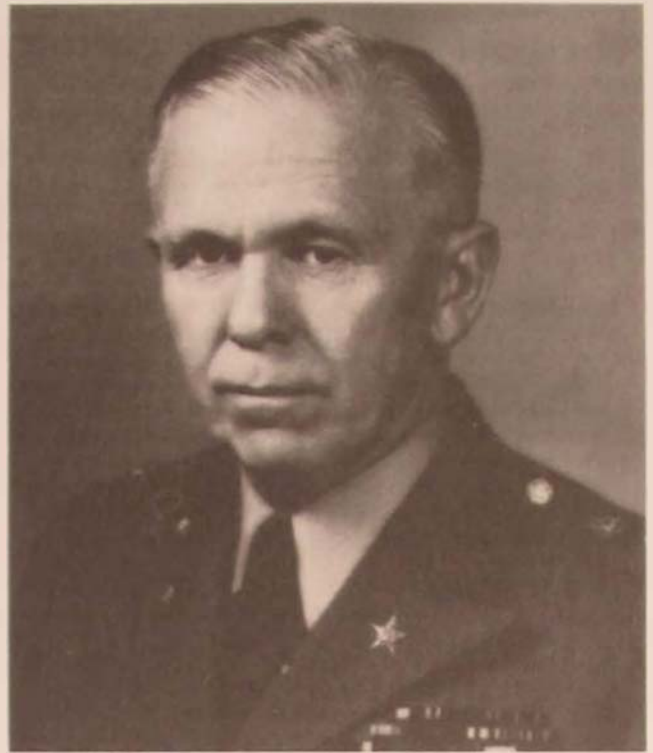
Patton understood that no enemy commander could confidently expect a smooth logistics flow in the face of Allied airpower. Major roads and rail lines were death traps. Allied air induced enough friction into the enemy's logistics, command and control, and scheme of maneuver to keep the Germans off balance, which allowed daring, rapid advances by Third Army. Patton understood the "trump card" that Allied airpower gave him—and seized the opportunity. A fundamental part of General Patton's genius in armored warfare was his appreciation of airpower.

General of the Army George C. Marshall

In the immediate aftermath of the Battle of the Bulge, Gen George Marshall reported to the secretary of war that "the weather has favored us recently and rather unexpectedly. The past few days have permitted our crushing air superiority to be directed against the enemy troops, tanks, trains, and communications. His marshaling yards are being blown to bits. Aside from the fighting spirit of our troops, no other factor means so much to us in the present situation as flying weather."¹⁵

Airpower's effectiveness was not a revelation to Marshall. Seven months earlier, in a memorandum to the secretary of war, Marshall identified the crucial role of airpower: "We are about to invade the continent and have staked our success on our air superiority, on Soviet numerical preponderance, and on the high quality of our ground combat units."¹⁶ Marshall knew that airpower would not prove decisive all by itself; he stated many times that no one military arm can win a war alone.¹⁷ However, by placing airpower on a par with the size of the Soviet army and the quality of American ground forces, Marshall explicitly recognized airpower's crucial role.

Earlier, he had codified the importance of airpower. Field Manual (FM) 110-20, *Command and Employment of Air Power*, published



Gen George Marshall. Late in 1943, in a memorandum to the secretary of war, Marshall identified the crucial role of airpower: "We are about to invade the continent and have staked our success on our air superiority."

under Marshall's signature in July 1943, stated as its major theme that "land power and air power are co-equal and interdependent." It went on to state the US Army's doctrine that "the gaining of air superiority is the first requirement for the success of any major land operation."¹⁸ After gaining air superiority, the first priority of tactical air forces was to "prevent the movement of hostile troops and supplies into the theater of operations or within the theater."¹⁹ These were combat-proven precepts. They reflected arguments fostered by the Air Corps Tactical School and proven during operations in North Africa and the South Pacific. Marshall codified these precepts into the basic fighting doctrine of the Army. In fact, airpower's contributions during the first two years of World War II garnered Marshall's highest praise: "The outstanding feature to date of America's war effort has been the manner in which our air forces have carried the war, in its most devastating form, to the

enemy."²⁰ Without a doubt, General Marshall understood airpower.

General of the Army Omar N. Bradley

In 1945 Gen Omar Bradley wrote a book titled *Effect of Air Power on Military Operations, Western Europe*, in support of the United States Strategic Bombing Survey.²¹ In this book, Bradley addressed the broadest reach of ground-force operations, from defensive operations (e.g., Bastogne) and breakthroughs (e.g., Operation Cobra) to assaults on defended river lines and fortress cities. In each of these ground operations, Bradley found air operations critical to overall success. He supported his findings with quotations from several ground commanders, both American and German. For example, Bradley summarized an interview with Field Marshal Gerd von Rundstedt: "Carpet bombing in the main line

of resistance is the type of air actions most detrimental to German ability to defend a position. He [von Rundstedt] rates the efficiency of the bombing on a par with the strength of the defenders and the initiative of the ground attackers. . . . The [German] troops could not move and were demoralized; the communications system broke down; artillery and anti-tank pieces were knocked out; and tanks were immobilized in craters or beneath heaps of dirt and debris."²²

Bradley expounded on von Rundstedt's statements: "From the high command to the soldier in the field, German opinion has been agreed that air power was the most striking aspect of allied superiority."²³ This opinion was endorsed by Lt Gen Hans Speidel, Field Marshal Erwin Rommel's chief of staff: "Air forces were the decisive factor for the Allied victories in the [Normandy] invasion and subsequent operations."²⁴ Maj Gen F. W. von Mellenthin, chief of staff of the Fifth Panzer Army, made

The effect of airpower on tanks—Wehrmacht panzers in northern France after D day. [According to] Lt Gen Hans Speidel, Field Marshal Erwin Rommel's chief of staff: "Air forces were the decisive factor for the Allied victories in the [Normandy] invasion and subsequent operations."





A B-17 over Berlin in early 1945. Franklin D'Olier, chairman of the United States Strategic Bombing Survey, concluded that "the German experience suggests that even a first class military power—rugged and resilient as Germany was—cannot live long under full-scale and free exploitation of air weapons over the heart of its territory."

a similar judgment: "The Ardennes battle drives home the lesson that a large-scale offensive by massed armor has no hope of success against an enemy who enjoys supreme command of the air."²⁵

On the American side, Bradley quoted Lt Gen J. Lawton Collins's appraisal of the Allied advantage in airpower:

The effect of this bombing on the enemy's transportation system . . . was most marked during the exploitation of the St. Lo breakthrough about August 1, 1944, when German troops were obviously unable to move with sufficient speed to meet our attacks. . . . The pattern bombing by the heavies, particularly on the front of this corps along the St. Lo-Periers road, had a devastating effect. Enemy communications were completely disrupted resulting, in some areas, in an almost total lack of coordinated resistance following the bombing. Most prisoners taken by our troops were stunned and bewildered by the bombing. The morale factor was truly shattering. There can be no question that the

bombing was a decisive factor in the initial success of the breakthrough.²⁶

Nor did Bradley limit his comments to operational-level airpower. After the war, he told Congress that strategic bombing "had a decisive effect on the ultimate ability of the allies to defeat Germany in a shorter time, saving many, many lives and dollars."²⁷ Although General Bradley, like Marshall and Eisenhower, understood that airpower cannot win a war alone, he fully appreciated its decisive effect.

Franklin D'Olier

Although nearly forgotten today, Franklin D'Olier was the chairman of the United States Strategic Bombing Survey, conducted immediately after World War II. In a letter to the House Armed Services Committee in 1949, D'Olier cited the survey's key finding: "Allied air power was decisive in the war in western

Europe."²⁸ He wrote this letter in response to airpower critics who had misused this survey to argue that bombing was ineffective against Germany. D'Olier—arguably the paramount expert on this survey—called such criticisms a "distortion." He quoted the survey's summary report:

The German experience suggests that even a first class military power—rugged and resilient as Germany was—cannot live long under full-scale and free exploitation of air weapons over the heart of its territory. By the beginning of 1945, before the invasion of the homeland itself, Germany was reaching a state of helplessness. Her armament production was falling irretrievably, orderliness in effort was disappearing, and total disruption and disintegration were well along. Her armies were still in the field. But with the impending collapse of the supporting economy, the indications are convincing that they would have had to cease fighting—any effective fighting—within a few months. Germany was mortally wounded.²⁹

After a thorough and impartial review, D'Olier came to the same conclusion as the leading soldiers of World War II: airpower was decisive.

Gen Vo Nguyen Giap

In late March 1972, Gen Vo Nguyen Giap attacked South Vietnam with two hundred thousand regular North Vietnamese troops. At that time, there were no major US ground-combat forces in South Vietnam; the last major unit withdrew in January 1972.³⁰ American advisors and logistical support were still in South Vietnam, but major US ground-combat forces were gone.

Giap thought the situation ripe for a strategic offensive. Unfortunately—for Giap and half his attack force—American airpower was still in the theater. Land- and carrier-based airpower slaughtered Giap's formations. Buttressed by this support, the South Viet-

In late March 1972, Gen Vo Nguyen Giap attacked South Vietnam with two hundred thousand regular North Vietnamese troops. Land- and carrier-based airpower [like this B-52] slaughtered Giap's formations. . . . In the end, Giap lost half his force—one hundred thousand men.





Airpower versus armored forces—the Gulf War. One Iraqi soldier complained, “During the war with Iran my tank was my friend. I could sleep in it at night and know that I was safe. However, during this war my tank became my enemy. No one would go near a tank at night because they just kept blowing up.”

namese army fought hard. In the end, Giap lost half his force—one hundred thousand men. After 10 weeks, the offensive petered out.

Three years later, in the spring of 1975, Giap launched another “final” offensive with a total of one hundred thousand troops (half the 1972 number). This time the South Vietnamese army collapsed. Giap captured Saigon in six weeks. The war ended as Americans watched Saigon’s evacuation on television.

Giap’s two offensives, occurring three years apart, produced radically different results. Why the huge difference between 1972 and 1975? Was the North Vietnamese army substantially better in 1975 (despite being half its 1972 size)? Was the South Vietnamese army substantially worse in 1975? Although either condition is theoretically possible, the

role of American airpower constitutes the more likely difference.

The official US Army history of the 1972 Easter offensive reports the critical importance of airpower. The southern thrust of the North Vietnamese attack surrounded An Loc, 60 miles north of Saigon. An Loc was strategically vital; its capture “would open the door to Saigon.”³¹ However, after initial setbacks, the South Vietnamese rallied to defend An Loc. This success was a close call in which airpower played the decisive role. The official history quotes the senior American Army officer on the scene: “An Loc would have never held out without the handful of American advisors directing the air strikes and shoring up the local leadership.”³² The description of the effect of the 887 B-52 strikes on the enemy is telling.³³ The threat of heavy-bomber strikes “forces the enemy to break up his ground elements into small units

and makes it difficult to mass forces for an attack. If he does mass his forces, he takes terrible casualties."³⁴ This is the traditional dilemma inflicted by effective airpower on surface forces. To surmount a determined defense, an attacker must mass. However, in the face of effective airpower, massing is suicidal. An Loc exemplified this axiom.

During the 1972 offensive, allied land- and carrier-based pilots flew 50,000 fixed-wing strike sorties against Giap's forces.³⁵ Their attacks were clearly decisive. However, US air strikes played no role in the 1975 offensive. By 1975 America had withdrawn from the war. American airpower was completely gone (along with the American advisors who could direct the air strikes). Unlike the massive air strikes in 1972, there were no massive air attacks on North Vietnamese forces during their 1975 offensive. Giap could mass, maneuver, and resupply at will. The net effect was startling. With half the forces and half the time, the North Vietnamese rolled victoriously into Saigon. General Giap had learned the decisive nature of airpower.

Gen Khaled bin Sultan

Gen Khaled bin Sultan commanded joint forces during the 1991 Gulf War. His major force elements were from Saudi Arabia, Egypt, Syria, and Kuwait.³⁶ During the ground offensive, their mission was to attack from Saudi Arabia directly into Kuwait. This meant attacking into the supposed teeth of Iraqi defenses. The highest number of coalition casualties was expected in this area. Gen H. Norman Schwarzkopf's "Hail Mary" flanking maneuver far to the west with VII and XVIII Corps was specifically designed to avoid these defenses.

As most people are well aware, Khaled's offensive was a complete success. His forces, alongside two divisions of American marines, advanced with minimal casualties. According to the official Department of Defense report, Joint Forces Command East "secured its objectives against light resistance and with very few casualties; however, progress was slowed by the large number of Iraqis who surren-

dered."³⁷ Khaled praised the skill of his ground commanders but gave most of the credit for this success to coalition airpower:

Both psychologically and physically, it must have been terrible to be on the receiving end of Coalition air power. From the start of the war the dilemma facing Iraqi troops was acute: they got hit if they stayed in their fortifications, they got hit if they fired their heavy guns, they got hit if they moved, and they got hit by Iraqi execution squads if they tried to cross over to us. . . . It was clear that the 38-day air campaign had done far more damage than we had imagined. There was little fight left in the Iraqi divisions facing our troops. Indeed, they must have realized the war was over.³⁸

Because of coalition air attacks, Iraqi divisions facing Khaled's forces were unable to survive no matter what they did. If they dug in, air strikes destroyed them piecemeal. One Iraqi soldier complained, "During the war with Iran my tank was my friend. I could sleep in it at night and know that I was safe. However, during this war my tank became my enemy. No one would go near a tank at night because they just kept blowing up."³⁹ Nor could the Iraqis maneuver. When Iraqi divisions attempted to flee north to Iraq, their high signature keyed intensive coalition air strikes. One section of road became known as the "highway of death." This was a classic dilemma for the Iraqis. They could stay in one place and be killed or attempt to move and be killed. They faced a dilemma that only defeat could resolve.

Coalition ground commanders faced no such dilemma. They could maneuver massive forces at will. For example, Schwarzkopf deployed a quarter million troops with 60,000 vehicles and their supplies four hundred miles to the west over a single road. At its peak, traffic near the Iraqi border was 18 vehicles per minute, 24 hours a day, seven days a week.⁴⁰ This logistics flow was crucial to the entire operational scheme. During the ground offensive, the US Army's VII Corps drew 1,330 truckloads of fuel and ammunition from these stocks *per day*.⁴¹ Without this massive logistical flow, there would have been no massive Hail Mary flanking attack, and without air supremacy, this logistical flow would

have been impossible. However, despite the inherent vulnerability of truck convoys, the Iraqis were unable to interfere with this deployment. Although Iraqi impotence was critical, it is not even the most remarkable fact. The most remarkable fact is that—because of coalition air supremacy—the Iraqis were unable even to *detect* the massive movement of troops and supplies over several hundred miles of open desert.

It's important to note that, if anything, Khaled was at a disadvantage on the ground. After-action reports reveal that the Iraqis deployed approximately seven divisions opposite Khaled's approximately five divisions.⁴² These Iraqi divisions had the inherent advantages of the defender. They employed fire trenches, minefields, barriers, and well-surveyed artillery zones—all of which coalition forces had to surmount. After their eight-year war with Iran, Iraq's divisions were experienced in war. Also, they were cohesive (i.e., all from one country). Khaled's forces, on the other hand, were drawn from 11 countries, none of which had any recent military successes. None could be considered elite. Despite these handicaps, Khaled's forces enjoyed Guderian-like success.⁴³ They exceeded the most optimistic timetables with minuscule casualties and captured 25,000 prisoners.⁴⁴ There has to be some logical explanation for these counterintuitive developments. According to General Khaled, the primary reason for these startling successes was airpower.

Conclusion

These great soldiers testified to the decisive nature of airpower in modern war. At the

strategic level of war, they saw airpower's unique ability to destroy an enemy nation from the inside out. They understood that when a nation cannot function, its military follows suit—and that airpower can render a nation dysfunctional. Bradley acknowledged this logic. D'Olier documented it. Eisenhower put the power of his presidency behind it.

At the operational level of war, where large numbers of forces mass and maneuver, Eisenhower, Marshall, Patton, Bradley, Giap, and Khaled have testified to airpower's decisiveness. Based on personal experiences with all types of military operations, each came to understand that surface forces cannot effectively move, shoot, and communicate under efficient air attack. As professional soldiers, they recognized this shortcoming as critical to any military operation. When one side can move, shoot, and communicate—while its opponent cannot—it has a decisive advantage. Each of these soldiers would vigorously argue that well-equipped and well-led surface forces are necessary to exploit this advantage, but each understood that control of the air enables this advantage in the first place.

Healthy skepticism is always valuable. The fact that something has worked in the past does not mean that one should slavishly rely on it indefinitely. Thus, a healthy skepticism of airpower's contributions in modern war is valid. However, critics must take the lessons of the past half century into account when they debate the merits of airpower. Some of the greatest soldiers of our era did so and came down firmly in support of the decisive nature of airpower. □

Notes

1. "Roles and Missions of the Armed Services" (letter to the editor), *Washington Post*, 7 November 1994, 22. General Kroesen commanded US Army Europe from 1979 to 1983.

2. For example, see Defense Report 97-9, *Tactical Aircraft Costs Limit Broader DoD Modernization*, October 1997, 2.

3. For example, these German attacks were at the strategic and operational levels of war (e.g., V-1 attacks on London and BF-109 attacks at Normandy, respectively).

4. Dwight D. Eisenhower, *Crusade in Europe* (Garden City, N.Y.: Doubleday & Company, 1948), 261.

5. Senate, *Testimony of General Dwight D. Eisenhower to the Committee on Military Affairs on S. 84*, 79th Cong., 1st sess., 16 November 1945, 360.

6. *Final Report of the Chief of Staff, United States Army, to the Secretary of the Army* (Washington, D.C.: Government Printing Office, 7 February 1948), 13.

7. Assistant Secretary of Defense (Comptroller), *National Defense Budget Estimates for FY 1998* (Washington, D.C.: Department of Defense, March 1997), table 6-13. Figures are for fiscal years 1954 through 1961. For comparison purposes, during the 10-year period 1987-1996, the Department of the Air Force averaged 32 percent of Department of Defense (DOD) outlays, with the Army and Navy departments averaging 27 percent and 34 percent, respectively. During this decade, the DOD share for each of the three departments remained relatively stable (i.e., within a range of three percentage points).
8. *Ibid.* In constant dollars, Army and Navy/Marine Corps outlays remained roughly the same.
9. This series included the F-100, F-101, F-102, F-104, F-105, and F-106.
10. George C. Marshall, Henry Harley Arnold, and Ernest Joseph King, *The War Reports of General of the Army George C. Marshall, Chief of Staff, General of the Army H. H. Arnold, Commanding General, Army Air Forces [and] Fleet Admiral Ernest J. King, Commander-in-Chief, United States Fleet and Chief of Naval Operations* (Philadelphia: J. B. Lippincott Company, 1947), 371.
11. Wesley Frank Craven and James Lea Cate, eds., *The Army Air Forces in World War II*, vol. 3, *Europe: Argument to V-E Day, January 1944 to May 1945* (1951; new imprint, Washington, D.C.: Office of Air Force History, 1983), 688.
12. *Ibid.*, 694.
13. Hugh Marshall Cole, *The Ardennes: Battle of the Bulge* (Washington, D.C.: Office of the Chief of Military History, Department of the Army, 1965), 468.
14. George S. Patton Jr., *War As I Knew It* (Boston: Houghton Mifflin Co., 1947), 113.
15. George C. Marshall, *The Papers of George Catlett Marshall*, ed. Larry I. Bland, vol. 4 (Baltimore: Johns Hopkins University Press, 1996), 713 (memorandum to the secretary of war, 16 May 1944).
16. *Ibid.*, 449.
17. "The national security is measured by the sum, or rather the combination of the three great arms, the land, air, and naval forces." Senate, *Hearing Report on S. 84 and S. 1482, 17 October-17 December 1945*, 81st Cong., 1st sess., 1945, 50.
18. FM 100-20, *Command and Employment of Air Power*, 21 July 1943, 1.
19. *Ibid.*, 10.
20. Marshall, Arnold, and King, 107.
21. Omar Nelson Bradley, *Effect of Air Power on Military Operations, Western Europe* by Omar N. Bradley, *Military Advisor, United States Strategic Bombing Survey and Air Effects Committee, 12th Army Group* (Wiesbaden, Germany: n.p., 15 July 1945).
22. *Ibid.*, 183.
23. *Ibid.*, 184.
24. Hans Speidel, *Invasion 1944: Rommel and the Normandy Campaign* (Chicago: Henry Regnery Company, 1950), 170.
25. F. W. von Mellenthin, *Panzer Battles, 1939-1945: A Study of the Employment of Armour in the Second World War*, trans. H. Betzler, ed. L. C. F. Turner (London: Cassell, 1956), 342.
26. Bradley, 198, 214. Collins was the commander of VII Corps.
27. House, *Hearing Report on the National Defense Program—Unification and Strategy, 6-21 October 1947*, 81st Cong., 2d sess., 1950, 27.
28. *Ibid.*, 406.
29. *Ibid.*
30. Clark Dougan and Stephen Weiss, *The American Experience in Vietnam* (New York: W. W. Norton & Company, 1988), 273.
31. Jeffrey J. Clarke, *Advice and Support: The Final Years, 1965-1973* (Washington, D.C.: US Army Center of Military History, 1988), 481.
32. *Ibid.*, 486.
33. A. J. C. Lavalley, ed., *Airpower and the 1972 Spring Invasion, USAF Southeast Asia Monograph Series*, vol. 2, monograph 3 (Washington, D.C.: Government Printing Office, 1976), 106.
34. *Ibid.*, 103.
35. *Ibid.*, 106.
36. Other nations in this force included Oman, Bahrain, United Arab Emirates, Niger, Senegal, and Morocco.
37. *Conduct of the Persian Gulf War, Final Report to Congress* (Washington, D.C.: Department of Defense, April 1992), 386.
38. *Ibid.*, 405.
39. EPW debrief of senior Iraqi armored officer, in SAF/OSX report, "Debriefs of Senior Iraqi EPWs," May 1991.
40. William G. Pagonis with Jeffrey L. Cruikshank, *Moving Mountains: Lessons in Leadership and Logistics from the Gulf War* (Boston: Harvard Business School Press, 1992), 9.
41. *Ibid.*, 147.
42. *Conduct of the Persian Gulf War*, 355, 358. The size and readiness of each division varied widely.
43. Heinz Guderian, a German general in World War II, led blitzkrieg operations in Poland, France, and Russia.
44. Khaled bin Sultan with Patrick Seale, *Desert Warrior: A Personal View of the Gulf War by the Joint Forces Commander* (New York: HarperCollins, 1995), 409.

Strategic Planning for the Air Force

Leveraging Business Planning Insights to Create Future Value

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If you are going to try to go to war, or to prepare for war, in a capitalist country, you have got to let business make money out of the process or business won't work.

—Henry L. Stimson

THE RAISON D'ÊTRE of our national Air Force is force application: possessing the capabilities to apply force, on command, to an adversary state as part of the United States and alliance joint operations team. We have two tenets regarding airpower. The first tenet is the belief that planning for the future of airpower is so critical to the United States, our friends, and our allies that it must be done right. To help ensure it is done right, we could gain much by examining how planning is accomplished in the fiercely competitive world of “for profit” business. The second tenet is that some commercial planning initiatives offer the potential to improve the Air Force plan-

ning process. This article explores strategic planning for the Air Force, illuminating how Air Force planning might incorporate some of the best planning practices used by competitive businesses. We have one hypothesis: The institutional planning process should drive the efforts and effectiveness of a 500,000-person firm, and it can and must be improved.

Perspectives

Over the past several years, the Air Force created an environment encouraging debate and promoting innovative thinking about the future. Sponsored efforts resulted in major studies and lengthy reports such as those cre-



ated by *Spacecast 2020, Air Force 2025, and New World Vistas*.¹ Creation of a "Revolutionary Planning Office"² as the precursor of a

As we define it, long-range planning is planning done without regard for risks or other constraints.

new Air Force-level deputy combining planning and programming allowed planners across the Air Force to look into the future and question where the Air Force was going, thereby identifying potential new vectors and new demands. The Air Force also created battlelabs³ to explore new concepts of operations and to allow the discovery of creative operational concepts.

Perhaps the most significant of all of these initiatives was creation of an institutionalized process linking planning functions to budgetary decisions. At the beginning of this ambitious endeavor, there were many naysayers to convince and many hurdles to overcome. Threatened by the thought of losing control over the ability to make decisions, many Air Force representatives debated the utility of the nascent planning function and its methodology. The constant questioning, debate, investigation and examination helped bring a stabilizing force to the Air Force's quest for planning for the future. But is this the desired effect the Air Force intended to achieve through a major overhaul of its planning processes? Was the outcome visionary and creative, pedestrian and stabilizing, or something else? Can the Air Force institutionalize a more creative process? Can the Air Force establish a process for creativity and innovation at every level? What will happen when all the "plans" at all the levels have been completed? What products does the Air Force now expect from its research and development? Will it still be important for the Air Force to support innovative thinking when the details of the plan are complete? If so, then maybe by striving for stability in Air

Force plans for the future, the Air Force will find itself actually stifling creativity and innovation. If creativity and innovation in developing airpower's tools or in the application of airpower are impeded, then airpower's contributions are limited. Can this be so? It can be so, unless leaders and planners are willing to think in the boundary between order and chaos.

Long-Range Planning, Strategic Thinking, or Strategic Planning?

As a starting point, consider the apparent difference between long-range planning for the future, on the one hand, and leveraging chaos to help develop strategies that allow for the creation of more desirable futures or the creation of future value on the other.

Planning

As we define it, long-range planning is planning done without regard for risks or other constraints. Long-range planning asserts the existence of alternative futures and what is important is *not* planning to offset the effects of one future or another, *but* the awareness that some futures would require more behavioral adjustments than other futures. Alternatively, strategic thinking is having *insight* about the present and *foresight* about the future. The key to both is understanding the *dynamics* of the "big picture" context in which decisions are made.⁴ So, as we define it, *strategic planning* is planning that appreciates uncertainty and risk. It is constrained by this awareness.

Strategic planning also is cold and calculating, measuring the probabilities associated with a rather large set of exogenous variables in an attempt to understand uncertainties, reduce risk, and identify opportunities. It asserts that, enough things considered, the domain of uncertainty can be understood at a sufficiently manageable level. Long-range planning asserts that "we could do this, or

this, or this and may have to be prepared to do that, or that, or that." Strategic planning asserts that "all things considered, we should do this." Long-range planning, then, is rather more unconstrained than strategic planning.⁵

Consequences and the Antiplan

To do either strategic planning or long-range planning, one must look into the future (or define a vision for the future); determine what is needed, identify and test assumptions; then build the broad or detailed maps, plans, and variants for achieving the desired end state. But can this be done when the future is as unknowable as the technology developments and the behavior of competitors that will help condition the future? Of course not.

In today's rapidly changing technology environment, it is important for any strategic decision to consider the competitors. It is imperative to determine competitors' ability to achieve the same level of technical competence or to leverage *less* technical competence by superior operational schemes, and then estimate how quickly they might be able to deliver a "product" to market. Thus, embedded in the notion of the "plan" is the notion of the "antiplan." The antiplan accepts that valuable markets will be contested and the "forces of good" are not the only ones planning or operating in the dynamic environment. The planning process is thus an iterative process. The plan is the thesis. Responses to the plan from customers, suppliers, and competitors may constitute the antithesis. Actual performance, which may be at wide variance with planned performance, is the synthesis. Said another way, the plan is a declaration of strategic intent. What actually results from the plan is more rather than less independent from the plan.

Helmuth von Moltke described it this way in an 1871 essay:

Certainly the commander in chief (*Feldherr*) will keep his great objective (*Zweck*) continuously in mind, undisturbed by the vicissitudes of events. But the path on which he hopes to reach it can never be firmly established in advance. Throughout the campaign he must

make a series of decisions on the basis of situations that cannot be foreseen. The successive acts of war are thus not premeditated designs, but on the contrary are spontaneous acts guided by military measures. . . .

The importance of "time to market"—the speed at which a product is brought to customers and begins generating revenue or adding some other value for the firm—also holds true for the military acquisition of new weapon systems.

Strategy affords tactics the means for fighting and the probability of winning by the direction of armies and their meeting at the place of combat. On the other hand, strategy appropriates the success of every engagement and builds upon it. The demands of strategy grow silent in the face of a tactical victory and adapt themselves to the newly created situation.

Strategy is a system of expedients. It is more than a discipline; it is the transfer of knowledge to practical life, the continued development of the original leading thought in accordance with the constantly changing circumstances. It is the art of acting under the pressure of the most difficult circumstances.⁶

Thus, and with von Moltke's advice firmly in mind, there also is a third approach: strategic development. Strategic development asserts that the Aristotelian entelechy, that which determines what a thing becomes, is not attainable by either long-range planning or strategic planning. Rather, the end state is not so much planned as it is negotiated with the developing future environment. Negotiations are active and interactive processes that reflect compromises with both internal forces and external environments. Negotiations keep von Moltke's "original leading thought" in mind but accept that it must submit to "continued development" in the face of "constantly changing circumstances." The negotiated end, because of these dynamics, is unknowable. Negotiators may have a sense of

best-case, worst-case, and initial positions; but in a true negotiation, the actual end state is unpredictable. The process of raising a child to become a self-sufficient adult is ample evidence. Parents may provide all the necessary guidance and training they deem appropriate to produce the adult that they envision their child becoming. They use existing formulas professing to have the "action plan" to success. They may feel they are working towards one "future" for their child, yet environmental influences, individual desires, and secondary interactions that are negotiated, interactive event by interactive event, result in a truly unique individual that may or may not resemble the hopes of their parents.

Strategic development is the process of preparedness for success in single-mindedly negotiating the flux of reality, whatever that reality is at any given moment. A key appears to be that adaptation and readiness for innovation may be the most important components of strategic development.

The Paradox: Planning Can Summon Failure

For companies with a product to sell, the speed at which innovative thinking produces new products to sell on the market is critical. It is not as important that some other company might produce a similar product. What is important is who got to the market first and most effectively, allowing for harvesting the greater percentage of the consumer market. The importance of "time to market"—the speed at which a product is brought to customers and begins generating revenue or adding some other value for the firm—also holds true for the military acquisition of new weapon systems. However, there is at least one added dimension to the military acquisition process. Not only is it important to be the first to develop the latest leverage technology, but it is equally as important to look at the consequences of developing that technology and understanding how it may alter an *enemy's* development strategy.

In democratic societies, openness may give an enemy sufficient strategic warning to commence building a countermeasure—especially

in an era of outsourcing and privatization, aerospace contractor press releases, congressional testimony, well-publicized "vision" documents, and so forth. Thus, just advertising a particular course may render a chosen path ineffective. It is classical measure, countermeasure, countercountermeasure behavior. With the world experiencing the same technology and information explosion, one must ask, Is the current long-range planning process the most efficient method for meeting the future? Asked another way, Can we be assured the current long-range planning process will result in the outcomes (strategic position, market share, and so forth) that we desire and indeed must have?

Other Planning Models?

In order to answer those questions, it is useful to set aside, at least temporarily, extant Department of Defense (DOD) or Air Force planning models and examine other models. These models suggest that perhaps a better way to move into the future is to develop strategies based on the knowledge of today that promise to have important and enduring impacts on the future. If this is so, then developing a good strategy is *not* developing a new planning process or better-designed plans. It is understanding at least two fundamental points: the benefit of having a well-articulated, stable purpose, and the importance of discovering, understanding, documenting, and exploiting insights about how to create more value than others.⁷ Said another way, the *process of planning* and the *plan itself* from this perspective are less important to the organization than the organization's focus—its well-articulated, stable purpose, its "original leading thought," however this "thought" is modified over time—and its behavioral transformation processes. An organization's behavioral processes are not confined to how it thinks about and prepares for the future. Rather, its key behavioral processes from day to day and every day *also* include how it goes about creating more value than other organizations create.

In this focus on day-to-day and everyday innovation and success, organizations can differentiate themselves no matter how the future develops. Innovation is a key for staying ahead of competition, whether competition is another company in the same or adjacent market or a military competitor who may have to be overcome someday. How organizations move into the future, by long-range planning or by developing strategies, will help define how innovative that organization can be. Organizations that make planning the methodical ossification of thinking are less likely to promote innovation than those making planning a creative process for innovation. These approaches differentiate evolutionary change and revolutionary change.

Evolutionary and Revolutionary Change

Evolutionary change accepts and endorses linear improvement in product and process. A commitment to evolutionary change is a commitment to modest innovation through line extension, "block upgrades," process improvement, and product improvement. Revolutionary change accepts all the advantages evolutionary change has to offer but appreciates the value of using discontinuities, non-linearity, and the emergent characteristics and consequences of compounded change. Revolutionary change accepts that the whole need not be limited to being greater than the sum of its parts but also that it can be, in Robert Jervis's words, different than the sum of its parts.⁸ How an organization is structured, how it is managed, and what the stakes are concerning risks all affect whether or not long-range planning or strategic development should be pursued. What may work for one type of organization may not work for another. The key is in the creative activity of making new maps or plans, not in the imitative following and refining of existing ones.⁹ Recently, the Air Force reviewed its core values and core purpose in order to produce a guiding vision to help focus on priorities for the future. The goal of Global Engagement is to provide a vision for the future—to ensure the Air Force possesses the air and space

power necessary for America's defense in an uncertain future. Using the vision, the Air Force executes a systematic, institutionalized long-range planning process to both identify the capabilities necessary for future war fighting and to allocate the resources required to enable the vision. A closer examination of the methodology used in this planning process is warranted. Is it too restrictive to allow for flexibility, institutional agility, and the rapid responsiveness required to meet the often unpredictable demands of an uncertain future? Will it support a revolution in military affairs? Does it allow for the discontinuous technology explosions that can rapidly and radically alter the strategic landscape and can neither be predicted nor forecast? Does it consider that the antiplan may be generated by the enemy based on his knowledge of the Air Force's desired end states?

Air Force Planning in Context

In the business world, companies that enjoy enduring success have core values and a core purpose that remain fixed while their business strategies and practices repeatedly adapt to changing environments. The metrics for continuously increasing shareholder value are as quantifiable as they appear to be inviolable. Market share, profit, and productivity all can be measured. The best businesses eschew a single "core competence" in favor of pursuing a family of constantly changing and evolving competencies.¹⁰ The ability to differentiate between the promise of profitability and the promise of loss, and the continuous revitalization around new products and processes differentiate the best businesses from other enterprises. Thus, the planning processes that businesses use may have much to offer to not-for-profit government enterprises. After examining the Air Force planning process, we can ask, What are the different methodologies used in the business world for developing business strategies under conditions of uncertainty and rapid change that may apply to the Air Force?

Since early 1992, the Air Force has developed a long-range planning process to aid in

the prioritization of new weapon system acquisitions and technology investments for the future. There have been many additions

Planning and programming are not the same. Planning builds mental models for the future; programming funds one model at the expense of another.

and modifications to the initial planning process, yet the primary goal has remained the same. The goal is prioritization of the most important operational needs for the future Air Force and the investment of declining defense funds towards meeting those needs. This process aims to ensure that the Air Force has the required weapon systems and technology advancements to meet operational requirements in the future. There has been a constant struggle between advocates of revolutionary modernization pathways and advocates of more evolutionary ones in trying to achieve this goal. The desire for innovative technology to allow for a revolution in military affairs also has begun to clash with the necessity for critical upgrades to weapon systems already in the current inventory.

The Genesis

The importance and difficulty of determining operational requirements for the future and the most useful or appropriate systems to acquire, subjects the Air Force to much scrutiny. One of the biggest perceived problems in the area of defense planning has been the inadequate linkage between national security objectives and DOD budget requests for system development and procurement.¹¹ Most critics complain about the alleged lack of rationality in past defense planning processes. Their criticism has been centered on the observation that the United States lacks an explicit strategy at both the national security and national military planning levels. So,

part of the defense planning problems rests on the perception that public budget statements did not or do not reflect an underlying rationale for the allocation of resources reflected in the documented plans. But is this perception driving the Air Force down a path towards stagnant thinking and planning for present threats?

Some exculpatory thoughts underscore the effect of the legacy of the cold war on military planning because it is important to have a basic understanding of why and how the Air Force developed its current methodology for long-range planning. Throughout the cold war, the "Soviet threat" drove long-range planning. In fact, it drove all planning in the defense community. In essence, the military projected the Soviet threat and matched it or developed competitive strategies to counter it. It is hardly an overstatement to claim that the military did not plan for, but rather programmed against, a projected threat. Planning and programming are not the same. Planning builds mental models for the future; programming funds one model at the expense of another. Since the Soviet Union invested steadily in its military machine, the pace of US military innovation was fueled by threat-based obsolescence. New weapons were introduced into the force because the old ones were deemed incapable of coping with new Soviet weaponry.¹²

Defense "Reform" or Reformatting?

Since 1985, there have been five major works that have directly influenced operational requirements and systems concepts generation processes and hence Air Force strategic planning for the future. Respectively, these were the Packard Commission reports issued from February to June 1986; the Goldwater-Nichols Department of Defense Reorganization Act of 1986, enacted October 1986; the Defense Management Report (DMR) issued by the secretary of defense to the president in July 1989; and RAND's *A Framework for Defense Planning* and *A Framework for Enhancing Operational Capabilities*, released August 1989 and November 1991.¹³

The Packard Commission reported to the president . . . "a need for more and better long-range planning to bring together the nation's security objectives, the forces needed to achieve them, and the resources available to support those forces." The commission also stipulated that long-range planning should be fiscally constrained, based on sound military advice, and, of course, [be] forward looking. The Packard Commission's recommendations for improving long-range planning encompassed several recommendations to improve other areas. As a vehicle for tying together the national security objectives, forces, and resources, the commission recommended a top-down planning process with the president's National Security Strategy Report followed by the secretary's defense guidance based on the president's choice from national military strategy options formulated by the secretary and the CJCS. Each of these options would be fiscally constrained by provisional five-year budget levels also formulated by the secretary and the CJCS. Integral to the military strategy options would be future projections of threats to US interests and corresponding US military capabilities to counter those threats.¹⁴

Although the Packard Commission and other earlier works were very influential for setting the stage, the RAND studies—*A Framework for Defense Planning* and *A Framework for Enhancing Operational Capabilities*—appear to have launched the development of the current Air Force long-range planning process. Both studies provided "recommendations for improving the entire defense planning and systems acquisition processes from the top-down direction and guidance at the national level down to the selection and acquisition of systems for development and procurement."¹⁵ The proposed framework focused on the building blocks of operational capability rather than on building blocks of hardware. It promoted the idea that long-term continuity of programs resulted by clearly linking national security objectives to the timely procurement of hardware.¹⁶ It also advocated translating demonstrated technology into increased operational capabilities by avoiding a cumbersome and time-consuming process of technology insertion.

From these recommendations and the activities implementing the plan, the Air Force produced a vision, defined core competencies, and embarked upon building a long-range plan for meeting the vision. The thought was that a long-range plan would be an invaluable tool for better understanding the systemic and long-term effects that decisions would have on resources and capabilities. The Air Force adopted a "strategies-to-tasks" methodology for linking national objectives to the Air Force budget. This process allowed for a structure depicting the interrelationships among mission area objectives, weapons system modernization and acquisition, technology investment recommendations, and the Air Force budget. The goal was to build a common, long-range planning framework and a projected 25-year master "road map" for all Air Force suborganizations. The Air Force has traveled a long way in the long-range planning process. A vision for the future was developed and institutionalized. Core competencies were identified for all to understand and, theoretically at least, support. A long-range plan was developed and documented. The plan was used as guidance for budget allocations.

Yet, there is still some concern that the Air Force is on an evolutionary path towards the future, with its sights still on the past. Concern about whether or not the Air Force is taking advantage of the current technology explosion to leverage its war-fighting capabilities still exists. There is a continual debate over the vision and how the 25-year plan should be detailed in order to get to the plan. There is also skepticism as to the validity of the plan—that is, whether or not the plan is too rigid to accommodate change. The struggle continues between pursuing revolutionary transformations (but is also higher risk) and the evolutionary path set into motion several years ago that just keeps up with technology. How an organization directs its research and development activities will determine whether or not it follows an evolutionary path or pursues a revolutionary transformation.

Next Steps

What ought to be the next steps? We propose some hybrid that combines the best orderly features of mechanical planning and the in-

The Air Force has recently organized battlelabs to hasten the process of implementing war-fighting innovations. However, the battlelabs are still burdened with resource allocation realities and political oversight.

clusion of rather more untidy emergent features. Plans exist to cope with the immediate needs of the organization. They operate under a preset timetable and demand structured documentation. Planning is a valuable activity and is unfairly derided, but it is a different process from forming strategy. Planning processes are not designed to accommodate the messy process of generating insights and molding them into a winning strategy. A well-structured planning process is therefore ill suited to strategy formulation.¹⁷

Michael E. Porter describes *strategy* as the creation of unique and valuable position, involving a different set of activities.¹⁸ If there were only one ideal position, there would be no need for strategy. The essence of strategic positioning is to choose activities different than the rival's activities. Strategic positioning is not sustainable unless there are trade-offs with other positions. Trade-offs occur when activities are incompatible. Simply put, a trade-off means that more of one thing necessitates less of another.¹⁹ Ralph Stacey states that new strategic directions emerge spontaneously from the chaos of challenge and contradiction through a process of real-time learning and political interaction.²⁰ While this sounds exciting, is such a process possible to implement in a large, complex organization like the Air Force?

If this emergent process can be implemented by private companies, elements of it can be implemented by organizations like the Air Force. There are several challenges common to both the Air Force and private companies. Both must identify where they are today, what their core competencies are, and where they want to be, and how they are going to get there. Market assessment, product lines, technology insertion, funding constraints, and rate of return are all common issues and concerns.

With these common challenges come several things that differentiate the Air Force from a private company. The first difference between the Air Force and private companies is the national and international consequences of making bad strategic planning decisions. If the Air Force decides not to build a capability in a particular area, such as theater missile defense, the competition or threat builds long-range missiles in order to take advantage of the weakness. The potential risk is loss of lives of service personnel and citizens (national and international). If a private company decides not to invest in a particular technology or market, the risk is a missed opportunity or at the very worst, bankruptcy. The loss of national sovereignty is not an issue with even the large corporations making a bad decision. If the United States or its Air Force fails to consider the antiplan as a part of their strategic planning deliberations, an enemy can leverage the United States Air Force's course of development and target it with an opposite response. These responses can have national and international consequences.

The second difference is the budget process supporting new acquisitions or product lines. The Air Force is given a budget after a political process involving taxpayers and congressional representatives working for the taxpayers. Within the Air Force it is a zero sum process, unless more money is allocated to the Defense Department. While it certainly is possible to take time, work, and costs out of existing government processes and programs,²¹ there really isn't an easy way to "make profit" off existing product lines in order to reinvest in innovative technology

exploration or new markets. The only way to pursue new product lines appears to be in divestment of current product lines. This divestiture is very difficult because of the institutional inertia and resistance from supporters of current product lines. Although this is somewhat true concerning companies, a company making a profit can increase allocations towards higher risk explorations. This in turn could build more revenue, which could be fed into current and potential markets continuously. The business motivation is being able to make more money, whereas the Air Force's motivation is to retain a capability edge against potential military threats.

The final difference is in how rapidly new products are introduced. The Air Force has a very long product-development cycle to bring new products to market, that is, to operational status. Because of the significant resources involved and the adverse political impact of a research and development failure, the acquisition development timeline is long, overly cautious, and full of reviews and oversight. Companies, on the other hand, have the luxury of rapidly making a decision about a new product line and initiating its production soon after the decision is made. Some companies even enjoy the ability to bypass market surveys, employing the tactics of expeditionary marketing, making a number of different versions of a product, putting them on the market, and letting the consumers determine the primary product line.²² The Air Force has recently organized battlelabs to hasten the process of implementing war-fighting innovations. However, the battlelabs are still burdened with resource allocation realities and political oversight. Oversight and the need for consensus will continually slow progress towards rapid changes.

Even so, the stated differences in the Air Force organization's planning and development for "products" actually help to promote a chaotic environment. As the environment changes, as technological break-throughs occur, the Air Force must deviate from its plan in the midrange and long range, resulting in chaotic behavior. But this is not necessarily an unsatisfactory situation. Chaotic

behavior has two important characteristics, noted by Stacey. At one level, it is inherently unpredictable, while at another level it displays a "hidden" pattern. Chaos in its scientific sense is not utter confusion. It is constrained, rather than explosive, instability. It is a combination of order and disorder in which patterns of behavior continually unfold in irregular but similar forms. In chaos, creativity is a potentially ongoing process internally generated in a spontaneous manner. It is neither proactive according to some prior design nor reactive to environmental change, but rather it is continuing interaction with other systems in the environment. A system in this state can create its own environment and its own future.²³

So, is the Air Force creating this chaotic state, strategic positioning, just by how the Air Force is organized and managed and how it executes its long-range planning process? Is this what the Air Force is doing by allowing its many suborganizations to conduct their own long-range planning process? Is the anti-plan being considered sufficiently in these chaotic deliberations? What is the role of research and development in creating future value in this chaotic environment?

Creating Future Value?

The heart of creative strategic management lies in the ability of managers within an organization to develop live, active strategic issue agendas continually. Strategic issues are perceived only when individuals notice some incongruity in what is currently going on—when they question the established recipes, culture, or business philosophy. Maintaining a live strategic issue agenda depends upon people having different perceptions and then amplifying those perceptions throughout the organization by means of political activity. Multiple perceptions thrive when cultures are not strongly shared.²⁴

So, as the Air Force struggles over creating future value and its 25-year plan, it should create chaos by investigating and under-



Gen H. H. "Hap" Arnold. He had a long-range vision that built American air supremacy.

standing the antiplan. There should be continuous questioning and investigation conducted by highly qualified individuals who are suited for leading this task. These individuals should be skilled in industry business practices and understand drivers for future value creation. As experts in the potential usage of technology for military purposes, they need to have the unique ability to understand and explore technology forecasts and combinations of different capabilities that could be brought together to counter the Air Force's long-range plan. Their role is twofold. One role is to recommend and develop the uniquely military technology needed to assist war fighting in the future. The second role is to investigate commercial technology explo-

sion and to determine its implications for war fighting. This is extremely important especially in areas such as information technologies and commercial space (particularly imaging and other forms of remote sensing) capabilities.

The Air Force must take advantage of the opportunity to influence its strategic positioning by adopting the most appropriate technologies and by leveraging commercial practices for new acquisitions. It must determine what the vulnerable and the robust nodes of the plan are. Debate should not end with the desired capability achieved or the future concept of operations identified. The Air Force must understand the technology explosion for its own purposes as well as for the *enemy's*.

Air Force research and development must possess a balanced portfolio, with technology enhancements as directed by the plan and with technologies to counter an enemy's antiplan. It must support line extensions, "block upgrades," process and product improvement, and thus evolutionary change. However, the portfolio must be allowed to leverage the discontinuities, nonlinearity, and the emergent characteristics of the technology explosion in order to render the enemy's antiplan ineffective.

Conclusion

It is interesting to observe that as the Air Force strives for stability, it creates a state of chaos unintentionally. Perhaps the worst thing that could happen to the Air Force is to finally produce a 25-year, long-range plan for all to agree upon. If this occurs and the debates cease, creative thinking would stop. So it is the challenge of the Air Force to manage the boundary conditions that push it into the area far from equilibrium in which spontaneous creativity may occur and new strategic

directions may emerge. It is only through these actions that the Air Force will be able to manage its unknowable future.

The future of the Air Force and our nation is too important to be left to long-range plans trying to react within those future environments. To create future value for the nation by continually providing dominant air and space power, the Air Force must have a consistent strategic purpose and a dynamic, creative strategic-planning process. The process should continually seek to understand future risks and opportunities. Strategic planning should be viewed as a means for creative strategy and product development and not the end product. The strategic-planning process should consider plans and antiplans. Military operators should help identify deficiencies and opportunities to create value. The research and development laboratories should scan the technological horizon to help identify new technologies to fulfill these value opportunities. A dynamic, creative strategic-planning process can provide the Air Force its best chance to shape the future and achieve its strategic purpose. □

Notes

1. In 1994, Dr. Sheila E. Widnall, secretary of the Air Force, and Gen Ronald R. Fogleman, Air Force chief of staff, directed the Air Force Scientific Advisory Board to identify those technologies that will guarantee the air and space superiority of the United States in the twenty-first century. The study was named *New World Vistas: Air and Space Power for the 21st Century* (Washington, D.C.: USAF Scientific Advisory Board, 1995).

2. The choice of the word *Revolutionary* is significant. It reflects an awareness within the Air Force that planning had ossified in a mechanical "strategy-to-task" process aimed primarily at remediating deficiencies that existed in the Air Force's ability to fulfill its existing tasks. New tasks, new concepts of operations, were inadvertently devalued in the quest to ensure that existing tasks could be accomplished. Thus, as early as 1994 the Air Force sought a system to plan for revolutionary capabilities.

3. In 1997, the United States Air Force established six battlelabs to identify innovative ideas and to measure how well those ideas contribute to the mission of the Air Force. The six battlelabs will be small, focused, and will rely on field innovation to identify potential ways to advance the Air Force's core competencies. On-line at <http://www.hq.af.mil/xo/afbattlelab/>.

4. T. Irene Sanders, *Strategic Thinking and the New Science: Planning in the Midst of Chaos, Complexity and Change* (New York: Free Press, 1998).

5. James A. Dewar et al., *Assumption-Based Planning: A Planning Tool for Very Uncertain Times* (Santa Monica, Calif.: RAND, 1993).

6. Helmuth von Moltke, *Militärische Werke*, vol. 2, pt. 2, in *Moltke on the Art of War: Selected Writings*, ed. Daniel J. Hughes (Novato, Calif.: Presidio Press, 1993), 45-47.

7. Andrew Campbell and Marcus Alexander, "What's Wrong with Strategy?" *Harvard Business Review*, November-December 1997, 42.

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9. Ralph D. Stacey, *Managing the Unknowable: Strategic Boundaries between Order and Chaos in Organizations* (San Francisco: Jossey-Bass Publishers, 1992).

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11. Lt Col Robert D. Dillman, "The DOD Operational Requirements and Systems Concepts Generation Processes: A Need for More Improvement" (thesis, School of Advanced Airpower Studies, Maxwell AFB, Ala., November 1993), 3.

12. Clark A. Murdock, "Mission-Pull and Long-Range Planning," *Joint Forces Quarterly*, Autumn/Winter 1994-95, 29.

13. Dillman, 3.

14. *Ibid.*, 15-16.

15. *Ibid.*, 5.

16. Glenn A. Kent, *A Framework for Defense Planning* (Santa Monica, Calif.: RAND, 1989), 1.
17. Campbell and Alexander, 48.
18. Michael E. Porter, "What Is Strategy?" *Harvard Business Review*, November-December 1996, 68.
19. Ibid.
20. Stacey.

21. Merely the title *Defense Reform Initiative* suggests that there is room for improvement.

22. Rosabeth Moss Kanter, John Kao, and Fred Wiersema, eds., *Innovation: Breakthrough Thinking at 3M, DuPont, GE, Pfizer, and Rubbermaid* (New York: HarperBusiness, c.1997).

23. Stacey.

24. Ibid.

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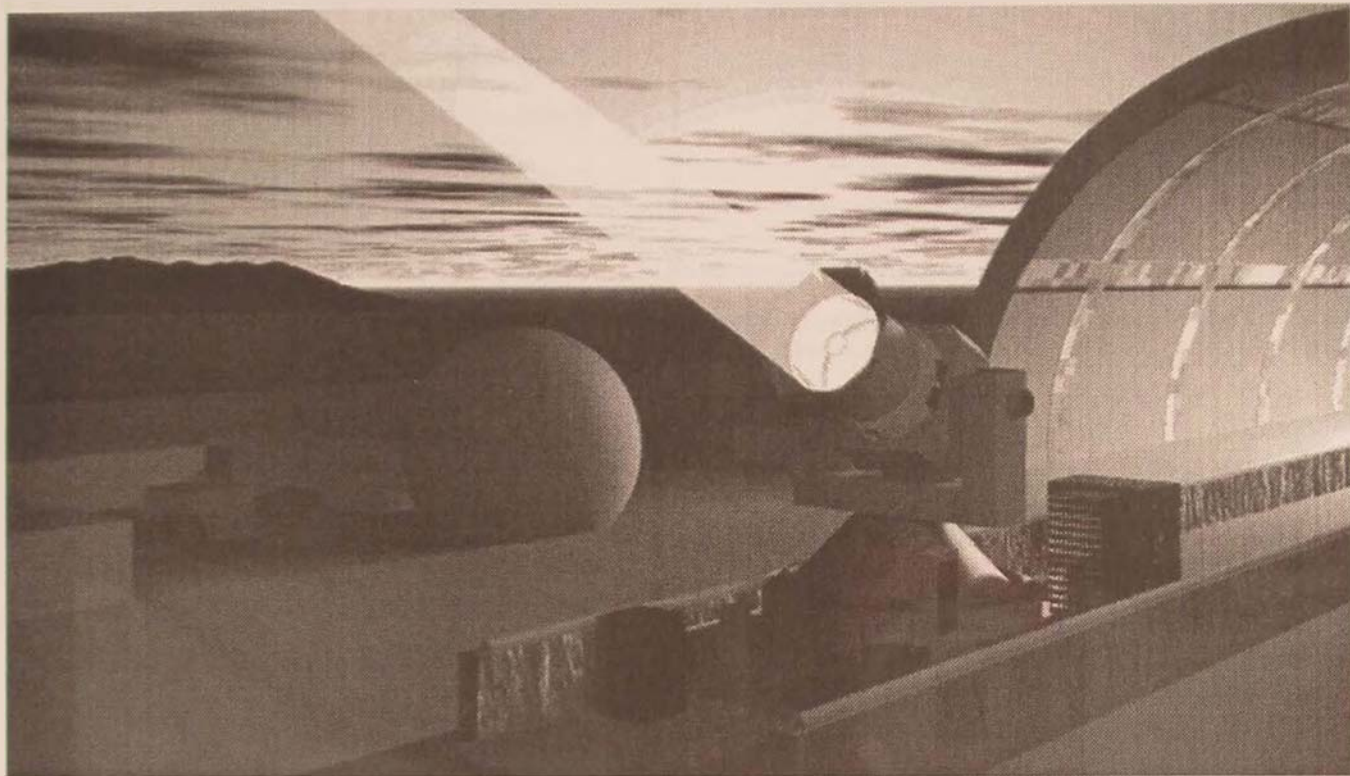
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Space Sanctuary

A Viable National Strategy

LT COL BRUCE M. DEBLOIS, USAF*



SPACE “militarization/weaponization” is not an “all-or-nothing” affair. For clarification, one can view military activities in space on a threat continuum (see table 1). As used here, *space weaponization* refers to anything greater than the current capability, which is roughly at the moderate threat level.¹

Much of the literature flowing from the Department of Defense (DOD) on space and its role for future military operations makes a fundamental assumption: “Space will be weaponized; we only need to decide if the US

will take the lead.”² One cannot so readily make such an assumption. The immediate military advantages of being the first nation to weaponize space are undeniable³ but must be weighed against long-term military costs, as well as against broader social, political, and economic costs. The decision to weaponize space does not lie within the military (seeking short-term military advantage in support of national security) but at the higher level of national policy (seeking long-term national security, economic well-being, and worldwide legitimacy of US constitutional values).

*I was privileged to be Maj David Ziegler’s research advisor during the preparation of his master’s thesis at the School of Advanced Airpower Studies, Maxwell AFB, Alabama. I am deeply indebted to him because much of his effort supports this work.

Table 1
Threat Continuum

THREAT LEVEL		MILITARY ACTIVITY
High	10	Space-to-Earth Weapons Capable
	7	Space-to-Space Weapons Capable
Moderate	5	Earth-to-Space Weapons Capable
Low	3	Space-to-Earth ISR/MCG/Comm ^a
	2	Space-to-Space ISR/MCG/Comm
	1	Earth-to-Space ISR/MCG/Comm
None	0	No Militarization

^aISR/MCG/Comm = intelligence, surveillance, and reconnaissance/mapping, charting, and geodesy/communications (military). Other less-threatening functions include missile warning, navigation, and environmental matters.

At that level, many reasons suggest why the weaponization of space may not be the obvious "best" strategy.

The purpose of this article is to articulate those reasons. Space-sanctuary advocates will appreciate what follows as a comprehensive summary of their position; likewise, space-weaponization advocates will have to address these issues if their belief (that American preemptive weaponization of space best serves this nation) is to remain on firm ground. The following summary of the case against space weaponization proceeds from the *historical* trend of US nuclear and space policy to consider domestic and international *political* concerns. It then addresses the space-weaponization issue by briefly examining *adversarial* potential (the threat), *technological* limitations, *financial* trade-offs, *practical* considerations of military strategy, and the *emotional* appeal of global security and well-being. This article is not meant to be an in-depth study of each facet of the debate; rather, it is a terse summary of the space-sanctuary argument aimed at opening the debate.

Historical Trend

Although the militarization of space may seem to be a new issue driven by emerging technological capacity, a historical trend dates from the close of World War II.

The Nuclear Weapons-Space Weapons Analogy

Demonstrations of atomic weapons at the close of World War II and the prospect of nuclear weapons married to emerging ballistic missile technology ushered in a new era of international relations. Threatening to use military force had always been an instrument of diplomacy, but the potential for instantaneous, indefensible, and complete annihilation posed a new rubric in the games nations play. Thus, nuclear deterrence was born.

Initial thoughts that such a threat relegated warfare to the shelves of history due to the prospects of massive nuclear retaliation proved naïve—subsequent lower-order conflict did not force nuclear escalation. Symmetric nuclear capabilities among the principal powers weakened the credibility of their use,

while asymmetric responses (guerrilla and terrorist tactics, aligning with nuclear-capable parties, conflict protraction, etc.) still allowed lesser powers to test the resolve of the principals—particularly over issues of peripheral interest to those nuclear powers. Examples include Vietnam and Afghanistan. Visions of *massive space superiority* and the touted huge, coercive power advantage they provide will likely prove as bankrupt a notion as that of *massive nuclear retaliation*. In their logical evolution, both give way to strategies that recognize an international context of reactive nations. Principal powers will simply not allow a space hegemon to emerge, and lesser powers may concede hegemony but will continue to seek asymmetric counters.⁴ The result will be a space strategy that better aligns with what evolved out of the nuclear dilemma: mutual assured destruction (MAD).

As a common MAD logic developed across the globe (but primarily between the two players in the game—the United States and Soviet Union), nontraditional foreign-policy traits became apparent. Any move toward developing weapons or practices that increased the viability of the idea that one could “win” a nuclear exchange was perceived as destabilizing. Deterrence in the form of MAD had to overcome the notion of “winning”—one that could come in several forms:

1. *A nation could survive nuclear attacks and prevail.* Conceding offensive dominance was critical if MAD were to deter nuclear holocaust. One had to avoid an odd array of destabilizing practices and systems, including missile-defense systems and civil-defense programs.
2. *A nation could use nuclear weapons on a small scale and prevail in a predominantly conventional conflict.* The term *theater nuclear weapons* was an oxymoron—every nuclear weapon was strategic because it posed the threat of escalation. Limited use of nuclear weapons was destabilizing; hence, one had to avoid any such strategy. Prohibiting the development of the neutron bomb, in spite of the immediate tactical benefits

it offered to outnumbered NATO forces in Europe, was a direct result of this logic.

3. *A nation could launch a successful first strike.* Stabilizing approaches that reduced the viability of surprise via first strike were pursued. More than its name implies, if MAD were to prohibit a nuclear exchange, it had to be paired either with a reliable early warning capability allowing a reactive nuclear response or with a survivable second-strike capability. The United States pursued both: the former via space- and land-based early warning networks and the latter via submarine-launched ballistic missiles.

From this experience, one can draw and apply lessons as the possibility of space weapons emerges. Clearly, these weapons offer the potential for instantaneous and indefensible attack. Although the Outer Space Treaty of 1967 (outlawing weapons of mass destruction [WMD] in space) prohibits complete annihilation, the threat of annihilation would still exist—it is difficult to distinguish space-based WMD from space-based non-WMD. In simple terms, space weaponization could bring a new round of MAD.

Although MAD successfully deterred a nuclear exchange over the past 40 years, it was a very costly means of overcoming the lack of trust between superpowers. The dissolution of that distrust and the corresponding reduction of nuclear arms lie at the very heart of the Strategic Arms Reduction Treaties (START). Comparing the emergence of nuclear-tipped ICBMs with the accession of space weapons does yield some stark differences, however. There is no single threat to focus diplomatic efforts aimed at building trust, and there does seem to be some international support for the idea of coalescing a strategy supporting space sanctuary and deterring third world space upstarts. Aside from these differences, though, one could assume the existence of proliferated space weapons and proceed with the thought experiment that a space-MAD strategy would emerge among the principal pow-

ers. Again, one would have to eliminate the notion of "winning" a space-weapons exchange, and on at least the first two counts, one could do so:

1. It is logical to concede the offensive dominance of space-based weapons in low-earth orbit (LEO). Any point on earth could have a weapon pointed at it with clear line of sight; the potential of directed-energy weapons takes the notion of instantaneous to the extreme; and defense of every national asset from such an attack would prove next to impossible.
2. The same argument against the logic of "tactical" nuclear weapons would also apply to the "tactical" use of space-based weapons. Once they were used, any conflict could automatically escalate to a higher level.
3. The failing of a space-MAD strategy comes on the third count: early warning or survivable second-strike capability. Should space be weaponized and two space-capable foes emerge, there will be no 30-minute early warning window from which one actor could launch a counterattack prior to the impact of the preemptive first strike. Furthermore, space basing is equivalent to exposure—no strike capability can be reliably hidden or protected in space in order to allow a surviving, credible second strike.

Space-MAD weapons without early warning or reliable survivability logically instigate a first strike. This creates an incredibly unstable situation in which the viability of "winning" a space war exists and is predicated upon striking first (with plausible deniability exacerbating the problem), eliminating the "mutual" from MAD and only assuring the destruction of the less aggressive state. Obviously, this is *not* a good situation. Putting weapons in space could well be a self-fulfilling prophecy: we put them there because we anticipate we'll need them, and because they're there, we'll be compelled to use them; hence, we needed them.

The conclusion, then, of a nuclear weapons-space weapons analogy can only be that while the threats from each type of weapon are similar, the most successful strategy (MAD) for dealing with the former cannot work for the latter. Unlike the strategy for nuclear weapons, there exists no obvious strategy for employing space weapons that will enhance global stability. If the precedent of evading destabilizing situations is to continue—and that is compatible with a long history of US foreign policy—one ought to avoid space-based weapons. Further, even if one could construct a workable space-MAD strategy, the nuclear-MAD approach teaches that this is an intensely expensive means of dealing with mutual distrust between nations.

American Foreign Policy Tradition of Space Sanctuary

Forty years of cold war history show a successful pattern of US policy aimed at supporting space as a sanctuary. The reason is that we have more to lose if space is weaponized. Since the Eisenhower era, the open-skies philosophy has sought to bolster space ISR/MCG/Comm legitimacy—not space dominance. Theoretically, weaponization is overtly threatening and destabilizing, while a robust ISR environment—everyone spying on everyone—reduces paranoia and is ultimately stabilizing. This motivated the many signatories of the Outer Space Treaty of 1967 to agree that no proprietary claims could be made of space, thereby legitimizing global space reconnaissance.⁵

During the cold war, military spending strategies were clearly escalatory—when in doubt, buy more weapons. In spite of this general philosophy, though, some US restraint in weaponization occurred. The Carter administration thought better of deploying the neutron bomb, seeing it as an intermediate step between conventional and nuclear war and making the latter more likely. The logic of *not* pursuing a destabilizing weapon offers a tactical advantage. Had the Soviets fielded a tactical nuclear weapon, US response might have been different. The concept of

space weapons took US restraint to another level. Although the United States pursued operational antisatellites (ASAT) on two occasions, they were reactions to Soviet moves toward operationalizing orbiting nuclear weapons and *not* a reflection of the prevailing trend away from ASAT deployment.

The first occasion came by order of the Kennedy administration (specifically, Secretary of Defense Robert S. McNamara) in May 1962. US Army Program 505 modified Nike Zeus antiballistic missiles (ABM) to accommodate nuclear warheads capable of destroying satellites in LEO. The second occasion, Program 437, followed soon thereafter. It too called for a ground-launched nuclear ASAT capability. Although both programs went operational in the spring of 1964, Program 505 was canceled within two years due to the longer range offered by Program 437. While these makeshift programs were in their infancy, information and sentiments were already emerging to halt them. Starfish Prime tests/studies of nuclear weapons in space made it clear that nuclear detonations in space were indiscriminate, capable of destroying adversarial and friendly capability alike.⁶ Additionally, the use of Program 437 capability would violate the Partial Test Ban Treaty signed by the president in 1963.⁷ The commitment to space-sanctuary strategy became clear as interest in and funding for Program 437 waned. The program was finally canceled in 1975.⁸

Other ASAT programs have appeared since, such as the F-15-launched Miniature Homing Vehicle, but congressional test restrictions as well as budgetary limitations have killed these programs well before they became operational.⁹ This occurred in spite of the fact that the Soviets began testing a co-orbital ASAT in 1967 and maintained it as an operational ASAT through the end of the cold war. Even when provoked, the United States has shaped its strategy to maintain space as a sanctuary in order to protect the legitimacy of space ISR as well as the quality advantage of US space ISR/MCG/Comm capability.

The United States has proceeded with this logic over four decades, producing, by far, the



Dwight D. Eisenhower. As president, he promulgated the "open skies" philosophy.

most capable of all ISR/MCG/Comm space infrastructures. The quality advantage of US ISR/MCG/Comm space capability still exists, and given waning Russian investment in its space program, one can make a strong case that the advantage is greater than it ever was during the cold war. The roots of this strategy are logically founded in the inherent, destabilizing nature of weaponization as opposed to the inherent, stabilizing effects of ISR. Simply put, in a relationship of mutual distrust, constant and assured surveillance is far more likely to avoid conflict than is the presence of offensive weapons. US pursuit of space sanctuary is more relevant today than it was in the past. In addition to destroying the legitimacy and security of our own ISR/MCG/Comm advantage, a policy move toward weaponization would be perceived domestically and internationally as a discontinuity of American national strategy—a destabilizing situation in itself.

Political Concerns

Aside from this historical pattern, there are numerous values, policies, and legal issues that directly support a space-sanctuary posture.

Incompatibility with US Constitutional Values

The United States exports its national values of individual freedoms and democracy and maintains a pattern of not bullying other nations into accepting these ideals. The expectation is that the inherent worth of the ideals is self-evident. Maintaining the moral high-ground in order to support this pattern is essential, even if it requires the United States to take some risks. Historically, it has taken such risks. Not responding in kind to the operational Russian ASAT is one case. More recently, the United States signed the Chemical Weapons Convention (ratified in the US Senate in April 1997) even though Russia, Libya, and Iraq refused to sign.¹⁰ Why give potential adversaries such a military advantage? The answer is reputation. The idea of putting weapons in space to dominate the globe is simply not compatible with who we are and what we represent as Americans.¹¹

No Political Will

Almost every military theorist from Carl von Clausewitz to B. H. Liddell Hart recognizes that the legitimacy of a military institution is predicated upon its connection with its supporting political instrument. The US Constitution is not subtle in its support of this concept. The fact that there is absolutely no political will to weaponize space calls into question the relevance of any plans to do so. The current administration¹² has been clear on its position regarding space, as evidenced in the opening statement of President Clinton's national space policy: "The United States is committed to the exploration and use of outer space by all nations for peaceful purposes and for the benefit of all humanity."¹³

The second statement in that same policy allows for defense and intelligence-related activities in pursuit of national security, but the intent is clearly at odds with current military thrusts for defensive and *offensive* space systems. Actions of the current administration have been stronger than its predecessors toward maintaining space sanctuary. Even space-weapons research and development efforts short of operational employment, traditionally used to hedge against emerging threats, have been derailed and replaced by terrestrial-based systems.¹⁴ This lack of American political will to weaponize space is both a result of and adds credence to the remainder of this space-sanctuary argument.

Treaty Limitations

There are few treaty limitations on the weaponization of space. Any survey of the Outer Space Treaty and other international space agreements yields but one conclusion: except for WMD and ABMs, no international prohibition on space weapons exists. What is not explicitly forbidden by international law is implicitly allowed; hence, the United States can, if it chooses, put conventional weapons in space. But a second-order look at the ramifications of treaty obligations and the way foreign nations interpret those obligations yields a different conclusion. For instance, both START treaties (US and Russian agreements to destroy thousands of nuclear weapons) are linked to compliance with the ABM Treaty of 1972,¹⁵ and most space weapons have ABM capability. The Russians will perceive the pursuit of space weapons as the pursuit of ABMs. This would jeopardize the START treaties—a direction the United States obviously does not want to follow.

International Opinion

Furthermore, any move by the United States to weaponize space not only incites potential adversaries to follow suit but also is perceived as provocative by allies as well as adversaries. History is full of examples of the emergence of one military power insti-

gating coalitions against it.¹⁶ Make no mistake, the world is acutely attuned to US moves toward space:

The world space community is confused as to the need for the US to develop space weaponry now, and is dismayed that the US is planning to test a high-powered laser against a satellite target [F. Ongaro, Headquarters European Space Agency].

The policing of space is an international concern. . . . The international community will be very concerned if the US goes alone to solve problems that affect all space powers [Dr. H. Richarz and Dr. K. Schrogl, Headquarters *Deutsche Agentur für Raumfahrt Angelegenheiten* (DARA—the German space agency)].

It is obvious to educated Russians that Americans are subject to self-persuasion. Americans say they intervene to uphold democracy and peace, but Russians see some other objective, oil, uranium or bananas. Therefore what America should not do in space at the present time is any sort of anti-satellite activity. The Duma (Russian Parliament) banned the use of anti-satellite weapons after a heated debate. The Russian military and their political allies wanted to keep an ASAT program. The proposed test of the US MIRACL laser against a US satellite is at the center of a Russian controversy. . . . ASAT development should not be a unilateral US action; it should be an international effort when required. Almost all of the Earth's states have some space requirements, and will see any move by the US towards space superiority as threatening [Dr. M. Tarasenko, Russian Center for Arms Control, Energy, and Environmental Studies].¹⁷

Adversarial Potential

What disturbs most foreign powers regarding US space development is the clear absence of motive: there is virtually no threat to US space-ISR dominance.

No Current Major Threat

Some foreign ISR threat has existed for many years. As mentioned above, the calculus was accomplished, and the historical pattern of US policy decisions has supported the conclusions that the gains from our own space-

ISR/MCG/Comm capability outweigh what we stand to lose from others' space-ISR/MCG/Comm capability. The best way to secure that advantage has been to pursue space sanctuary. Arguments that support weaponization often cite the emergence of foreign space-ISR capabilities; yet, the proliferation of worldwide space-ISR capability is stabilizing. Only aggressive nations—with something to hide—would take exception to being monitored. Additionally, concealment, communications and operations security, and deception are all means by which the United States can counter foreign space-ISR, if and when we so choose. In the event of conflict, active measures also include ISR and communications jamming and/or attacks against ground stations (the true vulnerability of any space architecture).

While foreign ISR capability is proliferating, one must perceive it as what it is, for the most part—a stabilizing global pattern of watchfulness. Besides, it is not simply a matter of what data one can access from space but, more importantly, what one can do with the data that is accessed. The United States is by no means surrendering its lead on data processing and exploitation. The fact that a third world actor has access to space reconnaissance data should not be alarming, since it must be weighed against the huge, coordinated intelligence infrastructure (tasking, collection, processing, exploitation, dissemination, and archives) possessed and being further developed by the United States. In short, one can use less provocative means than preemptive weaponization to deal with minor gains made on US access to space data. These minor gains on data access may simply be the price of peace.

Further claims of adversarial space weapons are simply unfounded. Military futures studies often cite predictions of foreign space-based particle beams and other such technologies,¹⁸ but in reality they merely provide paranoid justification for US space programs. Reality speaks of a different future:

1. Russia is currently operating under its own unilateral ban on ASAT testing. In

November of 1991, the Russians announced that their co-orbital ASAT was still operational. But 12 of 29 tests between 1968 and 1982 resulted in failure; the ASAT is limited to inclinations between 62 degrees and 66 degrees; and its maximum range is one thousand miles.¹⁹ Additionally, any current, open-source account of the Russian economy will find it in financial crisis (to the detriment of space funding). Earlier this year, Yuri Koptev, director of the Russian Space Agency, commented that of 20 nations active in space research and satellite launches, Russian spending ranked 19th.²⁰

2. Europe's combined space efforts are growing, but Europeans refuse even to consider collaborative efforts at theater ballistic missile defense because of the potential ASAT spinoff capabilities it might afford. Collectively, Europe is one of the strongest supporters of space sanctuary.²¹
3. Japan constitutionally prohibits offensive weapons. The Japanese also declined to participate in a cooperative agreement with the United States aimed at building theater missile defense.²²
4. China is interested in space but has done nothing except persistently pursue collaboration with Europe and the United States.²³

The overwhelming evidence suggests that, unprovoked, the rest of the world is simply *not* interested in space weaponization at this time.

Dealing with Minor Current and Future Threats

US passive defense plans continue to address limited ISR threats posed by potential adversaries. Space protection is a recognized priority within the US space community, which continues to examine vulnerabilities and protection of national space systems. One can divide the methods of passive defense into

two distinct categories—fundamentally a game of hide-and-peek:

1. Effective "*hide*": methods and mechanisms of countering foreign ISR collection efforts against the United States.
2. Secure "*seek*": methods and mechanisms countering attacks against US ISR collection efforts.

These will be discussed shortly. The point to be made here is that the space-weaponization advocate's conception of either defending space assets with space weapons or not defending them at all is a *false dilemma*. There are at least three viable approaches for defending US space assets: (1) diplomatic/political defenses (agreements aimed at building collective security), (2) passive defenses (hide-and-peek), and (3) active defenses (weapons). This article suggests that the more prudent option is a combination of the first two and active, aggressive avoidance of the third.

No "Pop-Up" Future Threat

To hedge against strategic surprise (a pop-up space-weapons-capable adversary), enhanced efforts at space-sanctuary treaty building offer several benefits. Beyond assurances that signatories are willing to abide, preestablished coalitions against any nation fielding space weapons would be a strong deterrent, greatly reducing the likelihood of an emerging threat. Furthermore, intelligence coordination across the coalition would provide a strong resource for monitoring the development of space weapons worldwide. If one can foster the appropriate international climate, it would be highly unlikely that space-weapons-capable rogue actors would pop up overnight.

Technological Limitations: An Overstated, Promised Capability

Much of the space-weaponization argument hinges upon an assumed capability, given proper investment. Such "technological

optimism" warrants a second look. As noted by a distinguished scientist, "Scientists and engineers now know how to build a station in space that would circle the Earth 1,075 miles up. . . . Within the next 10 or 15 years, the Earth will have a new companion in the skies, a man-made satellite that could be either the greatest force for peace ever devised, or one of the most terrible weapons of war—depending on who makes and controls it."²⁴

Surprisingly, the distinguished scientist is the father of the space rocket, Wernher von Braun, and the year he made this unrealized statement was 1952. More recently, space-shuttle design plans of the 1970s called for 160-hour turnaround times and a minimal-maintenance concept requiring three or four technicians.²⁵ Obviously, we have not attained anything close to this vision either. Such optimistic projections on the future uses of space have been around since the beginning of the US space program, and that tradition continues today. We should remain cautious on several counts:

1. The energy differential between air flight and spaceflight is orders of magnitude,²⁶ and requires not simply an evolutionary advance of current aerodynamics technology but revolutionary leaps in astrodynamics and rocket technology.
2. In the concept-design phase of many space systems, some aspects of the hostile space environment have underestimated effects. Micrometeorites, space debris, extreme temperatures, and excessive radiation all require shielding, insulation, and energy-dissipation mechanisms.
3. One of the biggest technical problems facing any spacecraft is generating and/or maintaining sufficient onboard energy.
4. Remote guidance and control of spacecraft have posed confounding problems since the advent of the rocket in the early 1940s.²⁷

5. The growing global interconnectedness will blur the distinction between who owns what and for what purpose the asset exists. Assumptions regarding the isolation of adversarial space assets, along with assumptions regarding the capability to discriminately target those assets without collateral effects, have not been thoroughly examined.
6. Finally, technical capabilities as seen from the military perspective are typically measured against an adversary's ability to counter them. But these capability measurements must not be confined to symmetric responses. Building a huge space-capability differential between itself and other states will not insure the United States a resultant huge coercion capability. Asymmetric response by opposing states is a natural tendency.

All told, the story of proliferated space access and exploitation in the near future is grossly exaggerated. Since the beginning of the space age, we have readily assumed away the very many technical and political difficulties associated with access to and movement in space. It is a natural thing to do—the skies were readily conquered; why not space? Visions of Buck Rogers "flying" through space reinforce the natural, albeit false, analogy between the conquest of air and space—hence the misnomer *spaceflight*. This optimism is part of our American heritage. Although it is a positive motivator of our inevitable move into space, it must not cloud rational decisions.

Financial Trade-Offs

Before any nation pursues a particular strategy, it must assess both the benefits and costs of doing so. Some of the costs of space weaponization have already been addressed in terms of American reputation and military trade-offs. Another aspect of cost comes in recognizing where the chosen path might lead.

Another Costly Arms Race

Once a nation embarks down the road to gain a huge asymmetric advantage, the natural tendency of others is to close that gap. An arms race tends to develop an inertia of its own and is difficult to turn off. Will this generation's legacy be to provide a constant threat of space weapons, just as the constant threat of nuclear weapons has diminished?

National Opportunity Costs

Still another part of the cost analysis must weigh opportunity costs: what else could have been purchased? The following are but a few of the broader trade-offs to consider:

1. Cancer research is currently funded at \$2.6 billion per year, an amount equivalent to roughly 1 percent of the DOD budget, yet 555,000 Americans are dying each year from cancer.²⁸ That is 10 times the number of American lives lost over the entire course of the Vietnam conflict. One must trade off further medical efforts at attacking this problem with the purchase of future weapons that might work against an adversary that is as yet unknown. It prompts the question, Which war are we losing? Cancer research is only one of many such domestic programs that must compete for limited resources.
2. By the close of fiscal year 1997, the national debt was estimated to pass \$5.5 trillion.²⁹ Can the United States afford to borrow more on its future to fund space weapons?
3. Particularly, is the investment of billions of dollars premature? Aside from the costs of building a space-capable weapon, lifting it to space today costs roughly \$10,000/pound. What if the United States pays \$10,000/pound to lift a space-weapons architecture only to find in the aftermath of a technical breakthrough that the rest of the world closes the gap at a cost of \$100/pound?

4. Even in the absence of a technological breakthrough, Americans have a pattern of fronting the costs of research and development only to find other nations taking our technology and using it to our disadvantage (for example, US development of microelectronics in the 1960s and subsequent Japanese exploitation of that development).³⁰ Parasitic behavior of corporations and nations in regard to technological advance is well documented,³¹ offering upstarts the "advantage of backwardness." Following this pattern, US investments in the research and development of space weapons could lead to the demise of US international prowess.

Space architects must recognize that although space-weaponization strategies seem appealing from a military perspective, the weighing in of opportunity costs favors the much cheaper and historically effective sanctuary strategy.

Simple Economics

More than being a lot cheaper than a space-weapons strategy, space-sanctuary strategy in practice has many advantages as it relates to global commerce. Space weapons are economically provocative because they can appear to threaten that commerce. During a conflict, distinguishing space friend from space foe would prove difficult since most nations do not overtly "flag" their satellites. Additionally, a number of satellites have many roles and are possessions of many nations. Discriminating impartial, commercial space assets from adversarial space assets will be problematic. Furthermore, even in the event that one can isolate adversarial space assets, the collateral effects of space debris³² will be extremely difficult to control. One cannot posit the benefits of having space-weapons capability without logically thinking through all the ramifications of using them.

Given the multinational commercialization of space that is being pursued far more intensely than a weapons program could be,

it is very doubtful that the political arm would ever authorize the use of space weapons even if the United States possessed them. Why, then, should we pursue a huge investment toward a suboptimal space-weapons strategy—while the better space-sanctuary strategy is overlooked? Probably because such a strategy comes across as a weak, “do-nothing” approach, something disdainful to American military leaders. On the contrary, though, actively pursuing space sanctuary does not need to be a “sit-on-your hands” approach to national strategy.

Practical Considerations

The US military strategist is trained to think beyond historical trends and current policy issues; he or she is trained to think worst-case scenarios and imminent threats to US national security. Military space strategy must also be examined with the scrutiny of this perspective.

A Flawed, Long-Term Military Strategy of Space Weaponization

Sound *military* reasons exist for *not* weaponizing space. For example,

1. *space-weaponization strategies lack the element of survivability.* Space systems will not survive if they are targeted. Military systems in space, like all others, follow well-established, fixed orbits (orbital transfers are energy- and cost-prohibitive). This leaves space systems exposed and vulnerable. As predominantly unmanned systems, they also require data link to a controller, leaving them vulnerable to interference in the electromagnetic (EM) spectrum. For instance, a nuclear explosion in space—with force and radiation not attenuated by the atmosphere—could negate the use of vast numbers of orbits. Or direct-ascent ASATs, constructed from modified cold war ICBMs, could disperse something as simple as sand in LEO, leaving anything passing through

it (17,000 MPH @ 200 km) severely damaged or destroyed. Many futuristic war games are conducted throughout DOD each year, and the play of space systems has increased. One conclusion persists: the fight for space is first and fast, and many space systems do not survive. As space access matures, the survivability issue will become obvious. Nations will not rely on space systems for crisis situations—they will rely on terrestrial systems (perhaps redundant with more efficient but more vulnerable space counterparts). Hence, the value of space weapons to deny those space systems will be moot.

2. *space-weaponization strategies maintain a bogus “center of gravity.”* A military theorist would recognize US space ISR/MCG/Comm assets as a vulnerable center of gravity (COG) since they are both critical to successful military operations and extremely vulnerable to adversarial attack, as noted above. But using space weapons to protect this vulnerability is a leap beyond prudence. Terrestrial-based and space-based ISR/MCG/Comm assets are assuredly a vulnerable COG, but their vulnerability is not a result of being in or related to space; rather, it is a result of a centralized architecture. Sound military judgment has often led military strategists to eliminate a COG’s vulnerability rather than require them to protect it—in this instance, perhaps a distributed architecture. A more detailed discussion of alternative means of dealing with the security-of-assets issue follows shortly. Here, one need only note that it is accurate to assume that space ISR/MCG/Comm is a COG, but the claim that “space” is the COG is awry. “Centralization” of this ISR capability is the COG, and weapons to protect it are not necessary. One can successfully protect current space ISR/MCG/Comm systems by both decentralizing and

enhancing the sanctuary approach of the past 40-odd years.

3. *space-weaponization strategies are provocative.* Space weapons are inherently offensive, and dominant offensive weapons encourage preemption against them.³³ Hence, space weapons are militarily provocative and destabilizing.
4. *space-weaponization strategies are escalatory.* Space weapons, by their nature, are escalatory. Because they are remote, they offer plausible deniability; because they are typically unmanned, they are easier to use. As such, the use of space weapons blurs the distinction between peace and war. They are another ambiguous step on the slippery slope to escalation.
5. *space-weaponization strategies are militarily self-defeating.* A space arms race threatens to negate the overwhelming military advantages we now hold in space, as well as in the air, on land, or at sea. By proving the efficacy of space weapons, the United States may provide the international community with an asymmetric approach capable of offsetting current US global dominance.
6. *space-weaponization strategies are politically self-defeating.* Pursuing the military advantages of space weapons will inevitably incite military coalitions against the United States.
7. *space-weaponization strategies are not a panacea.* As mentioned, the anticipated advantages of massive space superiority will be neutralized by symmetric reactions of major powers and offset by asymmetric responses of lesser powers.
8. *space-weaponization strategies are expensive.* There are significant long-term opportunity costs within the military, particularly in these times of diminishing DOD budgets. One can meet the same requirements with cheaper alternatives, such as combat unmanned aerial vehicles (UAV).³⁴ Weaponizing space will necessarily come at the expense of

satisfying documented military deficiencies (strategic-lift deficiencies and the C-17, air-superiority deficiencies and the F-22 or joint strike fighter, forward-basing deficiencies and carriers, ISR deficiencies and the next generation of ISR satellites,³⁵ etc.).

9. *space-weaponization strategies are a single-point solution.* What can be done with space weapons can also be done from the air, without the political baggage of weaponizing space.
10. *space-weaponization strategies are not the only solution.* Finally, the military notion of sanctuary—a place where one can posture forces and a place which, if attacked, necessarily changes the nature of the conflict—has a long history of successful use. Twentieth-century examples include Portugal as sanctuary for the Nationals during the Spanish Civil War (1936–39), China as sanctuary for the North Korean air force (1951–53), China and Cambodia as sanctuary for the North Vietnamese (1965–72), Lebanon as sanctuary for the Palestine Liberation Organization (1978–82), Pakistan as sanctuary for the Afghan rebels (1979–89), and space as sanctuary for US and Russian ISR assets (1965–97).

Military strategists need to pause and carefully consider the military attributes of the standing national space-sanctuary policy before dismissing it as a “head-in-the-sand” approach to future US military prowess. Not doing so raises the question, Whose head is in the sand?

A Viable Space-Sanctuary Strategy

The United States has a written national space policy. Unfortunately, it is weak and ambiguous. It sounds much like the traditional American position of pursuing space as a sanctuary but reserves the possibility of weaponization. What is America doing as a nation with regards to space? Fumbling around in an ad hoc manner is a fair characterization with

which few people would argue. No one is “in charge”; and there is no clear vision of what the future should be, no unity of effort, and no clear path or strategy to get to that future.³⁶ The following recommendations remedy this situation and stem from the validity of the sanctuary argument presented here.

Who Is in Charge? Before structuring a national space strategy, we must address the issue of command (authority and responsibility to set strategy) and control (authority and responsibility to execute strategy). The broad impact of space access and the issues it raises clearly warrant top-level oversight. Because the executive powers of the president were established for just such circumstances, the president should be “in charge.” Vested in that “charge” is both responsibility of providing vision and authority to set strategy to pursue that vision.

What Is the Vision? The president must produce and communicate a clear vision of where the future of the United States in space will be. John F. Kennedy’s vision of an American man on the moon by the close of the 1960s best illustrates a president’s ability to focus a nation toward national goals in space. The twenty-first-century vision should include the United States as world leader in a peaceful space environment characterized by both extensive, multinational, exploratory ventures and intense commercial endeavors.

What Is the Best Strategy for Pursuing That Vision? To pursue that vision, the president retains the power to set strategy. Based upon the argument presented above, the best strategy for getting to that vision is one of space sanctuary. As stated, this is not a do-nothing strategy. We need to undertake intense diplomatic efforts to convince a world of nations that space as a sanctuary for peaceful and cooperative coexistence and stability best serves all. Treaties must address exactly what constitutes a space weapon, commitments to not employ them, mechanisms of verification/policing, and assurances of punitive response for violations. A treaty with the clause “the positioning of any weapon in space or attacking any space platform will be considered an act of war against all signatories

of this treaty” would provide formal and instant coalition (or collective security) against any actor seeking the weaponization of space and would be a natural extension of the Outer Space Treaty of 1967. Clearly, the United States has the opportunity and means to lead the diplomatic ventures, as well as the resources to lead in developing the methods and tools of verification³⁷ and punitive response.³⁸

The question of securing US space capabilities remains. One can reconcile this “security of assets” issue by a variety of initiatives other than protective weapons. First, diplomatic efforts (agreements and treaties), as briefly outlined above, provide a measure of collective security. Second, strategic alternatives eliminate the vulnerability of this military COG. Space-based ISR/MCG/Comm assets, as well as all the peripheral components of that system, are clearly a vulnerable COG; but, as discussed previously, that vulnerability is not an inherent result of having spaceborne components. It is a result of choosing a centralized architecture. Methods to eliminate the COG rather than protect it with space-based weapons include

- ISR/MCG/Comm system redundancy: terrestrial and/or space-based, small, multiple components set in a decentralized, distributed architecture (much like switching networks in telecommunication systems, the security afforded here is self-redundancy);³⁹
- ISR/MCG/Comm system reconstitution: a plan that overcomes the loss of some system-critical components by establishing a responsive reconstitution capability (UAV backups and/or responsive space lift);⁴⁰ and
- ISR/MCG/Comm system substitutes: substitute and/or redundant terrestrial systems (e.g., inertial navigation, ground communication networks,⁴¹ UAVs,⁴² etc.).

Third, passive hide-and-see defenses provide a preemptive measure of security. Effective

hide measures (denying foreign ISR collection efforts against the United States) include

- deception (ISR provides a view of actions, but intent can be either hidden or scripted);
- camouflage;
- security measures to deny access (e.g., communications and computer security, software gates and passwords, proper classification and protection methods, etc.); and
- encryption, so even if data of intelligence value is accessed, it is not useful.

Secure *seek* measures (countering attacks against US ISR collection efforts) include

- warning to include ISR and other verification measures—attacks have to be observed while they occur if they are to be countered or avoided;
- vigilance to include ISR and other verification measures—more importantly, the emergence of ASAT capability needs to be recognized well in advance if countermeasures are to be in place if and when an attack occurs;
- restricted orbits—for instance, if an airborne direct-ascent ASAT capability emerges, moving assets from the more vulnerable LEO locales to the less vulnerable geostationary locales might be prudent, or if a ground-based-laser ASAT capability emerges, high-cost space assets may need to be kept in orbits that limit exposure to the ground-based location of the ASAT;
- shielding from a variety of EM pulses as well as shielding from physical debris;
- automatic shutdown of spaceborne ISR collectors once a harmful EM pulse is detected, coupled with retasking the collection mission to less vulnerable collectors as well as archiving the source and location of the harmful emitter;
- automatic frequency modulation to reduce possibility of data-link jamming/intercept;

- security measures aimed at protecting critical information regarding US space systems (frequencies, orbital parameters, capabilities, etc.); and
- defensive information operations to counter computer-virus attacks, software bombs, and so forth with restricted access, extensive and regular software operational test and evaluation (OT&E), passwords, gates, encryption, and so forth.

Fourth, and finally, preparedness (maintaining the technical ability to deploy coalition space weapons should the need arise and beginning with the lesser provocative earth-to-space weapons)⁴³ provides both an additional deterrent as well as a fail-safe measure of security.

To suggest that robust space weaponization is the essential means of providing security of US space ISR/MCG/Comm capability and denying similar foreign capability grossly overlooks the many alternatives that avoid much of the cost and political baggage of space weapons. More than simply choosing the sanctuary strategy, the president and his administration must aggressively pursue it, all the while clearly articulating the reasons behind the strategy and the ways of implementing it.

Where Is the Unity of Effort toward Executing the Strategy? The Departments of State, Defense, Transportation, Energy, and Commerce, as well as a variety of government agencies and offices, all have parochial interests in space. None of them could fairly arbitrate discrepancies and execute a comprehensive sanctuary strategy. As an example, one should consider once again the protection-of-assets issue. All communities agree that national ISR capability is vulnerable and requires a measure of protection—but who picks up the bill? Currently, no one does—little is done toward funding space protection. Organizations chartered to acquire and operate spaceborne intelligence-gathering systems see the protection of national assets under the jurisdiction of the Department of Defense, emphasis on *defense*. Contrarily, DOD claims

that government organizations with a mission to provide space reconnaissance cannot reliably satisfy that mission without providing a means of securing the assets. Both are good arguments without an arbitrator. Clearly, these issues require resolution, or the United States will end up with a very capable space architecture that is lost in the first fray. An organizational construct that can arbitrate such issues to the best interests of the country is necessary; fortunately, the United States has several models and precedent for just such an organization. All space-related organizations—including the National Aeronautics and Space Administration (NASA), United States Space Command (USSPACECOM), and the National Reconnaissance Office (NRO)—should be restructured under one single institution: the Department of Space. This would provide the unity of effort required for such an ambitious national effort.

Emotional Appeal

In total, the issues raised here indicate that long-term military costs and the broader social, political, and economic costs associated with the United States leading the world in the weaponization of space outweigh the prospect of a short-term military advantage. Furthermore, pursuing a national space strategy on the assumption made at the outset—that “space will be weaponized; we only need to decide if the US will take the lead”—can be challenged on a more fundamental level. This assumption is ultimately founded on a belief that the nature of people—their historical tendency to wage war—cannot change. Contrarily, the social nature of people can change. One has only to compare today’s global attitudes toward slavery with those of 150 years ago.

If we continue to assume that major global warfare between nations is inevitable and prepare for it accordingly, we condemn ourselves to that future. Doing so assumes determinism—that the future will happen and that we have to optimize our position in it. That assumption is not necessarily true and runs

counter to the American spirit. The future is what we make it. Perhaps we need to spend a little less time creating weapons to protect ourselves in a future that we are destined to stumble into and a little more time building the future we would want to live in. More than challenging a flawed assumption, this article suggests a replacement—an assumption that is both more optimistic about the nature of people and one that resonates with the American spirit: “The United States will lead the world into space; we only need to decide where and how to go.”

Conclusion

Many US military war games today begin with strikes against US space systems in the 2010 to 2020 time frame. Each war game addresses what to do about those strikes and, of course, concludes with the call for space weaponization. The more significant (but missing) issue is the examination of exactly what happened in the geopolitical environment from the present to 2010/2020 that allowed those strikes to occur, and raises the question, Could they have been prevented? This article offers a close-to-complete, albeit terse, listing of the historical, political, adversarial, technological, financial, practical, and emotional aspects of the sanctuary argument. It provides a framework for addressing such questions. It does not intend to close the argument on any of these counts; rather, it is specifically aimed at opening debate. Whether accepted or not, US long-range space strategy must deal with each of the issues generated by the space-sanctuary argument. Each count deserves much deeper work. Furthermore, if one is to consider a sanctuary strategy credible, one must take pains to think through its execution. This raises interesting questions regarding cooperation (diplomatic requirements), verification (intelligence requirements), and punishment (technological requirements). In the end, one would hope that serious thought on these issues would yield a US space strategy that both *today* continues the 40-year pursuit of a secure space

environment and global stability, and *tomorrow* projects several paths for cooperatively using space to seek US national interests:

long-term national security, economic well-being, and worldwide legitimacy of US constitutional values. □

Notes

1. Space has been "militarized" for many years. Space intelligence, surveillance, and reconnaissance assets have supported the American war fighter since the 1960s, and the role of space from the Cuban missile crisis to the Gulf War is well documented. Space "weaponization," a matter of degree, has not proceeded nearly as far. Both the United States and former Soviet Union have periodically demonstrated antisatellite weapons that are Earth-to-space capable, and the current testing of a ground-based laser (MIRACL) against a satellite indicates that the United States is on the threshold of robust Earth-to-space weapons.

2. See, for instance, comments by Gen R. S. Dickman (DOD's space architect) to the Institute of Electrical and Electronic Engineers' 1997 Aerospace Conference: "The department [DOD] is posturing to think of space as a fourth medium for operations. But it won't be sufficient to just develop space systems that can observe friendly forces or an adversary's forces. It will also become necessary to protect those systems from hostile action—destruction, deception, disruption, and takeover." Cited in W. S. Scott, *Aviation Week & Space Technology*, 10 March 1997, 57. See also C. A. S. McKinley (Air Force Space Command strategy and policy analyst): "By the turn of the century, military, civil and commercial exploitation of space will be an international norm. . . . Space warriors need to move beyond the Cold War's spacecraft destruction-only focus and employ space superiority campaigns composed of active defensive and offensive counterspace operations." "Space Superiority: A Call to Space Warriors," *Space News*, 24–30 June 1996, 15. See also Gen Joseph W. Ashy (then commander in chief, United States Space Command): "The United States will . . . eventually fight from and into space." J. Heronema, "AF Space Chief Calls War in Space Inevitable," *Space News*, 12–18 August 1996, 4.

3. Undeniable, yes; ubiquitous, no.

4. *Space hegemon* in these terms implies a military advantage from space that obviates other forms of military power (in much the same way the United States had a nuclear hegemony for a brief period after World War II).

5. The Outer Space Treaty of 1967 states that international law applies beyond the atmosphere. The treaty reemphasized standing international laws (e.g., one sovereign state cannot threaten the territorial integrity or political independence of another—United Nations Charter, 1947) and initiated new space-related laws (e.g., free access to space and celestial bodies for peaceful intent, prohibitions on national appropriations of space or celestial bodies, and prohibitions on putting any WMDs in space or on celestial bodies).

6. Curtis Peebles, *Battle for Space* (New York: Beaufort Books, 1983), 83–92.

7. Paul B. Stares, *The Militarization of Space: U.S. Policy, 1945–1984* (Ithaca, N.Y.: Cornell University Press, 1985), 81.

8. Peebles, 94.

9. Curtis Peebles, *High Frontier: The U.S. Air Force and the Military Space Program* (Washington, D.C.: Air Force History and Museums Program, 1997), 67.

10. T. Zimmerman, "Chemical Weapons: Senate Skeptics Ratify a Treaty," *U.S. News & World Report*, 5 May 1997, 44.

11. One may make the case that world domination is not the reason for putting US weapons in space, but, true or not, other nations would perceive it as a US attempt at world domination. Weaker nations have a natural tendency to unite and oppose

emerging hegemonies. This would pose a real threat to the United States and the ideals it represents.

12. Although the space-sanctuary argument cannot stand on the disposition of the current administration alone, and although some people outside the administration hold the counterview, the policies of the current administration reflect a historical pattern of US bipartisan foreign policy—an effective policy of space sanctuary.

13. National Space Policy, National Security Directive 30, Office of the White House Press Secretary, 19 September 1996; on-line, Internet, 1997, available from <http://www1.whitehouse.gov/WH/EOP/OSTP/other/launchstfs.html>.

14. Research into space-based concepts such as Brilliant Pebbles was replaced by terrestrial-based Patriot Advanced Capability, improved Aegis radar, and Theater High Altitude Area Defense systems. D. Mosher and R. Hall, "The Clinton Plan for Theater Missile Defenses: Costs and Alternatives," *Arms Control Today*, September 1994, 16.

15. The ABM Treaty prohibits development, testing, and deployment of any space-based system or component and limits the United States and Russia to a single terrestrial ABM site with a maximum of one hundred missiles. Alasdair W. M. McLean, *Western European Military Space Policy* (Aldershot, Hants, England: Dartmouth Publishing Company, 1992), 179.

16. Michael E. Brown, Sean M. Lynn-Jones, and Steven E. Miller, eds., *The Perils of Anarchy: Contemporary Realism and International Security* (Cambridge, Mass.: MIT Press, 1995), 238. See also Stephen M. Walt, *The Origins of Alliances* (Ithaca, N.Y.: Cornell University Press, 1987).

17. Headquarters USSPACECOM/J5X, trip report, "Space Power Theory Research Trip—Western Europe," 10 October 1997, 6, 7, 11. Gen Howell M. Estes III, commander of USSPACECOM, commissioned a small group of academics to produce a space power theory by summer of 1998—this trip report reflects research toward that end.

18. Many of the Air Force's latest futures studies expound upon the proliferating threat of new technologies: *SPACECAST 2020* (Maxwell AFB, Ala.: Air University, 1994); *New World Vistas: Air and Space Power for the 21st Century* (Washington, D.C.: Air Force Scientific Advisory Board, 1995); and *Air Force 2025* (Maxwell AFB, Ala.: Air University Press, 1996).

19. David E. Lupton, *On Space Warfare: A Space Power Doctrine* (Maxwell AFB, Ala.: Air University Press, 1988), 68–69.

20. N. Novichkov, "Russian Space Chief Voices Dire Warnings," *Aviation Week & Space Technology*, 6 January 1997, 26.

21. McLean, 119.

22. Joseph P. Keddell Jr., *The Politics of Defense in Japan: Managing Internal and External Pressures* (Armonk, N.Y.: M. E. Sharpe, 1993), xlii, 8.

23. C. Covault, "China Seeks Cooperation, Airs New Space Strategy," *Aviation Week & Space Technology*, 14 October 1996, 29.

24. W. von Braun, "Man Will Conquer Space Soon," *Collier's*, 22 March 1952. Another point worth noting is that in 1952 the Van Allen radiation belts had yet to be discovered. Von Braun did not realize that the orbit at 1,075 miles would be a deadly position for any space colony. This emphasizes our lack of experience in space and the complications that will inevitably arise as space access comes to fruition.

25. A sixteen-hundred-hour shuttle turnaround time (10 times that of the initial design) is currently exceptional, and

ground-based maintenance has become an elaborate effort requiring hundreds of scientists and technicians.

26. Scaling the thrust-to-(weight-to-orbit) ratio of the shuttle down or scaling the Atlas thrust-to-(weight-to-orbit) ratio up yields roughly 1.15 million pounds of thrust required to get an F-16-sized vehicle with reasonable payload to orbit. The General Electric F110-GE-129 engine in the F-16 produces 29,000 pounds of thrust at sea level—40 times less than the thrust required to get it to orbit. Of course, this is simply a notional energy comparison since the air-breathing thrust mechanisms of the F-16 would be totally incompatible with the space environment.

Calculation: The shuttle carries its empty weight of 105,000 kg and a maximum payload of 21,140 kg to LEO (204 km, 28.45°) and uses a total launch thrust of 7,781,400 pounds (6,600,000 pounds in the first two minutes contributed by the solid-rocket expendables and 1,181,400 pounds over the first eight minutes and 50 seconds by the orbiter main engines). An Atlas 2 can get 6,000 kg to a similar orbit with its 485,000 pounds of launch thrust. Andrew Wilson, *Jane's Space Directory* (Coulsdon, Surrey, United Kingdom: Jane's Information Group Ltd., 1995), 274.

Getting an empty-weight F-16 (11,300 kg) and a reasonable payload (3,700 kg) to the same location via a shuttle-type approach requires 15/105 the thrust of the shuttle—roughly 1.1 million pounds.

Getting an empty F-16 and reasonable payload to the same location using an Atlas-type approach requires 15/6 the thrust of the Atlas—roughly 1.2 million pounds.

27. Michael J. Neufeld, *The Rocket and the Reich: Peenemunde and the Coming of the Ballistic Missile Era* (New York: Free Press, 1995).

28. R. Rubin, "Special Report: The War on Cancer," *US News and World Report*, 5 February 1996, 54.

29. Council of Economic Advisors, *Economic Indicators* (Washington, D.C.: Government Printing Office, December 1996), 32.

30. Arthur J. Alexander, *Comparative Innovation in Japan and in the United States* (Santa Monica, Calif.: RAND Center for US-Japan Relations, August 1990).

31. Alexander Gerschenkron, *Economic Backwardness in Historical Perspective: A Book of Essays* (Cambridge, Mass.: Belknap Press of Harvard University Press, 1962), 5-11.

32. Space debris is a very serious problem. See Ross T. McNutt, *Orbiting Space Debris: Dangers, Measurement and Mitigation* (Hanscom AFB, Mass.: Phillips Laboratory Directorate of Geophysics, 1 June 1992).

Over seven thousand man-made objects larger than 10 cm and an estimated 30,000 to 70,000 smaller objects between 1 and 10 cm have been deposited into Earth orbit. Their extremely small size (10^5 grams) is offset by their incredible speeds (between 30 and 160 thousand MPH). In addition to these, the real problem may be the 10 billion objects in the .1 mm to 1 cm range, which we currently have no means of tracking. A \$50,000 shuttle window replacement was required following shuttle mission STS-7. The damage resulted from a .2 mm paint-chip impact on a side window.

33. The US Congress Office of Technology Assessment claimed that "pre-emptive attack would be an attractive countermeasure to space-based ASAT weapons." Edward Reiss, *The Strategic Defense Initiative* (Cambridge, England: Cambridge University Press, 1992), 145.

34. "Unmanned Strike Next for Military," "US Industry Searches for Design Formulas," "Payload, Not Air Frame Drives UCAV Research," and "Navy Wants UCAVs for Carrier Use," *Aviation Week & Space Technology*, 2 June 1997, 46-55.

35. Space weapons could very well come at the expense of the systems the weapons are designed to protect. The National

Reconnaissance Office is currently pursuing future architecture studies with cost as a principal constraint. It is no longer the cold war environment of "buy the best capability." Better, more capable ISR/MCG systems will be set aside due to expense, and less capable systems will be purchased. Rolling in the cost of space weapons to protect these systems will only worsen that situation.

36. When asked by Sen. Sam Nunn (D-Ga.), chairman of the Senate Armed Services Committee, "Are you in charge of space?" retired Air Force general Charles A. Horner, former commander in chief (CINC) of USSPACECOM, felt compelled to reply, "That depends." It depends because he is the one CINC who exercises little control over his own command. NASA, the Defense Information Systems Agency (DISA), the Ballistic Missile Defense Office (BMDO), the Central Intelligence Agency (CIA), the Central Imagery Office (CIO), the National Reconnaissance Office (NRO), the National Oceanographic and Atmospheric Administration (NOAA), the Department of Commerce, the Department of Transportation, the Department of the Interior, the National Science Foundation (NSF), and the White House Office of Science and Technology all intrude upon his budget, while many of the same organizations intrude upon his launch, on-orbit control, research and development, and acquisition authority. Air Force Association Special Report, *Facing Up to the Space Problem*, 1 November 1994.

37. Extensive investments in intelligence, surveillance, and reconnaissance assets would be necessary to fulfill worldwide verification requirements.

38. This includes the research, development, and production of ground-to-space ASATs specifically allowed by treaty in order to support an international space-policing effort.

39. The National Reconnaissance Office intends to reduce both the size and weight of its current satellites by more than 50 percent. "NRO Satellites to Shrink in Size, Technology Director Says," *Space Business News*, 19 February 1997, 18.

40. Orbital Space Sciences is currently under contract to NASA to produce a small, air-launched, reusable space vehicle—the X-34—while Lockheed Martin is under contract to produce a larger, single-stage space vehicle—the X-33. Prototypes are scheduled for testing in 1999. J. Anselmo, "X-34 Designs Locked In," *Aviation Week & Space Technology*, 2 June 1997, 33.

41. Fiber-optics networks are a growing technology. A single optic fiber exceeds the entire carrying capacity of current communication satellites. Gordon R. W. MacLean, "Will Fiber Optics Threaten Satellite Communications?" *Space Policy*, May 1995, 99.

42. High-altitude-endurance UAVs are nearing maturity. Communications packages are estimated to at least equal those of Defense Satellite Communication Systems, with dwell times ranging from 12 to 48 hours. See Defense Advanced Research Projects Agency (DARPA) Tactical Technology Office; on-line, Internet, available from <http://www.arpa.mil/asto/hae.html>; DARPA's "High Altitude Endurance UAV Concept of Operations," draft version 2.1, 10 February 1995, 1-1 through 1-6; Defense Airborne Reconnaissance Office (DARO) UAV Program Plan, April 1994; or any of the latest articles in the periodical *Unmanned Systems*.

43. The other historical trend in US space policy has been to hedge our sanctuary bets with investments in space-weapons research and development. Pursuing space-sanctuary policy does not preclude being prepared to do otherwise; in fact, one can make strong arguments that such preparedness encourages other actors to follow the sanctuary policy, since they could gain no advantage by challenging that policy.

The Mystique of Airpower

The Airpower Professional's Book Club

MAJ M. J. PETERSEN, USAF
Editor, Airpower Journal

There is no List with a capital L. The great books are simply the books which deal most incisively, most eloquently, most universally, and most timelessly with man and his world.

—Milton Mayer



A GOOD BOOK unread is a tragedy, but one that is read and not discussed is a learning experience largely lost. Book clubs or book discussion groups were invented to provide the structure (setting?) and the opportunity for people to share their insights on the works of great literature.

Maybe you have wanted to join a book club, but with TDYs, deployments, and busy schedules just simply haven't had the spare time to go to meetings. Perhaps you were afraid the books would not appeal to your tastes. Then consider joining the *Airpower Journal/Air Chronicles* newest effort—the Airpower Professional's Book Club.

For those of you who wonder about the origins of this idea, it had its genesis in the development of the CSAF Professional Reading Program in the spring of 1997,¹ the publication in the *Airpower Journal* of a series of bibliographic essays written by Dr. David Mets,² and the inauguration of the *Boston Globe's* on-line book club.³

In the spring 1997 edition, Gen-Ronald R. Fogleman, former Air Force chief of staff (CSAF), wrote about the development of the CSAF Professional Reading Program. It was designed as a complement to initiatives that came out of the long-range planning effort to

foster the growth of a unifying air and space culture throughout the Air Force. Together, these initiatives are intended to produce knowledgeable service members who more effectively can employ air and space forces in independent, joint, or coalition operations. Ultimately, they will help prepare current and future Air Force leaders to deal effectively with the challenges they surely will face in a post-cold-war world of austere defense budgets, diverse regional threats, and continued high-operations tempo for our units.⁴

As their titles indicate, the subjects of Dr. Mets's essays have been topically restrictive. The publication of these essays often results in requests from readers for other subjects or more often for a brief list of what books are important for airpower professionals.

The great books idea is not new.⁵ For example, in 1947, as part of a grassroots movement to promote continuing education for the general public, a group of Chicagoans led by University of Chicago president Robert Maynard Hutchins and supported by prominent businessmen established the Great Books Foundation. This is a nonprofit organization that provides people of all ages with the opportunity to read, discuss, and learn from outstanding works of literature. Since its inception, the foundation has helped thousands of people throughout the United States begin their own discussion groups in libraries, schools, and community centers.⁶ However, as one can readily suppose, involvement in such a program not only requires one to be available but also to invest a great deal of time simply to meet and discuss these books. An

excellent idea similar to the Great Books Foundation aimed at professional development—the Douhet Society—arose at Headquarters 5th Allied Tactical Air Force (SATAF), a North Atlantic Treaty Organization (NATO) headquarters in Vicenza, Italy. The core of the society's aim was to develop a concept of airpower in its participants that was based on theory, history, and contemporary developments.⁷

With the publication of the winter edition, *Airpower Journal*, in cooperation with *Air Chronicles*, will inaugurate a new section—the Airpower Professional's Book Club/Discussion Group. We will ask our senior editorial advisors to submit their own personal list of the top 10 books every airpower professional should read. In addition, we invite *Airpower Journal* readers to submit their own suggestions for such a list. Based on the lists we receive, we will develop our own list of the top 10 airpower professional's books and then launch this book club. Send your list by E-mail to editor@cadre.maxwell.af.mil or mail it to

Airpower Journal
Attn: Book Club
401 Chennault Circle
Maxwell AFB AL 36112-6428

In the Spring 1999 edition, we hope to publish some of the responses as well as a consolidated top 10 list composed of the most frequently chosen books by both senior editorial advisors and readers. We hope you will read these books and E-mail (or write) a paragraph or two describing what you thought of the book, its permanence, its importance, and its overall value in the development of an airpower professional. We will publish all appropriate submissions in a section of *Air Chronicles* and will print selected responses in *Airpower Journal*.

To stimulate discussion both on-line and in the quarterly editions, we suggest that as you read one of these books, jot down ideas or comments that come to mind. After reading it, reflect on the central theme or subject and how the overall content of the work relates to that theme. Also reflect on any

critical observations about the book that can be made. Again, write down your ideas as they occur to you. Then let the project lie fallow in your mind. After several days, peruse the book once again and draft your comments. Use your own words as much as possible. If you choose to quote from the book you are critiquing, do so sparingly. Lay aside your first draft for two or three days and then revise it for proper English and clarity.

A book-club review is composed of a critical evaluation. Always remember that what we are looking for is a critique of the book, not simply a description of its contents. So, when you write your paragraph or two, try to address these four key questions:

1. *What is the book about?* This question leads to other questions. Does the book have a central theme? Does it argue a thesis? What is the author's purpose? (The latter may be stated explicitly in the preface or conclusion, or it may be implied within the book itself.) Did the author achieve that purpose? Early on, try to summarize the theme, thesis, or subject in a sentence or two. Strenuously resist any temptation to describe the full contents of the book; as noted above, your critical *analysis* of the book is what really counts.
2. *Is the book reliable?* The first question to ask about a work of nonfiction is, Is it true? Again, this question prompts other questions:
 - a. *Who is the author?* What are his or her qualifications for writing a book on this particular subject? Has the author written other books? If so, are those other works about a related subject?
 - b. *Where did the author obtain information for the book?* Is the book based on the author's personal observations of events? Is it based on primary sources—letters, diaries, speeches, manuscripts, and archival records—that were contemporary or nearly contemporary with the period

or subject about which the author is writing? Or is the book based on secondary sources, that is, on works that were written after the time of the event using the primary sources? As a related matter, be sure to include some mention of how the author identifies the sources upon which the book is based—by a bibliography, by notes, in the preface or introduction, or simply by casual references within the text.

- c. *Are the sources reliable?* If the book is based on primary materials, are those materials credible? If based on secondary authorities, are those accounts reputable? Briefly but precisely identify some representative examples of the sources employed.
- d. *Does the author use evidence with care and discrimination?* Does the author read into the evidence ideas or facts that are not there? Is the author fair to all parties, or is he swayed by bias or prejudice? Cite specific examples of bias or prejudice or of fairness. Also consider the following questions: Are the facts correct? Do you consider the interpretations valid? Is the thesis well supported by evi-

dence and logical reasoning? Have you been persuaded to accept the author's conclusions? Whatever your answers to the last four questions, explain your reasons for answering them as you did.

3. *Is the material well presented?* Is the book understandable? Are the contents well organized? Does the author introduce the subject in clear and simple terms or does he or she presuppose the reader possesses general knowledge of the subject?
4. *Does the book make a contribution to the field?* What, if anything, did the book contribute to your knowledge and understanding of the subject? Would you recommend the book to someone else? Explain why or why not.⁸

When you finish, send your submission to the same address as listed above. We prefer E-mail since we intend to post your comments on the World Wide Web in *Air Chronicles* as we receive them. Check out the site⁹ when the club gets going; and if you disagree with another reader's critique of a book, respond; we're aiming at developing an ongoing discussion.

Notes

1. Gen Ronald R. Fogleman, "CSAF Professional Reading Program," *Airpower Journal* 11, no. 1 (Spring 1997): 63-65.

2. These essays by Dr. David R. Mets were as follows: "A Pacific Sampler: Fodder for Professional Development," *Airpower Journal* 9, no. 4 (Winter 1995): 80-98; "Bomber Barons, Bureaucrats, and Budgets: Your Professional Reading on the Theory and Doctrine of Strategic Air Attack," *Airpower Journal* 10, no. 2 (Summer 1996): 76-96; "Fodder for Professional Development: Reference Works for the Air Warrior/Scholar," *Airpower Journal* 12, no. 1 (Spring 1998): 53-65; and "To Kill a Stalking Bird: Fodder for Your Professional Reading on Air and Space Superiority," *Airpower Journal* 12, no. 3 (Fall 1998): 71-101.

3. This club developed out of the statement by Massachusetts state education chairman John Silber's request that one of his associates develop a reading list for students composed of books that all well-informed US citizens should read. The *Globe* editors invited their readers to submit their suggestions for such a list, and based on the hundreds of letters and E-mail messages they received, they developed a list of Top 10 books—and launched their book club. http://www.boston.com/globe/metro/packages/book_llst/about.htm.

4. Fogleman, 64.

5. Following are some of these available on the WWW: the Basic Program of Liberal Education for Adults (<http://www.uchicago.edu/grahamschool/bp/index2.html>); Center for the Study of the Great Ideas (<http://www.TheGreatIdeas.org>); Colby Committee—Wachs Great Books Forum at Colby College, Maine (<http://www.dol.net/~greatbooks/colby.htm>); Great Books Discussion List—an unmoderated list serv open to anyone with an interest in Ideas (<http://www.mala.bc.ca/~mcneil/chat.htm>); Great Books of Western Civilization Café (<http://cafes.mirror.org/gbcafe1.cgi>); Saint John's College (<http://www.sjca.edu>); and Thomas Aquinas College (<http://www.thomasaquinas.edu>).

6. See The Great Books Foundation home page at <http://www.greatbooks.com/fact.html>.

7. Lt Col Kimble D. Stohry, "The Douhet Society: A Recipe for Your Professional Development Program?" *Airpower Journal* 7, no. 1 (Spring 1993): 22-33.

8. Adapted from a student handout attributed to Dr. Harold T. Parker, professor emeritus at Duke University.

9. The *Air Chronicles* home page may be found at <http://www.airpower.maxwell.af.mil>.

Sentinels Rising

Commercial High-Resolution Satellite Imagery and Its Implications for US National Security

Lt Col Larry K. Grundhauser, USAF



Whereas I was blind, now I see.

—John 9:25

Authorized (King James) Version

ON 24 DECEMBER 1997, at the Svobodnyy Cosmodrome situated in a far corner of eastern Siberia, a modified Russian SS-25 intercontinental ballistic missile arched skyward, but

rather than the single thermonuclear weapon it was originally designed to deliver, it carried a peculiar cargo—a US-made imaging satellite.* The owner of the satellite, EarthWatch, Inc. of Longmont, Colorado, contracted with Russia to boost its EarlyBird 1 spacecraft into polar orbit using a Start-1 space launch vehicle.¹ As the first of an entirely new generation of high-resolution** commercial imaging satellites, EarlyBird 1 was postured to make his-

*Although the proliferation of ballistic missile technology is beyond the scope of this study, the growing market for commercial space activities, including spacelift, also has very serious implications for US national security. As an aside, *Start-1* roughly translates something akin to the "go" in English as in "Ready, set, go!" It is not related to the commonly used acronym for the *Treaty Between the United States of America and the Union of Soviet Socialist Republics on the Reduction and Limitation of Strategic Offensive Arms of July 31, 1991* (the START Treaty).

***High-resolution* is a relative term, but as it is used by this study describes satellite-imaging systems capable of providing order-of-magnitude improvements in spatial resolution over earlier systems.

tory.² Unfortunately, soon after the satellite settled into its low-Earth orbit (LEO), a problem developed with its communications sys-

tem that has prevented EarthWatch from issuing commands to the satellite, and EarlyBird 1 is nonoperational.³

Table 1
Land-Imaging Satellites Planned to be Operational by 2000

SYSTEM	OWNER	SENSOR	LAUNCH DATE	SPATIAL RESOLUTION (METERS)								STEREO TYPE	SWATH (km)	GLOBAL REVISIT (DAYS)	
				PAN	THEMATIC MAPPER BANDS						RADAR				
					VISIBLE AND NEAR IR				SHORT-WAVE IR						THERMAL IR
					1	2	3	4	5	7					8
MEDIUM-RESOLUTION															
IRS-1C, D	India	M & P	95, 97	8		23	23	23	70				C/T	70, 142	48, 24
IRS-P5, IRS-2A	India	M	98, 99			8, 23	8, 23	8, 23	23				C/T	25, 142	125, 22
SPOT 4	France	M & P	98	10		20	20	20	20				C/T	120*	28
CBERS	China & Brazil	M & P	98, 99	8	20	20	20	20	80	80	160		C/T	120	28
Landsat 7	US	M & P	98	15	30	30	30	30	30	30	60			185	18
EOS AM-1	US & Japan	M	98			15	15	15	8 bands @ 30		5 bands @ 90		F/A	60	49
R21A, B, C, D	Resource 21	M	2000		10	10	10	10	20					200*	4†
HIGH-RESOLUTION															
EarlyBird 2	EarthWatch	M & P	98	3		15	15	15					F/A	38	120
IKONOS 1, 2	Space Imaging	M & P	98, 99	1	4	4	4	4					F/A	12	247
QuickBird 1, 2	EarthWatch	M & P	98	1	4	4	4	4					F/A	20	148
OrbView 3	ORBIMAGE	M & P	98, 99	1 & 2	8	8	8	8					F/A	4 & 8	740, 370
SPIN-2	Russia	P‡	96, 97	2, 10									F/A	180, 200	
Eros-A	West Indian Space	P	98	1.5									F/A	14	211
Eros-B	West Indian Space	P	99	1									F/A	20	148
IRS-P6	India	P	98	2.5									F/A	10	296
HYPERSPPECTRAL															
EO-1	US	H & M	99			128 bands @ 30			256 bands @ 30					15	200
HRST	US	H	2000	5		210 bands @ 30								30	100
ARIES	Australia	H	2000	10		32 bands @ 30			32 bands @ 30					15	200
RADAR															
RADARSAT	Canada	SAR	95									10 C-band		50-500	
ERS	ESA	SAR	98									25 C-band		100	

Legend:

P = Panchromatic
M = Multispectral
H = Hyperspectral
SAR = Synthetic Aperture Radar
C/T = side-side stereo

F/A = fore/aft stereo

*Swath is achieved by two side-by-side instruments

†Four (4) satellites are planned to provide 3.5-4 day-global repeat coverage

‡Photographic film return system

The false start of the first EarlyBird 1 satellite marked a rather inauspicious beginning to what the commercial remote-sensing industry hopes will quickly become a thriving, multi-billion dollar market in the years ahead. Private remote-sensing firms are racing to get their high-resolution imagery satellites into orbit and imagery into the hands of consumers. Despite the daunting technical and financial risks, industry watchers predict that by mid-2001, over 30 satellites will be in orbit around the Earth using affordable technologies to provide volumes of imagery to an international clientele with fidelity previously unobtainable by the general public (see table 1 for system comparisons).⁴ No longer will the United States and the former Soviet Union enjoy their hegemony over satellite imaging of the Earth. Instead, they must share their vantage point of Earth from the ultimate "high ground" with other nations as a fleet of mercantile sentinels rises to provide high-resolution imagery to customers around the world.

The Military Challenges of the Year 2000 Constellation

The Clinton administration issued Presidential Decision Directive INSC-23 (PDD-23), entitled "U.S. Policy on Foreign Access to Remote Sensing Space Capabilities," on 9 March 1994. It established the policy framework to boost the nascent American remote sensing market so it could compete with foreign providers of high-resolution imagery.⁵ It also piggy-backed on the groundwork already laid by the Land Remote Sensing Act of 1992 (P.L. 102-555), which, *inter alia*, recognized that "the national interest of the United States lies in maintaining international leadership in satellite remote sensing."⁶ More important, PDD-23 reversed earlier policy that had sought to restrict commercial entry into the remote-sensing market. By liberalizing US licensing procedures, the White House and Congress formally acknowledged that not only had the geopolitical land-

scape fundamentally changed, but there was simply no easy way to get the "genie back into the bottle" with respect to the proliferation of satellite imaging technology.⁷

Spatial Resolution and Military Utility

To appreciate the security challenges brought about by current and planned commercial imaging satellites, it is instructive to survey what the first-generation reconnaissance satellites accomplished for the United States. The highly classified Corona project, operating under cover as the Discoverer space flight program, began in August 1960 and in little more than a decade collected over 800,000 images over "denied territory" that finally lifted the veil of secrecy from the USSR that had stymied accurate assessments of Soviet strategic capabilities.⁸ With its broad area coverage and reasonably good spatial resolution (two to 11 meters), Corona debunked the myth of a "missile gap" by providing the Eisenhower administration with incontrovertible evidence that Soviet offensive missile strength had been significantly overestimated. Based on this information, Eisenhower confidently rejected pleas for an American buildup of its long-range missile force to close a gap that was merely illusory.⁹ Like Corona, the commercial systems that will soon be in orbit also hold enormous potential for performing a wide range of intelligence, surveillance, and reconnaissance (ISR) tasks.

Table 2 provides a sense of what level of spatial resolution is required for ISR using commonly accepted ground resolutions required to detect, identify, describe, and analyze those targets.¹⁰ With the advent of one-meter ground-sample distance (GSD) panchromatic sensors as the current performance benchmark, nearly 60 percent of the table's military intelligence tasks, and 85 percent of the targeting-related tasks can now be satisfied.* Of course, these figures merely represent a rough approximation of what military re-

*Targeting is closely related to the ability to detect and precisely identify the given object or location.

Table 2
Ground Resolution (in meters)

TARGET	DETECTION ^a	GENERAL ID ^b	PRECISE ID ^c	DESCRIP-TION ^d	TECHNICAL ANALYSIS ^e
Bridges	6	4.5	1.5	1	0.3
Radar	3	1	0.3	0.15	0.015
Supply Dumps	1.5-3.0	0.6	0.3	0.03	0.03
Troop Units (in bivouac or on roads)	6	2	1.2	0.3	0.15
Airfield Facilities	6	4.5	3	0.3	0.15
Rockets and Artillery	1	0.6	0.15	0.05	0.045
Aircraft	4.5	1.5	1	0.15	0.045
Command & Control HQ	3	1.5	1	0.15	0.09
Missiles (SSM/SAM)	3	1.5	0.6	0.3	0.045
Surface Ships	7.5-15	4.5	0.6	0.3	0.045
Nuclear Weapons Components	2.5	1.5	0.3	0.03	0.015
Vehicles	1.5	0.6	0.3	0.06	0.045
Minefields (land)	3-9	6	1	0.03	0.09
Ports and Harbors	30	15	6	3	0.3
Coasts and Landing Beaches	15-30	4.5	3	1.5	0.15
Railroad Yards and Shops	15-30	15	6	1.5	0.4
Roads	6-9	6	1.8	0.6	0.4
Urban Areas	60	30	3	3	0.75
Terrain	-	90	4.5	1.5	0.75
Submarines (surfaced)	7.5-30	4.5-6	1.5	1	0.03

Sources: Senate Committee on Commerce, Science, and Transportation, *NASA Authorization for Fiscal Year 1978, 1642-43*; and *Reconnaissance Handy Book for the Tactical Reconnaissance Specialist* (St. Louis, Mo.: McDonnell Douglas Corporation, 1982), 125.

^a Detection: Location of a class of units, objects, or activity of military interest

^b General Identification: Determination of general target type

^c Precise Identification: Discrimination with target type of known types

^d Description: Size/dimension, configuration/layout, component construction, equipment count, etc.

^e Technical Analysis: Detailed analysis of specific equipment

quirements could be met since there are many other system performance factors that must be considered, including imagery timeliness and frequency of coverage (see the following discussion of the US Space Command study Operation Seek Gunfighter).

Carnegie Study

Obviously, one-meter GSD imagery data offers substantial military utility, but the threat is not only confined to those systems with the best spatial resolution. The Carnegie Endowment for International Peace conducted a

study in the late 1980s that evaluated the military utility of Landsat, *Système pour l'observation de la Terre* (SPOT), and Soyuzkarta KFA-1000 (now Spin-2) imagery. Surprisingly, the imagery analysts discovered that using SPOT's 10-meter GSD—imagery resolution that will soon be considered only mediocre—enabled them to easily satisfy nearly all the targeting-associated tasks contained in the study's target list. The Carnegie study concluded that commercial satellite imagery is "rich in information which can be used to affect the planning and execution of military operations."¹¹ As a result, a new table was

Table 3
Ground Resolution (by sensor system)

TARGET	DETECTION ^a	GENERAL ID ^b	QUANTITATIVE MEASUREMENTS ^c
Bridges	MSS/TM	TM/XS	XS/P
Roads	MSS	MSS	TM/XS
Radar	P	P	-
Railroads	MSS	P	-
Supply Dumps	MSS	P	P
Major HQ	MSS	TM/P	P
Airfield Facilities	MS	TM	P
Aircraft	P	P	P
Rockets and Artillery	MSS/TM	XS/P	-
Missiles (SAM)	MSS	MSS/TM	P
Surface Ships	XS	XS	XS/P
Submarines (surfaced)	TM	XS/P	P
Vehicles	P	-	-

Legend:

MSS: Landsat multispectral scanner (80-meter GSD)
 TM: Landsat thematic mapper (30-meter GSD)

XS: SPOT extended spectrum sensor (20-meter GSD)
 P: SPOT panchromatic sensor (10-meter GSD)

Source: Peter D. Zimmerman, "Introduction to Photo-Interpretation of Commercial Observation-Satellite Imagery," In *Commercial Observation Satellites and International Security*, Michael Krepon et al., eds. (London: The Macmillan Press Ltd., 1990), 203.

Note: No attempt was made to list all targets in the original chart (See *Reconnaissance Handy Book for the Tactical Reconnaissance Specialist* (St. Louis, Mo.: McDonnell Douglas Corporation, 1982)), 125.

^a Detection: A target of the given type is clearly present, but no details are apparent.

^b General Identification: Classes and numbers of objects can be discerned; little or no doubt the target has been properly classified.

^c Quantitative Measurement: Quantitative measurements of the target can be made. Objects classified by mission or type.

developed with revised spatial resolution criteria that summarized their findings (table 3).¹²

US Space Command Study

A decade after the Carnegie project, the US Air Force Space Command organized its own assessment of the military utility of commercial satellite imagery. Operation Seek Gunfighter was conducted under the auspices of the Space Warfare Center and its Aggressor Space Applications Project. The Air Force formed a "Red Cell"—a simulated opposing force—which relied exclusively on open-source information and commercial satellite imagery to track the deployment of an air expeditionary force (AEF) to Bahrain in October 1997.¹³

The Red Cell quickly learned a great deal about the AEF deployment from using the Internet without any special Internet access privileges afforded some "dot-mil" sites. For example, they discovered where the AEF would deploy, its mission, and its force composition. Imagery collection was more problematic, however, due to the limited number of commercial satellite resources available. A case in point, the Red Cell knew that the Canadian Radarsat could provide the timeliness that was needed, but the satellite was already performing priority collection in Antarctica and could not be retasked, nor could the Indian IRS-1C meet operational deadlines. The team did succeed, however, in tasking SPOT to image the AEF beddown locations in Bahrain, as well as Mountain Home Air Force Base,¹⁴ The

few SPOT images obtained offered a wealth of information that the Red Cell could not have otherwise obtained. Analysts were able to lo-

"A valuable intelligence picture can be pieced together using a combination of open source information and satellite imagery."

cate the AEF headquarters, the logistics areas, and a "tent city" for deployed personnel. Additionally, the security perimeter was clearly identified, as were hardened aircraft shelters, refueling areas, and hardstands.¹⁵ The Air Force concluded that "a valuable intelligence picture can be pieced together using a combination of open source information and satellite imagery."¹⁶

Beyond Spatial Resolution

Given the historical military significance of imaging satellites like Corona and the results of studies like those conducted by the Air Force and the Carnegie Endowment, one wonders why the debate over commercial imagery satellites has focused principally on the issue of spatial resolution. It is vitally important to move beyond the simplistic notion that spatial resolution is the deciding factor as to whether a particular system may pose a threat to national security. In fact, moderate resolution spectral data from multiple sensors may actually present a greater threat than does high-resolution panchromatic imagery alone.

Spectral Information. The commercial sector is clearly heading in the direction of using multispectral imaging for a variety of applications. These extended wavelength bands offer much more information than is available in even the highest-resolution panchromatic image of the same area. As an example, imagery obtained in the near-infrared and short-wave infrared regions of the electro-

magnetic spectrum can effectively defeat many efforts to use camouflage since these wavelengths can detect subtle changes in the moisture content of vegetation and earthen terrain. Spectral data can also be interpreted more easily by computers than spatial data, facilitating development of expert systems that can automate much of the interpretation process and reduce the burden on scarce human resources.¹⁷

Synergy. With today's advances in computer technology, it is now possible to use the phenomenology from one sensor, combine it with others, and do so using low-cost workstations running commercially available software applications. This approach makes use of the synergistic effect whereby the amount of information obtained by synthesizing data from multiple sensors exceeds that provided by individual sensors. Many firms already promote capabilities to provide such hybrid products, albeit in a limited fashion. For instance, Space Imaging markets "pan sharpened" multispectral imagery products that are made by merging high-resolution panchromatic imagery with multispectral imagery. The result is an image that contains a wealth of spatial and spectral information that outdistances what either sensor could separately provide.¹⁸

The GPS Threat. Security concerns over the proliferation of Global Positioning System (GPS) receivers around the world offer a thought-provoking corollary to the questions raised by the emergence of high-resolution commercial imagery satellites.¹⁹ The amazing growth in the use of civilian GPS has caused alarm in the national security arena. By 2005, the Department of Defense (DOD) estimates that the number of civilian GPS users will exceed three million compared with a mere 38,000 DOD users.²⁰ Government efforts to restrict the quality of GPS data in the interests of protecting US national security have met with controversy similar to that of high-resolution satellite imagery. What is instructive about the GPS case is that market forces provided a unique and thoroughly creative response to government restrictions. The market developed an ingenious workaround, known

as *differential* GPS, which uses presurveyed points to assess and compensate for the GPS errors in a particular geographic area. By using this method, geopositional accuracy that rivals the GPS data reserved for the military is possible and should serve as a classic example of how bureaucratic remedies to technical problems can be overcome by a little entrepreneurial ingenuity operating in a free market.²¹

Thinking Precisely. There is one particular GPS application that dovetails with the use of commercial satellite imagery that, over time, could have a profound effect on US national security. Precision agriculture combines the use of GPS with high-resolution multispectral imagery surveys of agricultural lands. Rather than treating crops as if they were homogeneous, farmers who use precision agricultural methods examine satellite imagery to determine precisely what areas need more or less water, fertilizer, pesticides, fungicides, and other elements and then apply what is needed exactly at the right time. The key to precision agriculture is the imagery management infrastructure to interpret the imagery data and make timely recommendations useful to the farmer, who can then use GPS-guided farm implements to precisely apply what the crops need.²² The precision agricultural process is strikingly similar to what the military has to do when it makes a threat assessment, plans a mission, and targets its weapons.

This similarity may have profound implications for US national security if one accepts the thesis offered by Alvin and Heidi Toffler in their recent work, *War and Anti-War: Survival at the Dawn of the 21st Century*. They contend that “the way we make war reflects the way we make wealth” and provide some thought-provoking insights about how societies differ in their approach to war and peace based on their degree of economic development.²³ First-wave and second-wave societies (i.e., characterized by agriculture and mass production, respectively) that become adept at precision farming could leverage imagery satellite technology and GPS to create their own limited version of a revolution in mili-

tary affairs. Thus, rather than aspiring to World War II-style armaments and organizational structures, nations (or even terrorist

Despite the obvious potential commercial satellite imagery holds for militaries around the world, it is not at all clear whether they can readily use satellite imagery.

groups) may find it relatively easy to take what they already know about applying pesticides precisely and build a precision strike combat capability.

Mitigating Factors

Despite the obvious potential commercial satellite imagery holds for militaries around the world, it is not at all clear whether they can readily use satellite imagery. While the ability to collect, process, analyze, and assess information is certainly important, it is only one element of a nation’s ability to wage war. Ultimately, a nation with obvious hostile intent and armed with the best satellite imagery available must still be able to convert that information into combat capability. Too often, a potential adversary is viewed as a doppelgänger of the United States rather than taking full account of the profound asymmetries that exist with respect to supporting the war fighter with satellite imagery.

The “Hail Mary” Case. Critics of the US policy to license high-resolution satellite imagery systems have often cited a “what if” scenario based on Operation Desert Storm. If Saddam Hussein had had access to satellite imagery prior to and during the Gulf War, they reason that Iraq could have thwarted Gen H. Norman Schwarzkopf’s bold “Hail Mary” maneuver by targeting the massed formations of men and materiel of the XVIII Airborne Corps and VII Corps with missiles.²⁴ The conclusion to be drawn is that for any future employment of US forces a similar scale will be vulnerable

to observation by commercial imaging satellites, and as such the forces would be "sitting ducks" for an enemy equipped with missiles and/or weapons of mass destruction.²⁵

"The primary problem in major strategic surprises is not intelligence warning but political disbelief."

Political Disbelief. On the other hand, in order to conclude that access to satellite imagery by an adversary will make the difference between military success and debacle assumes some facts not in evidence. One must assume that leaders like Saddam Hussein would actually believe what the commercial satellites detected. However, history is replete with examples where intelligence on an enemy was ignored, discounted, or disbelieved because it ran contrary to the predisposition of decision makers. Richard Betts, a senior fellow at the Brookings Institution, concluded in his study of surprise attacks that "the primary problem in major strategic surprises is not intelligence warning but political disbelief."²⁶

It's Just Not That Easy. Few would argue that the United States clearly has a technological and operational advantage with respect to information operations using space-based assets. Yet, despite decades of experience, not even the United States has gotten it quite right when it comes to getting the most from its imagery satellites. For instance, after the Gulf War a number of US "intelligence failures" related to the use of satellite imagery was identified, which included unreliable dissemination of imagery intelligence to air wings and ground units.²⁷ It is just not that easy to convert information into combat power. Therefore, there is no reason to assume that mere access to satellite imagery automatically confers to the enemy an ability to use that imagery in a manner that substantially alters the balance of power or the endgame.

The Diplomatic Challenges

There is little doubt that the new generation of commercial imagery satellites raises legitimate concerns with regard to their military utility. Nonetheless, their greatest impact upon US national security will likely occur during peacetime, not war, and in the context of day-to-day diplomacy. The oft-quoted military strategist Carl von Clausewitz observed in his 1832 magnum opus, *On War*, that the military act of war (or preparation for war) is inextricably linked to the political and diplomatic processes, which are not mutually exclusive, but rather form a continuum.²⁸ Therefore, assessing the impact of commercial satellite imagery on US national security also requires a review of how commercial satellite imagery may affect the "art of the state"—diplomacy.

Transparency

Over the past decade, a number of studies have attempted to consider what would happen when superpower dominion over satellite reconnaissance ended. In 1988, one such study by the Carnegie Endowment for International Peace determined that on balance, "the element of strategic transparency provided by readily available commercial images does far more for maintaining peace than it does for sharpening means of attack."²⁹ Many advocates for loosening restrictions on commercial satellite imagery have since joined the chorus of those who believe that improved transparency provided by commercial imagery will actually lessen the prospects for conflict.

The News Media

About the same time as the Carnegie study, Congress examined issues that involved the media's use of satellite imagery and national security. The reason for the study was that the media was very much interested in developing an independent source of satellite imagery, which included a proposal for construction of a "Mediasat."³⁰ The Office of Technology Assessment (OTA) report stopped short of the

Carnegie study's bottom-line endorsement of commercial imagery satellites. Instead, it concluded that the media's use of them might "*complicate* [emphasis added] certain U.S. national security activities and certain U.S. foreign policies."³¹ A number of things have changed since then that could resurrect national security concerns over the media's access to satellite imagery. The proliferation of "all-news" networks like the Cable News Network (CNN) has cut the news cycle from days to hours. Add to that the fact that dozens of satellites will soon orbit the Earth collecting high-resolution imagery around the clock, and that imagery will not only be much more literal than ever before but will be sold at very competitive prices. The result is a coincident convergence of two markets that are highly motivated and ideally suited for each other—a development that will almost certainly result in controversy over national security and freedom of the press.

War and Antiwar

Futurists Alvin and Heidi Toffler offer an even more profound assessment of the security implications of commercial satellite imagery and diplomacy. They predict that diplomats no longer can expect to shepherd the affairs of state exclusively. The *raison d'état* of third-wave societies—information superiority—will become the principal objective and diplomatic currency of citizens groups, businesses, and even religious organizations. High-tech sources of information like commercial satellites will be used by "knowledge warriors" to prosecute new forms of war and antiwar.* This will result in a gradual power shift from the traditional practice of diplomacy by the nation-state to advocacy by citizens groups and individuals.³² For citizen activists to make a difference, the population at-large must be well informed, thoroughly persuaded, and highly motivated.³³ Although the media will continue to play a central role in informing the public, nongovernmental organizations

(NGO) and international governmental organizations (IGO) will themselves seek to inform, persuade, and motivate the citizenry and will use all the tools at their disposal to advance their cause du jour, including commercial satellite imagery.

Public Interest Groups. NGOs and IGOs are not new. According to Dr. Stephen Cambone, a senior fellow at the Center for Strategic and International Studies based in Washington, D.C., about two hundred of them existed at the turn of the last century, but few had any real interest in diplomacy or international relations. Times have changed. The number of NGOs and IGOs has skyrocketed and by 1990, their numbers had peaked at nearly 18,000. While the majority of NGOs and IGOs still remain outside the sphere of international relations, organizations that are concerned with international matters seem to be motivated by their own ethos.³⁴ As the influence of NGOs and IGOs continues to grow, traditional nation-state diplomacy will be challenged by independent actors who derive their strength not from the state but from public opinion. To remain viable and relevant, these groups must be able to arouse the public and persuasively argue their causes and will certainly turn to powerful tools of persuasion like satellite imagery to seize the initiative, build momentum, and force governmental action.

Seizing the Initiative. Unlike public interest groups, governments are hobbled by their own internal policy debates that can slow or derail the well-intended efforts of public officials. NGOs and IGOs, on the other hand, often organize themselves around a single issue and, therefore, do not have to vet their positions to the same degree that governments must. The deliberate tempo of traditional diplomacy, which has been likened to the highly stylized Japanese Kabuki dance, may be replaced by a more frenzied pace caused by these interlopers. On the other hand, it is not clear whether the growing influence of watchdog groups—armed with information derived from

*The Tofflers define *anti-war* as actions taken to deter or limit war rather than the opposite of war. War itself may be considered antiwar, such as when a "preventive war" is begun to preempt a larger, more destructive form of warfare.

high-resolution imagery—is altogether undesirable. One reason for such a view is that there are times the US government simply cannot watch all of the “niche” issues that NGOs and IGOs want monitored. In fact, work done by groups like Human Rights Watch or Greenpeace could actually advance US policy interests by providing timely information in support of US policy. In effect, they could extend the “eyes and ears” of the government on a number of issues.

Arms Control and Verification

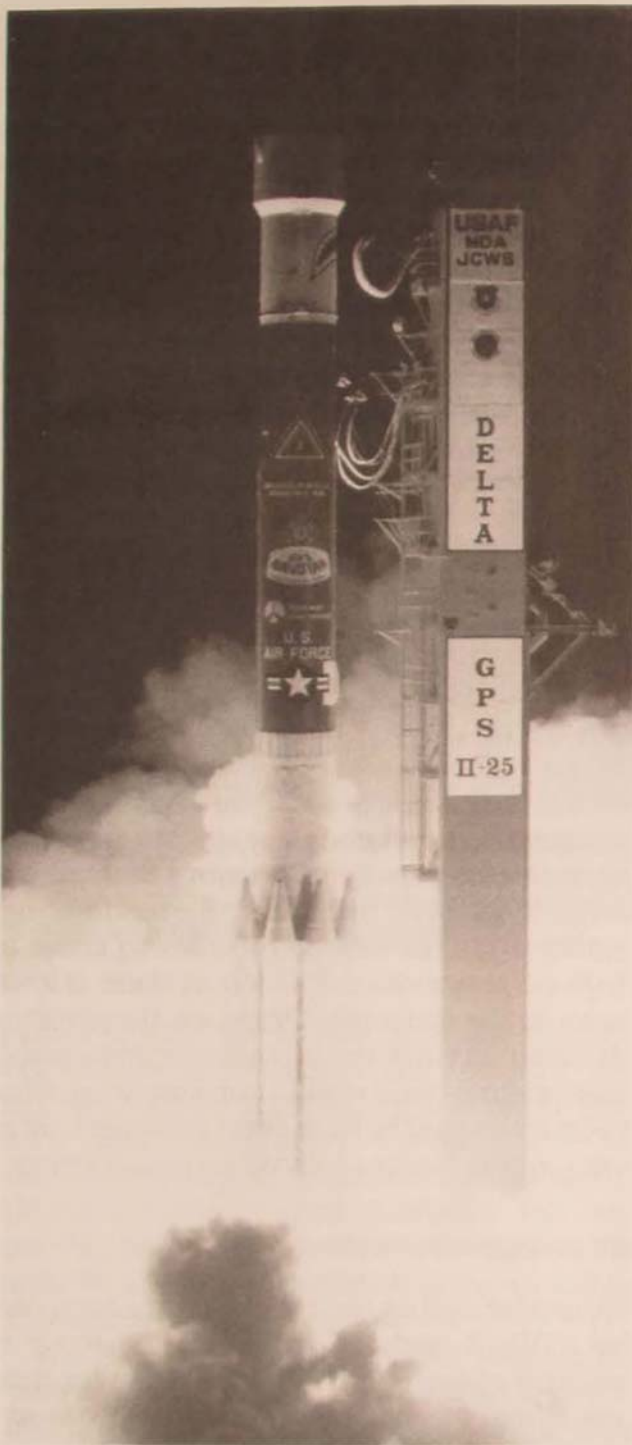
Imagery satellites, long considered the bedrock of arms-control monitoring, owe their very existence to the pursuit of verifiable arms control treaties during the cold war. Soviet intransigence with respect to on-site inspections had all but killed any prospects for meaningful arms control between the United States and the Soviet Union until 1962. At that time, the newly created US Arms Control and Disarmament Agency (ACDA) commissioned the Woods Hole Summer Study to consider issues related to verification of arms-control agreements with the Soviet Union. As a result, verification regimes that viewed on-site inspection as the sine qua non of verification were scrapped in favor of agreements that could be verified using “minimum access” methods, otherwise known as National Technical Means, or NTM.³⁵

The diplomatic currency of American NTM during the cold war is legendary and has resulted in the creation of a certain mystique regarding the true capabilities of America’s spy satellites. The mystery of spy satellites has captured the imaginations of Hollywood, the public, and is a matter of great interest abroad. Given the highly classified protection afforded information about these satellites and the imaginations of screenwriters and reporters, other countries would find it nearly impossible to separate fact from fiction, hypothesis from hyperbole. In response, foreign governments may employ commercial imagery satellites to gauge their activities with what they believe American NTM can detect. If

successful, this could seriously affect the ability of the United States to verify compliance with arms-control agreements.

Poor Man’s NTM. As commercial satellite imagery becomes increasingly commonplace, the mystique long associated with superpower NTM will eventually diminish. Such a development would not be altogether negative, however. Nations that have previously resisted the use of NTM to verify arms-control agreements might finally agree to its use since they would have direct access to their own source of satellite imagery—a sort of “poor man’s NTM.”³⁶ On the other hand, it may be difficult to convince them to trust commercial imagery suppliers that hail from another country, particularly with respect to American firms that are currently or have formerly been associated with the Pentagon or the intelligence community. Skeptical foreign governments might then turn to providers with less political baggage, or may even reject verification regimes based on commercial imagery altogether.

New Players and “Noise.” Commercial satellite imagery will also affect the world of arms-control verification and compliance diplomacy as a new set of players will emerge empowered with their own “eyes in the sky.”³⁷ These players will include NGOs and IGOs, as well as “white hat” countries like Canada, Sweden, Australia, and the Netherlands.³⁸ Increasing the number of players with access to high-resolution satellite imagery will undoubtedly elevate the “noise” level with respect to compliance assessments. A 1996 study prepared by Science Applications International Corporation concluded that with a new cast of players and attendant increase in noise, the compliance process will be affected by premature revelations, false alarms, increased ambiguity, use of stalling tactics, and self-serving political agendas.³⁹ By increasing the noise level, differentiating between proscribed and permitted activities may become even more difficult since assessing compliance invariably requires attempting to prove a negative (i.e., that a certain proscribed activity is *not* taking place).⁴⁰



A Delta II carries a Global Positioning System (GPS) Satellite into orbit in 1996. Security concerns over the proliferation of GPS receivers around the world offer a thought-provoking corollary to the questions raised by the emergence of high-resolution commercial imagery satellites.

Effective Verification. The noise issue is critically important to the United States because of its exacting “effective verification” standard. A treaty is considered to be effectively verifiable if the United States believes that it can detect any militarily significant breach of the agreement and do so in time to respond effectively and deny the other party any material benefit from the violation. Under the rubric of effective verification, it is assumed that violations will be met with some level of US response.* Consequently, the standard of evidence required to “prove” non-compliance is incredibly demanding. After detection, the evidence must survive the withering fire of skeptics and apologists who often insist on incontrovertible proof during the interagency review process. Beyond those requirements, however, evidence of noncompliance must also be innately credible and easily understood by policy makers so they can formulate and justify an effective response to violations.⁴¹ If the evidence is ambiguous and fails to persuade policy makers that a proportional response is warranted, not only can the verification regime be undermined, but the agreement itself could also unravel.

Deception. The exacting standard of evidence required for compliance assessments may be politically necessary, but some countries may view it as a tacit invitation to cheat on their agreements. They do not have to conceal proscribed activities or equipment completely from US observation, but merely create enough ambiguity that the activity is lost in the noise. Creating just that level of ambiguity is the role of *maskirovka*, a Soviet military term that most closely equates to that of the English concept of “deception” but includes camouflage, cover, decoys, feints, disinformation, and information denial.⁴² The Soviets were masters at it, and during the cold war, the implications it held vis-à-vis strategic stability were enormous. The principal challenge to arms controllers during that era was

*The United States could respond to violations with any or all of its Instruments of national power. Depending on the significance of the violation, the United States could protest diplomatically by demarche, raise the issue publicly, levy economic sanctions, or even conduct military operations against the violator.

designing an agreement that could prevent Soviet cheating. Amrom Katz, an arms-control legend and father of NTM, underscored the verification challenge in a manner worthy of Yogi Berra when he testified before Congress, "We have never found anything that the Soviets have successfully hidden."⁴³

Incentives to Cheat. Deception is still a concern of the present generation of arms controllers, and in some respects, they have a much more difficult job than did the cold warriors. Today's international environment is no longer dominated by superpower rivalry, but is characterized by regional disputes that require multilateral solutions. Asymmetries abound. Not even the former Soviet Union can match the United States in terms of its broad economic, political, or military power. Consequently, there are tremendous pressures in many regions to level the geopolitical playing field, creating incentives to cheat on arms-control agreements.

The Kennedy administration found that "verification acts as a deterrent to evasion only to the extent that a potential violator is concerned with the risks of exposure."⁴⁴ Accordingly, would-be violators would be well advised to fully assess their risk of exposure and develop methods to avoid detection. As states become more familiar with what can be seen by imagery satellites (and what cannot), there is a chance that some will use their newfound knowledge to risk cheating. On the other hand, there is no clear-cut answer to whether the availability of commercial satellite imagery will influence a country's decision to cheat by supporting its deception efforts because fear of detection is but one element of such a calculation. The other and more important element is national self-interest, and as ACDA concluded long ago, "National self-interest, rather than fear of detection, will remain the principal inducement to compliance."⁴⁵

The Opportunities

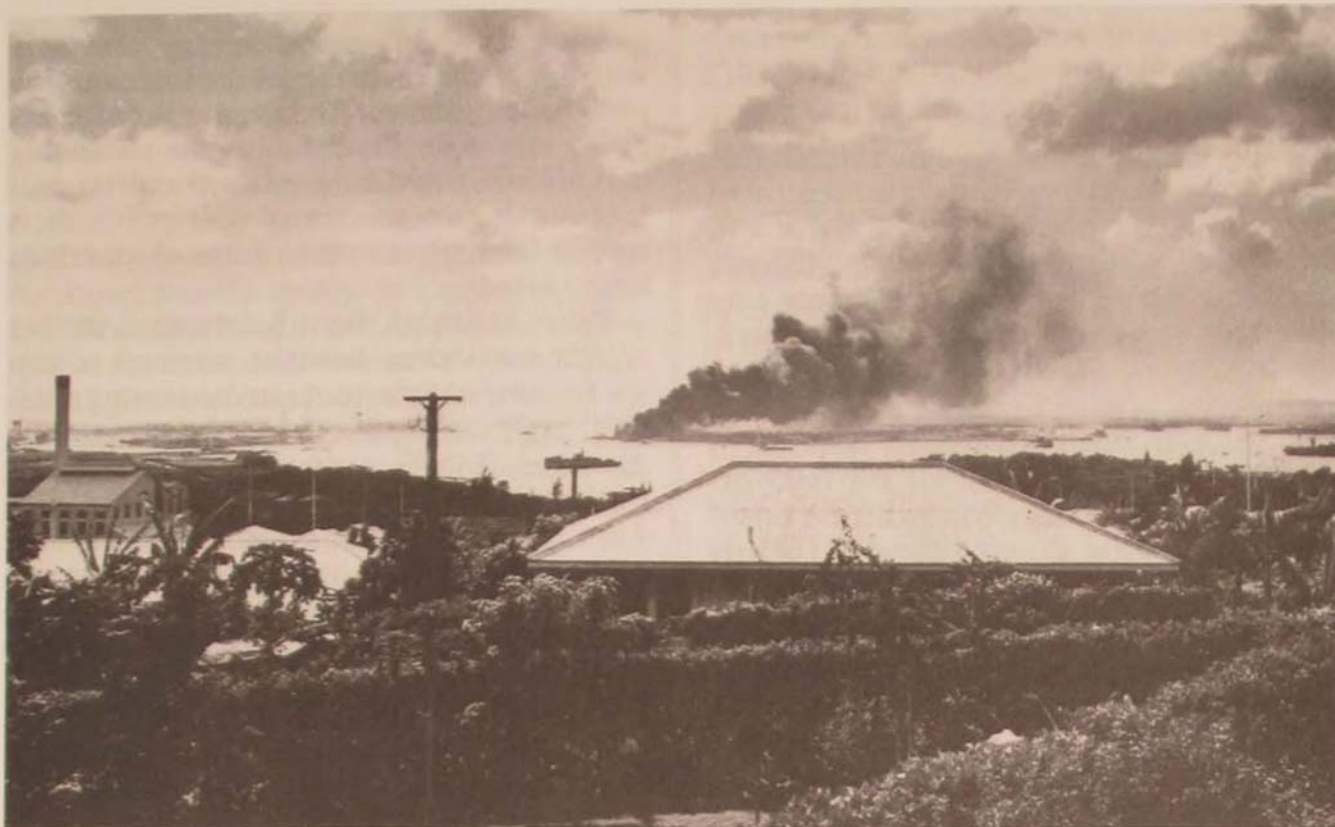
One outgrowth of private investment in commercial satellite imagery systems involves the potential for spin-off. The term *spin-off* refers

to technology developed for the military that might have some commercial application down the road. For example, much of the impetus for the new generation of commercial imaging satellites resulted from research done for the Strategic Defense Initiative (SDI).⁴⁶ Although spin-off technologies from SDI investments jump-started the interest in the high-resolution remote sensing industry, diminishing defense budgets will no doubt lessen the impact that military spending has on future technological developments. Nowhere is this more true than in information systems, where defense spending has generally played only a minor role in the explosive growth of computers, digital data storage, and high-speed communications.⁴⁷

What this means is that the tables may have turned with respect to spin-offs as technology originally developed for the private sector may now serve as the touchstone for government systems. This has largely already come about in the area of electro-optical sensors, as well as computers and mass storage that are critical elements of any digital imagery system.⁴⁸ To stay competitive, firms will have to prove their agility and creativeness in order to come up with better products and deliver them at lower costs to the customer. Therefore, the principal dynamic at work in the space reconnaissance business may well result from corporate effort to improve the "bottom line" for shareholders and not the National Reconnaissance Office.⁴⁹

US Plans for Commercial Imagery

Notwithstanding the policy goals enunciated by PDD-23 and the demonstrated value to military operations during the Gulf War, there are some government imagery analysts and policy makers that are less than enthusiastic in their approach toward commercial satellite imagery. This may be the result of either misapprehension of the true potential of these systems, or perhaps simply reflect nervousness with the prospect of bankrolling an industry that can make life much more difficult for those involved in national security. On the other hand, many in government recognize that this technology is here to stay, and inte-



Pearl Harbor, December 1941. To conclude that access to satellite imagery by an adversary will make the difference between military success and debacle assumes some facts not in evidence. Richard Betts, a senior fellow at the Brookings Institution, concluded in his study of surprise attacks, "The primary problem in major strategic surprises is not intelligence warning but political disbelief."

grating it with the overall national imagery architecture could offset some known shortfalls in US space surveillance and reconnaissance capability. While the planned fleet of commercial imaging satellites could certainly address some collection shortfalls, the one area that has received much less attention but holds much greater potential is the so-called back-end problem.

The Back-End Problem. Adm William O. Studeman, former deputy director of the Central Intelligence Agency, acknowledged that the government has placed too much emphasis on the "collection apparatus—its physical attributes, orbits, bells, and whistles" and not enough on how the data is processed, analyzed, and disseminated after it has been collected.⁵⁰ The myriad of activities needed to capture, process, analyze, produce, and disseminate information from imagery satellites is known as the system's back end. Unlike the

government, working end-to-end solutions is the forte of private enterprise, where market opportunities and cost-cutting drive innovation. Private companies will inevitably seek to improve their market share by devising innovative solutions to the back end of the imagery cycle that will make imagery more relevant and easier to use for their customers.

NIMA Charts Its Course. To its credit, the National Imagery and Mapping Agency (NIMA) has already taken several steps in an effort to tap into the innovative expertise of the marketplace. It recently completed its very first strategic plan and placed the use of commercial satellite imagery at the top of its list of strategic objectives.⁵¹ Indeed, before its release, the former director of NIMA, Rear Adm Jack Dantone said of commercial imagery:

We're committed to it not because it's the right thing to do politically but because it's the right thing to do. It will probably *supplant* [emphasis

added] some of the requirements that we have for other imagery, and that can only be good.⁵²

It is interesting to note that while it is generally thought that commercial satellite imagery will be used extensively for geospatial applications, the presumption is that it will play less of a role for classical intelligence functions. This is because "intelligence uses often require imagery resolution and timeliness that exceed the advertised capabilities of commercial satellite systems."⁵³ Some analysts and even end users remain skeptical of using commercial imagery for ISR tasks despite the obvious policy contradiction inherent in such a view. Current US policy clearly regards the use of commercial satellite imagery by foreign intelligence services as a genuine threat to national security.

Issues

The fundamental goal of current US remote sensing policy "is to support and to enhance US industrial competitiveness in the field of remote sensing space capabilities while at the same time protecting US national security and foreign policy interests."⁵⁴ The principal challenge is how to protect US national security interests without inadvertently stunting the growth of the very industry the new policy is intended to promote.

Shutter Control

In order to manage the attendant risks to US national security, both the Land Remote Sensing Policy Act of 1992 and PDD-23 rely on the possible restriction of data collection and/or dissemination.⁵⁵ Termed *shutter control*, perhaps no other single issue is more controversial than this cornerstone of current US policy vis-à-vis commercial high-resolution imaging satellites. Although meant to address the serious issues of operational security and force protection, there are obvious problems with US shutter-control policy. Alternative sources for imagery data already exist from a variety of foreign providers. Additionally, there is no

guarantee that US remote-sensing providers will dominate the market as the international providers of choice. The implication for US policy is simple: Overzealous use of shutter control will drive away customers who will seek alternative sources of data rather than subject themselves to the whims of American bureaucrats.⁵⁶

Prior Restraint. Even before such market adjustments occur, however, attempts to cap the shutters of American remote sensing satellites might be challenged in the courts. The day after PDD-23 was issued, David Bartlett, president of the Radio-Television News Directors Association, fired a warning shot when he notified key congressional leaders that the wording of the government's shutter-control policy fails to establish "a clear and present danger."⁵⁷ A clear and present danger is the burden of proof offered by Justice Oliver Wendell Holmes as the only compelling justification for the federal government enforcing "prior restraint" on fully protected speech.⁵⁸ According to the doctrine of prior restraint, the government cannot limit speech protected under the First Amendment "predicated on surmise or conjecture that untoward consequences may result." Supreme Court case law suggests that prior restraint is only necessary to prevent "direct, immediate, and irreparable damage to our Nation or its people."⁵⁹

Legal scholars believe that the issue of shutter control will be brought before the court sooner rather than later, and when it is, the government will find it difficult (some say impossible) to make a case that prior restraint is the most obvious remedy.⁶⁰ Others contend that commercial imagery and imagery-derived information does not even qualify for full protection under the Constitution. They argue that the First Amendment was crafted to protect freedom of speech and of the press, shielding expression of opinion, advocacy, and dissent from governmental censorship. Although data deserves some measure of protection from wanton censorship or governmental restrictions, they reason it does not require the same degree of protection as speech.⁶¹ Moreover, the US government al-

ready has several postpublication remedies under existing federal law to address such issues as espionage and distributing photographs of defense installations.⁶²

International Considerations. Aside from domestic legal concerns, there are a number of international concerns that could further confound the US policy of shutter control. Ever since the first Landsat was launched, the United States has endeavored to provide generous open and nondiscriminatory access to Landsat imagery. By adhering to the principles of "open skies" and nondiscriminatory access to remote-sensing data, the United States has put into practice the very principles embodied in international agreements related to the commercial use of space. As an added bonus, the United States was able to establish the bona fides for overflights made by remote-sensing satellites in general, including its intelligence systems.⁶³

Excessive use of shutter control could change all of that. Developing nations that come to depend upon commercial satellite imagery as a critical commodity will most likely take a dim view of US government efforts to exercise shutter control that could deny them the very information upon which they have come to depend. Sensed states might even find that the US action was in contravention of the UN's remote-sensing principles for having conducting remote-sensing activities "in a manner detrimental" to the rights of lesser-developed nations.

No Panacea. Even if the policy survives domestic court challenges, shutter control will certainly be cumbersome to implement for any length of time given the scope of US national security interests, the number of different companies, the variety of sensors in orbit, and the fact that the US military and intelligence communities will increasingly use commercial imagery. Even limited use of shutter control could drive customers away from American-flagged satellites in favor of foreign competitors. Shutter control, therefore, cannot be viewed as a panacea for addressing the security concerns of this country with respect to satellite observation of sensi-

tive operations. In fact, it may turn out to be a blunt instrument that could seriously harm the country's long-term security interests more than it protects them.

The United States must do more to preserve its advantage in the military use of space for information operations and other military tasks by protecting its space assets—including commercial satellites—from attempts to attack or degrade them.

Space Control

Andrew F. Krepinevich, the executive director for the Center for Strategic and Budgetary Assessments and a member of the National Defense Panel, noted that in the panel's report, *Transforming Defense: National Security in the 21st Century*, protection of all the nation's space assets was a principal concern. One reason the NDP highlighted the issue was that DOD has estimated 70 percent of military space requirements will migrate from military to commercial platforms in the next decade. Consequently, the United States must do more to preserve its advantage in the military use of space for information operations and other military tasks by protecting its space assets—including commercial satellites—from attempts to attack or degrade them.⁶⁴ Gen Howell M. Estes III, commander in chief of US Space Command, echoed the cautionary theme of the National Defense Panel during recent testimony before Congress. He underscored just how dependent US policy makers, the intelligence community, and military planners have become on satellites and that America must actively pursue measures to "guard against turning [that] dependence into a vulnerability."⁶⁵ While there appears to be general agreement with such an assessment, the White House and Congress are divided on just what to do about US vulnerabilities in space.⁶⁶

Satellite Legitimacy and Immunity. Satellite vulnerability is closely linked to the legal status of satellites. One of the great ironies of the cold war is that the United States and the Soviet Union implicitly cooperated to facilitate satellite reconnaissance of each other's territories despite the obvious contradictions inherent in such a policy. While the Soviet Union initially objected to American satellite overflights, Soviet opposition softened as the Kremlin began to see results from its own satellites, which Moscow found particularly valuable with respect to its on-again, off-again relationship with China.⁶⁷ So, over time the two superpowers established a "practice of the parties" as the legal basis for legitimizing the use of satellites for reconnaissance—an unspoken and unrecorded "gentleman's agreement" that respected the immunity of each other's reconnaissance satellites.⁶⁸

The legal status of satellites is difficult to determine for the same reason that has stymied efforts to control other technologies that can be used for military and civil purposes. Satellites are clearly "dual-use" technologies that can perform multiple missions using the same spacecraft. Some states have argued that immunity should be granted only to satellites that perform purely peaceful functions or otherwise contribute to strategic stability, excluding satellites that perform surveillance and reconnaissance, early warning, and any other satellites that support military operations. Critics argue against this approach because it is difficult to parse the functionality of satellites, not to mention the complexities associated with verifying compliance with any agreement based on it. Instead, some states favor embracing the principle of global immunity for all Earth-orbiting satellites.⁶⁹

Noninterference. Prior to 1972, there had been no specific ban on interfering with a nation's satellite systems until the United States and the former Soviet Union agreed on NTM-based verification of the Strategic Arms Limitation Talks (SALT) I accord and the Antiballistic Missile (ABM) Treaty. Paragraph 2 of Article XII of the ABM Treaty states that "each Party undertakes not to interfere with

the national technical means of verification of the other Party operating in accordance with paragraph 1 of this Article."⁷⁰ As a result, an international norm became firmly established by the superpowers that legitimized the use of satellites insofar as they legally acknowledged the need to verify compliance with arms control as the *raison d'être* for space-based reconnaissance. With growing international dependence on commercial imagery satellites, the United States might witness renewed efforts by the international community to protect commercial satellites from "harmful interference" pursuant to Article IX of the Outer Space Treaty. Moreover, should commercial satellites ever become *de facto* NTM for nonspace-faring nations, future arms-control agreements may have to include a "noninterference" provision to protect "poor man's NTM" to the same degree as the United States and the former Soviet Union enjoy under Article XII of the ABM Treaty.

ASAT and the ABM Treaty. One final issue related to space control and satellite vulnerability is the proposition that the United States might use antisatellite (ASAT) weapons to counter foreign commercial-imaging satellites during times of crisis or military conflict. President Bill Clinton made history as the first US president to use the line-item veto, targeting three ASAT programs with his pen, including the Army's Kinetic Energy Antisatellite Program. According to Robert Bell, special assistant to the president and senior director for defense policy and arms control on the National Security Council (NSC), although the administration recognizes the need for space control, it "doesn't necessarily believe at this time that the Army program is the appropriate solution." The White House would rather forgo attacking the satellites themselves, and instead find ways to destroy or disrupt the information downlinked by the satellites.⁷¹

The Nexus. One of the principal reasons for NSC opposition to ASAT programs is the inextricable link between ASAT weapons and the 1972 ABM Treaty. The Clinton administration reaffirmed the traditional interpretation of the treaty, which prohibits the development, test-

ing, and deployment of sea-based, space-based, and mobile land-based ABM systems regardless of the technology they would use. The reason for the connection between ASAT weapons and the ABM Treaty is because many of the ASAT employment concepts against low-Earth-orbiting satellites would also be useful if used against intercontinental ballistic missiles during the lengthy midcourse phase of their trajectories. Even though there is no international treaty that specifically bans the development, testing, and deployment of ASAT weapons per se, critics fear that ASAT programs could be used as covers for development of illegal ABM technologies that are severely restricted by the ABM Treaty.

Unfortunately, the crossover between ABM and ASAT does not end with the ABM Treaty, but affects the US relationship with the Russian Federation and the START treaties. Russia has explicitly linked the inviolability of the ABM Treaty with its commitment to full implementation of START I, ratification of START II, and START III negotiations for even deeper nuclear force reductions. Although efforts to counter the threats posed by foreign commercial imagery satellites using ASAT weapons may be legitimate, they nonetheless may threaten the delicate strategic relationship with Russia.

Conclusions and Policy Alternatives

Imagery is powerful, persuasive, and poignant. Within the photographic image lies a wealth of information that can transcend the mere representation of reflected photons. Not only can images record an event frozen in space and time, they inform authoritatively and are presumed to offer immutable representations of fact. Moreover, images can often evoke an emotional response from those who view them. Recall for a moment the image of the Earth taken by the Apollo 8 astronauts as they orbited the Moon on Christmas Eve 1968. It was a spectacular image—Earth set adrift in the blackness of space that quickly came to

symbolize the global context in which mankind lives. “Think globally, act locally!” became the mantra of an entire generation of global activists, whose perceptions of the world were undeniably shaped by that singularly stunning image of planet Earth.

The inherent power of imagery is one of the reasons underlying the spirited, and often passionate policy debates over commercial imagery satellites and their impact on US national security. Although the current policy approach—to encourage the growth of the domestic remote-sensing market—is a gamble, realistically it is the only game in town. The technologies for many of these satellites either cannot be effectively controlled or already exist well beyond America’s grasp. On the other hand, if American firms eventually dominate the global market, the US government will at least have some measure of control over the availability and distribution of the data from these satellites.

The Role of Government

Consistent with the long-term policy goals of PDD-23, the federal government should continue its efforts to encourage domestic growth of the remote-sensing market. On a case-by-case basis, the government may want to consider underwriting private development of new technologies and applications that hold particular promise for specific government requirements. By integrating the best of what the market has to offer with that of its national reconnaissance systems, the United States can slow or perhaps even prevent the erosion of American information dominance in space-based imagery intelligence, surveillance, and reconnaissance.

Nonetheless, the United States must resist the temptation to be too generous with governmental contracts for remote-sensing products and services. With its enormous buying power and influence over markets, the government could create a destructive codependency that could diminish incentives for innovation and encourage governmental intrusiveness and regulation. For that reason, the challenge for policy makers will be to balance the coun-

try's legitimate security concerns against the requirement for robust American competitiveness. Policy makers will simply have to trust in the self-regulating dynamics of the market for high-resolution satellite imagery and hope that it will contribute more to the maintenance of peace than to provoking conflict.

Negotiation over Negation. Although there is great temptation to address the threat posed by commercial imagery satellites with ASAT weaponry, their use could actually encourage others to place US satellites and/or ground infrastructures in jeopardy. A better approach would be US sponsorship of a legally binding treaty on the rights and obligations of remote-sensing countries with respect to data distribution. Such a treaty would require, inter alia, that sensing states possess the capability of exercising shutter control when the collection and/or dissemination of imagery data could harm another state while not depriving legitimate users of data they require. This multilateral device would complete what PDD-23 unilaterally began, enabling the US government to manage the security threat without placing American industry at a disadvantage or risking international rebuke.

Third-Wave Warfare. As the United States is carried ahead by the third wave as a postindustrial state, it can capitalize on its technological supremacy to obviate or reduce the need to rely on the tired strategies and structures of second-wave land warfare. Current joint operational doctrine, however, presumes that America can continue to use the strategies of the past, and as Maj Gen Chuck Link, USAF, Retired, has summarized, tries to "put the highest number of America's sons and daughters in range of enemy fires in as short a time as possible."⁷² Still, there is an alternative.

The United States can shed its legacy construct and recognize that large maneuver forces are rapidly becoming a "sunset" capability in the age of information dominance, stealth, and unprecedented battle-space lethal-

ity. Advanced technologies offer another approach to warfare, one where force is applied precisely to the vital nodes of an enemy from remote platforms. This new vision brings with it the ability to apply full spectrum dominance to the battle space in a manner that will lessen much of the current apprehension over America's growing vulnerability to satellite observation and targeting. Thus, the debate over high-resolution imaging satellites and the threat they pose really has much more to do with the preferred structure of the US military and the nature of future conflicts than with the capabilities of the satellites themselves.

Is the Sky Falling?

Ultimately, the existence of high-resolution commercial imagery satellites is simply a fact of life that US policy makers will have to accept. Although the information they will provide will undoubtedly offer many challenges in the years ahead, in some respects these high-tech gadgets merely represent the latest iteration in man's struggle to achieve relative advantage over one another. What often happens when a new technology is developed is that the anxiety and fear it generates is followed in quick succession by relief and optimism when another technological innovation cuts short the relative advantage of the first. This is the classic measure/countermeasure problem.

So, is the "sky falling" because of these new sentinels rising? The answer is complicated because these technologies are neither revolutionary nor inconsequential. Nevertheless, in the near term, the United States should not witness a fundamental alteration in the status quo, although the long-term prospects are less clear. In the final analysis, however, changes in the geostrategic landscape of the multipolar world will have far more impact on US national security than will any of the current or planned capabilities of commercial imagery satellites. □

Notes

1. The SS-25 is a three-stage, solid-fuel, road-mobile intercontinental ballistic missile (ICBM) that continues to serve in large numbers in Russia's nuclear arsenal. In its Start-1 configuration as a space launch vehicle, the missile incorporates an additional fourth stage used to boost the satellite payload into orbit. It is assembled at the Votkinsk Machine Building Plant—the same facility that produces the SS-25 ICBM, SS-27 (Russia's newest ICBM), and also built the infamous SS-20 IRBM banned by the 1987 Intermediate Nuclear Forces Treaty. The Russian development of the Start-1 space launch vehicle (as well as the Rokot, an SS-19 ICBM variant) precipitated a lengthy dispute between the United States and the Russian Federation over the accountability of space launch vehicles that incorporate the first stages of ICBMs or submarine-launched ballistic missiles (SLBM). Prior to signing Joint Statement 21 to the START Treaty in Geneva on 28 September 1995, Russia objected to the US position that a ballistic missile declared as a space-launch vehicle, but that incorporated a first stage of an ICBM or SLBM, was subject "to the provisions of the Treaty relating to ICBMs or SLBMs as an ICBM or SLBM of that type." Had the Russian position prevailed, these missiles could have been removed from accountability by declaring that they were space-launch vehicles. The Russian assertion now threatened to unravel the START verification regime and derail negotiations for deeper nuclear weapons reductions, but would have also opened up an enormous loophole for the proliferation of ballistic missile technology under the pretext of peaceful space launch activities.
2. "Russia Lofts U.S. Imaging Satellite," *Aviation Week & Space Technology* 148, no. 1 (5 January 1998): 29.
3. "Satellite Answers," *Aerospace Daily* 185, no. 6 (12 January 1998): 43.
4. See William E. Stoney, "Outlook for the Future: Land Sensing Satellites in the Year 2000," in *The Remote Sensing Tutorial On-Line Handbook* [CD-ROM], ed. Nicholas M. Short Sr. (Greenbelt, Md.: National Aeronautics and Space Administration Goddard Space Flight Center, 1998), 1-7.
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7. This practical argument is central to US policy toward the commercialization of space. To maintain a competitive and potentially dominant market position, US firms must not be impeded by regulatory risk. (See J. Laurent Scharff, "News Dissemination of Images from Remote Sensing Satellites: First Amendment Standards for Judging National Security Risks," in *Space Imagery and News Gathering for the 1990s: So What?* Proceedings from the Symposium on "Foreign Policy and Remote Sensing" held at the Patterson School of Diplomacy and International Commerce in Lexington, Kentucky, 24-25 February 1989, ed. Robert A. McDonald (Bethesda, Md.: American Society for Photogrammetry and Remote Sensing, 1991), 49.
8. Robert A. McDonald, "Corona, Argon, and Lanyard: A Revolution for US Overhead Reconnaissance," in *Corona between the Sun and the Earth: The First NRO Reconnaissance Eye in Space*, Robert A. McDonald, ed. (Bethesda, Md.: American Society for Photogrammetry and Remote Sensing, 1997), 70-71; and National Reconnaissance Office, Historical Imagery Declassification Fact Sheet, available from <http://www.odci.gov/corona/facts/html>; Internet accessed 6 October 1997.
9. Robert A. McDonald, "Corona Imagery: A Revolution in Intelligence and Buckets of Gold for National Security," in McDonald, 211-15.
10. Ann M. Florini, "The Opening Skies: Third-Party Imaging Satellites and U.S. Security," *International Security* 13, no. 2 (Fall 1988): 97-98. The ability to discern detail in an image and derive militarily significant information is not entirely determined by the spatial resolution of an image. Imagery analysts use other techniques that can lead to identifying unique signatures for natural and man-made objects and include shape, size, tone, texture, pattern, shadow, site, scale, and association.
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14. *Ibid.*, 4.
15. *Ibid.*, 7-15.
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Way Points

The pen is the tongue of the mind.

—Miguel de Cervantes

SPACE AS AN AREA OF RESPONSIBILITY

LT COL PAUL L. BAILEY, USAFR

IN THE SPRING of 1997, a proposal by United States Space Command (USSPACECOM) through the Joint Staff brought some profound thinking to bear on outer space. The proposal entailed making space an area of responsibility (AOR) within the Unified Command Plan (UCP), with the commander in chief of USSPACECOM (CINCSPACE) as the designated combatant commander responsible for that AOR.¹

This proposal was made in the context of the most recent projection of the current and future security environment. The recently completed Quadrennial Defense Review (QDR) depicts a world of regional instability and failed states with the distinct possibility of a major theater war in the near term. The projected QDR security environment then focuses on a midterm environment of more challenging regional threats and envisions a regional great power or global peer competitor in the long term of 2010 and beyond.²

Some people described Operations Desert Shield/Desert Storm as the “first space war.” The initial assessment of space capabilities by some of the service’s senior leadership and professional cadre was euphoric but gradually tapered off to a general acknowledgment of those capabilities. Space planners, however, continued to formulate plans for further use of space power within the context of each succeeding analysis of the global-security environment. Most people perceived space capabilities fitting nicely into the context of the QDR security environment; consequently, it seemed the opportune time to staff an enlarged role for space within the military-command framework.

A Unified Space Command

In the summer of 1993, Gen Charles A. Horner, leader of the Desert Storm air campaign and former CINCSPACE, told attendees of the annual

National Space Symposium that “space is vitally important.” He further stated that

throughout military history, command of the high ground, first on the land and then in the air, has been a prelude to victory on the battlefield. Desert Storm has taught us that, hereafter, victory will smile on the nation that commands the ultimate high ground—space. Having said that, I must emphasize that military space systems should not exist for themselves. US Space Command and its components should not exist for themselves. Space institutions and space infrastructures should not exist for themselves. Rather, all should exist and endure to ensure that US and allied war-fighting forces are able to fight and win in the air, on the ground, and at sea. If this is not our recognized and shared goal, then we should turn out the lights and lock the doors at Space Command.³

USSPACECOM planners worked to fulfill this vision through successive CINCSPACEs—Gen Joseph W. Ashy and the current CINC, Gen Howell M. Estes.

Space planners had worked within General Horner’s vision for some time prior to his speech. On 4 July 1982, President Ronald Reagan issued a national space policy that called for developing “enduring space systems.”⁴ Secretary of Defense Caspar Weinberger subsequently initiated a study on how Department of Defense (DOD) space assets could be integrated into the overall space structure. Additionally, the Joint Staff conducted exercises involving operational control of space that highlighted the need for “improving coordination of space assets.”⁵ In April 1983, Gen James V. Hartinger, CINC of Aerospace Defense Command, recommended to the Joint Chiefs of Staff (JCS) that a unified space command be formed. On 7 June 1983, the Air Force chief of staff echoed that recommendation. After further study, the president and secretary of defense approved the establishment of a unified space command. On 23 September 1985, USSPACECOM was activated and established its headquarters at Peterson Air Force Base, Colorado.

Objective

Within the framework of the unified command structure, military space was to be a decisive factor in determining the outcome of a conflict—or, for that matter, determining the successful outcome of any military operation. After the successful production of USSPACECOM, subsequent staff efforts began to focus on the simple statement that “space is a place.”

A parallel educational process within the space community for the military services capitalized on military space capabilities that had received much publicity in the Gulf War. This initiative stemmed from the realization that too much of the military still viewed space—especially space assets—as a rather mysterious area. A perfect example is a statement concerning planning for use of a military space asset: “I don’t care what you have to do, park the thing [space vehicle] over our theater and leave it there.” The statement, of course, ignores basic laws of physics and the work of Johannes Kepler.⁶ One logical outcome of such a statement involved

placing space in a simple, clearly defined, and identifiable position within the unified command structure—in other words, designating space as an AOR.

In order for USSPACECOM to have an AOR, the command had to have a regional rather than functional designation. USSPACECOM planners prepared and staffed a briefing to UCP that explained the rationale for this proposed change. The briefing described space as the “fourth” medium and the “sixth” AOR.⁷

These proposed changes were presented to the secretary of defense in November 1996. The UCP Working Group for the regular review cycle of the UCP heard briefings on the changes on 14 January 1997.⁸ Planners also provided members of the UCP Working Group a follow-on staff package with proposed changes to the UCP for comment. One focus of the argument and ensuing discussions was that regional CINCs have command authority over assigned forces and “coordinate the boundaries of geographic areas specified in the UCP with other combatant commanders and with other US Government agencies or agencies of countries in the AOR, as necessary to prevent both *duplication of effort and lack of adequate control of operations in the delineated areas*” (emphasis added).⁹

Plans announced by the Air Force in a study entitled *Global Engagement: A Vision for the 21st Century Air Force*, released in the spring of 1997, further complicated the AOR controversy. The document describes the Air Force desire to be an air and space force that will dominate the medium of space in the next century’s battles. In reaction to this new Air Force concept, Maj Gen Robert S. Dickman, the DOD space architect, stated that “the problem . . . is that [the Air Force Vision] does not take into account that U.S. forces will probably not see combat in space in the foreseeable future—if at all.”¹⁰

Strategy and Analysis

Naturally, this effort produced a storm of controversy and discussion. Following the formal presentation of the proposal in Washington, USSPACECOM conducted a series of briefings for the participants to allow further discussion and debate. The debate boiled over into the public sector with the publication of an article in *Aviation Week & Space Technology* that described the issues stemming from the proposal: the “elevation of ‘space’ to an equal footing with other AORs is a sensitive issue.” Further, General Estes stated that “I, as a military commander, have to say that somebody is going to threaten [space assets]. And when they [do], we [should] have armed forces to protect them. So, it’s a natural evolution.”¹¹

To which threatening space forces did General Estes refer? According to the *Interavia Space Directory, 1991-1992*, the former Soviet Union developed a co-orbital antisatellite (ASAT) interceptor around 1968. Estimates indicated that the ASAT would require about three and one-half

hours and several orbits to intercept its target. However, its operational capability remains unknown at this time since no known testing of the system has occurred since 1982. The document further notes that one version of the former Soviet Union's antiballistic missile—the Galosh interceptor—could be used against low-altitude targets. Additionally, the document describes possible directed-energy systems at Saryshagan and Dushanbe that could damage satellites within their range and field of view. Finally, jamming both uplinks and downlinks remains possible, since many nations already possess the electronic-combat capabilities needed to impair our space assets. Given proper resources and political will, other nations could produce—and may be producing—similar capabilities.¹²

The AOR Argument

Drawing examples from the history of warfare, USSPACECOM argued that technological surprise might pose a threat to our space assets.¹³ According to Alvin and Heidi Toffler's *War and Anti-War*, "The way we make wealth drives the way we conduct warfare."¹⁴ Consequently, as commerce flourished on land, at sea, and in the air, military forces were developed to protect national interests and investments. If history is any indication, then, the same development will occur in space.¹⁵ Therefore, since the other mediums are assigned within defined AORs, space should also be designated within an AOR. This should be especially true since the principles of physics in space differ from those in the other mediums, and military and commercial operations will occur in space. We should also note that USSPACECOM is the only command with forces capable of moving into and operating within the medium of space.¹⁶

To better understand this issue, one must understand the USSPACECOM argument for an AOR. The current UCP gives CINCSPACE "Presidential authority and responsibility to conduct warfighting missions in space—Space Control and Force Application."¹⁷ USSPACECOM's argument on this point is that space as an AOR would align existing *authority* with responsibilities no longer implied but presidentially authorized and assigned. USSPACECOM further notes that AORs clarify relationships and facilitate operations. The current UCP also states that CINCSPACE will "conduct operations to protect U.S. interests and investment in space."¹⁸ Because USSPACECOM has neither presidential authority nor the AOR responsibilities of a geographical CINC, its capability to effectively conduct those missions is diminished. Additionally, because US space assets are vulnerable, a space-faring enemy understands US dependence on those assets and could threaten them.¹⁹ This dependence takes the form of communications, navigation, weather, indications and warning, and intelligence support.

The command also argued new concepts to support its position. The job of protecting billions of dollars of US civil, commercial, and military space assets—and possibly selected international space assets—requires a

war-fighting CINC with a designated AOR. Further, that incredibly expensive investment was, in fact, a vital US national-security interest and could also be considered a center of gravity in certain situations.²⁰ The command also pointed out the similarity of on-orbit US space assets to terrestrial lines of communications (LOC). Space LOCs are critical to national security—specifically, to national defense, global navigation, terrestrial environmental sensing, global communications, and the global economy.²¹ USSPACECOM further believes that the designation of a space AOR will benefit its service relationships by clarifying those relationships and focusing on the seamless joint integration of operations. Finally, the command deems a space AOR a better integration of power in all of the operating mediums.²²

AOR proponents also drew on other sources to support their argument. During the course of the previously mentioned briefing to the UCP Working Group, *none* of the attendees except the Air Force and Navy came out in direct opposition to designating space an AOR. The Air Force argument that air and space form an indivisible whole did not carry throughout the staffing process on the issue. Arguments citing responsibility for transitory objects [forces] were thwarted by the success of Desert Storm. Specifically, forces from outside Central Command's AOR—from European Command, Pacific Command, Transportation Command, and Special Operations Command—either transited CENTCOM's AOR or were employed in it.

Possible Alternatives and Forces

Are there any alternatives to USSPACECOM's receiving a designated AOR? I see two possibilities. The first is to maintain the status quo in space. The second is to designate another CINC, single service, or government agency as the responsible organization for the overall control of military space activities—a *designated agency*.

The first alternative is a nondecision scenario at best. Space, for the US government, is a conglomeration of military, civil, commercial, and international activities.

Military space has seen each of the services begin booster programs independently in the late 1950s and early 1960s. Further, the services at one time independently developed service-specific space platforms for use in orbit. Although USSPACECOM today has Army, Navy, and Air Force components, the Air Force is the main focal point for space activities. Further, DOD's National Reconnaissance Office (NRO), designs, builds, and operates US reconnaissance satellites.²³ Coordination and cooperation already exist with the NRO within DOD. In its current designated responsibilities within DOD, USSPACECOM is the focal point for much of DOD's space activities.

On the civil side, the National Aeronautics and Space Administration (NASA) controls civil space activities, its most visible activity being the

space shuttle. However, even this activity has a direct DOD influence, since CINCSPACE is designated as the DOD director for the Space Transportation System. Further cooperation and integration between NASA and USSPACECOM are established and running—for example, collision avoidance from both orbital debris and other space objects, and varying degrees of cooperation in the use of both launchpads and space boosters.

NASA also leads in many areas of technology application and government fostering of commercial space ventures, such as the Pegasus launch vehicle. A winged vehicle, launched from a modified L-1011 aircraft, Pegasus carries small payloads to low-Earth orbit. There are also numerous examples of commercial communications and Earth-resource monitoring satellites. However, commercial space is very expensive and highly competitive.

The system works, but it may be possible to achieve better efficiencies in an era of declining government budgets. Maintaining the status quo—multiple agencies with large overhead costs—may become too expensive. Further, commercial space activities may truly flourish sometime in the near future, fulfilling the Tofflers' vision of developing true military capabilities in the medium of space.

The designated-agency alternative includes the possibility of forming a new military service, which could be called the National Space Force (NSF). Some advocates see the NSF emerging from the Air Force, just as the Air Force developed its own identity within the Army. Others would argue that it is time to create a separate space force because fast-evolving technology could be best applied only in a separate military service. More than likely, if such a revolutionary reorganization did occur, the idea would entail molding space-related elements of each of the existing services into a separate, distinct service. However, what would be the costs to the existing services? Further, would the establishment of an NSF subsume the existing CINCSPACE, with his or her UCP responsibilities? Obviously, establishing an NSF would require tremendous work.

Risk

Choosing the status quo carries the least risk but would involve higher costs as the current system continues into the next century. From a risk standpoint, doing nothing is the safest option.

USSPACECOM's AOR option appears viable but could have higher initial costs if the plan is implemented with either or both organizational consolidations and responsibilities. Establishing an AOR carries the risk of inviting an international perception of the weaponization of space and the possibility of a "space arms race" with an emerging peer competitor. Space has been militarized for decades. However, we could lessen those risks through diplomatic and informational campaigns of discussions, negotiations, and information sharing.

The designated-agency option has both high risk and high cost. Establishment of an NSF could seriously weaken the existing services and question the established force mix. Further, without its space forces and assets, the Air Force could become vulnerable to attempts to dissolve it as a service. Costs for transfer, recruiting, retention, and training of people for the NSF would be high, as well as costs for acquisition, transfer, and operation of materiel and equipment.

Partial Decision

The UCP Working Group made its recommendation: keep the space AOR issue throughout the Working Group process. In September 1997, the senior leadership of DOD and JCS reached a decision on the matter.

In effect, CINCSPACE assumed almost all of the responsibilities of a geographic CINC within the context of the UCP framework except noncombatant emergency evacuation, peacekeeping, and humanitarian relief. "It's all over but the emotional issue—designating space as an AOR."²⁴ USSPACECOM, already a functional unified command, will have codified in the UCP the additional responsibilities it sought as a regional CINCDom with an AOR.

USSPACECOM's new UCP responsibilities are an important step in military operations in space. USSPACECOM continues to support space being designated an AOR at the highest forums. Since responsibilities have been authorized for both a functional and regional unified command, some people would argue that space is a de facto AOR. All one has to do is codify that fact within the UCP framework to derive the full implications of a space AOR. A space AOR is not a question of why but a question of when. It is inevitable.

Conclusion

Space as an AOR has truly proved an emotional issue for many senior DOD decision makers. The traditional way of doing business, especially of conducting warfare and military operations, has changed before their very eyes. I would argue that the space AOR issue highlights a present-day, verifiable outcome in the revolution in military affairs.

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Notes

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4. Ronald H. Cole et al., *The History of the Unified Command Plan, 1946-1993* (Washington, D.C.: Joint History Office, Office of the Chairman of the Joint Chiefs of Staff [CJCS], February 1995), 95.
 5. *Ibid.*
 6. Johannes Kepler published his laws of planetary motion in 1609 and 1619. See James R. Wertz and Wiley J. Larson, eds., *Space Mission Analysis and Design* (Boston: Kluwer Academic Publishers, 1991), 122-23.
 7. Land, sea, and air are the traditional operating mediums; the fourth would be space. European Command, Atlantic Command, Pacific Command, Central Command, and Southern Command all have geographic AORs. USSPACECOM would have the sixth AOR.
 8. The UCP Working Group consisted of representatives from the nine unified commands, North American Aerospace Defense Command (NORAD), US Forces Korea (USFK), and the services.
 9. Joint Pub O-2, *Unified Action Armed Forces (UNAAF)*, 24 February 1995, III-5.
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 14. Alvin Toffler and Heidi Toffler, *War and Anti-War: Survival at the Dawn of the 21st Century* (Boston: Little, Brown and Company, 1993), 3.
 15. USSPACECOM briefing, slides 14-16.
 16. *Ibid.*, slide 24.
 17. *Ibid.*, slide 2.
 18. *Ibid.*, slide 3.
 19. *Ibid.*, slide 4.
 20. *Ibid.*
 21. *Ibid.*, slide 7.
 22. *Ibid.*, slide 24.
 23. "The National Reconnaissance Office: The Nation's Eyes and Ears in Space" (Washington, D.C.: NRO Public Affairs Staff, 1997).
 24. Brig Gen Alan Johnson, USSPACECOM/J5, interviewed by author, 5 October 1997.
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The radical of one century is the conservative of the next. The radical invents the views. When he has worn them out, the conservative adopts them.

—Mark Twain (Samuel Clemens)

EFFECTS-BASED AIRPOWER

LT COL GARY ENDERSBY, USAF, RETIRED
LT COL BARRY FULBRIGHT, USAF, RETIRED

Unfortunately, it was not until Desert Storm that we discovered that conventional air operations could not only support a ground scheme of maneuver but also could directly achieve operational- and strategic-level objectives— independent of ground forces, or even with ground forces in support.

—Gen Ronald R. Fogleman, former CSAF

IN SPITE OF the success of Desert Storm and more recently Deliberate Force, many airmen still lack a firm understanding of airpower.¹ As a group, airmen fail to cogently articulate airpower's strengths, falling back on the widely accepted premise that airpower is solely a deliverer of services. This characterization is understood and readily accepted by the other branches of the military because that is precisely how they relate to airpower. This premise fits neatly into the Army's viewpoint that airpower is a powerful adjunct to maneuvering forces.² Furthermore, it is beautifully tailored for the Army's operational doctrine whereby the Air Force functions, in effect, as the Army's air arm. While the supporting role of airpower continues to be of vital importance, it represents only a part of the total airpower picture. The Air Force looks beyond the pure surface support role and focuses a considerable portion of its effort on creating decisive theater-level and strategic effects. This ability to look beyond the geographically oriented surface battle is what separates the Air Force from the air arms of the other services and makes it the nation's only full-service air force.

The concept of creating theater-level effects offers a broad range of options for commanders. Unfortunately, most airmen do not grasp the full potential and diversity of airpower. These same airmen often nod in agreement with their Army counterparts when airpower is described primarily as a provider of services. A reexamination is necessary to develop a comprehensive understanding of airpower's attributes and capabilities. Before that is done, however, it is necessary to lay the foundation of how and why the Army, Navy, Marines, and Air Force have different perspectives regarding airpower.

Background

From the entry of aircraft into military service, airpower advocates sought victory through command and exploitation of the air. Some military leaders

totally failed to grasp the importance and promise of airpower. A prime example is French general Ferdinand Foch, Allied commander in chief during World War I in 1918. He reputedly stated in March 1913 that "aviation is fine as sport. I even wish officers would practice the sport, as it accustoms them to risk. But, as an instrument of war, it is worthless."³ Military analysts have had serious disagreements regarding airpower's potential to determine the outcome of conflicts. During its comparatively brief combat history, the role and importance of airpower have been hotly and passionately debated. The carnage of World War I furnished the impetus for airpower theorists such as Giulio Douhet, Hugh Trenchard, and William "Billy" Mitchell to espouse the benefits of this new form of warfare. The claims of these theorists and their disciples often fell short of the mark in the crucible of war. To many nonairmen, the history of airpower is a trail littered with broken promises. The strategic bombing campaigns in World War II, Korea, and North Vietnam all yielded results that, for a variety of reasons, lacked the decisiveness promised by the airpower visionaries.⁴ Consequently, an examination of airpower's achievements resulted in bitter arguments and differing perspectives between military practitioners on how best to employ airpower.

Service Perspectives

Joint doctrine serves as the unifying construct under which the services operate as a cohesive team and conduct military operations. But each service is responsible for its own particular doctrine and training. At the very heart of warfare lies doctrine. It represents central beliefs for waging war in order to achieve victory.⁵ At the very heart of doctrine lies the principles of war articulated by Antoine-Henri Jomini. The British army produced the first modern statement of "the principles of war" in 1920. More than a year later, in December 1921, the US War Department adopted the principles in Training Regulation 10-5, *Doctrine, Principles, and Methods*. Thus, the principles of war were incorporated into US military doctrine to serve as the foundation for the war-fighting guidelines of each service. Each service embraces a unique interpretation of these principles based on the inherent capabilities and the particular medium within which each service operates. The same principles become operational concepts and doctrine that guide the application of military forces. Because each service specializes in a unique environment, doctrinal differences emerge that affect both the structure and content of that doctrine. The manner in which the principles of war are interpreted and applied by surface combatants is different than that of airmen.⁶

If you are a soldier, then you believe that land power if used in certain ways can bring about more rapid and less expensive victory than if used in other ways.⁷ The Army naturally believes that land combat is decisive. Field Manual (FM) 100-5, *Operations*, states it rather succinctly: "The mission of

the U.S. Army is to protect and defend the Constitution of the United States of America. The Army does this by deterring war and, when deterrence fails, by achieving quick, decisive victory on and off the battlefield anywhere in the world and under virtually any conditions as part of a joint team.” It goes on to state, “It is the Army’s ability to react promptly and to conduct sustained land operations that make it *decisive*” (emphasis in the original).⁸ Moreover, the Army recognizes that it normally operates in combination with air, naval, and space assets to achieve the overall strategic aim of decisive land combat and the Army is the only force capable of achieving land dominance. This sentiment resonates even more loudly today in the words of Gen Gordon Sullivan, the Army’s former chief of staff: “While the circumstances of warfare have changed considerably in terms of weapons system advances and capabilities . . . the essential nature of warfare has not changed. Units are still required to close with the enemy to get within direct fire range, engage the enemy, and either destroy him or force him to move off of contested terrain.”⁹

Doctrine remains the heart and soul of the Army. Army officers believe they have an obligation to win and terminate the nation’s wars—a role that in their view is not shared by the other services, who are considered necessary and valuable but nonetheless supporting arms in the joint force.¹⁰ The touchstones for the Army are the art of war and the profession of arms. Army officers profess to be first and foremost war fighters. Their separate branches are unified in their concepts and doctrine.¹¹ Army doctrine is based on the philosophy of combined arms. It is defined as infantry, armor, and other branches ideally synchronizing close, deep, and rear battles. Maneuver and fires using combined arms enable the Army to gain positional advantage over the enemy. Everything revolves around a surface scheme of maneuver and shaping the battlefield for decisive land combat. Thus, geographic position on the battlefield is of critical importance to Army commanders. It is impossible for a land commander to ignore his own position, as well as that of enemy forces in terms of geographic location. Historically, geographic position of opposing armies has proven to be a critical element of land combat. From such a perspective, the soldier on the ground may intellectually comprehend the benefits to be derived from the independent application of airpower, but he has an overwhelming desire for its effects to be useful to his immediate environment of land warfare.¹² Significant differences of opinion therefore exist between soldiers and airmen regarding the proper operational employment of airpower.

If you are a marine, then you believe that the integrity and unity of the Marine air-ground team is a holy and inviolate entity, not to be interfered with by anyone, including the joint force commander, but especially *not* an Air Force JFACC (joint force air component commander)!¹³ Marine Corps Doctrine Publication (MCDP) 1, *Warfighting*, describes the Marine Corps doctrine on war fighting. Furthermore, it sets forth a philosophy for action which, in war and in peace, dictates the Marine approach to duty. Current

Marine Corps doctrine is based on maneuver warfare. This is a war-fighting doctrine based on rapid, flexible, and opportunistic maneuver. It is important to understand maneuver as a twofold concept: first, to maneuver in space is predicated on gaining a positional (i.e., geographical) advantage; second, to maneuver in time as well generates a faster operational tempo than the enemy to gain a temporal advantage. For the Marines, it is through maneuver in both dimensions that an inferior force can achieve decisive superiority at the necessary time and place.¹⁴

Organizationally, the Marine air-ground task force (MAGTF) is uniquely equipped to perform a variety of tactical actions—amphibious, air, and land—and to focus those actions into a unified scheme of maneuver. The MAGTF's organic aviation allows the commander to project power well in advance of close combat and to shape events in time and space.¹⁵ The effects of firepower (in which aircraft play a major role) are essential to the ability to maneuver. In this context, airpower equates to maneuver and firepower for the Marines. Artillery and close air support aid infantry penetration, and deep air support is used to interdict enemy reinforcements. (The concept of airpower as purely a supporting arm is clearly conveyed by the use of the term *deep air support* in lieu of *interdiction*.) Maneuver warfare is a way of thinking in and about war that shapes all actions.¹⁶ In the view of the Marine Corps, the Marine air-ground team was designed for a very specific purpose and it is wholly incomprehensible why anyone would ever want to break it up.¹⁷ In the final analysis, the geographic position of friendly forces on the battlefield, the position of enemy forces, and the corresponding centers of gravity of each of these fielded forces represent the essential ingredients comprising the Marine viewpoint of surface-oriented warfare.

If you are a seaman, then you believe that sea power if used in certain ways can bring about more rapid and less expensive victory.¹⁸ Its institution and its traditions, which have served it well during challenges to its relevancy, support the Navy's orientation. The Navy's culture has helped it formulate the maritime strategy to provide integration, coherence, and direction within the Navy. The creation of the Naval Doctrine Command and the publication of the Navy's first doctrine solidified the Navy's doctrinal foundation. Steeped in history and the tradition of Alfred Thayer Mahan and Sir Julian Corbett, Naval Doctrine Publication (NDP) 1, *Naval Warfare*, provides the naval position of why the United States is a maritime nation with many interests. The Navy still holds firmly to the quote from Themistocles: "Whosoever can hold the sea has command of everything."¹⁹ NDP 1 maintains that sea control is still vital and a prerequisite for most land operations.²⁰ These are geographically oriented concepts, and sea lines of communications such as the Strait of Hormuz play an important role in national security. Admittedly, with the advent of the aircraft carrier, the Navy arrived at the firm conclusion that airpower is part and parcel of war at sea—an indivisible and holistic unity.²¹ Furthermore, the Navy is beginning

to come to terms with the idea of effects-based airpower in its concept of projecting airpower ashore “from the sea.” Nevertheless, it still maintains a solid tie to geographic orientation when planning operations such as controlling sea-lanes, defeating enemy navies, or supporting amphibious operations.

The Navy promotes itself as the power-projection force that can respond worldwide in a minimum amount of time. Power projection is described as the Navy’s ability to project high-intensity power from the sea and is a cornerstone of effective deterrence, crisis response, and war. The Navy stresses two operational concepts.

The first important concept is that of battle space. From the Navy’s perspective, battle space is a zone of superiority from which the Navy projects power. It is defined by the outer reach of Navy weapon systems and, like a bubble, it moves above, on, and under the sea—encompassing land, space, and time. Modern battle space is multidimensional and is neither fixed nor stationary. Dominance of these dimensions is the important factor in the survival and combat effectiveness of the Navy and the Marine Corps when amphibious operations are undertaken.

The second concept in Navy doctrine centers on forward presence. The Navy firmly believes it will be the first service on the scene whenever a crisis occurs. Through forward presence, naval service forces are there when the conflict begins and remain there after the crisis has abated. Thus, land-based forces are viewed only as transitory players, while the Navy is seen as the forward-deployed service, always on hand no matter what the contingency.

Soldiers, sailors, and marines are educated and trained in combined arms operations. They employ together and are inextricably linked by objectives and responsibilities that almost always focus on specific geographic positions on the ground or geographically important sea-lanes. The natural and legitimate inclination of professional soldiers, sailors, and marines is to apply airpower simply as another supporting combat arm to be synchronized by the surface commander in support of a particular objective.²²

Airpower Characteristics

Airpower constitutes an inherently different form of warfare. Air and space forces are able to cross over land and sea boundaries and surpass all surface obstacles without difficulty. The advantages of airpower and space power over surface forces result in vastly superior mobility and responsiveness. Operations in the third dimension allow for speed, range, maneuverability, and a perspective unachievable by surface forces. These advantages provide air and space forces with unmatched capabilities to support both peacetime and contingency operations or to transition between activities with unequaled responsiveness. Air and space forces are

able to respond quickly and worldwide on short notice to counter potential threats to the nation's security interests. Additionally, these same forces provide air and space superiority, information superiority, rapid global mobility, precision engagement, global attack, and agile combat support around the globe. These competencies allow for detection and analysis of, and reaction to, situations with rapid, lethal, and decisive force regardless of time or location.

Increased speed, reliability, and responsiveness have fortified the presence of air forces, if relatively. The ability to conduct independent missions in areas where ground and naval forces cannot reach or are not present remains a primary military advantage of an air force. To cover the logical field of possibilities, airpower can support efforts on land and at sea, operate where ground and naval forces cannot, and undertake various operations that can feasibly be performed only from the air. The speed, range, and flexibility of airpower give it ubiquity, and this in turn imbues it with a wide range of capabilities.²³

Effects-Based Airpower

There are two ways to understand airpower. The first is the traditional approach whereby airpower is a provider of services. This is a narrow understanding of airpower and equates to delivering goods in a logistical fashion or supplying lethal firepower from the air. The second approach is a broader definition and encompasses a more complete understanding of airpower and its characteristics. Airpower is that form of military power generated by platforms capable of sustained, maneuvering, powered flight.²⁴ This understanding incorporates, in addition to the "provider of services" role, airpower's ability to create decisive theater-level effects beyond the scope of the geographically oriented surface battle. Unfortunately, these different perspectives, each wholly understandable, result in fundamental differences of opinion among military professionals as to the proper application of airpower.²⁵

If the end of airpower is striking at the enemy anywhere, not just at the enemy's surface forces, then the Air Force is unique as an institution wielding airpower. The Navy, Marines, and Army (to a lesser degree) also possess airpower (and other means) to strike at the enemy's engaged surface combat forces and to defend their own surface forces against enemy air attacks.²⁶ This airpower, although vitally important, is directly related to surface force positions both of enemy and friendly forces. But here is where the distinction between soldiers, sailors, and airmen begins. To an airman, geographic position does not hold the same level of importance as it does for the surface warrior. "Close," "deep," and "rear" have no meaning to an airman except in relation to surface forces, if they are present. Granted, the surface battle may be of primary importance; and

in that situation, airpower's priority naturally is directed towards the surface commander's needs.

At the operational level of war, theater objectives determine military priorities. The objective is especially important to airpower because of its inherent versatility. Unlike surface forces, modern air forces do not need to achieve tactical objectives first before pursuing operational or strategic objectives. From the outset, air forces pursue tactical, operational, or strategic objectives in any combination or simultaneously. Effects-based airpower is concentrated to directly achieve objectives with theaterwide significance, bypassing tactical objectives. From an airman's perspective, the objective shapes priorities, allowing air forces to concentrate on theater or campaign objectives and avoid the siphoning of airpower to fragmented objectives of lesser importance.

If you are an airman, then you believe that airpower if used in certain ways can bring about more rapid and less expensive victory than if used in other ways.²⁷ "Victory" in the sense it is implied here conjures up an image of war. However, a broader interpretation of the word *victory* should be applied herein because effects-based airpower is not dependent on a war per se. In fact, effects-based airpower does not require a war in order to be effective and may indeed prevent a war. This concept of airpower focuses on the political-military objectives and is based on four interrelated premises. First, airpower may be employed totally independent of surface forces. Second, indivisible airpower centrally controlled by an airman can, in its own right, conduct decisive operations. Third, airpower is employed from a theater or global perspective to achieve theaterwide objectives. Lastly, airpower can accomplish multiple objectives simultaneously.

The Berlin Airlift

Clearly there are scores of examples to illustrate the concept of effects-based airpower. One of the most compelling examples is the Berlin airlift. In June 1948, the Soviet Union exploited the arrangements under which the United States, Great Britain, and France had occupied Germany by closing off all surface access to the city of Berlin. If left unchallenged, the provocative actions of the communists might not only have won them an important psychological victory, but also might have given them permanent control over all of Berlin. Worried that an attempt to force the blockade on the ground might precipitate World War III, the allies instead "built" a *Luftbrücke*—an air bridge—into Berlin.

The Soviets for their part did not believe resupply of the city by air was even feasible, let alone practical. The Air Force turned to Maj Gen William Tunner, who had led the "Hump" airlift over the Himalayan mountains to supply China during World War II. As the nation's leading military air cargo expert, he thoroughly analyzed our airlift capabilities and requirements and set in motion an airlift operation that would save a city.²⁸ For 15 months,

the 2.2 million inhabitants of the Western sectors of Berlin were sustained by airpower alone as the operation flew in 2.33 million tons of supplies in 277,569 flights.²⁹ Airlift had previously come of age during World War II, but it is questionable whether its potential had been fully realized by commanders who predominantly defined "strategic" in terms of bombs on targets.³⁰ The Berlin airlift was arguably airpower's single most decisive contribution to the cold war, and it unquestionably achieved a profound strategic effect. The Soviets' eventual capitulation and dismantling of the surface blockade represented one of the great Western victories of the cold war and laid the foundation for the North Atlantic Treaty Organization—without a bomb having been dropped.³¹

The Battle of Khafji

The second example of effects-based airpower comes from Desert Storm. On the early evening of 29 January 1991, Iraqi armor and mechanized infantry in eastern and southern Kuwait attacked US Marine and Saudi Arabian ground units at several points along the Kuwaiti-Saudi Arabian frontier. The Iraqi attack lasted a little over four days. Known collectively as the Battle of Khafji, this series of engagements represented the first and only Iraqi offensive of the Gulf War. By launching a cross-border offensive, Iraqi president Saddam Hussein likely hoped to provoke a major ground engagement and with it an opportunity to impose heavy casualties on coalition (especially American) forces. The Iraqi leader's presumed objective was to inflict American losses so high that congressional and public opinion would turn against the war. Unfortunately for Saddam, Khafji proved a devastating defeat.

The Battle of Khafji was preeminently an airpower victory. Coalition airpower furnished offensive and defensive firepower to friendly ground forces and effectively isolated the battlefield. The ability to rapidly mass joint airpower against enemy follow-on forces prevented the Iraqis from exploiting the element of tactical surprise and ensured that friendly casualties were much lower than otherwise might have been the case. In the end, joint airpower took a heavy toll of three Iraqi divisions, destroyed approximately 600 enemy vehicles, and resulted in the recovery of all lost territory with minimal losses.³²

The strategic effects of joint air attacks transcended mere physical destruction. If the Iraqi offensive was to be successful, the initial offensive in and around Khafji required reinforcement and exploitation by at least two additional divisions. The Iraqis attempted to use the cover of darkness, which had worked so well in the Iran-Iraq war, to marshal these additional forces for a decisive encounter with the coalition. Denied the ability to exploit darkness through a combination of the joint surveillance, target attack radar system (JSTARS) and night-capable strike aircraft, the Iraqis could only dig in and contemplate three bleak alternatives: fight in place

and likely die, surrender, or retreat. As much as any single event of the Gulf War, the outcome of the Battle of Khafji appears to have undermined not only the Iraqi army's will to fight but also Saddam's overall strategy for the war.³³ Quite simply, the Iraqi strategy of drawing allied ground forces into large, high-casualty battles seems to have been defeated in detail at Khafji. It wasn't merely the recovery of Khafji nor the destruction of the better part of three Iraqi divisions that was decisive, but it was the effect of defeating Saddam's strategy that proved decisive.

Summary

All of the services have air arms, but as Gen Ronald R. Fogleman, former USAF chief of staff, notes, "We are the nation's Air Force—the only service that provides air and space power across the spectrum, from basic research to combat operations."³⁴ In order to understand the concept of effects-based airpower, it is important to start with a review of the perspectives of the Army, Navy, and Marine Corps. The traditional "land-centric" perspective of war subscribes to maneuver, gain positional advantage, and lastly seize and hold terrain. Surface commanders view airpower as the ultimate maneuver force that can help shape the battlefield. Surface proponents are steadfast in their belief that control of the enemy's land is the only decisive way to win the war. Even joint doctrine carries forward this land-centric focus because it is still largely based on dominant surface maneuver. All joint operations ultimately support the land campaign. Most of all, it is striking how closely joint doctrine runs parallel to the Army doctrine of maneuver, fires, and force protection.

Few countries can exploit airpower as thoroughly as the United States. Commensurate with an effects-based concept of airpower is the twofold nature of American military power: first, airpower is the preeminent means for preventing and deterring war; second, if a conflict arises, then airpower in the form of air and space superiority is the prerequisite for all other operations. A comprehensive understanding of the totality of airpower is a necessity for all operations. Is airpower a panacea or a substitute for surface forces? No, not by any stretch of the imagination. However, it does offer a wide degree of flexibility in its employment and can, as can surface forces, be decisive in its own right in many situations. In order to maximize the potential of airpower, we need to learn to think in terms of the effects it can produce rather than merely the support it can provide to surface forces. The bottom line remains that effects-based airpower has tremendous merit based on its employment in the past and its promise for the future.

Notes

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2. Eliot A. Cohen, "The Meaning and Future of Air Power," *Orbis* 39, no. 2 (Spring 1995): 191.
3. John H. Morrow Jr., "Expectation and Reality: The Great War in the Air," *Airpower Journal* 10, no. 4 (Winter 1996): 27.
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6. Rebecca Grant, briefing delivered to Air War College, Maxwell AFB, Ala., October 1996.
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8. Field Manual (FM) 100-5, *Operations*, 14 June 1993, iv, 1-4.
9. David Callahan, "Air Power Comes of Age," *Technology Review* 97 (August/September 1994): 70.
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11. Carl H. Builder, *The Icarus Syndrome: The Role of Air Power Theory in the Evolution and Fate of the U.S. Air Force* (New Brunswick, N.J.: Transaction Publishers, c.1994), 5.
12. Harold R. Winton, "A Black Hole in the Wild Blue Yonder: The Need for a Comprehensive Theory of Airpower," *Airpower History* 39, no. 4 (Winter 1992): 32.
13. Maj Gen Charles D. Link, special assistant to the chief of staff of the United States Air Force, briefing to *National Defense Review*, April 1997.
14. Marine Corps Doctrine Publication (MCDP) 1, *Warfighting*, 20 June 1997, 58.
15. MCDP 1-1, *Campaigning*, 20 June 1997, 28.
16. Fleet Marine Forces Manual (FMFM) 1, *Warfighting*, 6 March 1989, 77.
17. Winton, 33.
18. Jumper briefing, April 1996.
19. Naval Doctrine Publication 1, *Naval Warfare*, 28 March 1994, 3.
20. *Ibid.*, 9.
21. Winton, 33.
22. Col Phillip S. Meilinger, *10 Propositions Regarding Airpower* (Washington, D.C.: Air Force History and Museums Program, 1995), 19.
23. *Ibid.*
24. Cohen, 190.
25. Winton, 33.
26. Builder, 215.
27. Jumper briefing, April 1996.
28. Alfred Goldberg, ed., *A History of the United States Air Force, 1907-1957* (Princeton, N.J.: D. Van Nostrand, 1957), 235-36.
29. Alan Stephens, *Going Solo: The Royal Australian Air Force, 1946-1971* (Canberra, Australia: Australian Government Publishing Service, 1995), 201.
30. The "strategic" use of airpower during World War II included the US Army Air Forces' resupply missions over the "Hump" from northeast India into southwest China. It was precisely because of the success of this "strategic" operation that the Air Force even considered the Berlin airlift. See William H. Tunner, *Over the Hump* (Washington, D.C.: Office of Air Force History, 1985).
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32. James R. W. Titus, "The Battle of Khafji: An Overview and Preliminary Analysis," unpublished research paper (Maxwell AFB, Ala., College of Aerospace Doctrine, Research, and Education, September 1996).
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34. Quoted in Col Michael E. Haas, USAF, Retired, *Apollo's Warriors: US Air Force Special Operations during the Cold War* (Maxwell AFB, Ala.: Air University Press, 1997), vii.

The First Amendment is often inconvenient. But that is besides the point. Inconvenience does not absolve the government of its obligation to tolerate speech.

—Justice Anthony Kennedy

THE ESSENTIALS OF LEADERSHIP

LT COL SAUNDRA J. REINKE, USAF

CHANGE IS FRIGHTENING. In this age of downsizing, reorganization, movement of units, base closures, frequent deployments, outsourcing, and privatization, change is everywhere. Such major changes to the way we've always done business in the Air Force have left many people feeling disoriented and lost.

Major transitions unleash powerful conflicting forces in people. The change invokes simultaneous positive and negative personal feelings of fear and hope, anxiety and relief, pressure and stimulation, leaving the old and accepting a new direction, loss of meaning and new meaning, threat to self-esteem and new sense of value.¹

Leading people through such major changes is a difficult task. It calls for leaders with courage and conviction, leaders with the ability to "develop a vision of what can be, to mobilize the organization to accept and work toward the new vision, and to institutionalize the changes that must last over time."² In times like these, it is appropriate to take a few moments to look again at leadership and what it takes to lead in tough times. Unfortunately, scholars who have studied leadership have produced a range of conflicting theories. Leadership theory can now be summarized as follows: "Leader characteristics and situational demands interact to determine the extent to which a given leader will provide successfully in a group."³ In other words, there is no single all-purpose leadership style that is universally successful.⁴

Here is a simpler approach to successful leadership based on research and my experience as a squadron commander.

THE LEADER'S TEN COMMANDMENTS

1. Do unto others as you would have them do unto you.
2. Thou shalt be consistent.
3. Thou shalt get out of thy office regularly.
4. Thou shalt avoid snap decisions.
5. Thou shalt make time for thy people.
6. Thou shalt take the time to listen.
7. Thou shalt always be in control of thyself.
8. Thou shalt communicate clearly with thy subordinates.
9. Thou shalt take responsibility for thy actions.
10. Thou shalt LEAD thy people.

"Do unto others as you would have them do unto you" should require no explanation. And yet, how many supervisors forget to say "good morning" to their subordinates? How many leaders chair meetings that lack purpose and structure, wasting everyone's time? How many supervisors gossip about their bosses and peers? How many leaders forget to praise in public, reprimand in private? How many leaders "chop off the heads" of messengers with bad news?

Treating people with respect, dignity, and concern improves performance and morale. In one field study of seven different organizations, the results proved that highly productive employees consistently had supervisors who treated them as people, not as tools to get the job done.⁶ Good interpersonal relationships between leaders and those they lead improve productivity and unit morale.⁶

"Thou shalt be consistent." Consistency breeds trust. In experimental research involving "prisoner's dilemma," subjects were more likely to respond to guidance from sources whose behavior and communication were clear and consistent.⁷ Why? Because they felt the source was more trustworthy. Subordinates react to supervisory behavior and communication based upon consistency between what the supervisor *says* and what the supervisor *does*.⁸ Ask yourself what sort of behavior do you reward? Punish? And then ask yourself, is that *really* what I want to reward or punish?

"Thou shalt get out of thy office regularly" speaks to the importance of spending time out actually seeing what is happening in your organization. How do you know what is happening if you never go look? Secretaries often unwittingly compound the problem by obligingly scheduling their bosses for days of wall-to-wall meetings. So who's in charge of your life? Your secretary? Your calendar?

How you allocate your time sends powerful messages to the people you lead about what you think is important.⁹ If you spend your time doing paperwork, the message you convey to your followers is simple: my paperwork is more important than you are. No wonder researchers have found that supervisors who spend their time on their paperwork have lower-producing work sections than those with supervisors who spend more of their time actually training, communicating, and leading their subordinates.¹⁰

"Thou shalt avoid snap decisions." Certainly, there are times when rapid decisions must be made; however, those occasions are far fewer than we think. We are most prone to making snap decisions when something has gone wrong. How we deal with mistakes, errors, and failures communicate powerful messages to those we lead.¹¹ As leaders, we rely on information to make decisions. If we "shoot the messenger," our subordinates will be more likely to keep vital information from us.

"Thou shalt make time for thy people." As mentioned previously, how leaders use their time communicates powerful messages to followers. We often hear that "people are our most important assets" or "take care of the

people and they'll take care of the mission." But how much time do we actually spend taking care of the people? To go back to what was said earlier about consistency, followers judge how much their leaders care by what their leaders *do*. Making time for those who work for you is the most powerful way to convey to them how much you care.

"Thou shalt take the time to listen" is the sixth leadership commandment, and a very powerful one. Taking the time to listen to the needs and concerns of followers has a major impact on their morale, their productivity, and their perceptions of you as a leader. To improve your listening skills, try applying some of these suggestions. Make eye contact with the speaker; eye contact reassures them that you care about what they have to say. Try to tune out your ideas. Listen to the concept—the idea—behind what the person is trying to say. Listen to understand—not to refute or question. Take notes. Subordinates will be flattered if you take a few; however, if you're always taking notes, they're apt to think you're not listening. Keep your feelings positive; try to control any negative feelings you may have about the speaker. And credit the source when you're passing on someone else's good ideas.¹² Listening takes time—but it's time well spent!

"Thou shalt always be in control of thyself." It's commonly said that if we can't control ourselves, we can't control others. Leaders who indulge in temper tantrums, tirades, shouting matches, and abusive language damage their relationships with subordinates, and as a result, damage unit morale and productivity.¹³

"Thou shalt communicate clearly with thy subordinates." How many times have we seen communication get garbled—and work done incorrectly or not at all as a result? Taking a few minutes to provide clear direction, goals, and feedback pays off. Researchers have repeatedly shown a connection between clear communication and improved performance.¹⁴ Furthermore, subordinates who understand what the goal is are better able to adapt tactics to fit the situation and meet objectives.

There are several things leaders can do to improve communication. First, know what you want. Second, pay attention to the subordinate; eye contact is a good way to check for understanding. Third, use plain English to communicate. Finally, it takes only a few seconds to check for understanding by asking if your listener understands what you want.¹⁵

"Thou shalt take responsibility for thy actions." If you order something done, take the hit for it if something goes wrong. Accepting responsibility for decisions and actions taken is a crucial leadership skill.¹⁶ You can delegate authority, but not responsibility.

Assuming you've mastered the previous nine commandments, the last one—"Thou shalt LEAD thy people"—should be automatic. Treat people with respect and dignity, listen to what they say, be consistent, exhibit self-control, communicate clearly, and take responsibility for your decisions sum up the leader's ten commandments; adhering to them ensures that a

leader earns the respect of followers—and doesn't waste time demanding respect.

Leadership is a challenge, especially during periods of rapid change. Successful leadership calls for leaders who can recognize the mixed emotions people experience as a result of change and can act to mobilize and focus people's energy on the positive features of change and the actions needed to make change successful. The leader's ten commandments are the essential skills every leader needs. The rapid and intense change the Air Force is undergoing means those basic skills are more urgently needed than ever. The Air Force as an institution will survive. Whether it continues to thrive depends on its leaders. It's up to us to stop focusing on how things "used to be," seize the challenge of leadership, and move the Air Force forward to the next century.

Maxwell AFB, Alabama

Notes

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4. Paul Hersey and Peter Blanchard, "The Life Cycle Theory of Leadership," *Training and Development Journal* 23, no. 5 (May 1969): 27.
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6. Barry R. Nathan, Alan M. Mohrman Jr., and John Milliman, "Interpersonal Relations as a Context for the Effects of Appraisal Interviews on Performance and Satisfaction: A Longitudinal Study," *Academy of Management Journal* 34, no. 2 (June 1991): 353.
7. James L. Hogan, Roger H. Fisher, and Bruce John Morrison, "Social Feedback and Cooperative Game Behavior," *Psychological Reports* 35 (1974): 1080-81.
8. Rensis Likert, *New Patterns of Management* (New York: McGraw-Hill Book Company, 1961), 54-59.
9. Thomas J. Sergiovanni, "Leadership as Cultural Expression," in *Classic Readings in Organization Behavior*, 339.
10. Kahn and Katz, 287-89.
11. Mary Parker Follett, "The Giving of Orders," in *Classic Readings in Organization Behavior*, 264.
12. Air Force Handbook (AFH) 37-137, *The Tongue and Quill*, 31 August 1994, 105.
13. This idea is covered in a wide range of scholarly research including several of the works cited above, such as Kahn and Katz, Hersey and Blanchard, Sergiovanni, and Nathan, Mohrman, and Milliman.
14. This is another idea that has been widely studied and confirmed. For example, see Herbert H. Meyer, Emmanuel Kay, and John R. P. French Jr., "Split Roles in Performance Appraisal," *Harvard Business Review* 43 (January-February 1965): 123-29; and Cynthia M. Pavett, "Evaluation of the Impact of Feedback on Performance and Motivation," *Human Relations* 36, no. 7 (1983): 641-54.
15. *Tongue and Quill*, 1-6.
16. Douglas McGregor, *The Human Side of Enterprise* (New York: McGraw-Hill Book Company, 1960), 277.

Nothing in the world is more dangerous than sincere ignorance and conscientious stupidity.

—Dr. Martin Luther King Jr.

Ricochets and Replies

Continued from page 5

greatest likelihood of success in modern combat. Regardless of what particular service pundits might tell you, the ticket to future combat success is in joint operations. Our combatant commanders must make maximum use of the strengths of each component service. They know this, and they believe it. Joint operations may direct focused weapons' effects against the enemy to exact the greatest level of destruction at the lowest cost to US and allied soldiers, sailors, airmen, marines, and their equipment. What each component service does is to bring its best doctrine, equipment, leaders, and warriors to the joint and combined fight. Then, in response to the combatant commander's plan, they contribute in concert to defeat the enemy swiftly and with the least loss of life and equipment. No longer may one armed service, nor in many cases, may one nation win its wars alone.

Col Neal H. Bralley, USA
Westerville, Ohio

THE AIRPOWER TRINITY

Thank you for the opportunity to respond to Mr. Joseph Forbes's letter in the Fall 1998 issue concerning my article "In Search of High Ground: The Airpower Trinity and the Decisive Potential of Airpower" (Spring 1998) and my use of the Clausewitzian concept of the Trinity of War. Mr. Forbes makes some excellent points about Clausewitz; in fact, there are (and have been) numerous interpretations of this great master—Clausewitz has even moved into the information age with his own "chat room"!

The way I see it, one of the beauties of Clausewitz—and the key reason his theories have endured over the centuries—is that his theories are open to a wide range of interpretations. By focusing only on a narrow point in Clausewitz's writing, Mr. Forbes appears to have missed the whole point of my article—my attempt to develop a new theory, the

Airpower Trinity. My use of Clausewitz's Trinity was not intended to be simply a "mindless rehash" of Clausewitzian theory, but rather a concept to build upon, a launching point for the new Airpower Trinity. I would rather focus on the issues raised by the innovative part of the article rather than quibble over the interpretations of the words of Clausewitz.

But, even using Clausewitz's own words, I'll bet he would support my launching point. I believe that he implored warriors of the future to use his theories to educate the mind and be creative. He continuously challenged commanders to use his theories as a starting point and not "mark the narrow path on which the sole solution is supposed to lie by planting a hedge of principles on either side." Continuing in book 8, chapter one, he states:

When all is said and done, it really is the commander's *coup d'oeil*, his ability to see things simply, to identify the whole business of war completely with himself, that is the essence of good generalship. Only if the mind works in this comprehensive fashion can it achieve the freedom it needs to dominate events and not be dominated by them. . . . Theory should cast a steady light on all phenomena so that we can more easily recognize and eliminate the weeds that spring from ignorance; it should show how one thing is related to another, and keep the important and the unimportant separate.

That is precisely what I intended to do with my *Airpower Journal* article—to depict the relationship among theory, technology, and practice. I do not claim a perfect understanding of all these variables. Therefore, they should be debated, not just Clausewitz's words. What I do know, having led combat missions in the F-15, is that we must sort out "the weeds that spring from ignorance" before the next fight. In order for us to employ airpower to its maximum potential again in the future, we must understand the relationships in the Airpower Trinity.

Although I indicated in the article that airpower cannot provide the sole means to all ends and that joint forces must work together to meet the intended political objectives, many people have asked if I think airpower can replace the need for "boots on the

ground" to hold terrain. Certainly, that's a complex question and at this time in the evolution of airpower, I would have to say "not entirely, if holding terrain is the only political objective." But I will assert that the current operations in Southwest Asia, Operation Southern Watch and Northern Watch, might be a seminal moment in which airpower alone is occupying ground. It's worth a debate.

Col D. K. Edmonds, USAF
Washington, D.C.

THEATER WARFARE, MOVEMENT, AND AIRPOWER

I enjoyed the article by Lt Col Price T. Bingham, USAF, Retired, on the impact that JSTARS can have on theater warfare ("Theater Warfare, Movement, and Airpower," Summer 1998). I think he may have underestimated the value of unmanned aerial vehicles (UAV) in performing the same role. He assumes that there will be no jamming effects on the moving target indicator (MTI) radar. The effectiveness of jamming can be significantly reduced by flying closer to the target area. Terrain masking is also reduced as you fly closer or higher. JSTARS is not currently designed to fly in such a high-threat area or at higher altitudes. Another issue is the high maintenance costs associated with flying such an old platform.

If one could put the "encrypted, highly jam-resistant surveillance control data link" on a UAV, it could serve as a method to relay the "picture" to the ground. This assumes that enough bandwidth exists on such a link. UAVs can fly higher and in harm's way, but they currently suffer from many other growing pains, most of which will soon be ironed out. The biggest problem is most likely the high power as well as weight requirements for a radar-based sensor system.

Maj Al Glodowski, USAF
Sleaford, England

HOW WE OPERATIONALIZED QUALITY

I recently attended Squadron Officer School at Maxwell AFB, Alabama, where my randomly assembled 13-captain flight competed against 53 other flights over seven weeks and finished on top, winning the Chief of Staff Award as best flight at SOS. Observers told us we did not have the best athletes, the smartest academicians, or the best problem solvers in the school. Yet we became the most effective and unified team, breaking the school record for field campaign points in volleyball and flickerball, finishing among the top five in academics, and reaching logic utopia in problem-solving exercises. At one point we even shaved our heads together to celebrate. What caused such inspiration, led to mission success, and made us different than other flights? In my opinion, it boils down to three words: We operationalized quality.

Common vision. During our first week, when we really didn't know each other, we used quality management techniques to reach consensus on our group purpose. We assigned task owners to each key mission area, and made them accountable to lead. Each task owner was asked to "define excellence, propose tasks, and create a performance measure." Our strategic plan had detailed methods and measures (unlike other flights with vague goals), and everybody committed to doing the tasks required to meet common goals. Our mission was "team excellence through maximum individual performance," and our vision was "top five in the school." At the end, we had reached eight of nine goals and finished number one.

Positive leadership. Our flight was full of energetic leaders who never spoke a negative word. Even when people made mistakes, like when our flight scored a zero on a team leadership problem, everybody looked to improve themselves rather than each other. We took turns leading, and everybody supported each task owner. Social facilitation (positive peer pressure) inspired everyone to dig deep and work harder than they ever had. We didn't do it for the school or for ourselves. We did it for each other.

Listening and consensus. The members of our flight listened to each other. We learned that all of us possessed more knowledge together than any one of us individually. Some of the best ideas came from people you'd least expect. Whenever possible, we tried to agree on methods and reason out our differences patiently. We never left somebody behind in disagreement, we were never slowed by the "bid for power" stage, and we had no divisive cliques. Most other flights couldn't say that.

Statistical process control. In addition to key success measures, we employed analysis measures at deeper levels. Statistics prompted coaching and methodology changes almost daily—especially in field campaigns. Pareto charts revealed areas needing the most improvement, and root causes of errors were eliminated through improved process design and rehearsal. The results? We broke the school record for campaign points and dedicated a bottle of wine to any future flight that can surpass us. It may be there a long time.

In sum, we were different than other flights in four ways: vision, leadership, agreement, and control. We fulfilled our mission, met our goals, and achieved our vision, while many other flights—most with better talent—did not. Operationalizing quality requires shared purpose, specific planning, motivational leadership, inclusive teamwork, and analysis-based improvements. So if anyone can learn some leadership lessons by observing our flight, let this be among them: Quality may require extra effort, but it isn't measured by paperwork; it's measured by mission success.

Capt Gordon J. Klingenschmitt
Washington, D.C.

ON "MISTAKES IN TEACHING ETHICS"

It is a mistake for ethics teachers (or any teacher for that matter) to play fast and loose with definitions. In "Mistakes in Teaching Ethics" (Summer 1998), Dr. James H. Toner never delineates between ethics and morals (or even between ethics and law). An essay addressing the teaching of professional ethics ought to make clear whether personally ac-

ceptable behavior (morality) and professionally acceptable behavior (ethics) overlap and support or diverge and conflict. All this would have been further enhanced by discussing how to teach this against the backdrop of "socially" acceptable behavior (law). Dr. Toner muddied the already-murky water by stating a fundamental truth without expanding on what he meant: "*Human beings generally know right from wrong [moral or legal?], honor from shame [professional ethics or personal or religious morality?], virtue from vice [moral? spiritual/religious?]*" (emphasis in original). The incomplete treatment of definitions needlessly perpetuates debate because people will end up simply arguing over disparate points (i.e., not singing off the same sheet of music) rather than debating the most effective way ahead in mutually agreed terms. I do agree with Dr. Toner that people who are motivated should be allowed to teach, just as those who are trained to do so; one volunteer is worth 10 conscripts. However, if our ethics teachers aren't clear and comprehensive on the issues, then they do not aid the present need for a vector toward improved professional attitudes and behavior.

I am all for the Core Values movement—understanding also that those officers it's meant to empower can trivialize it (gimmick is as gimmick does). The Core Values program has brought the organizational-quality movement into the personal realm. "Quality" had become a neutered concept in the "process improvement" arena—a place where people outwardly had the signs of being quality oriented but inwardly were still full of unethical bones. However, Core Values still needs much work; hearts as well as minds continue to need this kind of improvement.

A good place to start is with a consensus toward definitions. Instead of heaving around terms whose definitions are more often assumed than elaborated—such as *morality, character* (and its development), *ethics, belief*, and so forth—let's see some clarity on the academic front. Then we can sort things out professionally (and personally) and get back to the main business of being a profession of arms. If it turns out that even these definitions

are "inchoate," then so be it: let's admit that right away and at least lay down a base upon which to build. Let's stop cutting academic bait and start fishing.

Maj Derek Reinhard, USAF
RAF High Wycombe, England

IN DEFENSE OF TEACHING ETHICS

What an encouraging tonic to read Dr. James H. Toner's fine defense of ethics education ("Mistakes in Teaching Ethics," Summer 1998). Having recently completed Air Command and Staff College, I am particularly struck by the contrast between the muddled thinking that passed for ethical reasoning in that program and the clear, concise, and ringing defense of ethical standards found in Dr. Toner's short piece. He is to be applauded for his courage in standing up to the fallacious (as he calls them) nostrums of the day that confuse any debate on ethical standards and for leading us back toward our common humanity instead of down the path to a nihilistic tribalism.

No finer modern foundation for a solid understanding of human ethics can be found than in our own Declaration of Independence. When it speaks of our common human equality and those unalienable rights with which we as humans are justly endowed, its argument undermines volumes of multicultural tribalist dogma. When that document goes on to speak of governments "instituted among Men, deriving their just powers from the consent of the governed," it points us in the direction of a uniquely human virtue, the capacity for rational deliberation over the means by which we shall secure the ends of safety and happiness through self-government. It is this human virtue, our specific excellence, as it were, that provides such a strong foundation for what Dr. Toner refers to as our innate ability to determine, and know, the difference between right and wrong.

Were we, as Dr. Toner recommends, to try to enhance the ethical education of our people by teaching them sound ethical principles

from which they can begin to reason thoughtfully about the ethical implications of any given course of action, we would not only provide an individual benefit of great worth to them, but we would also work to discourage and prevent the excesses one tends to find demonstrated by ethically rootless or confused individuals and organizations. Such an ethical education strengthens the individual as soldier, but also, and more importantly I would argue, strengthens the individual as citizen, thereby improving the organization in at least two ways. The role of citizen in a free republic is an especially important one, requiring continual pursuit of the characteristics necessary to individual as well as collective self-government in order to ensure the longevity and security of the republic. As Dr. Toner points out, it is difficult to see how ethical "training" in catchy slogans can begin to encourage the development of the virtues necessary to either good soldiering or good citizenship in a free republic.

How, then, does military ethics fit into the scheme, for the taking of life, as Dr. Toner again points out, quite apparently violates the mandates of the human ethics I describe. I would here agree with Dr. Toner that there are higher ends, the pursuit of which may justify military actions without getting bogged down in debates over the supposed "ethics" of a Nazi Germany or a Pol Pot. We must recall that military virtue, aiming at courage and honor more than wisdom and justice, is not the highest human virtue which one might pursue. But in an age of confusion over ethical standards, a vibrant and reasonable military ethic points inexorably in the direction of the higher human virtue. Many critics, and even some friends, of the military have in recent years decried the apparent gulf between popular societal ethical standards and military ethical standards. Thomas E. Ricks, who has written eloquently and affectionately of the power and efficacy of Marine Corps training, is perhaps the most popularly recognized of these voices following the publication of his book. I would, however, disagree with Mr. Ricks and his colleagues in this argument. While I would not propose to elevate military

ethics to the highest plane, I would encourage all of us to look at the successes of military ethics taught well as an example of how we may begin to recover a more sensible and reasonable approach to fostering the human virtues not only in our soldiers, but in our citizens as well.

Just as we do not want all of our citizens to mirror the military ethic, we just as surely do not want all of our soldiers to mirror all of the current lax popular standards. What is needed instead is to begin to address and understand how the two may be joined in an effort to restore the virtues and ethical standards necessary to the preservation of free government as well as to the pursuit of happiness. Dr. Toner provides us an excellent start from which we may begin to address these issues and deliberate on the means necessary to achieve the goals of free government.

Maj Lance Robinson, USAF
ONW VAQ-133

MORE THAT UNITES THAN DIVIDES

My sincere thanks to *Airpower Journal* and to Lt Col William T. Eliason, USAF, for taking the trouble to review my book, *Breaking the Phalanx: A New Design for Landpower in the 21st Century*, in the Summer 1998 issue. I appreciated the excellent review and wanted to add a few comments that may be of interest to your readers.

Far too little attention is directed to the importance of the joint command, control, communications, computers, and intelligence (C⁴I) structures that I propose for incorporation into the Army's ground forces. These are the critical links that must exist to integrate air and ground forces within a joint framework. It is increasingly clear that the direction of the current revolution in military affairs (RMA) points to the creation of a "system of systems" that literally encircles the earth and has global reach. For ground forces to integrate seamlessly into the global strike capabilities this system will make possible, joint C⁴I structures must exist at every level to exploit this global strike capability's potential

and to guarantee the safety of deployed ground forces.

In this connection, it is important to keep in mind that ground maneuver forces can compel enemy ground forces to mass. This is achieved through the types of offensive and defensive tactics and operations I describe in my work. In doing so, ground forces can create the concentrations of enemy that become lucrative targets for American airpower. This is an underlying theme that explains both the capacity of the phalanx force's ability to operate in a dispersed configuration, as well as to maneuver to avoid rather than directly confront enemy ground forces. This recognition also shapes Army ground force modernization. And finally, to correct any misperception of my views on the criticality of airpower to all military operations, I wish to quote two short passages from *Breaking the Phalanx*:

American Airpower is the nation's most responsive and flexible military capability. When the Air Force has access to usable bases, land-based fighters can quickly deploy from the United States and assemble a large amount of firepower. A fighter squadron that makes its morning sortie against a close air support target can fly an afternoon sortie against strategic targets hundreds of miles inside the enemy's territory. (Page 199)

And, in connection with the F-22, please note the following:

Hedging against future threats requires the United States to maintain selected, critical elements of combat power. In reduced numbers, the F-22 may qualify in this category if the USAF is to maintain its current edge into the first part of the next century. . . . In the meantime, scarce capital can be directed toward the development of the Joint Strike Fighter. (Page 203)

Again, I appreciate *Airpower Journal's* professional interest in the US Army and *Breaking the Phalanx*. In the final analysis, there is much more that unites us than divides us as any airman who reads my work will soon discover.

Col Douglas A. Macgregor, USA
Supreme Headquarters Allied Powers Europe

MYTHS OF THE GULF WAR REVISITED

I challenge a number of points made by Dr. Grant Hammond in his article ("Myths of the Gulf War: Some 'Lessons' Not to Learn," Fall 1998). Although he identifies several incorrect lessons learned, he runs the risk of creating new myths that are much more damaging than the ones he attempts to dispel. Dr. Hammond asserts that the following are "myths." I disagree.

"It Was a War." Unquestionably. Ask an Iraqi who was blasted by B-52s or buried alive by plough-equipped tanks if he thought it was a war. Ask the pilots who were shot down and tortured if they thought it was a war. The author draws the wrong conclusion here for two reasons. The first is his statement that the Iraqi military did not fight. In reality, the Iraqis fired millions of rounds from anti-aircraft artillery, attempted to fly defensive counterair sorties for several days, managed to down a few fighters with their radar and infrared surface-to-air missiles, launched an offensive attack on Khafji, and counterattacked the marines invading Kuwait. The difference between the Gulf War and other twentieth-century wars is that the Iraqi military was so overwhelmingly outclassed by superior US doctrine, equipment, and training that most of the suffering was confined to the Iraqi side.

The author's second error is that he incorrectly defines "classic" war in the twentieth century as a World War II-style conflict waged to unconditional surrender and occupation. World War II was the exception, not the norm. Most wars this century (Spanish-American, World War I, Korean, Russo-Polish, Russo-Japanese, Six-Day, Yom Kippur, and Indo-Pakistani) resembled Operation Desert Storm much more than they did World War II. They all ended without occupying the enemy's homeland, democratizing its political system, administering its country, or investing in its infrastructure.

However, Dr. Hammond's point that the American people may harbor unrealistic expectations for future wars is quite correct. Only Hollywood could have written a script

for a more one-sided victory in which so few good guys were killed in the defeat of a powerful foe. But that doesn't mean it wasn't a war. In fact, Desert Storm is exactly what Americans should expect from their military—not another drawn-out meat grinder.

"It's Over." Certainly. The author's primary rationale for declaring that it isn't over is the fact that we still have a large number of forces in the area. Yet, he says earlier that Desert Storm shouldn't even be considered a war because we didn't leave tens of thousands of troops in-theater as we did in World War II. Does this mean that World War II isn't over either?

"We Won." Absolutely. Saddam Hussein entered the war with the objective of seizing Kuwait and its oil reserves. He may even have had designs on the rest of the peninsula as well. He left that war without either and with his air force castrated and his army surrendering in droves. The coalition, on the other hand, won a stunning victory. We liberated Kuwait and restored it to its prewar independence. We dictated the cease-fire agreement to the Iraqi generals, which they signed because they knew they were beaten. Iraq lost its gamble to take over Kuwait, and we won in our drive to liberate it.

The author makes four references in this section to the fact that we did not demand unconditional surrender or the removal of Saddam, neither of which was our objective. Although Clausewitz didn't say it best, I think he said it first in *On War*: "Now, the first, the grandest, and most decisive act of judgement which the Statesman and General exercises is rightly to understand in this respect the War in which he engages, not to take it for something, or to wish to make of it something, which by the nature of its relations it is impossible for it to be."

The objective of the war was to liberate Kuwait—not to occupy Iraq. Unfortunately, Dr. Hammond is not alone in this misconception. It seems that even former president George Bush has succumbed to this most common of errors in his recent memoirs. In reality, he set the correct objectives for the war and achieved them. He won.

The fact that we didn't "play" it the way Americans expect is both irrelevant and incorrect. In point of fact, the war did start the same way as World War II. A powerful country invaded and conquered a weaker neighbor. We then took advantage of an opportunity to build up our forces during a lull akin to the "phoney war" on the western front of Europe. In the end, the Iraqis were begging for a cease-fire, which the Russians were trying to broker. We agreed to a cease-fire when we had achieved our primary objective of liberating Kuwait. This kind of quick, decisive victory is exactly what Americans expect.

"We Accomplished Our Objectives." The author states that we did not accomplish political objective number three, "protection of Saudi Arabia and other states in the Gulf from Iraq." However, eight years have passed, and Saudi Arabia has not been overrun. We may not have protected it permanently, but it is safe for now—at least from Iraq. We may have to keep forces in the region for a time, but that is probably in our interest anyway. On the other hand, accomplishing objective four, "protection of American citizens abroad," would have required occupying not only Iraq but also Iran, Syria, Libya, and several other terrorist sponsors. If Dr. Hammond is recommending such a crusade, I know many air warriors who would support him. However, I don't think the rest of our coalition partners would agree to it.

As regards the military objectives, we achieved them all to the degree necessary to achieve our strategic objectives. This is, after all, their only purpose. I must assume that the commander chose those operational objectives because he believed that they would best contribute to achieving his assigned strategic objectives. However, as Clausewitz also said, objectives need not remain constant throughout a conflict. Indeed, they should change as the situation changes.

We clearly achieved military objective number one, "attack Iraqi political/military leadership and command and control." The objective says nothing about eliminating it completely. In fact, we reduced it to such a degree that it was no longer capable of coor-

inating effective execution of its plans. Indeed, Gen Norman Schwarzkopf and Gen Colin Powell have been criticized for not realizing and taking advantage of the degree of degradation displayed at the battle of Khafji.

The coalition did achieve some success with military objective four, "destroy chemical, biological, and nuclear capability," although it was clearly incomplete. The follow-up United Nations inspection teams have destroyed some additional materials and are interfering with the development of others.

Finally, the coalition did fail to achieve military objective five, "destroy the Republican Guard forces." However, this objective was merely a means to an end. Early on, the US Army established the Republican Guard as the critical center of gravity in Iraq, rightly assuming that if the Republican Guard were defeated, then the rest would fall as well. If the coalition army had confined its attack to Kuwait and the forces there, the Republican Guard could have launched a counterattack and instigated a drawn-out war of attrition. In the end, however, the Guard ran away instead and removed itself from the fight. As desirable as its destruction would have been, it was not worth continuing the war since we had already achieved our objective of liberating Kuwait.

"We Can Do It Again If Necessary." A qualified yes. We have fewer forces, but we also have fewer threats to maintain reserves against. If Iraq were to try to absorb Kuwait again, the result would be quite similar. Although the US military is much smaller, it is also much better. When the coalition launched Desert Storm, the best available air-to-air missile was the AIM-7. F-16s went into battle with only AIM-9s and guns. The Air Force had enough LANTIRN targeting pods to equip only the F-15Es, and B-1s had no conventional capability at all.

Now, every fighter carries AIM-120s; every capable jet carries a targeting pod; every bomber can deliver conventional ordnance; and we have B-2s to add to the capability of the F-117. The Army must certainly have made improvements as well. In that same time, Iraq has been able to do nothing more

than buy black-market parts for equipment that was obsolete eight years ago, when it lost the last war. If Saddam tries it again, he'll be crushed again—and he knows it. Why else would he tolerate the no-fly zones?

"US Military Might and Prestige Are Restored." This is at least true from our own perspective. It is certainly higher than if we had relied on sanctions instead of force to kick Saddam out. The lesson to other countries is clear. If they directly threaten vital US interests, they will be met with overwhelming force. However, this kind of influence has natural limits. We shouldn't expect it to force other countries to resolve their internal civil wars.

I agree with the remainder of Dr. Hammond's conclusions. Technology (precision-guided munitions) did not win the war. Highly trained and well-led personnel employing superior equipment won the war through the joint execution of a sound combined-arms operational doctrine. As regards who paid for the war, my gut feeling has always been that the United States bore the brunt of the expenses, whether monetary or material. It is nice to see the data in writing. Also, the Gulf War does not represent an unblemished record of success. The author brings up some very important deficiencies, which we must correct. However, to extrapolate these errors into suggesting that we lost the war is absurd. Finally, I heartily agree that this is not the first time that the promise of airpower has been fulfilled. Perhaps this latest display was visible enough to convince people outside the Air Force as well.

Maj Gary Middlebrooks, USAF
Langley AFB, Virginia

DR. HAMMOND REPLIES

My thanks to Major Middlebrooks for putting so much time and effort into a response to my article. I believe he unwittingly reinforces the points I tried to make in the article.

Major Middlebrooks maintains that the Gulf War was a war, the Iraqis did fight, they lost, and it is over. And so history will record

it. He points out that millions of rounds of antiaircraft artillery were fired by the Iraqis and that they launched an offensive attack on Khafji. True enough. But unlike our past experience, we decided when to pull the trigger. We didn't have to fight our way into the theater. What fighting the Iraqis did was largely defensive and desultory. The "Battle of Khafji" was a confused affair of roughly 36 hours' duration. Most of the Iraqi air force fled rather than fight. My point was that it didn't square with the American perception of war. Most of the examples he cites are non-American. I said that we either stayed or left after the conflict. This is the first time in which we redeploy every time Saddam seeks to jerk our chain in a never-ending, high-cost, low-result conflict that is—eight years after the invasion of Kuwait—not over.

Like many people in the military, Major Middlebrooks equates military victory in battle with political victory in war. They are not the same. The rationale is not, as Major Middlebrooks maintains, that forces still remain in-theater. The argument is that one goes to war to establish a better peace. The most important point in Clausewitz, to which Major Middlebrooks refers me, is this: "War is the continuation of politics with the admixture of other means." It is to accomplish a political purpose. Saddam is still in possession of weapons of mass destruction, still has a strong Republican Guard, still claims Kuwait as the 19th province of Iraq, and is still a threat to his neighbors. Although we may feel good about the demonstration of our military prowess, what long-term political outcome have we accomplished?

Major Middlebrooks maintains that "Desert Storm is exactly what Americans should expect from their military—not another drawn-out meat grinder." I hope not. The whole point of the article was that the Gulf War establishes a false and perhaps never-to-be-emulated standard for military success. There is no denying that we can fight and win a conventional war now or in the near future. But having seen the Gulf War, what adversary in his right mind would seek to take on US armed forces head-to-head? Our adversaries

of the future will do so asymmetrically. Our Gulf War prowess may be less and less relevant.

More pointedly, Major Middlebrooks maintains that we won, we accomplished our objectives, and we can do it again if necessary. Although Iraq lost its gamble to swallow Kuwait and we did liberate it, war is not just about territory. Increasingly it is about effects—not lines on the earth's surface. Saddam did not lose politically, although he was defeated militarily. He took on the US-led coalition, survived, and is a hero in most of the Islamic and Arab world. We did not win politically, although we defeated the Iraqi military. There is no better state of peace, sanctions continue, and no significant rearrangement of the balance of power emerged in the region. In war, the adversary must decide when he is defeated. Saddam never did—we just stopped. Major Middlebrooks can quarrel with the view of his former commander in chief if he wishes. I did not put the words in President Bush's mouth. His memoirs, as well as my article, bemoan the way the war ended.

As to objectives, we didn't accomplish what we set out to do. It was not through resistance by Saddam but by poor decision making on our part. We did not accomplish half of our objectives—political and military. General Schwarzkopf's main military objective was to destroy the Republican Guard. That was more than an instrumental goal to defeat Iraq. It is Saddam's source of power internally. After we failed to get rid of him, we urged the Kurds and Marsh Arabs to do our bidding for us with immense loss of life and suffering as a consequence. Saddam became even more powerful in Iraq than before, as he used helicopters to move troops and put down revolts that followed the war because we didn't prohibit it.

I am sorry, but we can't do it again if necessary. That judgment is more about political circumstances than military forces, but that does not make it less crucial. Our former allies are less likely to support us politically or financially or to help with basing, overflight rights, or permission to launch offensive operations from their territory. We lack

a number of bases we used for an air bridge to the theater; VII Corps is no longer in Europe; and we would most likely have to fight our way into the theater. Saddam doesn't tolerate no-fly zones—he loves them! He gets political capital out of the "presence" of American planes, complains about sovereignty to the United Nations, and violates them at will, knowing that our restrictive rules of engagement won't allow us to make them true no-fly zones. Meanwhile, the US Air Force is killing itself putting hours on engines and airframes, degrading fighter-pilot combat skills, deploying squadrons endlessly to the "sandbox," and jerking personnel and their families around needlessly for no real political advantage.

Lastly, Major Middlebrooks states that I have suggested we lost the war and that that is absurd. (His judgment, not mine.) I said it wasn't really a war. I said we didn't win. I didn't say we lost. I did strongly imply that no better state of peace exists. Since that is the major reason to go to war, I think there is legitimate debate about the real nature of our "triumph without victory." Winning and losing are not the only outcomes possible. Saddam did not lose, and we did not win. The war just stopped. More importantly, the whole purpose of the article was to point out the dangers of what we might call the "other Gulf War Syndrome." This is the notion that we were so good in the Gulf War that we are virtually invulnerable. We are not. To even hint that we are sowing the seeds of our own destruction. The fact that we might think that our military might and prestige are restored is part of the problem—not part of the solution. What matters is what other people think.

Major Middlebrooks is to be commended for taking issue with these points and engaging in the debate. But it is precisely the attitude his rebuttal represents that may be the greatest danger to the United States in the future. But this exchange will be, I hope, part of a larger, continuing conversation for us all.

Dr. Grant T. Hammond
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Net Assessment

An intellectual is a man who takes more words than necessary to tell more than he knows.

—President Dwight D. Eisenhower

Complexity, Global Politics, and National Security edited by David S. Alberts and Thomas J. Czerwinski. National Defense University Press, Fort Lesley J. McNair, Washington, D.C. 20319, 1997, 381 pages.

Complexity theory is something that business and science have been using for quite some time, but the theory has only recently—since the end of the cold war—been used by national security strategists. Complexity theory is used to investigate systems and the behavior of the dynamics of nonlinear systems. Most Air Force readers will recognize the observation, orientation, decision, action (OODA) loop of John Boyd fame.

This book is a collection of essays presented at a National Defense University conference on complexity theory—or chaos theory as it is sometimes called. The presenters include Alan Beyerchen, an Ohio State University professor who has spent years examining Clausewitz in nonlinear ways and demonstrating that Clausewitz is as valid today as he was in his own time; Zbigniew Brzezinski, who discusses worldviews; and Murray Gell-Mann, the founder and most prolific writer of complexity theory. In all, 11 articles are presented, and the reader gets an excellent understanding and overview of the theory, as well as realistic and current themes that show the utility of the theory.

Zbigniew Brzezinski's piece, which points out that the world cannot function without the United States, lays out a variety of policy options that all require American leadership. In addition to supporting Russia, he feels that the United States needs to pick two other republics which may not yet be democratic to maintain access and force the Russians to operate in a democratic way. In addition to the Ukraine, these two would be Azerbaijan and Uzbekistan—the latter because it is the core of an independent Central Asia and that is in the interest of the United States, and Azerbaijan because it

provides access to Central Asia and the United States should not allow the Iranians and Russians to operate in collusion and prevent the United States that access. While there are other points he deals with, ranging from weapons proliferation to a united Europe, the avoidance of large-scale social collapse raises some real long-term policy problems. Mexico is the country he has chosen, and his arguments seem not only to be sound but based on current reality inside that Central American country. In addition, he urges that the United States government finally (after 50 years) establish an effective, global, political planning mechanism—not another bureaucracy, since national strategy and policy are not being planned at any level within the White House.

After the end of the cold war, James Rosenau writes that if there are enemies to be contested, challenges to be met, dangers to avoid, and responses to be launched, we are far from sure what they are. At the core of the complexity theory is a complex adaptive system—not a cluster of unrelated activities but a system—with unfamiliar feedback loops, and it is here that complete theory helps a participant to grasp the system. The role of the policy maker is not to understand the system—whether it is domestic or international—but to master it, and it is here in the post-cold-war era where most have failed. Steven Mann, writing about the current international system, points out that we are in an environment in which unperfected transformations lead to constant change in the international environment—witness Somalia, Haiti, Bosnia, Central Africa, and Chechnya.

The cornerstone of this collection of essays is Beyerchen's work on Clausewitz; the key here is that Clausewitz understood political participation as a stimulus for exercise of, and constraint upon, power. Using his great knowledge of German, Beyerchen examines key parts of *On War* and points out that politics and military action interact in a complex, continual feedback process. War cannot be a linear system since it does not behave predictably—hence Clausewitz's reference to the friction of war. This shows that war, even as Clausewitz understood it in his time, was not linear but complex. Thus, complexity theory is the appropriate way to study war. By thinking about this nonlinearity, one can design a more robust system of analy-

sis, allowing the military to adapt to the twenty-first century.

Other writers take up the theme that as the world moves to a knowledge-based society involving the production, dissemination, storage, and use of information, we are entering an era of rapid change. If institutions and business patterns of the industrial era fall to the side, so must national security doctrine and the way the Pentagon prepares for war. One of the more controversial points is to "leapfrog" an entire generation of weapons systems to develop one to fight this new wave of warfare, which currently no one has been able to define—not in this book either. Speed, agility, synergy, information dominance, and lethal, long-range precision strike are cornerstones of this revolution in military affairs. Given budgetary shortfalls, doctrinal differences, and the unlikelihood of a major upsurge in defense spending, leapfrogging is viewed as the only viable alternative to obsolescence of the Department of Defense.

Readers of this book should have some background in complexity theory and its uses in national security, since the essay writers assume some fundamental knowledge. Theories are in vogue in the Pentagon, so staff officers and defense planners may find this collection a useful primer.

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Lady GI: A Woman's War in the South Pacific by Irene J. Brion. Presidio Press, 505B San Marin Drive, Suite 300, Novato, California 94945-1340, 1997, \$18.95.

A Piece of My Heart: The Stories of 26 American Women Who Served in Vietnam by Keith Walker. Presidio Press, 505B San Marin Drive, Suite 300, Novato, California 94945-1340, 1997, \$15.95.

I initially perceived that World War II memories were happier than Vietnam memories and wondered why. I surmised three possible reasons: (1) more time had passed since World War II; (2) World War II was a more "popular" war, and (3) Vietnam was a different "type" of war. In *A Piece of My Heart*, a variety of women—nurses as well as United Service Organizations (USO) and Red Cross workers reported trauma from their experience. This was the general theme until I read Doris Allen's story.

Doris was a Women's Army Corps (WAC) intelligence operator. Her story of Vietnam read similarly to Irene's as a cryptanalyst from World War II.

Ms. Brion's memoir reminded me that some things never change about military life. Her latrine queen and white-collar bed stories were timeless. Although Brion's memoir speaks largely of pleasant things, she does address some of the hardships of being a woman in a service geared entirely for men. For instance, the women had no PX available to them and had to rely upon male soldiers and packages from home to provide sundry items and basic toiletries. Although Brion does not discuss problems she encountered after separating from the service, she alludes to them in her closing paragraph. I wonder if her story would be similar to those of the *Piece of My Heart* interviewees?

Keith Walker, in *A Piece of My Heart*, collates taped or written conversations with women who served in Vietnam as Army and Navy nurses, Army WACs, American Red Cross workers, USO workers, entertainers, International Catholic Voluntary Services and Catholic Relief Services workers, American Friends Service Committee workers, Armed Forces Radio show workers, and civilian airline flight attendants. Most people are not aware that 15,000 women served in Vietnam. Most people probably do not consider the carnage encountered daily by hospital workers in a war zone. The competency and ingenuity someone develops when working in that environment, day in and day out, rise to the level of doing what must be done to save a life. No one prepared them to deal with returning to a peacetime environment. Many of them encountered problems with supervisors because they exceeded the bounds of what they were authorized to perform in a civilian environment—they had problems readjusting to the "office politics" of working in a civilian hospital.

For several years, I wondered why Vietnam vets couldn't just "get over it and move on." Several years ago, I asked a friend who had served in Vietnam why that was. He replied that the age of people serving in Vietnam ranged from late teens to early twenties. During World War II, the average age was in the late twenties. That five-to-10-year gap made a big difference in how they were able to deal with their experiences. The experiences of the older group were no less traumatic, but they had more coping tools available to them. Someone in Walker's book addresses the issue of modern air travel as a contributing factor. In World War II, troops were moved by transport ship. When they were returning, they had up to two months to sit around, talk to each other, and "decompress." After

Vietnam, the airplane made it possible for a combat veteran to leave a combat zone in the morning and be in downtown San Francisco less than 48 hours later. I suspect that cultural and political changes also played a role.

Finally, pre- and postdeparture preparation was nonexistent. How could we adequately prepare someone for the shock of mangled bodies flowing nonstop into a triage area? A benefit from the techniques learned in Vietnam was civilian shock trauma centers such as the one in Baltimore. I'm acquainted with the life-saving qualities afforded by Baltimore's shock trauma configuration. As a San Antonio resident, I'm also aware of the benefits of trauma centers at Wilford Hall and Brooke Army Medical Center to both military medical teams and the community.

Ms. Brion's book enlightens the reader to one woman's experience in the WAC during World War II. Informative and interesting, she has produced a well-written, readable book. I couldn't put it down and finished it quickly. I enjoyed comparing her experiences to my own and noting not only how things have changed since World War II, but how they have remained the same. Walker's book contains much more pain and is less enjoyable reading. Since it's divided into 26 chapters, it's easy to read a segment at a time. I recommended it to a military nurse friend of mine. Both books are useful for gaining perspective.

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Hit My Smoke! Forward Air Controllers in Southeast Asia by Jan Churchill. Sunflower University Press, 1531 Yuma, Manhattan, Kansas 66505-1009, 1997, 220 pages, \$41.95.

Mission accomplished! Jan Churchill succeeds in this "attempt to tell the reader what it was like" to be a forward air controller (FAC). Admittedly not a rigorous history, this is a documentary tale of the men who flew low and slow over Southeast Asia, searching for targets to mark for destruction. Virtually every air strike in Laos, Cambodia, and South Vietnam had FAC direction. In this theater, the FAC became the de facto local air commander.

The book's large format accommodates over one hundred photographs of people, places, and fighting machines. Medal of Honor wearer George "Bud" Day provides an introduction, and the book offers a historical background. Tales from people

who were there dominate these pages and add authenticity, even if the reader dismisses some of the melodrama. Common threads of sweat and danger link the stories across the evolving war years when the FACs flew. Just at the point where the war stories begin to sound alike, the author shifts to another facet of the busy FAC mission.

Churchill devotes a chapter to the machines flown by FACs. The list includes several unlikely craft, although the O-1, O-2, and OV-10 predominate. One chapter tells of Raven FACs, who operated in blue jeans from unmarked airplanes with a high casualty rate in the secret war in Laos. Still another section focuses on fast FACs. In each case, there is a story of pushing and sometimes exceeding limits. Ironically, in order to find targets, FACs frequently had to present themselves as targets.

Authenticity also emerges from Churchill's recognition of the horrendous weather phenomena, searing heat, and thick jungle cover that challenged every FAC. The author demonstrates her grasp of a fundamental driving factor: FACs fought hard for each other and for their brothers on the ground. She even touches on careerism, which grew among more senior participants later in the war. She describes frequent FAC clashes with other Air Force subcultures.

Toward the end, the author provides the moving stories of Capt Hilliard Wilbanks and 1st Lt Steven L. Bennett, two FACs who received the Medal of Honor posthumously. There is an appendix containing actual FAC training manuals and a decent bibliography.

Hit My Smoke! is a good bedside companion. Portions contain enough detail to hold as a reference. This book belongs on the shelf with other tomes of what really happened in the war.

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Citizen Warriors: America's National Guard and Reserve Forces & the Politics of National Security by Stephen M. Duncan. Presidio Press, 505B San Marin Drive, Suite 300, Novato, California 94945-1340, 1997, 317 pages, \$24.95 (cloth).

If generals always prepare for the last war, Stephen Duncan deserves a star. As assistant secretary of defense for reserve affairs, he was in the middle of the first (the only) test of the total-force concept—Operations Desert Shield/Storm. Because the war was successful, he argues, we

should learn from it and reestablish our forces as they were on that occasion. Perhaps so; probably not.

Citizen Warriors has potential as a major study of the effectiveness of the reserve structure and missions established in the aftermath of the Vietnam War. Veterans of Vietnam, determined that never again would American forces fight without public opinion in their corner, created an active force incapable of fighting a war without the help of citizen soldiers. This book has promise, due to the author's inside position, to present major insights into the politics—internal and external—of Desert Shield/Storm. We should be able to learn much about the new model Army and its Vietnam-war commanders, charged with first containing the aggressor and then liberating the victim. We should—and to an extent, we do.

Duncan is a veteran of Vietnam, a long-time reservist, a Republican, an advocate of a strong and cheap defense, and a bureaucrat. He is not shy about taking credit for improvement. Nor is he reluctant to point out shortcomings in the reserve forces and to explain why he could not overcome those weaknesses. He notes, legitimately, that training on high-tech weapons takes more time than the weekender normally has, that training in large group maneuvers is completely different from small-unit training, and that mission shifts create the need for changes in skills without providing the time to acquire proficiency. He makes a case against using his citizen soldiers without long postmobilization training; he demonstrates their incapability for rapid mobilization into combat. He is careful to point out that one selling point of reserves is that they are cheaper than active duty forces, but the trade-off for economy is a force less skilled and less capable of fighting without additional individual and unit training. Duncan sees both sides of the issue

and understands the generals' reluctance to use round-out brigades in combat and their lukewarm appreciation for the citizen soldier.

Duncan ably treats the back-and-forth of the deliberate preparation for the war. He discusses the bureaucratic memo writing, the meetings, and the press conferences. He addresses the legal process in Congress and the courts. He shows above all that there remains a great deal of preoccupation in Washington, D.C., with minutiae better addressed at lower levels. He talks of the endless details of taking care of dependents, personal matters, and, occasionally, the troops—more than a half million of them moving thousands of miles into a war zone without infrastructure but with an enemy force the fourth largest in the world.

Then we win. The war itself is almost an afterthought, as Duncan shifts quickly to his prescription for the future. Having won the Republican way, he doesn't like the Clinton approach of downsizing, sending the reserves out on new domestic missions, and so forth. He fails to note that the war in the sand was a fluke, an anomalous coming together of conditions for one last set piece, the mobile technology of Rommel and Guderian against the mind-set of the Maginot Line, which in 1940 was the ultimate preparation for World War I. He also ignores that the victory was less complete than first reported, the weapons less effective, and the enemy less lethal. And he ignores the sad reality that there will be no more multi-trillion-dollar arms races. No more will we test and manufacture almost simultaneously and hang the expense. Duncan notes that the militia concept was obsolete long before Lexington and Concord. He might consider that nothing has changed.

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A fanatic is one who can't change his mind and won't change the subject.

—Sir Winston Churchill

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