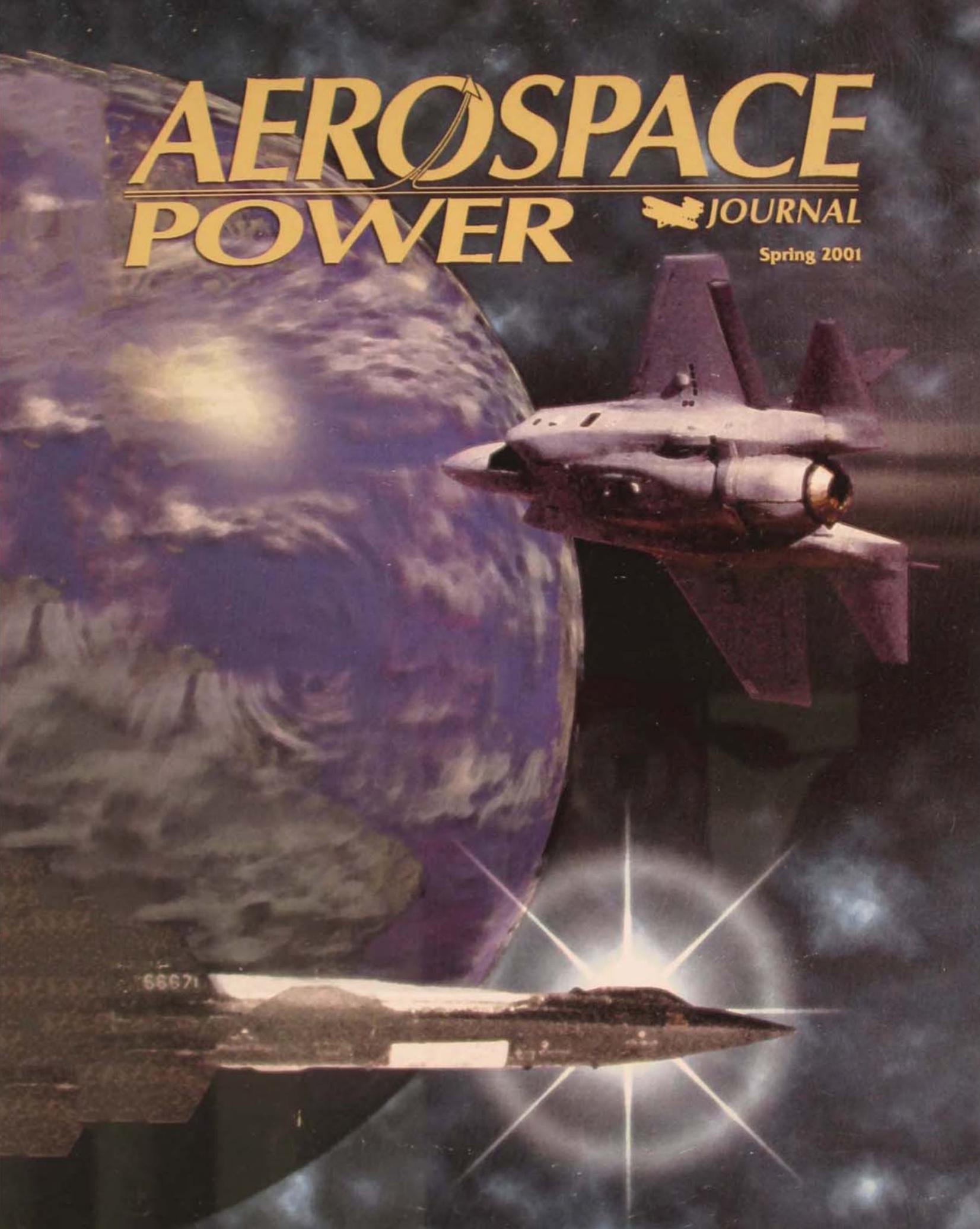


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 JOURNAL

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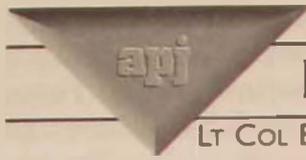
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Precision Doctrine

PRECISION IS A bedrock of aerospace power. It became a fundamental goal of aerial warfare prior to World War II and was codified into Air War Plans Division-1 (AWPD-1), a force-structure plan to produce assets capable of delivering high-altitude daylight *precision* bombing—specifically, the B-17 Flying Fortress with its Norden bombsight.

Precision is rooted in the concept of cutting with accuracy. It is the minute difference between a violin's being in tune or out of tune, the difference between a vote and a hanging chad in an election, and often the difference between life and death in the profession of arms. As Brig Gen Malham Wakin has eloquently expressed, in the military a fine line exists between incompetence and immorality. A crucial factor in that statement is precision—for it is paramount in core values and core competencies, in which excellence and integrity begin with precise honesty and end with precise execution. Whether we answer a question for a superior or drop a bomb, in the military it is our duty to be precise.

Precision spans the spectrum of what we do. It is obviously key to precision-guided munitions, introduced in Vietnam and now demanded by political necessity. Commonly called “smart” bombs, these weapons have the ability to strike surgically and thus reduce the risk of collateral damage, which makes them exceptionally more attractive than their old-fashioned predecessors—gravity (or “dumb”) bombs.

Precision is also a key enabler of stealth and other important platform technologies like the airborne laser (see PIREP, this issue) that continue to boost aerospace capabilities. It is certainly a requirement for good intelligence, and even successful leadership demands precision in myriad ways—for imprecise

leadership can lead to poor decision making, lack of confidence, and sinking morale. *APJ* will have much more on that subject in our special Developing Aerospace Leaders (DAL) issue, coming out in our Summer 2001 issue.

In just about every facet of the Air Force, precision really matters—even in publishing a professional journal like *APJ* or in composing a precise editorial (ouch!). Exact understanding of ideas and facts is often difficult but important, which is why the precise transcript of Dr. Kohn's interview is valuable to the story of General Fogleman's retirement. Precision is also crucial to projecting aerospace power, as exhibited in General Jumper's piece. And the articles on air and space demonstrate that precision is at the very essence of aerospace integration in both functional and organizational aspects.

Doctrine also spans the spectrum of what we do, and we must recognize the role of precision in doctrine—and vice versa. Traditionally, precision has been linked with strike, as it was with AWPD-1 and is today in an Air Force core competency. Yet, as our service continues to realize the importance of doctrine, it must promote precise doctrine. Covering the waterfront with more doctrine, which happens sometimes, is not necessarily better. Rather, better (read precise) doctrine is preferable. That is the road toward improvement we see in products like the concise Air Force Doctrine Document (AFDD) 1, *Air Force Basic Doctrine*.

Basically, doctrine is the nexus of precision and engagement. Doctrine is valuable only when deployed and employed through training and education. At that point, technological precision capabilities can be linked to learned (human) precision abilities to pro-

duce the precision-engagement core competency. The Air Force is on the right track in recognizing doctrine-education shortcomings and responding with initiatives from the Air Force Doctrine Center and the College of Aerospace Doctrine, Research and Education that emphasize the deployment of doctrine. For example, a new doctrine-education map

to clearly coordinate objectives and promote a continuum of doctrinal education at Air University schools and throughout the Air Force promises to help answer the DAL challenge to produce tomorrow's strategic leaders. The key to success in this and in nearly everything the Air Force does, however, lies in executing with precision—doctrinal precision. □



Ricochets and Replies

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

SPACE DEBRIS

APJ continues to stimulate aerospace integration with great material like Col Jonathan W. Campbell's "Using Lasers to Remove Orbital Debris" (Winter 2000). Such ideas are exactly what we need as we evaluate the Air Force's core missions in space beyond force enhancement and space support.

An operational capability to remove orbital debris from our space lanes of commerce and communication is a logical step to make space a safer place to operate. However, we must be careful not to oversimplify the problem, lest the common observer develop a mental picture of Air Force men and women shooting down debris like Han Solo and Luke Skywalker popping off TIE fighters in the movie *Star Wars*.

Such a capability would provide a tremendous opportunity to train a new cadre of space operators and maintainers. It would also give us an ability to develop operational concepts of air-space clearance, deconflic-

tion, and collateral-damage estimation, as well as improve our modeling and simulation of laser effects in space.

However, at least three considerations will probably make clearing the skies in two years for "less than \$200 million" highly unlikely. First, Colonel Campbell states that a laser pulse, "applied at the appropriate point in the object's orbit," could lower the object's perigee and hasten its disintegration in the upper atmosphere. Since he advocates only a single laser on the equator, Kepler will dictate very few such opportunities. A single ground site will have few (on the order of two to six, depending on altitude and inclination) opportunities per day to see an object, let alone at the required "appropriate point."

Second, for every laser pulse, there will always be some finite chance that it will create more debris rather than eliminate it. Laser effects on specific materials can be modeled and tested on the ground, but often we have no way of absolutely predicting the ultimate effect in space. We may very well find that after a number of laser pulses, we no longer have a single 8 cm piece of debris but two untrackable and equally deadly 4 cm pieces of debris.

This leads to my last point. US Space Command currently tracks nearly nine thousand objects orbiting Earth. The real worry is not the objects we see but those we don't. There are potentially as many debris items lurking

out there that are too small to track (down to 1 cm). Investment in a debris-removal system must be accompanied by an improved search/surveillance capability.

These issues are not insurmountable but point to the complex issues facing the Air Force in space and serve to show that there are few easy answers in this growing mission area. The threat to space assets and the Space Station Alpha crew is real, if remote, and an 80 percent solution is probably better than no solution. A modest test using existing lasers, like the US Army's mid infrared advanced chemical laser (MIRACL), would provide an opportunity to demonstrate the feasibility of this approach for a fraction of the cost.

Maj Brad Broemmel, USAF
Colorado Springs, Colorado

First of all, thanks to Major Broemmel for his thoughtful comments and for providing the opportunity to continue the dialogue on "Using Lasers to Remove Orbital Debris." This relates to an issue facing the Air Force in space that is becoming increasingly important. While we feel that our development and research of this idea at the conceptual level has been comprehensive, and while we respectfully disagree with Major Broemmel's opinion that this approach is unlikely to be successful, we always welcome additional looks at our advanced research.

Major Broemmel is correct in saying that our proposed single ground-based laser facility would only "see" any one 1-10 cm debris object two to six times per day, depending on altitude. Estimates continue to be debated and vary widely as to the total amount of 1-10 cm orbital debris. However, middle-of-the-road estimates place it at 150,000 objects, with roughly 80,000 objects below 800 km altitude. Since we are interested in all 80,000 objects passing over our facility two to six times per day, we will have in the beginning 160,000-480,000 potential targets per day. This works out to be over 50 potential targets of opportunity per minute. Extending our facility's capabilities with additional funding to 1,500 km

coverage would simply increase the number of potential targets.

Laboratory experimentation in vacuum at Oak Ridge National Laboratories and Wright-Patterson Air Force Base have shown that for typical orbital-debris materials, microablation tends to fuse the object's surface. This fusing actually strengthens the structural integrity of the object and reduces the probability of particle breakup. Furthermore, should particle-debris breakup occur after a 200 km perigee has been achieved, the cloud of particles will simply deorbit faster due to drag than as a single object. There is no current protection against 1-10 cm objects. If an 8 cm object is broken into two 4 cm objects, then at least one of those objects will be deorbited in the engagement. Hence, an 8 cm object will have been replaced with a 4 cm object (that will be brought down on a later orbit), achieving our mission of reducing the risk to spaceflight. Should an unlikely breakup occur, resulting in reducing the object to less than 1 cm in size, then we are now within the envelope for protection by onboard shielding. Major Broemmel is astute in recognizing that the laser is only half the solution. The other half is a sufficiently capable sensor system. Our conclusions are based not only on extensive laser research, but also on thorough radar, optical sensor, and pointing and tracking findings as well. One example is the Haystack radar, which has demonstrated the capability to track objects in low earth orbit (LEO) down to 1 cm in size.

Again, we reaffirm the derivation obtained from years of research analysis and experimentation. All 1-10 cm orbital debris up to 800 km in altitude can be removed in two years with one laser facility located near the equator for approximately \$200 million. We heartily agree with Major Broemmel that a demonstration is the next step. Part of that is planned to be a joint Air Force/NASA collaboration to conduct a laser-calibration demonstration in space from Maui that will demonstrate the capability of existing technology to successfully engage a debris object in LEO.

Col Jon Campbell, USAFR
Huntsville, Alabama

The Early Retirement of Gen Ronald R. Fogleman, Chief of Staff, United States Air Force

EDITED by DR. RICHARD H. KOHN*



Editorial Abstract: Air Force chief of staff Gen Ronald Fogleman's early retirement in 1997 has caused great speculation. Was this a "resignation in protest"? Here for the first time, in an interview with former Air Force historian Richard H. Kohn, General Fogleman explains his thinking and his reasons for choosing this unprecedented course of action.

ON MONDAY, 28 July 1997, Gen Ronald R. Fogleman asked Secretary of the Air Force Sheila Widnall to be relieved of his duties as chief of staff of the Air Force and retired as soon as possible, a year before the end of his four-year term. At the time, the press and electronic media overwhelmingly interpreted General Fogleman's act as a resignation in protest over the secretary of defense's intention to block the promotion of Brig Gen Terryl "Terry"

*The editor thanks Jacqueline Gorman (University of North Carolina at Chapel Hill) for transcription of the interview tape; Jonathan Phillips (University of North Carolina at Chapel Hill) for research assistance with the introduction and annotation; and, for help in locating documents and specific items of information, Wonne Kinkaid and Perry Jamieson (United States Air Force History Support Office), Elizabeth Muenger (Air Force Academy historian), Duane Reed and his staff (Air Force Academy Cadet Library Special Collections Department), and Barbara Levergood (Electronics Documents librarian, Davis Library, University of North Carolina at Chapel Hill).



Schwalier to major general. Schwalier had commanded the 4404th Composite Wing in Saudi Arabia the previous year when a terrorist bomb had destroyed the Air Force housing complex known as Khobar Towers outside Dhahran Air Base, killing 19 airmen and wounding a total of some three hundred Americans. After one Department of Defense (DOD) and two Air Force investigations, Fogleman had concluded that Schwalier had done everything that could be expected of a commander and had no culpability in the tragedy; punishing him would have a chilling effect on commanders around the world who might then infer that protecting their forces outweighed accomplishing their missions.

Reports had circulated some weeks earlier that General Fogleman would resign if the secretary blocked Schwalier's promotion. But the truth of the matter was that General Fogleman's decision to leave was neither a

resignation nor an act of protest; it was a retirement. Had he resigned in protest, he would have waited until after the secretary of defense announced his decision in the Schwalier case and explained publicly and unambiguously that the request for retirement was the product of disagreements over specific decisions and policies. Instead, General Fogleman chose to leave quietly. In a brief public statement written and issued the same day, the chief stated, "My values and sense of loyalty to our soldiers, sailors, Marines and especially our airmen led me to the conclusion that I may be out of step with the times and some of the thinking of the establishment. This puts me in an awkward position. If I were to continue to serve as chief of staff of the Air Force and speak out, I could be seen as a divisive force and not a team player. I do not want the Air Force to suffer for my judgment and convictions."

Until now, General Fogleman has not elaborated on or clarified that brief public statement he issued at the end of July 1997. His public statement at the time stated specifically that he "was driven by the desire to defuse the perceived confrontation between myself and the secretary of defense over his impending decision on the Khobar Towers terrorist attack." As he explains below, it "was a request for retirement versus a resignation. . . . My request was very carefully worded and consistent with historical practice and precedent. . . . I wanted to take that off the table and give him [the secretary of defense] one last opportunity to act on the Schwalier case on the merit and facts of the case, rather than the issue of the secretary of defense's power vis-à-vis some service chief." In leaving, General Fogleman recognized that a resignation in protest over policy would encroach on civilian control of the military, one of the foundations of American government and national defense, by setting a precedent that military leaders might resign instead of accepting a decision they opposed. Fogleman knew that there was no tradition or practice of resignation in protest in the United States military.

Indeed, the causes of General Fogleman's action were complex and lay rooted in a series of issues that went back many months. He had contemplated early retirement for at least a year and a half. "I said publicly from the beginning that Miss Jane [Mrs. Fogleman] and I considered being chief a four-year tour, not a sentence. . . . There were certain things that I intended to accomplish, and when they were done, I felt that I might want to leave rather than hang on. I had watched people hang on into that fourth year and just did not think it was value gained for them or the organization." Fundamentally, he believed that his continued service depended on his effectiveness as an adviser to the national leadership and as an advocate for, and leader of, his service. While he had good relationships with the other chiefs and the chairman and vice chairman of the joint chiefs, he was disappointed in some of the discussions and some of the positions taken by the group. There had been dis-

agreements over the modernization of the tactical aircraft inventory of the Air Force, Navy, and Marines; he disagreed with the determination of the Quadrennial Defense Review in early 1997 to reduce the number of F-22 airplanes to be purchased and, worse, was disgusted by the process which produced the decision. There were other conflicts: "Some serious resource allocation decisions were being made on the basis of superficial, often mistaken, thinking." In the summer of 1997, General Fogleman clashed with Secretary Widnall over the punishment of 1st Lt Kelly Flinn, the first woman B-52 pilot, whose impending court-martial for adultery, disobeying orders, and lying to an investigating officer led to national headlines, much criticism of the Air Force, and her separation with a general rather than an honorable discharge.

Then came the Schwalier decision. "As chief of staff of the United States Air Force, charged with providing military advice to the civilian leadership that the civilian leadership did not value for whatever reason, I had become ineffective as a spokesman." "When you sense that you have lost the confidence of the folks you're dealing with—almost to the extent where the service will be punished—that's one reason to leave." Another was that General Fogleman had "simply lost respect and confidence in the leadership that I was supposed to be following." General Fogleman "watched the way the United States Air Force as an institution was treated, for purely political reasons, and the way an individual was treated and came to the conclusion that it was fundamentally wrong." He remembered, "You really do have to get up and look at yourself in the mirror every day and ask, 'Do I feel honorable and clean?' I just could not begin to imagine facing the Air Force after Secretary [William S.] Cohen made the decision to cancel General Schwalier's promotion. It wasn't only Cohen. It was the Washington scene, the pressure from the Hill—from people who were uninformed—it was the way DOD treated this man and the Air Force. To merely shrug this off and say, 'Hey, it's okay guys, we'll do better next time. . . .'"



General Fogleman had also recently read H. R. McMaster's *Dereliction of Duty: Lyndon Johnson, Robert McNamara, the Joint Chiefs of Staff, and the Lies That Led to Vietnam*, a book detailing how the joint chiefs in 1964–65 had failed to insist on giving their advice directly to the president and had gone along with having their views misrepresented, thus contributing to the decision to intervene in Vietnam and pursue a strategy of gradual escalation. "There was the incredible performance of the joint chiefs at that time and then seeing some of the things that were going on in the tank and now, maybe not on the same scale, but the same sickness . . . service parochialism, the willingness to collectively go along with something because there was at least some payoff for your service somewhere in there . . . a slippery slope."

Thus, as General Fogleman makes clear below, he had come to believe that he could no longer serve effectively as chief of staff. "I felt out of step—the [Quadrennial Defense Review], discussions, and decisions that I saw being made in the tank, problems with the Air Force leadership over the Kelly Flinn affair. A whole series of things convinced me that perhaps I was riding the wrong horse here. After a

while, you look around and experience some serious doubts about whether you can be right and everybody else is wrong." As he concluded, "We also serve on a personal level. Unless you really believe, and see, that you are continuing to contribute . . . , when you begin to believe that your continued service is detrimental," then "the pressure" is to leave. "In my heart, I concluded that my continued service was not in the best interest of the Air Force."

In December 1997, some four-and-a-half months after his decision, the editor interviewed General Fogleman by telephone. What follows is a transcript of that conversation, transcribed by Ms. Jacqueline Gorman of the Curriculum in Peace, War, and Defense of the University of North Carolina at Chapel Hill. The transcript was then edited, reviewed by General Fogleman, annotated by the editor, and returned to General Fogleman for final approval. The purpose of publishing it is to clarify why he took the unprecedented step of asking for early retirement and doing so with so little explanation at the time—not resigning in protest but leaving out of a sense of obligation that the Air Force and the nation would be served more effectively if a new chief of staff were to take his place.

Interview

11 December 1997

Richard H. Kohn: General Fogleman, why did you decide to ask for early retirement?

Ronald R. Fogleman: The answer to that question is complex: on one level, simple, but on another, more complicated. Let me begin on one level. When I became the chief, I received a number of letters from people like you who essentially said that they thought the chief needed to restore the soul of the Air Force. That caught me somewhat by surprise because I was not sure exactly what the soul of the Air Force was, or what was required to fix it. But my conclusion was that somehow we had found ourselves, or allowed ourselves, through a series of decisions and actions, to lose sight of our values. The trouble came not from some overriding set of principles, but more from employing situational ethics (i.e., cronyism and other things) that made it seem as though the institution lacked integrity. So in the back of my mind, there seemed a necessity, or charge if you will, to work this issue on my watch.

Another factor grew out of a meeting in the fall of 1994 with all the other four-stars, before I became the chief, in which we discussed what we thought the Air Force needed more than anything else in the near term.¹ We concluded generally that the Air Force had been through an extraordinary period of change, most of it necessary in the altered world where we were heading. The change was both externally and internally driven. But it would be extremely valuable if we could give the Air Force some stability for a period of time from internal turbulence.

These two elements lay in the background as I began my tenure—my tour, if you will. I looked very carefully at the law specifying my duties as chief of staff: the responsibilities relative to organizing, training, and equipping the force and the separation of duties between the secretary of the Air Force and the chief.² So as I began the job, I thought I had a good understanding of what needed to be done in the Air Force. I did not have any special agenda. As we kicked off the tour, we ran into a series of things that we had to deal with: changing the uniform and a lack of confidence in the personnel system, promotions, and the evaluation system.³ I think our decisions in these areas were generally very well received.

I had also inherited two pieces of unfinished business. One was the F-15 shoot-down of the Black Hawk helicopter over Iraq.⁴ The other one was the B-52 crash up at Fairchild.⁵ The F-15 shoot-down was making its way through the legal process, and there wasn't much I could do about it until the process called for my action.

1. The day before taking office, General Fogleman met in the secretary of the Air Force's conference room in the Pentagon with the other Air Force four-stars, who were in Washington to attend the retirement of his predecessor.

2. The duties of the Air Force chief of staff are specified in *U.S. Code*, Title 10, chap. 805, sec. 8033 (1996).

3. General Fogleman's predecessor, Gen Merrill "Tony" McPeak, had overseen what many considered a radical change in the style and insignia of the Air Force uniform. A uniform board review in January 1995 reduced over twenty-five hundred suggestions to 363 proposals, 55 of which General Fogleman approved, including restoring the traditional shoulder insignia instead of sleeve rings to identify officer rank. See Suzann Chapman, "Last Uniform Changes?" *Air Force Magazine* 78 (May 1995): 24; and "Air Force Announces Uniform Changes." *Air Force News*, on-line, Internet, 11 September 2000, available from http://www.af.mil/news/Mar1995/n19950313_208.html.

4. On 14 April 1994, two F-15Cs of the 53d Fighter Squadron enforcing the "no fly" zone over northern Iraq mistakenly shot down two Army Black Hawk helicopters engaged in UN humanitarian missions for the Kurds, killing all 26 passengers, including 15 Americans; five Kurdish civilians; and British, French, and Turkish military officers. John F. Harris, "Four May Receive Court-Martial for Copter Mishap." *Washington Post*, 30 August 1994, 2; and Eric Schmitt, "Inquiry Urges Crew Stand Trial in Downing of Copters over Iraq." *New York Times*, 30 August 1994, A2.

5. On 24 June 1994, a B-52H of the 325th Bomb Squadron, 92d Bomb Wing at Fairchild Air Force Base (AFB), Wash., crashed while preparing to land after practicing maneuvers for an air show, killing all four crewmen. The pilot in command had over a long period of time demonstrated a disregard for Air Force flying rules and regulations, and this was known by the senior commanders in the wing. No appropriate action had been taken to discipline him or rein in his noncompliant behavior.

As I dealt with day-to-day business, stabilizing the Air Force (in terms of internal changes), I continued to think about the soul of the Air Force as an issue. As I dealt with these issues, the stress on accountability emerged—without my intending at the beginning of my watch to focus on accountability. At the completion of the court-martial of the AWACS captain at Tinker (I had been reading all the background investigation material), I was satisfied that the outcome was appropriate and just: no one was court-martialed who should not have been, or vice-versa, or issued letters of reprimand, Article 15s, and so forth.⁶ But I was appalled when I asked the question, “Let me see the evaluation reports on the people.” I discovered that none of what they had done was reflected in those reports, and from that, I then began to see the connectivity to standards, values, and core beliefs.⁷ That’s when I made the tape⁸ in which I talked about Air Force values and accountability—not because I was some zealot, but because I have always believed that if you want people, or an institution, to do something, you must explain what you expect of their behavior. The rules and standards for the behavior of any individual, group, or unit must be universally known and uniformly applied. That tape was designed for an internal audience, but it got much more play than that, and from then on, I believe we began to see a change all through the chain of command on the issue of accountability. If anything, it may have started to go too far. Commanders were deferring to lawyers rather than taking action, short of legal action, to correct the shortcomings of people. As I continued to work on other things that I thought were very important—the long-range planning effort for one—this issue of accountability and standards took on a kind of life of its own. The secretary of the Air Force and I emphasized very strongly the ideas of core values: excellence in all we do, service before self, and integrity.⁹ These became identified with me and with the secretary, but largely with me. This is important background leading up to the events of 1997.

On another level—viewing the Air Force from the outside as a military historian,¹⁰ as someone who has tried to stay involved in academic affairs as well as national security affairs—I sincerely believed that the nation was at a unique crossroads, that the country had a tremendous

6. Investigations by the Air Force resulted in charges of dereliction of duty against Capt James Wang, a crew member of the airborne warning and control system (AWACS) aircraft from the 963d Airborne Control Squadron controlling the airspace at the time, and charges of negligent homicide and dereliction of duty against one of the F-15 pilots and four other AWACS crew members. Captain Wang was acquitted, and charges against the others were dropped following Article 32 (the equivalent to grand jury) investigations. Altogether, eight officers were reprimanded, counseled, or admonished, and one punished nonjudicially. See news briefing, Maj Gen Nolan Sklute, Office of the Assistant Secretary of Defense (Public Affairs), 15 August 1995, on-line, Internet, 26 November 2000, available from http://www.defenselink.mil/news/Aug1995/t081795_tsklu-81.html; Susanne M. Schafer, “U.S. Pilot Charged for Downing Copters,” *Chicago Sun Times*, 8 September 1994, 3; Owen Canfield, “Air Force Closes Case on 26 Deaths,” *Chicago Sun Times*, 21 June 1995, 26; Frank Oliveri, “USAF Accuses Six in Iraq Shootdown,” *Air Force Magazine* 77 (November 1994): 15; and Bruce B. Auster, “Strange Justice, Air Force Style,” *U.S. News & World Report* 118 (15 May 1995): 42, 44. Article 15 of the *Uniform Code of Military Justice* outlines the punishments commanders can impose on the men and women under their command without resort to court-martial or other judicial proceedings.

7. In August 1995, General Fogleman (in the words of the Air Force judge advocate general) “concluded that the failures of certain officers to meet Air Force standards were not appropriately reflected in their performance evaluations” and “therefore, personally issued letters of evaluation . . . describing their failure” that became “a permanent part of each individual’s record.” For the two F-15 pilots, three officers on the AWACS aircraft, and two generals in the chain of command, this action effectively ended their careers in the Air Force. The chief of staff also grounded the pilots and AWACS crew members and disqualified them from duties in flying operations for three years. Sklute; Eric Schmitt, “Chief of Air Force Grounds 5 Pilots,” *New York Times*, 15 August 1995, A1; and Chris Black, “Shifts in Air Force Policy Are Seen after Reprimands,” *Boston Globe*, 16 August 1995, 3.

8. In a short videotape released in mid-August 1995, required to be viewed by every Air Force officer, Senior Executive Service civilian, and noncommissioned officer in the top three grades, General Fogleman reviewed the Black Hawk accident, as well as the actions taken against the individuals involved and the officers who wrote their performance evaluations. He used the affair to emphasize Air Force standards; personal accountability; and the necessity for officers to lead, to pursue excellence in the performance of their duties, to act always with integrity, and to place service before self. See transcript, on-line, Internet, 13 September 2000, available from <http://www.usafa.af.mil/core-value/accountability.html>. For background, see Sklute.

9. Sheila E. Widnall, previously professor of aeronautics and astronautics, director of the Fluid Dynamics Research Laboratory, and associate provost at the Massachusetts Institute of Technology, was secretary of the Air Force from August 1993 to October 1997.

10. General Fogleman earned a master’s degree in history at Duke University and taught military history at the Air Force Academy from December 1970 to November 1972, when he went back to combat-crew training for his second flying tour in Southeast Asia.

number of internal needs, that the external threats were lower than we had faced in half a century, and that we had an opportunity—if we could have a serious discussion about national security strategy and defense issues—to restructure our military into a smaller, better focused institution to respond to the kinds of challenges coming in the next 10 to 15 years. It was not a military that was going to be shaped by some force-structure slogan like two MRCs,¹¹ and it had to include a fundamental understanding of whether there really was a “revolution in military affairs” and how we could and should fight future wars. So I had begun to speak out about the Quadrennial Defense Review,¹² and I was hopeful that the QDR would start us down that path.

In this regard, in “the tank”¹³ I began to question some of the things that we were doing, or that we were planning to do, based on old paradigms—but not very successfully. As we began talking more and more about the QDR, an event occurred in September of 1996 which kind of put the QDR in a context that struck me as all wrong. An Army two-star from the JCS came by to see all the chiefs, and when he came to see me, he sat on that couch in the chief’s office and said, “I have a message from the chairman,¹⁴ and the message is, that in the QDR we want to work hard to try and maintain as close to the status quo as we can. In fact, the chairman says we don’t need any Billy Mitchells during this process.” That shocked me a little bit. I replied, “Well, that’s an unfortunate use of a term, but I understand the message.” From that point on, I really did not have much hope for the QDR. I guess I lost all hope when Bill Perry¹⁵ left because he had the stature to have given the services the blueprint, and I think the services would have fallen in line.

11. MRCs were *major regional conflicts*, a term for large conventional wars in a limited geographical area, such as the Persian Gulf War of 1990–1991 or an invasion of South Korea by North Korea which would involve American forces. The shift in defense policy, planning, and force structure from deterring and preparing for a world war against the Soviet Union to focusing on regional conflicts began with the reconsideration that resulted in the Bush administration’s base force policy of 1990. Lorna S. Jaffe, *The Development of the Base Force* (Washington, D.C.: Joint History Office, Office of the Chairman of the Joint Chiefs of Staff, July 1993), 2–9, 11–13, 16, 18, 21–22, 25–26, 29, 33, 36, 45; and *National Security Strategy of the United States* (Washington, D.C.: White House, August 1991), 7–11, 27–29, 31. The ability to fight nearly simultaneously two MRCs (now called major theater wars) became the chief planning factor shaping the size and configuration of the American armed forces after the “Bottom-Up Review” of defense policy and force structure undertaken by the Clinton administration in 1993. Defense Department briefing, Gen Colin Powell and Les Aspin, subject: DOD Bottom-Up Review, 1 September 1993, Federal Information Systems Corporation, Federal News Service, accessed through Academic Universe, “bottom up review” Search Terms, 13 December 2000; and Les Aspin, *Report on the Bottom-Up Review*, October 1993, sec. 2, “Addressing Regional Dangers and Seizing Opportunities,” on-line, Internet, 15 December 2000, available from <http://sunet.dtic.mil/str/index.html> (search “Les Aspin”).

12. The Quadrennial Defense Review (QDR)—a comprehensive reconsideration of American national security policy, defense strategy, and force structure expected to be repeated every four years at the beginning of a presidential administration—originated in a recommendation by DOD’s 1995 Commission on the Roles and Missions of the Armed Forces. DOD undertook its first QDR in 1996–1997; the report in the spring of 1997 listed a number of reductions, adjustments, realignments, and planned changes in defense posture. See *Directions for Defense, Roles and Missions Commission of the Armed Forces, Report to Congress, the Secretary of Defense, and the Chairman of the Joint Chiefs of Staff*, 24 May 1995, executive summary, on-line, Internet, 26 November 2000, available from <http://www.fas.org/man/docs/corm95/di1062.html>; William S. Cohen, *Report of the Quadrennial Defense Review*, May 1997, on-line, Internet, 26 November 2000, available from <http://www.defenselink.mil/pubs/qdr/index.html>; and Background on the Quadrennial Defense Review, May 1997, H.R. 3230, National Defense Authorization Act for Fiscal Year 1997, Title IX, subtitle B, sec. 923, Quadrennial Defense Review/Force Structure Review, on-line, Internet, 16 January 2001, available from <http://www.comw.org/qdr/backgrd.htm>. General Fogleman discussed the QDR at greater length with reporter George Wilson. See Wilson, *This War Really Matters: Inside the Fight for Defense Dollars* (Washington, D.C.: Congressional Quarterly Press, 2000), 38–44.

13. The “tank” is the conference room in the Pentagon where the Joint Chiefs of Staff (JCS) meet, so named, according to popular lore, because “access to the entrance used by staff officers was down a flight of stairs through an arched portal, supposedly giving the impression of entering a tank.” Ronald H. Cole et al., *The Chairmanship of the Joint Chiefs of Staff* (Washington, D.C.: Office of the Chairman of the Joint Chiefs of Staff, 1995), 177.

14. Gen John M. D. Shalikashvili, US Army, was chairman of the JCS from October 1993 to September 1997.

15. William J. Perry, who had worked in the defense and financial industries in technical and executive capacities and served on the Stanford University faculty in engineering and international security, was secretary of defense from February 1994 to January 1997. He had been undersecretary of defense for research and engineering from 1977 to 1981 and deputy secretary of defense in 1993–1994. Roger R. Trask and Alfred Goldberg, *The Department of Defense, 1947–1997: Organization and Leaders* (Washington, D.C.: Historical Office, Office of the Secretary of Defense, 1997), 121, 141.

Kohn: Did you or the other chiefs ask Secretary Perry to stay or to press for that?

Fogleman: I did. I went to see him in early November of 1996, after completing my second year in office. I had a policy of visiting him to talk about the year in review and the future. There were strong rumors that he would go. I told him, "Mr. Secretary, you have the stature and you have the confidence and the vote; if the QDR is going to go anywhere, you need to come down to the tank, and you need to give us your vision." Short of that, I said I didn't have much hope. A week later, he announced his retirement.

Secretary Cohen faced a very difficult challenge in the QDR and was, quite frankly, not as well grounded in real military issues as one might have thought, given his time on the Senate Armed Services Committee.¹⁶ He worked hard but was at the mercy, like all of us, of his advisers, and particularly what I thought was a rather close circle of people who lacked much experience in the issues. Once Bill Perry left, work on the QDR went into suspended animation until Cohen arrived because no one wanted to get out in front of the new boss. He arrived with a very limited amount of time to deliver the QDR to the Hill, a difficult challenge. I came to believe that the QDR could not be completed in three months, or even six. To an extent, he tried to solicit the advice of his military people, but it became clear that this QDR was to be more a political response than a sincere effort to reshape our military. It was driven by the consideration to come up with \$60 billion in savings to apply to the procurement of new weapons. From an Air Force perspective, we had no problem with procurement reform; our modernization program was fully funded, fully budgeted, so it was interesting to watch this unfold. The major issue that concerned me was TACAIR modernization.¹⁷ This issue had been inflamed by Bill Owens,¹⁸ who had incorrectly quoted some statistics that got over onto the Hill and into the public about how large a part of the budget the TACAIR program would consume vis-à-vis other things. This line of argument took on a life of its own. If you look at the history of TACAIR, anytime the amateurs mess with it, it gets screwed up; and when the pros put together a program and follow through, the result is a pretty solid program.

Kohn: Do you mean the design of the aircraft, its requirements, its role, and its mission?

Fogleman: Exactly. After the Second World War, the Navy, in its battles internally over carrier air, essentially allowed their program to atrophy. The Air Force, on the impetus from Arnold¹⁹ and the others who came after him, worked very hard to achieve a balanced program. When Korea²⁰ came along, the Air Force had an air superiority fighter, a fighter-bomber, bomber forces coming on stream. In the air superiority realm, there are many similar experiences in the past. In Korea, who had the aces? Who did the daytime patrolling? It wasn't that there weren't great naval aviators or great Marine aviators, but the Navy did not have equipment since they had been diverted to thinking about things other than the core issue of airpower. Who thinks about airpower full-time for the nation? The Air Force.

16. William S. Cohen became secretary of defense on 24 January 1997. A lawyer and former elected official in Bangor, Maine, he served in the US House of Representatives (1973–1979) and US Senate (1979–1997), where he was a member of the Armed Services and Government Affairs Committees. Trask and Goldberg, 127. For a more personal profile, see John Donnelly, "The Evolution of William Cohen," *Boston Globe Magazine*, 22 October 2000, 14–15, 28–36.

17. The 1997 DOD tactical air (TACAIR) modernization program proposed to replace completely by the year 2030 the A-10, F-15, F-16, and F-117 aircraft of the Air Force and the F-14, F/A-18, and AV-8B aircraft of the Navy and Marine Corps with F/A-18E/F, F-22, and Joint Strike Fighter aircraft, for the air superiority, anti-air-warfare, suppression of enemy air defenses, fleet air defense, interdiction, short- and long-range attack, reconnaissance, and close air support missions. The overall purpose was to secure "overwhelming air domination for US forces" for the next generation. See *Statement of Dr. Paul G. Kaminski, Undersecretary of Defense for Acquisition and Technology before the Subcommittee on Research and Development and the Subcommittee on Procurement of the House Committee on National Security on the DOD Tactical Aviation Modernization Program*, Committee on National Security, Military Research and Development Subcommittee meeting jointly with the Military Procurement Committee, US House of Representatives, 105th Cong., 1st sess., 5 March 1997, 242–66, on-line, Internet, 16 January 2001, available from http://www.acq.osd.mil/ousda/kaminski/aviation_modernization.html.

18. Adm William A. Owens was vice chairman of the JCS, March 1994–February 1996.

19. General of the Air Force Henry H. "Hap" Arnold was chief of the Army Air Corps and commanding general of the Army Air Forces from September 1938 to his retirement in June 1946. His five-star rank was awarded by act of Congress in 1949, the year before his death.

20. The Korean War began in June 1950.

After Korea, TACAIR lost to the domination of nukes. So the Air Force began building fighter-bombers like F-105s. The Navy studied airplanes like Vigilantes that could deliver tactical nukes off of carriers. The US did not possess an air superiority fighter when Vietnam began.²¹ We did a dismal job in Vietnam in the air-to-air business and used not an air-to-air fighter but a missile platform, the F-4, and it became the backbone of the forces. But it was never a great air superiority fighter.

Kohn: Was the issue at this time (1996 and 1997) the F-22?

Fogleman: No, the whole TACAIR program, not just a single aircraft. But eventually it came down to that, and so we took a fully funded program, the F-22, into the QDR, whereupon the folks at OSD [Office of the Secretary of Defense] decided to make major disruptions in this program for no good reason at all.²² On the one hand you have somebody who is fairly well grounded in the airpower business giving advice to the senior leadership, and on the other side a bunch of number crunchers, and in the end, the decision gets made, I think, on political grounds more than anything else.

Kohn: How did this differ from most major aircraft programs or even most major defense issues, historically and in the last 20 years? Isn't what you describe the nature of the business—in "the building" [the Pentagon], in the budget process, and in programming?

Fogleman: Yes, in the macro sense. But in the micro sense, I'm not so sure because of the internal nature of the debate. If somebody can show me that something makes sense from a resource allocation or budgetary standpoint, or similarly reasonable measures, I'm more than willing to lose the argument—and have lost lots of those arguments, walked away none the worse for wear. But this was an issue in which the nature of the presentation, the nature of the discussion, and the rationale for the changes, were basically going to upset an integrated tactical air modernization program that included the F-18, the Joint Strike Fighter, and the F-22. I think just fundamentally, OSD ignored the military rationale.

Kohn: Is it inconsistent to speak about a fundamental restructuring of the armed forces, in part to prepare for a possible revolution in warfare and a lower threat than at any time since the 1920s, while advocating a modernization program that looks to many on the outside as incremental: that is, purchasing some old technologies, even purchasing the newest technology (the F-22), which could, perhaps, be skipped? How would you respond to that criticism?

Fogleman: If this was argued by someone in OSD, I would ask if they knew the true capability of this airplane. In the "black world" [very highly classified programs], the F-22 is a truly revolutionary airplane. On the surface, it looks conventional, like an F-15 with some stealth capabilities. But the combination of stealth, supercruise, and integrated avionics is a quantum jump. It will allow the United States to cease worrying about air superiority for the first 35 years of the next century. With air superiority so critical to everything we do and considering the double-digit SAMs [surface-to-air missiles] of the next 10 to 15 years, it looks like a program we must have. One of the side benefits of the end of the cold war was our gaining access to foreign weapons; we discovered that the SA-10s, -11s, and -12s are much better than we thought. In planning for asymmetrical warfare—people's ability to deny us things we need in

21. The United States intervened with its own ground-force units and Americanized the Vietnam War during the first half of 1965.

22. The QDR reduced the total planned procurement of F-22s from 438 to 339, to provide three wings of the aircraft. Ramp-up to full production was to be slowed, and the maximum production rate reduced from 48 aircraft per year to 36. However, DOD promised in the future to consider other F-22 variants to replace F-15E and F-117 long-range interdiction aircraft "when they reach the end of their service lives beyond 2015." Cohen, sec. 7, 45. For an analysis of the QDR, see Wilson, 25ff.

such situations as the Taiwan Strait crisis, when we sent two carriers in and watched the Chinese move their SA-10s up—we need that airplane.²³ Those two carriers did nothing more than make a political statement, which is fine as long as that is all that's necessary. So one understands why a service chief begins saying he will try and be as balanced in his tour as he possibly can be, as joint, but then a weapon system comes along that truly is revolutionary. There are only two revolutionary weapon systems in the entire DOD budget: the F-22 and the airborne laser.²⁴ There are no others. I will acknowledge that I may be wrong on this, but I don't think so. I guess my problem was arguing from facts and knowledge and finding decisions being made by people without a fundamental understanding of what the weapon system contributed. Somehow that just didn't strike me as right.

Kohn: In the past, some of your predecessors and some other service chiefs would have taken this fight into the bureaucratic world of beltway and national politics. They would have leaked, they would have struggled, they would have made allies, they would have gone to the Congress. . . .

Fogleman: I think I did a lot of fighting in that arena. That's how we were able to get a lot of the funds restored. And the fight is not over. We will get the F-22, but the issue from my perspective was this: you pay me to give you military advice, and I'm giving you military advice; I'm watching not just whether or not you take it but how the advice is considered, part of a larger web of what became my relationship with Secretary Cohen and OSD.

Kohn: Can you translate this background into the decision to retire early?

Fogleman: Let me draw one more thread, one more part of the equation: Khobar Towers.²⁵ My side of that story has not been well told. I watched with great interest as that event happened and subsequent events unfolded. I watched people in Washington make statements on the basis of no factual knowledge whatsoever. I waited for about a week until after all the high-profile people had gone through Dhahran and then went to Saudi Arabia myself. I sat down with the commander,²⁶ listened to what he had to say—to include his offering to retire to remove any kind of a target for people to attack both the institution and individuals. I told him at that time that I did not want him to retire but to get the facts out. "This goes beyond you. This is an important issue having to do with whether we support our troops in the field when

23. In March 1996, prior to the election for president on Taiwan, the People's Republic of China moved military forces to its coast on the Straits of Taiwan and fired missiles over the island in an apparent attempt to intimidate Taiwan into voting against Lee Teng-hui, who had taken steps that appeared to move the island toward independence. In response, the United States repositioned into the area the aircraft carriers *Independence* and *Nimitz* with their support vessels, implying that any attempt to invade or harass Taiwan with military force would be opposed by the use of US forces. News briefing, Kenneth H. Bacon, Office of the Assistant Secretary of Defense (Public Affairs), 19 March 1996, on-line, Internet, 16 January 2001, available from http://www.defenselink.mil/news/Mar1996/t031996_t0319asd.html; Geoffrey Crothall and Dennis Engbarth, "US Sends Second Carrier, Support Ships to Strait," *South China Morning Post*, 12 March 1996, 1; Geoffrey Crothall, "Li Warns US against Show of Force in Strait," *South China Morning Post*, 18 March 1996, 1; and Michael Dobbs, "Chinese Revert to Mao Formula in New War of Nerves on Taiwan," *Washington Post*, 16 March 1996, A20.

24. For a more extended discussion of the F-22 program, see Michael J. Costigan, *The F-22: The Right Fighter for the Twenty-first Century?* Air War College Maxwell Paper no. 9 (Maxwell AFB, Ala.: Air University Press, August 1997). The airborne laser (ABL) program originated in the aftermath of the Gulf War to find a defense against theater ballistic missiles. Transferred from the Strategic Defense Initiative Office to the Air Force in 1992, the program has been developing a high-energy laser mounted in a Boeing 747 designed to destroy missiles during their boost phase. In 1995 General Fogleman listened to a briefing on the program at Kirtland AFB, N. Mex., and threw his full support behind the effort. "The Airborne Laser is going to be to directed-energy weapons what the F-117 was to stealth and precision munitions," he told an interviewer. John A. Tirpak, "First Force: The USAF Chief of Staff Talks about Airpower, the Air Force, and the Future," *Air Force Magazine* 79 (September 1996): 41. "Given the nature of this revolutionary weapon system, the ABL will be studied in other roles . . . other uses will be found." Johan Benson, "Conversations . . . with Gen. Ronald Fogleman," *Aerospace America* 34 (July 1996): 15. See also Suzann Chapman, "The Airborne Laser," *Air Force Magazine* 79 (January 1996): 54–55; Airborne Laser History, on-line, Internet, 26 November 2000, available from <http://www.airbornelaser.com/special/abl/history>; and Capt Gilles Van Nederveen, "A Light Dawns: The Airborne Laser," *Aerospace Power Journal* (PIREP, Spring 2001).

25. On 25 June 1996, terrorists exploded a large truck bomb outside the American air base at Dhahran, Saudi Arabia, killing 19 airmen and wounding some three hundred Americans in the high-rise housing complex named Khobar Towers.

26. The commander of the 4404th Composite Wing (Provisional) was Brig Gen Terry J. Schwalier, USAF.

we send them out there, and if you have screwed up, you can expect to be held accountable. If you haven't, then I will support you." I then watched the way the investigations unfolded.²⁷ I watched the way the United States Air Force as an institution was treated, for purely political reasons, and the way an individual was treated and came to the conclusion that it was fundamentally wrong. I think a hell of a lot of other people came to that same conclusion.

As chief of staff of the United States Air Force, charged with providing military advice to the civilian leadership that the civilian leadership did not value for whatever reason, I had become ineffective as a spokesman. This was a crowd that took any kind of military advice that ran counter to administration policy or desires as a sign of disloyalty on the part of the person providing the advice. That was one element; the other was based on what I had seen and the way the Khobar Towers tragedy had been handled. I simply lost respect and confidence in the leadership that I was supposed to be following.

Kohn: By this do you mean OSD?

Fogleman: Yes.

Kohn: JCS, too?

Fogleman: Not so much the JCS, although I was disappointed in the JCS. There were some discussions and decisions in the tank that I thought were just absolutely absurd, some at fairly high levels of classification. More and more in the tank I found myself being the one who was raising the b- - - - - flag, and it resulted in a couple of fairly high-profile articles on arms control—things of that nature—that made some of the civilian leadership uncomfortable.²⁸

Kohn: Relative to theater ballistic missile and strategic nuclear defense?

Fogleman: Yes, both.

Kohn: Did your disenchantment with the leadership extend to the president, the NSC [National Security Council], or Congress?

Fogleman: I don't think so. I had one confidant within the NSC with whom I would talk occasionally. This really did not involve the president; frankly, my dealings with the president, both as a CINC²⁹ and as a service chief, led me to conclude that he executed his commander-in-chief responsibilities pretty well, at least his interface with the military. As a service chief, your primary responsibility is to advocate for your service, and when you sense that you have lost the confidence of the folks you're dealing with—almost to the extent where the service will be punished—that's one reason to leave. Then there was the internal pressure which says: here's a guy who has talked about integrity, talked about doing what's right, talked about taking care of the troops and all of these things, and you realize that the secretary of defense is going to make a decision that is just fundamentally wrong.

27. The bombing was investigated by Congress (hearings before the Senate Armed Services and House National Security Committees); a task force appointed by the secretary of defense and headed by Gen Wayne A. Downing, USA, Retired, the most recent former commander of US Special Operations Command; and by two separate Air Force groups, the first headed by Lt Gen James Record and the second by Lt Gen Richard Swope (Air Force inspector general) and Maj Gen Bryan Hawley (Air Force judge advocate general). Matt Labash, "The Scapegoat: How the Secretary of Defense Ended the Career of an Exemplary Air Force General," *The Weekly Standard* 3 (24 November 1997): 20–29.

28. In an interview with Bill Gertz of the *Washington Times*, described on 10 March 1997 ("Service Chiefs Fear Missile Defense Deal with Russia Could Blunt U.S. Edge, General Says"), General Fogleman was reported as saying that "the military service chiefs are worried that an agreement being negotiated with Russia could impose harmful restrictions on future U.S. missile defenses as part of a side agreement to a U.S.-Russian defense treaty. 'All the chiefs have great concerns about this,' Gen. Fogleman told *The Washington Times*. 'I would hate to see us negotiate away any kind of advantage we might have in space-based sensors, or in the airborne laser or anything like that.'" The previous week, there had been discussions in Moscow over a possible side agreement between the two countries "expanding the . . . 1972 Anti-Ballistic Missile treaty to cover short-range missile defenses."

29. General Fogleman was commander in chief (CINC) of US Transportation Command, August 1992–October 1994.

Kohn: Many people believed that perhaps General Schwalier should not be punished, but promoting him after such a disaster seemed to fly in the face of any sense of accountability. How would you respond to that point, and who, if anyone, should be held accountable for the Khobar Towers disaster?

Fogleman: Well, I recognized, and I think General Schwalier recognized, everybody recognized, that no matter what happened, his career was over. This was a man who had, at the tactical and operational levels, done everything reasonable (and beyond) to protect his troops. Have you seen an article by Matt Labash in the November 24, 1997 issue of *The Weekly Standard*?

Kohn: No.

Fogleman: Labash has done as fine a job of researching and reporting on Khobar Towers as I have seen anywhere.

Kohn: Does that article explain your view of what really happened and who should be held accountable, if anyone?

Fogleman: Yes.³⁰

Kohn: When did you first consider the idea of leaving office early?

Fogleman: First of all, I said publicly from the very beginning that Miss Jane and I considered being chief a four-year tour, not a sentence. I had not been the choice of the Air Force to become chief. Frankly, that had a sort of liberating effect on me because I felt I could deal on a different level with the secretary. There were certain things that I intended to accomplish, and when they were done, I felt that I might want to leave rather than hang on. I had watched people hang on into that fourth year and just did not think it was value gained for them or the organization.

Kohn: That they had ceased to be effective?

Fogleman: Yes. They were going through the motions rather than working for the good of the institution.

Kohn: Were some other items involved in your decision to leave early? Perhaps one was personnel issues, such as the pilot shortage, the lower retention of airmen, the promotion system, the dominance of below-the-zone promotions, and the difficulties of the OER [Officer Efficiency Report] system, a lot of which were related to the ops tempo of the force. Were frustrations in those areas at all involved?

Fogleman: No. In fact, those were what I considered unfinished business and really argued against leaving because early on in the tour, we addressed the issues of confidence in the OER and personnel system.³¹ We did that very openly, and we seemed to put that stuff to rest.

The real challenges that I saw facing us as I got ready to step over the side was pilot retention, and we put into place nine months before I left, some of the actions that are starting to bear fruit now, specifically the ops tempo problem.³² We have worked that in several ways. We

30. In "The Scapegoat," Labash, a staff writer at *The Weekly Standard*, used numerous interviews with (and public statements by) people involved in the incident and the investigations afterward, as well as the conclusions of the investigation reports, to argue that General Schwalier had been extremely aggressive and had done everything in his power to protect the people under his command, and that political pressures to hold someone accountable for the deaths led the secretary of defense to deny Schwalier promotion to major general.

31. The changes in the officer promotion and assignment systems in 1995 were outlined in Bruce D. Callander, "A New Shot at the Officer Promotion System," and "The New Way of Officer Assignments," *Air Force Magazine* 78 (July 1995): 70-73, and 78 (September 1995): 90-93, respectively. A quality-of-life survey (answered by 356,409 Air Force uniformed and civilian members) in 1995 revealed that 50 and 53 percent of enlisted and officers, respectively, did not think their promotion systems were fair. See Peter Grier, "The Quality of Military Life," *Air Force Magazine* 79 (December 1996): 33-34. Dissatisfaction with the evaluation and assignment systems diminished in the 1996 survey. See Suzann Chapman, "USAF Survey Shows Positive Trends," *Air Force Magazine* 79 (October 1996): 12.

32. Predictions about a pilot shortage and retention problems were detailed in Bruce D. Callander, "And Now, the Pilot Shortage," *Air Force Magazine* 79 (March 1996): 70-74.

went to the chairman and got relief from the responsibility for some weapon systems.³³ One of the ideas that I was disappointed did not succeed (although I knew it could) was the Air Expeditionary Force. We wanted to demonstrate to the CINCs that because of technology and logistics—mobility—forces did not have to be stationed in deserts to be responsive within 36 or 48 hours. We could demonstrate that the Air Force had the capability to deploy very rapidly and had several times. We were just on the verge of getting to that next step.

But what frustrated me was that some serious resource-allocation decisions were being made on the basis of superficial, often mistaken, thinking.

Kohn: Was your relationship with Secretary Widnall involved in the decision?

Fogleman: I think we generally had a good relationship right up to the Kelly Flinn controversy.³⁴ Until then, I thought the Air Force senior leadership, both civilian and military, understood the issue of accountability and how important it was to apply the UCMJ [Uniform Code of Military Justice] universally. I don't know what pressure Secretary Widnall was getting, but I came into work one morning, and she indicated that she was contemplating an honorable discharge for Kelly Flinn. I said, "Madam Secretary, if you give her an honorable discharge, you can also select a new chief of staff." That was the only time I ever talked that way to any direct supervisor or leader because I felt so strongly about it.

Kohn: The Flinn case sounds like one more drip on the forehead, moving you towards something that you had been thinking about increasingly for six months or so previous to the decision.

Fogleman: Yes. The Flinn case was a cut-and-dried thing as far as I was concerned, and I had studied the facts intensively.

Kohn: Was Gen Joseph Ralston's failure to be appointed chairman of the JCS part of the decision at all?³⁵

Fogleman: No, not really, although it was a great personal and professional disappointment because we had worked for a long time to give him an opportunity. First of all, he was the right person for the job. Secretary Cohen was more a victim of circumstance than anything else. I don't have harsh feelings about this.

Kohn: What historical precedents guided you in the decision? Did Vietnam, and particularly H. R. McMaster's book *Dereliction of Duty*, influence you?³⁶

33. General Shalikashvili permitted General Fogleman for a period of time to set the level of tasking for certain weapon systems like the AWACS and airborne battlefield command and control center—which were small in numbers of aircraft but in almost continuous use—for the purposes of training crews and expanding their numbers.

34. 1st Lt Kelly Flinn, the first female B-52 line pilot in the Air Force, graduated from the Air Force Academy in 1993 and joined the 23d Bomb Squadron, Minot AFB, N. Dak., in October 1995. At the base, she had a brief affair with an enlisted man and then with the husband of an enlisted woman in her wing. She was ordered to break off the affair and allegedly told investigators first that she was not involved with the man and then that she had ended the relationship when she was at the time living with him. Her case became national news when she asked the secretary of the Air Force for permission to resign from the service with an honorable discharge rather than face court-martial. See Frank Spinner, attorney, "Military Career of Lt Kelly Flinn," 20 May 1997, on-line, Internet, 26 November 2000, available from <http://www.kellyflinnfoundation.org/military.htm>; David Van Biema, "Sex in the Military: The Rules of Engagement," *Time* 149 (2 June 1997): 36–37; Elaine Sciolino, "Air Force Chief Has Harsh Words for Pilot Facing Adultery Charge," *New York Times*, 22 May 1997, A1, B12; and editorial, "The Discharge of Kelly Flinn," *New York Times*, 23 May 1997, A30.

35. Gen Joseph Ralston, USAF, the vice chairman of the JCS, was named by the secretary of defense to succeed General Shalikashvili, but in June 1997, in the wake of the controversy over Kelly Flinn, General Ralston withdrew from consideration because of involvement in an extramarital affair some 13 years earlier, when he was a student at the National War College. "Ralston: Uproar Ends Bid," *The News-Hour with Jim Lehrer*, 9 June 1997, on-line, Internet, 16 January 2001, available from http://www.pbs.org/newshour/bb/military/jan-june97/ralston_6-9.html.

36. H. R. McMaster argues in *Dereliction of Duty: Lyndon Johnson, Robert McNamara, the Joint Chiefs of Staff, and the Lies That Led to Vietnam* (New York: HarperCollins, 1997) that the joint chiefs contributed to the American failure in the Vietnam War by not expressing their disagreements—with the policy of gradual escalation—directly to the president, and by allowing their views to be misrepresented to Congress and the public by the Johnson administration in 1964–1965. According to McMaster, the chiefs went along with a policy they opposed in part out of loyalty to their civilian superiors, in part because of benefits each gained for their service in bargains with the secretary of defense, and in part because they expected later to be able to negotiate changes in the policy and strategy. The editor was McMaster's primary adviser at the University of North Carolina at Chapel Hill for the MA and PhD theses on which the book was based.

Fogleman: Yes, I did read that book, as you know, and I must say that it did play a part. History is a series of events, and when you analyze major crises and reconstruct chains of events, asking, what could someone have done at one point or another that might have changed the outcome, you are encouraged to act. There was the incredible performance of the joint chiefs at that time, and then seeing some of the things that were going on in the tank and now, maybe not on the same scale, but the same sickness . . . service parochialism, the willingness to collectively go along with something because there was at least some payoff for your service somewhere in there.

Kohn: In other words, horse-trading and being bought off.

Fogleman: Yes, and it is a slippery slope.

Kohn: How would your leaving alter that equation?

Fogleman: In two ways. One is personal; you really do have to get up and look at yourself in the mirror every day and ask, "Do I feel honorable and clean?" I just could not begin to imagine facing the Air Force after Secretary Cohen made the decision to cancel General Schwalier's promotion. It wasn't only Cohen. It was the Washington scene, the pressure from the Hill—from people who were uninformed—it was the way DOD treated this man and the Air Force. To merely shrug this off and say, "Hey, it's okay guys, we'll do better next time. . . ." It wasn't just the Air Force. The other services' commanders—lieutenant commanders, marines, Army types—were really watching this case. People who are or will be out there as tactical commanders are a lot less comfortable today than they were before this decision. They may not have read the detailed reports, but I think they've read the articles. There was an incredibly large number of people at Dhahran, and what is interesting is the number of letters I received from various locations around the world, from people who were there sometime during that year, who watched the kinds of actions and preparations that were being taken. These people exist almost as emissaries within other organizations. In the same way morale is established and affected—you know, the whisper factor, not a major force but they are there—this will affect our military forces.

You asked a larger question: what difference will it make? No one has told me this, but as I have sat and observed what has occurred in Washington since my departure, I can give one example of how my leaving may have made a major difference or had some influence, and that is the big debate about whether the United States would sign the land-mine treaty.³⁷ This was an item that the service chiefs cared very deeply about. We said, "Look, these things are critical to us in Korea, and while we are committed to working for some replacement, to allow some very altruistic motive to put our forces in the field at risk is wrong." And so we had consistently opposed signing the treaty. But about the time I made my decision to leave, tremendous pressure was being exerted by people within the NSC and elsewhere, and it began to have a telling effect, I think, on the chiefs because we were about to get beat up worldwide in the media over the US not going to Ottawa to sign the big treaty. My departure may have alerted people to remember to pay attention, every now and then, to the military judgment of the chiefs because those guys over there have other options than to sit still and take their licks. I can't prove that, but I suspect it very strongly. I think the politicians were reluctant to take on the chiefs because they didn't want somebody else to step over the side.

37. The treaty to ban the development, production, acquisition, and use of antipersonnel land mines in war, and to remove those in use and eliminate stockpiles, was signed in Ottawa, Canada, in December 1997. Some 133 countries signed the treaty. Because of opposition from the Pentagon, but after much consultation and last-minute diplomacy, the United States refused to be a signatory. Raymond Bonner, "U.S. Seeks Compromise to Save Treaty Banning Land Mines," "Land Mine Treaty Takes Final Form over U.S. Dissent," *New York Times*, 17 September 1997, A6, and 18 September 1997, A1, respectively; Dana Priest and Charles Trueheart, "U.S. Makes One Last Pitch on Mine Treaty," Dana Priest, "Mine Decision Boosts Clinton-Military Relations," Howard Schneider, "Dozens of Nations, but Not U.S., Sign Land-Mine Treaty," *Washington Post*, 16 September 1997, A14, 21 September 1997, A22, 4 December 1997, A33, respectively; editorial, "Land Mine Foe Wins Peace Prize," *San Francisco Chronicle*, 11 October 1997, A20; and "Land Mine Treaty Goes into Effect—Without the U.S.," *Chicago Sun-Times*, 2 March 1999, 18.

Kohn: Whom did you consult about your decision and when? What, in general, did your advisers say?

Fogleman: I really did not consult. To the extent that I talked to anybody, I corresponded with you by E-mail and with Perry Smith.³⁸ This was a very personal decision. When I left home that morning, I had not made the decision to submit my request for early retirement. When I went to work that morning, Miss Jane and I had talked about it over the weekend. It was Monday, the 28th of July (I had recently returned from a trip overseas). I don't think there was any one thing that day that triggered it. It was just that when I went in, and sat there, and thought about events—saw what was coming up, looking down the road—I decided I was going to preempt the decision on the Khobar Towers so that my leaving would not be in response to the decision on General Schwalier, to defuse that conflict.

Kohn: You did not want your request to be seen as a reaction to Khobar Towers?

Fogleman: Correct. And, in fact, the reason it was a request for retirement versus a resignation is that it was consistent with everything that I had said up to that date—which was, this is a tour and not a sentence. My request was very carefully worded and consistent with historical practice and precedent.³⁹

Kohn: So you do not view your departure as a resignation in protest?

Fogleman: No.

Kohn: You wrote specifically about stepping aside to avoid a perceived conflict with the secretary of defense. What, exactly, did you mean and have in mind?

Fogleman: There had been stories in the media that I had gone to the secretary of defense and threatened to resign if he canceled Schwalier's promotion.⁴⁰ That was simply untrue, but the secretary being a political animal and having watched him respond more to press stories than to the intel briefings, the perception of a conflict was clearly going to affect his decision. So I wanted to take that off the table and give him one last opportunity to act on the Schwalier case on the merit and facts of the case, rather than the issue of the secretary of defense's power vis-à-vis some service chief.

Kohn: Was there anything further that you hoped to accomplish by stepping down, beyond what you have said previously about losing your effectiveness with the civilian leadership and timing the request to avoid a confrontation?

38. Maj Gen Perry McCoy Smith, who retired from the Air Force in 1986, served with General Fogleman in the F-15 fighter wing in Bitburg, Germany, in 1977. A PhD in political science from Columbia University and the author of numerous books (most recently a biography of the hero Jimmie Dyess), General Smith is also a television analyst and teacher of leadership, ethics, and strategic thinking to corporations and nonprofit and government organizations. He lives in Augusta, Georgia.

39. General Fogleman's handwritten note, misdated "27 Jul 97," read in its entirety: "Secretary Widnall[,] I request that I be retired from active duty at the earliest possible date, but not later than 1 Sep 1997, the fifth anniversary of my promotion to my current grade/rank. Very Respectfully[,] Ron Fogleman [signature] [,] Ronald R. Fogleman[,] General, USAF[.]"

40. In June, reports reached the press that General Fogleman was telling associates privately that he might seek early retirement if General Schwalier's promotion was withdrawn. See Bradley Graham, "Cohen Near Decision on Fatal Saudi Blast," *Washington Post*, 29 June 1997, A4; Michael Hedges, "Air Force Chief Decides to Quit," *The Detroit News*, 29 July 1997, on-line, Internet, 27 November 2000, available from <http://www.detnews.com/1997/nation/9707/29/07290078.htm>; and Susanne M. Schafer, "Head of Air Force Asks to Step Down," *Las Vegas Review-Journal*, 29 July 1997, on-line, Internet, 27 November 2000, available from http://lvhj.com/lvrj_home/1997/Jul-29-Tue-1997/news/5796823.html.

Fogleman: My statement to the troops captured my perspective in very general terms.⁴¹ I felt out of step—the QDR, discussions and decisions that I saw being made in the tank, problems with the Air Force leadership over the Kelly Flinn affair. A whole series of things convinced me that perhaps I was riding the wrong horse here. After a while, you look around and experience some serious doubts about whether you can be right and everybody else is wrong.

Kohn: Are there guidelines under which military leaders working directly for the highest civilians can—appropriately—request early retirement? Did you consider the precedent you might be setting and try to think through what is proper and what is improper in our system of government?

Fogleman: I thought it through to this extent: when you reach that level, you are a product of all your years, and hopefully one of the reasons you are appointed is that people recognize that you possess some kind of internal moral compass and some expertise in the profession of arms in a democracy. I was not thinking about trying to establish some future norm; I was thinking about it more in terms of my own personal views and perspectives on the substance of my service as chief of staff. I think I was selected because folks thought I knew something about the business and that I stood for certain values. When you reach a point in your tenure where (1) you think you've accomplished most of the things that you set out to do and (2) you begin to see evidence that your values and your advice, your expertise, are not valued by those in charge. . . . Having spent three tours in Washington, I have watched how people can be gracefully continued in a position but just frozen out of any kind of effective participation. Knowing how bad that is for an institution, it is better to step aside and let the leadership appoint someone who they are more comfortable with, who will be able to represent the institution and play in the arena.

Kohn: Why did you choose a retirement ceremony in Colorado rather than in Washington, D.C.?

41. The entire statement, written personally by General Fogleman and dated 30 July 1997 but released on 28 July, was published in *Air Force Times*, 11 August 1997, 15:

As my tenure as your chief of staff ends, I want to tell you what an honor and a privilege it has been to represent everyone in the United States Air Force.

The timing of my announcement was driven by the desire to defuse the perceived confrontation between myself and the secretary of defense over his impending decision on the Khobar Towers terrorist attack. The decision to retire was made after considerable deliberation over the past several weeks.

On one level, I've always said that my serving as the chief of staff was a "tour" not a "sentence" and that I would leave when I made all the contributions that I could. After I accepted this position in 1994, I met with other senior leaders of the Air Force to discuss our goals for my tenure. We wanted to take care of the troops and their families, to stabilize the force, to set a course for modernization and to develop a new strategic vision. During some difficult and challenging times we have worked hard to accomplish that and more. Certainly there is more to be done, but the framework of the plan and the leadership [are] in place to move forward with the support and efforts of the magnificent men and women of our Air Force.

On another level, military service is the only life I have ever known. My stock in trade after 34 years of service is my military judgment and advice. After serving as chief of staff for almost three years, my values and sense of loyalty to our soldiers, sailors, Marines and especially our airmen led me to the conclusion that I may be out of step with the times and some of the thinking of the establishment.

This puts me in an awkward position. If I were to continue to serve as chief of staff of the Air Force and speak out, I could be seen as a divisive force and not a team player. I do not want the Air Force to suffer for my judgment and convictions. In my view this would happen if I continue as your chief. For these reasons I have decided to retire and devote more time to personal interests and my family . . . but the Air Force will always be in my thoughts.

Miss Jane and I have met a lot of wonderful American service men and women—active duty, Guard, Reserve, civilians and family members—and they will continue to be a part of our lives. We have been proud to represent the men and women of the United States Air Force around the globe and to serve in the finest Air Force in the world. God bless and keep you all as you continue to serve this great nation.

Fogleman: Well, first, I was in Colorado [establishing residence after leaving Washington on terminal leave] and, second, I was the first Air Force chief of staff to graduate from the Academy. It seemed to complete a circle for me.

Kohn: The location was not a statement about not wanting the Washington establishment to be present at your retirement?

Fogleman: No, it really wasn't.

Kohn: Why have you remained silent about leaving until now? Do you plan to write anything or grant other interviews?

Fogleman: No I don't, particularly, and I have grave misgivings about this interview. Perhaps, some day, I may want to write something, but I am not sure that (1) I would be able to present this in a way that made any sense, and (2) I do not consider myself to be bearing any particular cross. I don't believe anybody out there is breathlessly awaiting the Ron Fogleman story. That's just sort of my take on all of this. This may be a story that does not need to be told.

Kohn: Reflect on the pressures in the Office of Chief of Staff in general. Would you do anything differently in your approach, style, or relationships in the office as you look back upon it now?

Fogleman: It's kind of interesting. I don't know if I would categorize this as the pressures of the office, but I had never really thought about the fact that the senior military guy in a service finds himself in a unique position. As you come up through the ranks, if you are the A Flight commander and somebody screws up in A Flight, you are responsible for that. But you are also in a position to take some direct action to try to fix that; the squadron is not necessarily harmed by what happened in A Flight, nor the wing or higher echelons. Think of it at every level. If you are the squadron commander, or the wing commander, the responsibility is finite, and the impact of decisions or disciplinary actions or whatever is always finite, all the way up through and including commanding a major command. In other words, as you look at the institution, if you happen to be in C Flight and someone messed up in A Flight, you felt a little sorry for the A Flight commander, but there was never any blow to you personally, or to your beliefs. When I was the Air Mobility Command commander and I read something about an event in Air Combat Command or Materiel Command, I thought, "I'm sure glad that's not happening in my command; I wonder what I can do to help them." The problem is for that commander. But for the chief of staff of the Air Force, no matter where something happens within your institution, it's a personal blow for you. When you see both accurate and inaccurate representations of events in the media, it's a different kind of feeling.

The Washington routine never pressured me greatly. I knew when I went there that my job was to deal with the Washington scene. That was my job. As I moved from one position to another in my career, I tried to read the job description, bring to bear all the expertise that I developed through the years, and apply it to the current job and not worry about the fact that I'm no longer wearing a G suit, or in the case of the chief of staff, no longer in command. And so Miss Jane and I, I don't think, found it onerous from that perspective.

Kohn: You felt you were prepared for the job? Three tours in Washington, having the historical perspective, ready both by experience and personality.

Fogleman: I never felt any trepidation from that perspective. I remember a social occasion when General Piotrowski was the Ninth Air Force commander.⁴² Someone was flattering him and asked, "Well, General Pete, what did you do to prepare yourself to be the Ninth Air Force commander? How did you do that?" General Piotrowski thought for a moment and then replied, "I did it one day at a time." I think that's how you find yourself in whatever job you are in; you prepare yourself one day at a time.

42. Gen John L. Piotrowski commanded Ninth Air Force from October 1982 to July 1985 as a lieutenant general and then was promoted to four stars to serve as vice chief of staff of the Air Force and commander of US Space Command. He retired in March 1990.

Kohn: My last question is a tough one, Ron. You have been a very respected and popular chief. But there are people in the force who are unhappy with your decision to step down. They disagree with you, feel a sense of loss and in some very few cases, perhaps, even a sense of betrayal. They—officer and enlisted—identified with you, believed that you were in step. If you think you were out of step, then they think they are out of step also. How are they supposed to carry on? Do you have any thoughts for them?

Fogleman: I may not have a good answer. But I go back to our ethic that says we serve on two levels. First, we serve as part of a profession: service before self, integrity, strive for excellence in all that you do. From this perspective, the answer is that it doesn't matter what happens. You ignore it. You keep soldiering on, you just keep slugging away. But we also serve on a personal level. Unless you really believe, and feel, that you are continuing to contribute to the Air Force and thus to the country and to the national defense, when you begin to believe that your continued service is detrimental to the Air Force, the pressure is in the opposite direction. Then the institution becomes more important than the individual, and, looking at the core value of service before self, the choice becomes staying another year and going through the motions or stepping down. In my heart, on the personal level and on the professional level, I concluded that my continued service was not in the best interest of the Air Force, in Washington where I was serving, given my beliefs, and considering the advice I was offering to our national leadership.

It is not worthy for a great State to fight for a cause which has nothing to do with its own interest.

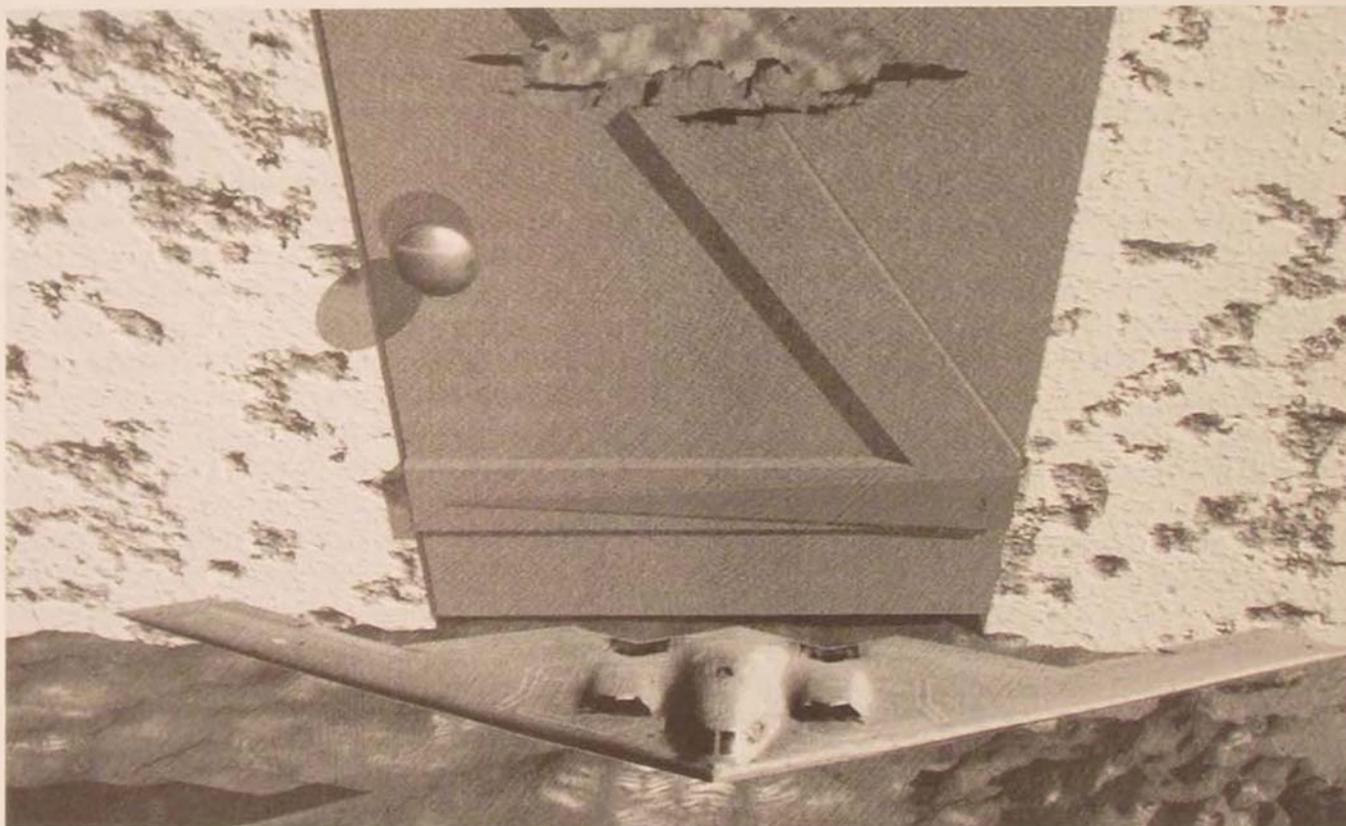
—Otto von Bismarck, 1850

Global Strike Task Force

A Transforming Concept, Forged by Experience

GEN JOHN P. JUMPER, USAF

Editorial Abstract: Reviewing recent history and anticipating future needs, General Jumper calls for action to capitalize on technology with new operational concepts and a new organizational tool to fight more effectively in the future. Specifically, with the F-22, B-2, and a constellation of access-granting platforms, the Global Strike Task Force promises to complement the Air Expeditionary Force to create dominant, immediate, and sustained aerospace power.



HISTORY IS REplete with battles, campaigns, and wars that were lost because fundamental changes in the nature of warfare went unrecognized. The Maginot Line provides the backdrop for one such example. According to post-World War I French conventional wisdom, the defensive strength of barbed wire and trenches during the Great War suggested that a permanent system of trenches, fortifi-

cations, and barbed wire would be even more effective during the next war. This misinterpretation and overreaction led to a “permanent” defense system extending from Switzerland to the Ardennes in the north, and from the Alps to the Mediterranean in the south. In contrast, the German *Wehrmacht*, realizing that technological and industrial advances had altered the nature of warfare, synergistically exploited new weapons such as the

Panzer I and Junkers Ju-87 Stuka to develop a new concept of operations—the blitzkrieg.¹ Packaged in powerful, combined panzer-air armies, later called *Kampfgruppen* on the eastern front, *Wehrmacht* forces cut large swaths around the determined resistance and drove deep into enemy territory. Nations that had the means to defend themselves with tanks, aircraft, fortifications, and manpower clung to outmoded ideas of positional warfare while the *Wehrmacht* flew over or maneuvered around permanent defenses. The results were devastating and immediate. The German onslaught quickly moved through Poland and overwhelmed numerically and often technologically superior forces in the Low Countries and France.

Today, we stand on the brink of technological advances that can prompt a new concept of aerospace power employment. Stealth applied to bombers and maneuverable fighters, all-weather precision-guided munitions (PGM), and unmanned aerial vehicles (UAV) will allow us to maneuver over, around, and through—or to stand off outside advanced defensive systems and networks already available to potential adversaries. Even more startling advances in information technologies are enabling new dimensions of command and control (C²), allowing horizontal integration of air and space intelligence, surveillance, and reconnaissance (ISR) platforms. With the application of valuable lessons from conflicts of the past decade, these technologies will provide the means to master persistent difficulties that continue to plague efficient planning and execution of aerospace power at the operational and tactical levels: time-critical targeting, all-weather precision, restrictive rules of engagement (ROE), collateral-damage control, and—perhaps most importantly—access issues. How well we capitalize on these advancements will depend largely on our ability to develop useful concepts of operations (CONOPS) that can deliver the right capabilities and produce profound effects in any scale of conflict. The Global Strike Task Force (GSTF) is just such a

concept, one that springs from schooling of the past 10 years of conflict.

Present for Duty: Lessons of Warfare in the 1990s

The fall of Communism and the end of the cold war brought about sweeping changes in the way our nation and Air Force fight wars. Relatively stable international relations for over 50 years have given way to a long series of geographically localized crises—political, ethnic, or religious unrest; humanitarian disasters such as famine; outright regional military aggression; genocide on a horrific scale; and hurricanes, earthquakes, and other natural disasters. In many ways, the “small scale” contingency (SSC) has become our first priority—driving demand for force structure and personnel more than the strategy-based two-major-conflicts scenario. These SSCs often continue indefinitely and should not be considered a “lesser included case” of our strategy.

Regardless of the nature or location of the crisis, aerospace power has played a significant role. From 1990 to 1997, the US military conducted 45 SSCs—an average of one every nine weeks, as compared to 16 during the entire cold war.² The US Air Force has been present for duty in all major conflicts of that defining decade, and we have learned in the classroom of combat.

Operation Desert Storm was a watershed event for the US Air Force. We advanced the role of the joint force air component commander (JFACC) into joint doctrine, demonstrated the power of stealth, and implemented unprecedented integration of space into air operations. There can be no doubt that aerospace power played a significant role in reversing the Iraqi occupation of Kuwait—our stated objective in that conflict.

As the scenario developed in the summer of 1990, political necessity aided by the universal condemnation of Iraq’s aggression thrust the United States into the lead of a large ad hoc coalition of multinational forces. In some cases, our new coalition partners

were countries formerly considered neutral, if not hostile, to the US presence in Southwest Asia. The task was daunting as US Central Command leadership forged C² arrangements in ways never anticipated, much less trained for or exercised. Thus, the new-world "disorder" introduced new enemies, new partners, and "blue," "gray," and "red" weapons on our side against "red," "gray," and some "blue" weapons on the other side.

World opinion was against Iraq, but coalition reaction was, at best, restrained during the initial stages of the crisis. Only the clear threat to Saudi Arabian sovereignty, posed by an Iraqi buildup of forces on Kuwait's southern border and along the Saudi Arabian frontier, solidified resolve. The blatant threat—communicated in person by US Cabinet-level officials—quickly opened access for the United States and its allies to local bases for air, land, and sea forces—bases critical for sustained operations. This allowed coalition forces to prosecute over two thousand sorties a day during Desert Storm, sanctioned by the United Nations (UN).³

In that conflict, we also came face-to-face with frustrations of the "limited objective." One thousand hours of the air campaign, one hundred hours of air-land warfare, and many months of sanctions enforcement at sea drove the Iraqi military into full retreat. Today, many people still criticize the decision to terminate the ground war short of total victory, forgetting that the coalition's main objective was limited to evicting the Iraqis from Kuwait. At the time, the coalition was unwilling to press further.

Less than four years later, however, Saddam Hussein was again rattling his saber. In late 1994, he moved two armored divisions toward the border of Kuwait. Although this initially looked like a repeat of Desert Storm, Operation Vigilant Warrior played out much differently. Again, with coalition support, the United States deployed more than 275 combat aircraft to the region. The United Nations Security Council passed a resolution condemning the aggression and demanded that Iraq withdraw its forces.

However, the similarities to Desert Storm ended there. This time, the presence of additional combat forces was enough to make the Iraqi dictator "blink." As the first US-based aircraft arrived to reinforce aircraft already present in the Gulf and the United States redirected a carrier battle group into the area, the Iraqis beat a swift retreat, less than one month after the start of the crisis. The threat to sovereignty dissolved, once again, as the coalition demonstrated willingness to engage and sustain whatever operations were necessary to avoid a repeat of August 1990.⁴

Another test of US resolve occurred in 1996, with the Iraqi seizure of Irbil, a city in northern Iraq populated mainly by Kurds. This action was a clear violation of United Nations Security Council Resolution 688, which prohibited Iraqi repression of disenfranchised Kurds in the north and of Shi'ites in the south. In response, President Clinton expanded the southern no-fly zone. Although Britain supported our actions, the rest of the coalition did not, in part due to threatening rhetoric from Baghdad. The United States chose to act unilaterally, virtually ruling out any participation from Operation Southern Watch air forces. Our coalition partners did not agree with the US asymmetrical strategy of bombing targets in southern Iraq in retribution for Iraqi actions against the Kurds in northern Iraq.

Nonetheless, the United States launched a coordinated attack on 3 September, comprised of cruise missiles from the Navy's Task Force 50 and two B-52 bombers launched from Barksdale Air Force Base, Louisiana. These bombers flew the longest bombing mission in history to complete the task, flying over 14,000 miles and refueling three times. This strike and a second launched from Task Force 50 the following day clearly demonstrated US resolve. The bulk of the Iraqi forces stood down and returned to garrison within weeks.⁵ Other periodic "behavior modification" operations have kept Iraqi aggression in check throughout the 1990s.

US commitments in Europe over the last decade also depended heavily on aerospace

power. Operation Deliberate Force, the 11-day bombing campaign in 1995, was a reprisal against the Bosnian Serbs for their attacks on UN-designated "safe areas." Much like the other operations discussed earlier, the UN called for and sanctioned this nine-nation coalition effort. In the thirty-five-hundred sorties flown, over 70 percent of the munitions dropped were PGMs.⁶ Ultimately, Deliberate Force was one of a number of crucial steps taken to bring the warring parties to the negotiating table, and it culminated with the signing of the Dayton Peace Accords. Initially, dual-key approval chains, one to the UN and one to the North Atlantic Treaty Organization (NATO), made target planning and approval difficult.⁷ Although this cumbersome arrangement later improved, it demonstrated how political concerns can impact operations down to the tactical level. There would be more of this.

Aerospace power faced another difficult test in the Balkans in 1999. Seeking to end Serbian violence and genocide in Kosovo, NATO launched Operation Allied Force in March 1999 after the breakdown of peace negotiations in Rambouillet, France, between Serbian leaders and Kosovar Albanians. The world watched as the Serb army, under cover of the negotiations, first massed at the border and then invaded Kosovo, joining the Yugoslav interior forces, which had already started the genocide. Regular Serb forces occupied Kosovo down to the village level, eventually displacing over 750,000 refugees.⁸ Of the classic phases of war—deter, deploy, halt, build up, engage, and reconstitute—we virtually jumped to the engagement phase. Although the NATO Alliance for 50 years had planned and trained to defend its borders against invasion, now the first fully coordinated, Alliance-wide military action ever was to be on the offensive and beyond NATO borders. The 19 members of the Alliance did agree to take action, but consensus was fragile in the beginning. While political leadership anticipated that three or four days of bombing would be sufficient to convince Serbian president Slobodan Milosevic to invite NATO

peacekeepers into Kosovo, the requirement for sustained operations was quickly evident. Airpower got the call to conduct what amounted to a counterattack from the air. As hundreds of thousands of refugees poured across the borders of neighboring countries, they told their stories of the Serbs' wanton killing. In April 1999, the Washington NATO Summit yielded a stronger consensus among the allies that led to more intense action against the Serbs. The air operation continued for 78 days from over 25 bases and multiple axes of attack, ending with Milosevic's agreement to allow NATO forces into Kosovo.

In many ways, we relearned the lessons of Desert Storm during Allied Force; however, this time the fighting was not conducted by a cold war Air Force but by one that was lighter, leaner, and expeditionary. We also conducted both information and aerospace operations in urban and mountainous environments, rather than across a vast expanse of desert, to which the success of Desert Storm was so often attributed. Aircrews employed precision-guided weapons against 70 percent of the targets, and there were only 20 cases of collateral damage from the 28,000 weapons employed.⁹ Moreover, this conflict was by no means a "cakewalk"—as the Serbs launched more than seven hundred surface-to-air missiles (SAM) at Alliance aircrews, with only two aircraft and no lives lost to enemy action.

These five operations have taught a number of lessons about warfare in the 1990s. They portend the future nature of warfare and provide a basis for the GSTF concept. First, we can fully expect to fight jointly alongside partners and allies. UN approval and sanction of major action is a probable prerequisite. In addition, although we will not do battle alone, success will highly depend upon our technological prowess. For example, US planes flew 79 percent of the ISR sorties and dropped nearly 80 percent of the PGMs used during Allied Force.¹⁰ Indeed, the technological gap between US and allied forces within NATO is well documented.¹¹

Second, our experience confirms that we should never start a limited operation if the



The F-22's capabilities give it 12 times more survivable airspace than that enjoyed by the F-15.

enemy can turn it into a sustained conflict. Allied Force was initially planned as a three-to-four-day operation, but it ultimately took 78 days to complete. We have learned that 24-hour, seven-day-a-week (24/7) persistence is required for large-scale sustained operations—that is, those involving more than three hundred to five hundred sorties a day over an extended period.¹²

Third, restrictive ROE, high-level political involvement in the targeting process, and public demand for low collateral damage are here to stay. In fact, our adversaries count on it. The Iraqis in 1991 and, more recently, the Serbs during Allied Force played upon the international distaste for civilian casualties and used politically sensitive structures such as hospitals, churches, mosques, cultural antiquities, and residential neighborhoods to

“morally harden” their tanks, weapons, and even aircraft. Americans have come to expect their armed forces to limit not only civilian casualties, but also military casualties on both sides. While an expectation of zero casualties is unrealistic, we cannot allow an enemy to gain a military advantage from our concern about casualties.

Fourth, we must recognize lessons from the military annals of Belgrade and Baghdad. Our enemies have taken notes too. They have found that fighting the United States does not require a “win.” Their objective simply could be not to lose. Shooting down a single aircraft or sinking a single ship may be enough to turn the tide of public opinion, regardless of the raw numbers on the scoreboard. They try to acquire “silver bullets”—antiaccess threat systems such as advanced tactical ballistic missiles, cruise missiles, aircraft, and double-digit SAMs they believe will allow them to leverage casualty aversion and our reluctance to put Americans in harm’s way.

Last, the issue of access assurance is another lesson from the 1990s, and some consider it the key factor in the near future. In general, access has been granted to US and allied warplanes during the past decade, particularly when a host’s sovereignty or vital interests are at stake. But restrictions to access, both physical and political, will always impact operations, and no service is immune to the problem. For example, during Allied Force, the French did not permit B-52s laden with conventional air-launched cruise missiles to transit French airspace, forcing them to fly a circuitous twenty-six-hundred-mile route around Spain to complete their mission. Even our fighter aircraft had to contend with long distances to the target area, such as the one-way distances to Kosovo of eighteen hundred and thirteen hundred miles from RAF Lakenheath and Spangdahlem Air Bases, respectively.¹³ Nonetheless, Allied Force taught us that employment from great distances is possible when conducting sustained operations and that forward basing need not be a major limitation.

Some people claim that our ability to gain access to the theater and provide the air superiority America takes for granted is now in jeopardy. Advanced aircraft such as the Su-35 and Su-37, used in conjunction with ever-more capable SAMs such as the SA-10 and SA-12, support such arguments. These are not future threats. More than 10 countries own these systems today, and several more have plans to purchase one or more systems within the next year.¹⁴ The longer weapon range, sophisticated fire control, and advanced countermeasures of these systems, even in small numbers, present a formidable barrier to our fleet of aging aircraft. Stealth, electronic countermeasures, and high-altitude attack profiles decrease our vulnerability significantly, but the full benefit is realized only when we add supersonic speeds to the mix.

Theater ballistic missiles tipped with chemical, biological, nuclear, and conventional warheads threaten vast tracts of land and significant resources. They hinder our ability to operate land forces and could restrict basing for our air forces. It is important to note, however, that we continued to conduct sustained land-based operations in the face of Scud missile attacks during Desert Storm (and have spent decades investing and training in nuclear, biological, and chemical defense equipment; in other words, we have prepared ourselves for this scenario). But future beddown of forces faces even more threats. All forces are susceptible to access challenges. Antiship cruise missiles, ultraquiet diesel submarines, and sophisticated sea mines can restrict maritime access required to engage fully from the sea or to disembark significant land forces.

Clearly, there are significant challenges for aerospace power now and in the future. Advanced threats erode US technological superiority and push our current airframes to the limit of their capability. Political and physical constraints, along with long-range enemy missile threats, limit access to theater basing and force operations over extended distances. Restrictive ROE and other conditions of caution test the limits of precision weaponry. Although we desire quick results, sustainability

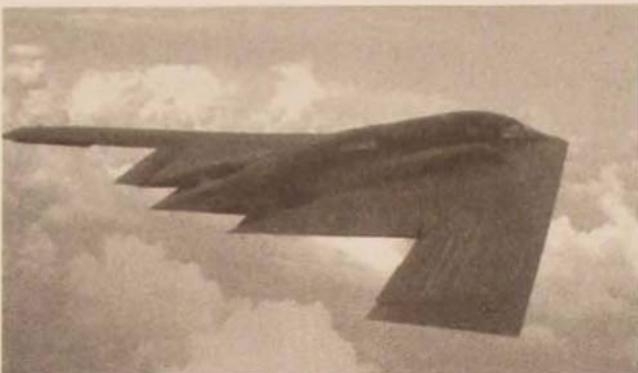
and persistence to see the job through to completion are "must haves," while unnecessary human loss must always be kept to an absolute minimum. Finally, joint, interoperable, and seamless command, control, and communications with our allies and coalition partners are critical elements for success.

We have plans, capabilities, and CONOPS to address many of these challenges. Perhaps the most significant of the challenges—the lack of access assurance—now has a solution: the GSTF, a concept that maximizes existing and emerging joint capabilities and enables us to meet our nation's toughest near-term challenges. GSTF empowers us to overcome range barriers by providing the means to rapidly roll back adversary threats. Once this is done, we can then provide the traditional 24/7 battlefield persistence America has come to expect: air superiority over friendly forces, interdiction, and close air support (CAS)—all enhanced by evolving technologies that will enable time-critical targeting.

Kicking Down the Door: The Global Strike Task Force

GSTF will be the US Air Force's contribution to the nation's kick-down-the-door force. It will better meet the needs of commanders in chief (CINC) by leveraging our current and near-future capabilities to overcome the challenges our experience has identified and the threat to theater access. GSTF will rapidly establish air dominance and subsequently guarantee that joint aerospace, land, and sea forces will enjoy freedom from attack and freedom to attack. It will combine stealth and advanced weapons with a horizontally integrated command, control, intelligence, surveillance, and reconnaissance (C²ISR) constellation that provides lethal joint battlespace capability. The C²ISR constellation will team space assets, UAVs, and a consolidated wide-body platform that transforms data into decision-quality data for a CINC and the engaged component commanders. GSTF will be a rapid-reaction force employed within the Air Expeditionary Force (AEF) construct and

timeline while maintaining interoperability with joint, coalition, and allied assets. It will initially leverage the mass and standoff of our bomber fleet and ISR platforms, protected by the F-22, to strike targets inhibiting our ability to gain access.



The CONOPS: F-22s and B-2s kick down the door, taking out high-value assets, while information operations target key nodes and the ABL targets ballistic missiles—clearing the way for follow-on forces.

The concept hinges on precision weapons and stealth capabilities inherent in the B-2 and F-22. The latter's unparalleled combination of stealth with supercruise will reduce threat rings, allowing it to establish air dominance and deliver its PGMs deep inside enemy territory. Simultaneously, our bomber fleets will provide the "heavy lifting." A few B-2s, enabled by F-22s and in conjunction with standoff platforms such as the B-52, will target the enemy's antiaccess weapons, launch sites, and C², rolling back his war-fighting capability, just as we have done with air defense networks in recent conflicts. These assets will provide substantial firepower where and when we need it most—against our adversary's antiaccess threats in the early days of a conflict. So how does the GSTF come together?

Prior to any conflict, preparation is key. The team of GSTF assets, aligned within an AEF, will be on call and ready for immediate tasking to hot spots around the globe. As in any emerging crisis, the first requirements call for ISR platforms. Today, this means Rivet Joint; the airborne warning and control system; the joint surveillance, target attack radar

system; space-based systems; and other platforms to collect order-of-battle data sufficient to refine target lists. In the future, this phase will take advantage of platforms that integrate and dialog at the machine level. One wide-body commercial platform using modern, tunable antennas will perform most of the surveillance, reconnaissance, and C² functions that currently require the specialized platforms listed above. When teamed with UAVs, such as Global Hawk, and mechanized to interact directly with space platforms, the power of machine-level integration will close the seams that currently delay our ability to precisely locate and identify critical targets. These are key steps in the kill chain, and we have learned that a more efficient kill chain is crucial to combat success.

The development of predictive-analysis tools will expand the power of integrated ISR. Horizontally integrated ISR, combined with these predictive tools, will build the concept of intelligence preparation of the battlefield into an emerging concept called predictive battle-space awareness (PBA). Such awareness includes baseline reconnaissance of the battle space; terrain delimitation; focused surveillance; cataloged analyses of movement patterns; knowledge of enemy tactics, intentions, and disposition; as well as course-of-action analysis. This concept should allow a shift of ISR platform utilization from collection, used for pure discovery, to targeting those events that our predictive power leads us to anticipate. We are aiming for a forensic-level understanding of the battle space in all four dimensions. PBA will allow us to anticipate the right move rather than simply react to enemy moves. PBA is essential to the GSTF.

The first aircraft to deploy will be the ISR wide-body platforms that will operate beyond enemy airspace, their eyes and ears extended by UAVs if necessary and their protection provided by stealthy F-22s. Machine-level coordination with space-based platforms will fill gaps in the airborne platforms' coverage, and reachback will provide the analysis necessary to complete PBA for targeting the enemy's integrated defenses and his means to attack

bases, ports, and other facilities required for friendly access. Capitalizing on our decade of lessons learned, targeting will entail more than a target name, a black-and-white photograph, and mensurated coordinates. Desired mean point of impact (DMPI) analysis of second- and third-order effects, ROE target confirmation, and collateral-damage assessment will be part of a process completed and transmitted to ingressing manned and unmanned shooters in near real time, if necessary.

Once suitably prepared through PBA, the GSTF will be ready to go to war. With our C²ISR constellation in operation, air-refueled B-2s flying from the continental United States or rear bases beyond the enemy's reach, in concert with standoff weapons such as sea- and air-launched cruise missiles, will deliver the first blows to shore defenses, integrated air defenses, ballistic-missile launch sites, and chemical and biological storage facilities.

The F-22 is key to expanding the B-2's stealth advantages beyond moonless-night-only operations; indeed, 24-hour stealth will be possible. F-22s will pave the way for the B-2 and other bombers by providing initial local air superiority through the traditional "sweep" role and through air-to-ground targeting of the enemy's air defense network. Some F-22s, which are also compatible with the winged miniature munitions, will attack up to eight targets per sortie, further hindering the adversary's ability to defend his airspace.

The shock effect of this B-2/F-22 "one-two" punch will be unprecedented. In the first 24 hours of Desert Storm, after six months of buildup, we launched 1,223 strike sorties, hitting 203 targets. Stealth assets accounted for 40 sorties and 61 targets.¹⁵ With GSTF, four B-2s and 48 F-22s carrying miniature munitions can strike 380 targets in only 52 sorties. Surging the same assets will more than double the target destruction—an exponential increase over our 1991 results.¹⁶ Our success during Allied Force is similarly eclipsed by the GSTF concept.

Air refueling ensures that we can sustain and, if necessary, employ GSTF over long ranges, while airborne laser (ABL) aircraft

provide force protection as part of a layered theater ballistic missile defense system. F-22 will be the guarantor of air dominance for all friendly forces.

Thus, with F-22s and B-2s, the GSTF will contribute to the joint team's capability to overcome enemy attempts to deny access. Joined with other standoff and special-operations capability, GSTF will provide a capacity to systematically destroy hundreds of targets, roll back enemy defenses, and clear the way for follow-on forces. Additionally, bombers will orbit in combat air patrols, awaiting tasking for fixed and time-critical targets located and identified by our C²ISR constellation. Small, armed UAVs, present throughout, will provide a single hunter-killer platform for finding and killing threats in the highest-risk areas. Sustained AEF airpower, including the Joint Strike Fighter (JSF) and, subsequently, nonstealthy fighters with precision-attack capability, will roll into the fight as the antiaccess threat diminishes, beddown locations open, and survivability increases.

Furthermore, the GSTF will fit naturally into the AEF construct and timeline. Follow-on AEF forces will quickly join GSTF assets embedded in the AEF. Low-density, high-demand assets will continue to support operations during their eligibility window.

These persistent operations will include other fighters, such as the JSF in the air-to-ground and suppression-of-enemy-air-defenses roles, to provide continuous presence over the battlefield. The presence they offer is necessary to sustain full-spectrum joint and combined operations, such as the targeting of time-critical mobile targets and CAS. Therefore, the GSTF complements and improves the AEF construct by providing maximum shock during the first stages of the battle.

Although parts of the GSTF concept could be executed with today's force structure, it will achieve full potential only by leveraging new technology. Therefore, we must direct scarce modernization funds toward improvements that maximize GSTF capability. Miniature munitions will maximize the effectiveness of our bomber and fighter platforms and

validate the concept of "targets per sortie"—one that is already reaping benefits for the United States.¹⁷ Advanced weapons will also enhance our effect on targets that are deeply buried as well as mobile target sets. To ensure survivability, we must implement improvements in self-protection for all our combat air forces. Furthermore, space-based assets and UAVs must integrate with our next consolidated C²ISR platform to break down bottlenecks and even barriers in the kill chain. By integrating today's stovepiped platforms into a common platform, we will garner the benefits of a reduced overseas footprint. More importantly, we will improve information flow by rapidly conducting machine-level conversations to refine the myriad of information that is not currently fused. This is critical to closing seams in the kill chain.

Combat experience has also inspired major changes to our C² processes. The potential contribution of PBA to our target-destruction capability is lost without the C² to orchestrate the campaign, and the air-operations-center weapon system provides the C² foundation. It will serve as the focal point for decision-quality information, allowing an airman to effectively command aerospace power in support of a joint force commander. The decision-quality information on the JFACC's data wall will be void of stovepiped barriers—the information, not the source, is key. This will allow rapid response and the inherent flexibility of

GSTF aerospace power to deviate from any plan with minimal impact.

Conclusion

Our experience in conflicts over the past decade has revealed the changing nature of warfare. The reliance on coalitions and allies, stringent ROE, concern about casualties, need for sustained air operations, and access issues are a few of the factors that now shape the application of American military power. Sophisticated new weapons available to our potential enemies further complicate our task. The GSTF operationalizes many of the lessons learned in combat in the 1990s. Decades ago the Luftwaffe demonstrated to the world the cost of failing to honor change.

The GSTF provides the nation a new capability—one that maximizes current systems and technologies and leverages their potential through innovative CONOPS. In sum, GSTF is a rapid-reaction, leading-edge, power-projection concept that will deliver massive around-the-clock firepower. It will mass effects early, from longer ranges, and with more precision than our current capabilities and methods of employment; it will give adversaries pause to quit and virtually guarantee air dominance for our CINCs. In sum, GSTF is an elegant and effective near-term solution to meet the challenges facing America. □

Notes

1. Actually, blitzkrieg tactics were introduced in earlier forms with German Pioneer forces during the spring offensives of World War I in an attempt to break the four-year stalemate. See James S. Corum, *The Roots of Blitzkrieg: Hans von Seeckt and the German Military Reform* (Lawrence, Kans.: University Press of Kansas, 1992).

2. "Named Military Operations, 1989–1999," comp. Francis M. Doyle (Fort Monroe, Va.: Technical Library, 1999).

3. A grand total of 118,661 sorties were flown in support of Operation Desert Storm by all participants, for an average of 2,697 sorties per day. Thomas A. Keaney and Eliot A. Cohen, *Gulf War Air Power Survey*, vol. 5, *A Statistical Compendium and Chronology* (Washington, D.C.: Department of the Air Force, 1993), 251.

4. Maj W. Eric Herr, "Operation Vigilant Warrior: Conventional Deterrence Theory, Doctrine, and Practice" (thesis, School of Advanced Airpower Studies, June 1996), 24.

5. *Operation Desert Strike*, on-line, Internet, 12 January 2001, available from http://www.fas.org/man/dod-101/ops/desert_strike.htm.

6. Of the 1,026 bombs and missiles expended during Operation Deliberate Force, 708 were PGMs. Col Robert C. Owen, "The Balkans Air Campaign Study: Part 2," *Airpower Journal* 11, no. 3 (Fall 1997): 12.

7. Col Robert C. Owen, "The Balkans Air Campaign Study: Part 1," *Airpower Journal* 11, no. 2 (Summer 1997): 15.

8. Headquarters USAF, *The One Year Report of the Air War over Serbia: Aerospace Power in Operation Allied Force*, vol. 1 (Washington, D.C.: Department of the Air Force, October 2000), 50.

9. Aircraft flew 38,000 sorties, with an overall collateral-damage rate of .0005. *Ibid.*, 513.

10. A total of over eighty-five-hundred PGMs were employed, with almost seven thousand dropped by US assets. *Ibid.*, 504.

11. William S. Cohen and Henry H. Shelton, *Kosovo/ Operation Allied Force After-Action Report: Report to Congress* (Washington, D.C.: Department of Defense, 31 January 2000), 24.

12. *Persistence* refers to 24/7 enduring air operations such as Operation Southern Watch. The three hundred to five hundred sorties per day included all combat and combat-support sorties.

13. Distances are measured on a straight line to a point in the center of Kosovo.

14. *Jane's Land-Based Air Defence*, 13th ed. (Alexandria, Va.: Jane's Information Group, Inc., 2000), 140.

15. F-117 aircraft flew 40 sorties and are credited with 61 strikes on day one of Operation Desert Storm. *The Gulf War Air*

Power Survey defines a strike as "the delivery of a weapon or weapons against a specific target." In this example, the words *strike* and *target* are synonymous. Keaney and Cohen, 351, 421-37.

16. Surging can be accomplished either by increasing the number of bomb-dropping sorties or by shifting the focus of the F-22s to their multirole, air-to-ground capability.

17. Advanced munitions allow nearly one DMPI-per-bomb destruction or the ability to effectively destroy mobile targets or targets with imprecise locations. An example is the sensor-fused weapon.

Aerospace Power Chronicles

As we enter 2001, we are striving to publish current, timely, and thought-provoking articles on-line. For example, one of our first offerings is "A Sea of Peace or a Theater of War: Dealing with the Inevitable Conflict in Space," by Lt Col John E. Hyten, who addresses issues regarding future conflict in space. He emphasizes that such conflict is inevitable, complicated, and unresolvable by either the Air Force or the military alone: "Dealing with future space conflicts and defining the future of this nation in space are national issues requiring involved leadership and integrated efforts from throughout the federal government."

Another article, equally intriguing, details the completion of a theater missile defense (TMD) reorganization by Combined Forces Command and US Forces Korea. In "Organizing for Success: Theater Missile Defense in Korea," Col Dale C. Eikmeier explains that this innovative solution to a serious war-fighting challenge grew from a problem shared by many of the geographical CINCs and may become a model for other theater-level TMD organizations.

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Luetwinder T. Eaves
Managing Editor
Aerospace Power Chronicles

Going Boldly—Where?

Aerospace Integration, the Space Commission, and the Air Force's Vision for Space

LT COL PETER HAYS, USAF
DR. KARL MUELLER



Editorial Abstract: Aerospace Power Journal has regularly showcased discourse over the functional and organizational relationship between air and space. The future of air and space integration or separation is the subject of the congressionally mandated Space Commission, whose final report was released in January 2001. Dr. Mueller and Colonel Hays observe inconsistencies in the Air Force's approach to aerospace integration that may accommodate that service's bureaucracy but be perceived as "poor stewardship" of space.

AS WITH MOST other new technologies and frontiers, our perceptions of outer space and space technology have been fundamentally shaped by competition and warfare. World War II was the rationale for Nazi Germany's equivalent of the "Manhattan Project," led by Wernher von Braun, which first brushed the edge of space in 1942 with the revolutionary V-2 (A-4) ballistic missile.¹ Likewise, the superpower competition during the cold war was the most influential factor in shaping both the Soviets' opening of the space age with the launch of *Sputnik I* on 4 October 1957 and the eventual American response of initiating a race to the Moon.² From the beginning, the interrelationships between

space and national security have been complex and controversial. Today—due to the end of the cold war, the absence of competition from military peers (at least for the near term), space's role in enabling the information revolution, and the blurring of lines between traditional space sectors caused by the growth of commercial space activities—space issues are more complex, multidimensional, and controversial than ever. One of the most significant implications of these developments is that it is no longer clear that the relationship between space and national security is, or should be, shaped primarily by international military competition. What, then, is the relationship between space and national security? What should guide our vision for space, and how should we organize to implement it?

Due to its sweeping charter and powerful members, the Commission to Assess United States National Security Space Management and Organization was the most important, and potentially influential, group ever formed to examine these broad issues.³ The Space Commission was the brainchild of Sen. Bob Smith (R-N.H.); it was established by the fiscal year 2000 National Defense Authorization Act, first met on 11 July 2000, and delivered on schedule its final report to Congress and the secretary of defense in January 2001. The Air Force, as the largest military player in space, is clearly the organization that the Space Commission studied most carefully.⁴ Moreover, because Senator Smith and several members of the commission have repeatedly criticized the Air Force's overall stewardship of space to date, it is no secret that the commission was established, in large part, to challenge the status quo in military space. Indeed, the very creation of the commission was an implicit critique of the Air Force's vision for space.

Meanwhile, the Air Force has recently refocused on the concept of aerospace—a concept that defines air and space as a seamless operational medium and that strongly implies two things: the Air Force should be the lead service in this operational medium, and it should seek to control and apply force from

this medium. The Air Force's vision statement of June 2000, *Global Vigilance, Reach & Power: America's Air Force Vision 2020*, emphasizes aerospace integration (AI) or the blending of air and space capabilities and personnel to advance aerospace power, regardless of where the platforms are located or which ones are chosen.⁵ The Space Commission and the start of a new presidential administration create an excellent opportunity to reexamine the utility of the aerospace concept and AI in providing a vision for the Air Force's future in space.

This article reviews the evolution of arguments about the relationship between space and national security and examines what space means for the future of the Air Force. It looks first at the roots and evolution of the aerospace concept and evaluates its influence on the way the Air Force thinks about space and develops space doctrine. Next, it examines enduring military space issues and evaluates how well AI serves the Air Force in addressing these important questions. Finally, it offers recommendations to strengthen the Air Force's vision for space.

Roots and Implications of the Aerospace Concept

Conceptually, the roots of the aerospace concept are closely associated with airpower theory and run quite deep. In practice, however, both the word and the concept of aerospace have proven to be controversial, confusing, mired in bureaucratic politics and interservice rivalry, and—worst of all—detrimental to the development of more robust space-power theory.⁶ Today's airmen can be forgiven if they don't know very much about the controversies associated with the aerospace concept because the Air Force has tended to sweep many of them under the rug. A bureaucratic politics-oriented approach has obvious appeal for the Air Force at a time when it faces strong external pressure such as the Space Commission represented, but such an approach is certainly no way to build a robust vision for space power.

Airmen have been at the forefront of thinking about the military uses of space, but, unfortunately, we still have a long way to go on the road to developing mature space-power theory. At least as far back as 1945, in Gen Henry "Hap" Arnold's visionary "Third Report to the Secretary of War" and Dr. Theodore von Kármán's *Toward New Horizons* study, space was seen as a natural extension of core Army Air Forces doctrine and a potential means of "flying" higher, farther, and faster to conduct long-range strategic-attack missions.⁷ RAND's very first report, *Preliminary Design of an Experimental World-Circling Spaceship*, issued in 1946, was even more prescient because it laid out the engineering challenges and conceptual utility for almost all types of military space systems that have been built to date.⁸

Airmen also have been thinking about the relationship between the mediums of air and space for a long time. Air Force chief of staff Gen Thomas D. White first used the word *aerospace* in 1958, and the concept that air and space form a seamless operational medium has been the foundational component of Air Force thinking about space ever since. From the Air Force's perspective, the roots and development of the aerospace concept seem an innocent and natural evolution from air-power theory.⁹ Outside the Air Force, however, the aerospace concept and its implication that the Air Force should be the lead service for this boundless new medium were often viewed by individuals in the other services and within the Office of the Secretary of Defense (OSD) as an unabashed "land grab." The other services and OSD have never accepted the Air Force's definition of aerospace and certainly have not ceded all operations within this realm to the Air Force. The aerospace concept has also, at times, led the Air Force into seemingly inconsistent positions, such as when it joined with the Navy during 1997 to oppose the proposal by Howell Estes, commander in chief of US Space Command (CINCSpace), that space be designated as a separate area of responsibility within the Unified Command Plan.¹⁰ Perhaps the best illustration of the Department of Defense's (DOD)

lack of consensus, or even dialogue, on the Air Force's concept of aerospace is the fact that the word does not even appear in DOD's July 1999 directive entitled *Space Policy*.¹¹

Moreover, because the Air Force argued that it should seek to control and apply force from space just as from the air, the aerospace concept inevitably came into conflict with the Eisenhower administration's "space for peaceful purposes" policy. That administration saw the aerospace concept (and any other discussion of overtly military activity in space) as antithetical to its secret but highest-priority space policy as established by National Security Council Resolution 5520 in May 1955. This policy called for the United States to use the civilian face of its International Geophysical Year scientific satellite program as a "stalking horse" to establish a legal regime to legitimize overflight and thereby open up the closed Soviet state to satellite reconnaissance by the secret WS-117L spysat system.¹² Eisenhower's space-for-peaceful-purposes policy, along with his distrust of the military, also led to the establishment of the National Reconnaissance Office (NRO), America's secret and independent space agency, whose existence was not officially revealed until 1992. In sum, the aerospace concept was repeatedly thwarted in its early years, both secretly (via the creation of the NRO) and publicly (as reflected in the string of cancelled Air Force efforts to develop systems for aerospace operations such as the Dyna-Soar space plane and the Manned Orbiting Laboratory).¹³

Given this controversial and obscured early history, it is hardly surprising that the aerospace concept was not a very firm foundation for developing space-power theory. The aerospace concept attempted to define a new, seamless operational medium but did not provide a powerful rationale with which to address fundamental issues such as what the Air Force should do in space, how it should do it, or why. It certainly did not provide a rationale strong enough to overturn the basic tenets of Eisenhower's vision. And it clearly did not help that, in its doctrine manuals up until the 1980s, the Air Force simply

substituted the word *aerospace* for *air* and inappropriately ascribed attributes such as speed, range, and flexibility to space forces.¹⁴

Fortunately, many of the problems with the aerospace concept and the development of space-power theory and doctrine have already been thoughtfully addressed in this journal over the years. Dennis Drew, Charles Friedenstein, and Kenneth Myers and John Tockston published three of the best analyses during the 1980s.¹⁵ These interrelated articles build on Drew's doctrine-tree model—the idea that doctrine should grow out of the soil of history, develop a sturdy trunk of fundamental doctrine, branch out into doctrine for specific environments, and only then attempt to sprout the organizational doctrine analogous to “leaves.” This approach provides a comprehensive way to examine the aerospace concept and the Air Force's first official space doctrine, Air Force Manual (AFM) 1-6, *Military Space Doctrine*, released in 1982.¹⁶ Friedenstein finds that “there is no doctrinal foundation for the term *aerospace*” (emphasis in original) and critiques the Air Force for attempting to produce “leaves on a nonexistent branch” because it had not developed environmental doctrine before issuing the organizational doctrine in AFM 1-6.¹⁷ Myers and Tockston strongly critiqued the Air Force's tendency to “force-fit” space doctrine into the mold of air doctrine and argued that the three major characteristics of space forces are in fact emplacement, pervasiveness, and timeliness.¹⁸

Unfortunately, the weaknesses of the aerospace concept clearly identified by the 1980s (if not earlier) continued to pervade Air Force thinking about space into the 1990s and still contribute to our cloudy and inconsistent vision. But, in a major departure, for the greater part of the 1990s, the Air Force abandoned aerospace both conceptually and semantically. Air Force chief of staff Gen Merrill McPeak emphasized the importance of space assets in enhancing the combat effectiveness of coalition forces during the Gulf War by labeling the conflict “the first space war” and then changed the Air Force mission statement in June 1992 by adding the words

air and space.¹⁹ According to Gen Thomas Moorman, McPeak's vice chief of staff, with this change “Air Force space operations were formally legitimized and placed conceptually on an equal footing with air operations.”²⁰

Shortly thereafter, in its *Global Engagement* vision statement of November 1996, the Air Force issued what is probably its most strident position ever regarding the importance of space to the Air Force's future: “We are now transitioning from an *air* force to an *air and space* force on an evolutionary path to a *space and air* force” (emphasis in original).²¹ Although this statement excited space enthusiasts in Colorado Springs and elsewhere, it begged the question of what types of space missions would justify such a major evolution, and, overall, it raised more issues than it resolved. Many saw it as a divisive vision because it clearly seemed to promote space separatism without providing much guidance concerning critical issues such as the rationale or timing for the Air Force's evolution to a space and air force. Indeed, *Global Engagement* and even United States Space Command's (USSPACECOM) *Long Range Plan* of March 1998 still suffered from underdeveloped fundamental and environmental doctrine for space and still failed to provide persuasive answers to the basic questions of what the Air Force should do in space, how it should do it, and why.

Recognizing these difficulties, Air Force chief of staff Gen Michael Ryan created the Aerospace Integration Task Force in the spring of 1998, tasking it to look in particular at the wisdom of continuing to use the separate “air and space” construct. The Air Force's white paper of May 2000 (*The Aerospace Force*) and its vision statement of June 2000 (*Global Vigilance, Reach & Power*) are the fruit of this effort and take us full circle to the aerospace concept with their emphasis on AI. Of course, space enthusiasts may perceive the Air Force to be backsliding on the importance of space to its future in its latest vision statements. And, ironically, due to the Air Force's movement away from aerospace in the early 1990s and the timing of their release, these statements may actually have given more ammuni-

tion to Air Force critics on the Space Commission.²²

Unresolved Debates and Premature Questions

Participants on all sides of the debate between AI and space separatism invoke the physics of space and spaceflight to bolster their arguments, implying that the fight can be resolved through the application of indisputable scientific laws. Integration proponents correctly observe that no clear demarcation exists between air and space, pointing out that some true aerospace vehicles will exist in the future, but overlook the fact that the boundaries between other realms are also indistinct—ask the pilot who flies an air-cushion vehicle or a wing-in-ground-effect craft.²³ Their opponents cite the vast differences between aircraft and satellite operations, but these alone will never justify the establishment of a separate space force by a country that has found it sensible to include aircraft in its army and navy.²⁴ In the end, such debates cannot provide the answers to questions that are essentially strategic and political.

Too much of the recent debate over the future of US military space operations has centered on how the United States ought to organize and manage this realm of activity. This is perhaps not surprising, given Americans' penchant for quick fixes and the organizational dimension of the Space Commission's mandate, but it is unfortunate, for it places the cart squarely before the horse. In order to identify the best answer to the question of organization, our nation should first address a set of sweeping strategic issues regarding the nature and relationship of space and national security. Then and only then can the focus usefully turn to the question of organization. In other words, it is impossible to know how best to organize until you know what you want to do. Even setting aside the uncertainties that always come with looking far into the future—for these must be set aside in order to conduct long-term planning—having a reasonable sense of the probable relationship

among space, national security, and US grand strategy in coming decades depends upon making assessments of several factors that remain very much open to debate.

Unfortunately, the aerospace concept and AI are not sufficiently developed to provide much help in identifying the most important underlying questions, let alone addressing them. A more useful vision would provide far more guidance in this area. Among these fundamental and unresolved issues, the three that loom largest in current discussions of space power are the desirability and inevitability of space weaponization, the implications of the growing commercial importance of space, and the relationship between space and information operations in national security.

Space Weaponization

The most incendiary debates about space policy relate to the placement of weapons in space, particularly whether space weaponization is desirable for the United States and whether it is inevitable. A wide range of opinions exists with respect to the first of these issues.²⁵ Some advocates of space weaponization are extreme "space hawks," favoring the all-out pursuit of US dominance of space, which they often describe as the ultimate high ground. According to Senator Smith, for example, the concerted development of American space weapons "will buy generations of security that all the ships, tanks, and airplanes in the world will not provide. . . . Without it, we will become vulnerable beyond our worst fears."²⁶ In short, if the United States moves expeditiously to take advantage of its existing leadership in space technology and establish an unassailable dominance of orbital space, its position as the preeminent world power will be enhanced and perpetuated; if, on the other hand, it fails to seize the opportunity to establish unassailable superiority in space, its world leadership will be threatened by more visionary rivals.

Other proponents of weaponization predict less extravagant benefits from space weapons and are less sanguine about how un-

challengeable US space dominance really would be. Instead, they emphasize the importance of space control and the role of space as a vital future arena of military competition, though not necessarily the dominant one. Rather than foreseeing the wholesale replacement of airpower with space-to-Earth weapons, these theorists principally base their arguments for space-weapons development on the need to protect growing US interests in space and to prevent enemies from using space systems against the United States or its armed forces. Yet, this perspective, too, is based upon the fundamental premise that he who controls space will control the world—or at least he who doesn't, won't—and, thus, the more the United States invests in developing its space power, the more powerful and secure it will be.²⁷

On the other side of the weaponization debate is a variety of perspectives that favor the preservation of space as a weapons-free "sanctuary." Some sanctuary proponents see space weaponization as fundamentally bad because they wish to avoid any expansion of military competition into domains where it had previously been absent, based on general principles of morality, arms control, or conflict resolution. Others oppose the weaponization of space in particular because they believe that the nature of space-based weapons would generate instability due to the incentives for preemptive attack that powerful but vulnerable weapon systems seem likely to create.²⁸ Although adherents to these perspectives are scarce within the ranks of the US Air Force, they are less so among national and foreign policy makers; thus, these beliefs remain a powerful force in US space policy.

An alternative, realist version of sanctuary theory also exists, though it is often overlooked by those who write off the sanctuary perspective as idealistic and naïve peacemongering. Theorists in this camp oppose space weaponization not on the grounds that it would be harmful on a global level, but because they believe it would reduce rather than enhance US power and security in particular.²⁹ They argue that the United States, as

the leading user of space, has by far the most to lose if space systems become increasingly vulnerable to attack and that as the world's preeminent air and surface power, it has the least to gain from developing such weapons. Sanctuary realists also assert that if the United States takes the lead in developing space weapons, it will be easier for other states to follow suit, thanks to US technological trailblazing. Finally, they tend to be skeptical that the military utility of space weapons, both for power projection and to protect US space assets, will be as great as weaponization proponents typically claim.³⁰

The question of whether the United States should—and will—lead the world into placing weapons in space or work to maintain and perpetuate the informal sanctuary status of space remains very much unresolved. This is not surprising, for many of the technologies involved are still immature, making it difficult to assess how useful space weapons would in fact be. Moreover, because of the current lack of conventional military threats to the United States, delaying a final decision on this issue for some years seems quite reasonable. However, this uncertainty makes it impossible to declare that any organizational plan for US space forces will be ideal for the long term, since whether—and, if so, how—space is to be weaponized should fundamentally shape the organizations that will execute national space policy.

Of course, US preferences regarding space weaponization might not matter to the organizational question if weaponization is inevitably going to occur, regardless of whether it is desirable, and if the pace and nature of other states' decisions about weaponizing space are not affected by the actions or inactions of the United States. This is a suggestion made by many theorists, including several former CINCSPACEs³¹ and is frequently invoked as a key reason to press ahead on the path to weaponization. However, the argument that weapons eventually go anywhere that people do is too simplistic to provide much insight about the ways in which space might actually become weaponized. Space is only the fourth

genuinely new environment into which human activity has spread (the others being the maritime, aerial, and submarine worlds), and the fact that something has happened three times before hardly proves the existence of a timeless law of nature. Moreover, the spread of weapons into these three domains occurred very differently: at sea, navies gradually appeared to control piracy and transport armies; weaponization of the air occurred very soon after the first flights, mainly driven by the need to defend against observation aircraft and then to escort them; while submarines were initially created as weapons to use against nonsubmersible targets, and to this day, military operations in the undersea arena vastly dominate civil and commercial activities there. In light of this diversity of experience, the assumption that there is a consistent, predictable pattern to the militarization of new and different environments simply does not hold water (or air).

But what about the similarities between the exploitation of air and space, so often mentioned by Air Force leaders? On the surface, these appear compelling, at least to the extent that reconnaissance was initially the most important military mission performed in both realms; in fact, reconnaissance was the most important application of US airpower for many decades, until satellites began to take over the mission.³² Bombers greatly outnumbered reconnaissance aircraft in World War II air forces not because bombing was more important but because even a small number of aerial observation platforms was sufficient to transform warfare, while many bombers were required to have much effect. Yet, the very fact that space is not weaponized today demonstrates that air and space have followed divergent evolutionary paths. This becomes even clearer if one recalls that "space weapons" such as the US nuclear-tipped Program 505 and 437 antisatellite (ASAT) systems or the Soviet Fractional Orbital Bombardment System and co-orbital ASAT system were actually deployed to a limited extent beginning in the 1960s but that no such dedicated systems are deployed today—

a retreat from space weaponization without precedent in airpower history.³³

Other similarities between the development of air and space operations will surely arise in the years to come, but there is very little basis for assuming that examining the history of airpower will reveal more than some vague hints of what might—or might not—happen in space. At a minimum, these shaky analogies do not absolve strategists and policy makers from the responsibility of deciding not only whether space is destined in its own right for weaponization, but also what role the United States should play in shaping the environment in which these decisions will be made.

Space Commerce

In much the same way, the implications of the profound, ongoing boom in the commercial use of space cannot be deduced from the history of the development of maritime and air commerce. It is vitally important to understand that commercial space activities are fundamentally different from merchant shipping and air transport in every respect, save that all three are economically important. Today, once on orbit, *all* significant space commerce involves information—either its collection and transmission, or both. In contrast, virtually all commercial shipping and most commercial aviation involve the movement (or the collection, in fishing) of goods and passengers. This distinction between information and transportation is also evident in space's role in providing "global utilities" such as Global Positioning System (GPS) timing signals. As a result, the commercial space revolution has less in common with the rise of the steamship or the airliner than with the invention of telegraphy or radio.³⁴

This difference has several important implications for space power. First, it fundamentally alters the sorts of threats that might be anticipated against commercial space systems. Traditional piracy, for example, is out; commerce raiding is a possibility; and destructive terrorist attacks (probably by states) may be a serious threat. Satellites, however,

are likely to be a more difficult and thus less attractive target set for direct attack under most circumstances than are other components of space systems, such as launch facilities or ground-control stations, and if they are attacked, it will most likely be through indirect means such as communications jamming.³⁵

Second, it means that the menu of options for deterrence and defense against such threats is very different for space systems than for air and sea commerce. Because satellites convey information, their vulnerability to attack can in many cases be eliminated through the development of distributed and redundant capabilities—something that the advent of the microsat should make vastly more practical.³⁶ This may be far more efficient than trying to protect space systems by using body-guard satellites or other space weapons (which would probably be useless against directed-energy attacks in any event). Navies developed largely because this option is not available for maritime commerce since the same merchandise or passengers cannot travel on several vessels simultaneously, and since there are severe practical limits to the extent to which a state's trade can be divided among a larger number of smaller merchant ships.

Finally, due to the novelty and the highly dynamic nature of space commerce, we believe it is too early to assess with confidence the implications of these developments or to base significant changes in space policy or organization on what has happened so far. In the wake of the Iridium system's bankruptcy and a host of other cancellations or delays, commercial satellite operators and their backers are giving greater scrutiny than ever to their projected bottom line and are certainly not clamoring for military protection or even discussing hardening standards or other measures that might interfere with their potential profitability. In the end, the United States may want its military to play an important role in operating and protecting global utilities, but it is far from clear that either economists or strategists fully understand the

emergence and trajectory of the commercial markets that have risen out of military innovations such as the Advanced Research Projects Agency Network (ARPANET) or the GPS system.

In light of these factors, space strategists should resist the temptation to engage in easy but fallacious generalizations about the equivalence of maritime trade and commercial space operations, or the need to escort commercial satellites as if they were merchant ships at sea.³⁷ In fact, greater attention to the air-space analogy might be helpful in this area, for the Air Force does not routinely make a practice of escorting US commercial airliners, even though they are economically important and entirely vulnerable to attack. It is already clear that better mechanisms for space surveillance, space traffic control, and attack characterization are needed. Beyond this, serious consideration of the sorts of threats that space systems may face, and under what circumstances, is required, followed by an assessment of how best to provide security against these threats—perhaps but not necessarily including defense—for space is different. This assessment in turn will furnish considerable guidance in designing or tasking appropriate organizations to accomplish this.

However, even this discussion only just begins to reflect how significant the commercial space revolution—and the information revolution of which it is a part—will be to global politics and military strategy in the future. These developments also seriously undermine the strategic tenets of Eisenhower's vision of space for peaceful purposes that led to the creation of the NRO. Under the Land Remote Sensing Policy Act of 1992 and Presidential Decision Directive 23 of March 1994, it is now the policy of the United States to create incentives to develop a high-resolution *commercial* remote-sensing industry. At a minimum, readers should consider how stability considerations and military operations will need to change under the conditions of global transparency these new systems will create.³⁸

Space and Information

In order to decide how best to organize US military space operations, it will also be necessary to resolve the question of the relationship between space and information power. Because space operations are principally directed toward information collection and transmission—and this will probably remain true even if space is weaponized—it is reasonable to think that the same organizations that operate space-based reconnaissance and communications systems ought to be responsible for other types of platforms that perform the same missions. Indeed, there has already been some movement toward transforming USSPACECOM into a Space and Information Command by giving it DOD's computer network attack (CNA) and computer network defense (CND) missions.³⁹

Whether or not such a course is to be followed to its logical conclusions will obviously have enormous implications for making choices about military space organization. If the same entity is responsible for manned aircraft, unmanned aerial vehicles, and satellites that conduct reconnaissance, as well as for both space communications and CNA and CND, its structure and culture will be very different from those of an organization exclusively devoted to space operations. Addressing this issue will be complicated by the fact that it must involve not only space functions performed today by the armed services, but also the functions of the NRO and other organizations. Realigning the relationship between the military and nonmilitary components of the larger national security space arena would be a major undertaking. However, it is difficult to see how one can make any serious case for the need to consolidate military space operations either as or within a single service without engaging this question.

Aerospace Integration: An Unsatisfying Vision

Even if there were consensus on the critical strategic issues that must underpin a

sound strategy for US space power, AI in its current form falls far short of offering the sort of organizational vision likely to have impressed either the Space Commission or the American public. This is clearly illustrated by a number of recent arguments in the pages of this journal.

Before examining some of the shortcomings of AI as an organizational prescription, however, it is important to note that the *philosophy* of AI is genuinely compelling. As the military importance of space has grown in both potential and reality, the close integration of air and space power in theory, doctrine, and operations becomes ever more important.⁴⁰ The same is true of integrating land and sea with space power, of course; moreover, integrating air, land, and sea power is also more important than ever, as the speed, range, and complexity of military operations in each of these environments increase. The relationship between air and space may be unique among these—indeed, we strongly believe that it is—but if few skeptics are persuaded of this by the Air Force's current approach to AI, it should come as no surprise.

Cloudy Vision

Perhaps the most obvious, if not the most serious, shortcoming of the AI organizational vision is that it has so little theoretical content. Why the Air Force believes that US military space capabilities should be concentrated in its hands remains surprisingly unclear, considering that this is the principal theme of AI advocacy. Since integration with space is essential for all the armed services, AI proponents must make a strong case both that integration works best within a single service and that the Air Force's need to be close to its space assets is greater than that of the Army or Navy. But if interservice boundaries really are such a serious obstacle to functional integration, AI cannot possibly look attractive to the other armed services, for space support from the Air Force would probably be even less responsive than support from an independent organization for which space

support to others would be most of its *raison d'être*.

Moreover, some of the prominent arguments that the Air Force's space interests are inherently greater than those of others are distinctly unimpressive.⁴¹ One of the most glaring illustrations of the latter problem appears in two articles advocating AI that recently appeared side by side in *Aerospace Power Journal*, both with authors who played leading roles in the Air Force's Aerospace Integration Task Force. Maj Gen John Barry and Col Darrell Herriges argue for centralizing US space assets in the hands of the Air Force because of the likelihood of space weaponization, while allowing that proposals to create a separate Space Force might be valid if military space operations were limited to supporting other military operations.⁴² Ralph Millsap and Dr. D. B. Posey make the opposite case for the same policy, however, arguing that it is the Air Force that can most efficiently provide space support for terrestrial operations but stating that "when military operations become concerned with effects in space, then they may warrant the establishment of a Space Force."⁴³ If AI advocacy is based on such divergent premises, it seems likely that many critics will perceive it as little more than a stratagem to preserve the Air Force's organizational turf.

Been There, Done That

More disturbing than the internal inconsistencies in the AI vision are the overt and subtle ways in which it may promote strategic conservatism in thinking about space power. Not surprisingly, Senator Smith has taken the lead in openly critiquing the Air Force's vision for space and the conservative, air-centric thinking he believes it produces:

Even the Air Force's Space Warfare Center and Space Battelab are focused primarily on figuring out how to use space systems to put information into the cockpit in order to drop *bombs* from *aircraft* more accurately.

This is not space warfare. It is using space to support air warfare. . . .

. . . if this is all there is to aerospace, then it is a woefully deficient concept. It is not space power. (Emphasis in original)⁴⁴

Although there is a kernel of truth in Senator Smith's arguments, we believe his case is overstated, given today's political, fiscal, and technical realities. Even more telling is the fact that few, if any, uniformed officers are willing to make this case so strongly in public. In fact, perhaps as the result of Smith's assertions, the Air Force now seems quite concerned about the breadth of its vision for space. According to Gen Ralph E. Eberhart, the current CINCSPACE, "I don't think we would be good stewards of space capabilities if we only thought about 'integration.' We also need to be spending resources and intellectual capital on space control and space superiority."⁴⁵

The AI vision does allow for the possibility that space will become more than a supporting arm, with some airpower missions migrating primarily—or even completely—to space systems. However, the missions and functions that it considers are essentially limited to those that the Air Force performs today. Whether airpower or space power takes the lead, what is being done is something that airpower used to do alone or—as in the case of space superiority—is a familiar airpower mission simply projected onto the darker canvas of space. More importantly, however, all of this discussion necessarily refocuses our attention on the Air Force's plan for how we get from here to there—the primary purpose of a vision statement—and highlights the weaknesses of AI in this regard.

To a considerable extent, of course, any argument that claims through false analogies that the military use of space will inevitably recapitulate earlier experiences with the sea or the air encourages conservative strategic thinking. Rarely if ever does one find AI advocates acknowledging the possibility that space power may involve wholly new missions or that it may call for a fundamentally different set of strategic categories. However, this reluctance to consider that space activity might evolve in unprecedented ways is at least

as common among air and space separatists as it is in the arguments of aerospace integrationists. This does not mean that AI will strangle innovation in Air Force thinking about space power, but if real innovation does occur, it is more likely to come in spite of the AI movement than because of it.

Space Isn't Just Black and White

One of the most surprising aspects of the AI debate is that both its proponents and the advocates of a separate space force or corps are so quick to assume that military space assets ought to be centralized in a single organization. After all, US national security space assets are currently divided between the Air Force and the NRO, and whether or not this arrangement is ideal, it is certainly one that both parties have accepted with little public complaint for many years.

This tendency is particularly visible in the debate surrounding the most innovative concept for future US space organization to appear in some years—Lt Col Cynthia McKinley's recent *Aerospace Power Journal* article titled "The Guardians of Space."⁴⁶ In a strikingly original proposal, McKinley advocates using economic criteria to separate the direct war-fighting and support functions currently performed by US military space assets, retaining the former in the Air Force while making the latter into a United States Space Guard closely based on the organizational model of the US Coast Guard.⁴⁷ This new organization would fall under the management of the Department of Transportation in peacetime and revert to Air Force control during war or national emergency. McKinley's suggestion in many ways is crafted to promote AI and would remove from the Air Force a number of current functions (such as operating the GPS satellite constellation) for which the service seems to have only limited enthusiasm.

Whether or not McKinley's specific proposal is a good idea—and it does have at least as much to recommend it as do the organizational options that the Space Commission's charter called for it to consider—it reminds us how important the development of the

commercial aviation sector was to early airpower theorists such as Billy Mitchell. It also points out that those who simply assume that military space assets must be combined in a single service or organized in ways similar to existing military structures are not looking beyond a very narrow spectrum of choice. It is possible that centralization of military space will promote the most rapid innovation and development of US space power (whatever that turns out to look like), but it is at least equally plausible to suggest that healthy competition among rival organizations will be far more effective at achieving this goal.⁴⁸ It is worth noting that AI advocates do not typically argue that the division of US military aviation among multiple services has retarded the development of American *airpower* thought and employment.

Conclusions and Recommendations

Our first recommendation is for the Air Force to acknowledge the considerable limitations of the aerospace concept and AI. As discussed above, despite many years of effort, these concepts simply are not theoretically rigorous enough to bear much weight. They are clearly far more attractive within the Air Force than outside it, and they don't necessarily do very much to advance space's contributions to national security. Simply put, they are not visionary. The idea of aerospace may have been forward looking when it was advanced in 1958, but the Air Force has developed few actual capabilities along the lines originally envisioned, and it is difficult to see many areas where the concept subsequently had much influence. Likewise, in its present form, AI seems to place much more emphasis on how space can contribute to today's war-fighting capabilities than on how space can enhance future national security.

Contrasting Billy Mitchell's comprehensive vision of the United States as an airpower nation in *Winged Defense* or the Air Corps Tactical School's (ACTS) vision for strategic bombing in the 1930s with whatever guidance

AI provides concerning space and future national security emphasizes just how little vision is contained in AI.⁴⁹ To be sure, Mitchell and the ACTS did not always get things right, which only reinforces how important it now is to foster open and rigorous debate concerning space's role in the future of the Air Force and the nation. Current policy restrictions and a lack of civilian guidance should not be allowed to stifle innovative thinking about the nature, possibilities, and limitations of space power. Amidst the changing international environment, the increasing military utility of space, and the emerging importance of information operations, these are debates concerning the very soul of the Air Force—they are inevitable and overdue.

Second, revisiting the background of this issue convinces us of the need for greater rigor and consistency in the development of Air Force vision statements. Vision statements should illuminate a path to a desired future state by providing general, long-term guidance. They can do this only if they are clear and consistent. Rigor in developing vision statements helps to ensure that they are comprehensive, supportable, and do not need to be changed very often. The two most recent Air Force vision statements clearly fail these basic tests: only about three-and-a-half years elapsed between the releases of *Global Engagement* and *Global Vigilance, Reach & Power*, yet these consecutive statements represent starkly different visions of space versus aerospace and disagree about the importance of space in the Air Force's future. Imperfect but durable vision statements that merely get it less wrong than our potential adversaries (to use Michael Howard's phrase) are preferable to churning out new vision statements with every change in senior leadership.

Third, if the Air Force is serious about fostering innovative approaches to national security space issues, it must carefully address the human dimension of this problem. People provide the leadership required to develop and implement vision. In *Winning the Next War*, Stephen Rosen explains that peacetime military innovation is most likely when senior

military leaders develop a new theory of victory and then create "a new promotion pathway to the senior ranks, so that young officers learning and practicing the new way of war can rise to the top, as part of a generational change."⁵⁰ There is much the Air Force can do on the space front at both the junior and senior levels to help encourage the type of long-term innovation Rosen discusses.⁵¹ The Air Force should develop promotion pathways so that junior space officers can rise to senior levels of command, not only within the space community but also—and this will be one of the best tests of whether AI is rhetoric or reality—within the air community as well. The Air Force's ongoing Developing Aerospace Leaders Program is exploring ways to create these types of promotion pathways.

At the senior levels, the Air Force's greatest need is for more stability and longer tenures. By design, a great deal of turnover normally occurs in senior military positions, but certain key positions such as CINCSPACE need to be broken out of this pattern in order to create more stability and long-term vision in an area in which these are so sorely lacking. There have already been eight CINCSPACEs in the 15 years of USSPACECOM's existence, and this type of rotating door at the top makes it virtually impossible for anyone to provide long-term leadership and stable vision for the future.⁵² Of the eight, only two (Gen Robert T. Herres and Gen Donald J. Kutyna) had any significant space background prior to becoming CINCSPACE, further aggravating the effects of rapid succession in command. It is particularly telling to contrast the plight of each CINCSPACE to date with the long-term tenure enjoyed by Adm William Moffett and Adm Hyman Rickover as they nurtured naval aviation and nuclear propulsion—the United States Navy's most important innovations during the twentieth century.

Finally, and perhaps most importantly, we reiterate the importance of focusing on the first-order issue of developing a robust and comprehensive vision for United States space power rather than becoming mired in premature debates over the second-order issue

of how to organize the management of national security space. As we have argued throughout this article, any road will get you there when you don't know where you're going; a more effective and better funded organization will only get you lost faster in these situations. Limited resources are always a problem, and although there is a clear need for much greater investment in some areas such as launch and space surveillance, simply throwing more money at the Air Force (or a new space service, for that matter) will not resolve America's unclear vision for its national security space program.⁵³

Ultimately, the problem facing the Air Force comes down in large part to issues of perception and trust. Creating commissions and mandating organizational changes in order to address underlying issues are what politicians in pluralist democracies do when they do not trust bureaucracies to promote and implement change on their own. In

order to retain its responsibilities in space, the Air Force must not only *be* a good steward of space but must be *seen* to be a good steward. All the recommendations presented here address this challenge. Greater intellectual honesty and openness in discussions of strategy, greater coherence and rigor in the resulting vision statements and other public rhetoric, and greater efforts to develop knowledgeable and enduring military space leadership at all levels could do much to build faith in the Air Force's management of space. Without improvement in these areas, progress in space-power thought, the organizational health of the Air Force, and US national security will all suffer. But with such changes, the Air Force could establish itself as the champion of space-power transformation and in the process, avert future crises of congressional and the public's lack of confidence in its stewardship of space. □

Notes

1. Michael J. Neufeld, *The Rocket and the Reich: Peenemünde and the Coming of the Ballistic Missile Era* (New York: Free Press, 1995). Nazi Germany's rocket program and the Anglo-American Manhattan Project were both, in part, driven by reciprocal fears that the other side would gain a decisive military advantage by developing these technologies, and each program imposed a roughly equivalent burden on the economies of the Third Reich and the United States. This raises what Neufeld terms the "central paradox of Peenemünde"—the question of why their rocket program was such an unproductive military investment for the Nazis but so valuable to everyone else after the war.

2. Walter A. McDougall's Pulitzer prize-winning . . . *the Heavens and the Earth: A Political History of the Space Age* (New York: Basic Books, 1985) is the best comprehensive history of the complex political maneuvering by the superpowers at the opening of the space age. The best analysis of why President Kennedy chose to challenge the Soviets to a Moon race in 1961 remains John M. Logsdon's *The Decision to Go to the Moon: Project Apollo and the National Interest* (Cambridge, Mass.: MIT Press, 1970).

3. The most important previous committees and their key space-policy recommendations include the following: the 1954–55 Technological Capabilities Panel (TCP) (establish the legality of overflight and develop spy satellites); the President's Science Advisory Committee (PSAC), led by Science Advisor James Killian in 1958 (create NASA); the group led by Science Advisor George Kistiakowsky in 1960 (create the NRO); the review led by Vice President Lyndon Johnson in April 1961 (race the Soviets to the Moon for prestige); Vice President Spiro Agnew's 1969 Space Task Group (establish NASA's post-Apollo

goals); the Air Force's 1988 Blue Ribbon Panel led by Maj Gen Robert Todd (integrate space power into combat operations); NASA's 1991 Augustine Commission (emphasize scientific exploration over shuttle operations); and the Air Force's 1992 Blue Ribbon Panel, led by Lt Gen Thomas Moorman (emphasize space support to the war fighter and establish the Space Warfare Center).

The Space Commission was chaired by Secretary of Defense Donald Rumsfeld and included 12 other members with a broad range of very high-level military space expertise (listed with the top "space" job formerly held): Duane Andrews (deputy undersecretary of defense for command, control, communications, and intelligence); Robert Davis (undersecretary of defense for space); Howell Estes (commander, US Space Command); Ronald Fogleman (Air Force chief of staff); Jay Garner (commander, Army Space and Strategic Defense Command); William Graham (president's science advisor); Charles Horner (commander, US Space Command); David Jeremiah (vice chairman of the Joint Chiefs of Staff); Thomas Moorman (Air Force vice chief of staff); Douglass Necessary (House Armed Services Committee staff); Glenn Otis (commander, Army Training and Doctrine Command); and Malcolm Wallop (senator). See John A. Tirpak, "The Fight for Space," *Air Force Magazine* 83 (August 2000): 61.

The legislation authorizing the commission was clearly action-oriented and spelled out its duties as follows:

The Commission shall, concerning changes to be implemented over the near-term, medium-term, and long-term that would strengthen United States national security, as-

sess the following: (1) the manner in which military space assets may be exploited to provide support for United States military operations. (2) The current interagency coordination process regarding the operation of national security space assets, including identification of interoperability and communications issues. (3) The relationship between the intelligence and nonintelligence aspects of national security space (so-called "white space" and "black space"), and the potential costs and benefits of a partial or complete merger of the programs, projects, or activities that are differentiated by those two aspects. (4) The manner in which military space issues are addressed by professional military education institutions. (5) The potential costs and benefits of establishing any of the following: (A) An independent military department and service dedicated to the national security space mission. (B) A corps within the Air Force dedicated to the national security space mission. (C) A position of Assistant Secretary of Defense for Space within the Office of the Secretary of Defense. (D) A new major force program, or other budget mechanism, for managing national security space funding within the Department of Defense. (E) Any other change to the existing organizational structure of the Department of Defense for national security space management and organization.

See sec. 1622 of *National Defense Authorization Act for Fiscal Year 2000* (Public Law 106-65; 113 Statute 814; 10 U.S. Code 111 note).

In October 2000, Congress added an amendment directing the commission to study

(6) the advisability of—

- (A) various actions to eliminate the de facto requirement that specified officers in the United States Space Command be flight rated that results from the dual assignment of officers to that command and to one or more other commands in positions in which officers are expressly required to be flight rated;
- (B) the establishment of a requirement that, as a condition of the assignment of a general or flag officer to the United States Space Command, the officer have experience in space, missile, or information operations that was gained through either acquisition or operational experience; and
- (C) rotating the command of the United States Space Command among the Armed Forces.

See sec. 1091, Additional Duties for Commission to Assess United States National Security Space Management and Organization; sec. 1622(a) of the *National Defense Authorization Act for Fiscal Year 2000* (Public Law 106-65; 113 Statute 814; 10 U.S. Code 111 note).

There were two other major congressionally mandated space studies during 2000: A review of the National Imagery and Mapping Agency (NIMA), *The Information Edge: Imagery Intelligence and Geospatial Information in an Evolving National Security Environment* (Washington, D.C.: n.p., December 2000); and a review of the NRO, *The NRO at the Crossroads* (Washington, D.C.: National Commission for the review of the National Reconnaissance Office, 1 November 2000). All three reports are available on-line at <http://www.space.gov>.

4. The Air Force and the NRO are, by far, the largest national security space organizations. By contributing 90 percent of space personnel, 85 percent of the space budget, 86 percent of space assets, and 90 percent of space infrastructure, the Air Force clearly "fields the majority of . . . space capabilities within the Department of Defense." See Gen Michael E. Ryan and the Honorable F. Whitten Peters, *The Aerospace Force: Defending America in the 21st*

Century: A White Paper on Aerospace Integration (Washington, D.C.: Department of the Air Force, May 2000), 5.

5. Gen Michael E. Ryan and the Honorable F. Whitten Peters, *Global Vigilance, Reach & Power: America's Air Force Vision 2020* (Washington, D.C.: Department of the Air Force, June 2000).

6. Many have asked, "Where are the Alfred Mahans or Billy Mitchells for space?" because analysts and military space leaders have yet to develop a comprehensive space-power vision or theory as compelling as President Eisenhower's. In 1997, then-CINCPAC/SPACE Howell M. Estes III attempted to tackle this problem by commissioning Dr. Brian R. Sullivan to write a book on space-power theory. This project was taken over by James Oberg and published as *Space Power Theory* (Washington, D.C.: Government Printing Office, 1999). On the enduring nature of strategy and problems with developing space-power theory, see also Colin S. Gray and John B. Shelton, "Spacepower and the Revolution in Military Affairs: A Glass Half-Full," in *Spacepower for a New Millennium: Space and U.S. National Security*, ed. Peter L. Hays et al. (New York: McGraw-Hill, 2000), 239-58; and Colin S. Gray, *Modern Strategy* (Oxford: Oxford University Press, 1999), 243-67.

7. Gen Henry H. Arnold, "Air Power and the Future: Third Report to the Secretary of War by the Commanding General of the Army Air Forces," 12 November 1945, in *The Impact of Air Power: National Security and World Politics* by Eugene M. Emme (Princeton, N.J.: D. Van Nostrand, 1959), 306-10; and Theodore von Kármán, *Toward New Horizons: A Report to General of the Army H. H. Arnold, Submitted on Behalf of the A.A.A. Scientific Advisory Group* (Wright Field, Dayton, Ohio: Air Materiel Command Publications Branch, Intelligence, T-2, 15 December 1945). For an outstanding, highly detailed analysis of the roots of the aerospace concept, see Maj Stephen M. Rothstein, "Dead on Arrival? The Development of the Aerospace Concept, 1944-1958" (master's thesis, School of Advanced Airpower Studies, Maxwell AFB, Ala., June 1999).

8. *Preliminary Design of an Experimental World-Circling Spaceship*, Report no. SM-11827 (2 May 1946; reprint, Santa Monica, Calif.: RAND, 1998).

9. Lt Col Frank W. Jennings, "Doctrinal Conflict over the Word *Aerospace*," *Airpower Journal* 4, no. 3 (Fall 1990): 46-58.

10. Lt Col Paul L. Bailey, "Space as an Area of Responsibility," *Air Chronicles*, Winter 1998, on-line, Internet 13 December 2000, available from <http://www.airpower.maxwell.af.mil/airchronicles/apj/apj98/win98/waywin98.html>.

11. Department of Defense Directive 3100.10, *Space Policy*, 9 July 1999.

12. McDougall was the first to break through the veil of secrecy surrounding America's early space policy. The term *stalking horse* is taken from R. Cargill Hall's "Origins of U.S. Space Policy: Eisenhower, Open Skies, and Freedom of Space," in *Exploring the Unknown: Selected Documents in the History of the U.S. Civil Space Program*, ed. John M. Logsdon, vol. 1, *Organizing for Exploration* (Washington, D.C.: NASA History Office, 1995), 213-29.

13. For more detail on the disconnects between what the Air Force wanted to do in space and what it was allowed to do during this period, see Peter L. Hays, "Struggling towards Space Doctrine: U.S. Military Plans, Programs, and Perspectives during the Cold War" (PhD diss., Fletcher School of Law and Diplomacy, Tufts University, May 1994), 96-302; and David N. Spires, *Beyond Horizons: A Half Century of Air Force Space Leadership* (Peterson AFB, Colo.: Air Force Space Command, 1997), 50-173. The most comprehensive analysis of the Dyna-Soar Program is Roy Franklin Houchin II's "The Rise and Fall of Dyna-Soar: A History of Air Force Hypersonic Research and Development, 1944-1963" (PhD diss., Auburn University, May 1995).

14. The Air Force's latest space doctrine describes the attributes of space power as global coverage, flexibility, economy, effectiveness, and robustness. See Air Force Doctrine Document 2-2, *Space Operations*, 23 August 1998, 15-18. Keith Hall, assistant

secretary of the Air Force for space and director of the NRO, recently explained the main attributes of space forces as perspective, persistence, penetration, precision, reliability, and speed. Presentation to the "Space 2000" Conference, American Institute of Aeronautics and Astronautics, Long Beach, Calif., 19 September 2000.

15. Lt Col Dennis M. Drew, "Of Leaves and Trees: A New View of Doctrine," *Air University Review* 33, no. 2 (January-February 1982): 40-48; Lt Col Charles D. Friedenstein, "The Uniqueness of Space Doctrine," *Air University Review* 37, no. 1 (November-December 1985): 13-23; and Col Kenneth A. Myers and Lt Col John G. Tockston, "Real Tenets of Military Space Doctrine," *Airpower Journal* 2, no. 4 (Winter 1988): 54-68.

16. The Air Force published AFM 1-6 on 15 October 1982, and its release was designed to coincide closely with the stand-up of Air Force Space Command on 1 September 1982. For a detailed critique of AFM 1-6, see Hays, "Struggling towards Space Doctrine," 400-422.

17. Friedenstein, 21, 22.

18. Myers and Tockston, 59. A more up-to-date and outstanding blueprint for developing space doctrine is provided by Maj Robert D. Newberry, *Space Doctrine for the Twenty-First Century* (Maxwell AFB, Ala.: Air University Press, October 1998).

19. Gen Thomas S. Moorman Jr., "The Air Force in Space, Its Past and Future," in *The U.S. Air Force in Space: 1945 to the Twenty-First Century*, ed. R. Cargill Hall and Jacob Neufeld (Washington, D.C.: USAF History and Museums Program, 1998), 174.

20. *Ibid.*

21. Gen Ronald R. Fogleman and the Honorable Sheila E. Widnall, *Global Engagement: A Vision for the 21st Century Air Force* (Washington, D.C.: Department of the Air Force, November 1996), 8. Another candidate as the Air Force's most strident statement regarding space used to adorn the wall in the entryway of Headquarters Air Force Space Command (before the building was dedicated to the late Gen James V. Hartinger): "Spacepower will be as decisive in future combat as airpower is today." Gen Larry D. Walsh and Secretary E. C. Aldridge Jr., *Air Force Space Policy* (Washington, D.C.: Department of the Air Force, 2 December 1988).

22. See, for example, Sen. Bob Smith, "The Challenge of Space Power," *Airpower Journal* 13, no. 1 (Spring 1999): 34-35.

23. Maj Gen John L. Barry and Col Darrell L. Herriges, "Aerospace Integration, Not Separation," *Aerospace Power Journal* 14, no. 2 (Summer 2000): 44. Aerospace enthusiasts often fail as well to acknowledge that military operations in the suborbital aerospace region are unlikely to be more than a useful but relatively minor adjunct to air and space operations due to the unfavorable physical characteristics of the realm.

24. However, Maj Bruce M. DeBlois, "Ascendant Realms: Characteristics of Airpower and Space Power," in *The Paths of Heaven: The Evolution of Airpower Theory*, ed. Col Phillip S. Meilinger (Maxwell AFB, Ala.: Air University Press, 1997), 529-78, does so without neglecting strategic variables.

25. For a more detailed discussion, see Karl Mueller, "The Phantom Menace: Assessing Threats to American Interests in Space" (paper presented at the American Political Science Association Annual Meeting, Atlanta, Ga., 4 September 1999). For an outstanding analysis of trigger events that might lead to weaponization of space and a very interesting analogy between space and railroads, see Barry D. Watts, *The Military Uses of Space: A Diagnostic Assessment* (Washington, D.C.: Center for Strategic and Budgetary Assessments, forthcoming).

26. Smith, 33.

27. Prominent examples include the USAF Scientific Advisory Board's *New World Vistas: Air and Space Power for the 21st Century: Space Applications Volume* (Washington, D.C.: USAF Scientific Advisory Board, 1995), 164. See also the summary of the study in

Peter Grier, "The Arena of Space," *Air Force Magazine*, September 1996, 44-46.

28. Ashton Carter discusses this as "the paradox of ASAT arms control." See "Satellites and Anti-Satellites: The Limits of the Possible," *International Security* 10 (Spring 1986): 46-98.

29. Joseph S. Nye Jr. and James A. Schear, eds., *Seeking Stability in Space: Anti-Satellite Weapons and the Evolving Space Regime* (Lanham, Md.: University Press of America and Aspen Strategy Group, 1987); David W. Ziegler, *Safe Heavens: Military Strategy and Space Sanctuary Thought* (Maxwell AFB, Ala.: Air University Press, 1998), reprinted in *Beyond the Paths of Heaven: The Emergence of Space Power Thought: A Comprehensive Anthology of Space-Related Master's Research*, ed. Col Bruce M. DeBlois (Maxwell AFB, Ala.: Air University Press, 1999); Karl Mueller, "Space Weapons and U.S. Security," *Security Studies* (forthcoming); and Charles S. Robb, "Star Wars II," *The Washington Quarterly* 221 (Winter 1999): 81-86.

30. See especially William L. Spacy II, *Does the United States Need Space-Based Weapons?* (Maxwell AFB, Ala.: Air University Press, 1999).

31. William B. Scott, "USSC Prepares for Future Combat Missions in Space," *Aviation Week & Space Technology*, 5 August 1996, 51; and Gen Howell M. Estes III, speech to the Air Force Association Annual Symposium, Los Angeles, Calif., 18 October 1996. See also Thomas D. Bell, *Weaponization of Space: Understanding Strategic and Technological Inevitabilities* (Maxwell AFB, Ala.: Center for Strategy and Technology, Air War College, January 1999).

32. The inappropriateness of using the airpower-development analogy to analyze the development of space power is a primary finding of Hays, "Struggling towards Space Doctrine."

33. There is no consensus on what constitutes a "space weapon." For example, the Air Force insisted for many years that ICBMs were not space weapons even though they travel through space en route to their targets—and then implicitly reversed that position after transferring its missile forces from Strategic Air Command to Air Force Space Command in 1993. Modern space systems that provide real-time information directly to war fighters or dynamically retarget GPS-enabled munitions are further eroding any clear lines for defining space weapons. The most comprehensive history of ASATs is Paul B. Stares's *The Militarization of Space: U.S. Policy, 1945-84* (Ithaca, N.Y.: Cornell University Press, 1985). On the ultimately unsuccessful arms-control efforts to roll back the weaponization of the air during the interwar period, see Phillip S. Meilinger, "Clipping the Bomber's Wings: The Geneva Disarmament Conference and the Royal Air Force, 1932-1934," *War in History* 6 (July 1999): 306-30.

34. On the importance of the sea change caused by the burgeoning commercial space sector, see Frank G. Klotz, *Space, Commerce, and National Security* (New York: Council on Foreign Relations Press, 1998); Gen Thomas S. Moorman Jr., "The Explosion of Commercial Space and the Implications for National Security," *Airpower Journal* 13, no. 1 (Spring 1999): 6-20; and John M. Logsdon and Russell J. Acker, eds., *Merchants and Guardians: Balancing U.S. Interests in Global Space Commerce* (Washington, D.C.: Space Policy Institute, George Washington University, May 1999). The development of truly inexpensive access to space would create incentives for new types of commercial space activity such as space tourism.

35. Of course, it is always worth recalling that terrorism by or against states is very uncommon and that countless potential targets that are economically valuable and even more vulnerable are never attacked, making it a bit unclear why enemies would choose to attack space systems in particular.

36. See Robert B. Giffen, *U.S. Space System Survivability: Strategic Alternatives for the 1990s* (Washington, D.C.: National Defense University Press, 1982); Ziegler, *Safe Heavens*; and Matt Bille, Robyn Kane, and Maj Mel Nowland, "Military Microsatellites: Matching Requirements and Technology" (paper presented at the Space 2000 Conference and Exposition, American Institute

of Aeronautics and Astronautics, Long Beach, Calif., 19–21 September 2000).

37. See, for example, Lt Gen Bruce Carlson, "Protecting Global Utilities," *Aerospace Power Journal* 14, no. 2 (Summer 2000): 37–41. For a more detailed development of this argument with a focus on distinctions between the role of armies and navies, see Brig Gen Simon P. Worden, "Space Control for the 21st Century: A Space 'Navy' Protecting the Basis of America's Wealth," in Hays et al., *Spacepower for a New Millennium*, 225–38.

38. See, for example, Yahya A. Dehqanzada and Ann M. Florini, *Secrets for Sale: How Commercial Satellite Imagery Will Change the World* (Washington, D.C.: Carnegie Endowment for International Peace, 2000); and Lt Col Larry K. Grundhauser, "Sentinels Rising: Commercial High-Resolution Satellite Imagery and Its Implications for US National Security," *Airpower Journal* 12, no. 4 (Winter 1998): 61–80.

39. USSPACECOM became responsible for CND in 1999 and picked up the CNA mission on 1 October 2000. It is currently quite unclear, however, how the command will organize to perform these new missions. Apparently, one of the leading contenders is a unified subcommand for both CND and CNA, but this option, along with several others, is the subject of a comprehensive study set for completion by 1 October 2001. See George I. Seffers, "Cyberwar Ops May Unify," *Federal Computer Week*, 30 October 2000, 12.

40. Barry and Herriges, 42–43.

41. Barry and Herriges, for example, assert that space belongs in the Air Force because although all the services depend heavily on space support, only the Air Force plans to migrate some of its key functions there. *Ibid.*, 46. They do not address the resulting implication that if the Army or Navy rewrote its vision statements to place greater emphasis on space and committed itself to shifting key functions such as fire support or sea control to space platforms, the Air Force would lose its claim to being the natural home of military space operations.

42. *Ibid.*, 45.

43. Ralph Millsap and Dr. D. B. Posey, "Organizational Options for the Future Aerospace Force," *Aerospace Power Journal* 14, no. 2 (Summer 2000): 48.

44. Smith, 33–35.

45. Quoted in William B. Scott, "CinSPACE: Focus More on Space Control," *Aviation Week & Space Technology*, 13 November 2000, 80.

46. Lt Col Cynthia A. S. McKinley, "The Guardians of Space: Organizing America's Space Assets for the Twenty-First Century," *Aerospace Power Journal* 14, no. 1 (Spring 2000): 37–45.

47. Although some critics (e.g., Col Darrell L. Herriges, "US Space Guard? No Thank You!" *Aerospace Power Journal* 14, no. 2 [Summer 2000]: 53) have misunderstood McKinley's somewhat ambiguous discussion of space control to imply shifting this mission entirely to the quasi-military Space Guard, she clearly advocates retaining ASAT capabilities such as the Space Operations Vehicle in the hands of the Air Force. See McKinley, 39, 44.

48. See Robert L. Butterworth, "The Case against Centralizing Military Space," *Strategic Review* 24 (Summer 1996): 41–49.

49. William Mitchell, *Winged Defense* (New York: G. P. Putnam's Sons, 1925); and Robert T. Finney, *History of the Air Corps Tactical School, 1920–1940* (1992; reprint, Washington, D.C.: Center for Air Force History, 1955). See also the essays by Lt Col Mark A. Clodfelter, "Molding Airpower Convictions: Development and Legacy of William Mitchell's Strategic Thought," and Lt Col Peter R. Faber, "Interwar US Army Aviation and the Air Corps Tactical School: Incubators of American Airpower," in Meilinger, *Paths of Heaven*, 79–114 and 183–238, respectively.

50. Stephen Peter Rosen, *Winning the Next War: Innovation and the Modern Military* (Ithaca, N.Y.: Cornell University Press, 1991), 20. For a very interesting and more comprehensive model for military innovation, see Maj Bruce McClintock, "The Transformation Trinity: The Role of Vision, Culture, and Assessment in Strategic Innovation" (master's thesis, School of Advanced Airpower Studies, Maxwell AFB, Ala., June 2000).

51. It is currently impossible to assess how much needs to be done in this area, however, as the Air Force categorically refuses to release information about promotion rates for officers in the space career field, even to researchers within the service. See McClintock, 56–57. This policy raises the question of what's being hidden and casts serious doubt upon the Air Force's current commitment to make such changes. Another personnel policy, the recent change to fill the position of CINCSpace with officers eligible to compete for further assignments rather than being on their terminal assignment, seems likely to further restrict the leadership autonomy of those who wear the three hats in Colorado Springs.

52. The top recommendation of Adm Hal Gehman, the recently retired CINC of Joint Forces Command (JFC), was for future JFC CINCs to serve longer terms in order to create a corps of dedicated experimental forces and implement transformation. Robert Holzer, "Stability at Top Is Critical to JFC's Pentagon Clout," *Defense News*, 4 September 2000, 1.

53. See E. C. "Pete" Aldridge, "Vision for Military Space: Roadmap Proposes Foundation for Space Defense," *Defense News*, 20 November 2000, 30.

Maneuvers are threats; he who appears most threatening wins.

—Ardant du Picq, 1821–70



THE MOUNTING DIALOGUE over the future space role of the Air Force is very interesting and important. The article by Lt Col Peter Hays and Dr. Karl Mueller (“Going Boldly—Where? Aerospace Integration, the Space Commission, and the Air Force’s Vision for Space”) in this issue certainly contributes to the aerospace conversation, but it also needs further comment. Their article discusses, and in some cases criticizes, some of the space approaches outlined in previous issues of this journal: Lt Col Cynthia McKinley’s proposal for a space “Coast Guard” (“The Guardians of Space: Organizing America’s Space Assets for the Twenty-First Century,” Spring 2000); Maj Gen John Barry and Col Darrell Herriges’s treatise on today’s aerospace integration (AI) approach (“Aerospace Integration, Not Separation,” Summer

The Air Force and Future Space Directions

Are We Good Stewards?

BRIG GEN SIMON PETER WORDEN, USAF

Editorial Abstract: The space-power debate continues. In this response, General Worden argues that the aerospace integration approach to space power is not only consistent with time-tested Air Force doctrine, NCA priorities, and commercial realities, but it also makes the most sense, given that the Air Force has not been given the “space stewardship” mission. In General Worden’s view, if the Air Force deserves criticism in its approach to space, it is for its slowness to demonstrate and test sortie-type systems for space access and space control.

2000); and Lt Gen Bruce Carlson’s discussion of future options for space control to protect commercial activities in space (“Protecting Global Utilities: Safeguarding the Next Millennium’s Space-Based Public Services,” Summer 2000). In particular, they suggest that the AI approach is not persuasive and should not represent the Air Force approach toward space in the years ahead. While many of Hays’s and Mueller’s points are valid, their criticisms are mostly “straw men” set up and knocked down.

Much of the problem is a failure to separate strategy and mission from basic doctrine, operational doctrine, and tactical doctrine. Strategy and mission are not fundamentally Air Force corporate concerns. These are set by the National Command Authorities (NCA) and by the Joint Chiefs of Staff.¹ Conversely, basic aerospace doctrine is concerned with

how we organize for and use the aerospace environment. Operational doctrine guides the proper employment of aerospace forces to achieve objectives. Tactical doctrine details specifics of using individual aerospace systems.² The various articles cited above involve different aspects of the doctrinal confusion about air and space. This response to them argues the following points: (1) we currently have a basic aerospace strategy and mission—to rapidly deter or defeat two nearly simultaneous, large-scale acts of aggression in different theaters (the “two major theater war” [or 2MTW] strategy that has been issued to us by the NCA and joint community); (2) current aerospace basic doctrine, which stresses centralized control and decentralized execution, is as sound for space and information capabilities as it is for traditional air capabilities; (3) operational doctrine for space and information systems needs to be developed as these capabilities are integrated into our forces (the premise of the Barry-Herriges AI article); and (4) we must develop new aerospace capabilities to do “space sorties” before we can truly take proper advantage of space.

Any discussion of the Air Force’s approach to developing and using space capabilities must begin with the admonition that the Air Force doesn’t operate in a vacuum (space excepted). Yet, there seems to be an attitude afoot that the current national security space debate is largely internal to the Air Force. Some believe that senior Air Force leadership has close to one hundred billion dollars per year to spend and could choose simply to redirect it, based on internal strategic decisions. Anyone working for a few minutes on the Air Staff knows that senior Air Force leadership’s flexibility extends not much further than lunch money. In fact, the job of the Air Force is to train, organize, and equip forces to meet the nation’s security needs as defined by the joint war-fighting community, senior defense officials, and, ultimately, the NCA. As Air Force leadership has repeatedly stated to Congress, we are woefully underfunded to accomplish *assigned* missions, let alone prepare for new ones. However, it is very much within



our “job jar” to provide aerospace options for current and future national security needs. One of our nation’s very great strengths lies in having multiple services with differing doctrines and capabilities providing national leadership with a range of options and approaches for meeting these needs.

As Hays and Mueller point out, much of the increased attention to space is in response to the congressionally mandated Space Commission, whose report was due out in January 2001. While some would say that the Air Force has not been a good steward of space, we must all understand the Air Force position on this issue.³ In short, the Air Force does not have an assigned responsibility to be the “steward” for space, and Air Force leadership has been quite reasonable in its approach to the situation. They have told the commission that the Air Force would eagerly become the “space steward,” but it must have that mission assigned along with the resources to accomplish it. That new responsibility would be consistent with the current approach to missions the Air Force already is assigned—which is



the main point General Barry and Colonel Herriges were stating in their AI article.

The core USAF assigned mission is to provide the necessary trained personnel, organizations, and equipment to conduct two near-simultaneous MTWs and several small-scale contingencies. The Barry-Herriges article points out that the USAF sees an increased role for space capabilities, primarily intelligence, surveillance, and reconnaissance (ISR) for this basic theater-warfare mission. In this respect, their article represents a coherent and compelling case for using space ISR as part of our evolving operational doctrine.

Hays and Mueller criticize the article on the grounds that it lacks a coherent doctrine. In so doing, they fail to recognize the applicability of the USAF's well-defined basic doctrine, constructed from almost a century of experience. The AI concept supports this basic doctrine as part of our evolving operational doctrine specified in Air Force Doctrine Document 2 (AFDD 2), *Organization and Employment of Aerospace Power*, and its space section, AFDD 2-2, *Space Operations*.⁴ In short, the doctrine states that flexible and rapid forces such as aircraft must be commanded and controlled as a single, integrated whole over the entire theater of operations. We in the Air Force had been rightly criticized in the past for not having a crisp state-

ment of our doctrine. But that is being remedied by the creation of the Air Force Doctrine Center and its series of products, beginning with AFDD 1, *Air Force Basic Doctrine*, dated 1 September 1997.

But again, doctrine must not be confused with missions or strategies. This is the mistake many space advocates have made. Basic doctrine is a concept for organizing and commanding forces, not specifying missions.

Basic and operational USAF doctrine is well suited for the current theater warfare mission. The challenge, however, has been to truly integrate forces to match that doctrine and to present them appropriately to the joint force commander (JFC). This is fundamental to the whole focus on organizing an Aerospace Expeditionary Force concept around a joint aerospace operation center (JAOC), including all aerospace capabilities like new elements of space and cyberspace support, as specified in AFDD 2. The Air Force might be justly criticized in its past treatment of space for not integrating space into the JAOCs, but this is being remedied. The AI concept simply states that we have convinced ourselves that the ratio of airborne to spaceborne elements—particularly in ISR—will shift toward space in the decades ahead. Ironically, the Air Force chose to put about a sixth of its scientific and technology (S&T)



dollars (almost the entirety of our leadership's flexibility) into the next major step in this evolution—developing space-based radar. But as one element of Congress criticized the Air Force for insufficient attention to new space capabilities, another element of the same Congress zeroed the effort to demonstrate space-based radar capability.⁵

USAF basic doctrine is also well suited for important future missions such as protecting US economic power as linked to space. This is the point of General Carlson's article. Systems based in space (and cyberspace for that matter) are already crucial parts of our economic infrastructure, a point lost on Hays and Mueller. They ignore the devastating disruption that losing just one pager satellite two years ago had on our economy.⁶ They also seem to doubt the immediate need to address the issue of protecting the global commons of outer and cyberspace. Yet, this past decade there were at least five documented attacks on space systems and hundreds of malicious cyberspace attacks.⁷ Thus, recent history proves the point: The strategic mission to protect and prevent hostile use of

these capabilities will likely be a critical new national security dimension.

Effective space and cyberspace control is the central dimension of this strategy, and, once again, USAF doctrine is the answer. The basic doctrinal approach of centralized control and decentralized execution (master tenet of aerospace power) is key to an effective future strategy and mission in this economic sphere. Our operational doctrine can and must evolve if we are assigned this mission.

The Air Force's basic and operational doctrine covers current strategic deterrent missions involving nuclear weapons. This, too, is an enduring truth developed over the last half century. Here is where space and information might enable a new strategic approach, relying not on nuclear weapons but on control of information and conventional precision strikes from and through space—albeit with evolutions of our tried and true doctrine.

A strategic objective in the future will be to deter adversaries from any aggressive move without the necessity of massive deployments or risky moves with weapons of

mass destruction—either of which risks major loss of life to American personnel and property. To be effective, a deterrent must be rapid and credible, convincing an adversary that his move would both fail in its objective and result in long-term, unacceptable loss of military and economic stature. A conventional precision-strike deterrent relying heavily on space capabilities, coupled to comprehensive information operations and warfare capabilities and supplemented with long-range, standoff conventional missile strike assets based in the United States, on submarines and on aircraft could provide an effective deterrent.

While considerable additional analysis is needed, the basic approach to a nonnuclear deterrent appears feasible. The keys to this deterrent revolve around new space capabilities: launch-on-demand capability (likely a “spaceplane” system), deployable targeting sensors (probably space-based radar), and precision-weapons delivery vehicles. These technologies are maturing today, with National Aeronautics and Space Administration (NASA) or the Department of Defense (DOD) expecting demonstration flights within five years.⁴ All of these capabilities, including the launch-on-demand space plane (probably consisting of a two-stage-to-orbit vehicle based on the concepts NASA is currently experimenting with in its X-33 and X-37 programs) and microsatellite efforts for space control are part of the Air Force’s long-range plan.⁹

The current AI approach, as well as potential new strategic mission approaches in

economic protection and nonnuclear strategic deterrence, will use space power as an extension of current Air Force basic doctrine. Our operational doctrine is already evolving to incorporate these new capabilities. Of course, we have not yet developed the necessary tactical doctrine for systems we have not developed and flown. However, one thing is clear. The new systems most consistent with our current doctrine and approach are those capable of doing “sorties” into and from space, vice those that are permanent “utilities” on orbit. If the Air Force is to bear any criticism of its approach to space, it would be due to its slowness to demonstrate and test sortie-type systems for space access and space control.¹⁰

In summary, many of the criticisms of the Air Force in its approach to developing true aerospace power and incorporating emerging space and information capabilities are unjustified. The Air Force has to accommodate established national strategy and strategic missions. It applies aerospace capabilities and aerospace doctrine to the strategies the national leadership assigns. The space capabilities the USAF is pursuing and including in long-range plans are well suited to long-standing basic and operational doctrine. Tactical doctrine will follow the development and deployment of new capabilities. The hallmarks of basic USAF doctrine—unity of control and flexibility—are well suited to new missions and strategies that may be assigned and new space and information capabilities which are now emerging. □

Notes

1. National military strategy is contained in a variety of sources. However, the most concise statements appear in William S. Cohen, secretary of defense, “Report of the Quadrennial Defense Review” (Washington, D.C.: Department of Defense, May 1997).

2. For a concise discussion of Air Force doctrine, see Air Force Doctrine Document 1 (AFDD 1), *Air Force Basic Doctrine*, 1 September 1997.

3. The Space Commission was established by the FY 1999 Defense Authorization Act with additional tasking given in the FY 2000 Defense Authorization Act. The key impetus behind the commission has been Sen. Robert Smith (R-N.H.). Its members

and work are discussed in the Hays and Mueller article and in John A. Tirpak, “The Fight for Space,” *Air Force Magazine* 83 (August 2000): 61. The commission has been meeting through the fall of 2000, and its report was released in January 2001. Its most controversial charge has been to consider the advisability of a separate “United States Space Force” military service or a “Space Corps” within the United States Air Force. Gen Michael Ryan, Air Force chief of staff, briefed the USAF position to the Space Commission on 19 September 2000. Based on Air Staff summary notes from that briefing and the briefing itself, several points emerged. In the briefing, General Ryan emphasized the current fiscal limi-

tations on the USAF and its current operational problem with an aging aircraft fleet that limits the amount of money that can be spent. But he also stressed the view that we are evolving to more use of space for military and economic purposes and that consequent defensive aspects of space are increasingly important. At the same time, however, he suggested we are evolving to more offensive use of space. In the ensuing discussion, it was clear that the key issue is where to find the necessary money to develop and use space to its full potential vice organizational and structural problems.

4. Air Force operational doctrine is outlined in AFDD 2, *Organization and Employment of Aerospace*, 17 February 2000. Space operational doctrine is contained in AFDD 2-2, *Space Operations*, 23 August 1998.

5. In 1998 the USAF Defense Advanced Research Projects Agency (DARPA) and the National Reconnaissance Office (NRO) began the Discoverer II space-based radar research and demonstration program. The \$600 million-plus program was designed to demonstrate the feasibility of putting between 18–27 small satellites into a low earth orbit to detect and track moving targets on Earth. Two demonstration satellites were to be placed into space by the middle decade. A space radar deployment of this type is at the core of the AI effort proposed by Barry and Heriges. Whereas critics of the Air Force such as Senator Smith make statements such as "I do not see the Air Force building the material, cultural, and organizational foundations of a service dedicated to space power" (Sen. Bob Smith, "The Future of Space in the Military," remarks given at the American Institute of Aeronautics and Astronautics [AIAA] Global Air and Space Conference, 15 May 2000), the Discoverer II program was cancelled by Senator Smith's colleagues on the House and Senate Defense Appropriations Committees (House Report 106-754 on the Defense Appropriations Bill for FY 2001). Reports on this largely congressional controversy can be found in *Space News* 11, no. 27 (24 July 2000): 7 and no. 28 (31 July 2000): 8. Despite this controversy, the Air Force and its partners remain committed to pursuing space-radar capability as part of an AI strategy (see comments by NRO director and assistant secretary for space Keith Hall in "NRO Chief Presses for System Similar to Cancelled Discoverer II," *Aerospace Daily*, 7 September 2000).

6. On 19 May 1998, the Pan-AmSat Corporation's Galaxy 4 spacecraft experienced a failure in its altitude-control system. Unfortunately, the backup system also failed, either at that same time or earlier, so that the operators were unable to maintain stable Earth-link (*Space News*, 25–31 May 1998, 3). The Galaxy 4 spacecraft is a heavily used communication satellite at geostationary orbit; its sudden failure caused the loss of pager service to some 45 million customers as well as numerous other communications outages (*USA Today*, 21 May 1998, 1).

7. There were a handful of satellite-jamming reports in the 1990s. For example, reported in Paris AFP (North European Service) in English, 1006 GMT, 24 November 1999, the Russian government admitted jamming commercial-satellite phone communications in its breakaway province of Chechnya. A Russian Defense Ministry spokesman was quoted as saying, "There is spe-

cial equipment for radio-electrical jamming." Even more than attacks on space-system capabilities, worries grow about real incidents of computer-network attack against economic and national security. For example, a major "denial of service" attack occurred against a variety of cyberbusinesses on 9 February 2000 (CNN Report, 9 February 2000, 1456 GMT). Attacks against military targets have also been documented (see, for example, CNN Report, 6 April 1990, 1829 GMT).

8. There are a variety of "space plane" and conventional strike concepts discussed. The feasibility and maturity of these concepts are controversial. Nonetheless, a brief summary of the technologies is in order. These systems are discussed in the context of force applications in the United States Space Command's "Long-Range Plan: Implementing USSPACECOM vision for 2020," 1998. The basic space-access system would consist of a reusable suborbital space operations vehicle (SOV) that would operate solely within the United States. It could carry a reusable orbital "mini-space plane" or space maneuver vehicle (SMV) capable of carrying a payload into low earth orbit. It could also carry an expendable upper stage or "modular insertion stage" (MIS), for access to higher orbits. Finally, it could carry weapons capable of being delivered over intercontinental ranges. The weapon's carrier is called a "common aero vehicle" (CAV). However, the Air Force would need to move smartly to develop and test these components this decade. Each of these components is now being pursued by either commercial space-launch developers, NASA, or the Air Force. By leveraging these diverse efforts, the Air Force can integrate a comprehensive space-operations-vehicle architecture at considerably less cost than if it had to develop all components itself. All of these systems would require the USAF to develop new tactical doctrine.

9. The elements of a space plane and associated microsatellite system are included in Air Force long-range plans supporting the AI concept. These long-range plans have identified microsatellites—self-contained, highly maneuverable vehicles weighing about 100 kilograms each and costing less than a few million dollars each—as a key basis for future space-control capabilities. Several are planned for near-term demonstration by the Air Force Research Laboratory (AFRL). These systems would be able to rendezvous, inspect, and, if necessary, interfere with suspect or hostile space systems. In addition, they could include robotic capabilities for servicing or moving fixed, expendable space assets. The SMV appears to be an ideal means to place these microsatellite systems into position and to retrieve them when no longer needed. Under the direction of senior Air Force leadership ("Corona"), Headquarters USAF, Plans and Programs, was directed to prepare a "Vision Force" to meet its 2020 vision. This Vision Force was preliminarily approved in fall 2000 by Air Force leadership.

10. Despite being a central part of Air Force long-range plans, only a modest amount of money added by Congress for specific purposes, such as the SMV or microsatellites during the past few fiscal years, has actually been spent to demonstrate the new capabilities.

AEROSPACE INTEGRATION: NOT JUST AN ACADEMIC PURSUIT

The article "Going Boldly—Where? Aerospace Integration, the Space Commission, and the Air Force's Vision for Space" by Lt Col Peter Hays and Dr. Karl Mueller (this issue) contains a number of criticisms of aerospace integration (AI) as a concept and the way it has been presented. The authors question the theoretical basis for AI and also point to perceived contradictions in two recent *Aerospace Power Journal* articles as evidence that AI is not a sound idea. These criticisms are unwarranted, and I will address them in turn.

The argument that AI lacks a theoretical foundation is not a new one. Many people point to the use and misuse of the word *aerospace*, trying to conclude that because of its various possible meanings, it must be flawed as a concept. The authors argue that because AI has little theoretical content, it should not be the basis for organizing military space.

First, AI is not a plan for reorganizing the Air Force. Certainly, future changes in culture, personnel, operations, and capabilities may support changes in how we organize, but AI was not developed solely to drive organizational changes. This misperception is likely the result of releasing *The Aerospace Force*—the AI white paper—so close to the creation of the Commission to Assess US National Security Space Management and Organization. Although AI has been the foundation for the Air Force strategy to engage the commission, AI predates the commission by over two years. At the Corona of fall 1997, the vision of a "space and air force" was reconsidered and revised because it was a stovepiped and potentially divisive approach to developing space power. Our leadership saw that the Air Force and the nation could not afford to develop airpower and space power in isolation. AI was conceived as a means to bring air and space closer together.

To do that, AI is impacting Air Force culture, operational concepts, capabilities development, and—ultimately—the service's organization. Even Hays and Mueller accept that the "philosophy of aerospace integration is com-

elling," and perhaps they have a point in using the term *philosophy*. AI has the potential to change much of what the Air Force does, how it does it, and who leads it into tomorrow.

The argument that AI lacks theoretical content can be the result of an academic approach. Not to discount the importance of military theory and doctrine, but sometimes practical solutions, born of trial and error in the field, can emerge and change both theory and doctrine. From our research, we concluded that AI is such a concept. After the Air Force leadership adequately defined what AI was, the Aerospace Integration Task Force traveled throughout the Air Force community to gather information on ongoing integration activities. What they found was that, though they did not use the term *aerospace integration*, many organizations were bringing together air and space capabilities, operations, and personnel because it was the practical solution. Without a signed policy or established doctrine, Air Force personnel were finding out on their own that combining air and space led to more effective and efficient operations. This type of "grassroots" creativity was called upon when the task force stood up in April 1998 and brought together over 40 Air Force officers to begin writing the conceptual foundation, or white paper, for AI.

The second criticism of AI described by Hays and Mueller was the perceived lack of consistency between two recent *APJ* articles in support of AI. The first article, by Maj Gen John Barry and Col Darrell Herriges, describes the progress the Air Force has made in AI to date and argues for continued integration of air and space within the Air Force. The second article, by Ralph Millsap and Dr. D. B. Posey, describes the very long-term implications of AI and the future of space power.

The confusion lies in Hays's and Mueller's reading of both items that they identify as inconsistent. Barry and Herriges state that if space operations were limited to today's force-enhancement functions, then that scenario might merit a separate organization. The basis for this statement is the fact that today's space operations are largely not com-

bat operations. Such operations could be relegated to a nonservice organization or defense agency if space were limited to a supporting role. However, the Air Force believes that space operations will someday include force application and space-control activities, which could be classified as combat operations. Thus, space belongs within a military service, specifically the US Air Force. Nowhere in the Barry and Herriges article do the authors propose a Space Force if space is limited to a support role.

The Millsap and Posey article attacks the issue from a long-term perspective. They state that "when military operations become concerned with effects in space, then they may warrant the establishment of a Space Force." The issue here is how one reads *effects in space*, defined by advocates of AI as a long-term requirement when humanity has moved off Earth and when interplanetary space operations are required. Until then, all operations in space, regardless of mission area, will be focused on creating *terrestrial* effects. For example, space control might be necessary to help protect our surface forces from overhead surveillance and force application to create strategic effects on the ground. As long as humanity is bound to Earth, all military operations will affect people on Earth. In the dis-

tant future, when human colonies may exist elsewhere in the solar system, then the effects of space operations will not be Earth-centric, and we may need an independent Space Force.

The two articles are not contradictory. In fact, the two specific issues that have been identified support one another. Barry and Herriges correctly point out that without a direct war-fighting mission, space operations could be relegated to a support agency. Millsap and Posey look beyond the confines of Earth orbit and recognize that someday we may need a Space Force to protect our interests throughout the solar system.

In this letter, I have attempted to address two major criticisms of AI. I would like to close by saying that one of the purposes of releasing *The Aerospace Force* was to stimulate intellectual debate, so comments and criticisms such as those made by Hays and Mueller provide a welcome opportunity for discussion. Aerospace integration is a journey, not a destination, so the more our colleagues ponder it, the more relevant our position will become.

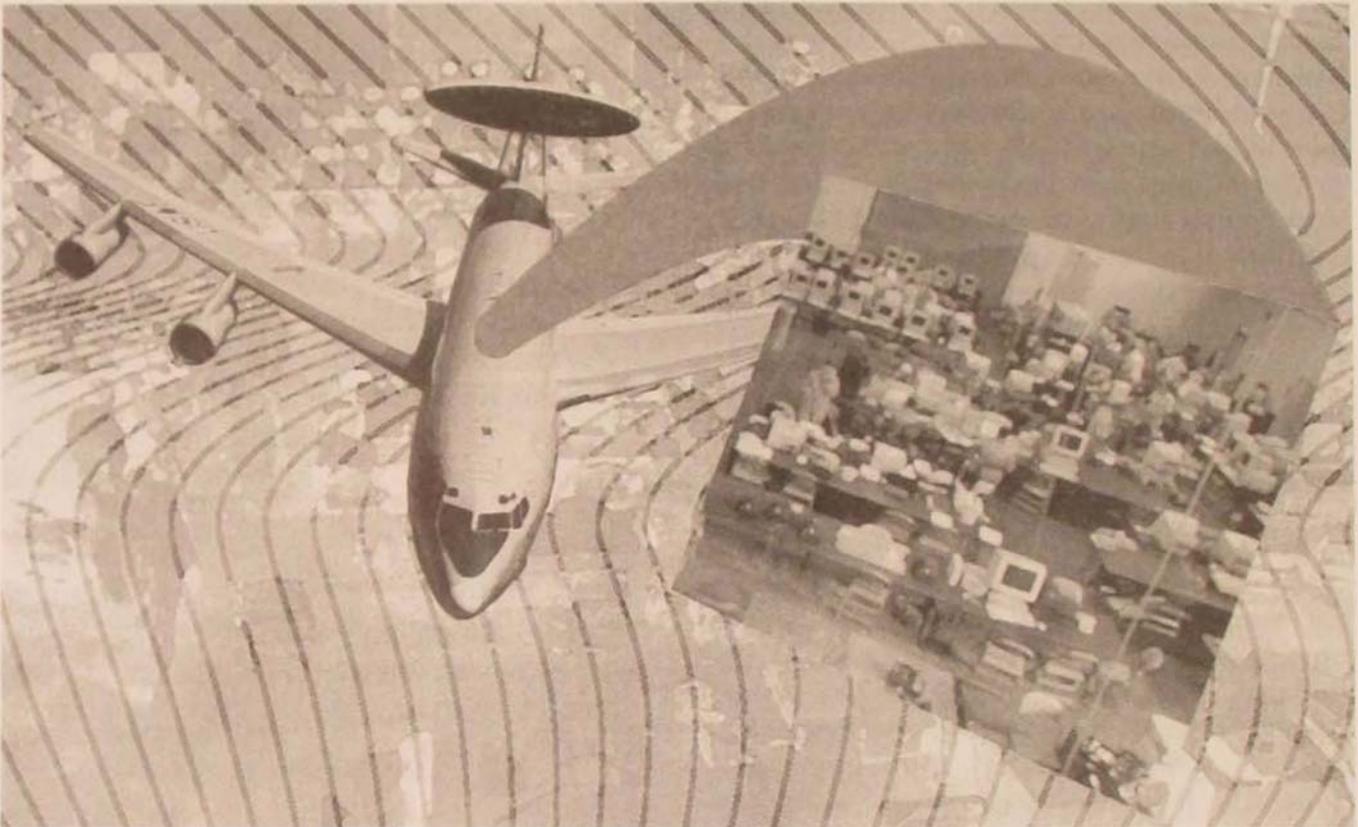
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The best strategy is always to be strong.

—Carl von Clausewitz

Transforming Warfare with Effects-Based Joint Operations

LT COL PRICE T. BINGHAM, USAF, RETIRED



Editorial Abstract: What used to be science fiction is becoming reality. Command, control, intelligence, surveillance, and reconnaissance (C²ISR) technology has so progressed that it may soon be possible to direct warfare in real time from or through C²ISR platforms. Colonel Bingham introduces such a concept of effects-based joint operations that would give commanders in chief unprecedented control of the battle space and enable realistic training of command and battle staffs via something called advanced distributed simulation.

THE QUADRENNIAL DEFENSE Review can transform warfare and dramatically increase strategic options across a range of threats, from theater war to stability operations, by recommending that the military services train and equip their forces to conduct effects-based joint operations. Such operations would

transform warfare by using a theater team of airborne command, control, intelligence, surveillance, and reconnaissance (C²ISR) systems to manage the decentralized execution of US aerospace sorties (of the Air Force, Navy, Marine Corps, and Army) for targeting enemy land forces. Key to the transformation would be the use of friendly (not necessarily

US) land maneuver to support this asymmetrical engagement of enemy land forces. The transformation is possible because advances in wide-area, real-time airborne ground-surveillance and battle-management systems make it feasible for air attacks to create physical and psychological "effects" that combine to quickly prevent a fielded land force from functioning well enough to achieve its desired objectives. Effects-based joint operations would increase strategic options by permitting US personnel to achieve success faster, more efficiently, and with less risk than is possible in operations that depend primarily on physical attrition and the close battle to defeat enemy land forces.

Importance of the C²ISR Team

The unprecedented airborne surveillance and battle-management capabilities provided by a theater C²ISR team consisting of joint surveillance, target attack radar system (JSTARS); airborne warning and control system (AWACS); and Rivet Joint aircraft make effects-based joint operations possible. The team possesses the advantages of powerful, wide-area sensors; line-of-sight communications with most combatants; and, most importantly, large crews needed for the real-time management of both surveillance and target attacks. The C²ISR team's combination of surveillance and surveillance-management capabilities is the key to achieving dominant battle-space awareness. The team's battle-management capabilities make it feasible to exploit this awareness in real time to achieve the functional effect of paralysis by targeting air attacks against machines operated by the enemy.

The C²ISR team enhances US expeditionary capabilities because it and the aircraft for which it targets (fighters, bombers, and armed helicopters) can quickly self-deploy to a distant theater. The team also enhances these capabilities by dramatically reducing and, in some scenarios, even eliminating the need for US land forces to engage powerful enemy army units in close combat. This com-

plements the Army's "medium-weight" combat-unit transformation initiative by allowing US land forces to deploy quickly and maneuver rapidly after their arrival in-theater.

The C²ISR team reduces or eliminates close-combat requirements in several ways. Air attacks managed by the team make it possible to halt powerful enemy units before they can move close enough to friendly land forces to effectively employ their organic weapons. These attacks also create an important maneuver advantage for our land forces by allowing them to avoid close combat in other-than-ideal conditions because enemy forces subject to air attack cannot, or are unwilling to, move quickly. Furthermore, the C²ISR team provides real-time information needed by US commanders to maneuver their land forces most effectively.

Achieving and Exploiting Dominant Battle-Space Awareness

The C²ISR team achieves dominant battle-space awareness by exploiting an army's dependence on movement and machines. Throughout the history of warfare, effective army commanders have orchestrated the movement of their forces to create the advantages of superior force ratios, favorable positions, surprise, and protection. During the twentieth century, technology in the form of motorized vehicles transformed the conduct of land warfare at both the operational (campaign) and tactical (battlefield) levels by greatly enhancing the ability of armies to move combat forces and their logistical support. Today, all but the most primitive armies rely heavily on vehicles to perform a variety of critically important military functions such as maneuvering, targeting (with radar-equipped vans), delivering heavy firepower, protecting (through armor and movement), constructing, communicating (carrying heavy radios), and resupplying.

It is difficult to conceive of an opposing army attempting a powerful, high-tempo land offensive without using thousands of vehicles because of the many important functions they

perform in the conduct of land warfare. Given the vulnerability of fixed facilities, the antiaccess capabilities employed to protect such an offensive would also likely make extensive use of vehicles. Even internal-oppression operations rely heavily on vehicles. For example, as was the case with such operations in Iraq, large numbers of vehicles with army artillery and tank support provided protection for operations by Serb paramilitary forces in the Balkans.

The C²ISR team's unprecedented surveillance and surveillance-management capabilities take advantage of the central role that movement and machines play in modern land warfare to provide and exploit dominant battle-space awareness. The role of machines makes it difficult for an enemy to counter effects-based joint operations. For example, if an enemy avoids using his machines, he loses all the advantages they provide, rendering his forces much less capable of aggression and making them extremely vulnerable to defeat by forces able to use their own machines. People familiar with the advantages machines provide understand why the North Vietnamese increased their reliance on them throughout the war in Southeast Asia and why mechanized units were among the last US Army forces withdrawn. Contrary to the myth that bicycles sustained the North Vietnamese, they devoted a huge effort to making the Ho Chi Minh Trail capable of handling an increasingly large volume of truck traffic.

The C²ISR team's sensors "see" machines in real time whenever they move or emit within a wide area, even in darkness and adverse weather. By cross-cueing each other's sensors, as well as those on unmanned aerial vehicles (UAV) and other surveillance platforms, and then correlating the collected information, the team can quickly and reliably detect, precisely locate, and accurately characterize an enemy's machines. (The team could further enhance this information by using geo-filtered and identification-filtered friendly location and status information to create a composite display of forces essential for reducing the risk of fratricide.) The team

can then quickly and securely disseminate its information to a joint force commander (JFC), the component commanders, and their subordinate echelons to ensure that everyone shares the same real-time situational awareness.

The C²ISR team's ground moving-target indicator (GMTI) radar surveillance plays an especially important role in achieving and then exploiting dominant battle-space awareness. This radar allows the team to collect persistent, real-time information on both enemy and friendly vehicular movement within a large area, even during adverse weather and darkness. In many cases, GMTI information would be the key to cueing when and where to employ smaller-field-of-view but higher-resolution sensors, such as those carried by UAVs and U-2s, that provide positive target identification.

Our experience in Kosovo, as well as exercises, shows that GMTI cueing enhances battle-space awareness by making UAVs much more efficient, effective, and survivable. Specifically, cueing these aircraft on when and where to look for enemy activity can significantly reduce wasted surveillance time. Cueing can also increase UAVs' effectiveness since targets have less warning time to employ countermeasures such as smoke. Finally, GMTI increases the survivability of UAVs by reducing their loiter time in target areas and thus decreases their exposure to point air defenses.

Why Dominant Battle-Space Awareness Makes Transformation Possible

Dominant battle-space awareness makes transformation possible by rendering obsolete an assumption that close combat should play the major role in the defeat of enemy land forces. Without dominant battle-space awareness, commanders (and war-fighting models) had to assume that information on the location and strength of individual enemy army units would not be reliable or precise. This assumption proceeded from major limi-

tations in the ability to collect and process data on an enemy's mobile land forces, exploit that data into information, and then disseminate that information to war fighters fast enough to support dynamic targeting and land maneuver.

The information problem was caused by the fact that most ground-surveillance systems had to be very close to their coverage area; that sensors had restricted fields of view and needed daylight and/or good visibility to operate properly; and that a system had difficulty providing persistent coverage. Systems that could operate in adverse weather could not see, let alone precisely track, slow-moving land vehicles; moreover, camouflage, concealment, and deception (CCD) measures degraded the effectiveness of many of these systems. After collecting data, many systems had to return to base to convert it into useful information. When finally available, the surveillance information still had to be disseminated. This entire process took precious time, during which enemy mobile forces continued to move, rendering a commander's information on them, collected by ground-surveillance systems, increasingly unreliable.

Without reliable information on opposing army forces, commanders often depended on actual contact (close combat) to determine an enemy's location, strength, and intentions. British military theorist B. H. Liddell Hart explained the role of close combat in locating an enemy with his "man-in-the-dark" theory of infantry tactics that compared land combat to two men fighting hand to hand in a dark room. Given the problems involved in finding enemy forces, success often depended on fielding large, powerful, heavy land forces and fighting a campaign whose tempo was restricted by the immense logistical problems associated with the use of such forces.

The Role of Danger and Jointness in Effects-Based Joint Operations

Conducting effects-based joint operations requires that the JFC direct the joint force air

component commander (JFACC) to employ precision engagement to paralyze the enemy land force and minimize its ability to engage friendly land forces in close combat. The JFACC would design counterland operations to apply deterrence theory at the tactical and operational levels. The objective would entail targeting vehicular movement in order to create such "shock and awe" that surviving enemy soldiers quickly perceive that such movement and the massing of forces, especially vehicles, are extremely dangerous.

The attacks would be designed to communicate clearly to enemy soldiers that movement makes them visible and very vulnerable to deadly air attacks that would soon follow if they attempt to move. Creating such a perception of extreme danger is very important because of soldiers' tendency to behave in a way that will minimize exposure to that danger. In this case, the desired "effect" is an enemy force whose soldiers will not risk vehicular movement. This behavior explains how one can achieve militarily significant vehicular paralysis faster and with fewer resources than might otherwise be expected from the physical destruction actually inflicted.

As the suppression of enemy air defenses (SEAD) operation in the Gulf War demonstrated, one can quickly create a sufficient perception of danger to achieve paralysis (or suppression) by beginning a campaign with large numbers of sudden and extremely lethal air attacks. One can maintain that perception by conducting prompt, lethal attacks against any enemy attempt to operate machines (move, mass, or emit). Making *persistent* vehicular paralysis a desired effect has the additional advantage of allowing component commanders and their staffs to assess quickly and reliably the success of precision engagements that target this movement. The theater C²ISR team aids in this assessment with its ability to see in real time the location and amount of vehicular movement. With continuous coverage, the team's assessments will be even less subject to distortion by enemy CCD measures.

Ideally, the JFC's campaign guidance to the joint force land component commander (JFLCC) would be to support the JFACC's precision engagement with maneuver while also maneuvering to avoid close combat as much as possible. Under this guidance, the JFLCC would orchestrate maneuver to present such a threat or opportunity that creates the "effect" of causing enemy forces to attempt rapid and massive vehicular movement. Closely coordinated with the JFACC, such an effect would greatly increase enemy vulnerability to air attack. The resulting destruction of enemy forces attempting to move would, in turn, complement friendly land maneuver by quickly causing more long-lasting and widespread enemy vehicular paralysis and dispersal.

After the JFC determines that the combination of precision engagement and maneuver has achieved the degree of paralysis and dispersal of enemy forces that will provide friendly land forces with maneuver dominance, enemy units would become vulnerable to being bypassed or defeated in detail. Thus, regardless of whether an enemy commander chooses to move or disperse and conceal forces, the JFC's conduct of effects-based joint operations would dramatically reduce the role of close combat, while ensuring that enemy land forces face certain, quick defeat with minimum risk for civilians and friendly forces. Unable to fight effectively, organized enemy resistance likely would collapse rapidly, allowing US forces to quickly achieve the campaign's objective.

Airborne Battle Management and Effects-Based Joint Operations

The success of effects-based joint operations depends on airborne battle management. The JFACC would use the C²ISR team to manage the decentralized execution of counterland operations that would target mobile forces within the team's coverage area. The JFACC would do this by using the air tasking order (ATO) to assign objectives, forces (fighters, bombers, armed helicopters,

UAVs, and—in the future—unmanned combat air vehicles), and coverage areas to subordinate commanders located with their battle staffs on board the C²ISR team's systems. One should emphasize that the use of the C²ISR team's airborne battle management would be integrated into the JFACC's exercise of centralized control over theater air operations. The JFACC would remain responsible for developing the air portion of the theater campaign plan, based on JFC guidance, and coordinating that plan and its dynamic execution with the JFLCC.

The C²ISR team's airborne battle staffs would be responsible for dynamically prioritizing targets and pairing weapons with targets, based on changing conditions created by vehicular movement and weather. They would be expected to create and then exploit opportunities and neutralize developing threats created by vehicular movement. For example, they might create an opportunity, such as a lucrative vehicle concentration, by targeting route structure just in front of a convoy when it reaches a location where the vehicles could not quickly disperse under a follow-up attack. Airborne battle staffs could also create opportunities by suggesting schemes for friendly land maneuver designed to make enemy forces move in ways that would increase their vulnerability to air attack. The JFACC would closely monitor this decentralized execution of the ATO, coordinating recommendations for land maneuver as necessary with the JFLCC. Perhaps as the result of new JFC guidance or dialogue with the JFLCC, the JFACC would make timely adjustments, as necessary, in terms of the objectives, coverage areas, and forces assigned to the airborne battle staffs.

One could compare the C²ISR team's role in effects-based joint operations to that of a quarterback whom the coach (JFACC) allows to exercise his judgment and change plays (divert sorties and assign targets) at the line of scrimmage to counter developing threats or exploit fleeting opportunities. For example, a coach may instruct his quarterback to call an audible when necessary to counter developing threats or exploit opportunities created

by the location or movement of an opponent's defensive players. Like the quarterback calling an audible, when the C²ISR team detects a developing threat or fleeting opportunity created by enemy vehicular movement, the JFAAC could authorize it to act quickly and divert aircraft previously identified as potential divers in the ATO to appropriate targets.

Differences between Mobile and Fixed Targeting

The differences between the processes for the precision engagement of mobile and fixed targets help explain why one needs the C²ISR team's decentralized airborne battle management to achieve the "single digit" response time required in effects-based joint operations. In contrast to engaging fixed targets, the precision engagement of mobile army forces requires minimizing the engagement-decision timeline because target movement can quickly change one or more factors vital to targeting effectiveness. One obvious factor vital to effectiveness is target movement's ability to change its location rapidly. Movement can also quickly reduce target vulnerability through dispersing, increasing the intervals between vehicles, changing the types of vehicles (armored versus soft skin) in the target area, and decreasing target exposure to attack by using terrain and foliage for protection and concealment. Movement can quickly reduce target size in terms of the numbers of vehicles in the target area and can rapidly increase the risk of collateral damage by adding civilian vehicles or by putting military vehicles into a populated area. Furthermore, the risk to friendly forces can increase quickly through movement. For example, enemy vehicles can move under the coverage of an air defense system, a missile launcher can reach a firing position, and enemy land forces can move into sufficient proximity to friendly land forces to employ their weapons.

Adding to the differences between the processes for precision engagement of fixed and mobile targets is the way vehicular movement can influence the complexity of the tar-

geting process—for example, through the number and types of vehicles that are potential targets. The enemy could have thousands or even tens of thousands of different vehicles, military and civilian, moving in very dense traffic within the C²ISR team's coverage area. Their unpredictable movement adds to targeting complexity. Unlike aircraft, vehicles on land can, and often do, frequently change their direction and speed, making unpredictable stops and starts while moving over a very short distance. Traffic density can also quickly change. Other reasons for the unpredictability of vehicular movement include the way darkness, adverse weather, traffic density, and changing surface strength (perhaps from weather or damage to a road) affect vehicle speeds. In addition, movement can affect targeting complexity by quickly changing surveillance coverage and visibility due to screening caused by terrain, foliage, and buildings.

Operational Factors and Airborne Battle Management

Timeless operational factors related to human capabilities and limitations provide still more reasons why airborne battle management is essential for effects-based joint operations. Even when battlefields were far smaller and commanders could see and quickly communicate (using horns, drums, and flags) with all their forces, effective commanders learned to organize by exercising command and control (C²) through subordinate echelons (through commanders of tens, hundreds, thousands, and ten thousands). The limitations were not so much technical as human. These commanders knew, as do fighter pilots experienced in air-to-air combat, that their span of surveillance limited the number of dynamic entities and engagements that they could track, especially when the entities moved in many different and widely separated parts of the battle space. They also knew that their span of control limited the number of units they could effectively manage during a very dynamic engagement. Fi-

nally, they knew that the survival of their forces, let alone their ability to achieve success, depended on whether their exercise of C² would degrade gracefully due to interruptions in communications with the fighting forces or if they or a key subordinate became disabled.

The magnitude of the span-of-surveillance problem created by large numbers of mobile land targets has a significant impact on the airborne battle management of counterland operations. This problem makes it necessary for C²ISR systems responsible for the execution of counterland operations to have large numbers of operator workstations. For example, on land—especially during the initial part of a campaign—there are likely to be more targets (thousands instead of tens or hundreds) to detect, locate, track, and characterize than in the air.

As has been noted, the movement of vehicles on land is much more complex than in the air, in that they move far more slowly and unpredictably, ensuring that they rarely move continuously or relatively directly between their starting points and destinations—as do aircraft. The ability of vehicles moving across the land's surface to stop moving at any time also creates increased opportunities for effective CCD—all of which makes reliable tracking and characterization far more difficult on land. Additionally, land vehicles often move in dense traffic and are more subject to screening. Finally, the fact that civilian vehicles are much more likely to be intermingled with military vehicles adds to the difficulty of characterizing and prioritizing targets on land.

Constraints on span of control also contribute to the need for C²ISR systems large enough to support multiple numbers of attack-control operators. The much larger number of targets and the complexity of their movement do much to make span of control for the engagement of mobile land targets generally much more constrained than is the case with the engagement of air targets. Given the very large number of vehicles likely to be moving on land, especially during an enemy offensive or in a defensive reaction to a

friendly offensive, effective precision engagement will likely require control of a large number of nearly simultaneous attacks.

But target movement is not the only factor constraining span of control on land. Span of control is limited because aircraft targeting moving land vehicles probably need more information from off-board sources than is the case with the engagement of targets in the air. This is so because aircraft attacking mobile land targets do not have a sensor for detecting and tracking vehicles from a significant distance, let alone tracking a vehicle moving during adverse weather. In addition, aircraft attacking land vehicles generally employ munitions that do not have their own sensors, as do air-to-air missiles, that allow them to guide on a moving target. The fact that attacking aircrews need to precisely aim their munitions at land targets can easily increase the amount of targeting information operators must provide to ensure an effective precision engagement.

A surface C² facility, such as an air operations center, usually located deep in friendly territory, needs airborne battle management to maintain timely contact with large numbers of aircraft operating deep in enemy airspace. Much of the dominant battle-space awareness needed to orchestrate precision engagements against mobile targets depends upon one's ability to monitor the communications of aircraft operating in enemy airspace.

Deployability and out-of-area "untethered" operations provide still more reasons for exercising airborne battle management. Increasingly, countering threats posed by land forces will require quickly deploying forces to areas where surface facilities for exercising C² are limited or unavailable. Even if such facilities are available, they and their communications are likely to be more vulnerable to attack—especially from ballistic or cruise missiles delivering weapons of mass destruction—than an airborne system. If necessary, one can base an airborne system at a significant distance from the area of operations, where it can maintain an orbit beyond the reach of an enemy's surface-based air defenses.

The Requirement for Advanced Distributed Simulation

The success of effects-based joint operations depends greatly on whether JFCs, their component commanders, and their subordinates—including the commanders and battle staffs located on board the C²ISR team's systems—use advanced distributed simulation (ADS) to conduct realistic training, war planning, and mission rehearsal. ADS is essential because live peacetime exercises provide an extremely limited environment for learning how to most effectively employ C²ISR systems that can detect, locate, track, and target very large numbers of vehicles moving in an unpredictable manner within a vast area. For example, cost constraints severely limit both the number of live exercises and the number of vehicles used in these exercises. Peacetime exercises also tend to be unrealistic because the majority of them are confined to familiar and relatively small operating areas that bear little similarity to areas where combat is likely. In addition, safety considerations can greatly constrain the realism of the peacetime training environment.

One also needs ADS because current models and simulations cannot show the full value of battle-space awareness provided by airborne ground surveillance and the need for airborne battle management to effectively exploit that awareness with timely precision engagements that complement and reinforce land maneuver. Problems have arisen from a limited ability to simulate realistically the surveillance and targeting of large numbers of moving vehicles. The lack of realism has extended to both visual displays and surveillance-control measures. Because they cannot realistically show the value of ground-surveillance systems' battle-space-awareness capabilities, current models and simulations do not provide the repetition needed for effective concept development, war planning, and mission rehearsal.

Fortunately, ADS can help solve the problems associated with both live exercises and current models and simulations. With ADS it

is possible to have a scenario generator provide over a distributed interactive simulation network thousands of virtual vehicles, each of which can move realistically across any desired terrain according to a script written to replicate a specific doctrine. More importantly, ADS allows one to take virtual target information from the scenario generator and translate it into realistic target reports, as seen by the surveillance system, by introducing factors such as probability of detection, target location, false detection, and terrain-screening effects. Displayed on a C²ISR system's operator workstations, these reports are indistinguishable from "live" action.

Since ADS makes it possible to fight realistic scenarios located anywhere in the world and provide repetition, theater commanders could easily use ADS for war planning. With ADS, they could assess a variety of different campaign options. Similarly, battle staffs on board the C²ISR team could use ADS for mission rehearsal, even en route to a contingency. Moreover, by allowing realistic training without having to fly the C²ISR team and conduct live target attacks, ADS could significantly reduce training costs, wear and tear on actual C²ISR systems, and the impact of operations tempo on their crews.

Challenges to Implementing Effects-Based Joint Operations

Although implementing effects-based joint operations provides important advantages, it also poses numerous challenges for the services. Given the critical role played by the C²ISR team, implementation would require that the services solve the current low density/high demand problem by procuring sufficient numbers of C²ISR systems so that a team can place vital areas under continuous coverage well before aggression or internal oppression begins. The team's vital role also means that the services must accelerate their efforts to provide these systems with enhancements that improve the quality of the team's information and its ability to use that information to support dynamic targeting.

Since models play a major role in determining equipment requirements, the services must develop new war-fighting models that treat an enemy's fielded land forces as a system whose ability to function depends upon the operation of its machines. The models must show how all vehicles, not just tanks, influence an army's war-fighting effectiveness. They must also show with realism the way people actually behave in war—behavior that is vastly different from how an opposing force's "entities" act in current attrition-oriented models.

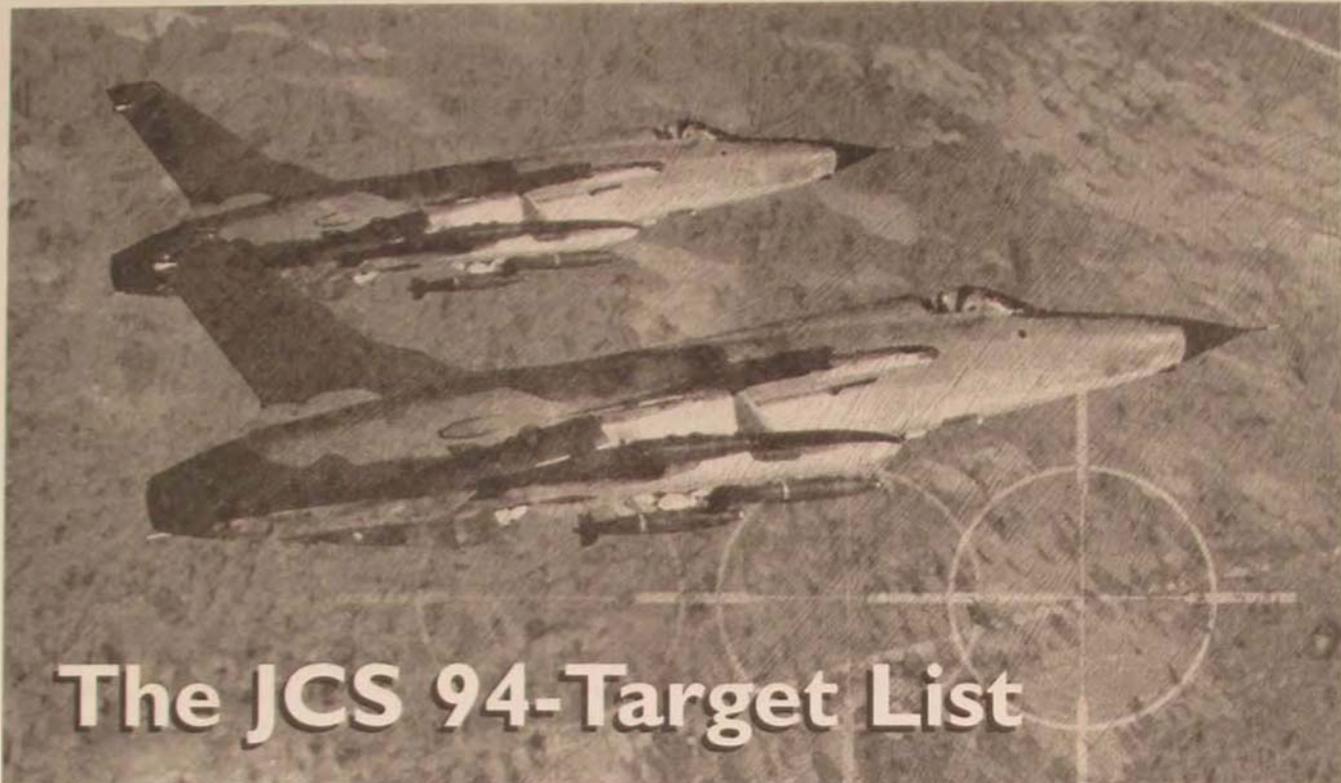
Forces fight as they train. Therefore, it is essential that the services train together more frequently and more realistically. Effective training for the C²ISR team and the services' air forces requires an opposing force fielded in appropriate numbers and employing intensive CCD measures. Scenarios should also include the use of simulated civilian vehicles.

In contrast to what they do in today's training, Army and Marine Corps forces must design their land maneuver to make US air forces more effective at targeting opposing forces without becoming engaged in costly close combat. Also of great importance, training must be conducted in realistic terrain and weather conditions.

Finally, the successful implementation of effects-based joint operations requires that US commanders and their staffs be well qualified to conduct war at the operational level. The services must treat qualifications for this level with the same thoroughness that they currently apply to those for the tactical level. As is the case with tactical-level units, the services must demand that all personnel, regardless of rank, demonstrate appropriate knowledge and judgment at the joint operational level before assigning them war-fighting responsibilities. □

Domestic policy can only defeat us; foreign policy can kill us.

—John F. Kennedy, 1961



The JCS 94-Target List

A Vietnam Myth That Still Distorts Military Thought

CHARLES TUSTIN KAMPS

Editorial Abstract: One of the great debates about the Vietnam conflict is whether it was the Joint Chiefs of Staff or the Johnson administration who misapplied airpower. Critics have alluded to the infamous JCS 94-Target List as the example of how unimaginative air campaign planners used World War II-vintage strategic bombing inappropriately against a nonindustrial North Vietnam. Professor Kamps unveils and analyzes the actual list, arguing that a professionally derived and potentially effective air campaign was never utilized due to the politics of the time.

THE FLEXIBILITY OF airpower provides decision makers with many options for using or abusing the military instrument of power, as seen in conflicts from Vietnam to Kosovo. Some writers have used the bombing of North Vietnam during 1965–68 as a case to denigrate the ability of airpower to contribute effectively in Southeast Asia by claiming that the Vietnam-era generals simply dusted off the strategic

bombing plans from World War II and inappropriately applied them to North Vietnam. One of the proofs offered for this view has been the often-mentioned, but never revealed, Joint Chiefs of Staff (JCS) 94-Target List. The list is published here and is a far cry from being a substantiation of the critics' claims. Quite the opposite, it reveals professionalism and shows how airpower was intended to be applied in an effective way in Vietnam.

The Claims

A generation of Air Force officers and others have now read essays claiming that the JCS and other high-ranking US military leaders of the early 1960s erroneously wanted to bomb North Vietnam's alleged industrial heartland in order to achieve victory in South Vietnam. Of course, North Vietnam did not have anything like an industrial heartland, and the critics have had to resort to the theory that unimaginative generals simply fell back on pre-1940 doctrine. Crucial to this misrepresentation is the mysterious 94-Target List, which supposedly enumerated the nonexistent industrial targets. It is worth quoting a few examples of how the list has been invoked by writers to criticize US military leaders.

Earl H. Tilford's 1991 book, *Setup: What the Air Force Did in Vietnam and Why*, makes the following claims:

They [the Air Force] devised a set of targets—the 94-targets list—designed to destroy North Vietnam's industries and wreck its transportation system, thereby preventing North Vietnam from supporting the insurgency in South Vietnam. . . .

The Joint Chiefs, particularly the Air Force, had advocated bombing North Vietnam's industrial base from the beginning. Had the Air Force had its way North Vietnam's Thai Nguyen steel mill, its only cement plant, its single explosives plant, and most of its thermal power plants would have been destroyed by the end of the first few weeks of the campaign outlined in the original 94-targets list. . . .

Instead of operating within parameters of a limited war, air power leaders sought to refight World War II—a conflict for which the doctrine of strategic bombardment was better suited.¹

Raymond W. Leonard's article "Learning from History: Linebacker II and U.S. Air Force Doctrine," which appeared in the April 1994 issue of *The Journal of Military History*, asserts: "It [the 1964 JCS plan] was in many ways a classic replay of the offensive against Japan: it called for the concentrated and rapid destruction of ninety-four industrial, transportation, and infrastructure targets in North Vietnam."²

Writing for the Airpower Research Institute in 1986, Dennis M. Drew stated:

The criteria for selecting targets on the 94 Targets List and the JCS plan for striking those targets clearly indicate that the JCS desired to wage a classic strategic bombing campaign and a complementary interdiction campaign against North Vietnam . . . and finally the progressive destruction of the enemy's industrial web. . . . In essence, the JCS planned to take the World War II bombing campaign in Europe and transplant it 20 years later in North Vietnam.³

Finally, perhaps the most articulate of the critics, Mark Clodfelter, writes in his highly touted 1989 work *The Limits of Air Power* that "LeMay's 'Stone Age' was exactly what its name implied—the absence of the perceived technological essentials of modern life. In equating economic well-being to industrial strength, the ninety-four-target scheme embodied the essence of American strategic bombing doctrine."⁴

Needless to say, without an examination of the JCS Target List, all of the above claims lack substantiation—but they are often taken at face value by the uncritical reader and have even found their way into lesson plans at Air Force professional military education schools. Were the generals really one-dimensional? Did they really think that North Vietnam was like Germany in World War II? Did they really believe that an industrial web existed and that bombing it would win the war?

The Background

US involvement in South Vietnam intensified in August 1964 after the Gulf of Tonkin incident, during which US destroyers skirmished with North Vietnamese patrol boats of the Democratic Republic of Vietnam (DRV) navy. Within days, Congress passed the so-called Tonkin Gulf Resolution, which allowed President Lyndon Baines Johnson nearly carte blanche to apply military force in the region. US Navy carrier aviation was quickly ordered to strike back at DRV coastal targets in Operation Pierce Arrow, a purely retaliatory action.⁵ This tit-for-tat pattern was

repeated in February 1965 when Vietcong (VC) attacks on the US military installations at Pleiku and Qui Nhon prompted the Flaming Dart operations.⁶

In the latter part of 1964, there was a general feeling that the military situation in South Vietnam was deteriorating. Both Hanoi and Washington, thinking that they were losing, decided that a faster tempo of reinforcement was necessary to prevent defeat. On the ground, Ho Chi Minh, communist leader of the DRV, responded quicker than Johnson. In addition to political and technical cadres and replacements, he infiltrated regular North Vietnamese Army (NVA) combat units into South Vietnam. By December 1964, a regiment of the NVA 325th Division was identified in the Central Highlands. The rest of the 325th was in action in the south by February 1965.⁷ US ground combat troops did not deploy to South Vietnam until March 1965, when the 9th Marine Brigade landed at Da Nang. With a rapidly deteriorating ground situation in South Vietnam and the unattractive prospect of a slow logistical buildup of Army units to combat the communists, the Johnson administration turned to airpower as a rapidly deployable and flexible arm to influence events in Vietnam.

A deep divide existed between the majority of the US military high command and some of the Johnson administration's civilian advisers over the scope and intensity of the bombing effort against North Vietnam. These civilians, best personified by John T. McNaughton, assistant secretary of defense for international security affairs, favored an incremental approach, or a progressive slow squeeze. This was articulated as Option C in a 26 November 1964 memorandum for the National Security Council by McNaughton and William Bundy (assistant secretary of state for Far Eastern affairs):

Option C would add to present actions an orchestration of (1) communications with Hanoi and/or Peiping, and (2) additional graduated military moves against infiltration targets, first in Laos and then in the DRV, and then against other targets in North Vietnam. The military

scenario should give the impression of a steady deliberate approach, and should be designed to give the US the option at any time to proceed or not, escalate or not, and to quicken the pace or not. These decisions would be made from time to time in view of all relevant factors. The negotiating part of this course of action would have to be played largely by ear, but in essence we would be indicating from the outset a willingness to negotiate in an affirmative sense, accepting the possibility that we might not achieve our full objectives.⁸

While the civilians were concentrating on the use of airpower to demonstrate resolve, send diplomatic signals, and influence North Vietnamese will, the military had a different perspective. The cigar-chewing chief of staff of the US Air Force, Gen Curtis LeMay, would write, "My solution to the problem would be to tell them frankly that they've got to draw in their horns and stop their aggression, or we're going to bomb them back into the Stone Age."⁹ Hyperbole aside, the Air Force position can be summed up in the following passage written in a 1968 classified study that analyzed the war to that point: "The proper use of military force, airpower in concert with combined arms, can be decisive. Military force can eliminate the enemy's means of war because North Vietnam does not possess an in-house capability to continue the war. Imports are paramount. If authorized, air and naval power could render this capability nil."¹⁰

Evidently, the enemy thought so too. Senior Col Bui Tin of the North Vietnamese Army General Staff remarked in an interview:

Q: What of American bombing of North Vietnam?

A: If all the bombing had been concentrated at one time, it would have hurt our efforts. But the bombing was expanded in slow stages under Johnson and it didn't worry us. We had plenty of time to prepare alternative routes and facilities.

Q: How could the Americans have won the war?

A: Cut the Ho Chi Minh trail inside Laos. If Johnson had granted [Gen William] Westmoreland's requests to enter Laos and block the Ho Chi Minh trail, Hanoi could not have won the war.¹¹

The Army developed several contingency plans to block the Ho Chi Minh trail with ground-unit maneuvers into the Laotian panhandle. These operations were never permitted by Johnson. What did the JCS plan for the air arm to accomplish?

The JCS Target Lists

When active US participation in the Vietnam War became increasingly likely, the JCS established a Joint Working Group in Washington to explore alternatives for air operations against the DRV. On 22 May 1964, after examining 451 possible targets in North Vietnam, the group presented a preliminary list of 99 targets to the commander in chief Pacific (CINCPAC) for comment. (Ironically, by the end of the air campaign against North Vietnam, the total number of active targets increased to over four hundred due to enemy dispersion operations.) This initial list of 99 targets is reproduced here, broken down by target sets and the number of specific targets within each set (table 1).¹²

It is immediately apparent to one who scrutinizes this list that it does not place emphasis on industrial targets. It includes only eight such targets, and two of these, radio communications facilities, are arguably related to command and control, not industry. All the industrial targets are listed in category C, which was accorded the lowest priority.

What strikes one about the target list is the evident emphasis on strategic interdiction and strategic paralysis. The reason for this is not hard to discern. In spite of the claims of the critical writers, claims based on some inaccurate estimates of the early sixties, supplying new weapons, equipment, and ammunition to the VC was important to the DRV war effort by late 1964, as was organizing the main-force VC into large units. For example,

"Hanoi, beginning in mid-1964 and using material furnished by the Soviet Union and China, also decided to upgrade the Viet Cong, introducing among other weapons the famous Soviet AK-47 assault rifle. The first Viet Cong unit of division size, the renowned 9th Viet Cong Division, operating in the general area north of Saigon, was formed in the latter part of 1964."¹³ The war was changing from simply a guerrilla campaign into a dual-natured war that was quickly becoming dominated by larger conventional units on both sides. Far from being an enemy consisting only of rice farmers in black pajamas, the communist main-force VC and NVA were well-equipped regular units, which were dependent on material support from Russia and China funneled through North Vietnam's major supply hubs. The change from a low-intensity guerrilla effort into two wars—one guerrilla and one conventional—did not happen overnight in 1972. It was a constantly evolving process from 1964 on.

Nevertheless, the modern critics appear to be completely unaware of how the communists actually fought the war. For example, Clodfelter asserts that "they [the JCS] failed to consider whether massive bombing suited the nature of the war, which was primarily a guerrilla struggle before March 1972 (with the notable exception of the 1968 Tet Offensive)."¹⁴

This interpretation collapses in the face of the increased intensity of conventional operations,¹⁵ the tempo of regular NVA reinforcements going south (reaching 12 battalions a month by the start of 1966),¹⁶ and the famous "Big Battles" of 1967.¹⁷

In the 99-Target List, the 30 highest-priority targets included airfields (to secure air superiority), key military headquarters and barracks (to disrupt NVA command/control), and strategically important supply facilities and lines of communications (to interrupt the North's ability to send troops and materiel south). The concept of striking these targets in a lightning effort was obviously aimed at producing temporary paralysis in the DRV's war machine.

The second group of 61 targets expanded the first group and added storage facilities, railway assets, vital rail/highway bridges, and, most importantly, the mining of North Vietnam's ports. This target set was pivotal. As was appreciated at the time, 85 percent of North Vietnam's military imports came by sea, primarily through Haiphong—a prime candidate for mining.¹⁸ Most of the remainder en-

tered via the northeast and northwest rail lines to China. As Sir Robert Thompson, renowned British counterinsurgency expert, noted, "In all the insurgencies of the past twenty-five years, since the Second World War, none has been sustained, let alone successful, without substantial outside support."¹⁹

Johnson's failure to authorize striking the port targets and rail links meant that efforts to

Table 1
JCS Working Group 99-Target List for North Vietnam,
22 May 1964

Target Sets	Category A	Category B	Category C	Total
Airfields	5	3	-	8
Road Line of Communications	4	1	-	5
Military Barracks	6	9	-	15
Ammunition Dumps	2	7	-	9
Military Headquarters	8	3	-	11
Supply Dumps	5	14	-	19
Military Training Center	-	1	-	1
Storage Areas	-	4	-	4
Ports	-	7	-	7
Storage Depot	-	1	-	1
Railroad/Highway Bridges	-	9	-	9
Railroad Yard/Shop Complexes	-	2	-	2
Chemical Plant	-	-	1	1
Iron/Steel Plant	-	-	1	1
Radio Broadcast Facilities	-	-	2	2
Thermal Power Plant	-	-	1	1
Machine Tool Factory	-	-	1	1
Industrial Plant (other)	-	-	2	2
TOTAL	30	61	8	99

Source: Lt Col William E. Long, *Target Selection Process: Categories and Decision Levels*, Air War College Research Report 3634 (Maxwell AFB, Ala.: Air University, April 1968), in the Air Force Historical Research Agency (AFHRA), file K239.042-3634, 14. Document is now declassified.

The above table outlines the targets selected by the JCS joint working group tasked to develop target options for execution against North Vietnam. It was presented to CINCPAC for comment and further development on 22 May 1964. Targets were grouped into three categories.

Category A – "included those targets the destruction of which was expected to bring an immediate reduction of DRV support to PL [Pathet Lao] and VC forces. These targets were near the national boundary (NVN/SVN and Laos/NVN), or on a key logistical route."

Category B – "included targets the destruction of which would reduce the DRV military capability to take action against Laos and SVN. These targets were somewhat more remote from the national boundaries, and key logistical routes."

Category C – "included selected industrial targets. Eight specific targets were listed."

achieve air superiority to prosecute the campaign were subjected to intensifying opposition. In September 1964, the DRV had only fourteen hundred anti-aircraft guns, 22 early warning, and four fire-control radars.²⁰ As for the North Vietnamese air force, "By the end of 1964 they possessed only 34 fighter aircraft. These were MiG-15s and MiG-17s based at Phuc Yen."²¹ Furthermore, the first North Vietnamese SA-2 surface-to-air missile (SAM) site did not begin construction until April 1965.²² However, by the end of Rolling Thunder in October 1968, the DRV had 75 MiG-21s, MiG-19s, and MiG-17s; seventy-five hundred anti-aircraft guns; and two hundred SAM (SA-2) sites.²³

In addition to the air defense system mentioned above, the DRV was allowed to build up some 18 ground-combat divisions equipped with heavy mortars, the latest rocket-propelled grenades (RPG-7), tanks, armored personnel carriers, 122 mm rocket launchers, and 122 mm and 130 mm artillery (that outranged South Vietnamese artillery). It was this force, the NVA, that defeated South Vietnam. The guerrillas could not have won on their own after the commitment of American troops, and they ceased to be a major

force in the war after virtually being exterminated in the aftermath of the 1968 Tet offensive. The NVA, like most armies from underdeveloped nations, required time to absorb the equipment and tactics that it demonstrated in 1968 and 1972 and used to achieve victory in 1975. Essentially, the Johnson administration permitted the flow of materiel from the USSR and China that built the NVA into an effective offensive instrument over time.

The third category in the 99-Target List included the eight targets that represented the military industrial capacity of the DRV considered worth striking. It was conceded that Hanoi had some stake in these facilities as showcases of the regime, but they were not critical.²⁴ Therefore, as a threat to be voiced to the DRV, these targets might assume marginal importance, but they still held low priority in the campaign envisioned by the JCS. By comparison, one can see the emphases in the strategic bombing of Germany during World War II by target-set priorities listed in the three major plans: AWPD-1, AWPD-42, and the Combined Bomber Offensive (CBO) (table 2).²⁵

The strategic air campaign against Germany was interrupted during 1944 in order to

Table 2
World War II US/Allied European Strategic Bombing Plans

	AWPD-1 Target Priorities	AWPD-42 Target Priorities	CBO Target Priorities
1	German air force aircraft factories, aluminum plants, magnesium plants, engine factories	German air force aircraft factories, aircraft engine plants, aluminum plants	German air force fighter aircraft factories, aircraft engine plants (combat attrition)
2	Electric power power plants, switching stations	Submarine building yards	Submarine force building yards, bases
3	Transportation rail, water	Transportation rail, water	Ball bearings
4	Petroleum refineries, synthetic plants	Electric power power plants, switching stations	Petroleum refineries, synthetic plants
5	Morale	Petroleum refineries, synthetic plants	Rubber synthetic plants
6	—	Rubber synthetic plants	Military transportation armored vehicle factories, motor vehicle factories
Total	191 targets	177 targets	76 targets

support preparations for the Normandy invasion. The Allied staff advocated "a concentrated air offensive against rail communications in France, involving some 75 to 110 rail bridges, marshalling yards, and maintenance facilities—to make Northern France a 'railroad desert' and hamper German movements to the Normandy beaches. All Allied air forces, strategic as well as tactical, would be exclusively devoted to this purpose."²⁶

This effort, to slow German panzer reinforcements, might roughly be equated to the JCS desire to strike transportation nodes in

North Vietnam, but the contrast between the World War II programs and those of 1964 is otherwise remarkable.

The 94-Target List

The JCS Working Group revised the preliminary target list, presenting a version with 94 targets to the secretary of defense as appendix A of JCSM-729-64, *Target Study – North Vietnam*, on 24 August 1964 (table 3). Planners designated subsidiary targets with the addition of decimals as they were added to the list.

Table 3

The JCS 94-Target List

Target Number	Target Description
1	Na San airfield
2	Dien Bien Phu airfield
3	{B} Hanoi/Gia Lam airfield [limited jet-capable] (plus petroleum, oil, lubricants [POL] storage 1965)
4	{R} Dong Hoi airfield [limited jet-capable] (airfield closest to South Vietnam)
5	{R} Vinh airfield [limited jet-capable]
6	{B} Phuc Yen airfield [jet-capable] (plus NNE POL storage 1966)
7	Hanoi/Bac Mai airfield [limited jet-capable]
8	{B} Haiphong/Cat Bi airfield [jet-capable] (plus POL storage 1965)
9	Haiphong/Kien An airfield [limited jet-capable] (plus POL storage 1965)
10	Ninh Binh railroad/highway bridge
11	Hai Duong railroad/highway bridge
12	Hanoi railroad/highway bridge (Red River)
13	Hanoi railroad/highway bridge (canal)
14	Thanh Hoa railroad/highway bridge
15	Viet Tri railroad/highway bridge (on Route 2: Hanoi—Lao Cai—Kunming, China)
16	Dap Cau railroad/highway bridge (on route from Hanoi to Chinese border)
17	Haiphong highway bridge (on Route 10: Haiphong to NE DRV and China)
18	Lang Son railroad/highway bridge
19	Yen Vien railroad yard
20	Hanoi railroad repair shops (Gia Lam)

Table 3 (Continued)

21	Hanoi railroad yard/shops
22	Xuan Mai barracks SSW
23	Xuan Mai barracks NNW and headquarters
24	{R} Chanh Hoa barracks SE and division headquarters
25	Son La barracks/supply depot/military region headquarters NW
26	Dien Bien Phu barracks
(27)	(Although in the "barracks" group, a target numbered 27 did not appear in any sources consulted.)
28	Ban Xom Lom barracks
29	Quang Suoi barracks NE
30	Hanoi military headquarters; North Vietnam air defense headquarters
31	Ha Dong barracks/supply depot
32	{R} Vu Con barracks and supply depot
33	{R} Dong Hoi barracks WNW (probable division headquarters)
34	Vinh Yen barracks/training area N
35	Son Tay barracks SW and supply depot
36	{B}{R} Vit Thu Lu barracks/storage area (guerrilla staging area)
37	Moc Chau barracks
38	Vinh barracks and headquarters military region IV
39	{R} Chap Le barracks NW
40	Phu Qui ammunition depot SW
41	{R} Phu Van ammunition depot E (major depot)
42	{R} Phu Van POL storage and ammunition depot NE
43	Qui Hau ammunition depot W
44	Yen Bai ordnance depot
45	Haiphong ammunition depot SW (Kien An)
46	Ban Phieng Hay ammunition depot
47	Yen Son ordnance and ammunition depot
48	{B} Haiphong POL storage [+] (largest POL storage facility in North Vietnam)
49	{B} Hanoi POL storage [+]
50	Vinh POL storage
51	Nguyen Khe POL storage [+] (Thach Loi)
52	{R} Vinh supply depot E
53	{R} Phu Van supply depot SE
54	Thien Linh Dong supply depot S
55	{R} Vinh Son supply depot SW/SE

Table 3 (Continued)

56	Phu Qui barracks/supply depot
57	Hanoi Ministry of National Defense/MZ Headquarters
58	Hanoi supply depot S/barracks
59	Hanoi supply depot N/barracks
60	Thai Nguyen supply depot N
61	Xom Chang barracks S
62	Van Dien supply depot/barracks
63	Thuan Chau barracks/supply depot
64	{R} Xom Bang ammunition depot (supports Pathet Lao in Laotian panhandle)
(65)	(Although in the "depot" group, a target numbered 65 did not appear in any sources consulted. In a later edition of the list, the number 65.8 was reserved for the Hanoi SAM support facility.)
66	Hanoi international radio communications transmitter facility
67	Hanoi international radio communications receiver facility
68	Cam Pha Port (mine laying and bombing targets)
69	Hon Gai Port (mine laying and bombing targets)
70	Haiphong Port (mine laying and bombing targets)
71	{R} Ben Thuy port facilities/transshipment center (mine laying and bombing targets)
72	Port Wallut naval base (mine laying and bombing targets)
73	Hanoi port facilities/Red River (mine laying and bombing targets)
74	Quang Khe Port approaches (mine laying area)
75	Viet Tri chemical plant (explosives)
76	Thai Nguyen iron and steel complex
77	Hanoi machine tool and engineering equipment plant
78	Haiphong phosphatic fertilizer plant (explosives)
79	Bac Giang chemical fertilizer plant (explosives)
80	Haiphong West thermal power plant [++]
81	Hanoi thermal power plant [++]
82	Uong Bi thermal power plant
83/84	Road/Rail Route 1 (Hamrong to Hanoi)
85/86	Road/Rail Route 1 (Vinh to Hamrong)
87/88	Road/Rail Route 5 (Hanoi to Haiphong)
89	Route 7 (Laos/North Vietnam border)
90	Route 8 (vicinity Nape, Laos to Roa Qua) (main supply route to Central Laos)
91	Route 12 (Laos/North Vietnam border to Xom Ma Na) (main supply route into southern Laos and South Vietnam)

Table 3 (Continued)

92	Route 19
93	Route 6
94	Route alternate to Route 6

Sources:

1. Rolling Thunder, 28 March 1966, Headquarters PACAF Tac Eval Center, 14–15. (Document is now declassified.) [AFHRA file K717-0423-28].
2. "The Consensus to Bomb North Vietnam: August 1964–February 1965," *The Pentagon Papers* (Senator Gravel edition) (Boston: Beacon Press, 1971), 329, 330.
3. Intelligence Activity Input, Intelligence Production, Out Country Targeting (NVN), 31 March 1968, Deputy Chief of Staff/Intelligence, USAF. (Document is now declassified.) [AFHRA file K717.0422-4, January 1962–March 1968]
4. Target Analysis–North Vietnam, 19 February 68, Pacific Division, J-3, OJCS. (Document is now declassified.) [AFHRA file K160.609-4, 19 February 1968]
5. The Effectiveness of the Air Campaign against North Vietnam, 1 January–30 September 1966, SC no.12898/66, December 1966, CIA Directorate of Intelligence. (Document is now declassified.) [LBJ Library]
6. Courses of Action in Southeast Asia, revised draft of 26 November 1964, by W. P. Bundy and J. McNaughton, Department of State (Document is now declassified.) [LBJ Library]
7. JCSM-670-65, memorandum for the secretary of defense, subject: Air Strikes against North Vietnam, 2 September 1965, Joint Chiefs of Staff. (Document is now declassified.) [LBJ Library]
8. Concept of Operations [supporting JCSM 652-65], [1965], Department of Defense. (Document is now declassified.) [LBJ Library]

[+] In 1964, seven POL storage areas collectively held 76 percent of North Vietnam's supply of POL. In addition to the three targets on the list above, these included Bac Giang POL storage (51.11), Do Son POL storage (51.13), Viet Tri POL storage (51.14), and Duong Nham POL storage (51.17). [source 3, page 187]

[++] In 1964, seven power-generating facilities (thermal power plant [TPP]) and the Hanoi transformer station collectively produced 82 percent of North Vietnam's electric power. In addition to the two targets on the list above, these included Haiphong East TPP (82.12), Hon Gai TPP (82.13), Thai Nguyen TPP (82.16), Viet Tri TPP (82.17), Hanoi transformer station–Le Pap (82.24), and Bac Giang TPP (82.26). These targets were largely restricted until early 1967, allowing the DRV two-and-a-half years to acquire and disperse many smaller generators. [source 3, page 187]

{R} denotes JCS-recommended targets for the first eight weeks of Rolling Thunder, after the option to strike all targets in a massive, swiftly delivered campaign was disapproved. In addition to the 14 targets on the list above, these included Dong Hoi highway bridge (18.1), Thanh Yen highway bridge (18.2), Cau Tung highway bridge (18.3), Huu Hung highway ferry (18.4), Tam Da railroad/highway bridge (18.6), Ben Quang barracks SW (39.1), Ile du Tigre barracks/storage (39.16), Vinh Linh barracks NE (39.2), Mu Gia Pass barracks/supply area/staging point (39.3), Quan Len barracks/storage/training area (39.4), Xom Trung Hoa barracks/supply depot NW (39.5), Vinh Son radar (67.2), Phuc Loi naval base (71.1), and Quang Khe naval base (74.1). [source 1, pages 14–15]

{B} denotes JCS-recommended targets for the first 60–72 hours after a hypothetical decision to implement the military's preferred "Option B" operations against North Vietnam. These would have been accompanied by the striking of five targets in Laos within the first 24–36 hours (Tchepone barracks and military area, Ban Tay military area, Nape highway bridge, and Ban Ken bridge–Route 7). Following those strikes, the remainder of the fixed targets and route targets in North Vietnam on the "94 Targets List" would be hit. "The military program would be conducted rather swiftly, but the tempo could be adjusted as needed to contribute to achieving our objectives." However, "Option B" was never approved for execution. [source 6, tab 2]

The list was broadly divided into five categories: 12 lines of communications nodes, nine airfields, 53 military installations/ports, eight industrial plants, and 12 armed reconnaissance routes. Many of the targets were complexes with more than one activity present (table 4).

Out of 113 entities on the list, only eight (7 percent) are industrial. Of the remainder, nine (8 percent) are airfields (air superiority targets), 11 (10 percent) are command/control, 23 (20 percent) are troop-related, 30 (27 percent) are sustainment-related (ammo,

fuel, supplies), and 32 (28 percent) are transportation nodes (including ports).

The two apparent emphases are on the strategic isolation of North Vietnam from outside sources of war materiel and on impeding the DRV's offensive capability by devastating key headquarters, troop concentrations, materiel stockpiles, and lines of communications. Fully recognizing that the DRV was not an industrialized nation and that it required military imports for everything, including AK-47 assault rifles, the JCS planners quite logically aimed to cut off Eastern-bloc aid. Without such aid, the

Table 4

Target Complexes

2 jet-capable airfields	7 ports and port approaches
5 limited jet-capable airfields	2 railroad repair facilities
2 non-jet-capable airfields	2 railroad yards
2 communications facilities	8 railroad/highway bridges
9 headquarters	1 highway bridge
22 barracks	3 railroad armed-reconnaissance routes
1 training area	9 highway armed-reconnaissance routes
2 ordnance depots	1 iron and steel plant
8 ammunition depots	1 machine tool plant
5 POL storage facilities	3 chemical/fertilizer plants (explosives)
1 storage area	3 thermal power plants
14 supply depots	

NVA could never generate the combat power either to sustain the flagging Vietcong efforts or to mount serious offensive actions itself. In addition, the extremely dense antiaircraft environment which US flyers faced was possible only due to the imported air defense systems.

In retrospect, the 94-Target List seems entirely congruent with the objective of disrupting the DRV's efforts to conquer South Vietnam. Given that the generals and admirals were capable of producing a realistic target list, we must examine their execution plan.

Implementation Plans

Historically, the lackluster Rolling Thunder bombing program of the Johnson administration was based on "Option C" of the McNaughton/Bundy memorandum quoted above. This was the progressive, slow squeeze of incrementalism. In the same memo, however, McNaughton and Bundy presented the JCS position as "Option B":

Option B would add to present actions a systematic program of military pressures against

the north, with increasing pressure actions to be continued at a fairly rapid pace and without interruption until we achieve our present stated objectives. The actions would mesh at some point with negotiation, but we would approach any discussions or negotiations with absolutely inflexible insistence on our present objectives.²⁷

The JCS air plan that supported this option was to be executed in four phases, involving 13 weeks of air strikes, allowing the North Vietnamese ample opportunity to cease their operations and begin negotiations.²⁸ The outline plan was as follows:

Phase I (three weeks duration): Emphasis - continuous attacks on lines of communications and military installations south of the 20th parallel.

Phase II (six weeks duration): Emphasis - isolation of the DRV by destroying the rail links to China.

Phase III (two weeks duration): Emphasis - isolation of the DRV by mining port approaches and destroying port facilities; destruction of supply centers and ammunition storage in the Hanoi-Haiphong area.

Phase IV (two weeks duration): Emphasis - destruction of all remaining targets on the 94-Target List, including industrial targets, and reattack of other targets which had been repaired or not completely put out of action by initial attacks.

Additionally, the joint chiefs were mindful of the need to neutralize the DRV's air defense and warning network. Thus, an integral part of planning was a night strike by 30 B-52s from Guam against the operational jet fighter base at Phuc Yen, followed the next morning by 68 fighter-bomber sorties striking Gia Lam and Cat Bi air bases and revisiting Phuc Yen.²⁹ "They [the JCS] also desired that a plan be conceived which would provide for the complete and systematic destruction of the radar and telecommunications facilities which allowed the North Vietnamese to monitor the approach of allied aircraft."³⁰ As there were no SAM sites in the DRV at this time, B-52s and tactical fighters would have had much greater freedom of action—comparable to when the DRV ran out of SAMs in 1972 due to the mining of Haiphong. The Johnson administration, however, would not permit the closure of the DRV ports—key to achieving air superiority and stifling the buildup of the NVA.

Although Secretary of Defense Robert S. McNamara acknowledged that the country had no industrial war-making potential, he continued throughout the conflict to prohibit air strikes against the ports which were the receiving areas for the enormous input of communist-bloc industrial and war-making equipment and supplies. Trucks, field artillery pieces, missiles and associated equipment, POL, portable power generators, food, and medical supplies were all allowed free passage into the port of Haiphong throughout the air campaign, much to the chagrin of military commanders at all levels of command.³¹

US airmen had to dodge communist missiles or avoid them by going low—into the lethal range of anti-aircraft artillery. Johnson did not permit the war-sustaining supplies for the NVA and the VC to be stopped at sea or on the docks at Haiphong, where operations

would have been much easier. Instead, supplies would make their way south via the Ho Chi Minh trail, where airpower—blinded by triple-canopy jungle—could destroy only a fraction.

Given that the 94-Target List was realistic for the purpose for which it was designed, and given that the JCS plan for its implementation addressed the military objectives at hand, could there have been a different outcome to the Vietnam War? Would a better result have been produced by the combination of a rapidly executed air campaign, naval mining (which worked admirably in 1972), and Army plans to block the Ho Chi Minh trail on the ground?

Douglas Pike, probably the leading authority in the West on the mind and mood of North Vietnam, believes that the North Vietnamese were truly shocked by Linebacker II [B-52 raids in 1972] and has written: "Had a similar campaign of all-out bombing been made in early 1965" (when General LeMay and Gen John P. McConnell began calling for it), Lyndon Johnson probably could have achieved his goal of "moving Hanoi's forces out of South Vietnam." Pike argues that although Hanoi would have maintained its objective of unifying Vietnam (just as Kim Il Sung retained his goal of "reunifying" North and South Korea), Ho would have had to reassess the wisdom of seeking that goal through violence. The Korean paradigm is informative in other ways. Massive bombing in the spring of 1953, on a scale never before experienced by the North Koreans, forced a long truce—one that continues to this day—and has allowed the people governed from Seoul to prosper. But such was not to be the case in Vietnam.³²

Perhaps there could have been another outcome to the war. The combination of a whirlwind air attack against the 94 targets, the naval mining of the DRV coast, and a ground maneuver to block the Laotian panhandle could have deprived North Vietnam of the outside sources of materiel that it depended upon; choked off its ability to send units and supplies south; and rendered the Vietcong in-

capable of prolonged activity. In the long run, these actions could have stabilized South Vietnam (like Korea), leading to democratic and economic progress in the following decades. The cost, most likely, would have been a continued American presence along a fortified demilitarized zone stretching from the Tonkin Gulf to the border of Thailand.

In this regard, one of the most interesting ironies of the period is included in the draft of the McNaughton/Bundy memorandum, which presented the various options. Before the paper went final, a paragraph on page 21 was lined out, to be excluded from the finished memorandum: "1. Option B probably stands a greater chance than either of the other two of attaining our objectives vis-à-vis Hanoi and a settlement in South Vietnam."³³ What might have been. . . .

Conclusions

Although this article has not treated Vietnam ground and naval planning in depth, JCS air planning, as revealed by the 94-Target List and implementation plans, suggests several conclusions:

1. Were the generals and admirals mesmerized by a nonexistent North Vietnamese industrial web that they planned to bomb? No. In spite of period rhetoric, the 94-Target List does not substantiate any fantasies of World War II industrial bombing campaigns. The JCS appears to have had a realistic grasp of the situation.
2. What was the thrust of the target list and the implementation planning for it? Clearly it recognized that North Vietnam was not an industrialized country and that its vital war-sustaining means were provided via a few critical nodes—port facilities and a couple of key rail lines—which could be (and in 1972 were) shut down. Additionally, key command/control and troop targets, as well as critical lines of communications nodes and air superiority tar-

gets were marked for destruction. The all-important military aspect of time was emphasized. The ability of an enemy to recover from, and accommodate, bombardment is closely linked with the tempo and mass of the effort. Unfortunately, incrementalism can dilute any military effort to the point of ineffectiveness, which is what took place during Rolling Thunder.

3. In this case, the critics have gotten it wrong. They have perpetuated a myth that the air arm could not have made a positive contribution in a war like Vietnam because Air Force strategic bombing doctrine got in the way. This position is manifestly unsupportable when the 94-Target List is scrutinized. The problem has been that since the list has remained an unrevealed mystery, it is easy for critics to misrepresent the entire air planning effort. In retrospect, generals and admirals can, and often do, call things the right way.
4. What are the lessons for the future? Instructors at Air Force professional military education schools need to do their homework. The uncritical acceptance of assertions that the air arm was (and perhaps is) irrelevant in places like Vietnam distorts student officers' views about the capabilities and limitations of airpower. The fact is that airpower (as well as land and naval power) was not allowed to accomplish what was planned, but it accomplished everything that it was allowed. There are no grounds to assert that it was commanded by doctrinaire generals who were wedded to obsolete methods. It is clear that they knew what to do. One lesson brought home by the 94-Target List is that airpower, as a major joint contributor, should not be discounted out of hand in the context of conflicts such as Vietnam. It might be just what is needed. □

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In war there is never any chance for a second mistake.

—Lamachus, 465-414 B.C.

The Ethical Problem in Pluralistic Societies and Dr. Toner's "Mistakes"

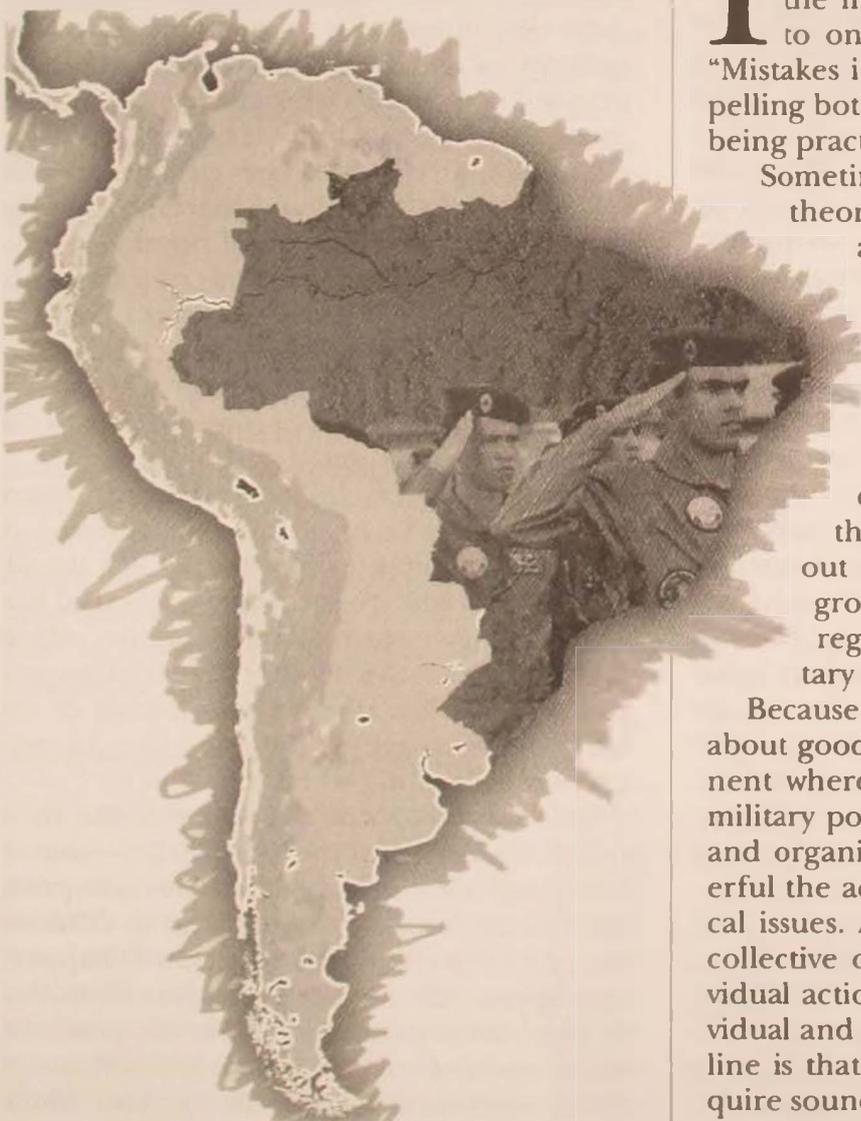
DR. ALEXANDRE S. da ROCHA

Editorial Abstract: How can the military instill high ethical standards in its members when these standards appear to be in social decline? Are military cultures out of touch with the people they protect? First published in the Portuguese edition of Aerospace Power Journal, this piece by Dr. da Rocha responds to an earlier APJ article by Dr. James Toner. Here da Rocha provides an international (Brazilian) perspective in a deep, theoretical tutorial on the origins and relationships of social and military ethical standards. His article will challenge readers to think.

IN THE PAST, the *Airpower Journal* has published many articles about ethics in the military. This article is in response to one of them: Dr. James H. Toner's "Mistakes in Teaching Ethics," which is compelling both for its content and for its goal of being practical.¹

Sometimes academic discussions about theoretical issues can be rather abstract and remote from the practicalities of everyday life. However, I believe in scrutinizing theoretical concepts as a tool to make them useful in achieving "practical" results. I will discuss theoretical issues absolutely necessary to understanding ethical problems as they appear in today's society. Without that understanding, there is no ground for sound, practical decisions regarding ethical issues in the military or elsewhere.

Because ethics deals with value judgments about good or evil, ethical issues are preeminent where and when it comes to applying military power. This involves both individual and organizational actions.² The more powerful the actor, the more important the ethical issues. And we must also remember that collective conduct, in fact, stems from individual actions—hence the link between individual and organizational ethics. The bottom line is that individuals and organizations require sound ethical judgment.



Authors who write about ethics and the military, like Dr. Toner, point out that the essence of the ethical problem is being sure that decisions are “right” and lead to “right” actions. This requires clear understanding of what “being right” means, as well as establishing *who* is entitled to legitimately define those “rightness” criteria.

Since this is entirely a multifarious problem, a linear argument is poorly suited to deal with it. What follows are some comments regarding various aspects of this ethical problem. They encompass diverse concepts that will, in the end, show their commonality.

First, I intend to discuss a rather abstract issue that is key to understanding the ethical problem today—what is the nature and the source of “ethical bewilderment” seen in our society? I would suggest it comes from ideological³ differences most people fail to notice as they engage in rational discussions about ethical matters. Because they do not share a common ideological basis, rational discussion is impossible, even though it may take on the appearance of rationality. As a consequence, it cannot produce rational agreement. Simply put, people talk in good faith but don’t understand each other.

This certainly applies to the military. Military members are real people living at a particular time in history and experiencing the perplexities of changing, clashing values. The military is generally socially and politically conservative (see the section “Some Concepts ‘Held Sacred’ in the Military,” below), if not for other reasons, because of its rigid hierarchical structure. Consequently, it is possible that many of the most cherished values in the military could conflict with newer, possibly more liberal, ones of society. New social values are not necessarily the result of a deliberate attack upon the “good old ones” but can be simply a result of social experiences.

I also discuss how personal conduct is affected by the insertion of an individual in an organization, particularly one—like the military—known for its strong “esprit de corps.” Finally, I deal with the difficulties of defining the ethical standards that must be taught in a

military academy and some of the problems that affect teaching. In order to focus my argument, I follow the “mistakes” pointed out in Dr. Toner’s article.⁴ However, I show that all of the difficulties we can identify in teaching ethics in the military are broader than mere pedagogy. In fact, they come from the very nature of the military bureaucracy.

The Ethical Problem in Pluralistic Societies

The Intuition of Good

The concept of ethics is directly related to the concept of good. Today there are two philosophical trends explaining how good originates: the universalist school affirms that the concept of good is a universal intuition—people know how to tell right from wrong because they have, as human beings, an inherent ability to do so. The circumstantialist school, on the other hand, declares that the concept of good has a social origin—it is related to the collective interests of a society to ensure its survival and development. Such interests become values that are part and parcel of the set of concepts known as the society’s symbolic universe⁵ and become criteria to discriminate between good and evil.⁶

There is a great difference between asserting the existence of a universal intuition of good and accepting that people are usually able to tell right from wrong in practical life. The most interesting aspect of the ethical problem is not the mystery that enables people to know what is good but whether or not they choose to act for the good they know—and why they don’t when they don’t.

It is not my purpose to deepen the theoretical discussion of the two schools—universalist and circumstantialist. They are mentioned only because they address in different ways an important question: how it happens that apparently everybody shares the notion of good, both those who act for the good and those who don’t. Also, how is it possible that deep, uncompromising divergences about

good and evil remain among intelligent, rational people?

Actual Divergences: Opinion Conflicts

It is generally accepted that usually people know how to tell right from wrong. In many cases, however, society may be split on what is right and wrong, depending on the size and influences of various interest groups behind their causes.

When a social group is ideologically homogeneous, it is usually possible to reach consensus on what is ethically appropriate and what is not through a debate that can come very close to a rational discussion. Consensus can appear as an obvious truth, sometimes held "sacred," accepted by most people and handed down as tradition from generation to generation. In such a case, the task of ethics education involves adjusting individual behaviors of occasionally rebellious minds to the fully accepted, well-established consensus.

However, in ideologically heterogeneous societies—such as modern pluralistic societies—this is not likely to happen because people do not share the minimal ideological basis needed for true consensus. Adjusting someone, in his or her socialization, to behaviors that "everybody" follows and supports is quite different from adjusting the same young person to behaviors to which society pays lip service but does not follow all the time. The inescapable issue is this: when a society's ideological homogeneity is changed into one of diversity, the unanimous acceptance of key values, which ultimately built the concept of good, is destroyed.

Who Is the Referee for Opinion Conflicts?

When such a situation exists and rational discussion is unsuitable to settle the issue, it is still possible to rely on accepted "magisterial authority" to "teach the good." Such a magisterial authority is quite different from a political authority with power to impose specific solutions that might force desired action but would still not solve the ethical issues. So, the magisterial authority must be acknowledged,

if not for its arguments, at least for its charismatic leadership.

Thus, in ideologically heterogeneous societies, how to teach ethics follows how to establish accepted social values. The puzzling thing is that most people in society have no difficulty in mentioning the values taught in times of greater ideological homogeneity. However, when it comes to making these values operational, opinions diverge greatly, making it almost impossible to find and articulate the true standards of behavior.

Conditioning the Conduct: The Organizational Influence

The previous section dealt with individual conduct relating to social standards, explicit or implicit. This one discusses regulating individual conduct by rules that bind people to their organizations, by the culture of these organizations, and by a game made out of the reciprocal expectations of behavior between organizations and society.

For expository purposes, the issue of how an organization interferes with the conduct of its members can be split in two—outer and inner. The outer aspect refers to the expectations about people's behavior related to how an organization is seen by society. Each of its members is supposed to carry out duties in accordance with the organization's social function. The inner aspect refers to the relationship between an organization and its members. One should note that such a relationship encompasses the rules inspired by an organization's interests for survival and development, including the rules that aim at building a favorable social image.

A latent conflict exists between an organization's interests for survival and development and its members' private interests. Such a conflict must be managed. Members are motivated toward maximum benefit with minimum effort. But this is at odds with the organization's need to produce in order to survive—hence the need for institutional loyalty to the organization over the individual (self-sacrifice for the sake of the team). This is

not an evil consequence of organizations, as some authors contend;⁷ it is just a logical requirement.

The best way to manage the essential, latent conflict between an organization and its members is to dissolve the overall interests of that organization into the particular interests of its members. Usually, a good working environment, high wages, and fringe benefits encourage institutional loyalty. However, these are often not enough. In many cases, there must be a synthesis of interests—institutional and private—so that members are convinced it is their duty to promote organizational interests that are in harmony with values held sacred by that organization and society. This gives meaning to their lives.

Accepting organizational “sacred values” also promotes identity and solidarity in the organization. When members link their own identity to that of their organization, it produces “group consciousness” and distinctiveness, which are strong team motivators but which can also end up in social castes or elitism.

The Case of the Military

I cannot overemphasize the importance of ethical issues in the military. Its members are guardians of a nation’s power and therefore hold a social position that can be diverse in different societies but always relevant to ethics. Because of its very nature, the military is prone to display a strong group consciousness, and in many countries it can become a true caste. This is not the case in the United States or in Brazil. Even though Brazil’s segregated military education promotes some military ideological homogeneity, there is little social differentiation. In fact, throughout Brazilian history, the military has been an important factor in social mobility.⁸

Even though there is some altruism on the part of the military, which is essential for society’s security, it is also legitimate for the military to have certain interests that promote its existence and development—just as individual members also have their specific interests related to their own lives. So it is only natural

that conduct in the military be conditioned by rules whose aim is to (1) accomplish the military functions required by society, (2) promote the existence and development of the military, (3) accommodate appropriate interests of individual members so they feel they are part of an organization that cares about them individually, and (4) interpret for its members the more relevant societal values.

All around the world, the military cultivates a very rich and colorful complex of rites and symbols intended to promote some values it holds sacred. Such rites and symbols help to create a sense of psychological differentiation for the military. In countries where the military is a true caste-like stratum, such psychological differentiation helps provide a consciousness of belonging to a distinctive (and privileged) social group. In countries where the actual social differentiation does not exist or is not strong—like Brazil or the United States—such consciousness helps locate the individual in his or her social (professional) group and foster the kind of solidarity typical of the military.

The Military Conditioning of Conduct

From an external perspective, how the military conducts itself ethically and morally is a reflection of what the military means to society. Reciprocal expectations exist between the military and the society at large regarding duties and rights, and this is the foundation of many societal features as, for example, the degrees of independence with respect to the military’s employment of power. This is an important issue regarding the modern definition of democracy.⁹

Because such an issue reflects a nation’s political organization and culture—its global structure and its people’s way of life—it is not surprising that there is much diversity in different countries due to cultural and political differences. For instance, in the United States, civilian control of the military is an ethically relevant, explicit condition of political life. There is no doubt that the military knows and practices this tenet of American democracy, and it is crucial as a military mem-

ber to know where to draw the line (e.g., between the right to free speech and the duty of noninterference in politics).

In the United States, both civilian thinkers and retired military members write on defense matters. In Brazil, even though the law and actual political practice do not allow for military interference in political life, it is still difficult to find civilian thinkers, much less competent ones, interested in discussing military issues. So, naturally, common opinion is that military issues are "reserved" for military opinions, which causes a greater degree of military involvement in the making of military policies. Such involvement by the military could seem excessive to the American way of thinking. Perhaps it is fair to stress that this state of affairs does not imply any undue involvement of the military in politics in Brazil, and there is no concern regarding the country's democratic stability. Moreover, a rather recent interest in strategic and defense studies has surfaced in the universities and research institutes, initiating some civilian thought on defense and military affairs—with no complaint from the military.

From an internal perspective, how the military conducts itself has more to do with the individual member and his or her conduct with respect to accepted standards of behavior from a military point of view. Of course, this is not exclusive of the external factors mentioned above—society's expected "image" of its individual military members.

So, in this internal respect, ethical issues in the military encompass *both* society's requirements of loyalty and effectiveness from its military *and* the institutional loyalty each individual member owes to the military at large, as well as to his or her own specific military unit. Again, this is not a phenomenon restricted to the military; it is typical of any organization important enough to deserve its own identity as a social actor.

Some Concepts "Held Sacred" in the Military

It is a feature of any organizational culture to favor societal values that most contribute to

the organization's existence and development. So any values that promote the organization and its effectiveness are particularly cherished.

The military's conservative nature and rather rigid hierarchical structure promote its effectiveness and survival as an organization. This does not mean that most of the military necessarily supports conservative political parties but that, for the most part, the military is prone to be against sudden, deep, unexpected changes in a society's way of life. Because they value hierarchy—as discussed later—most people in the military would prefer an organized, stable world in which power positions are clearly defined and do not change—or only change following well-established, enduring rules.

A world of black-and-white, absolute, and unchangeable "rights" and "wrongs" is very comfortable for people like military members, who are supposed to make swift, dramatic, sometimes life-and-death decisions. Shades of gray can make things confusing and disturbingly complex for the decision maker.

Since risking life is intrinsic to military activities, it is hardly surprising that values connected with fearlessness and solidarity, mainly *interna corporis*, are so highly esteemed among the military. So courage, loyalty, truthfulness, and all the other qualities that make conduct predictable—encompassed in the concept of integrity—are among the core virtues in any armed force. What becomes an ethical issue is not the statement of these values but how to make them operational. I will come back to this issue later.

Among the military's core values are hierarchy and discipline, which together promote an attitude of holding obedience sacred. Let's dwell a bit on this.

The requirement for obedience is integral to discipline. Why discipline (and obedience) is essential to the armed forces is evident. The military must be always ready to face situations in which it could be mandatory to (1) accomplish actions coordinated in time, space, intensity, and mode in a way that makes them appear as a whole—a collective,

very complex, purposeful action performed preferably with the maximum economy of effort; (2) risk their own lives; and (3) perform actions potentially so destructive that under normal conditions they would cause a guilty conscience in the performer. Therefore, it is essential to submit the military to the physical, psychological, and moral training suitable to make it able to, under certain circumstances, perform actions effectively while suspending, if only for a while, the paralyzing effects of the perplexity that such actions would normally cause in rational, ethical people. Briefly stated, it is essential that the military be trained to obey orders effectively.

However, it is not easy to systematically block personal judgment regarding one's own actions while being fully aware of them.¹⁰ So holding obedience sacred is the way to accomplish that aim because the agent becomes convinced that obeying is more important, better, or more righteous than following the inner imperative of one's personal judgment. In order for one to do this without a personal inner conflict, he or she has to believe that the person in charge is in some sense "superior" to the person who obeys. This is the root of hierarchy.

Hierarchy—in the military or elsewhere—involves *functions*. In the military, the commanding officer must be certain that his or her command will be strictly followed. This allows the commander to manipulate his or her subordinates—the people who will actually perform the effective actions—collectively, exerting control over them to the extent needed for very great operational precision. Such is the logical justification for hierarchy. However, this is just a view on the grounds of organizational necessity; it is not immediately apparent to people who lack abstract vision. On the other hand, it is not appealing enough to motivate one to renounce the supremacy of personal judgment. Thus, another element must be added to make it easier to hold obedience sacred—people must believe that information is not evenly disseminated. The person who obeys lacks information known exclusively by the commander—

who is better informed, more experienced, and *knows better*. When there is an honest, intelligent, selective procedure for appointing military leaders, this is true. However, it is not always the case, and even the best selection process cannot guarantee good results. Usually the commander-subordinate hierarchy never changes during military members' careers. So there is psychological acceptance—an act of faith—of the superior's actual superiority. The hierarchy of functions becomes a hierarchy of *people*. So the captain comes to think the colonel is somehow superior, forgetting that it is the functional hierarchy rather than the personal one that involves superiority. In essence, the military hierarchy is raised to the category of a metaphysical proposition!

Such ideas simply serve to illuminate at least two aspects of the ethical problem in the military. The first is that since military hierarchy is acknowledged as a metaphysical proposition, obedience to the superior becomes a good in itself, regardless of its concrete results—or, at least, it justifies a claim against accountability on grounds of what is called "the principle of due obedience." Second, the metaphysical vision of hierarchy lurks into the military culture to "infiltrate" possible worldviews in such a way that most individual members of the military would be prone to accept the notion of a world that displays (or should display) a hierarchical organization based on essential, absolute criteria rather than on efficiency criteria to achieve desired ends through acceptable means. Obviously (1) it is not true that every military necessarily shares such a metaphysical concept of the world, and (2) such a metaphysical concept of the world is not exclusive to the military. It is not our purpose here to further speculate on metaphysical views of the world. Our only aim is to point out that there can be a link between people's belief in a metaphysical view of hierarchy and a *Weltanschauung* that is relevant to the discussion of ethical issues they face.

The Ethical Problem in Military Conduct

The ethical problem in military conduct is shaped by two expectations: those of society

and those of the military. The most puzzling issue today about military ethics involves determining how to reconcile the military's standards for acceptable conduct with those of society. Take, for example, the controversies about the involvement of women in typical military activities, especially as combatants, or the compatibility between the display of specific sexual choices and service in the military.¹¹

Even when there are undisputed values, an occasional conflict could still arise. For instance, nobody disputes that courage is a virtue (in the military and elsewhere). However, in some societies (or parts of them) it could be deemed "courageous" to blindly obey orders that would put an individual member of the military at risk—physically, morally, or legally. For other societies, "courage" could entail resisting illegal or illegitimate orders and risking one's career, if not survival. Of course, these are complex problems, and most of the time, in the event of a controversial action, it is extremely difficult to determine the factual truth and the real aim of the actions at stake.

Take, for example, the "ethics of conviction." Dr. Toner employs such an ethical view when he states that "*human beings generally know right from wrong, honor from shame, virtue from vice*" (italics in original).¹² People know what is right and submit to a Kantian categorical imperative¹³—you have to do what you know is right. Under such an imperative, the concept of good is not open to debate; people must simply do what their convictions tell them to do without dwelling on the consequences. When prescribing a teleological adherence to righteousness, however, the ethics of conviction can lose sight of any ethical criticism of the means and ways to reach the proposed end.

Another example is the "ethics of responsibility," promoted by Max Weber, involving a greater concern about the intermediate states, which occur before reaching the ultimate end. Thus, the ethics of responsibility stresses the ethical concern about means as well as about unexpected or undesired collateral results.

In many situations involving ethics of conviction and ethics of responsibility, it is not that easy to determine which would be the uncontroversial "right." This, then, is the core of the ethical problem of conduct. Difficulties could arise at different levels: it could be difficult for one to establish his or her own convictions about right or wrong from initial perception, to deliberate about the situation, and finally to choose a course of action.

The Ethical Problem and the "Mistakes" Pointed Out by Dr. Toner

The point so far is that to teach ethics in the military, we must first determine a minimum core of values that can be made operational and that is not controversial, both to the society at large and to the military. If such core values are found, the second problem is how to teach them effectively.

Several relevant questions deal with this issue: are there any values that society has forgotten but which are still important for the military? If so, is it possible to teach them without creating a conflict with the standard behavior cherished, accepted, or tolerated by society? If such a conflict is unavoidable, are the armed forces (ethically) entitled to persist in urging the practice of such values? On the other hand, should it be the (ethical) duty of the armed forces to insist on such values? Or should the armed forces reformulate their views of reality to adjust themselves to the values that effectively belong to society?

These questions need answers before going further into how to teach ethics in the military. By examining Dr. Toner's insightful series of "mistakes," we can hopefully narrow in on a line of reasoning toward some answers.

Mistake Number Zero

"Some people argue that, in a multicultural country, we are hard pressed to delineate *one* understanding of ethics. . . . None of these points makes any negative impact on this fun-

damental truth: *human beings generally know right from wrong, honor from shame, virtue from vice*" (italics in original).¹⁴ The core issue in this quotation is how to understand such a thing as "one understanding of ethics." I certainly agree with Dr. Toner on the general willingness of people to support ethical behaviors and to criticize unethical ones—in the military or in any other professional group. However, as mentioned before, problems do not arise when people are supposed to declare themselves for or against ethics—or even when they are invited to voice what they deem to be ethical behavior. Difficulties come when such good intentions must be made operational.

So I would agree that there is a problem with looseness of customs and consequent conduct. This is a real problem today in some societies in which people in power appear to be above the law or their stated ethical standards hypocritically conflict with their actual behavior.

Because, however, the cherished, accepted, or tolerated behaviors effectively change in time, in many circumstances people find it difficult to form their own convictions about what is right or wrong. People's convictions are as much determined by the influence of others as by a personal sense of ethics.

This is why controversies about abortion, alternative sexual orientation, legal protection against discrimination, legalization of certain drugs, legal status of infidelity, and so forth rage today on the agendas of the Western nations and give birth to passionate debates about which everyone—no matter which side he or she takes—is quite sure, in good faith, that his or her side is the defender of civilization. Contrast this to questions like the existence of angels or of the devil, the true meaning of the Eucharist (whose discussion in the Middle Ages gave origin to the physical concept of mass),¹⁵ or believing or not believing in God. In the past, a "mistake" about them was serious enough to be punishable by death. Yet, today such questions—outside specialized forums of discussion—only

cause condescending smiles or an impotent gesture of dismay.

Regarding the armed forces of primarily Judeo-Christian nations, if people had no difficulty reconciling the categorical "*Thou shalt not kill*" with perfecting the art of war, any ethical concept would likely become strengthened or bypassed through the enunciation of adequate sophisms. The only requirement is ideological homogeneity. When such ideological homogeneity is deemed helpful to the society's preservation and development, it will eventually become a rational truth with the blessings of the accepted religion. However, our present situation is not so simple. Because ideological homogeneity is not a feature of contemporary times, our present "ethical bewilderment" is not a result of ignorance or malice; it is just reality in a pluralistic world.

Mistake Number One

"*We sometimes suppose, as teachers of military ethics, that, despairing of today's youth, we must 'build from the bottom up.'* . . . *People entering our forces today already have the power of ethical judgment. We do not have to reinvent the ethical wheel*" (italics in original).¹⁶ Dr. Toner is quite right: *we do not have to reinvent the ethical wheel.* First of all, that "minimum core of values that can be made operational and that is not controversial, both to the society at large and to the military," which I mentioned before, does exist; the only difficulty lies in articulating its axiological content. But the mere living together of people without continuous serious conflicts shows that they share some values, which they make operational in similar ways.

It is essential, I believe, that all citizens and professionals (military members included) be humble enough to acknowledge the truth of two statements: (1) there are shared values that operate in people's lives, and (2) such values do not depend on our own understanding or our own acceptance; it is a social fact.¹⁷ What we must do is build upon such a "shared foundation"—through sound arguments and, most of all, through good examples—to help

people improve according to what we think, in good faith, is possible and necessary.

Mistake Number Two

"Just as it is a mistake to assume that people have no ethical judgment, so is it *a mistake to assume that they have superior ethical judgment Our task as teachers of military ethics is to impart some sense of order, some overarching scheme of discipline, to the ethical sense and awareness that already exist*" (italics in original).¹⁸ Again, I agree with Dr. Toner. Everybody is endowed with the ability to make ethical judgments. It is immaterial to discuss here whether people can have a universal intuition of good through some natural ability or share the sense of what is vital for the society in which they all live. What matters is people's capacity to factually make ethical judgments. And such capacity operates inherently in the person who is unable to get rid of it, even when acting under orders and when told not to judge his or her superior's motives or choices.¹⁹

However, when Dr. Toner says that not everybody has "superior ethical judgment," he seems to acknowledge that when several people exert their ability to make an ethical judgment about the same subject, the conclusions they reach can be diverse, which seems inconsistent with the statement that they "generally know right from wrong." In fact, there is no contradiction at all—people generally know right from wrong, but the notion of right and wrong they have is not the same for everybody.

Nevertheless, when speaking of *superior* ethical judgment, Dr. Toner seems to suggest that there is a "right" that is better than other "rights." It seems to me that it is ethically relevant to decide *who* determines such an absolute "right" (or, at least, the preferred "right") because a mistake on this important issue can give rise to many kinds of disastrous consequences for society. A member of the Roman Catholic Church could say that decisions regarding faith or morals are up to the Pope, speaking *ex cathedra* under the inspiration of the Holy Ghost and thus infallibly.

This answer might seem right to me except that, contrary to what happened in the Middle Ages, not everybody has to be a member of the Roman Catholic Church. We could consider creating a deliberative body, like a parliament, specifically to decide about the preferred "right." However, since Socrates' discussion of virtue, the difference between the coercive capacity of a formal authority and the cogency of arguments capable of being based on judgments of value is clear. In short, when there is a meaningful split regarding the rightness or wrongness of certain conduct in a pluralistic society, I cannot see how it is possible to determine, in an ethical way, the *superior* "right."

However, I gladly agree with Dr. Toner that the only function of a teacher—who teaches ethics or something else, in civilian or military schools—is always *to impart some sense of order, some overarching scheme of discipline to the . . . sense and awareness*. In highly objective matters, a teacher imparts to his or her students information that will lead them to immediately acknowledge certain laws or truths of nature. In fact, this is what defines the degree of objectivity of an academic subject—not any professional *lobby* to Congress or to an educational board. However, when an educational program deals with strong opinionative content and a low degree of objectivity, teachers can offer their students only an improvement in their ability to exert criticism and organize thought. Such is the teacher's business. It is doubtful whether intending anything else could be deemed ethical behavior for a teacher.

Mistake Number Three

"The fact that the boss is ethical does not mean that the organization will be a moral exemplar; and the fact that the boss is corrupt does not mean that everyone in the unit will be infected with ethical disease. But isn't there some common sense here? If people desire an ethical organization, they should choose ethical leaders. It is not a guarantee of ethical success, but it is a much better bet than choosing ethical slackers as leaders" (italics in original).²⁰ Beginning his discussion of this "mistake," Dr.

Toner refers en passant to whether or not teaching ethics should be left to chaplains; he then elaborates on the relevance of the commanding officer to ethical education.

I share Dr. Toner's opinion about how helpful good advice from chaplains could be, mainly if associated with good examples. On the other hand, contrary to commandants and teachers, chaplains have the *right* to indoctrinate their audience without failing to be ethical. It is normal and appropriate for them to preach their religion if their audience is free to choose the religion in which they want to be indoctrinated. However, chaplains should make sure that their teachings are not given in a way that could break military solidarity or fail to show respect to any citizen on the grounds of his or her beliefs—something the citizenry morally deserves and can legally demand.

It is essential to my point that the state be a secular institution. I do not deny the great importance for many individuals—if not for all—of faith as the ultimate support of the truth. This is a very important issue in the *private* lives of people. However, no religious way of thinking can be imposed by the secular state without offending the legally protected freedom of conscience. On the other hand, secular criteria exist for finding and supporting truth—logic-mathematic demonstration and empirical proof with all the procedures loosely defined as “the scientific method.” For instance, someone who smokes could dislike hearing a doctor sponsored by the state declare the high probability of smokers to develop lung cancer or a heart condition. However, much scientific evidence buttresses the doctor's statement. So it is not appropriate to block the spreading of the doctor's information on grounds of offensive behavior. But it is unacceptable for a state-sponsored minister to tell another church's follower (or someone who refrains from following any church at all) that he or she is going to hell for not being a follower of the minister's religion, regardless of whether or not this person believes in hell. The point is that there is no incompatibility between religious thinking and the secular

state only if the state does not discriminate among religions and religious ministers.

Apart from chaplains, I do not deem it ethical behavior for a teacher or a commanding officer to indoctrinate the people he or she teaches or commands in his or her own specific religious beliefs. Regarding commanders, they can offer no better teaching than their good example in everyday life, mainly when doing little things. Because they think everybody pays attention to greater things, people are usually very careful when doing them.

Teachers and theoreticians of ethics can and should repeat to their students and to everybody else the difference between the coercive capacity of authority and the cogency of sound ethical judgment. The obedience owed to a military leader, restricted to the very limits of his or her legal authority and intended to guarantee the effectiveness of his or her performance in command, does not make that leader's decisions wise, right, or ethically sound; it only makes them mandatory for their subordinates. Dr. Toner is quite right when he says that the commander's example is a powerful input, but, at the same time, a corrupt boss cannot infect an entire organization when it is ethically healthy.

Mistake Number Four

“Not every word and not every action are deeply troubling moral quandaries. We simply cannot have commanders who become catatonic at the prospect of making an ethical misjudgment” (italics in original).²¹ This is true for everyone who must make swift decisions that can be consequential to someone else's life—whether he or she is a commanding officer at war or a brain surgeon performing surgery. Even though all decisions are likely to inspire ethical concerns, not all of them imply an ethical puzzle because they are not equally relevant.

The ethics of responsibility sheds light on another aspect of the decision's relevance: if we are responsible for the consequences of our actions, no matter the intended ends, we should strive to be aware of all the possible results of our actions—and many times we don't.

Hence, the question, Why is it so? In many cases, it is perfectly possible to forecast disastrous consequences from a not-so-relevant action, but we do not pay attention to them; is this incompetence or an ethical fault? That leads to another question: is it ethical for us to accept power and authority in areas above our level of technical or emotional competence? And in a hierarchical structure where obedience is held sacred, is it ethical to grant commanding power to someone whose competence is questionable just because he or she has enough seniority and was once a loyal, cooperative member of our own staff?²²

Mistake Number Five

"The idea that every commander is an ethics teacher is absolutely correct; the idea that every teacher is thereby a competent classroom instructor is absolutely wrong. . . . In teaching courses on military ethics, I want students to read good sources about military ethics and not to assume, necessarily, that the commander is an expert in the field of teaching military ethics" (italics in original).²³ Here, Dr. Toner addresses the sensitive issue of factual competence versus official competence. There is widespread understanding among the military that *mission is more important than specialization*, which means that whoever is tasked with a mission must and *can* accomplish it, whether or not he or she is competent enough to do so.

It is useful to establish the difference between "official competence" and "factual competence." In the military, the former is declared authoritatively by the unit or organization due to official position or rank, and the latter is demonstrated by the person himself or herself.

A commander who was never trained to present a lecture can still be a gifted speaker; however, this should not be expected. If he or she is not factually competent to address a large audience, no matter if he or she is a person of admirable integrity, his or her speech will produce only a feeling of respectful pity. Such a person should not be put (or put himself or herself) in such a situation. He or she must teach through his or her example,

which usually would be more convincing than the brightest lecture. It is sad to see a great man or woman, able to perform great things, stumbling on minor difficulties.

Mistake Number Six

"At so many levels in the Air Force, we make the mistake of thinking that *curricula make teachers*. . . . *Get out of the way and let teachers teach*" (italics in original).²⁴ Dr. Toner is quite right again, and his comment reaches farther out than perhaps intended.

Formal rules are not a guarantee, per se, of high-level results. The formal rules intended for state control, for example, are not enough to ensure that all politicians will always act as true statesmen; they do not even ensure honesty among them. The formal mechanisms for professions, which exist in countries like Brazil, do not guarantee good practice; rather, they can be a hindrance when it comes to prosecuting and punishing malpractice. So *curricula* do not make teachers.

However, we must understand that restrictive, controlling, and impersonal mechanisms planned for the "improvement" of activities—which keep competent people from doing their jobs, as Dr. Toner rightly points out—are but a process of spreading out egalitarian opportunities, typical in democracies. The idea behind them is very simple: replacing individual decisions with a more or less complex rule, which would be self-applied, to make everybody's performance *equal*. So all people would be eligible to perform a task, regardless of individual attributes.

Apparently, such uniformity has its advantages. However, it generates several mistakes and drawbacks as well.

Fundamental Mistake. No matter how automatic a process becomes, the human element still exists. Personal idiosyncrasies are still present and acting, albeit in an indirect mode. Thus, it is even more difficult to detect or perhaps correct them because they are disguised and shielded behind the apparent impersonality of the process.

Weakening of Accountability. The more individual judgment is excluded from a pro-

cess, the less accountable people are for their actions. Of course, commanders can always be accountable for everything that happens under their watch. However, such legal fiction cannot long survive the pressures of reality: nobody can be held accountable for something he or she did not actually do and knew nothing of.

A special kind of weakening of accountability happens when a technical document has to be produced by experts from a lower hierarchical level or by contributors external to the institutional hierarchy. The bureaucratic path followed by such a document toward the higher authorities can be full of "improvements" from intermediate-level authorities whose official competence grows along the path while their factual competence may decline proportionately. The changes inserted in such documents are not usually discussed with the lower levels that worked on it, both because they already contributed and because it would violate the hierarchical principle. When things happen this way—and they do—what reaches the higher authority is a "Frankenstein" built "with everybody's cooperation," sometimes bringing an incredible array of silliness before the final authority. In the armed forces, when the subject is typically a military issue, such a procedure carries low risk because authorities with higher official competence usually have higher factual competence. But when the issues at stake are not typically military, then such problems can exist.

Devaluation of Competence. Imposing regulations and guidelines might be intended to allow people with poor competence to perform tasks at the same level of excellence as people with a high competence level. Yet, most often this is not so. Competent people can always further improve their performance by using some support intended to help less competent people, but formal restrictions usually impose lower performances as a "least common denominator" standard.

Favoring Form Rather Than Content. This is a consequence of the equalizing process that contaminates all educational activities, if

not all organizational activities. As rules, norms, manuals, and the like multiply, providing more and more detailed instruction, people end up feeling that their duties were accomplished when they acted by the book, regardless of the result accomplished. If the goals were not fulfilled, someone else should be guilty because "I just followed the book."

We can easily generalize Dr. Toner's very sensible comment: in all organizations, factual competence should be consequential for the accomplishment of the organization's purposes. It should be mandatory for things to be done by people who know how to do them—teachers or any other professionals. If a higher-level authority does not agree with some conclusion in a work, such a person should, at the very least, ask who did it and ask for the reasons underlying the conclusion—and such reasons should also be brought to the decision maker. By doing so, the decision maker would be better informed because there is no guarantee that the intermediate-level authority's criticism is always factually right.

Conclusion

Because contemporary Western societies—here called pluralistic societies—shelter a large ideological heterogeneity, they have lost commonality in appreciating key ethical values. The ethical problem is not that people promote antiethical conduct or that people experience difficulty in voicing their ethical opinions. The problem arises when such values must be made operational in everyday life. People can agree on the ethical values, but they can also disagree, in good faith, on what practical behavior would match such values.

This axiological perplexity affects all organizations in society—including the military. Despite this, the armed forces are always a very important organization to society. Therefore, ethical problems in the military are important to the military and to society at large.

The ethical problem of military conduct involves value judgments by individual mili-

tary members regarding their actions. Such judgments should take into account the specific rules that bind the individual to the military; these rules reflect society's expectations toward its armed forces and the internal administration of interests, both of the military at large and of individual members as well. As in all organizations, the armed forces are selectively sensitive to society's values as a whole, and are prone to hold sacred those values particularly compatible with the military's purpose and how well it performs. The ethical problem in the military includes making sure that individual behavior is in line with societal values and military values.

The ethical bewilderment that permeates contemporary, pluralistic societies is also found in their armed forces as well as in all other important organizations. Because the ethical problem in the military is of utmost importance, it is natural for the armed forces to become more aware of the ethical problem and more sensitive to the urgency in settling it for the benefit of good performance. However, what "ethical behavior" means in the military is not inherently different from what it means elsewhere in society. The overall ethical problem is a social issue. No organization or specific social group is entitled to take over as a guardian of social values.

The academic teaching of ethics meets two kinds of difficulties. First, that teaching should articulate some axiological core capable of being put into practice without great controversy. The second difficulty entails how to accomplish such teaching in view of spe-

cific restrictions that affect the armed forces and military education.

This article has shown that formal difficulties affecting the teaching of ethics in the military just reflect wider difficulties for a hierarchical organization like the armed forces in managing the relationship between official competence and factual competence. Such difficulties are not exclusive to the armed forces, but they are emphasized by the military's strong belief in hierarchy.

So, inspired by the practical concerns of Dr. Toner, who analyzed the teaching of ethics from his extensive experience with the United States Air Force, this article has tried to view the problem in a broader scope, pointing out that

- there is a global crisis underlying the ethical problem, which is sometimes called "Western crisis," "values' crisis," or "modernity's crisis" and that
- some aspects of the ethical problem are rooted in or are affected by the very nature of organizations as social actors. This is not exclusive to the armed forces, but specific features of the military color the problem with special shades.

Further criticism should be developed regarding ethical aspects of performance criteria, relations between work and its aim, and relations between actors and the final consequence of their actions. These, however, are issues for another day. □

Notes

1. Dr. James H. Toner, "Mistakes in Teaching Ethics," *Airpower Journal* 12, no. 2 (Summer 1998): 45-51.

2. By "single actor" is meant the individual as the acting person. A collective actor consists of many people (agents) who act in a coordinate way to fulfill an end that was not established by the individual agents but is determined by a different commanding level, which could be embodied in a collective board or in an individual decision maker.

3. As used in political science, *ideology* is defined as a set of ideas—true or false—promoted by a political group as a tool for taking over and maintaining political power.

4. Toner, 46-50.

5. For the concept of "symbolic universe," see P. L. Berger and T. Luckmann, *A Construção Social da Realidade* (Petrópolis: Vozes, 1985).

6. One should be cautious in applying such descriptive qualifications to people. For example, philosopher Jürgen Habermas, whose work offers many inputs to support the "circumstantialist" standing, believes in the universal intuition of the good, as he himself told the author in private conversation.

7. See, for instance, E. Enriquez, "Os desafios éticos nas organizações modernas," *Revista de Administração de Empresas* 37, no. 2 (April-June 1998): 6-17.

8. Once, while representing Brazil at the Inter-American Defense College, Washington, D.C., the author was explaining to an American diplomat how the Brazilian selective process to the military academies works, pointing out that it is objective and free from political pressures. A Latin-American navy officer intruded upon the conversation and asked for the mechanisms that would allow for the undercover manipulation of the process, mentioning some possible examples. As I assured him that none of them existed in the Brazilian case, he almost provoked a diplomatic incident by declaring emphatically, "I do not believe!" When he made it clear that he was serious, I explained to him that his behavior was inappropriate. Regardless of his lack of good manners in this case, such a comment clearly indicated that in his country, it would be unthinkable that "everyone" could reach the status of a military officer just by having the intellectual merits and the physical fitness required by regulation. He simply could not believe that there was no hidden manipulation to preserve the social homogeneity of the caste-like military stratum. He confessed this later when apologizing to me for his rudeness. Regardless of his impulsiveness, he turned out to be a nice person.

9. If readers wish to conduct a comparative analysis, they should check, for example, the constitutions of Brazil, Chile, and Honduras.

10. This is the dilemma of administration: restraining information to make the agents follow orders blindly is sometimes the choice of linear (hierarchical) organizations. However, such a limitation could greatly diminish the overall efficacy of the collective actor, mainly when the intended goals cannot be reached through mere routine. Many recent articles in the United States defend the need to expand the horizon of the views held by the individual members of the US military—even though, for cultural reasons, members of the American military already enjoy a broader or freer view of their profession than that allowed their counterparts in other countries. The author's personal experience in dealing with general officers in the Brazilian military in the 12 years he served the government led to the following conjecture: commandants who have confidence in their own intellectual capacity are more likely to show their subordinates or associates the "bigger picture." They understand that they can receive better advice from better informed people. Other commandants feel challenged if somebody presents them some idea different from the ones they prefer or have already formulated and that fit the boundaries of their understanding.

11. Berger and Luckmann note that, for the ancient Greeks, homosexuality was a military *virtue*. Today, many Western armed forces can be very reticent about the concept that homosexuality and the capacity for combat or command are not incompatible.

12. Toner, 45–46.

13. For Kant, the categorical imperative is an absolute imposition to practical reason.

14. Toner, 45–46.

15. See Max Jammer, *Concepts of Mass, in Classical and Modern Physics* (Cambridge, Mass.: Harvard University Press, 1961).

16. Toner, 46.

17. This does not mean any moral *laissez-faire* or *laissez-passer*. Nevertheless, the moral tutelage of the society by a military or civilian elite implies great ethical problems. I understand that any citizen has the right—if not the duty—to promote the values that his or her conscience tells him or her are in the best interest of civilization. He or she would do so through social interchange, legitimate participation in political life, and all the processes of informal teaching and learning that occur during people's lives. However, to assign an ethical priority to a professional category, social class, or any other collectivistic abstraction seems to me a dangerous absurdity.

18. Toner, 46–47.

19. It is true that some people believe so fervently in the sacredness of the military hierarchy and in obedience that they refuse to judge any act of a "superior" authority. However, such an attitude—which approaches religious bigotry—is not usual and could be deemed pathological. It is possible to produce such an attitude through mind-control techniques, individually or collectively. Obviously, such techniques are inhumane and antiethical. The essence of military discipline lies not in obeying superiors because they are always right. It lies in obeying them *even though* they could be wrong because they need such a degree of obedience to manipulate the collective actor under their command and to evaluate the results of their orders. Without discipline, this would be impossible.

20. Toner, 47.

21. *Ibid.*, 48.

22. The relationship between ethical deficiency and incompetence is interesting and deserves elaboration. Incompetent people need to rely on someone else's advice to practice acts that such advisors are not allowed to perform because they have not been deemed officially competent. This is a sham because the advisors become the real decision makers (because their bosses cannot make their own evaluations), but such advisors do not bear any responsibility for their decisions (because making decisions is not part of their official competence). Another possible consequence of such incompetence is that some commanders hire staffers less competent than themselves because they are fearful of losing any of their power or because their egos cannot tolerate the presence of an intellectual superior. Because armed forces are always very important, no matter how peaceful a nation, such a situation could cause incalculable damage to that nation's interests.

23. Toner, 49.

24. *Ibid.*, 49–50.

A Light Dawns

The Airborne Laser

CAPT GILLES VAN NEDERVEEN, USAF*

Editor's Note: PIREP is aviation shorthand for pilot report. It's a means for one pilot to pass on current, potentially useful information to other pilots. In the same fashion, we intend to use this department to let readers know about aerospace-power items of interest.

THE AIRBORNE LASER (ABL), or YAL-1A, is the second-largest aircraft program in terms of funding (the F-22 being the largest).¹ The modified 747-400F ABL (fig. 1) is designed to serve as a theater-ballistic-missile-defense platform by engaging missiles in their boost phase. After

Operation Desert Storm, the Air Force stood up the ABL Program Office in 1992 at Phillips Laboratory, located at Kirtland AFB, New Mexico.

In order to carry out a successful intercept and shutdown, ABL will operate above the clouds at 40,000 feet, where its boost-phase at-

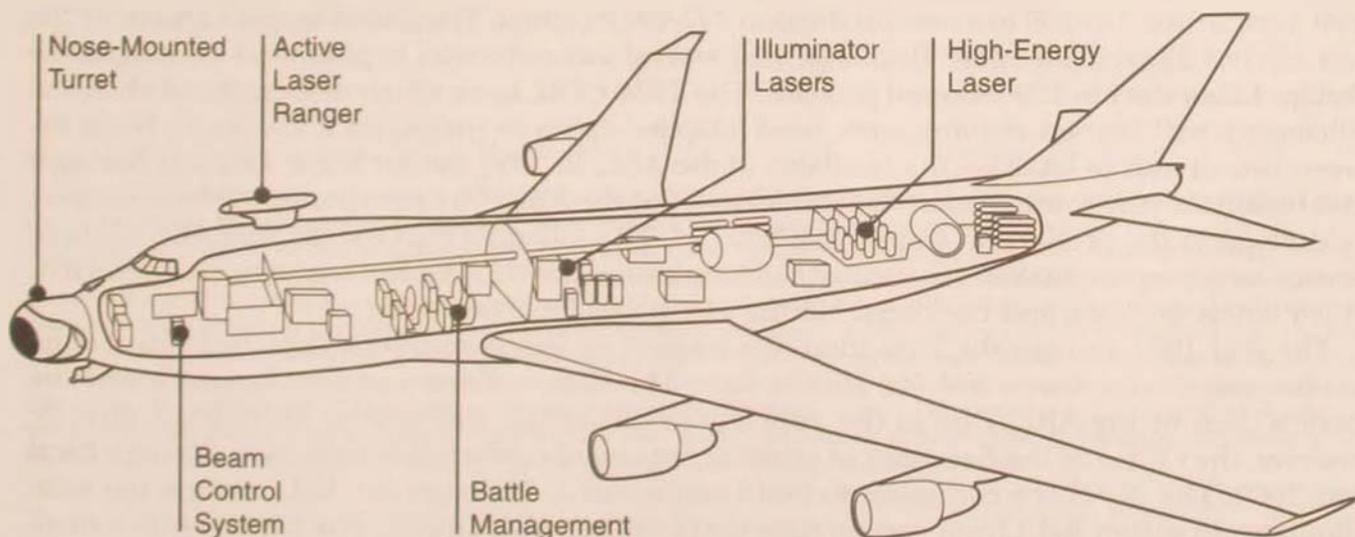


Figure 1. The 747-400F Airborne Laser YAL-1A

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tack profile offers several advantages. First, the target missile moves slowly in this phase of flight, and the missile frame is highly stressed, making it vulnerable to attack. Second, the missile's infrared plume is easy to detect so that targeteers do not have to worry about distinguishing between decoys and warheads. Finally, destruction of the missile over enemy territory minimizes the threat to US and allied positions from falling debris.

The technologies used in the ABL were first developed in the Airborne Laser Laboratory (ALL), an NKC-135 that successfully used an ABL to shoot down air-to-air missiles and drones in the 1980s. The ALL's limited laser range, however, made the system militarily insignificant.² Yet, the ALL program prompted several new technology initiatives for the ABL.

For example, chemical mixtures were reformulated to produce a more powerful version of the chemical oxygen iodine laser (COIL), invented at Phillips Laboratory in 1977. The laser fuel consists of hydrogen peroxide, potassium hydroxide, chlorine, iodine, and ammonia—all of which are combined with water to produce the beam. The laser operates at 1.315 microns, an infrared wavelength invisible to the naked eye. By using plastics and titanium and by recycling chemicals, laser contractor Thompson Ramo Wooldridge (TRW) was able to make the module lighter but at the same time increase the laser's power output by 400 percent. The one-megawatt laser will have a range of four hundred kilometers, and an ABL will be able to fire the laser 30 times per sortie.

Another significant technological development is adaptive optics, developed to combat fluctuations in air temperature and consequent atmospheric turbulence that weakens and scatters the laser's beam. Adaptive optics relies on a deformable mirror, sometimes called a rubber mirror, to compensate for tilt and phase distortions in the atmosphere. The mirror has 341 actuators that change one thousand times per second, enabling the mirror to modify the laser beam so that it can travel further through turbulent air. Finally, the development of non-water-cooled optics resulted in enormous weight savings.

In 1995 the ABL transitioned out of Phillips Laboratory, becoming a major defense-acquisition program. In order to mitigate risk, the chief of staff of the Air Force changed the prototype aircraft from a used 747-200 to a new-production 747-400 freighter. The added weight capacity of the new aircraft allowed for more flexibility, and several risk-reduction experiments conducted by Phillips Laboratory in 1996 showed promise. The TRW COIL laser, which demonstrated chemical efficiencies well beyond requirements, used adaptive optics to propagate a low-power beam between two aircraft to establish the feasibility of the ABL. In 1997 the Air Force awarded Boeing a \$1.4 billion six-year contract to design, build, and test the ABL. The test aircraft will have six laser modules, and the production version will have 14. The schedule calls for the first ABL to shoot down a target representative of a theater ballistic missile in 2004. The Boeing team includes TRW, which builds the laser, and Lockheed Martin, which develops the optics.

The year 1997 also saw the formation of a team to gather atmospheric data in theaters of interest—specifically, Korea and the Middle East. The data, collected seasonally, confirmed the models used by the ABL. Due to the difficulty in measuring atmospheric turbulence directly, however, the Office of the Secretary of Defense requested further data collection through fiscal year 2000. The Air Force continues to build atmospheric databases for ABL, using a star scintillometer to gather light from certain stars that simulate ABL targets. The process uses a modified C-135E—code-named Argus—as the test platform, from which the scintillometer locks onto a star and then measures the amount of optical turbulence between the sensor and the star. By knowing the amount of distortion present, the ABL can predistort the laser-beam weapon so that it will be most intense when it hits the target.

In order to help with the tracking of the laser beam and target acquisition, the ABL is fitted with an active ranging system (ARS), composed of an F-15 LANTIRN pod with a CO₂ laser. The ARS, cued by the infrared search-and-track sensor, points the CO₂ laser for a highly accurate

ranging and three-dimensional track of targets. Six infrared search-and-track sensors, located along the fuselage of the 747-400, provide 360-degree surveillance, initial detection, and tracking of missiles in boost phase.

Currently, the ABL system's crew consists of a pilot, copilot, mission commander, weapons officer, maintenance technician, and communications/intelligence officer. Boeing is developing an extensive battle-management suite for the ABL, which will give it the ability to data-link with other theater platforms. An onboard four-man battle crew will accomplish surveillance, tracking, and prioritization. For targeting, ABL will be able to determine missile-launch site points and pass this data to attackers.

The first ABL aircraft is currently about halfway through its modifications at a Boeing facility in Wichita, Kansas, where some radical changes are required to turn a transporter into a laser weapons system. The nose was cut off to make room for the 14,000-pound turret that steers/points the laser. Titanium belly skins, the largest titanium components in the world, are being installed on the 747 for the safe venting of laser exhaust gases. Finally, to provide deployment flexibility and mission orbits, Boeing is fitting the aircraft with an air-to-air refueling receptacle.

Like other weapons systems, ABL may evolve to a more diverse set of missions than just shooting down tactical ballistic missiles. These include shooting down low-flying cruise missiles (provided there are no clouds in the ABL's line of sight); suppressing enemy air defenses; imaging and reconnaissance with the aid of an onboard telescope; and cueing other weapons systems through search and detection of infrared signatures.

As with most programs, funding cuts have occurred. For example, the latest round saw the first laser test over White Sands Proving Grounds pushed back to 2004. To date, the cuts for fiscal year 2002 have not been announced, and lawmakers on Capitol Hill who are disappointed with current progress have threatened to move the ABL from the Air Force to the Ballistic Missile Defense Organization. After testing in 2004, the Air Force would like to buy six more ABLs and modify the test bird into an operational aircraft. The Air Force will choose the home base for the seven ABLs next year.³ □

Notes

1. YAL-1A: *Y* (prototype), *A* (attack), *L* (laser), *1* (first of its kind), and *A* (first configuration/model). For fiscal year 2001, F-22 program costs include \$2.5 billion in procurement for 10 aircraft and \$1.4 billion in research and development.

2. The best book on the ALL program is Robert W. Duffner's *Airborne Laser: Bullets of Light* (New York: Plenum Publishing, 1997).

3. The Web contains numerous sources of information on the ABL. The following list is by no means exhaustive: One can find the Air Force site and the contractors at www.airbornelaser.com. Boeing runs its own site at www.boeing.com/defense-space/military/abl/index.htm. *Aviation Week* has a very good news site at www.aviationnow.com. Jane's publications are available at www.janes.com. The Federation of American Scientists has ABL and related technology data at www.fas.org/spp/starwars. This site also has links to academic papers on laser and optical-engineering technologies as well as Government Accounting Office and congressional reports. *Space Daily* runs ABL stories at www.spacer.com. The weapons system and its employment are the subject of an Air Command and Staff College paper at www.au.af.mil/au/database/research/ay1997/acsc/97-0581.htm. Finally, one can find detailed COIL performance calculations at the Maui High Performance Computing Center at <http://pipeline.mhpc.edu/research/ab96/ab31.html>.



A great country cannot wage a little war.

—Duke of Wellington

Political-Military Engagement Policy

Casualty Avoidance and the American Public

KENT D. JOHNSON*

RECENTLY WE HAVE heard much discussion regarding the apparent unwillingness of the American people to accept casualties during military conflicts. Indeed, many commentators insist that the American casualty-avoidance mind-set has so hamstrung the US political leadership that it faces monumental political risk by supporting any military operation that generates casualties. In a broad sense, this sweeping generalization has its merits when one recognizes the influence of American public opinion on US military-engagement decisions. However, to say that the American public is so squeamish that it is unwilling to accept casualties in *all* military engagements is wrong-headed and ignores many complicating factors, such as the role of the media, mission objectives, the threat to US vital interests, and a phenomenon I call the “Family Factor,” described below. What follows is an explanation of how these elements combine to form an easily understood theory of why Americans are not actually phobic about military casualties.

After the disastrous results of a poorly led military adventure in Vietnam, everyone generally agreed there would be “no more Vietnams.” That experience deeply affected the American public, who felt that any future military operation ran the risk of escalating into another ill-considered and poorly led conflict. This concern ran through the military as well. Indeed, as young, professional soldiers fighting a war the political leadership would not let them win, Gen Colin Powell and Gen Norman

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Schwarzkopf were profoundly influenced by their experiences in Vietnam and became strong supporters of the “Weinberger doctrine,” which became a major factor in our Gulf War victory and in the retention of public support for Operation Desert Storm, despite the threat of thousands of American casualties.

Speaking to the National Press Club in November 1984, Caspar W. Weinberger, President Reagan's secretary of defense, set out what he considered appropriate conditions for the use of American troops: (1) when political efforts fail; (2) when one intends to win; (3) when the mission is vital to US national interests; (4) when one has well-defined political and military goals and an end state one is fighting to achieve; (5) when one is willing to reassess the size, composition and mission; and (6) when one has the support of the American people. Of all these conditions, I think a well-defined and well-understood “vital national interest” is key to ensuring American public support, which, in turn, influences all other criteria. Further, differentiating between “vital national interest” and “national interest” is critical to understanding the apparently conflicted casualty-avoidance mind-set of Americans.

A vital national interest is directly tied to the peace and security of the United States. If such an interest is threatened, the peace and security—the very survival—of the nation may be at risk. Therefore, defense of vital national interests requires a commitment to fight and, if need be, die for them. Because countries need oil in the same way humans need water, the free flow of oil from the Middle East is vital to the peace and security of the United States. Therefore, it is a vital national interest. Public support for defending a vital national interest ensures that casualties, while mourned, will not necessarily undermine American involvement or commitment to fight and win.

A national interest, however, is related to the principles set forth in the Declaration of Independence and the Constitution. Such principles as economic freedom, individual liberty, and human rights are very important to the American public and the US government. Indeed, because of our belief in the rights of people to be free and self-determining, it is in the best interest of the United States to globally support and promote economic freedom, individual liberty, and human rights. Although promoting the national interest is worthy of political and economic support, it is not worth fighting and losing American lives. In this case, the American people would not support foreign military intervention to promote national interests because there is no direct threat to the peace and security of the United States. For example, President Clinton recently declared the spread of AIDS in Africa a national-security threat to the United States. Obviously, AIDS in Africa, while definitely an item of national interest, is hardly a threat to our peace and security.

Understanding the difference between a vital national interest and a national interest is crucial to comprehending the “Family Factor,” mentioned earlier. That is, the president may declare that something is vital to the national security of the United States, but until his judgment is validated by the American people (i.e., parents), this issue/threat is simply not going to be worth the nation’s blood. In that case, parents will object, and the political risk associated with placing American troops in harm’s way is very real—and very dangerous.

On the one hand, as I see it, the probability of the United States becoming involved in a low-intensity military operation is high (fig. 1). For example, the United States has involved itself in over half of the 39 peacekeeping missions undertaken by the United Nations (UN) since 1943. On the other hand, the probability of the United States engaging in a high-intensity war is low—witness the fact that this country engaged in only four major regional conflicts (MRC) (World War II, Korea, Vietnam, and the Gulf War) in the same period. Thus, the relationship between the two variables is essentially linear.

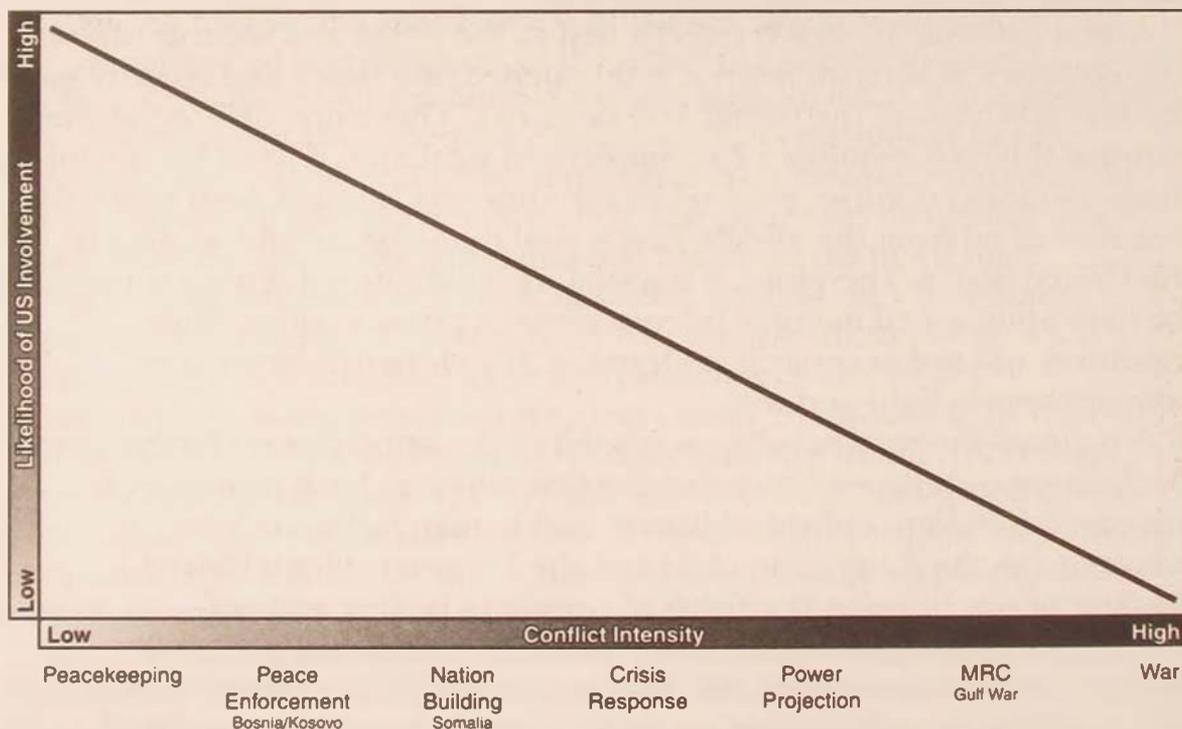


Figure 1. Probability of Occurrence

Historically, it is clear that the US approach to warfare reflects a great reluctance on the part of its people to enter into a fight. Nonetheless, once engaged, the American people are capable of a ferocious fight—something that has occurred only a few times in US history. Of course, as we have seen after both world wars, Korea, Vietnam, and the cold war, the

American people “build down” the military soon after their victory—intent upon living peaceful lives, uninvolved in the affairs of others, and unencumbered by foreign entanglements. Indeed, the number of people at arms decreased from a high of over 14.9 million during World War II to fewer than a million in 1950; from 1.95 million during the Vietnam conflict to 1.1 million shortly thereafter; and from nearly 2.2 million during the cold war to today’s count of barely 1.4 million.

This approach works when conflicts are essentially well understood, the issues are clear, the time to respond is sufficient, and the issues are resolved cleanly. However, with “peacekeeping” missions exploding worldwide as the UN attempts to wrestle with intrastate ethnic strife (Kosovo) and interstate conflict (Cyprus), the likelihood of the United States becoming involved in “dirty” missions is significant, and the time required to build up does not exist.

Blood risk is always a factor when the United States employs troops, regardless of whether they merely stand between warring factions in a nation-building peacekeeping mission (Somalia) or whether they directly challenge an enemy who wishes to destroy their country (World War II). The risk of casualties is quite low during operations that do not involve active and sustained combat. However, blood risk explodes once we switch to actual combat environments (fig. 2). Regardless, in all cases, the deployment and use of military troops carry political risk.

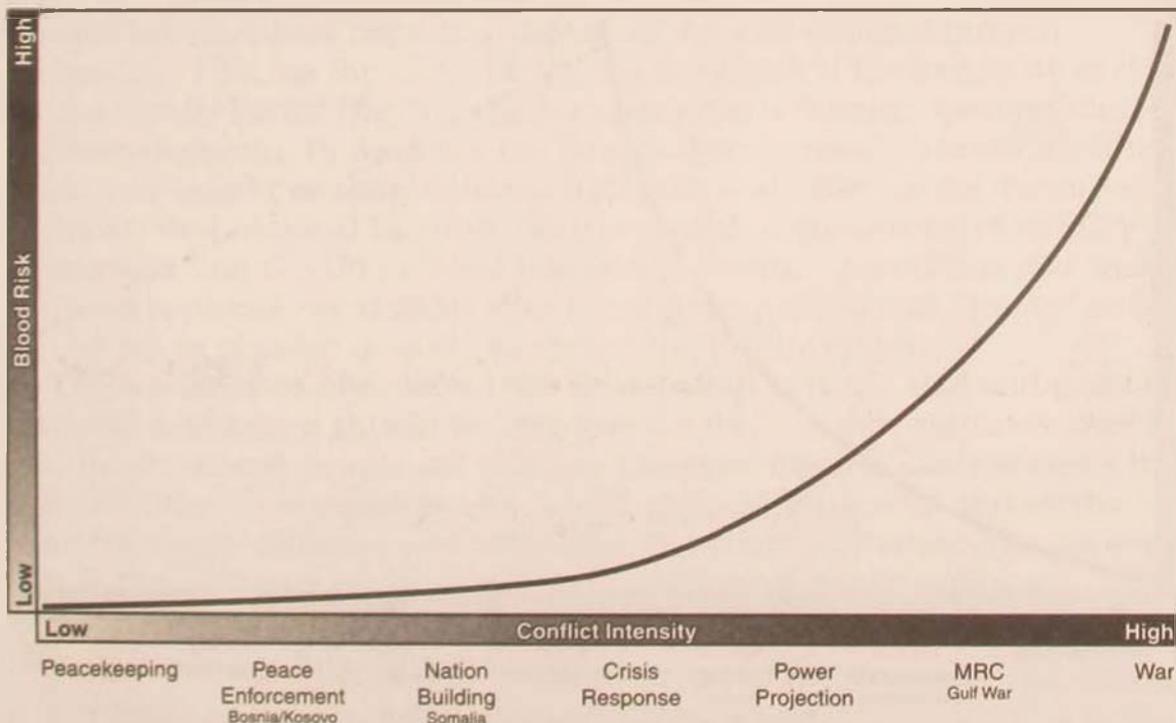


Figure 2. Blood Risk

Political risk is an ever-present element in any combat operation, no matter how just the cause, because the American people have a healthy distrust of the government and rightfully wish to examine critically any activity that results in American deaths and injuries. Therefore, one would imagine that a direct relationship exists between blood risk and political risk. Curiously, however, this is not the case.

Whereas blood risk is initially low and increases only slightly as we move further along the peacekeeping portion of the graph (fig. 2), political risk does not follow the same gradient. Indeed, at the first indication of American casualties, political risk skyrockets (fig. 3). This makes no sense until one recalls the political influence of the American people (parents). As mentioned earlier, in the final analysis these people determine what is and is not a vital national interest worthy of losing American lives. Peacekeeping missions, by definition, do not involve a vital national interest. Thus, regardless of the mission's importance, unless the president can convince parents that the mission is worth their children's lives, substantial political risk ensues. However, if the military operation is in defense of the vital national security of the United States, as in the Gulf War, at least they understand why their children are in danger, and political risk drops off significantly (fig. 4).

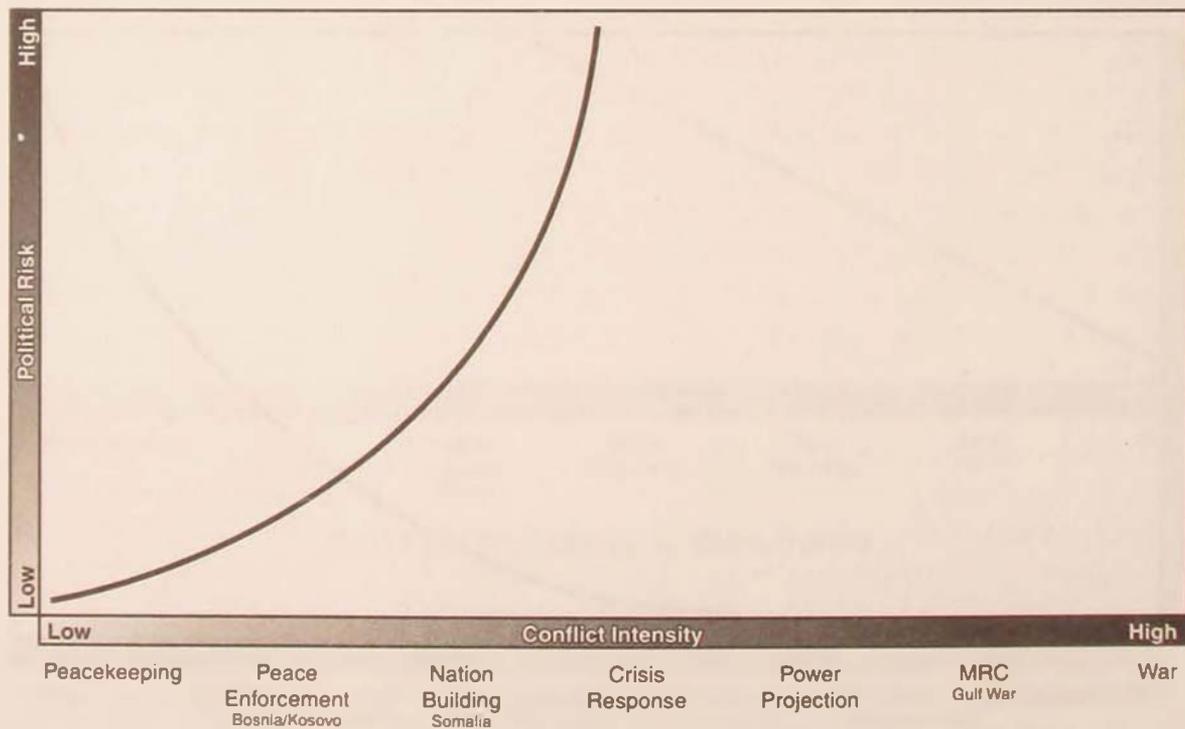


Figure 3. Political Risk (Peacekeeping)

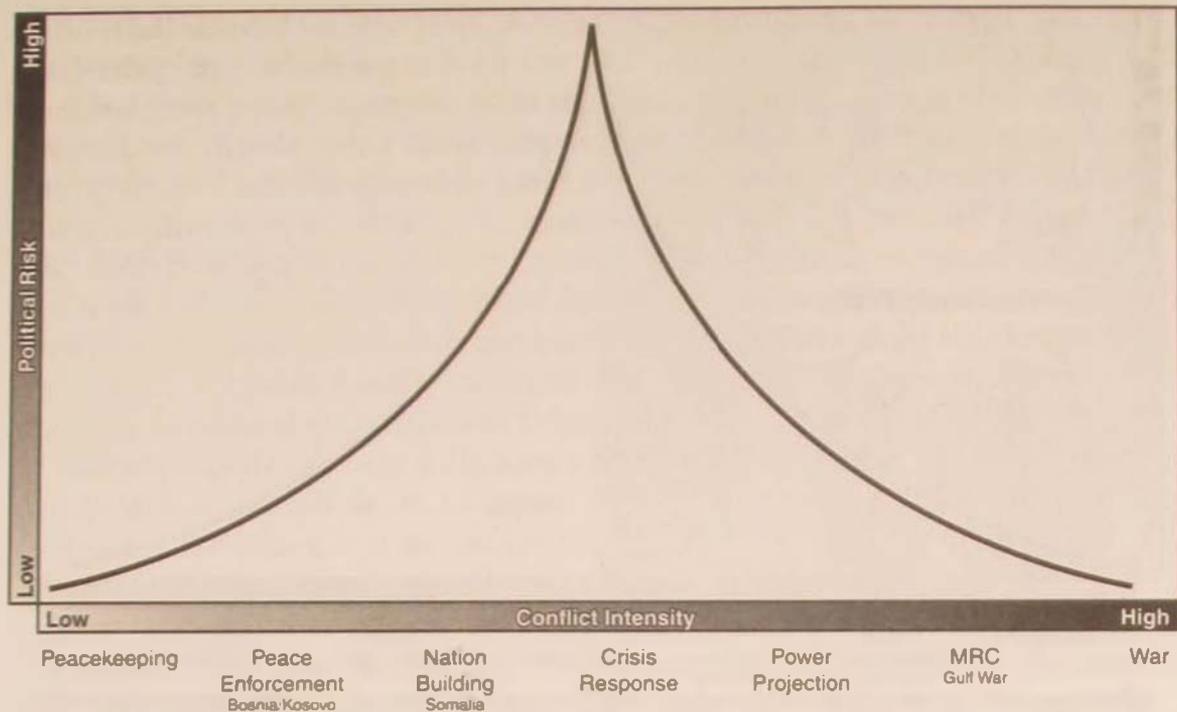


Figure 4. Political Risk (Fighting in Defense of America)

Of course, these same parents are not as understanding when the threat to vital national security is unclear or just plain absent (Somalia, Kosovo). In these cases, they do not understand why their sons or daughters are at risk, and political support evaporates rapidly when casualties mount and people ask questions regarding threats to the vital national interest (Somalia). This has the effect of placing the political leadership squarely in the Family Factor (fig. 5), which exerts great influence upon political-military decisions. In America, the people determine—by means of either their own insight or some external influence—whether or not the mission supports vital national interests. So it is crucial to the success of military operations that the US political leadership convince Americans that vital national interests are at stake, thus moving the political-risk “hump” as far to the left as possible in order to escape the Family Factor.

Once politicians understand the relationship between vital and nonvital national interests, it should be very easy for them to determine whether or not the American people will tolerate a military mission likely to result in US casualties. One wonders why the US political leadership and media elite have such difficulty understanding this concept. Perhaps the answer lies in the influence of the media elite on shaping public policy, a phenomenon known as the Cable News Network (CNN) factor, which usually tracks the following scenario:

1. CNN covers a tragedy somewhere in the world.
2. Naturally, because Americans have big hearts, they demand action, and the United States embarks upon a “do something” mission.

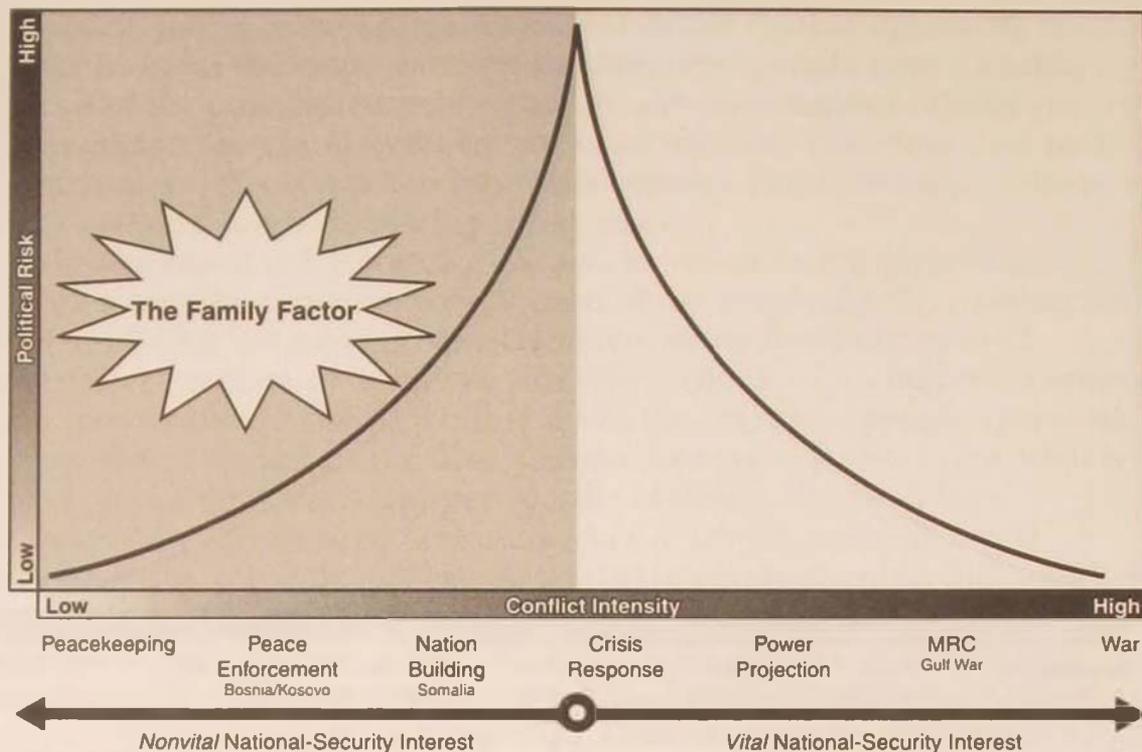


Figure 5. Family Factor

3. Troops are dispatched but operate under severe restrictions because the political leadership knows that casualties generate political risk.
4. The media cover the deployment, complete with interviews of American soldiers who say on camera, "Gee, it's nice to be able to go help someone."
5. American support for the deployment soars.
6. Casualties inevitably occur, and people raise questions about the cost of the mission.
7. Leadership places more restrictions upon American troops to avoid any further casualties.
8. Media interest wanes, and other events attract the public's attention.
9. Americans are now stuck. They cannot fight to achieve a well-defined goal and "win," and they cannot just leave.
10. The mission continues with no definition of victory and no objective other than avoiding casualties at all cost.

This situation exactly mirrors the Bosnia mission. After leadership initially assured the American people that our involvement would last only a year (maybe a little more), our presence continues unabated—with no end in sight. Ill-considered and reflexive missions engaged in by politicians who respond to emotional appeals result in bad policy decisions—both international and domestic.

So what should we do? First, we should insist upon responsible political leadership that is willing to lead the American people and *not* follow media-driven public-opinion polls that measure feelings and emotion. Second, we should insist upon responsible media that will fully investigate a tragedy and ask the question (and honestly report the answer) “Sad as this situation is, is it a threat to a vital national interest of the United States and therefore worth the loss of American lives?” Third, we should insist upon an informed and thoughtful American public. All too often in TV America, the public becomes emotive—feeling rather than thinking about a situation. Feelings usually result in do-something missions that do nothing to defend vital national interests of the United States.

Past experience clearly indicates where vital national interests lie, and the American people seem to agree. The example of oil, used previously, is apropos. Like water, it is necessary for life and important enough to risk American lives.

The American people can be remarkably tolerant when it comes to casualties. They have *not* become casualty-averse but have simply become averse to casualties from missions that do not defend the vital interest of the nation. □

Springfield, Virginia

The army will forage liberally on the country.

—Gen William Tecumseh Sherman

Casualty Sensitivity and the Indirect Approach

CAPT ROBERT DIETRICK, USAF*

DR. DANIEL MORTENSEN makes an interesting observation in his article "An Ethos of Casualty Sensitivity" that "American casualty sensitivity long predates Vietnam."¹ Unfortunately, this observation completely misses the point of the recent writings of Dr. Jeffrey Record and Maj Charles Hyde.² Recognizing that the casualty-sensitivity problem has existed for a longer period of time is not the same as showing that it is a benign factor in shaping future American policy.

According to Clausewitz, "If one side uses force without compunction, undeterred by the bloodshed it involves, while the other side refrains, the first will gain the upper hand."³ This concept, taken to an extreme, has been partially blamed for the frontal assaults and associated heavy casualties of the First World War. In *Strategy*, B. H. Liddell Hart rebukes Clausewitz for this and similar statements and argues for indirect attacks or an attack by the path of least expectation. Liddell Hart warns, "To move along the line of natural expectation consolidates the opponent's balance and thus increases his resisting power. In war, as in wrestling, the attempt to throw the opponent without loosening his balance results in self-exhaustion, increasing in disproportionate ratio to the effective strain put upon him."⁴ This is where the two classical writers and the recent writings converge.

Dr. Record quotes Gen Henry Shelton, the most senior American military officer, as saying, "The well-being of our people must remain our first priority."⁵ Similarly, Major Hyde identifies self-protection as the foremost objective of an American brigade in Kosovo.⁶ One may argue that these statements and objectives do not represent actual policy constraints; however, even if they do not represent actual policy, they create a deadly perception. By establishing the perception, true or untrue, that the United States will not accept casualties, American policy makers have dramatically reduced the number of available military options. This reduction of options translates to a convergence of military aims or a direct approach in military conflict. In short, the American military has become extremely predictable.

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Think about it. What could be more predictable than the current American military? Anyone even remotely familiar with America's recent campaigns should realize that any future campaign will begin with standoff cruise-missile attacks aimed at disrupting command and control (C²) networks and air defenses. These attacks will be followed by additional strikes with stealthy aircraft against remaining air-defense assets, C² centers, and the power grid. Furthermore, these attacks will always begin at night. Is this the indirect approach or attack by the path of least expectation favored by Liddell Hart and early air-war advocates?

Then again, why change if this approach has worked so well in the past? Perhaps the key is "the past." Liddell Hart recognized that under certain circumstances, even a simplistic frontal assault would be successful: "Success by such a method only becomes possible through an immense margin of superior strength."⁷ Undoubtedly, Clausewitz also recognized that under certain situations, two opponents could be so hopelessly mismatched that even while restrained, the mightier would triumph. Again, why change? Why is being predictable such a potentially dangerous thing?

Consider the French following the First World War. As Germany began rearmament, the French constructed the Maginot Line, based on experiences gained from the previous war. Indeed, had such a fortified line existed in 1914, French casualties would have been much lower, since the French defensive position would have been simplified. This was the purpose of the line in 1940. Contrary to popular history, the French never really expected the Germans to strike directly at the Maginot Line. This fortified defense was hastily built and designed merely to reduce the number of troops required to hold the flank and to channel the German attack to the north, through Belgium. After all, that was where the Germans attacked in 1914.

To counter this expected attack, the French and British deployed their best troops and most mobile formations opposite Northern Belgium. The plan was simple. After the Germans invaded Belgium, the French and British would rush in and prevent the Germans from turning the northern flank along the coast. Unfortunately for the French, German general Heinz Guderian expected this response and devised the actual invasion plan. The Germans began with little more than a feint against Belgium and the Netherlands and awaited the Allied response. After the Allies were committed to Northern Belgium, Guderian struck at the hinge between the mobile forces and the Maginot Line. With a mobile force approximately one-tenth that of the combined Allied army, Guderian shattered the Allied forces and ensured the surrender of France in only six weeks with a minimal number of casualties. This is the power of the indirect approach.

Serbia had little chance against the vast military resources of the United States but still held out longer against a limited and highly predictable

military effort than did the French in 1940. In part, this must be partially due to the ability to prepare for the expected assault or aerial siege favored by the United States. What might other opponents accomplish against such a predictable siege? If I had to face an American aerial siege, I would attempt to decentralize my C² and make it as mobile as possible. The same would apply to my air defenses. At a national level, I would devote nearly all of my resources to countering cruise-missile strikes and stealthy aircraft. I would decentralize my power grid, place critical elements underground, and add more redundancy with smaller, more numerous power-generation plants. In short, I would consolidate my balance, increase my resisting power, and devote my resources to frustrating my opponent long enough to undermine the popular support for his military action. Record asks a rhetorical question, "Does it [casualty aversion] not encourage enemies to adopt the simple strategy of filling as many American body bags as possible?"⁸ The resounding answer is an unequivocal *yes*.

Still, could the use of ground forces have altered the conflict against Serbia and provided a better postwar situation? According to Mortensen, "it certainly would not have served a purpose to threaten injection of ground forces. Just how long would it take to get ground forces to the slaughter site? Nothing could have stopped the horrible ethnic killings in short order."⁹ Again, Mortensen seems to consider only the direct approach—the least effective one. Prior to the start of the aerial siege, the deployment of ground forces to Hungary or Romania, threatening Belgrade, could have been decisive even without the use of force.

With hostile ground forces poised to occupy Belgrade, Serbia would have been psychologically dislocated. The threat, although direct against Belgrade, is indirect against Kosovo. Slobodan Milosevic would have had a difficult time pursuing his policies in Kosovo while leaving the capital vulnerable and running the risk of his own capture and imprisonment. The mere threat of this action might have been sufficient to achieve US political aims at zero cost in lives, equipment, and even munitions. In the event that Milosevic proceeded anyway, either the ethnic cleansing would have occurred at a slower rate, with greater force deployed to the defense of Belgrade, or a quick NATO ground victory would have been possible with the continued deployment of Serbian forces to Kosovo. Milosevic would have been unbalanced and on the horns of a dilemma.

Of course, there are two significant obstacles to this scenario of response. First, permission to stage offensive ground forces to Hungary or Romania would have been required. Second, in order to avert armed conflict, the threat of ground invasion would have to be credible. I won't address the first obstacle since it is not particularly relevant to this argument but is a matter for the politicians. As for the credibility of an imminent ground invasion, I think the credibility would have been sorely lacking. Since Milosevic apparently did not place much credibility in the

threat of an aerial siege, why would he have believed that the United States would risk ground forces and casualties to achieve its political aims?

Record jokingly suggests the virtual elimination of American ground forces due to their vulnerability and the fear of suffering casualties if they're employed.¹⁰ I have another suggestion—the elimination of our nuclear arsenal. If our credibility is lacking, even in terms of suffering a couple of hundred casualties, how can we make a credible threat of nuclear annihilation that would result in the total destruction of our own society? On a more serious note, I would urge American military leadership to end the talk of bloodless victories and, at least on a public note, believe in T. R. Fehrenbach's concept that "the real function of an army is to fight and that a soldier's [or airman's] destiny—which few escape—is to suffer, and if need be, to die."¹¹ Only with senior leadership openly committed to risking American casualties might credibility, with respect to the use of any type of force, be restored to the United States. □

Tinker AFB, Oklahoma

Notes

1. Dr. Daniel R. Mortensen, "An Ethos of Casualty Sensitivity," *Aerospace Power Journal* 14, no. 2 (Summer 2000): 116.
2. Dr. Jeffrey Record, "Force-Protection Fetishism: Sources, Consequences, and (?) Solutions," *Aerospace Power Journal* 14, no. 2 (Summer 2000): 4–11; and Maj Charles K. Hyde, "Casualty Aversion: Implications for Policy Makers and Senior Military Officers," *Aerospace Power Journal* 14, no. 2 (Summer 2000): 17–27.
3. Carl von Clausewitz, *On War*, ed. and trans. Michael Howard and Peter Paret (Princeton, N.J.: Princeton University Press, 1976), 75–76.
4. B. H. Liddell Hart, *Strategy: The Decisive Wars of History*, 2d rev. ed. (New York: Praeger Publishers, Inc., 1967), 25.
5. Record, 5.
6. Hyde, 26.
7. Liddell Hart, 25.
8. Record, 10.
9. Mortensen, 116–17.
10. Record, 5–6.
11. T. R. Fehrenbach. *This Kind of War: The Classic Korean War History*, 1st Brassey's ed. (Washington, D.C.: Brassey's 1994), 66.

The general is the principal sentinel of his army.

—Frederick the Great

Countless and inestimable are the chances of war.

—Winston Churchill, 1899

The Genesis of Flight: The Aeronautical History Collection of Colonel Richard Gimbel by Tom D. Crouch et al. University of Washington Press (<http://www.washington.edu/uwpress/index.html>) in association with Friends of the Air Force Academy Library, 1326 Fifth Avenue, Suite 555, Seattle, Washington 98101-2604, Fall 2000, 380 pages, \$60.00.

This is a magnificent book. Rarely in life does one come across a book as profound as this one. *The Genesis of Flight* is absolutely astounding as a work of art, science, literature, and history. It clearly stands out as a pinnacle of scholarship, aptly reflecting the stellar reputation of the Air Force Academy Library's Gimbel Collection of Aeronautical History. Yet, it is bigger than that. The publication of this book is, in many respects, one of the Academy's finest hours in its 40-plus-year history.

It is primarily the product of the combined efforts of Academy archivist Duane Reed and the "Friends of the Library," led by former Academy superintendent Lt Gen A. P. Clark. A heroic leader who survived years of captivity as a prisoner of war in the Second World War, Clark has once again demonstrated his talent and drive to complete a successful mission. In contemporary effects-based targeting vernacular, this book is definitely a shack! It is particularly fitting that Reed, Brig Gen Philip D. Caine, and other members of the Friends of the Library executive committee dedicated the book to Clark (without his knowledge, I should mention).

The Genesis of Flight is an illustrated catalogue of the aeronautical collection of Col Richard Gimbel. As such, it rivals any books of this type found anywhere in the world. In fact, the Smithsonian Museum, the Musée du Louvre, the State Hermitage Museum, and other renowned art and science collections have no nicer products to illustrate their holdings. This book is a handsome coffee-table display of beautifully crafted plates and captions,

but it is also a history text for students and scholars. It proceeds chronologically through the priceless Gimbel Collection of books, paintings, letters, engravings, coins, five-thousand-year-old Babylonian seals, and numerous other aeronautical memorabilia from dinner plates to sheet music to snuffboxes. The collection provides a remarkable adventure for most aviators who envision their profession as something relatively modern. Indeed, manned air and space flight is new—but mankind's fascination with flight and the quest to conquer the third dimension have been around for thousands of years.

Colonel Gimbel was an avid collector of rare books and just about anything related to the study and appreciation of flying. As a United States Army Air Forces officer stationed in London who witnessed the effects of the famous blitz (German bombing) of the Second World War, he became interested in collecting aviation-related materials, partly in order to protect them from destruction. The fact that he was an heir to the Gimbel Department Store chain undoubtedly helped in that effort, which he continued after the war as curator of aeronautical literature at Yale University, his alma mater. By the time of his death in 1970, Gimbel had amassed a collection of more than 20,000 items.

But Gimbel had more than an academic appreciation of flight. He was himself a pilot and flew as an aerial gunner on combat sorties with Eighth Air Force over France and Germany until replaced by Capt Clark Gable. Interestingly, it was another famous aviator, Charles Lindbergh, who coordinated with the Academy's first superintendent, Lt Gen Hubert R. Harmon, to initiate the transfer of the aeronautical collection to the Academy specifically for the benefit of cadets, according to Gimbel's wishes. Gimbel not only had a personal love of flight but also appreciated the value of his collection for the professional education of future flyers and aviation leaders.

Therefore, the Gimbel Collection does not reside in obscurity, and it is Reed who makes sure it is carefully preserved but still accessible to cadets, Academy faculty, and visiting scholars. The collection, as beautifully displayed and described in this book, represents the symphony of flight in all its historical majesty, humor, and tragedy. How

quickly the reader is reminded of the personal courage and self-sacrifice displayed by early aviators, many—if not most—of whom appear to have died with their inventions. Particularly noteworthy in setting the stage and tempo of the air ensemble is Tom D. Crouch's introduction, a scholarly perspective of aviators' fascination with and exploration of flight. From the legends of Icarus to the aspirations of rocket scientist Robert H. Goddard, Crouch portrays the science and science fiction of humanity's noble quest for the sky.

Beyond the importance of mastering the technicalities of aerodynamics, the full story of flight is also one of human imagination that evolved from impossible fantasies to the realm of the possible and the pragmatic. It is that picture of flight which is so eloquently captured in this book with illustrations and learned commentary. The familiar phrase "a picture is worth a thousand words" rings quite true as spectacular engravings and prints bring to life fascinating events in the history of ballooning and heavier-than-air flight.

Adding to the book's appeal are several helpful accouterments: an appendix, a bibliography, an index, and a very helpful chronology of flight. Also, in keeping with recent museum and collection publications, this book comes with a compact disk that provides a multimedia visit to the collection, which some high-tech readers and researchers may prefer. Self-opening and of unusually high fidelity, the CD provides an impressive electronic complement to the book.

In all, *The Genesis of Flight* constitutes a valuable resource for the student of aeronautical history who seeks to expand his or her understanding of the art and science of flight. It should be a part of the serious scholar's library and will leave any reader with an intense desire to visit the Air Force Academy's Gimbel Collection of Aeronautical History.

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Fire in the East: The Rise of Asian Military Power and the Second Nuclear Age by Paul Bracken. HarperCollins (<http://www.harpercollins.com/hc>), 10 East 53d Street, New York, New York 10022, 1999, 186 pages, \$25.00.

Paul Bracken, a professor of management and political science at Yale and author of *The Com-*

mand and Control of Nuclear Forces (1983), has written a thought-provoking book for the policy community about how the proliferation of weapons of mass destruction (WMD) in Asia may affect international relations. In the past, technology helped the West dominate Asia militarily; today, Asian countries are acquiring technologies that will help them challenge Western military dominance as an unbroken chain of countries between Israel and North Korea either possesses or is developing WMDs and ways to deliver them. Within Asia, such weapons allow Asian countries to attack each other's homelands, something that has largely been beyond their means in the past. In addition, they are intensifying relations among countries that were loosely linked in the past, exemplified by China's relations with Pakistan and Iran. Finally, these weapons allow Asian countries to attack the US homeland and its bases abroad.

Bracken's contribution is to move beyond weapons and capabilities to assess consequences: how will WMD proliferation affect Asia, and how will it affect America? His answer is that the effects may be revolutionary. At its heart, this book is about the political effects of a revolution in military affairs (RMA). Unlike the application of information processing to warfare that is at the core of the RMA debate in the United States today, Bracken goes back to the RMA of nuclear weapons and brings it forward. Nuclear weapons (and other WMDs) were, and are, revolutionary because they can potentially devastate the infrastructure supporting military forces or the homeland of a country without first defeating the defending military forces. This characteristic of WMDs has ramifications beyond the obvious political ones of any capability to attack the US homeland. For example, the capability to target US bases means that the United States may be unable to act with as much of the logistical tail that has been critical to the American way of war. The residual logistical tail that remains will be more dispersed and so both less efficient and more problematic for host countries. Politically, the capability to confront the United States without confronting the US military on its favored terms may constitute a paradigm shift for US power and engagement in Asia because the United States may be more circumspect in its relations with Asian countries in the future.

Bracken's argument seems most applicable to major-theater-war contingencies, like the canonical Persian Gulf and Korean Peninsula that might see engagement of US land forces, or to the unspoken contingency in the Taiwan Straits. How-

ever, Bracken does not address how the WMD revolution in Asia might interact with the information revolution in America. Attacking Global Positioning System, reconnaissance, and communications satellites individually by antisatellite weapons or en masse by means of a nuclear weapon exploded at high altitude could degrade US conventional capability without creating conditions in which the United States might retaliate with nuclear weapons. US reliance on information as a force multiplier might then turn into a force divisor.

The widespread availability of WMDs may make interactions among countries in East Asia, including the United States, more complex and paradoxical than Bracken seems to expect. First, many Asian countries have a strong, if unspoken, interest in the order provided by US power outside of their immediate regional quarrels. Even China, which may want to be a regional hegemon, probably does not want to bear the expenses inherent in providing order in faraway places or of suffering if the United States does not. Second, states may attempt to balance against other nuclear-armed states by allying themselves with a benignly hegemonic United States, so America may become more rather than less involved in the region. Both of these arguments warrant a continued, robust US presence in East Asia to maintain stability, although that presence may be increasingly exposed to complex war-initiation dynamics if the United States intervenes in support of an ally fighting a foe armed with WMDs. Finally, WMDs may be more likely to be used in intraregional conflicts, like a nuclear war in South Asia, in which the United States might not have much influence and in which US military forces might not have much of a role. The effects of such a war on US power are hard to forecast, although they might lead either to increased anarchy as the United States and other countries in the region pull apart from each other or to increased reliance on the United States as the best guarantor of security.

Fire in the East is an essay rather than a scholarly piece, and Bracken succeeds by asking an important question. Unfortunately, the examples he uses can frequently be interpreted to make an opposite point. Many leave out important elements, and far too many are not on firm historical ground. These missteps are unfortunate rather than fatal, although they do diminish the credibility of the argument.

Read *Fire in the East* for a thought-provoking big picture of consequences. Do not get bogged down in the examples and try to think about the impli-

cations for US power of a world with more Asian powers with WMDs and ways to deliver them, both within Asia and beyond.

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Flags of Our Fathers by James Bradley with Ron Powers. Bantam Books (<http://www.randomhouse.com>), 666 Fifth Avenue, New York, New York 10103, May 2000, 376 pages, \$24.95 (hardcover).

It remains the transcendent image of World War II: six US marines—actually five marines and a Navy corpsman—raising the American flag on Iwo Jima on 23 February 1945. The legendary photograph of the event, snapped by Joe Rosenthal of the Associated Press, won a Pulitzer prize.

However, details surrounding the event on Iwo Jima were quickly forgotten. Few people can even remember the names of the men who actually raised the flag, with the possible exception of Ira Hayes, the group's lone Native American whose tragic life became the basis for two Hollywood movies.

Authors James Bradley and Ron Powers have produced the definitive book on flag raising and, more importantly, the men who made it possible. *Flags of Our Fathers* traces the lives of these six men who came from vastly different backgrounds and were forever united in that brief, shining moment on Mount Suribachi. Produced as a labor of love (Bradley's father was the Navy corpsman who participated in the flag raising), *Flags of Our Fathers* is a fascinating and moving account of the event, cast against the awful spectacle of combat in the Pacific theater.

Leading the squad was Sgt Mike Strank, the Czech immigrant described as a "Marine's Marine" and "the finest man I ever knew." He was joined by Franklin Sousey, a good-natured country boy from Kentucky; Harlon Block, the Texas high school football star who led his team to an undefeated season; Rene Gagnon, a former mill hand from New Hampshire; Hayes, a Pima Indian from Arizona, remembered by friends as an "island unto himself"; and John Bradley, the Wisconsin altar boy turned combat medic, "always eager to serve."

Bradley and Powers also describe the literal transformation of a generation that bore the brunt

of combat during World War II. They suggest that by the time of the Iwo Jima invasion, whatever idealism and innocence we carried into the war had long since been replaced by the stark realities of combat—lessons systematically reinforced on the island's killing fields. We see Sergeant Strank showing his boys the "safest" way to attack an enemy emplacement, just moments before he was killed by friendly fire; Harlan Block leading the platoon with the grace and confidence of a football star, dying in combat just hours after Mike Strank; Franklin Sousey's gentle charm and humor providing a spark for his fellow marines until he fell from a sniper's bullet, just days before the battle ended.

The authors effectively capture the irony that inevitably surrounds all historical events. The reader learns that Strank and his men were selected for the job largely because they were in the right place at the right time—having just strung a new communications line to the top of Mount Suribachi. The now-famous flag raising was actually the second of the morning: a Marine commander had ordered the erection of another banner big enough "so every SOB on the island can see it." Photographer Rosenthal—who was present largely because he *missed* the first flag raising—shot his famous image almost without thinking, unsure what his camera had captured. And the famous flag? It had been salvaged from a ship sunk at Pearl Harbor almost four years earlier.

Flags of Our Fathers also offers a masterful account of the aftermath of battle, detailing each survivor's efforts to come to terms with the lingering effects of combat and his own sudden celebrity. Ira Hayes, of course, proved unable to make the transition to civilian life. He died of exposure in 1955, after a night of heavy drinking, haunted by memories of combat. Rene Gagnon passed away in 1978, conflicted by his dual status as both a war hero and an ordinary man with an overbearing wife. John Bradley, we discover, was perhaps the only real survivor among the flag raisers. After the war, he returned to Wisconsin, married his grade-school sweetheart, and became a successful mortician. But even he was plagued by the ghosts of Iwo Jima; for the rest of his life, he refused all requests for media interviews and discussed the battle only twice. When he died in 1994, James Bradley found a Navy Cross in his father's closet, tucked away inside a shoe box. John Bradley won the decoration for heroism on Iwo Jima, just two days before the flag raising. But he never mentioned the award to

his wife or his eight children, maintaining that the "men who never came back" were the real heroes.

This is a remarkable book, richly detailed and extraordinarily moving. It invites immediate comparisons to Michael Shaara's *The Killer Angels*, brilliantly conveying both the sweep of war and the individual struggles of soldiers locked in its grip. Stephen Ambrose has called *Flags of Our Fathers* "the best book about men in battle that I've ever read." I humbly concur. You must read this book.

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The Collapse of Communism edited by Lee Edwards. Hoover Institution Press (<http://www-hoover.stanford.edu/presswebsite/hooverpress2.html>), Stanford University, Stanford, California 94305-6010, January 2000, 207 pages, \$18.95 (paper).

There are several reasons for reading *The Collapse of Communism*, not the least of which is the impressive array of academics who, knowing communism well, have contributed to this collection. Several of its essays in particular serve as an important building block in expanding one's understanding of the demise of communism. This book should find its way to the bookshelves of people who appreciate the failure of one of history's most repressive forms of government but who are not necessarily well versed in the reasons for that failure.

Two themes emerge in this collection. One is that Western observers were caught off guard by the instability of the Soviet Union—and by its sudden demise. The other is that many Western communist sympathizers were more than willing (and still are) to shill for the communist state. The essayists who cover these two themes are disturbed by the implications.

In his brief essay "The Year of Miracles," Edwards sets the stage for what will follow. He lays out four main reasons for the fall of communism (its leaders' lack of faith in communist ideology; geography; communism's inherent stagnancy and corruption; and the growing influence of mass media during the 1970s and 1980s).

Richard Pipes's "The Fall of the Soviet Union," perhaps one of the most eye-opening essays, discusses several of the author's explanations for the demise of the Soviet empire and finally arrives at the one "decisive catalyst" that brought about the

collapse of communism. In doing so, he anticipates some of the essays to come. Noting that the fall of the regime was brought on by "the utopian nature of its objectives" (42), he then explains the problems inherent not only in utopia itself, but also those in the Soviet pursuit of utopia. Finally, Pipes chastises Western academics who failed to see the imminent collapse.

Michael Novak's "The Silent Artillery of Communism" deals with communism's destruction of one of the most important aspects of life in a thriving society—human capital, specifically as it affects the economic world. He notes that "for communism, there is in man no internal source of dignity" (100) and that "it destroyed the human capital on which a free economy and polity are based" (113). Novak feels that the strength of personal will is stronger than any political system and looks toward a difficult but manageable transition from a repressive society to one that encourages enterprise and imagination.

Andrzej Brzeski follows with "The End of Communist Economics," in which he contends that "the economic system of the Soviet Union . . . was fatally flawed from the very beginning" (119), pointing out the differences between a free-market economy and one run by an oppressive government. He argues that the destruction of private ownership led to a lackadaisical attitude in the workforce, the members of which were no longer personally invested in the success or failure of the economy. He also faults the military buildup, which stole much-needed resources from the citizenry and did nothing to replace them. This buildup was brought about by President Reagan's application of pressure in the arms race, which increased the pressure on an already-suffering economy. Finally, Brzeski returns to Novak's argument that human capital—as well as the incentive to achieve and amass an inheritance to pass on—was erased, thereby stifling the will of the people to succeed and thrive.

The final essay (and perhaps the most compelling, from the standpoint of someone interested in the academic world) is "Judgments and Misjudgments" by Paul Hollander. He focuses on the inability of Western academics to see communism for what it really was—and is. After quoting intellectual after intellectual, each of whom heaps praise upon communism, he discusses several reasons for this blindness, stating that "Western misconceptions were shaped by ignorance, wishful thinking, favorable dispositions, and sometimes the manipulation of impressions and experiences"

(177). Hollander discusses the favorable press given communist leaders, systems, culture, and even spiritual life. He also notes that many *anti*-communists also missed predicting the fall of the Soviet empire, blaming this more on the false impression created by the Soviets and the limited access to data. What frustrates Hollander is that those who defended communism tended to be more disaffected with their own society—which, he points out, led to a misunderstanding of other political systems—and seemed to overlook and discount the negative impact communism had on the "basic needs and dispositions" (197) of its subjects.

The Collapse of Communism studies one of the greatest events of the modern era through the eyes of academia, and the conclusions it draws should not sit well with us. The authors take a hard look not only at communism and the reasons it failed, but also at the reasons why its fall caught the West by surprise. In addition, Edwards scrutinizes former and current defenders of communism, pointing out the fallacies inherent in their perspective. We are better for having these essays and better for understanding their conclusions.

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Alliance Adrift by Yoichi Funabashi. Council on Foreign Relations Press (<http://www.foreignrelations.org/public/cpub.html>), Harold Pratt House, 58 East 68th Street, New York, New York 10021, 1999, 514 pages, \$25.00 (paper), \$49.95 (cloth).

For Japan, the mid-1990s were a period of dislocation and readjustment, both domestically and in foreign affairs. During the decade, the Japanese economic miracle peaked and then weakened. Bureaucratic infighting and a revolving-door leadership characterized the government. Absolute dependence on the United States for protection became embarrassing. And the American presence on Okinawa became problematic. When the time came to renegotiate the Status of Forces Agreement, Japanese leaders were ready to rethink Japan's role and relationships in the region and the world after decades of demilitarized dependence. Published initially in Japan in 1997, the award-winning *Alliance Adrift* captures Japan's struggle, internal and external, to redefine its alliance with the United States. It describes Japan's difficulty in redefining itself, expanding beyond

economic leadership and moving into the international arena as a self-sufficient diplomatic and military participant after a half century of mostly being ignored by the major players.

Foreign crises during the period shocked Japanese complacency, causing a loss of face. First came the embarrassment of Operation Desert Storm, in which Japan gave only money; it brought the realization that the economic success that allowed Japan to give billions of dollars meant nothing in comparison with the commitment of people and the sharing of risk. A few years later, Japan sat helpless again. The regional crises in Korea and China revealed Japan's lack of self-defense and self-determination as a junior partner sometimes ignored by the rest of the region, as well as the senior partner, the United States.

Japan also suffered internal problems beyond the mid-decade collapse of the economic miracle. There was the Sarin gas attack in the Tokyo subway, revolving-door prime ministers, and Okinawa—always Okinawa, where most of the American GIs live, train, and disrupt Okinawan lives. The bases issue gets a great deal of attention in this book. There is much back-and-forth on the difficult negotiations on the return of Futenma Air Station and where to put the missions it hosts, the rape of a schoolgirl, and the problems of military bases in an urban setting. Detailed coverage also explains the internal Japanese local-regional-national political situation. Most noticeably, in virtually every context is the issue of face.

Compounding the complexity of this story is the Clinton presidency, whose priority is not always Japan and whose course is sometimes inconsistent. This book deals with diplomatic and political current events—not history necessarily, except when the author moves way back to World War II or the 1950s to give context to current arrangements in the Status of Forces Agreement, the Self Defense Forces, and so forth.

The style of this book is unusual because it's a translation of a Japanese work. It has that alien feel that commonly occurs early on when reading a work written in another language and from the perspective of another culture. The American reader would be well advised to know that there are many players, much jumping back and forth in time and topic, and occasional duplication of information. The documentation preponderantly consists of interviews with government officials on both sides—some of whom are prominently involved, some of whom are unnamed.

Despite the caveats, the book is well worth the reading. It gives a good overall feel for the differences between the Japanese predilection for bottom-up consensus building and the American top-down approach. It shows that both methods are slow, and it brings forth the many internal and external difficulties that each government has in arriving at a quick, lasting, and effective resolution to a serious problem. Half a decade after the attempts to restructure the alliance, the base issue is still alive in Okinawa and Japan, and there is still no satisfactory solution to Japanese and American concerns about North Korea's and China's involvement in the American-dominated region. And the Japanese role remains undefined.

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Tex Johnston: Jet-Age Test Pilot by A. M. "Tex" Johnston with Charles Barton. Smithsonian Institution Press (<http://www.si.edu/sipress>), 470 L'Enfant Plaza, Room 7100, Washington, D.C. 20560, 2000, 284 pages, \$17.95 (paper).

Tex Johnston (1914–98) was one of America's significant aviation pioneers, and he deservedly became a member of the National Aviation Hall of Fame. He grew up a classic all-American boy and experienced a pretty good rags-to-riches life, which included a paper route and saving to buy his first glider and his first motorcycle. But his passion was flying—that's where he ended up no matter how many detours he took or how high he rose. His first exposure to an airplane came as a kid of 11 when a barnstorming pilot offered a free ride to the locals, and he was the only one to take the offer. From that point he was committed, and he devoted his free time to the study of airplanes. Still, his route from Kansas to the hall of fame was circuitous and unusual in that it did not include military flying. His journey included training and employment as a mechanic, catch-as-catch-can flight instruction, and—finally—civilian flight school. He moved from barnstorming to the Apollo program without making a fatal mistake in an accident-prone profession. With a little bit of luck and a lot of skill (knowledge, training, and practice), this Kansas boy who wanted to be a test pilot eventually made it without fighting in either World War II or Korea. Over his career, he flew or tested just about every significant aircraft, from bi-

planes to the supersonic XP-59—the first American-made jet. As he rose through the ranks at Bell and Boeing, he played a key role in making planes faster and safer. Even when his job title put him behind a desk, he kept flying until his projects went into space.

Tex Johnston was one of the pioneers of military and commercial aviation. He made helicopters functional for oil exploration and made the Boeing 7-series planes safe and successful for passenger flight. As this memoir brings out, developing new machines entails lots of mistakes (and people do die), but Tex was always in control and able to explain why the others screwed up. From almost the beginning, he was the pilot who figured out where the other guys went wrong and adjusted the training and manuals accordingly. He knew his planes better than most, and he could get the designed performance out of them. He could, after all, double-barrel-roll a 707.

Much of the text is devoted to step-by-step description of the various moves in each of the planes—a pilot's pleasure but not of particular interest to the general reader. Further, the narrative sometimes reads as if it came directly from the operator's manual or the pilot's postflight report. The language and much of the material is surprisingly impersonal. Stilted prose and noticeable detachment from the subject are unusual in a work written with the help of an experienced writer. Still, the book holds the reader's interest. The hardcover version was originally published in 1991; this paper reissue is useful in bringing a particular era in aircraft development to a larger audience.

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The Book of War: 25 Centuries of Great War Writing edited by John Keegan. Penguin Group (<http://www.penguinputnam.com>), 375 Hudson Street, New York, New York 10014, 1999, \$17.00 (paperback), 492 pages.

*Here the truceless armies yet
Trample, rolled in blood and sweat;
They kill and never die;
And I think that each is I.*

—A. E. Housman, *The Welsh Marches*

In *The Book of War*, eminent military historian John Keegan assembles a masterful anthology that records the progress of Western warfare as told

through the authentic and often unique voices of its participants. No dry narrative history, Keegan's work is characterized by diversity and depth. Through 82 essays and poems, he gathers in a single volume some of Western history's most spectacular military writing. His introductions to each entry are superb: concise yet definitive. Part one of the book's three segments illustrates the various forms war takes, particularly highlighting the fact that what motivates people to war today did not necessarily provide the impetus to combat in the past. Considering such cultural and methodological divergence, Keegan exemplifies these contrasting military traditions. In part two, he examines warfare among established European states of common military cultures employing similar technologies. The dictates of empire would bring these powers into conflict with dissimilar cultures—specifically, Africa and India. Finally, in part three, Keegan examines war in the twentieth century. One salient feature he explores is how primitive or less technological cultures often overcome the advantages of advanced enemies through ingenuity, evasion, and the perpetuation of "warrior spirit."

Particularly praiseworthy is Keegan's insertion of some of Western history's most haunting poetry. Included are Thomas Hardy's "In the Time of the Breaking of Nations," Thomas Campbell's "Hohenlinden," John Scott of Amwell's magnificent eighteenth-century antiwar poem "The Drum," and Wilfred Owen's magnum opus "Anthem for Doomed Youth." Moreover, Keegan's book is just as valuable for what it *omits*. He refrains from including a warmed-over serving of Clausewitz or Sun Tzu, as well as sparing us a currently fashionable diatribe on the supposed leadership qualities of history's mass murderers. Likewise, we must not overlook the fact that Keegan includes the testimonies of both victors and vanquished, which makes the work all the more alive and didactic.

There is little to criticize in this outstanding anthology. Since only so much poetry could be included, I would have dropped one of Sassoon's two poems and added one from an era subsequent to World War I. The universal lessons of Goethe's "Campaign in France" (1792), a poignant portrayal of war as seen through the innocent suffering of horses, would have underscored much. But such considerations take nothing away from Keegan's present anthology, which remains a paragon of military anthological writing.

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Words of War: From Antiquity to Modern Times by Gerald Weland. Hellgate Press (<http://psi-research.com/hellgate.htm>), P.O. Box 3727, Central Point, Oregon 97502, 1999, 168 pages, \$13.95 (paperback).

Unfortunately, despite the alluring title, this is not a work to be taken seriously. First, Weland offers no attempt at a thesis and does not even state the purpose of his book. Whatever his intent, what results is a collection of anecdotal historical sketches and chimerical observations, clumsily seamed together in superficial summations. This reviewer was continually puzzled by the author's fondness for unscintillating and commonplace quotations, a feature surpassed only by his storytelling vernacular, obscured by cliché.

As a professed historian, Weland exhibits an inexcusable absence of mind. For instance, he incorrectly asserts that George Pickett "rendered mediocre service in the war against Mexico" (p. 85). The truth is that Pickett was cited for gallantry and was breveted twice in fighting in Mexico. As for quotations, he seems to think that Thomas "Stonewall" Jackson's only worthy citation was his biblical allusion to "crossing over the river." With just a little research, Weland would have found Jackson's most memorable quote, often falsely attributed to George Patton: "Never take counsel of your fears." Alternatively, Weland could have included Jackson's aphorism "War is the sum of all evils." Furthermore, rather than repeating William Tecumseh Sherman's inaccurately recorded words "War is hell" (p. 87), Weland could have brought a fresh reiteration of Sherman's lesser-known wisdom, such as "War is at best barbarism." Meanwhile, with regard to Robert E. Lee's last words, Weland would leave us with a feeble epigram: "Strike the tent." It would have been better to cite Lee's reply to some of his soldiers who wanted to continue the war after Appomattox: "Abandon your animosities. . . . Make your sons Americans."

Weland does provide some long-needed discussion of incidents perhaps treated lightly in American history, such as wars of the Middle Ages or America's war with the Sioux. His praise of Native American warriors is a long-overdue welcome, as is his excoriation of the US government for depredations in the western territories. But, sad to say, whatever good may come from this sketchy book can be more thoroughly gained from any junior-high-school history textbook. Even if describing the contexts for notable quotes is Weland's intent, readers would be better served by James Charlton's

The Military Quotation Book or William J. Bennett's *Our Sacred Honor: Words of Advice from the Founders in Stories, Letters, Poems, and Speeches*. From a scholastic standpoint, such a cursory treatment is not worthy of any professional reader's time.

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The Challenge of Change: Military Institutions and New Realities, 1918–1941 edited by Harold R. Winton and David R. Mets. University of Nebraska Press (<http://www.nebraskapress.unl.edu>), 233 North 8th Street, Lincoln, Nebraska 68588-0255, 2000, 247 pages, \$50.00.

From the end of World War I to the beginning of World War II, France, Germany, Britain, the Soviet Union, and the United States made large-scale changes in varying degrees to their military thought and application. Political, social, environmental, economic, and technological advancement and uncertainty shaped the means of waging war during the interwar years. In *The Challenge of Change*, contributing authors examine each country's military institutions and the evolution of its doctrine and technological modernization.

Based on three papers presented at the Society for Military History conference in 1994, the chapters on France, Germany, and Britain provide interesting reading on the military mind-sets of those countries prior to the outbreak of hostilities in World War II. The chapter on the French military is a comical look at the stereotypical French hubris which led that country to believe that its military could handle any matter at hand. The sad fact is that the French believed it. The little-known fact is that France came out of World War I with the largest and best-equipped army in the world. To add to this advantage, the French military believed that efficient nationwide mobilization, in addition to massive defensive firepower, would halt any formidable offense against the homeland. If an enemy's assault faltered, the mobilization could mount a counteroffensive and deliver the knockout blow. Now we know the reason for the Maginot Line. True, it helped defend the border against Germany. During the German sweep around the Maginot Line, France believed that its nationwide mobilization of troops would be large and decisive enough to stop an attack through Belgium. Nevertheless, France fell in 1940.

Perhaps the most interesting chapter is the one that relates Germany's rise from defeat in World War I to its powerful display of military might in the early years of World War II. Besides the incorporation of blitzkrieg warfare into doctrine, the most dramatic German reform took effect in the officer and noncommissioned officer (NCO) education system. Officer candidates had to complete a university education, basic training, additional NCO courses, and combat-branch service before they became officers. Some members of the general staff were encouraged to obtain civilian engineering degrees, while others were sent overseas to observe new weaponry in foreign exercises. In addition to education, joint operational doctrine came to fruition. Combined air and land operations became the keystone to German combat effectiveness. Mobile forces became mechanized, and Poland was the first country to witness Germany's military reformation in 1939.

While Germany proceeded to use the tank as an integral part of offensive operations, Great Britain tended to think more in terms of mechanized forces instead of armored forces. Britain dealt with a massive downsizing of its armed forces, a large war debt, and a popular pacifist movement. Britain's economy and isolated geography, as well as its navy and air forces, became the keys to defense during another world war. Once Hitler took the Sudetenland, Britain realized it was committed to the protection of the Continent and implemented peacetime conscription. The inexperience and lack of training of these new army forces would have a devastating impact on Britain in the first few years of the war.

Obviously, the Russian interwar reformation began with politics. The new communist government dealt with raising an army based on political theory and loyalty in its doctrine. This was especially true of the officer corps. Military thinkers conceived of a more strategic and operational doctrine for defense of the homeland. The idea of a protracted war of attrition took effect as military history combined with current military problems to come up with new strategies. Once Stalin came to power, the Soviets turned to mass-producing weapons of war to improve on their doctrine of modernization and mechanization. But the Soviets delivered far less than expected, and Stalin's purging of the officer corps certainly never helped morale or the continuity of experienced leaders. At least Mother Nature provided a good defense for Russia by lending a helping hand in winter.

The United States had difficulty during the interwar years. Having to deal with a "back to normalcy" campaign, budget battles, and the Great Depression took its toll on the military. America's focus turned inward, yet its military continued to plan for the next war. Armored warfare and air-power theory were incorporated into doctrine. After the United States declared war, the depression ended, industries mobilized, and the country's greatest generation began its ascent into history. This chapter does a superb job covering the times of America's military, emphasizing the role of aviation in its military transformation.

The Challenge of Change is a good study of the reformation of five major countries' armed forces. Each chapter is well researched, featuring a wealth of information and enlightening facts on where five major countries stood from the Treaty of Versailles to the beginning of World War II. Historians, military professionals, and even politicians would be wise to study what happened during this tumultuous time in history. I highly recommend this book to anyone who wants to know how politicians, military reductions, and defense budgets can fuel—or douse—a nation's ability to wage war. Sound familiar?

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The Operational Art of War: Century of Warfare. CD-ROM. TalonSoft (<http://www.talonsoft.com>), P.O. Box 632, Forest Hills, Maryland 21050, 1998–2000, \$39.95. Minimum system requirements: Pentium 133 or higher, Windows 95/98, 16-bit High Color or SVGA graphics, 16 MB RAM (32 MB recommended), 4X CD-ROM drive, Microsoft-compatible mouse, Windows-compatible sound card.

Century of Warfare is the latest and most complete installment in a game series that began in 1998 with *The Operational Art of War, Volume 1, 1939–1955*, followed by several revisions and expansions. *Volume 2, Modern Battles*, carries the series up to the present. *Century of Warfare* further expands it with updates and scenarios covering World War I and the early twentieth century. I believe that this CD represents the finest example of commercial war gaming yet produced. Despite its faults, it provides the best mix of playability and serious simulation yet seen in a computer war game.

Others who grew up playing the board games of now-defunct companies such as Simulations Publications, Inc. (SPI) and Avalon Hill will probably agree. To understand why this is so, we must examine the game's origins.

Back in the heyday of board war gaming, there were whole families of campaign-level games, ranging from simple-but-fun titles that could be played in an afternoon, like Jim Dunnigan's *France 1940* (Avalon Hill, 1972), to pedantic monsters that could run a week to a turn, like Rich Berg's *Campaign for North Africa* (SPI, 1979). One found both great variety and great challenge—much to enjoy as both a game player and a historian. Then the paper-and-cardboard war-gaming industry died in the mid-eighties, killed by a combination of hostile takeovers, corporate mismanagement, and competition from the growing computer-gaming industry. A long hiatus followed, during which serious war gamers either fell back on old titles or drifted off into adventure-strategy computer games. Times were fairly lean until the mid-nineties, when a crowd of true war-game titles exploded onto the scene. The flash point of this explosion was *Panzer General* (Strategic Simulations, Inc. [SSI], 1995), which combined a remarkably intuitive user interface with a game engine that had enough depth and "chrome" to attract even serious war gamers. Although several levels of abstraction away from a real model of warfare, it made players confront many of the choices actually faced by campaign commanders. It was so good at this, in fact, that Air Command and Staff College (ACSC) actually experimented with using a version of it (*Pacific General*) as a teaching tool in campaign-level planning.

Beyond this, the game was *fun*. It provoked a reaction within the gaming community akin to that of Jim Dunnigan's *Panzer Blitz* (Avalon Hill, 1970), whose popularity back in the early seventies helped create much of today's *grognard* community (a term that means "grumbler," formerly applied by Napoléon to his Old Guard and currently to hard-core war gamers), and John Hill's *Squad Leader* (Avalon Hill, 1977), which helped fuel the great board-war-game boom of the late seventies. The war-gaming hobby seems to need a fun, accessible hit every so often to attract new players, a few of whom eventually become interested in deeper simulations. Boiled down and rendered, they become *grogards*.

A number of excellent war-game series appeared in the year or so following the release of *Panzer General*. The renaissance was short-lived, however, as the large companies realized that de-

mand for true war games came from a relatively small (if somewhat fanatical) community. Still, as the wave of war-game popularity washed over the industry, many tide pools of serious game development formed, a number of which remain today. One of these is TalonSoft, which offers *The Operational Art of War (TOAW)*, the finest attempt yet seen at building a serious model of warfare in a playable format. Creator Norm Kroger, formerly with SSI, is known for his innovative designs and attention to detail. The two titles he produced prior to *TOAW*—*Tanks!* and *Age of Rifles*—are among the finest tactical simulations available. Many people have contributed scenarios or developmental aid to the *TOAW* system, including ACSC's Matt Caffrey and Chuck Kamps.

All *TOAW* games look like conventional board war games: a "God's-eye view" of a hex-based map grid, with unit counters (small squares) containing standard NATO functional symbols surrounded by status information. The player interacts with units and the game engine, either by directly clicking on unit counters or selecting from a variety of available menus. There is nothing remarkable here although the terrain presentation is more attractive than in most such games. (There is a cheesy attempt at rendering a three-dimensional play area, but most gamers will stick with the better-presented two-dimensional display.) The rule book, thorough and well laid out, contains a wealth of reference material for scenario developers, who will find the game a rich source of enjoyment.

Military historians and gamers who have the time to research and build scenarios will find this game a treasure. Actually, the game could best be called a scenario-building engine for modern campaign-level combat, with a number of finished scenarios attached, much like *Age of Rifles* and *Tanks!* The game system is flexible enough to cover scales from 2.5 km to 50 km per hex, game turns ranging from six hours to a week, and unit sizes ranging from companies to corps. The *Century of Warfare* edition comes with close to one hundred scenarios, and about two hundred more are available on the Web in various war-game-site scenario archives. (See, for example, www.wargamer.com/archive.) Many of these are as good as or better than those released commercially.

The game system carries forward a number of innovations introduced by Kroger in earlier SSI games, but their combined effect is something of a revolutionary departure. The first of these is the game's interface, which is remarkably intuitive. In fact, it's a model of its kind. Almost all of the te-

dious unit-status bookkeeping that plagued serious operational-level board games of yore is transparent to the player, yet all of the detail is available at the push of a menu button (usually to several levels of detail beyond anything the player can use).

Also innovative are the game's movement and combat system. The game is turn-based, but within a given player's turn, movement and combat are almost seamless. A player may instruct his or her moving units to conduct combat at any point by ordering them into enemy-occupied hexes. If the opposing units are much weaker, they are simply overrun. If they are strong enough, they force a prepared battle, and a combat menu appears, allowing the player to plan attacks, including nearby maneuver units and fire support, if available. The combat-resolution system calculates how much of the attacking units' movement allowances has been spent and allows movement after combat if sufficient capability remains. Higher-quality and better-supplied forces are better able to use this type of movement. Additionally, units may be forced to fight when attempting to disengage from the enemy, and only the largest or most mobile forces can do so with impunity. Thus, players must carefully sequence their movement and attacks to achieve significant breakthroughs. There is a random element here too, so players are never completely certain when their turns will end. This is an elegant system, and the practical effect is to make blitzkrieg-type exploitation possible, even if other game features work against this potential.

The game's logistics model constitutes yet another innovation. The system forces players to deal intimately and intelligently with their lines of communication and supply states if they wish their units to retain any significant combat power. This is the correct focus for an operational-level game—the soul of surface warfare at this level is logistics, and no game has yet modeled it better.

The system's artificial intelligence (AI) routines are among the most sophisticated in war gaming. Players expecting the easily mastered AI logic trails of other games will be unpleasantly surprised (and probably defeated). Kroger has somehow managed to model *Auftragstaktik* fairly effectively, as long as nothing more is required of the virtual general than the taking or holding of geographical objectives. The AI cannot play Gen Vo Nguyen Giap, but it's more challenging than real Soviets, Iraqis, or other inflexible opponents might have been.

A final significant innovation is the event engine, which allows scenario designers to introduce external factors affecting a campaign. It can be

used, for example, to control the participation of forces if certain conditions are met (e.g., Chinese intervention in Korea if the United States pushes too far), to introduce political constraints and restraints upon the players, or simply to convey news. Designers can attach probabilities that events will happen, adding a satisfying degree of uncertainty to historical campaigns.

All of these features add up to a remarkable simulation, but the game system has its shortcomings. Early editions contained peculiar unit valuations that led to consistently unrealistic results. Many of these problems have been fixed—Kroger seems to update the unit database about once a year. Even so, the problems point out one of the major limitations of the scenario-building function: designers cannot edit unit values or create their own new units within the force database. This is particularly frustrating to anyone interested in accurately gaming airpower within *TOAW* since much of the air-unit data is grossly in error.

Another problem is that units incur significant, often mobility-crippling, penalties for moving near enemy units. It's possible to run *through* them if your units are big and mobile enough, but even without considering disengagement combat, it is very difficult to move *around* the enemy. This works against other game features, making true (and historically accurate) breakthroughs and exploitations almost impossible. *Century of Warfare* is better than earlier versions of the game in this respect, but the problem is still not fixed. It may be that unit zones of control are "stickier" than they should be, or the problem may lie in the fact that the psychological effects of combat are not modeled well. Unit "readiness" and "morale" levels reflect the effects of fatigue and loss of supply with fair accuracy, but the more profound effects of shock and dislocation are not present. The game system includes a "shock value," which is associated with a player's entire force and which confers advantages upon the attacker (if his shock value is higher than the enemy's). Its effect is not strong enough, however. True historical breakthroughs, in which the defender is shocked into inaction or headlong flight, are almost impossible to achieve. There is no *Kaiserschlacht*, no true blitzkrieg, no O'Conner in the desert, no MacArthur after Inchon, and no Desert Storm in *TOAW*'s art of war. Kroger *has* modeled shock effects before, at the tactical level in *Age of Rifles*, for instance, but has not included them (or at least not enough of them) in *TOAW*. The psychological effects of shock

and dislocation are just as profound at the operational level as they are on the battlefield.

A corollary of this problem is that command and control (C²) are not well modeled. Headquarters units exist, but their function is to bolster resupply and help coordinate combat. The effect is to make even the most doctrinally rigid armies practice *Auftragstaktik* as well as the Israelis or World War II Germans. This is patently unrealistic and makes simulation of rigidly commanded armies, like those of the Arabs or Warsaw Pact, difficult to simulate. According to the scenario design notes, command structures can be made more fragile, but this hasn't been implemented in many published scenarios. This may simply reflect a lack of understanding on the part of scenario designers and not a structural game flaw.

All of this leads up to the game system's biggest problem. Airpower is the dominant arm in modern warfare. The airplane, not the tank, is today's primary means of inducing shock and dislocation within an enemy army. Airpower can also induce these effects theaterwide, not just on the immediate battlefield. Yet, in *TOAW*, airpower is portrayed as nothing more than flying artillery. In the game, players manage airpower with a menu that allows them to apportion air units to air superiority, interdiction, or close air support (CAS) missions. The CAS and interdiction rules work fairly well, as far as they go, but the game system fails to show some of airpower's most important contributions to the operational art. Firstly, airpower cannot impose shock/dislocation effects, since these are not modeled. (An "air shock value" exists but applies only to combat with other air units.) Secondly, airpower cannot interdict supply or C², one of the main uses of this type of mission in the "real world." In short, because airpower cannot be used to "isolate the battlefield," it is impossible to accurately game AirLand Battle doctrine in NATO-Warsaw Pact scenarios. Thirdly, air cannot attack fixed targets of high value other than bridges. It would be nice to be able to use tactical air forces to tear up railroads and interdict German armor in late World War II scenarios, but the game doesn't allow this.

Apportioning air assets doesn't accurately reflect air's contribution in this game any more than it does in the real joint air-tasking process. Modern aircraft (and, in larger scenarios, even the earliest aircraft) can fly all of the apportioned missions within the scope of a single game turn, but there is no way to portray this in *TOAW*. Reconnaissance is vital to game play, but even this aspect of airpower is

not modeled well. Ground units in contact reveal enemy dispositions, but players can fly their airplanes over the enemy until kingdom come, striking deep targets, and these sorties will not uncover enemy units. A "theater recon level" makes up for some of this but is usually set too low in published scenarios. Once again, these may be conceptual—not structural—problems. More "air-minded" scenario developers may be able to coax more accurate results from the game system. Still, it is revealing that the monster Desert Storm scenario begins at the start of the ground campaign, tacitly conceding defeat in modeling airpower and leaving well over half the Desert Storm story untold.

In short, *TOAW* is a serious, brilliantly innovative simulation—one that every serious war gamer and student of war should own. It will provide countless hours of enjoyable play and may, with improvements to the system, become an invaluable tool for speculative research. It is unfortunate that the game presents a classic "groundcentric" perspective of war, leaving a great deal of the true "operational art of war" unrevealed. It would be gratifying to see *TOAW* incorporate accurate treatment of shock/dislocation and airpower, since these are two of the most pivotal phenomena in this "century of warfare."

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Steadfast and Courageous: FEAF Bomber Command and the Air War in Korea, 1950–1953. Air Force History and Museums Program (<http://www.airforcehistory.hq.af.mil/pubs/index.htm>), 200 McChord Street, Box 94, Bolling AFB, Washington, D.C. 20332-1111, 2000, 60 pages, \$4.00.

Anything, Anywhere, Anytime: Combat Cargo in the Korean War by William M. Leary. Air Force History and Museums Program (<http://www.airforcehistory.hq.af.mil/pubs/index.htm>), 200 McChord Street, Box 94, Bolling AFB, Washington, D.C. 20332-1111, 2000, 40 pages, \$3.00.

Within Limits: The United States Air Force and the Korean War by Wayne Thompson and Bernard Nalty. Air Force History and Museums Program (<http://www.airforcehistory.hq.af.mil/pubs/>

index.htm), 200 McChord Street, Box 94, Bolling AFB, Washington, D.C. 20332-1111, 1996, 63 pages, \$5.00.

The USAF in Korea: A Chronology, 1950–1953 edited by A. Timothy Warnock. Air Force History and Museums Program (<http://www.airforcehistory.hq.af.mil/pubs/index.htm>), 200 McChord Street, Box 94, Bolling AFB, Washington, D.C. 20332-1111, 2000, 105 pages, \$7.50.

MiG Alley: The Fight for Air Superiority by William T. Y'Blood. Air Force History and Museums Program (<http://www.airforcehistory.hq.af.mil/pubs/index.htm>), 200 McChord Street, Box 94, Bolling AFB, Washington, D.C. 20332-1111, 2000, 48 pages, \$4.00.

The Air Force History and Museums Program has produced five volumes of a projected eight-volume series that covers the major topics of US Air Force involvement in the Korean War. Because of their brevity, scholarship, and recent origins, they will appeal to a wide audience—and rightly so. Certainly, they make Air Force operations in that conflict more visible and understandable—a giant step forward from the detailed, difficult, and dated official history *The United States Air Force in Korea, 1950–1953* by Robert F. Futrell.

Steadfast and Courageous tells the story of the B-29s that bombed from the very beginning of the war to the end. During the campaign, they knocked out the few strategic targets in North Korea; leveled North Korean cities; and attacked airfields, close air support, and interdiction targets. The bombers had problems. The numbers employed were small—just over a hundred aircraft, in contrast to over one thousand stationed in the Mariana Islands at the end of the Japanese war. In addition, the Boeing bombers were plagued by engine problems, just as they had been in the Pacific war. But most of all, these Superfortresses were savaged by Communist MiGs and forced into night operations. *Steadfast and Courageous* delivers this story, along with such interesting and important details as the use of guided bombs and the first combat use of air-to-air refueling. The study concludes by noting, “With courage and steadfastness, Bomber Command’s aircrews policed their assigned beat, stoically enduring their losses. Many were their missions, many were their accomplish-

ments” (57). This is also a fair appraisal of the US Air Force during the entire war.

William Leary writes about transport operations in *Anything, Anywhere, Anytime*. In writing one of the better volumes of the series, the author puts this neglected subject into the context of the war and gives interesting details in clear, lively prose. He not only discusses the story of transporting passengers, evacuating casualties, and supplying the troops in the field, but also concludes with lessons that the Air Force drew from the conflict. Leary describes the highlights of the air-transport story and clearly shows how important it was to the ground conflict.

Within Limits is an overview of the air war. It gives the big picture by providing the context of the entire ground and political war. As a result, it is less detailed and accurate in the smaller matters. Because of its broader scope, it may not be as useful to some readers as the other studies in this series. (A footnoted version of this study appears as a chapter in Bernard Nalty’s *Winged Shield, Winged Sword: A History of the United States Air Force*.)

Tim Warnock’s *The USAF in Korea: A Chronology, 1950–1953* is well done. It consists of an overview of each month of the war and then follows with important and interesting happenings on specific days (fortunately, not every day). Like other volumes in this series, it candidly mentions not only the successes, but also the failures and defeats of airpower. It is noteworthy for its broad coverage, dealing with both the glories of air-to-air combat (the F-86 versus the MiG-15) and other important aspects, such as bombing, air-sea rescue, and air transport. Although some readers may grouse over incidents or people not mentioned, my two criticisms are technical: (1) there are no maps, an omission that becomes quite a burden due to the great number of similar-looking Korean place-names, and (2) the pictures are dark. Yet, these are minor drawbacks, relative to the advantages of this slim volume. In fact, readers may get a better “feel” for the air war by reading or skimming this chronology than by reading a more conventional text.

William Y'Blood narrates the story of the F-86's battles with the MiG-15 in *MiG Alley*. The US Air Force quickly achieved air superiority over the North Korean air force in the first days of the war and made good use of it. But then in November 1950, the Communists intervened with an overwhelming Chinese ground force, as well as with a jet fighter that threatened air operations and that was superior to anything the United States was flying over Korea. The US Air Force quickly dis-

patched its best fighters to the theater, albeit in limited numbers—fewer than one hundred F-86s. In the air battles that followed, the Sabres obtained combat dominance with an exchange ratio (according to Y'Blood) of perhaps 7:1. This was not due to the superiority of the F-86, which was in fact inferior to the MiG in some key flying-performance areas, but mainly to pilot skill and aggressiveness. Having researched most of the primary US Air Force sources on this subject, I expected this brief account to be flawed and superficial. My fears were unfounded. Y'Blood's effort, which incorporates the latest scholarship, is concise, well written, and accurate. *MiG Alley* is popular history at its best but retains the limitations of that genre. I would have preferred citations and more details, but that would have called for a different book in a different series.

Having raised the issue of criticism, I now turn to the weaknesses of this series. The reader should be aware that it is intended for the casual reader—not the student or scholar. There are no citations, and the bibliographies are brief—varying between 12 to 19 references per volume. This reader would have greatly appreciated a bibliographic essay. For the most part, there are no conclusions or analy-

ses—only descriptions. And there are no indices. A critic may also question why other important topics, such as intelligence and reconnaissance, air-sea rescue, and helicopters, were not covered in separate monographs.

The Air Force History Office plans to publish three other volumes in the series. William Y'Blood is working on a volume covering close air support and another on interdiction, both scheduled for publication in the summer of 2001. In view of Y'Blood's success with the air-superiority volume, this reader eagerly anticipates these additional studies. Finally, the Air Force intends to publish a statistical volume (a reprint of the Far East Air Force Korean War Statistical Summary) on a CD-ROM.

The Air Force is to be highly commended for this fine effort. These volumes will provide a wide range of readers greater access to the history of that service's operations in Korea with well-written, concise, accurate, and up-to-date studies. The veterans, public, and the Air Force itself are well served by this impressive effort.

Kenneth P. Werrell
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Touch and Go

In this section of "Net Assessment," you will find additional reviews of aviation-related books and CD-ROMs but in a considerably briefer format than our usual offerings. We certainly don't mean to imply that these items are less worthy of your attention. On the contrary, our intention is to give you as many reviews of notable books and electronic publications as possible in a limited amount of space. Unless otherwise indicated, the reviews have been written by an APJ staff member.

Science and Technology: The Making of the Air Force Research Laboratory by Robert W. Duffner. Air University Press (<http://www.au.af.mil/au/oas/aupress>), 131 West Shumacher Avenue, Maxwell Air Force Base, Alabama 36112-6615, 2000, 307 pages.

Unbeknownst to most of the Air Force, 8 April 1997 heralded a major change in the service's science and technology (S&T) management—specifically, the formation of the Air Force Research Lab-

oratory (AFRL). Four disparate laboratories with very different missions and reporting chains were brought together under one commander. This long overdue change was meant to strengthen the Air Force's S&T efforts by streamlining management and collecting all S&T decisions under a single commander. Robert Duffner, chief of AFRL's Kirtland Air Force Base, New Mexico, history office, has written an extremely thorough history of all the events, circumstances, and high-level decisions that led to the formation of AFRL. He has

compiled copious amounts of information from historical records and interviews of the principal players, including Maj Gen Richard Paul (AFRL's first commander). This interesting but esoteric work will mainly interest people in the S&T community or those enthralled by the Air Force's bureaucratic decision processes.

The Dragon Strikes: China and the Korean War, June–December 1950 by Patrick C. Roe. Presidio Press (<http://www.presidiopress.com>), P.O. Box 1764, Novato, California 94948, 2000, 480 pages, \$34.95.

Of a number of significant aspects of the Korean War, none is more important than Chinese intervention. This move turned a hurried US and noble United Nations (UN) operation from success into a major disaster. The Chinese not only inflicted perhaps the worst defeat on US arms in history but in so doing, leaped upon the world stage as a major player. The Chinese intervention in Korea was truly a world-shaping event.

Using a broad range of sources, including some Chinese materials, Patrick Roe explores the topic and attempts to put the Chinese intervention into context. The author is especially good in describing the atmosphere, terrain, weather, and populace. He does a fine job showing the various deception measures taken by the Chinese to cover their operation. These actions, coupled with poor US intelligence and—perhaps most of all—American arrogance and self-delusion, help explain the result. Although the United States believed there were but 75,000 Chinese volunteers in Korea, in fact there were about 380,000 combat-tested veterans who were full of fight. Consequently, UN forces were surprised and badly beaten. True to his purpose and subtitle, Roe essentially concludes the story at the end of December 1950.

Unfortunately, Roe's ambitious undertaking is marred by his prose. At best, the writing is mediocre, with long sentences and long direct quotations that make a complex topic even more opaque. Too many details at the tactical level obscure the author's main thrust and unnecessarily bulk up the book. In brief, this text cries out for an editor.

Nevertheless, with this major reservation, *The Dragon Strikes* is a good summary of an important historical event. Such a discussion is particularly relevant today, with the Chinese movement toward peer-competitor status and the continuing American trend toward overseas intervention and coalition warfare. Many lessons are available from this

war, some of which are clearly demonstrated in this study. These include the problem of overestimating airpower, the importance of security (the infamous Philby, Burgess, and MacLean spy ring leaked plans to the Reds), and the difficulties of allied partners (in this case, the British). But most of all, this book makes abundantly clear the importance and problems of intelligence collection, analysis, and use. Aside from the Pearl Harbor disaster, no American historical event can better describe the difficulties, risks, and consequences of faulty intelligence. *The Dragon Strikes* is not for the timid, but it is a useful study of an important, historic, and relevant topic.

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Documents on the Laws of War, 3d ed., edited by Adam Roberts and Richard Guelff. Oxford University Press (<http://www.oup-usa.org/index.html>), 198 Madison Avenue, New York, New York 10016, 2000, 781 pages, \$35.00 (paper), \$85.00 (cloth).

Sooner or later, most historical treatments of war and military operations deal with questions of legality and morality. Therefore, both legal and military historians should have access to a good collection of relevant international statutes.

Documents on the Laws of War fills that need, and its 46-page introduction is probably the most important part of the book for readers who are not specialists in the field of international law. In this condensed yet very understandable chapter, the editors explain the sources of international law as well as its application in conflicts.

Naturally, most of the book consists of the documents themselves, each one preceded by a short introduction detailing its history. These documents, which reflect recent developments in international law, include extracts from several statutes of international courts, as well as an opinion on nuclear weapons; a UN secretary-general's bulletin; and even rules of engagement printed on a pocket card issued to US troops during Operation Desert Storm.

Despite the undisputed usefulness of *Documents on the Laws of War*, we historians need a collection of the laws of warfare that lists all rules valid within a certain time frame (e.g., World War I, World War

II, Korea, Vietnam, etc.). It is time someone published such a work.

Dr. Marcus Hanke
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Spacepower for a New Millennium: Space and U.S. National Security edited by Peter L. Hays et al. USAF Institute for National Security Studies (<http://www.usafa.af.mil/inss>) and McGraw-Hill, 1221 Avenue of the Americas, New York, New York 10020, 2000, 308 pages.

The most heated debate in the Air Force today concerns the future acquisition, implementation, and organization of US space power. With the current discussion centering on the lofty and complex

issues before the Congressional Space Commission—such as aerospace integration versus a separate space service—many officers find themselves grossly uninformed about the details of military space. Even those of us who've been involved in various facets of the military space business are often unclear about how our activities fit into the military's grand space-power plan. *Spacepower for a New Millennium* fills both of these voids, serving as a space-power primer as well as providing a detailed overview of the Air Force's long-range space plan. The USAF Institute for National Security Studies (INSS) has pulled together writings from the top experts in all aspects of military space in an informative anthology that will likely become a standard text for introductory courses in early twenty-first-century space power. □

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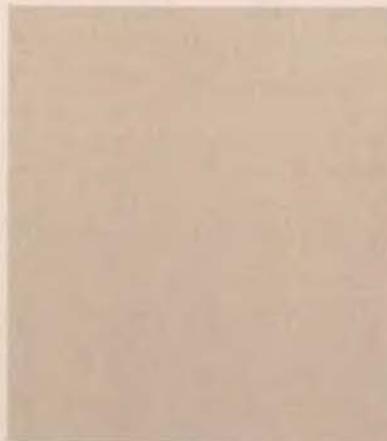
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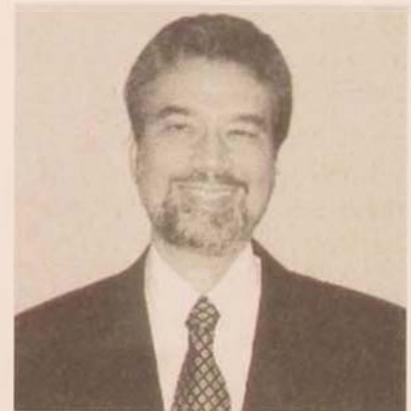
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Dr. Karl P. Mueller (BA, University of Chicago; MA, PhD, Princeton University) is an associate professor of comparative military studies at the School of Advanced Airpower Studies, Maxwell AFB, Alabama. He has written articles on a variety of national security topics, including deterrence theory, economic sanctions, and the coercive use of military power in such journals as *Security Studies* and *Foreign Affairs*, and has contributed chapters to *The Paths of Heaven: The Evolution of Airpower Theory* and *Deliberate Force: A Case Study in Effective Air Campaigning*, both published by Air University Press. He is now working on projects dealing with space weaponization, the role of airpower in twenty-first-century warfare, and the strategy and results of Operation Allied Force. Dr. Mueller is completing a book about the security strategies of European middle powers. In early 2001, he will be joining the Washington, D.C., office of the RAND Corporation.





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