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Spring 1999

JOURNAL



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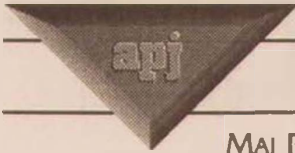
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Flight Lines

MAJ PETER M. OSIKA, ASSOCIATE EDITOR

The Curse of Interesting Times

"MAY YOU LIVE in interesting times" is supposedly an ancient curse disguised as a blessing. If so, it appears to be particularly well suited to the circumstances we seem blessed with in this post-cold-war world.

The very notion of "interesting times" carries inherent contradictions: peace and quiet being best appreciated by those who have known little of it; chaos and conflict being most appealing to those who have never had to deal firsthand with the consequences. Perspective also plays its part: For those who must cope with change or uncertainty in making or executing policy, "interesting times" is a daunting and at times discouraging benediction; whereas for those tasked with reporting the "news," at least the perception of such times is mandatory. Finally, I suspect human nature invariably promotes the notion that one's own time always presents unique and more significant challenges than any past era when, so our thinking goes, people were fortunate enough to live in a "simpler age."

Contradictory would seem to be the defining term for our times. The cold war ended with a better, safer world. Peace and prosperity, if not universal, are at least widespread. Human rights are at least acknowledged if not always respected around the globe. Prospects for the new millennium should appear bright, yet conflicts smolder even where they do not burn. More ominous, perhaps, are the threats that lurk in the dark corners of our thoughts—loose weapons of mass destruction, genocide, global depression, and other natural or man-made catastrophes. These certainly call into question any notion that a better future is guaranteed.

Perhaps that is the true nature of interesting times: believing we live on a cusp of history but having no clear sense for the

change—a golden era or a new dark age? Whatever your opinions on the challenges ahead or the probable outcomes, rest assured there will be no shortage of people who will wish to argue an opposing view. It may seem trite to venture that difficult times can serve as a spur to healthy debate, but I submit this edition's feature articles as support for that contention.

Few topics have received more recent attention than debates over the Air Force's stewardship of space. Perhaps it is not surprising that we offer three unrelated but very complementary articles dealing with the Air Force's past record and possible futures in space. While the focus and viewpoints may be complementary, the conclusions reached by the authors are often in stark contrast.

To lead off, Gen Thomas S. Moorman Jr., USAF, Retired, in "The Explosion of Commercial Space and the Implications for National Security," argues that a broader and more creative approach to providing space-power assets and capabilities for the nation is both necessary and possible. In "The Challenge of Space Power"—an article we were fortunate to receive just before we went to press—Sen. Bob Smith (R-N.H.) agrees, but he also believes we should do more, soon, and he questions whether the Air Force can meet the challenge. Senator Smith contends that the Air Force has failed to provide either the vision or investments needed to be "on track" in transitioning to a space and air force and ominously concludes that the Air Force has no special claim to space. Have we neglected space? Is there a case to be made for a separate space service, and could it do any better? Maj Shawn P. Rife tackles just this issue in "On Space-Power Separatism."

I think you will find our other features equally provocative. In "US Arms Transfer Policy for Latin America: Lifting the Ban on

Fighter Aircraft," Lt Col Antonio L. Palá and Dr. Frank O. Mora provide an extensive review of the pros and cons and come down strongly in favor of lifting the ban. Then Lt Col James M. Liepman attempts to slay some of the acronym dragons while offering us a conceptual framework for air battle management in "C^{nth}I^{nth}xyz, TACS, and Air Battle Management: The Search for Operational Doctrine." Finally, Lt Col Terrie M. Gent explains the evolution and implications of Air Force operational law in her article "The Role of Judge Advocates in a Joint Air Operations Center: A Counterpoint of Doctrine, Strategy, and Law"—a particularly timely piece given the just-concluded Operation Desert Fox. With all the pundits holding forth on questions like the legality of targeting foreign leaders, it's nice to know where to go for the real answers.

While any detailed discussion on the subject of Operation Desert Fox had best wait until more information is available, I do want to take a moment to talk about a few of the possible implications. It was an operation we may not be able or willing to repeat. We achieved surprise—tactically and especially politically—by turning deployment efforts and time lines to our advantage. In effect, the painfully established track record of past buildups helped disguise a global "sucker punch," gratifying to administer but a ploy we may not be able to use again. Also, the lack of preparation cut both ways with some senior US leaders, to say nothing of foreign governments, expressing shock or dissent after the fact. Also important, and by no means assured in the future, was our ability to completely define scope and duration of the operation, Iraq being unwilling or incapable (apparently the latter) of engaging on anything other than our terms.

Relying largely on forces in place was also possible because of their lethality. The avail-

ability, integration, and effectiveness of precision-guided munitions (PGM) and cruise missiles represent a growing increase in our capabilities even over those of Operation Desert Storm. It was a success story, but one with associated questions and concerns about cost and numbers of precision weapons, and particularly standoff weapons. A related issue may be how much the concerns over the survivability of conventional aircraft may drive use of these weapons (both Air Force and Navy cruise missiles were launched in unprecedented numbers). Finally, as the key to our fielding of low-cost, all-weather PGMs, the denial or exploitation of the Global Positioning System by an adversary should correspondingly be a key concern.

Only time will tell whether this operation was the best or perhaps the least undesirable option available. Did we do enough damage to the right targets at the right time? Will it be worth the uncertain (as yet) effects on a moribund weapons inspections regime backed by the highly criticized sanctions? More telling, but even less certain, will be the unanswered (as yet) question, What now?

Whatever strategy we adopt, airpower will almost certainly play a significant role. If, as Secretary of State Madeleine Albright likes to say, "The US has become the indispensable nation" in dealing with crises around the world, then just as clearly US airpower has become the indispensable force in virtually any formula for doing so. Of course, that is no guarantee that it will be used wisely or well; that is for us to ensure through means great (establishing air expeditionary forces, fielding F-22s, developing joint airpower doctrine, etc.) and small (writing a letter to your professional journal). In the end, "interesting times" are what we will make of them. □

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

ON THE AIR WAR IN EL SALVADOR

It was most gratifying to read Dr. James Corum's article "The Air War in El Salvador" in the Summer 1998 issue of the *Airpower Journal*. Dr. Corum, a member of the faculty at the School of Advanced Airpower Studies at Maxwell AFB, Alabama, has made a commendable effort to describe the role played by the Salvadoran air force (*Fuerza Aérea Salvadoreña* [FAS, in its Spanish acronym]) during that costly 12-year insurgency that plagued our nation. As I see it, his article closely reflects the sequence of events that took place during that time frame.

Most authors who have shared their insights on the conflict are not native Salvadorans. So, as Dr. Corum correctly points out, although airpower played a significant role, there isn't much literature on the history of FAS, which has done very little to disseminate its version of the events.

The author's excellent article is detailed, objective, and balanced. This letter seeks to enrich that article—not to generate controversy. (Also, the opinions expressed here are solely mine and not those of either the Salvadoran air force or Air University.) I believe, however, that Dr. Corum should have interviewed FAS officers who were attending Air War College (AWC)/Air Command and Staff College (ACSC) at Maxwell to glean some

valuable firsthand insights for his article, whose endnotes clearly show a lack of direct contact with FAS representatives. All Salvadoran officers who attended AWC/ACSC either during or after the conflict could have been of great assistance. I, for one, would have been honored to have met with him. Having been an active participant in that conflict, I still have a vivid memory of most of what he discusses. After joining the El Salvadoran armed forces in 1983, I attended undergraduate pilot training under the international military education and training program, to which Dr. Corum alludes on page 34 of his article. I also flew over two hundred combat missions on the AC-47 (page 33) and helped reorganize the FAS intelligence section (page 38).

There are a few details that would not have gone unnoticed by a Salvadoran. San Miguel, the country's third most important city, is located in the *eastern*, not southern, part of the country. FAS never had Super Mystère fighters in its inventory. All FAS T-34s and T-6s had already been retired a few years before the outbreak of the conflict. The attack helicopter used during the insurgency was the UH-1M, not the UH-1H (page 29). Also, 1983 ended badly with the destruction of the 4th Brigade headquarters during the night of 29 December and early hours of the morning of 30 December (not on 31 December, as Dr. Corum asserts on page 33). What did take place on 31 December was the bombing of the Cuzcatlán bridge over the Lempa River, the country's largest. I believe that Dr. Corum may have been confused about these two events.

Additionally, some important insights should be shared with anyone who studies the Salvadoran conflict for the first time. First, El

Salvador is a small country (approximately the size of Massachusetts). With only 20,000 square kilometers, it is smaller than some of Brazil's farms. Also, it is the most densely populated country in the Western Hemisphere, with more than two hundred inhabitants per square kilometer.

Second, in 1969 El Salvador waged a brief but violent war against Honduras, its neighbor to the north. That conflict was not resolved until the early 1990s. Although the chances for renewed fighting with Honduras were very slim, FAS remained ready for action if called upon.

Third, the Farabundo Martí National Liberation Front (FMLN) was no doubt the most organized insurgent force in the Western Hemisphere. It was able to fight in rural and urban areas as a guerrilla force or as urban cells. The FMLN was comprised of five factions based on different ideologies—Maoist, Leninist, Castroist, and so forth. Each of those organizations had its own version as to how to prosecute the war and nurtured the goal of being the "revolutionary front" in its struggle for power. Popular support for these organizations was widespread. As a matter of fact, by the end of the 1970s, they could mobilize up to 250,000 people.

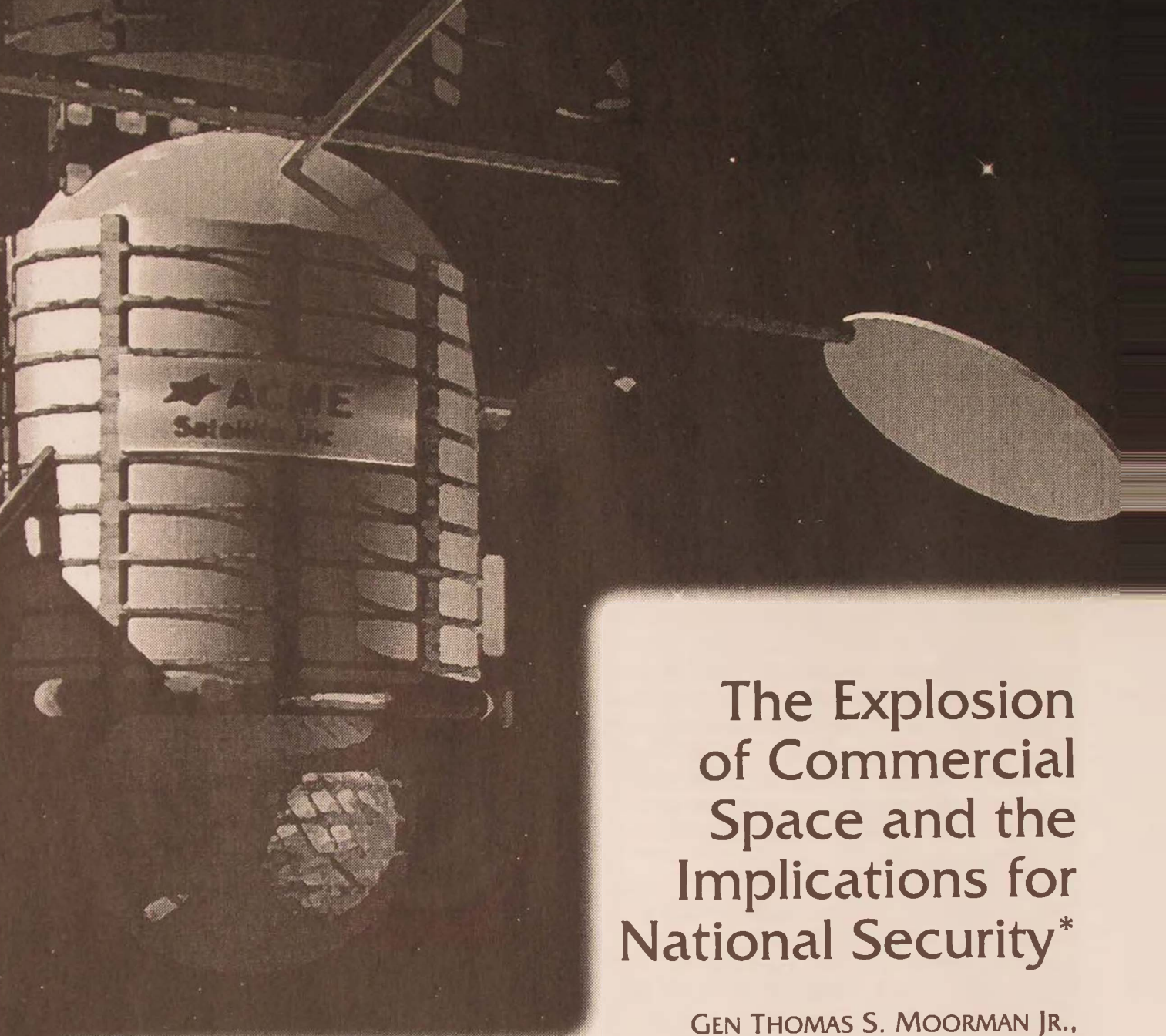
Fourth, the Salvadoran conflict certainly had its roots in the population's poor economic conditions and the lack of a real democracy, but it was also a part of the East-West conflict characteristic of the cold war. The role played by pressure groups within US and European societies against the Salvadoran government is undeniable as well, thus making it difficult to distinguish the good guys from the bad guys.

In my view Dr. Corum could have provided additional balance to the article by considering the following factors:

1. The definition of "bombing" had a markedly different meaning to the different parties in the conflict. To the FMLN, bombing was anything that fell from the skies (bombs, rockets, and strafing). FAS, however, considered bombing an activity carried out by the

A-37B (the only airplane in the FAS inventory capable of dropping bombs). The A-37B is so low that it cannot land safely while loaded with bombs. The decision to use the A-37B was a very complex one since the target selected had to justify dropping the entire bomb load. Under those circumstances, it was very difficult to avoid civilian casualties. Despite that, the figure of two thousand civilian casualties quoted by Dr. Corum would amount to an average of 166 losses per year for the entire conflict. That number, though regrettable, is very low when one considers the country's population density. In addition, given the popular support to the FMLN and the fact that the guerrillas did not wear uniforms, it was hard to distinguish the fighters from sympathizers or innocent civilians.

2. The aircrews developed a great ability to provide effective close air support. The aircraft were the only means of providing superior volumes of fire over distant areas (the army has only 105 mm howitzers with a range of 12.5 km, and, contrary to Dr. Corum's assertion on page 42, FAS does not have [and has never had] aircraft capable of carrying them). I have no doubt that the precision achieved during that conflict rivaled that of any modern air force. Suffice it to compare the air photographs of San Salvador after the guerrilla offensive of November 1989 with those of Panama City after the US invasion in December of the same year.
3. The article fails to mention that FAS evolved during the conflict and began to conduct night operations. After 1985, supply, medevac, and close air support missions over rugged terrain were carried out 24 hours a day, and the use of night-vision goggles was extensive. FAS provided sustained logistical support to the units operating in remote areas and at command, control,



The Explosion of Commercial Space and the Implications for National Security*


GEN THOMAS S. MOORMAN JR.,
USAF, RETIRED

BECAUSE I SPENT 27 years of my professional life in assignments related to the national-security space program and because space continues to be my abiding passion, it is not surprising that I have chosen to write about space—specifically, the significant changes in the evolution of the national space program and my views on the implications for military space. The

article also addresses some ramifications for the intelligence community.

A vitally important topic, space has always played a significant strategic military role, but the mainstream neither understood it nor appreciated its criticality to modern tactical war fighting—until Operation Desert Storm, which opened the eyes of senior military leaders. Now, space is like air-condition-

*This article is adapted from the annual von Kármán lecture that the author presented to the National Convention of the American Institute of Aeronautics and Astronautics at Reno, Nevada, on 13 January 1998.



ing—everyone who needs and wants information from space wonders how we ever got along without it. All joint documents underscore this fact, including *Joint Vision 2010* and *Transforming Defense: National Security in the 21st Century*, the latter report emphasizing the importance of space and stating that “unrestricted use of space has become a strategic interest of the United States.”¹

Although other services have been involved in space and certainly employ data from space in all operations, the Air Force is the space service for the Department of Defense (DOD), providing the overwhelming majority of both the military space budget and the people engaged in space acquisition and operations. Over the last 15 years, the importance of space within the Air Force has increased substantially. However, the airplane culture has been clearly dominant. Today, for a variety of reasons—Desert Storm, loss of overseas information-gathering assets, the growing military dependency on space, technology that permits the placing of more capabilities in space, and the steadily diminishing DOD budget—the Air Force has totally and unequivocally embraced the space mission and has made a commitment to its stewardship. Nowhere is this commitment better enunciated

ated than in the strategic-vision document *Global Engagement: A Vision for the 21st Century Air Force*: "We are now transitioning from an *air* force into an *air and space* force on an evolutionary path to a *space and air* force" (emphasis in original).² This document also envisions the integration of air and space, operationally and institutionally. It is interesting to note that Air Force thinking on this vision has evolved in recent months to the point that senior officials now talk about a seamless aerospace rather than a space and air force.

Making this vision a reality will be one of the Air Force's biggest challenges in the next century. Besides melding the air and space cultures, which will take years to achieve, the service also faces the challenge of evolving the necessary technology in the face of continued budget pressure. Military space programs have fared well in this decade—the topline budget has generally remained constant while most of the other major mission areas have declined. The military space budget today is around \$7 billion, 85 percent of which is in the Air Force.³ This budget sustains and modernizes the communications, navigation, warning, weather, space command and control, and launch capabilities on which we all depend. In the absence of a major change in the threat or the geopolitical equation, the next century likely will continue to see significant pressure on the defense budget. To realize the evolutionary vision of the Air Force, however, will probably entail performing new missions from space. Given the continued budget constraints, the Air Force will have an increasingly difficult time funding the sustainment of current military-space force structure while at the same time pursuing new opportunities critical to realizing our vision.

This article suggests a greater reliance on commercial space as an approach to this dilemma. On the one hand, commercialization is not a total panacea. To be sure, some functions are not amenable to commercialization, such as missile warning, signals intelligence, certain surveillance functions integrated into weapon systems, heroically survivable assured commu-

nications, and space weapons. On the other hand, the commercial space industry is expanding at such a rate and with such marvelous capabilities that it seems reasonable if not inevitable that a number of missions—heretofore the exclusive province of the government—can be satisfied or augmented commercially. We can also realize significant efficiencies by taking advantage of commercial space.

Evolution of the National Space Sectors

The Soviets' launch of *Sputnik I* created a crisis of US national identity that galvanized both government and industry. One of President Dwight Eisenhower's initiatives to deal with this crisis was the National Aeronautics and Space Act of 1958, which created the National Aeronautics and Space Administration (NASA) and established the policy that devoted the civil space program to "peaceful purposes for the benefit of all mankind." At the same time, the act clearly stated that "activities peculiar to or primarily associated with the development of weapon systems, military operations, or the defense of the United States (including the research and development necessary to make effective provision for the defense of the United States) shall be the responsibility of the Department of Defense."⁴ In other words, the act explicitly established—in law and in policy—a separate and independent military space program.

At about this same time, the Eisenhower administration had grave concerns that the Soviets enjoyed a large lead over the United States in the development of long-range missiles—the beginning of the so-called missile gap. To obtain hard intelligence on Soviet missile development, a joint Central Intelligence Agency (CIA)–Air Force team developed the U-2 aircraft, which began flying over the USSR in June 1956. Because of the vulnerability of these aircraft, the CIA and Air Force began the development of reconnaissance satellites, combining these separate efforts with the crea-

tion of the National Reconnaissance Office (NRO) in September 1961.⁵ This covert office—whose existence remained unknown until 1992—conducted its operations in the utmost secrecy.

Thus, three space sectors—civil, military, and intelligence—have existed since 1961. Although the sectors interacted in areas such as selected technology transfer, launch, and satellite command and control, they remained independent for 30 years, for the most part due to distinct differences in their missions.

The fourth sector—commercial—also began in the early 1960s with the launch of the first communications satellite. From the outset, space communications proved an attractive venture and, over time, grew not only in the United States but also in Canada, Great Britain, France, and several international consortia, all of whom built commercial communications satellites. Although the other sectors had their origins in law and presidential policy, not until the Reagan administration did we identify commercial space as a separate sector with comprehensive policy underpinnings.⁶ Growth of the communications-satellite market; industry expansion; and emerging commercial markets for launch, navigation, and remote sensing led to this formal recognition. Moreover, this emerging industry also faced foreign competition—either from international consortia or from strong aerospace countries such as France. Because the Reagan administration was clearly probusiness, it believed that commercial space needed a solid public-policy foundation.

This bit of space history provides a historical context for the components of our national space program. In sum, we established our four space sectors as independent entities. Each president since Eisenhower enunciated his administration's space policy, which reaffirmed the separateness of the sectors. In the last 15 years, the sectors gradually have become more interdependent. Today, for example, NASA, the NRO, and the Air Force are entering into cooperative partnerships—including joint architectures, technology shar-

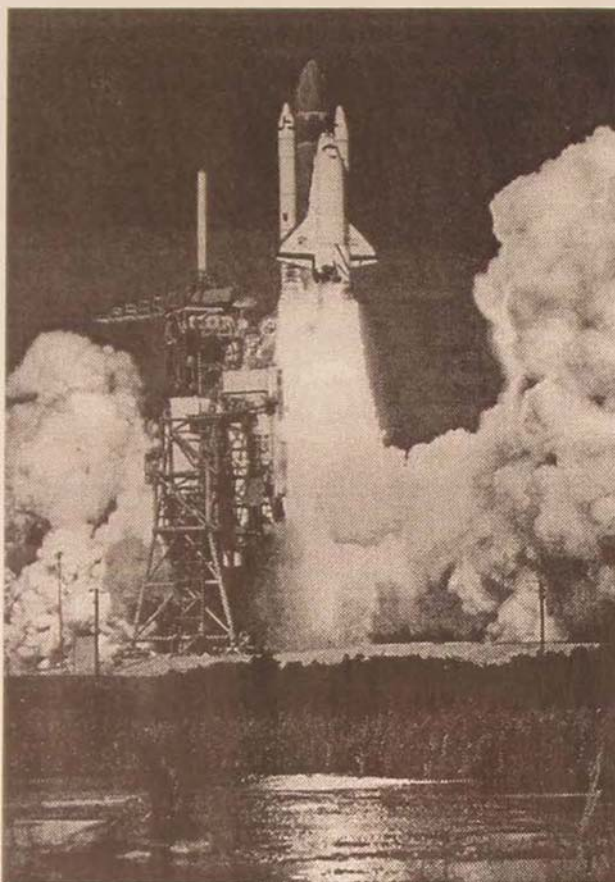
ing, and joint programs—at an unprecedented rate. All sectors will continue to converge and overlap—an interdependence that is not only inexorable but also good government.

Three space sectors—civil, military, and intelligence—have existed since 1961. . . . They remained independent for 30 years, for the most part due to distinct differences in their missions.

To use a solar-system analogy, one may describe space sectors as planets in their own orbits, which, over time, have begun to converge. In the twenty-first century, the planet/sector with the highest density—and thus gravitational pull—may well be the commercial sphere. In other words, although we will always have a compelling need for strong military, intelligence, and civil space sectors, some traditional missions will likely break off and be absorbed by the commercial sector.

The Explosion of Commercial Space

For nearly 40 years, the government has dominated the space business. Low-risk, cost-plus contracts with NASA, the military, or the intelligence community were the norm. Today, that picture is changing, and the rate of change will become even more dramatic. A number of factors have contributed to this phenomenon: the rapid evolution of information technologies, such as the explosive growth in semiconductor technology and the extraordinary advances in digital signal processing and voice compression; progress in international space policy, including the increasing deregulation of telecommunications services, the allocation of new spectrums to commercial satellite communications, and the allowance of higher imagery resolution for commercial remote sensing; fundamental



Discovery is launched on the first all-military shuttle mission on 24 January 1985. "Although the government used to have a virtual monopoly on the systems and sites to access space, that picture has fundamentally changed."

changes in the process and cost of satellite manufacturing; the increased reliability (if not decreasing costs) of launches; and an expanding global demand for satellite services driven by the information revolution.

Consequently, a remarkable infusion of private capital into space and space-related industry has occurred. According to estimates by Space Publications and the consulting firm A. T. Kearney, worldwide revenues from space are currently \$88 billion annually, projected to grow to \$117 billion by 2001.⁷ Although this growth may not be surprising, the fact that the government is not the engine may indeed be surprising. The commercial space market is the driver—its growth is 20 percent annually compared to about 2 percent for the government. Incidentally, in 1996 the total revenues of the commercial sector surpassed the gov-

ernment's for the first time (53 percent and 47 percent, respectively).⁸ By 2001 commercial revenues may account for 70 percent of space-industry revenues.

Furthermore, if one examines and aggregates all the various satellite ventures planned over the next 10 years, the number of satellites projected for launch into orbit totals over seventeen hundred.⁹ Although all such ventures may not prove successful, the launch of more than one thousand satellites would probably be a conservative estimate. This demand is fueling a commensurate launch requirement that as late as four years ago was considered wildly speculative and highly improbable. I can make that statement with some certainty because five years ago I was deeply engrossed in chairing a national space-launch study. We thought we were pretty bullish, but our predicted launch manifests were well off the mark. One finds a certain wisdom in Yogi Berra's maxim that it is tough to make predictions, particularly about the future. Although several entrepreneurs had plans to launch tens of small communications satellites to low Earth orbit (LEO), funding was problematic, and no one at that time anticipated the extent of this market. Today, these proliferated systems have become a reality and are now being launched. These new multisatellite communications constellations will clearly dominate future launch manifests.

Communications

As it was in the past, space-based communications is the giant in space commerce. The giant clearly will be even more dominant in the future, and the information revolution will be the driver. Globally, governments, business, and individuals want to receive more data faster, which will drive the demand for bandwidth. Satellites offer an efficient and relatively inexpensive means to move large amounts of data quickly.

Quite a bit of excitement and attendant publicity has characterized these new satellite-communications ventures. Part of the excite-

ment derives from the players and substantial investment involved. *Business Week* noted that "some of the most dynamic entrepreneurs of recent times are hooked on the great space race and orbiting egos will enhance a drama already fueled by mind boggling sums."¹⁰ The names of the players make anyone sit up and take notice: Bill Gates, Rupert Murdoch, Craig McCaw, and Bernard Schwartz. The projected investment in a host of communications-satellite programs, which account for the bulk of the one-thousand-plus satellites projected for launch, totals about \$40 billion.

Although the new distributed systems designed to operate at LEO and medium Earth orbit (MEO) have received most of the attention, traditional geosynchronous satellites will continue to play a major role commercially and in support of national security objectives. The Commercial Space Transportation Advisory Committee of the Department of Transportation predicts an average of 33 launches annually to geosynchronous orbit over the next decade.¹¹ Although many people in the space community are converting to the "smaller is better" mantra, satellites for this orbit will continue to become heavier and more capable. Factors influencing the demand for heavier satellites include the availability, in the not too distant future, of new heavy-lift launch vehicles, the increased cost-effectiveness of larger spacecraft (on a dollars-per-transponder basis), a trend to larger antennae, increasing power requirements to accommodate the expanded capability, and orbital congestion. In other words, because the geosynchronous belt is becoming crowded, the slots are becoming dearer; consequently, space businessmen want to field the most capable satellite. That means heavier satellites with as many transponders as possible. The desirability of maximizing transponders per satellite is an inexorable trend. Twenty years ago the average communications satellite had 10 transponders; today the figure is 30.¹²

Several new geosynchronous programs under development, such as Cyberstar, Spaceway, Astrolink, and Eurosky Way, are designed to provide global, two-way, broadband capability

to meet the needs for voice, data, interactive multimedia, and video teleconferencing. These new programs will also address the need to service the demands of the Internet—a market that may well surpass phone services or broadcasting. The computer industry must find faster and more efficient ways of moving huge amounts of digital information and video. Incidentally, our national security establishment obviously has the same requirement. Fiber will be important, but I believe that satellites will service that demand before fiber becomes dominant. Geosynchronous satellites likely will always have a major role, given their unique advantages in simultaneous access to large regions and their tremendous capacity.

At a lower altitude regime (MEO and LEO), a number of exciting and technically challenging programs on the horizon will also service the worldwide, two-way, broadband multimedia need. These programs feature very large constellations and have recently received a great deal of notoriety due to the amount of investment involved. In this category the most audacious is probably Teledesic, the so-called Internet in the sky, which envisions 288 satellites in orbits from 100 to 1,400 km. This category also includes the Wideband Euro Sat Telecom (10 satellites), Skybridge (64 satellites), and Orblink (seven satellites).

In another class of low-orbiting communications satellites, the new product is inexpensive, worldwide personal-communications service. The competition here is fierce, and the stakes are high. One may group these programs by the size of the constellation (Big and Little) and by ownership (US-only and primarily foreign). US-owned Big LEOs include Iridium, Globalstar, Ecco, and Ellipso, while mostly foreign-owned Big LEOs include ICO Global (a 79-nation consortium), Signal (a Russian firm), Euro-African Sat Telecom (Matra-Marconi), and Eco 8 (Telebras-Brazil). US-owned Little LEOs, which provide global, handheld, one-way-store and forward-communications systems, include Orbcomm, Gemnet, FaiSat, and Starsys. Foreign-owned Little LEO programs include Elekon (Rus-

sia/Germany), Gonets-D (Russia), Iris (Belgium), and Leo One (Mexico).¹³

These systems, of course, will have tremendous business advantages by linking international corporate offices. In the long run, however, the biggest beneficiaries are likely to be the two billion or so people who live in areas not serviced by phone lines. The risks in this business are very high. Many of the technologies needed for global telephone services are unproven, and overcoming the regulatory obstacles to gain access to foreign markets is by no means certain. Although Iridium has successfully deployed a full constellation of spacecraft, other systems have encountered problems. In September 1998, for example, 12 Globalstar satellites were lost when their Ukrainian Zenit booster failed to reach orbit.

What are the implications of this burgeoning commercial communications-satellite industry for the other space sectors? Operationally, military satellite communications will benefit in terms of access to additional capacity (tremendous increases in available bandwidth and flexibility, as well as multiplicity of alternative communication paths). Today in Bosnia the military is leasing a commercial high-bandwidth, direct-broadcast system to service the needs of US ground forces in Bosnia and their supporting infrastructure in Europe and back in the United States. Currently this system provides reconnaissance data, weather, intelligence on demand, and even Cable News Network to about 30 different locations at 24 megabits a second. In addition to the increases in capacity, commercial communications satellites—because of their relatively short-acquisition time lines—can serve as “gap fillers” to provide continuity of high-bandwidth service in the event of the degradation or loss of government capability.

These new commercial systems also offer efficiencies that potentially have more significance than the operational advantages. The short cycle-times of commercial satellites are remarkable compared to the government-acquisition cycles. For example, new commercial geosynchronous satellites are available 18

months after order—soon to be down to 12 months. For the small LEO systems, time from order to delivery is about three years—probably less as these systems mature. In contrast, the acquisition of national security systems runs 10 to 15 years. To understand the profound contrast in time lines, one should consider that the same plant will build three hundred Teledesic satellites in three years and 15 Global Positioning System (GPS) satellites in seven years.

Because time is money, satellites will be considerably cheaper. Moreover, these short time lines afford the opportunity to take advantage of new technologies because the launch rate is so much faster. How about satellite design? I anticipate a greater use of commercial common buses with tailored national security payloads. This approach would benefit not only from shorter acquisition cycles but also from economies of scale since the commercial vendor produces satellites in numbers far exceeding national security requirements. Finally, taking advantage of commercial production can mean a stable and flexible source of capital. Today, Wall Street is waiting to see how its investments in Iridium, Globalstar, and Orbcomm will pan out. If these ventures meet investors' expectations, this promises to be a capital-rich business with a constancy and continuity of purpose based upon continuing demand. I am not sure that we can anticipate the same stability in government funding.

Launch

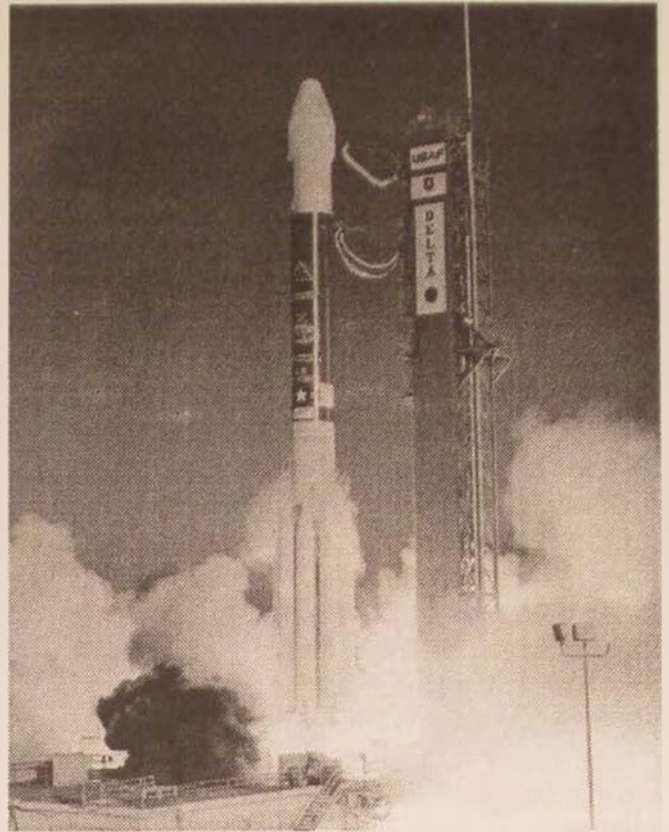
The space-launch business is changing as dramatically as space communications. From 1975 to 1995, the national launch rate was about 23 launches a year, with government sectors constituting about 75 to 80 percent of all launches. Over the next 10 years, the number of launches will increase to 45–52 a year, and commercial launches will exceed both civil (NASA) and those categorized as national security (military and intelligence).¹⁴

Space launch is also undergoing major modernization. The government's current space-launch systems derive from early inter-

continental ballistic missiles (ICBM). Deltas, Atlases, and Titans were effective launch vehicles in the first 15 years of the space age, but as the launch rate declined, the cost of access to space grew considerably. This was especially true of the heavy-lift capability—the Titan's cost had grown to \$250–300 million per launch by the early 1990s. Many people were also concerned that the time to launch was excessive, especially for the Titan—from either a military-operational or commercial-competitiveness standpoint. By the early 1990s, due in large part to these high costs and scheduling difficulties, the French Ariane vehicles had captured 60 percent of the commercial market.

Consequently, the 1980s saw a number of programs proposed to make the fleet of expendable launch vehicles (ELV) more efficient and effective. Unfortunately, the military, intelligence, and civil space sectors couldn't agree on a single national program. After about 10 years of debate, an agreement codified as the National Space Transportation Policy emerged in August of 1994. This policy assigned DOD the responsibility for funding and operating the US fleet of ELVs, and NASA became the lead agency for the technology development and demonstration of the next generation of reusable launch vehicles (RLV).¹⁵

Today, the Air Force has the evolved expendable launch vehicle (EELV), a \$2 billion program that recently entered the engineering and manufacturing development phase. This program seeks to leverage private investment to increase the capability of two industry teams over the next two decades. The goals are to increase operational responsiveness and to reduce the launch life-cycle cost by 25 percent. I have no doubt that the program will meet these goals and probably surpass them. Obviously, this lower cost would give the United States a cost advantage and a likely increase in international market share. The first flight for the medium commercial EELV is 2001, and the first government operational payloads are slated for launch in fiscal year 2002. The Air Force has acquired commercial launch ser-



A Delta II model 7925 launches NAVSTAR II-10 on 26 November 1990. The expanding GPS constellation provided critical support during Operation Desert Storm.

vices for a total of 28 government payloads scheduled through 2006.¹⁶

As for NASA, it is sponsoring RLV technologies such as the X-33 (a one-half-scale single-stage-to-orbit technology demonstrator) and the X-34 small-booster technology demonstrator. Clearly, the military believes that, ultimately, the most effective and efficient way of achieving low-cost, highly operational access to space lies in the RLV or a space plane. Because of profound technical challenges in propulsion, materials, and structures, the military is an active participant in NASA's RLV technology work. If the RLV demonstrations prove successful, the finished model might be designed to replace the shuttle. Some people believe that financing and operating the new RLV would be a commercial venture.

But the government's launch-modernization efforts tell only part of the story. Although the government used to have a virtual

monopoly on the systems and sites to access space, that picture has fundamentally changed. Ariane arose as a competitor in the last decade, and now we have the Pegasus aircraft-launched system, several new commercial ELVs, and a sea-launch option from an oil-rig type of platform south of Hawaii, projected for operation in 1999. Additionally, US firms have entered into agreements with international partners. Russian vehicles such as the Proton, Zenit, Tsyklon, and Kosmos are now available, and the Chinese Long March is also an inexpensive, albeit risky, option. Additionally, we are seeing the emergence of federally endorsed, state-sponsored spaceports. Currently, Florida, California, and Virginia have established programs offering launch services from existing pads at Cape Canaveral Air Force Station, Vandenberg Air Force Base, and Wallops Island, respectively. Other states such as Hawaii and Alaska have strong support for indigenous launch capabilities.

Another very interesting development is the contracting out of launch services. NASA, which has led the way in this area, hired the United Space Alliance, a private joint venture, in 1996 to take over shuttle operations at the Kennedy Space Center. This transition to private management, to be complete in 2002, is designed to get NASA out of the business of running the expensive and manpower-intensive shuttle operation so that it can plow back the savings into its core mission of space sciences and technology.¹⁷

In sum, space launch is undergoing dramatic change. Highly competitive today, the business will become even more so in the future. Commercial satellite builders—understandably concerned with cost and responsiveness/timeliness—now have a range of options, including the use of multiple launch sites and multiple vehicles for a single satellite constellation. For example, Iridium is being deployed by at least three different launch vehicles (Delta, Proton, and Long March) from three different locations (Vandenberg, Baikonur [Russia], and Taiyuan Space Launch Center [China]).

Given these basic changes, what are the implications for the Air Force and the national security community? First, I think the competition is such that launch costs for the government will drop significantly. I also believe that the continued commercialization of launch is inexorable. Consequently, I think that the Air Force will follow NASA's lead and ultimately purchase launch as a commodity. In the not-too-distant future, I envision commercial firms operating the launch sites at Vandenberg and Cape Canaveral. The Air Force and other satellite builders would contract for a satellite capability on orbit. (The Navy has used this effectively with the ultrahigh-frequency follow-on program.) This outsourcing would prove more cost-effective since it would allow either reduction or transfer of expensive Air Force people to other endeavors.

Remote Sensing

Commercial remote sensing from space is another industry poised to take off during the next decade. Like space launch, this area remained the sole domain of the government for many years. Space reconnaissance systems built and operated by the NRO have provided intelligence on potential adversaries that has proven essential to our military and vital to successful arms control agreements. On the civil side, since 1972 this country has flown Landsat, a civil remote-sensing satellite initially built and operated by NASA and then transferred to the National Oceanographic and Atmospheric Administration. In 1985 the government privatized the program and placed responsibility for it in the hands of the Earth Observation Satellite (EOSAT) Company under the premise that within a reasonable amount of time, revenues from product sales and ground-station fees would exceed costs. For a variety of reasons—government restrictions on the quality of data, distribution problems, and lack of funding assurance—this commercialization experience failed.

The issue of government policy concerning remote sensing was one of the hottest space issues of the early 1990s. Having participated

in the debates, I believe that several reasons existed for redressing remote-sensing policy at that time. The first involved a growing acceptance of the value of Landsat and the French SPOT system for military applications, both of which had proved their worth in Desert Storm. The second entailed a strong belief that the United States needed government support for continued investment in remote sensing to monitor environmental change. Last, and most important, SPOT provided considerably better resolution than Landsat. For that reason there existed legitimate concerns that, without a policy change which removed resolution restrictions, the United States would lose out in the marketplace for multispectral satellite imagery, especially since the French continued to invest in a higher-resolution SPOT system as well as the Helios military reconnaissance system. Other countries staked claims to the market as well, including India, Japan, and the European Union consortium. Two camps emerged, one consisting of industry, environmentalists, and elements of the scientific community who believed that our restrictive policies were unrealistic and wanted a policy to stimulate the remote-sensing business. The other included elements of the military and intelligence communities concerned about unrestricted trade in remote sensing. This group advocated controls over distribution.

The debate resulted in a reasonable compromise—the Land Remote Sensing Act of 1992, which formed the foundation for commercial operation of remote-sensing systems. The act permits companies to apply to the Department of Commerce for licenses to build and operate these systems. Recognizing the security concerns of totally unfettered operation and distribution of data, the act and subsequent policy directives require companies to maintain tasking records so that the government can determine who is asking for what data when. Companies must also maintain control of the spacecraft at all times and be able to limit collection or distribution upon direction of the US government. The act also authorizes the govern-

ment to cut off or restrict data during times of crisis or conflict.¹⁸

This act also spoke to the sale of remote satellite systems; specifically, the Clinton administration noted that “such sensitive technology shall be made available . . . only on the basis of a government to government agreement.” Further, the act codified the management agreement whereby DOD would build the follow-on Landsat spacecraft and instruments, while NASA would fund and operate the ground station, processing, and distribution systems.¹⁹

With the proper policy foundation established, the government has granted a total of 12 licenses to date, including five high-resolution electro-optical systems and one high-resolution radar system. Three US ventures appear at this time to be serious competitors in the remote-sensing business. One should note that the volatile, competitive nature of this business will probably produce a shakeout over the next few years.

If first-to-orbit is the measure, then the leader is EarthWatch, Inc. On 24 December 1997, it orbited *EarlyBird 1*, a satellite designed to provide three-meter resolution two to three days from the time of request. As further evidence of the internationalization of space commerce, *EarlyBird 1* was launched on a converted Russian ICBM from the Svobodny Cosmodrome, Russia’s newest commercial launch site. Unfortunately, the satellite failed soon after launch. EarthWatch is now focusing on Quickbird, a one-meter resolution system to be launched from Russia on a Kosmos booster.

Another competitor in the game, Space Imaging EOSAT, will initially offer a one-meter product—the highest resolution of any commercially available system—that will have imagery available within one day of order. The first Space Imaging satellite was scheduled to launch in late 1998 from Vandenberg Air Force Base atop an Athena-2 booster but has been postponed until the Spring of 1999.

Orbiting Image (ORBIMAGE), the third major player, offers the OrbView series of satellites: *OrbView 1*, a small lightning-and-atmospheric mapper launched in 1995; *OrbView*

2, an ocean-color-and-vegetation mapping satellite launched successfully in August 1997 after a four-year delay; and *OrbView 3*, the

Worldwide commerce in high-resolution imagery has significant positive and some negative implications.

company's first venture into the realm of higher resolution, which, after launch in 1999, will provide one-meter resolution (black and white) and multispectral (color) pictures at four meters. A follow-on satellite, *OrbView 4*, will also include an Air Force-sponsored hyperspectral imaging capability (*Warfighter 1*), advertised as able to detect objects through camouflage and tree canopies. Interestingly enough, ORBIMAGE is the first commercial venture to secure a prelaunch contract with the US government. Planned for launch aboard a Pegasus rocket, *OrbView 4's* promised features may exceed Pegasus's capability and thus require a Taurus rocket.²⁰

Other remote-sensing systems planned for launch in the next few years deserve mention. These include AVSAT, which will provide a more macro view at one-kilometer resolution for geophysical exploitation; Boeing's Resource 21, aimed at the agricultural market; and RDL's Radar 1, which will provide all-weather, medium-resolution radar imagery to commercial buyers. International systems, some flying today and others scheduled for orbit in two to three years, include SPOT (France), RADARSAT (Canada), IRS (India), ALOS (Japan), CBERS (China/Brazil), and EROS (Israel). I believe that these programs will remain viable, primarily because of the market but also because they represent a national resource for their countries.

Clearly, great optimism exists for this particular niche of the commercial space business. Is it justified? Market Plan Graphics, a market-research firm hired by the Department

of Commerce, estimates that this will be a \$2.65-billion-a-year business by the turn of the century.²¹ Others say that this figure is conservative and that anticipated revenue by 2000 is closer to \$5 billion. I don't know what is right, but I do know that the Landsat example—involving the government as the primary customer for a relatively low-resolution product—is not the model. Today, all firms offer high resolution, and the number of systems projected for orbit will ensure that the product remains timely. In terms of demand, the uses for remote-sensing data abound—environmental monitoring, energy (oil and gas) exploration, resource management (agricultural and mineral), mapmaking, and community and urban planning, to name just a few. Today, aircraft systems provide synoptic imagery for these and other applications, but high-resolution satellites are far more efficient.

The market is in its infancy but has huge potential. Remote sensing will become an essential part of the information revolution. Images on demand, including three-dimensional products linked to the databases of other geographic information systems and mensurated and indexed through GPS, will become the order of the day. The only question is not whether this will happen but when. I am inclined to believe that the pacing factor will be distribution systems, with their efficiency driven by communications bandwidth and computing power. Although I certainly can't predict the rate of growth, I am inclined to see the utility of remote sensing in the context of the movie *Field of Dreams*—build the systems, and they will come. However, some question may remain as to when the remote-sensing industry will become profitable.

Worldwide commerce in high-resolution imagery has significant positive and some negative implications. On the negative side, how does the military deal with adversaries who can access up-to-date imagery benchmarked against GPS on their personal computers through the Internet? Not only will ensuring the element of surprise in military operations be infinitely more difficult, the

imagery becomes the targeting database for the rogue nation or terrorist. This is why the Clinton administration has insisted on "shutter control." I don't have a good answer for this dilemma, but the military of the next century must plan its operations with this potential transparency in mind, and it must develop sophisticated countermeasures. On the positive side, this readily available imagery has immense benefits to our military. One of the intelligence shortcomings of Desert Storm was that the tasking cycle—the time from making the initial request to receiving the imagery product—was too lengthy. Commercial remote-sensing data integrated into a responsive distribution system will meet many needs of the war fighter.

Even today, we see a microcosm of how this might evolve. In a growing number of locations, the Air Force has deployed small, portable ground stations to receive SPOT imagery at tactical field units. That is an Air Force example. A number of other service examples exist, such as trafficability analysis for ground forces and oceanographic and coastal analysis for naval forces. Another very important defense application involves providing the basic source for mapmaking. Generally, we have up-to-date maps of the major countries of Europe and Asia. However, our forces are increasingly being deployed to underdeveloped areas, such as the African states, without current charts.

A most significant area involves the effect of this industry on the amount of money that the military and intelligence communities will need for manned and unmanned airborne-reconnaissance systems and satellite-reconnaissance programs. Currently, we don't have the modeling systems to accurately predict the extent to which commercial imagery can offset or contribute to the satisfaction of government requirements, but those analytical tools are in the works. My sense is that these new commercial capabilities will both complement and reduce the numbers of military and intelligence systems required. The resulting savings could be substantial.

Navigation

The evolution of the commercial aspects of space navigation is not as clear as the areas previously discussed. Although this system was developed for military use and initial commercial sales were to small aircraft, pleasure boats, and large aircraft (after Federal Aviation Administration approval), the market today and in the future will lie overwhelmingly in the consumer sector. To be sure, this is a growing area for commerce—GPS worldwide sales have grown from about \$500 million in 1993 to \$4 billion in 1998 and are projected to increase to \$16 billion by 2003.²² Navigation systems for cars are the highest growth area, followed closely by handheld systems now available for under \$100. The military, of course, has reaped the advantage of the dramatic drop in receiver costs due to commercial volume—aircraft receiver costs have been reduced an order of magnitude. Moreover, GPS receivers have become considerably smaller in weight and volume as well as more reliable.²³ Reduction in cost and size will certainly increase military applications.

Whereas commercial firms will develop and operate either the spaceborne portion of communications, launch, and remote sensing or the associated ground infrastructure, it is unlikely that GPS, the US space-navigation system, will evolve similarly—at least in the near future. The reason, of course, is the presidential GPS policy of March 1996, which clearly enunciated that "GPS has been designed as a dual use system with the primary purpose of enhancing the effectiveness of US and allied military forces."²⁴ As such, the policy reaffirmed DOD's responsibility to acquire, operate, and maintain GPS. At the same time, the US government is committed to the nonmilitary use of GPS on a continuous, worldwide basis, free of direct-user fees. Although the United States wants to prevent enemy use of GPS during wartime, policy dictates that the Air Force must operate GPS as a "global information utility" without unduly disrupting or degrading civilian uses of the

system. A recent bilateral cooperation agreement with Japan, the world's other leading producer of commercial GPS equipment, reinforced this commitment.²⁵

The Air Force has an effort to deal with these three interrelated problems of denying enemy exploitation, maintaining the capability for US military and allied use, and assuring continued civil use.

Although one could envision a GPS antenna as a payload on a commercially provided common bus, the fact that basic GPS will continue to be a government-provided free good for the next several years makes it difficult to envision how a commercial firm would have any incentive to compete. I understand, however, that a few entrepreneurs are looking at providing differential GPS services from space—but the market is not developed. Clearly, precise spatial reference is essential for all forms of robotics, from playing fields to laying pipes. Internationally, I understand that the Germans at one time were thinking about acquiring the Russian GLONASS for a regional augmentation system.

Despite the fact that GPS may not fit the other models, it has obviously become absolutely critical to our armed forces. Virtually all platforms (terrestrial, air, and seaborne), individual ground units, and a host of munitions (missiles and bombs) either now or in the near future will employ GPS for timely and precise navigation. With this dependency has come a real concern about the vulnerability of GPS. President Clinton's policy recognized this vexing problem and directed DOD to prevent the hostile use of GPS to ensure that the United States maintains a military advantage. Thus, GPS has within its design a capability to degrade the accuracy of the signal to one hundred meters—known as selected availability.

As the commercial use of the GPS signal even today dwarfs the military's, with the gap ever widening, the selected-availability feature—controlled by the military—has become a paramount issue over the past few years. Consequently, the policy includes a provision that, beginning in 2000, the president will make an annual determination on the continued use of this feature.²⁶ The policy provides for discontinuing selected availability within a decade (by 2006), but many people in the national security community believe that it will be discontinued earlier. The Air Force has an effort to deal with these three interrelated problems of denying enemy exploitation, maintaining the capability for US military and allied use, and assuring continued civil use. The Air Force and the Defense Advanced Research Projects Agency (DARPA) are exploring many different technical approaches, including a higher-power signal on the follow-on GPS Block IIF buy; embedding an atomic clock in the receivers; installing adaptive nulling antennae in the skin of the platform or weapon; or reusing the GPS spectrum to provide more capable, jam-resistant signal structure for operations in high-threat environments.

New Military Space Needs

At the outset of this article, I posed the dilemma that the Air Force, DOD's space service, would have great difficulty funding the new space requirements inherent in realizing its strategic vision. The problem lies in affording new initiatives while maintaining basic space services in the face of a flat or declining DOD budget. These reductions could be due to higher-than-anticipated inflation or, in the absence of a pressing threat, the need for DOD to contribute more heavily to the move to balance the budget.

Clearly, we should pursue a number of new military space initiatives over the next 10–20 years. For example, as more commerce is placed in orbit and as we depend more on space, DOD will need a more comprehensive program to protect our assets. The previously

mentioned report by the National Defense Panel, *Transforming Defense: National Security in the 21st Century*, recommended increased attention to this area. A comprehensive protection program would include improving our ability to detect and assess threats (surveillance), enhancing the survivability of ground stations and platforms, and using commercial assets to augment national security capabilities, to name a few.²⁷

Many people in the Air Force believe that certain surveillance functions now done by aircraft systems such as the E-3 Sentry airborne warning and control system and E-8C joint surveillance, target attack radar system should more appropriately be done from space. Both of these systems use very old airframes and are quite expensive to operate. For years, we have pursued the holy grail of space-based radar (SBR), only to be thwarted by the power-aperture-product problem. To get the quality required for tracking, the spacecraft must be at a relatively low altitude, and to get the global coverage, one must orbit a great many spacecraft. This conundrum led to an expensive program. New technologies in miniaturization, power, and antenna design may permit an affordable SBR (the new term is *ground moving target indicator* [GMTI]). Moreover, the capability and efficiency of an SBR/GMTI would necessitate an entirely new concept of operations. But there is good news here: to demonstrate the potential of such a system, DARPA has teamed with the Air Force and NRO on the *Discoverer II*. This technology demonstration will fly two prototype spacecraft by 2003, paving the way for the development and deployment of a constellation of 24–48 satellites by 2010. The program seeks to employ commercial-design practices to produce operation satellites at costs of \$100 million per unit.

As for weapons, the Air Force has always been bedeviled by concerns over making space a battleground. Consequently, the Air Force—and the Army, for that matter—has had a number of unsuccessful antisatellite (ASAT) programs. I anticipate two reasons that would stimulate a wider debate on ASAT. First is the

phenomenon that serves as the subject of this article—the commercialization of space. As more capability moves to space and as we become critically dependent upon that space infrastructure for our day-to-day living (much

The Air Force has always been bedeviled by concerns over making space a battleground.

less our defense), I think the nation will want to provide the necessary protection and deterrence to attack. Here, the naval analogy of freedom of the seas is apt. The second reason is that the proliferation of high-resolution, remote-sensing systems presents opportunities for our adversaries to target our forces and facilities from space. I think our commanders in the field would want a system to negate the threat posed by this targeting capability.

As for permanently based weapons in space, for the mainstream body politic, this subject has always been politically incorrect. Frankly, I think that this will gradually change. More and more decision makers see the need for a national missile-defense system, and the most effective and efficient way to defend the United States from missile attack would utilize a space-based system. The Air Force is also working with the Ballistic Missile Defense Organization to conduct a treaty-compliant space-based laser demonstration by 2008. Despite differences of opinion as to the correct technical solution, the maturity of the technology, and a plausible date for launch, we have discourse. The country must invest in these enabling technologies to ensure that we are ready when the need arises and the political will becomes manifest.

People have recognized space as a primary enabler for the revolution in military affairs. The Air Force, therefore, envisions that space will become even more important in the twenty-first century. As such, the military must take advantage of the tremendous capa-

bilities now being developed by the commercial space industry. It is also clear to me that new space missions will emerge and that certain terrestrially based functions will move to space. To afford these initiatives, the Air Force must become more efficient in its space stew-

ardship and sustainment. This requires another revolution—a revolution in business affairs. Commercializing selected space functions and adopting processes and practices from space's business world offer enormous opportunities for efficiency. □

Notes

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The ultimate measure of a man is not where he stands in moments of comfort and convenience but where he stands at times of challenge and controversy.

—Dr. Martin Luther King Jr.

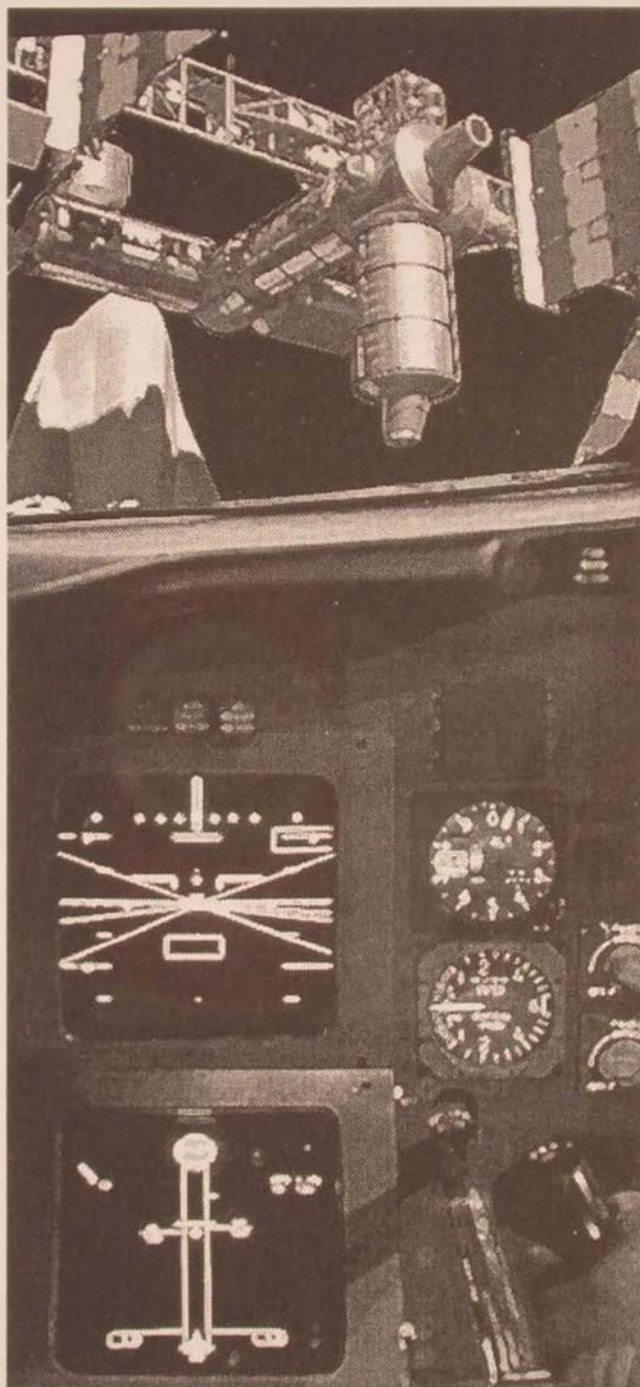
On Space-Power Separatism

MAJ SHAWN P. RIFE, USAF

IN SEPTEMBER 1997, Gen Charles A. Horner, USAF, Retired, commander of coalition air forces during Operation Desert Storm and later head of Air Force Space Command and US Space Command (CINCSPACE), created something of a stir when he questioned whether the US Air Force should continue to run military space systems: "If the Air Force clings to its ownership of space, then tradeoffs will be made between air and space, when in fact the tradeoff should be made elsewhere."¹

Although General Horner made his assertion based on budgetary considerations, his remarks encouraged Air Force officers who, using the original leaders of the US Air Force as role models, argue for a separate "space service." Space-power enthusiasts see themselves as modern counterparts to the early airpower visionaries and often draw parallels between the rise of airpower and the rise of space power. Both originated in a desire to occupy the "high ground" and maintain a commanding perspective of the surface battlefield. Air-to-air and air-to-surface combat arose and flourished in the flames of two world wars, leading eventually to the creation of independent air forces as air officers sought to set free a new and potentially decisive arm of military force from surface-warfare paradigms.²

If, as Billy Mitchell said, "airpower is the ability to do something in the air," then one can say that *space power is the ability to do something in space*. Unfortunately, over 40 years after the first satellite orbited the Earth, we still cannot operate in space nearly as easily or routinely as air forces could operate within a decade of the Wright brothers' first flight.



Space power has not yet progressed much beyond that first parallel stage of development. Most people assume, however, that warfare in and from space will eventually become a reality.³ Although space weaponization is hardly a foregone conclusion,⁴ the weapons and concepts of operations to make it happen have been in development for some time. Fancying themselves as modern-day Mitchells or Giulio Douhets, space-power separatists maintain that space forces will reach their full military potential only when they free themselves from airpower paradigms.

A United States Space Force?

No explicit agreement exists on a specific boundary between air and space. The altitudes at which the effects of lift and drag become negligible, or at which a cabin or suit must have an independent supply of oxygen and pressure, or at which turbojet engines become inoperable all differ. In international law, the major space powers generally accept "the lowest perigee attained by orbiting space vehicles as the present lower boundary of outer space," but this standard is not universal.⁵ Even if a more precise delineation between the two environments proves impossible, their physical differences remain significant. The space environment is largely a vacuum characterized by high-energy particles, fluctuating magnetic fields, and the presence of meteoroids and micrometeoroids. The motion of bodies in orbit closely follows the laws of celestial mechanics, a much different system of knowledge than the laws of aerodynamics governing the flight of aircraft. Aircraft operate in the much more benign environment of Earth's atmosphere, characterized by moisture, wind, precipitation, and pressure.

In perhaps the most persuasive argument for a separate space service, Lt Col Bruce M. DeBlois analyzes the two different environments and extrapolates a comparison of the relative advantages of airpower and space power (table 1).⁶ Based on his analysis, DeBlois concludes that "one cannot build space power theory and doctrine in general upon airpower theory and doctrine. Theories and

doctrines of airpower, land power, and sea power may contribute significantly to the development of the theory and doctrine of space power, but space power clearly requires fundamental, bottom-up, theoretical and doctrinal development. The most conducive requirement for such development remains a separate space corps or service."⁷

In the past, Air Force doctrine has challenged the notion that physical differences between air and space necessarily require a separate space service:

Some people have seized on the differences in air and space technologies to argue that space constitutes a separate environment from the air and that space requires development of a separate force to exploit it just as the land, sea, and air environments require separate forces. This argument is equivalent to saying that submarines and surface ships should be in separate force structures. Although there are many differences between submarine and surface craft, the important quality they share is that they both operate at sea. Infantry and armor use quite different technologies as well, but they do not require separate services because their significant unifying characteristic is that they both operate on land. Similarly, the important quality that air and spacecraft share is that they operate above the earth's surface. Moreover, no sharp boundary exists between air and space, while it is quite obvious when one moves from land to sea or from aerospace to land or sea. . . .

Freedom of movement and speed underscores [*sic*] the military usefulness of exploiting air and space. While no current platform has the ability to completely exploit the full spectrum of the aerospace environment, the planned development of an aerospace plane to operate both in the atmosphere and in space serves to illustrate the continuity of aerospace. Its continuity is further evidenced by the fact that conceptually many of the same military activities can be performed in air and space, even though different platforms (some of which are yet to be developed) and somewhat different methods must be used to perform them. Thus, from a military, as opposed to an engineering, perspective, the aerospace environment must be considered as an indivisible whole.⁸

Table 1

Characteristic Advantages of Airpower and Space Power

	Airpower	Space Power
Politics	Political access to the realm [military use of space is limited by particular political and legal constraints]	Sovereignty [no overflight restrictions in space; international agreements support free access] Likelihood of reduced casualties [based on use of remote, unmanned systems]
Development/ Employment	Centralized command and control (C ²) [centralized C ² for space is degraded by multiple organizations intruding upon CINCSpace's on-orbit control, launch, acquisition, research and development (R&D), and budget authority; airpower not comparatively constrained] Decentralized execution [concept applies relatively more to airpower; controlling and executing elements for space may, in effect, be the same]	[No comparative advantage for space power]
Realm Access	Access to the realm (operations) [ease of performing operations in the air as opposed to space] Access to the realm (maintenance/support) [ease of performing maintenance/support for air operations as opposed to space operations]	[No comparative advantage for space power]
Realm Environment	Composition of the realm [hostile nature of the physical space environment as opposed to the air environment]	Size of the realm [space affords unlimited potential for freedom of movement] Position of the realm [space environment encloses the air environment]
Realm-Afforded Capability	Autonomy [advantage of independent decision-making capability in manned versus unmanned systems] Maneuver [aerodynamics versus orbital mechanics] Flexibility Precision Firepower Stealth	Surveillance and reconnaissance [advantages of perspective and elevation] Duration Range Speed of response



Where is today's [Billy] Mitchell . . . for space power?

DeBlois asserts, however, that "*the aerospace conjecture is false*" (emphasis in original).⁹ Although he concedes that there is "potential for some technological mitigation of the vast differences in the characteristics of airpower and space power," he dismisses programs such as the space plane on the grounds that, historically, "dual-environment vehicles have proved more expensive and less capable than separate vehicles designed especially for each environment."¹⁰ Although this observation may be valid, as a casual rejection, it is certainly premature.

Regardless, as do many space-power advocates over the years, DeBlois criticizes a perceived tendency to derive space doctrine simply by substituting the term *space* (or *aerospace*) in airpower doctrine. He rejects the argument that airpower and space power should be merged, based on their functional equivalence in "employing military power from the third dimension." He counters that this logic wrongly dictates merging land and sea power based on the same functional equivalence (employing military power from the two-dimensional surface): "Despite the existence of a functional equivalence between two forms of military power . . . and the existence of the technical means to accomplish those functions, the fact remains that the environment and the technological means that posture us in those environments remain different. This is true of land and sea power; the examination of characteristics indicates that it is also true of airpower and space power."¹¹

Two Hypotheses

One cannot dispute the fact that the air and space environments, as well as the technological means that allow us to operate in those environments, are different. However, the fact that the differences necessarily dictate a space force (or space *corps*) separate from the Air Force is not as obvious.

From a practical viewpoint, to assert that *because a unique environment requires a unique expertise, an independent space force is required* demands that one prove at least one of the following hypotheses (preferably both):

1. The requirements for that unique expertise are not being fulfilled within the current framework of organization, or the resources of that expertise are not being used properly.
2. Only an *independent* space force can provide a capability that is considered vital to our national defense.

In effect, proving the first hypothesis means proving that the United States Air Force has not served as a satisfactory steward for our nation's military space power. Undoubtedly, some people, both in and out of the Air Force, would make such an assertion—but the evidence suggests otherwise. Certainly, as with air, many civil, commercial, and military organizations remain involved in and committed to space, including the Army and Navy. However, the Air Force owns and operates the *preponderance of military* space assets. As Gen Robert T. Herres, former CINCSPACE, has written, "Since the 1950s the Air Force has continued to fund, research, and develop those military systems designed to exploit the full medium encompassing all of aerospace. The Air Force has accumulated a wealth of experience in space operations and accumulated it at a great price. It is incorrect to think those investments have been made and are being made without a full appreciation of the force structure that must be provided for air and space operations."¹²

Some people may disagree with the general's last assertion. Certainly, many Air Force officers today do not have full cognizance of the value and importance of space power. At the same time, one should admit that not all Air Force officers have full cognizance of the value and importance of *airpower*! Too many Air Force officers think that understanding and appreciating basic and operational-level aerospace doctrine is somebody else's problem, not theirs.

Nevertheless, today and for the foreseeable future, the United States in general (and the Air Force in particular) remains the world's preeminent military space power. In the Persian Gulf War, Air Force Space Command as-

sets proved critical enablers to the conduct of combat operations by all of the services—but particularly by coalition air forces, which shouldered most of the war-fighting burden during the thousand-hour-war air campaign. Since then, several new types of precision-guided munitions that use space-based navi-

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So far, no such original thinker
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gation for guidance have entered (or will be entering) the Air Force inventory, including the AGM-130, the Joint Direct Attack Munition, and the AGM-154A Joint Standoff Weapon. Such weapons and space-based capabilities provide the foundation for the Air Force core competency of "precision engagement."

In fact, space-power considerations are so intertwined with *all* Air Force core competencies that, without these inherent space capabilities, the Air Force's core-competency promises become almost meaningless. Space power, together with the information-superiority and precision-engagement capabilities provided thereby, enables airpower finally to approach the full level of its potential as envisioned by Mitchell, Douhet, and other early airpower theorists. The air and space mediums *are* different, but *air and space forces, operating together, offer a unique and potentially decisive synergistic effect from the third dimension.*

Space-power separatists may maintain that a separate service (or corps) could better address vulnerabilities that exist in our space capability or better exploit technological capabilities to field currently nonexistent systems. This was the implication of General Horner's statement, and—to an extent—the point is valid: in funding aerospace forces, one *should* make choices somewhere other than between air and space. All the services enjoy

the benefits of space-based capabilities, but the Air Force bears most of the funding burden for very expensive space assets. Currently, the defense budget is roughly split three ways (among land, sea, and aerospace power). If creating a separate space force would allow the budget to be split *four* ways, thus allowing air and space forces to command *half* of US defense outlays, the attraction for aerospace power advocates becomes obvious. In reality, such an arrangement likely would not make a significant difference when one considers diminished budget resources, the power of the established services to retain their share of the pie, the additional overhead costs in creating and maintaining a separate space service, and the very real questions regarding the nation's political will to militarize space even further. For example, one cannot blame Air Force doctrine or leadership for the fact that the Clinton administration, without consulting the Air Force (and in apparent contravention of its own space-transportation policy), used the line-item veto in 1997 to strike out Air Force funds for testing a military space plane.¹³

Thus, based on the current state of our military space forces and the attention those assets receive within today's Air Force organization, I argue that the first hypothesis remains *unproven*. The second hypothesis now becomes even more important.

Space-power separatists inherited the pioneering and rebellious spirit that spawned the independent United States Air Force. At first blush, it appears natural that space power should remain separate from airpower, just as airpower should remain separate from surface power. But something is missing. Early airpower advocates offered a compelling rationale for an independent air force, based on reasons other than the differences in physical environment. Mitchell, Douhet, Hugh Trenchard, and many others argued instead for the *decisive and revolutionary impact that independent airpower would have on the conduct of warfare*. They articulated a comprehensive vision showing that an independent air force could do things for national defense that an air force corralled within the organizational framework of the Army and Navy could *not*

do. In some cases, these early advocates were way ahead of their time. Prophecies regarding capabilities of airpower once thought discredited now receive new emphasis.

The real crux of the matter for airpower separatists in the early years was the prevailing view of surface officers that air forces *must* remain ancillary to surface forces. Although some antagonism exists within the Air Force (certainly not confined to Space Command) with regard to the flying community's domination of today's service leadership, one wonders whether the current situation really parallels the fundamental philosophical disagreements between air and surface officers earlier in this century. According to General Herres,

Space Operations were seen as a natural outgrowth and extension of air operations. As early as the 1950s, Gen Thomas L. White coined the word *aerospace* to describe the medium for Air Force operations. Since then we have considered "air" and "space," while two separate entities, as constituting a single realm—an "operationally indivisible medium." Even before the Soviets launched Sputnik, the senior leadership of the Air Force was looking ahead to a role for the Air Force in space. Clearly this is quite different from the view the Army took toward aviation in those earlier years when General Mitchell and others argued for a distinct role for air power. The Army of General Mitchell's era rejected a large role for aviation; the Air Force of today eagerly awaits the growth of space activities as part and parcel of aerospace.¹⁴

So, where is today's Douhet or Mitchell (or even Alfred Thayer Mahan) for space power? So far, no such original thinker has yet clearly emerged. Without one, an independent space force really seems to lack a *raison d'être*. Arguing that one needs a separate space service to fulfill the potential of military space forces without elaborating a realistic vision of what that potential is (and *why* it requires an independent space force) is like putting the cart before the horse. One finds much theoretical discussion on the "how" of space warfare but, other than the paradigm of independent airpower theory (or the futuristic musings of

science fiction), not much on the "why." One also finds only vague generalities of the need to "take the high ground" to gather information and apply precision force globally. (Interestingly, as should be clear, this is what aerospace power already does today.)

Let us return for a moment to the question of *decisive* force. One need only look to history for scenarios involving the decisiveness of land power, sea power, and airpower in warfare. The dictionary definition of *decisive*—"having the power to decide"—is not very precise. In a joint war-fighting context, the term can easily cover a range of possibilities, including an eclectic "me-tooism," in which everyone claims a "decisive" role. Thus, one can reasonably say that space-based force enhancement proved decisive in the Persian Gulf War—much as one can argue that airpower (in a reconnaissance role) proved decisive in the Battle of the Marne in 1914. The definition can also include another extreme whereby a single service declares itself the sole factor of victory in war—an interpretation that provides fertile ground for bitter interservice rivalry. One should keep in mind Douhet's admonition that "there is a vast difference between 'the sole factor of victory' and 'the decisive factor of victory.'" ¹⁵

The point of this discussion is that the current lack of a full range of force-application capabilities directly from space to Earth becomes an important consideration in the debate over space-power separatism.¹⁶ Until humans migrate from Earth, warfare will still be about achieving objectives within the terrestrial environment (land, sea, and air). This means that without a viable space-to-surface force-application capability, space power (independent or otherwise) in and of itself cannot be decisive in warfare except under the broadest possible interpretation that includes Space Command's outstanding force-enhancement capabilities. The latter definition implies a subordination to airpower, land power, and/or sea power, which would place an independent space force in a uniquely inferior position by way of the other established services. By necessity, future war fighting will be joint. But all of the independent services are organized,

trained, and equipped to fight and win the nation's wars—preferably together, alone if absolutely necessary. Space power by itself cannot currently do that.

*At least for now, the case for
an independent space force
remains unsubstantiated.*

If, however, space-based force-application capability becomes a reality, many terrestrially based military systems will probably become obsolete. For example, a recent article in US Naval Institute *Proceedings* argues that weapons in low Earth orbit would present such a threat to seaborne forces that the modern carrier battle group—the centerpiece of current US naval strategy—might become extinct.¹⁷ Moreover, because any space-based force application into the terrestrial environment must (in a unique fashion) transit the atmosphere, the eventual implications for airpower are profound.

If space-based force application approaches the full potential of its technological capabilities (i.e., the ability to find, fix, track, and destroy virtually anything in the terrestrial environment), the debate over a separate space service will become obsolete because airpower, as we understand it today, will become obsolete. Space power will be able to do virtually everything that airpower does today—and do it faster with less risk. Predominantly space forces (with air in an auxiliary role) will subsume the roles and missions of air forces, and the reins of power within the US aerospace force will, by rights, transfer from the combat pilot of today to the space operator of tomorrow. Because we are already an aerospace force, the transition should be a smooth one—perhaps imperceptible. (Conversely, if the Air Force flying community successfully resists such a necessary transition, the need for an independent space force will become clear.)

In this future aerospace force, the practical war-fighting dimensions of the air and space

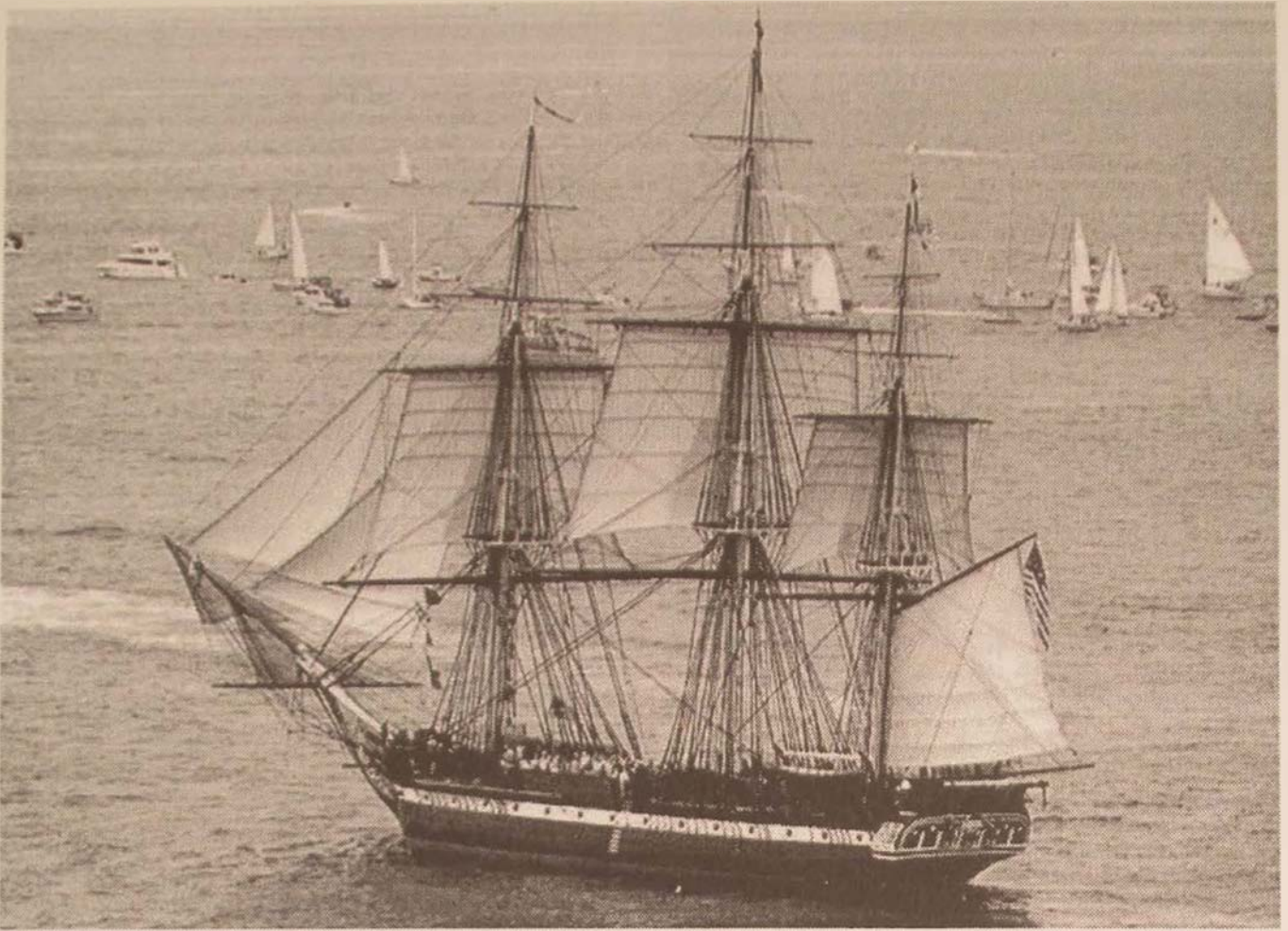
environment will become fully unified. Moreover, in this context, space-based force application can effectively implement its role and mission by capitalizing on the expertise (particularly in intelligence, targeting, battle-damage assessment, etc.) already resident within the Air Force, rather than replicating those capabilities within the framework of a separate organization.

Thus, I argue that the second hypothesis, like the first, is *unproven*. At least for now, the case for an independent space force remains unsubstantiated.

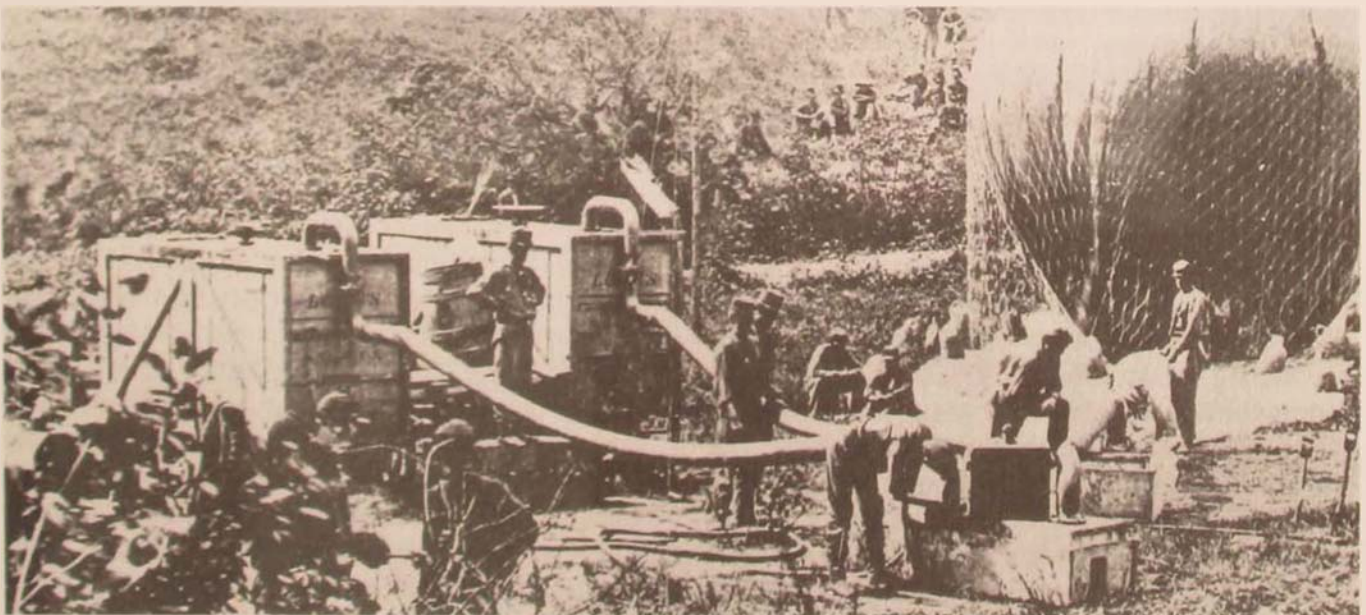
The Tasks at Hand

To say that the current rationale for an independent space force is hollow is not the same thing as saying that there are no issues to resolve before today's Air Force can become a fully capable aerospace force. In doctrine, the Air Force must come squarely to grips with a broad issue: the theater requirements of a joint force commander (and his or her component commanders) versus the global focus of space forces (in terms of retaining unity of command of aerospace forces). Newly approved Air Force Doctrine Document (AFDD) 2, *Organization and Employment of Aerospace Power*, presents images of unified air and space organization and employment but leaves many questions unanswered. The practical understanding of how we will fight the next war remains unclear. The Air Force is actively exploring a number of options for marrying vision to reality, including fleshing out notional supported/supporting relationships and concepts that implement "reachback." Proposals that integrate formal space expertise into other Air Force major commands and numbered air forces are being studied.

One answer entails centralizing the tasking of military space forces at the unified level (i.e., US Space Command) so that service components would receive all wartime tasking from CINCSPACE.¹⁸ In effect, this means the creation—in function if not name—of a joint force space component commander, probably



Although the need or desire to exploit a new medium has resulted in separatism, the pace has been set by the development of technology and doctrine. Are time lines for sea power (centuries) or airpower (decades) relevant?



CINCSPACE, directly supporting a theater commander. Although this option may seem attractive on the surface, it directly undercuts the integrated aerospace concept (and thus strengthens the argument for a separate space force). It also sets the stage for significant coordination problems between air and space (as space war-fighting capabilities mature) that parallel today's coordination problems between air and surface forces.

Alternatively, one might designate the joint force air component commander as the *supported* commander for space operations within a given theater. (In the absence of functional component commanders, the supported commander for space operations would be the commander of Air Force forces.) Establishing direct liaison authority between the service components of US Space Command—operating in mutual support—and the joint force air component commander¹⁹ would make the latter the single point of contact for operational-level space concerns for a joint force commander. It would also prevent the division of aerospace forces for employment and would avoid the insertion (except when absolutely necessary) of an extra staff layer (i.e., at US Space Command) in the tasking process—thus expediting space support to the war fighter. Currently, no approved joint doctrine on space addresses this issue,²⁰ but the latter approach is consistent with current Air Force and joint C² doctrine as well as long-standing doctrinal tenets on the C² of airpower.

The good news on the doctrine front is the recent publication not only of AFDD 2 but also of AFDD 1, *Air Force Basic Doctrine*, as well as AFDD 2-2, *Space Operations*. Both AFDD 1 and 2-2 go to great lengths to present a united view of aerospace power;²¹ they also show the degree to which the facets of that power are not characteristically or inherently limited to air-breathing platforms. Inevitably, as people digest these and other follow-on doctrine publications, one will probably hear charges that Air Force doctrine has not changed enough—or is not forward thinking enough—with regard to space operations. However, to say that a separate space force is justified in order to

create space doctrine is backwards. One must base the creation of a separate space force on sound concepts and doctrine *first*.²²

Generally, doctrine comes from three sources: actual wartime experience, theory, and war games/exercises. Deriving new doctrine from wartime experience can prove painful since armed forces tend to learn their most meaningful doctrinal lessons only in defeat. The debacle at Kasserine Pass in 1943 is a poignant example of wartime experience teaching American forces the value of proper C² of airpower. Conversely, victors tend to refight the "last war," often with unfortunate consequences. The French military experience of 1940 is probably the best modern illustration of this danger. French doctrine, featuring an infantry-dominated linear strategy reminiscent of World War I, fell prey to the innovative, mechanized blitzkrieg doctrine of the Germans. Obviously, for the purposes of our discussion, we have little wartime experience to draw on in the creation of unique space war-fighting doctrine.

Deriving doctrine solely from theory is also undesirable because it means adopting strategies without any empirical evidence that they will prove successful or even necessary. The disastrous French infantry charges early in World War I, mandated by doctrine derived from the theoretical power of *élan*, provides an example of the danger of inferring doctrine in the abstract. Most notional, doctrinal ideas about space war fighting are based on theory. Without actual war-fighting experience, theory serves as a logical and necessary first step, but one should not regard the results as conclusive.

Because war games and exercises based on realistic models and simulations can provide empirical evidence for what works and doesn't work in doctrine without putting lives at risk, they represent the best option for turning theory into doctrine. Space has received much attention in recent war-game play among the services and other agencies. People continue to consider and debate the doctrinal implications of these games. The US Army, in particular, has made space an extraordinary focus of emphasis in its "Army after Next" war-game series.

Even if some of the conclusions drawn from these games should be obvious axioms to advocates of aerospace power,²³ the Air Force, as the custodian of the nation's military-space experience and expertise, should seize and hold the lead in the creation and implementa-

tion of military-space strategy in the joint environment. To do that, we should collectively embrace our identity as a US *Aerospace* Force, in both name and function, sooner rather than later. □

Notes

1. "Air Force Space System Control Questioned," *Space News*, 8 September 1997, 2.

2. Amazingly, one still hears arguments about whether or not the Air Force has "proved" itself as a separate service. For example, James F. Dunnigan writes, "Currently, the marine ground commanders have the advantage their army counterparts had until the air force became a separate service: complete control over air support for the ground troops. Merging the army and air force would give soldiers that same edge once more. . . . It's time to admit that we made a mistake creating a third service." *Digital Soldiers* (New York: Saint Martin's Press, 1996), 294-96.

3. For example, in a published interview, Gen Joseph W. Ashy, retired commander of Air Force Space Command and US Space Command, said that "the United States will—and I'm not trying to promote war here, I'm just saying that's what humankind is like—eventually fight from space and into space" when it becomes imperative to protect US assets. "A. F. Space Chief Calls War in Space Inevitable," *Space News*, 12 August 1996.

4. For an outstanding review of the arguments against the weaponization of space, see Maj David W. Ziegler, *Safe Heavens: Military Strategy and Space Sanctuary Thought* (Maxwell AFB, Ala.: Air University Press, June 1998).

5. Maj Michael J. Muolo, *Space Handbook: An Analyst's Guide to Space*, vol. 2 (Maxwell AFB, Ala.: Air University Press, December 1993), 4-5.

6. 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.

7. *Ibid.*, 564-65.

8. "Essay H: Aerospace Environment," in Air Force Manual (AFM) 1-1, *Basic Aerospace Doctrine of the United States Air Force*, vol. 2, March 1992, 67. Air Force Doctrine Document (AFDD) 1, *Air Force Basic Doctrine*, the most recent example (September 1997) of basic doctrine, does not directly address the conflicting notions of air versus space but implicitly treats the two as a unified whole from a doctrinal point of view.

9. DeBlois, 564.

10. *Ibid.*, 564, 566.

11. *Ibid.*, 565.

12. Gen Robert T. Herres, "The Future of Military Space Forces," *Air University Review* 38, no. 2 (January-March 1987): 43.

13. "A Shortsighted Veto," *Space News*, 8 September 1997, 12.

14. Herres, 42. General Herres also presents a good argument as to why a separate space service does not make sense in terms of the how and why of current Department of Defense organization and structure. Although I have not addressed this here, his points remain valid and worth reading.

15. Giulio Douhet, *Command of the Air*, trans. Dino Ferrari (1942; new imprint, Washington, D.C.: Office of Air Force History, 1983), 258.

16. One can legitimately define ICBMs as space weapons (our current ICBM force now resides in "space wings"). However, one can safely dismiss as 40 years too late any argument that ICBM force application constitutes a revolution in modern warfare requiring an independent space force.

17. Kenneth Roy, "Ship Killers from Low Earth Orbit," US Naval Institute *Proceedings*, October 1997, 40-43.

18. This is the option presented in Headquarters US Space Command/J330, "Concept of Operations for Command and Control of Space Forces," draft, 24 April 1998.

19. This is the option presented in Fourteenth Air Force, White Paper on the Command and Control of AFSPACE Forces, 20 April 1998.

20. As of this writing, release of a preliminary coordination draft of Joint Publication 3-14, *Space Operations*, is still pending.

21. Sensibly, the Air Force is jettisoning the unintentionally divisive "air and space" construct in favor (once again) of *aerospace*. Using the term *aerospace* does not mean pretending that no boundary exists between air and space. As Lt Col Frank Jennings, USAFR, Retired, one of the originators of the term, wrote, "Whoever in the Air Force is proclaiming that satellites are much like airplanes, or that no boundary separates air from space, not only does not understand aerospace doctrine but has strayed far from the concept explained and expounded by Gen Thomas White and many others since the 1960s." "Doctrinal Conflict over the Word *Aerospace*," *Airpower Journal* 4, no. 3 (Fall 1990): 50-51.

22. One should note that mature airpower doctrine preceded the creation of an independent Air Force. In July 1943, for instance, the US Army introduced Field Manual (FM) 100-20, *Command and Employment of Air Power*, which made the following assertions: "Land power and air power are co-equal and interdependent forces. . . . The inherent flexibility of air power is its greatest asset. . . . Control of available air power must be centralized and command must be exercised through the air force commander if this inherent flexibility and ability to deliver a decisive blow are to be fully exploited" (pages 1-2). Such tenets remain a crucial part of US Air Force doctrine.

23. For example, a preliminary conclusion drawn from the "Army after Next" Space Game Two exercise held in Colorado Springs was that "synchronizing satellite and terrestrial operations is difficult because no matter how fast things unfold on the ground, *space systems will have an impact on a given area sooner*" (emphasis added). "Antisatellite Weapons Factor in Simulation," *Space News*, 9 February 1998, 4.



The Challenge of Space Power*

SEN. BOB SMITH (R-N.H.)

THANKS TO *STAR TREK*, space is often called the "final frontier." I call it the "permanent frontier." It is without end, forever, and limitless. It is truly a realm about which the more you learn, the more you realize just how much more there is left to learn.

My education in aerospace has occurred in Congress. I came to the House of Representatives in 1985 and served on the Space Subcommittee of the Science and Technology Committee until my election to the Senate in 1990. During that period, President Ronald Reagan reinvigorated America's awareness of

the possibilities of space with his Strategic Defense Initiative. I participated in the twists and turns of some very difficult issues—the Hubble telescope, expendable launch vehicles versus the space shuttle, the *Challenger* disaster, and the space station.

I became a staunch supporter of space programs during those turbulent years, and my interest in space has deepened since then. As chairman of the Strategic Forces Subcommittee on Armed Services, my focus is now more on the national security applications of space—but I have never lost my fascination with the sheer mystery of it all. I hope my

*Adapted from a speech hosted by the Institute for Foreign Policy Analysis and the Fletcher School of Law and Diplomacy at Tufts University on 18 November 1998.

on-the-job education in Congress has taught me a few things.

My approach to space has come to rest on three assertions: (1) America's future security and prosperity depend on our constant supremacy in space; (2) although we are ahead of any potential rival in exploiting space, we are not unchallenged, and our future dominance is by no means assured; and (3) to achieve true dominance, we must combine expansive thinking with a sustained and substantial commitment of resources and vest them in a dedicated, politically powerful, independent advocate for space power.

Strategic Overview

With our hardware and our brainpower, the United States has unchallenged mastery of air, sea, and land. Except for our government's failure to defend us from ballistic missiles—a glaring, reprehensible exception—no one can seriously threaten us with conventional forces.

Experts on such things say that this is a period of "strategic pause," a rare opportunity to catch our breath and rethink our strategy and force structure. Although the cold war required us to follow a course of incremental advances in doctrine and procurement just to keep pace with the Kremlin, nothing of the scope and scale of that technological competition exists today. As they say at the war colleges, we have no "peer competitor."

Although I vigorously oppose those people who use this fortunate circumstance to justify reckless cuts in defense spending or to rationalize their refusal to support an effective ballistic missile defense, I do see an opportunity for us to exploit this period of unchallenged conventional superiority on Earth to shift substantial resources to space. I believe we can and must do this, and, if we do, we will buy generations of security that all the ships, tanks, and airplanes in the world will not provide. This would be a real "peace dividend"—it would actually help keep the peace.

None of us can truly imagine the opportunities that space may one day offer. But for

now I think we can agree that space offers us the prospect of seeing and communicating throughout the world; of defending ourselves,

I do see an opportunity for us to exploit this period of unchallenged conventional superiority on Earth to shift substantial resources to space.

our deployed forces, and our allies; and, if necessary, of inflicting violence—all with great precision and nearly instantaneously and often more cheaply. With credible offensive and defensive space control, we will deter and dissuade our adversaries, reassure our allies, and guard our nation's growing reliance on global commerce. Without it, we will become vulnerable beyond our worst fears.

Shortchanging Space

In their rhetoric, both the Department of Defense (DOD) and the Air Force have acknowledged the importance and promise of space power. In his report to Congress in 1998, Secretary of Defense William Cohen stated that "spacepower has become as important to the nation as land, sea, and air power."¹ In 1995 the Air Force made clear in *Global Engagement* that "the medium of space is one which cannot be ceded to our nation's adversaries. The Air Force must plan to prevail in the use of space."²

Expanding and refining our ability to gather and transmit information has been DOD's principal focus in space. The Air Force's space budget is dedicated almost entirely to the maintenance and improvement of information systems as a means of increasing the effectiveness of existing forces here on Earth. But as important as early warning, intelligence, navigation, weather, and communications systems may be, today they are basically dedicated to supporting nonspace forms of power projection. Even the Air Force's Space

Warfare Center and Space Battlelab 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.

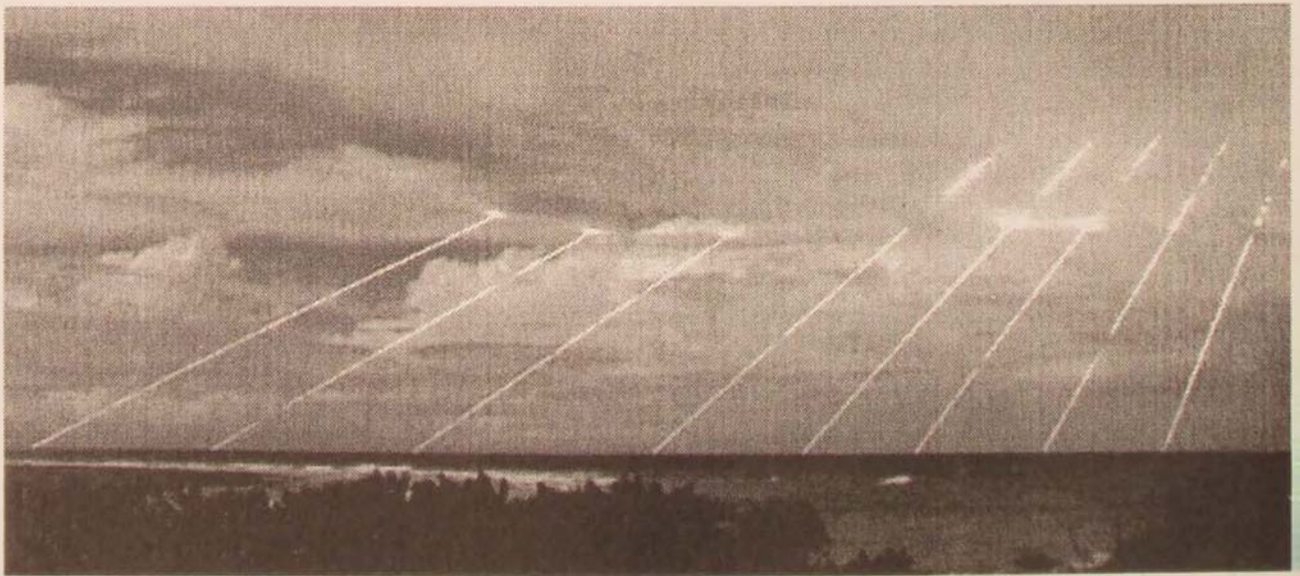
This is not space warfare. It is using space to support air warfare. It is essentially the space component of "information superiority." Given the degree of importance that *Joint Vision 2010* and other recent statements of policy and doctrine give to information superiority, it is understandable that the Air Force and DOD have tried so hard to fully exploit the information revolution. But if we limit our approach to space just to information superiority, we will not have fully utilized space power.

Four years ago the secretary of the Air Force and the chief of staff challenged the Air Force Scientific Advisory Board to "search the world for the most advanced aerospace ideas and project them into the future."³ Among the many valuable findings in the resulting *New World Vistas* report was the following conclusion: "For the U.S. to sustain its superpower status it will become necessary not only to show global awareness through space based information, but also to be able to project power from space directly to the earth's surface or to airborne targets with kinetic or directed energy weapons."⁴

But as I look at the way the Air Force is organized, trained, and equipped, I do not see it building the material, cultural, and organizational foundations of a service dedicated to space power. Indeed, in some respects it is moving backward. *Global Engagement* spoke of a transition "from an *air* force to an *air and space* force on an evolutionary path into a *space and air* force" (emphasis in original).⁵ This language, heavily influenced by the revolutionary vision in the *New World Vistas* report, was consistent with the kind of leap into space power that I believe is necessary.

But the Air Force uniformed leadership has recently replaced the vision laid out in *Global Engagement* with the concept of an "aerospace force." Although this new approach is not necessarily inconsistent with the development of space power, it appears to reflect the view that space is fundamentally an information medium to be integrated into existing air, land, and sea forces.

Once again, I believe that fully integrating space-based information capabilities into existing concepts and organizations is an important near-term goal. Both the Air Force and the National Reconnaissance Office (NRO) have done a good job of advancing this cause. But if this is all there is to aerospace, then it is a



Unarmed reentry vehicles from a *Peacekeeper* missile impact in the Kwajalein Missile Range in the South Pacific.

woefully deficient concept. It is not space power.

Where are the science-and-technology investments and the technology demonstrations that the Air Force is currently pursuing in order to build a future space-power projection capability? Where is the Air Force's space-based missile-defense development program? (A space-based laser program that does not envision a technology demonstration for 15 years or an operational capability for 35 years is not serious.) Where is the Air Force's military space-plane program? Does the Air Force really want to stand idle while the National Aeronautics and Space Administration (NASA) develops a follow-on to the space shuttle that may contribute only marginally to meeting the requirements of military space power? Compared to the magnitude of the technical challenges involved—and these programs' potential military value—the investments being made by the Air Force in these areas are paltry. In some cases—programs involving the space plane, kinetic-energy antisatellites, and Clementine II asteroid-intercept mission—I have had to personally earmark funds to get the Air Force to move forward at all.

Personnel investments are also inadequate. Many of the institutions of space power have been established within DOD, including joint and service space commands and the Fourteenth Air Force, but I still do not see the emergence of a war-fighting community within the Air Force that in any way rivals the air and missile organizations. Having one or two space generals rise to the senior levels of Air Force leadership is not enough. Similarly, a service that promotes only one space officer at a time to brigadier general is not showing much commitment to space power.

Right now, Air Force Space Command includes 11 general officers. None are career space officers—although two have had three space assignments, and three have had two space assignments (including their current jobs). The other generals are serving for the first time in space jobs. A further breakout shows that five of the 11 are command pilots, five are command missileers, and one has a command and control

background. To put this in context, consider how many general officers at Air Combat Command are not command pilots.

Nor has the Air Force taken steps to build a dedicated space-warfare cadre of younger officers. The attempt to combine space and missile personnel and the tendency to assign nonspace officers to lead space organizations may actually undermine the development of a true space-power culture. Although I strongly support flexibility in the career paths among different war-fighting communities throughout our military services, it has gone too far when most of the Air Force's space institutions and commands are led by officers who are not space specialists.

Embracing Space Power

To ask if the Air Force is serious about space is to ask the wrong question. The Air Force has played the dominant role in military space matters for decades. A significant portion of its budget has gone toward developing and operating the nation's military space systems. So no one should question the Air Force's proud space legacy. But an honored past does not automatically mean that the Air Force is correctly poised for the future.

What do DOD and the Air Force need to do in order to create the conditions necessary for the emergence of space power? Let me offer the following recommendations as intellectual fodder, if not as an actual road map forward. Some of these suggestions are specifically directed toward the Air Force, while others are directed more generally toward DOD.

First, we must foster a space-power culture. We must create an environment in which revolutionary thinking about space power is not only accepted but also rewarded. We should strive to re-create for space power the type of intellectual environment that Gen Henry "Hap" Arnold created for airpower in the wake of World War II. We simply cannot allow a blanket of political correctness and bureaucratic inertia to smother those people who would offer us the most innovative and revolutionary visions for



Depiction of the airborne laser (ABL) engaging theater ballistic missiles in the boost phase of flight. "[One cannot] see the Air Force building the material, cultural, and organizational foundations of a service dedicated to space power." Do Air Force plans and programs reflect cultural bias or realistic solutions to technical, fiscal, and political constraints?

exploiting space. The emergence of a real space-power force will require the creation of a highly skilled, dedicated cadre of space warriors clearly focused on space-power applications—not merely on helping air, sea, and ground units do their job better.

Second, we should be more creative in maximizing the cooperation between military, civil, and commercial space practitioners. We need to work aggressively with the commercial sector to find a new equilibrium in which private profit and government cost reduction meet both commercial and military needs more cheaply. DOD must also cooperate more with other users of space, such as

NASA, NRO, and the commercial sector. Partnering on a range of technology demonstrations is one way to leverage our investments. We must also carefully consider the potential for privatization and commercial partnering in certain elements of DOD's space infrastructure—for example, in the creation and maintenance of multipurpose spaceports. DOD's existing willingness to enter into public-private partnerships in the area of depot maintenance, for example, might also be applied to the space-launch arena. In this regard, however, we must exercise great caution to ensure that government control of war-fighting capabilities is not jeopardized.

Above all, we must give our space warriors the tools they need. Let me be clear—if the potential savings I've described here are not sufficient, DOD must simply begin to dedicate a larger portion of its budget to the development and fielding of space-power systems. We cannot simply walk away from core missions or legacy systems. But we also cannot continue an investment strategy that continually consigns space-power systems to the "out" or even the "way-out" years—especially when space power may provide faster, better, and cheaper offense and defense.

Two Options

We will need more than a better space-power culture—and more than money—if we hope to dominate the permanent frontier. We must be willing to dramatically restructure our institutional approach to this ultimate strategic theater. As a baseball fan and coach, I am fond of Yogi Berra, especially his advice "When you get to a fork in the road, take it." Well, today the Air Force is at a fork in the road. It must truly step up to the space-power mission or cede it to another organization. In plain English, the Air Force is going to have to change.

The National Command Authorities have established the policy foundations for such a transition. According to the president's national security strategy of October 1998, "our policy is to promote development of the full range of space-based capabilities in a manner that protects our vital national security interests."⁶ With its Global Engagement strategy, the Air Force itself established the vision of a space and air force—in that order. Now the Air Force must decide whether it is willing to make the internal choice to embrace space power fully.

Changing the Air Force?

Let's not sugarcoat this problem. We will have to shed big chunks of today's Air Force to pay for tomorrow's, and that will be very painful. Congress could help by allowing the Air Force

to keep any savings from this divestiture and allocate them directly to space programs. If such a change proves impossible, then we in Congress must consider another alternative.

Ultimately—if the Air Force cannot or will not embrace space power and if the Special Operations Command model does not translate—we in Congress will have to establish an entirely new service.

The notion that the Air Force should have primary responsibility for space is not sacred. For the most part, space is well outside the "wild blue yonder." Just because space hardware and signals move about over our heads, must space be the exclusive domain of the Air Force?

This is not a new question. In 1995 the commander in chief of US Space Command found "no compelling arguments" to make the Air Force solely responsible for the design, launch, and operation of space systems.⁷ In 1997 retired Air Force general Charles Horner told *Space News* that "if the Air Force clings to its ownership of space, then tradeoffs will be made between air and space, when in fact the tradeoff should be made elsewhere."⁸ Furthermore, Gen Charles Krulak, commandant of the Marine Corps, stated that "between 2015 and 2025, we have an opportunity to put a fleet on another sea. And that sea is space. Now the Air Force people in the audience are saying, 'Hey that's mine!' And I'm saying, 'You're not taking it.'"⁹

These officers express legitimate frustrations, but I see a risk that their concerns could lead to a Balkanization of space power. This would be a setback. A better approach to explore might be to vest US Space Command with authority similar to that held by US Special Operations Command—the Major Force Program (MFP) structure. MFP-11 gives the commander of Special Operations Command substantial control over development,

acquisition, promotions, and assignments in this unique mission area.

US Space Command is perhaps the only institution within DOD that is developing both the theory and practical plans for space power. But the commander in chief of US Space Command needs the teeth and claws to compete for—and dispense—DOD resources. As a conservative Republican, I am opposed to unnecessary bureaucracy. But space power is every bit as important as special operations—perhaps, like special ops, space power should have its own MFP and even its own assistant secretary of defense.

Or Creating a New "Space Force"?

Ultimately—if the Air Force cannot or will not embrace space power and if the Special Operations Command model does not translate—we in Congress will have to establish an entirely new service. This may sound dramatic, but it is an increasingly real option. As I have tried to convey, I want us to dominate space—and frankly, I am less concerned with which service does it than I am committed to getting it done. This view is increasingly shared by my colleagues.

Creating a new military service to exploit a new medium is not without precedent. At the close of World War I, the Army General Staff viewed military aviation as a servant of ground forces and opposed the development of a new service that would conduct a new set of roles and missions. Senior officers with little or no operational experience were chosen to guide the development of the new aviation technologies, roles, and missions. Ground officers controlled promotion of aviation officers. The General Staff refused to fund acquisition at levels needed by aviators. The vast majority of Army officers were ignorant of—and indifferent to—disparities between US and foreign development of airpower. The Army exiled or forced into retirement its internal critics. By any measure, aviation had an inferior status within the Army. As a result, advocates of new roles and missions for aviation, such as Billy Mitchell, sought organizational independence to implement their ideas. The result

was the creation by Congress of the Army Air Corps (1926) and, later, the United States Air Force (1947).

A Space Force would put the same bureaucratic and political muscle behind space missions that the Army, Navy, and Air Force flex in theirs today. A separate service would allow space power to compete for funding within the entire defense budget, lessening the somewhat unfair pressure on the Air Force to make most of the trade-offs and protecting space-power programs from being raided by more popular and well-established programs. A separate service would create an incentive for people to develop needed new skills to operate in space and a promotion pathway to retain those people. Further, a separate service would rationalize the division of labor among the services—and consolidate those tasks that require specialized knowledge, such as missileery and space—so that this specialized knowledge could be applied more effectively.

I have been a member of Congress for 14 years—long enough to learn that, very often, an organized advocate equals political power and that political power gets the resources. We may not like this—and any handful of us might be able to sit down and divide things up better—but that is not how the American political system works. I'd bet that—in a DOD comprised of four service departments—a Space Force would get a fair share. This is a crude method, but it is one way to ensure that space power gets resources.

As with any other major change, there are risks. A separate service would not be immune to bureaucratic stagnation and the suppression of new ideas as leaders seek to achieve a single "vision" and unanimity behind it. Unfortunately, unity of bureaucratic effort often seeks to avoid competition of ideas—the very competition we need if we are to learn how to make new things and how to do new things. There is no guarantee that the initial vision—whichever one wins in bureaucratic competition—would be the most effective in real combat against a wide range of adversaries.

A separate service will face coordination problems with the existing services as it seeks

to integrate space concerns into the Army, Navy, Marine Corps, and Air Force operational concepts, although the Goldwater-Nichols Department of Defense Reorganization Act should help reduce the magnitude of this problem. A separate service would surely add a level of bureaucracy and associated costs—although this would be offset somewhat by the consolidation of existing functions and commands within the new service. Of course, there would be decisions to make about which commands and functions to place under a new space service. I would personally struggle, for example, with the question of which ballistic missile defense programs to include.

This would be a dramatic step. Perhaps a "Space Corps" (like the Marine Corps, a separate service but without a secretariat) would be a step toward a Space Force. Maybe the Air Force will preempt these dramatic changes by truly becoming the "Space and Air Force." But space dominance is simply too important to allow any bureaucracy, military department, service mafia, or parochial concern to stand in the way. I intend to muster all of the political support I can to take any step necessary to make true space power and space dominance a reality for the United States of America.

Conclusion

America has always been a nation of discoverers and explorers. It suits our national character to pursue the permanent frontier of space. Like Columbus, we must dare to move

away from the "old world"—old vision, old strategy, and old institutions—if we are to truly enter the "new world" of space.

As the senior senator from New Hampshire, I am proud to represent the state that sent astronaut Alan Shepard and teacher Christa McAuliffe to participate in the national space program. As you recall, Christa perished with her brave comrades aboard the *Challenger* one awful morning in January 1986. Christa said, "I touch the future—I teach." Christa touched the future in our children, and she sought to touch the future as an astronaut. Like President Reagan, she helped create a wave of enthusiasm for space exploration.

We must renew this enthusiasm. The American people are ready. Look at the popularity of space and science-fiction films—*Apollo 13*, *Independence Day*, *Armageddon*, and eight *Star Trek* movies. Look at the public's fascination with the recent journey back to space of John Glenn, my Armed Services Committee colleague.

We are nearing the end of mankind's bloodiest century. Through enormous sacrifice, America has preserved its own freedom and has freed millions around the world. As leaders, we must seek an Apollo-like commitment from the American people. We must ask them to reach into space again with gusto—for its science, its mystery, and the security it can offer us. Control of space is more than a new mission area—it is our moral legacy, our next Manifest Destiny, our chance to create security for centuries to come. □

Notes

1. Secretary of Defense William Cohen, *Annual Report to the President and the Congress* (Washington, D.C.: Department of Defense, 1998), 7-1.

2. *Global Engagement: A Vision for the 21st Century Air Force* (Washington, D.C.: Department of the Air Force, 1997), 7.

3. Secretary of the Air Force Sheila E. Widnall, "The Challenge," in *New World Vistas: Air and Space Power for the 21st Century (Ancillary Volume)* (Washington, D.C.: USAF Scientific Advisory Board, 1995), 7.

4. *New World Vistas: Air and Space Power for the 21st Century (Space Applications Volume)* (Washington, D.C.: USAF Scientific Advisory Board, 1995), v.

5. *Global Engagement*, 7.

6. *A National Security Strategy for a New Century* (Washington, D.C.: The White House, Office of the President of the United States, 1998), 25.

7. "CINCSPACE Finds No Compelling Reason to Give USAF Control of Satellites," *Inside the Navy*, 3 July 1995.

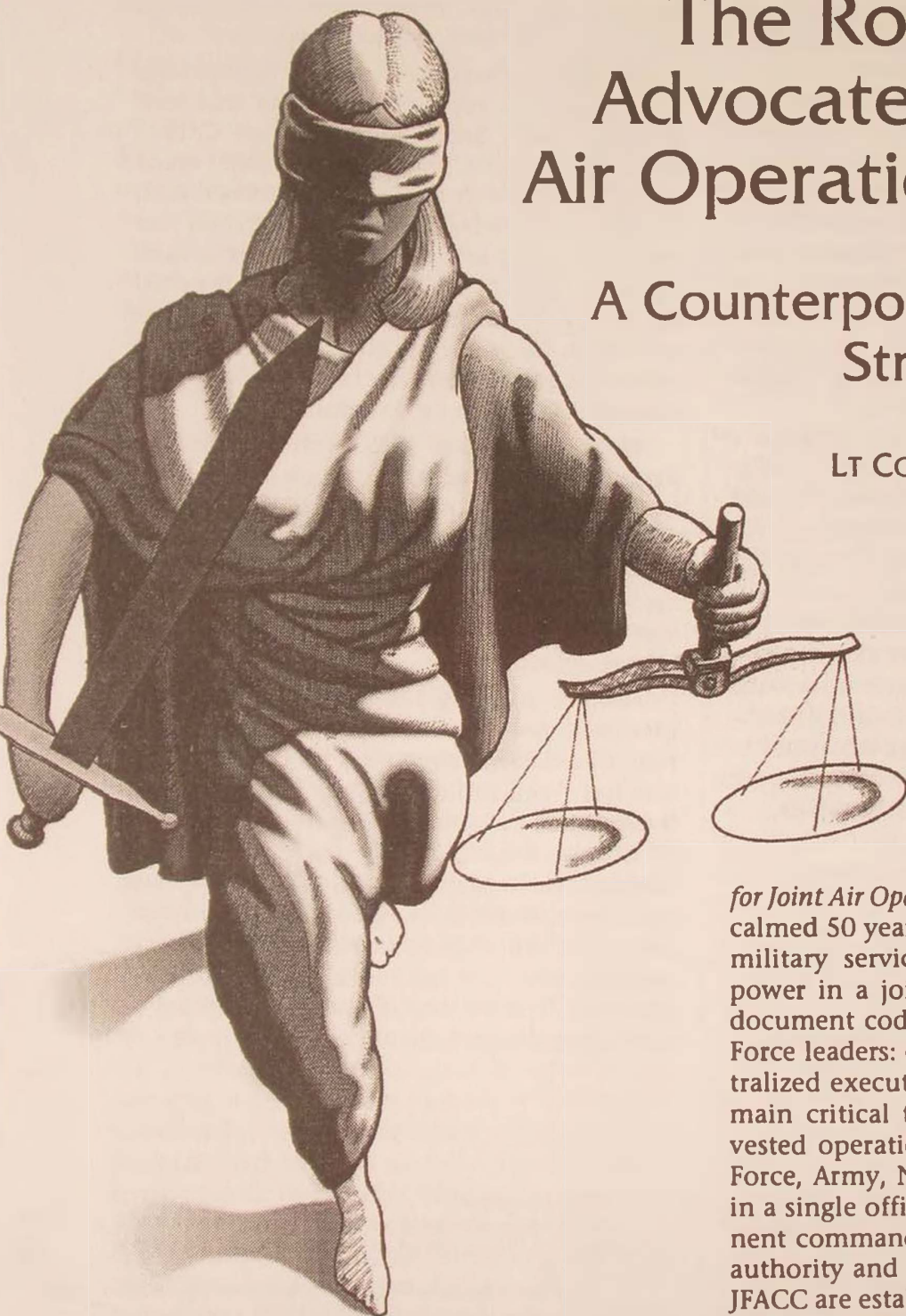
8. "Air Force Space System Control Questioned," *Space News*, 8 September 1997, 2.

9. Gen Charles Krulak, commandant of the Marine Corps, speech delivered at the Fletcher School of Law and Diplomacy, Tufts University, 10 November 1997.

The Role of Judge Advocates in a Joint Air Operations Center

A Counterpoint of Doctrine, Strategy, and Law

LT COL TERRIE M. GENT, USAF*



THE APPEARANCE of Joint Publication (Pub) 3-56.1, *Command and Control for Joint Air Operations*, on 14 November 1994 calmed 50 years of fervent debate among the military services about the control of airpower in a joint-operations area. This brief document codified a verity long held by Air Force leaders: centralized control and decentralized execution of air and space forces remain critical to force effectiveness.¹ It also vested operational or tactical control of Air Force, Army, Navy, and Marine air missions in a single officer—the joint force air component commander (JFACC),² stating that “the authority and command relationships of the JFACC are established by the joint force commander. These typically include exercising

*I would like to thank Brig Gen Edward F. Rodriguez, USAFR, president of the Air Force Judge Advocates Vietnam Veterans Association, for giving me invaluable information about the matters involving Lt Gen John D. Lavelle. I also owe a great debt of gratitude to Col Henry G. Green, USAF, Retired, president of the Air Force Retired Judge Advocates Association, for his assistance in locating several retired judge advocates and for sharing important insights about the relationship between commanders in Vietnam and their judge advocates.

operational control over assigned and attached forces and tactical control over other military capabilities/forces made available for tasking."³ In addition, Joint Pub 3-56.1 established the organization headed by the JFACC—a joint air operations center (JAOC).⁴

In this publication, the "wiring diagram" for the JAOC made it clear that a staff judge advocate advises the JFACC, his staff, and the JAOC's two core divisions—Combat Plans and Combat Operations.⁵ The staff judge advocate, as well as the JAOC's entire staff of attorneys and paralegals, must therefore be well versed in the joint and service doctrine that guides the activities of a JAOC. This article examines the judge advocate's duties during operations planning and during each stage of what some commanders refer to as the battle rhythm of the JAOC. It does not explain the law but illustrates the judge advocate's role in ensuring that the JFACC receives operational recommendations consistent with rules of engagement promulgated by the National Command Authorities (NCA), domestic and international law, and restraints and constraints specified by superior commanders.⁶ However, since the structure of the JAOC evolved from tactical air control centers used by Seventh Air Force during the war in Vietnam, this article also examines the evolution of the JAOC as well as the role of Air Force judge advocates in operations during and since the Vietnam era.

Tactical Air Control Centers during the Vietnam War

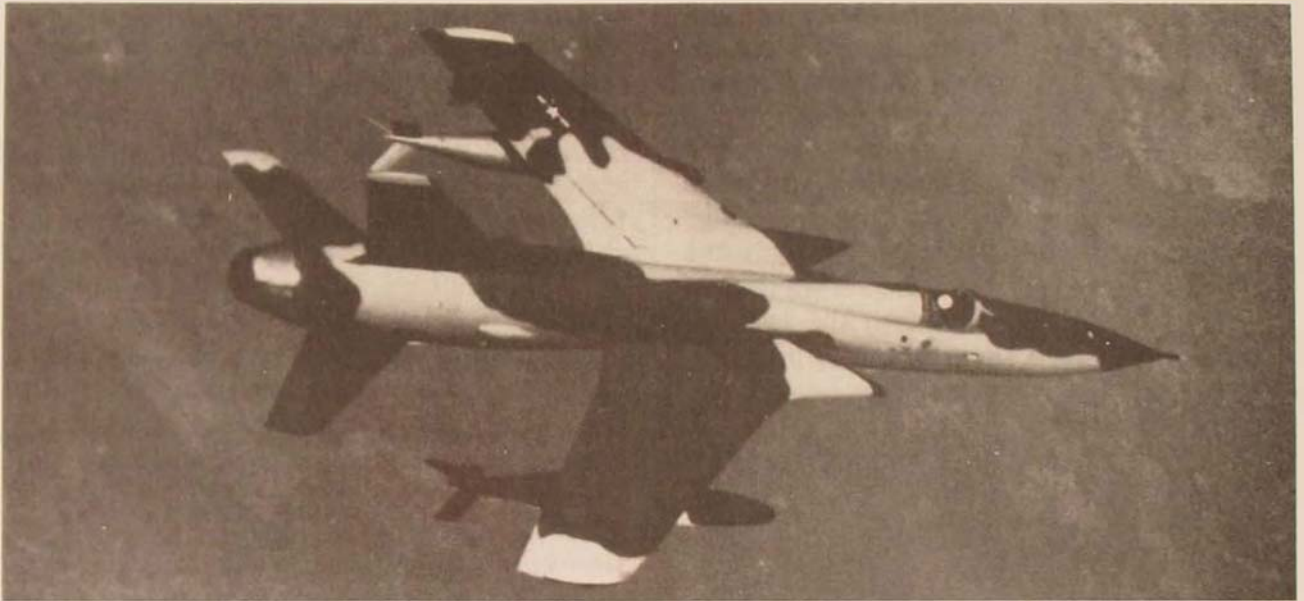
Every major war involving America's air arm has tested the concept of centralized control of airpower.⁷ During World War II—particularly in 1942 and 1943—the Army Air Forces insisted that only air officers control air forces. Earlier, aviation units had been assigned to and took orders from Army and Navy organizations. Although air leaders did not question their obligation to perform cooperative missions, they understood that decentralized control only undermined airpower's most significant contributions to the

operational effort—mass and speed.⁸ Before the Air Force became a separate service, air leaders insisted that they take direction only from a commander of a theater of operations or a large task force.⁹ Even then, they accepted only missions required by the strategic plan.¹⁰

The lessons of history led airmen to conclude that the most effective scheme of control of air and space assets involved a single JFACC responsible for integrating the employment of all aerospace forces within a theater of operations.¹¹ During the Korean War and the early years of the Vietnam War, makeshift efforts resulted in some level of coordination of air activity.¹² As the war progressed in Vietnam, however, air operations in-theater became divided both geographically and organizationally, reflecting a divided command structure.

Although Gen William F. Momyer, commander of Seventh Air Force, had responsibility for coordinating all tactical air operations of US aviation units in South Vietnam in 1962, three separate tactical air control centers eventually directed operations, each planning missions and controlling air assets to meet the needs of disparate parts of operations.¹³ In the south, for example, the air mission primarily involved supporting daily ground operations. The Seventh Air Force tactical air control center at Tan Son Nhut Air Base near Saigon focused on "today's war," close air support, and targets requested by the Army. Yet another center at Tan Son Nhut—the Seventh Air Force Command Center—planned operations with a focus on "tomorrow's war," including intelligence analysis, targeting, and battle damage assessment. A third tactical air control center, established in Thailand in 1965 to control air strikes in Laos, later became the alternate Air Force command center.¹⁴ This cumbersome system, described by Henry Kissinger as "institutionalized schizophrenia," made it difficult for leaders to exert effective command and control over air operations. Although many people, including President Richard Nixon, recognized the folly of this tripartite method of controlling air operations, the structure had become too difficult to repair before the conclusion of the war.¹⁵

During the Vietnam War, the divided and cumbersome system of command and control recognized the responsibility for conducting air operations in accordance with the Law of War but did not include support from judge advocates.



The Role of Air Force Judge Advocates in Vietnam

Did judge advocates have any role in advising commanders about the function of the tactical air control centers or the lawfulness of their operations? Despite the vigorous tempo of air operations during some periods, Air Force judge advocates assigned to units in Vietnam had almost no contact with the people who planned or executed air operations. According to Col Michael R. Emerson, permanent professor and head of the Law Department of the United States Air Force Academy, Air Force judge advocates in Vietnam had no discussions about the Law of War or the rules of engagement with people who worked in the centers. Assigned as a captain to the 377th Combat Support Group Office of the Staff Judge Advocate at Tan Son Nhut Air Base during 1970 and 1971, Emerson recalled that "no one in our office gave briefings to the guys in the TACC. I remember it was in the Seventh Air Force Headquarters building, a gray-green building surrounded by concertina wire and guarded by lots of cops. You had to have a [high-level] clearance to get in there, and none of us had one."¹⁶

If airmen who planned and executed air operations received no advice about the Law of War and rules of engagement from judge advocates at the group or base level, did they get it from judge advocates at Headquarters Seventh Air Force? Col Richard F. Rothenburg, assigned as a captain to the Seventh Air Force's Office of the Staff Judge Advocate in 1969, remembered making only one brief visit to the tactical air control center to meet with officers investigating a claim alleging that Air Force members had defoliated parts of a rubber plantation.¹⁷ Col Philip J. Williamson, Seventh Air Force staff judge advocate, attended Headquarters Seventh Air Force staff meetings that reviewed the prior week's operations, but no one consulted him about future operations, the lawfulness of striking selected targets, or compliance with the rules of engagement.¹⁸

If neither base-level nor Seventh Air Force judge advocates provided personnel at the tacti-

In short, no Air Force judge advocate in Vietnam offered what lawyers today call "operations law" advice to Air Force commanders and their staffs who led air operations in or from South Vietnam.

cal air control center with operational legal advice, did they get it from judge advocates at the unified command—Military Assistance Command/Vietnam (MACV)? Apparently not. Brig Gen Gordon Ginsburg, assigned as a lieutenant colonel to the Office of the Staff Judge Advocate for MACV from January 1969 until January 1970, said that Air Force judge advocates at MACV routinely focused on a large variety of legal issues, none of them requiring explication of the Law of War or the rules of engagement. Although MACV was located in a compound immediately adjacent to Tan Son Nhut Air Base, Lieutenant Colonel Ginsburg and his legal brethren simply had no reason to visit the tactical air control centers.¹⁹ In short, no Air Force judge advocate in Vietnam offered what lawyers today call "operations law" advice to Air Force commanders and their staffs who led air operations in or from South Vietnam.

An Air Force judge advocate assigned as an exchange officer to the embassy in Thailand, however, gave operations law advice to some of the airmen operating in North Vietnam and Thailand. From July 1967 to July 1969, Walter Reed, then a major but later a major general and the judge advocate general of the Air Force, reviewed target lists to ensure that US forces did not attack targets restricted by the Law of War or by the NCA. He also made sure no bombing occurred that would offend the sensitivities of the Thailand government. No bombing mission could launch from Thailand without approval from an authority located in Thailand. Apparently, Major Reed was the only Air Force judge advocate in-theater who scrutinized some of the "frag orders," just as a judge

advocate supporting a JAOC would review the lawfulness of attacking targets today.²⁰

Many of today's military leaders who served in Vietnam remember the allegations against General Lavelle and expect their legal counsel to fully advise them on the rules of engagement.

The Lavelle Case and Development of Standing Rules of Engagement

Prior to 1972, judge advocates outside the highest levels of leadership had no occasion to read the rules of engagement for air operations.²¹ Both judge advocates in the field and commanders viewed these rules as an operational matter, something solely within the purview of the NCA and higher levels of command.²² Prepared on an ad hoc basis and transmitted by message, letter, radio, and telephone calls, the rules of engagement, along with the Hague and Geneva Conventions, formed the "operating authorities" that governed the manner in which American forces could operate.²³ In 1972 the Air Force was embarrassed by allegations that Gen John D. Lavelle, commander of Seventh Air Force, ordered attacks on North Vietnamese positions in violation of the rules of engagement and instructed aircrews to falsify their after-action reports about the raids.²⁴ In hearings before both houses of Congress, the general asserted that the extant rules of engagement permitted the missions and that his superiors both knew of and encouraged the attacks he had authorized.²⁵ Nevertheless, the Air Force relieved him of command and retired him in the permanent grade of major general.²⁶ A week later, the Air Force changed the rules of engagement to allow the kinds of attacks he had ordered.²⁷

Although the rules of engagement for the Vietnam War received closer scrutiny as the conflict drew to a close, not until five years later did anyone take steps to codify the general principles governing any of the services' operations. In 1979 Adm Thomas B. Hayward, chief of naval operations, directed a study to standardize the Worldwide Peacetime Maritime Rules of Engagement.²⁸ The study consolidated various references and provided supplemental measures that commanders could request when they needed to clarify their authority beyond basic self-defense.²⁹ In 1981 after coordination among the four services and the Office of the Secretary of Defense, the Department of State, and the National Security Council, the Joint Chiefs of Staff (JCS) approved the Worldwide Peacetime Rules of Engagement for Seaborne Forces.³⁰ These rules represented a clear statement of national views on self-defense in peacetime, and commanders could use them in many stages of a belligerency, thereby smoothing the transition from peace to hostilities and back to peacetime.³¹ On 26 June 1986, the JCS Peacetime Rules of Engagement superseded the 1981 rules, and on 1 October 1994, they were renamed the Standing Rules of Engagement in Chairman of the Joint Chiefs of Staff Instruction (CJCSI) 3121.01.

Although the JCS publishes the Standing Rules of Engagement and commanders have ultimate responsibility for complying with them and any approved supplemental measures, judge advocates can play a significant role as interpreters of the rules and as drafters of supplemental measures. Moreover, many of today's military leaders who served in Vietnam remember the allegations against General Lavelle and expect their legal counsel to fully advise them on the rules of engagement. Joint doctrine emphasizes that "joint forces operate in accordance with applicable [rules of engagement], conduct warfare in compliance with international laws, and fight within restraints and constraints specified by superior commanders. Objectives are justified by military necessity and attained through appropriate and disciplined use of force."³²

Evolution of the Role of Air Force Operations Law Judge Advocates

Air Force judge advocates also had little contact with operators and issues concerning the rules of engagement prior to 1972 because nothing required them to do so. The US government and Department of Defense (DOD) had long recognized the necessity of complying with the Law of War (now also referred to as the Law of Armed Conflict). But not until the case of 1st Lt William L. Calley³³ shocked the conscience of the entire nation did a directive (DOD Directive 5100.77, *DOD Law of War Program*, 5 November 1974) mandate, among other things, that the services implement a program to prevent violations of the Law of War. Later regulations that implemented this directive cast Air Force judge advocates, as well as those from other services, in the role of trainers.

Beginning in 1980, Ninth and Twelfth Air Forces began exercises that, to a greater or lesser degree, trained personnel on their duties in a tactical air control center.³⁴ Air Force members, including judge advocates, also participated in joint and combined exercises. For guidance, they relied on DOD Directive 5100.77, Air Force Pamphlet (AFP) 110-31, *International Law—The Conduct of Armed Conflict and Air Operations* (1976), Air Force Regulation (AFR) 110-32, *Training and Reporting to Insure Compliance with the Law of Armed Conflict* (1976), and AFP 110-34, *Commander's Handbook on the Law of Armed Conflict* (25 July 1980). The exercises quickly improved in sophistication and realism, but the operational role of the judge advocate remained unclear. To remedy this, on 4 August 1988, the JCS sent a memorandum—MJCS 0124-88—to all combatant commanders, expressly requiring the immediate availability of legal advisors to provide advice on rules of engagement, the Law of Armed Conflict, and related matters during planning and execution of joint and combined exercises and operations.

In 1989 United States Southern Command (USSOUTHCOM) followed this guidance by

involving judge advocates in planning for Operation Just Cause in Panama. Relations between the United States and Manuel Noriega, the Panamanian dictator, had been deteriorating for some time before Noriega annulled his country's elections on 10 May 1989 and sanctioned violence against his opponents, who had won the election. As the United States increased its pressure on Noriega to step aside, he responded with anti-American rhetoric and conduct. At Noriega's behest, on 15 December 1989, the National Assembly of Panama passed a resolution stating that "owing to U.S. aggression," a state of war existed with the United States. Noriega said that someday the "bodies of our enemies would float down the Panama Canal and the people of Panama would win complete control over the waterway." The next day, Panamanian Defense Forces personnel killed one US officer and wounded two others. Within days, President George Bush authorized the execution of Operation Just Cause to safeguard the lives of nearly 30,000 US citizens; to protect the integrity of the Panama Canal and 142 defense sites; to help the Panamanian opposition establish genuine democracy; to neutralize the Panamanian Defense Forces; and to bring to justice Manuel Noriega, who had been indicted on drug-related charges in the United States.³⁵

On 10 October 1989, Gen Maxwell Thurman, commander of USSOUTHCOM, designated Lt Gen Carl W. Stiner, commander of XVIII Airborne Corps, as the commander of Joint Task Force South and the war planner and war fighter for the operation.³⁶ Over 22,000 soldiers, thirty-four hundred airmen, nine hundred marines, and seven hundred sailors were part of the task force.³⁷ Headquarters Twelfth Air Force, the Air Force component of USSOUTHCOM, joined in the planning efforts. Its commander, Lt Gen Peter T. Kempf, exercised operational control over all in-place and deploying Air Force forces.³⁸ Over two hundred aircraft participated in the deployment to Panama.³⁹ C-141s, C-130s, and C-5s, together with the requisite refueling support, carried out the bulk of the sorties; F-15s and F-16s flew combat patrols from Key West over

the Caribbean from Cuba to the Yucatán Peninsula to deter attacks from the Cubans; Air Force E-3 airborne warning and control sys-

Colonel Moorman's staff provided in-depth legal advice on such varied issues as the lawfulness of proposed targets, prisoners of war, refugees and detainees, overflight of other nations, the capture of war trophies, claims for damage by Air Force forces, and the prosecution of Air Force members for misconduct, such as looting.

tem (AWACS) aircraft provided aerial surveillance, threat warning, fighter control, and air-situation updates;⁴⁰ AC-130 gunships and UH-60 helicopters supported teams who assaulted ground positions;⁴¹ and F-117s dropped bombs near the Panamanian Defense Forces barracks to persuade the troops to surrender.⁴²

The massive airlift and complex operation gave rise to novel legal issues and, for the first time, Air Force judge advocates assigned to war-fighting units became deeply involved in planning a major operation and providing "real-time" legal advice during its execution. Col William A. Moorman, staff judge advocate for Twelfth Air Force, established a close liaison not only with his counterparts at Headquarters Tactical Air Command and USSOUTHCOM but also with Col John R. Bozeman, staff judge advocate for XVIII Airborne Corps, and Col Michael Nye, an Air Force judge advocate assigned to the CJCS legal staff.⁴³ To ensure that the command had continuous access to legal counsel, Colonel Moorman joined the battle staff, put four operations lawyers on 12-hour shifts, and assigned Maj Mary Boone to review all applicable "off-the-shelf" war plans. She earned the gratitude of operations planners when she

found some disconnects that would have undermined the mission. Twelfth Air Force judge advocates who attended planning sessions also spotted synchronization errors missed by the planners. For example, they noticed that one group of forces contemplated dropping flares in an area where pilots would be using night-vision goggles.⁴⁴ They thereby established that they could contribute more to the planning effort than purely legal advice.

Because of the small airspace and proximity of civilians to military targets and objectives, the legal issues raised by Just Cause proved thorny; thus, clear rules of engagement were essential but difficult to write. Fortunately, Colonel Moorman had a secure telephone unit with which to make encrypted telephone calls, using it several times a day to talk with Colonel Bozeman and Colonel Nye about the language of the rules of engagement to ensure that they complied with NCA guidance and took into account the mix of aircraft in the operation. Colonel Moorman's staff provided in-depth legal advice on such varied issues as the lawfulness of proposed targets, prisoners of war, refugees and detainees, overflight of other nations, the capture of war trophies, claims for damage by Air Force forces, and the prosecution of Air Force members for misconduct, such as looting.⁴⁵ Although Just Cause lasted only 19 days, the participation of Twelfth Air Force's judge advocates in both its planning and execution became a turning point in the role of Air Force lawyers in air operations. The Twelfth Air Force commander and his staff not only sought the advice of judge advocates on legal matters but also viewed them as full members of the war-planning and war-fighting team.⁴⁶

At the annual Air Force General Court-Martial Conference at Homestead Air Force Base, Florida, in January 1990, Colonel Nye and Colonel Moorman shared their experiences with Air Force judge advocates for all the general-court-martial convening authorities, including Ninth Air Force.⁴⁷ Not many months later, when the judge advocates at Ninth Air Force—the air component to United States

Central Command—participated in Internal Look, a Central Command exercise, they benefited from the experience of Twelfth Air Force's judge advocates.⁴⁸ Some of Ninth Air Force's judge advocates who participated in that exercise immediately became involved in Desert Shield, helping to plan operations to expel the Iraqis from Kuwait.⁴⁹ During both Desert Shield and Desert Storm, Ninth Air Force's Maj Harry Heintzelmann, for example, provided legal counsel to the now-famous Black Hole planners.⁵⁰ The Ninth Air Force staff judge advocate himself, Col Dennis Kansala, assisted in the refinement of the proposed rules of engagement and reviewed all the target lists after his staff had given them a careful "scrub."⁵¹

The unflagging and split-second issue spotting displayed by the judge advocates of all services during the Persian Gulf War solidified the confidence of commanders. Hays Parks, special assistant for the Law of War in the Office of the Judge Advocate General of the Army, remarked, "I have heard General Schwarzkopf, General Powell, and just about any other officer I run into, say that they consider the lawyer to be absolutely indispensable to military operations."⁵² Air Force leaders shared this view. On 11 December 1991, Lt Gen Michael A. Nelson—Air Force deputy chief of staff for plans and operations—and Maj Gen David C. Morehouse—Air Force judge advocate general—jointly signed a letter stating that "we cannot afford to wait for war to bring judge advocates into the operations and planning environment. We need to work together all the time so that we all understand how and why [the Law of Armed Conflict] must be an essential element of our mission." Their letter announced the creation of a new legal discipline called operations law.⁵³ Marine leaders also shared this view. At an operations law seminar held at Camp Pendleton, California, in 1995, Lt Gen Anthony C. Zinni, commanding general of I Marine Expeditionary Force, said that "operational law is going to become as significant to a commander as maneuver, as fire support, and as logistics. It will be a principal battlefield activity. The senior

[staff judge advocates] may be as close to the commander as his operations officer or his chief of staff. . . . [Staff judge advocates] will find themselves more and more part of the operational aspects of the business. They will be the right hand of the commander, and he will come to them for advice."⁵⁴

Role of the Judge Advocate in a JAOC

As airmen of the Vietnam era rose to positions of influence, the tactical air control center continued as the doctrinally approved element for the Air Force's control of conventional air and space forces.⁵⁵ By the time Desert Shield began, however, the functions of each of the three tactical air control centers employed in Vietnam had been combined and streamlined but still retained a "today's-war" and "tomorrow's-war" approach.⁵⁶ In 1991 the tactical air control center officially became the *air operations center*, a term first used during World War II.⁵⁷ Joint Pub 3-56.1 relied heavily on the Air Force model but included adjustments based on the practical experience from Desert Shield and Desert Storm, as well as improvements validated during joint exercises in the years that followed the Gulf War.⁵⁸

Although Joint Pub 3-56.1 encourages the tailoring of a JAOC's organization, Combat Plans and Combat Operations should remain common to all JAOCs.⁵⁹ Further, the Air Force has published doctrine that adds the Strategy and Air Mobility Divisions.⁶⁰ The Combat Plans Division has the primary responsibility of planning near-term, joint air-and-space operations and building the daily joint air tasking orders,⁶¹ while the Combat Operations Division executes the air tasking orders.⁶² The Strategy Division develops, refines, disseminates, and assesses the progress of the JFACC's long-range air and space strategy,⁶³ while the Air Mobility Division plans, coordinates, tasks, and executes the air-mobility mission.⁶⁴

After Desert Storm, some criticism of the JAOC centered around its "functional rigidity"—its inability to respond immediately to

tactical threats or targets of opportunity such as the Iraqi Scud missiles.⁶⁵ Headquarters Air Combat Command responded to this commentary on 8 July 1997 by publishing *Combat Air Forces Concept of Operations for Command and Control against Time Critical Targets*, which described the JFACC's processes for planning, tasking, and executing offensive and defensive missions against time critical targets. It also suggested inclusion of a multidisciplinary time critical target cell in the Combat Operations Division.⁶⁶ Air Force doctrine relies upon the integrated team concept in other areas as well.⁶⁷ Although a JAOC patterned after the Air Force model may have four divisions and many subordinate teams, they remain fully integrated, and individuals will draw assignments to divisions and multidisciplinary teams rather than isolated functional cells. Therefore, judge advocates should expect to participate in the activities of all the divisions and several teams as well.⁶⁸

Role of the Judge Advocate in Crisis Action Planning

Peacetime requires deliberate-planning procedures to prepare for future situations to which the United States must respond militarily.⁶⁹ The product of such planning includes operation plans, functional plans, or concept-of-operation plans. Judge advocates review deliberate plans and draft their "legal" portions. Situations arise, however, for which no plans exist. Instead, crisis action planning procedures come into play before activation of a JAOC or before initiating other military operations. These procedures include six phases, all subject to acceleration, combination, or omission, if circumstances warrant.⁷⁰ In phase one—situation development—national authorities receive reports about an event with possible national-security implications. Judge advocates for the JCS, geographic combatant commander in chief (CINC), and component levels of command begin to assess the legal issues that attend the change in circumstances and advise their commanders accord-

ingly. They also begin to review the deliberate plans, which may be executed in whole or part in response to the new operational environment. They join planners in considering viable courses of action in anticipation of a call to do so by the NCA. They also carefully review the rules of engagement to determine whether to request supplemental measures.

In phase two—crisis assessment—the CINC assesses the event and informs the NCA. While this takes place, judge advocates continue to counsel the planners, who are considering courses of action. If national leaders opt for military action, in phase three—courses-of-action development—the National Command Authorities publish a warning order and direct the CINC to develop multiple courses of action in response to the situation. Along with the courses of action, the CINC may include a commander's estimate of the situation, which usually contains a mission analysis and statement, a situation analysis, an evaluation of enemy and friendly courses of action, and operational objectives.⁷¹ If time permits, the CINC may issue a commander's evaluation request to subordinate and supporting commanders. They reply with a component's course-of-action-evaluation response message, which outlines the component's best guess on the time, in hours or days, required to execute each course of action and the planning factors used to make that estimate.

Judge advocates at the component level participate in course-of-action development to ensure that the military may execute each proposal without violating the Standing Rules of Engagement, the law, and international agreements. If the course of action requires supplemental rules of engagement, a judge advocate at either the component or CINC level should begin the effort to get those measures drafted and later approved by the NCA. After the NCA receives the CINC's courses of action, the CJCS may issue a planning order to begin execution planning even before formal selection of a course of action. After selection of a course of action in phase four—course of action selection—an alert order is issued, advising the CINC of the chosen course of action.⁷²



The "highway of death." Even lawful combat operations can endanger the potentially fragile nature of consensus for military action.

Although this may be possible to do beforehand—after issuing a planning or alert order—the judge advocates at the component, joint task force, and CINC levels should begin to consider targets for inclusion in a “no hit” or “restricted” target list. They must also advocate approval of supplemental measures to the rules of engagement necessary to execute a mission based upon the approved course of action.

In phase five—execution planning—the CINC transforms the NCA-selected course of action into an operation order, a lengthy document that explains the mission in detail. Most importantly, it explains our nation’s objectives, the role of military units in accomplishing these objectives, and the political or practical constraints for the mission. Furthermore, it sets out the “big picture”—that is, it explains the concept of operations, task assignments for subordinate units, and the functions of administration and logistics. It also gives pertinent information about command and control networks, electronic emissions,

and code words and names. Since joint operations also may have complex command relationships, the order explains them and designates alternate command posts. Separate appendices of the operation order set out the rules of engagement and specific guidance on legal matters. The CINC’s legal staff drafts these in consultation with CJCS attorneys and, when time permits, the components’ legal staffs as well, but the NCA remains the final approval authority for all rules of engagement.⁷³

The components may augment the CINC’s staff with liaison officers and convene their own battle staffs both to assist the CINC and begin their own planning to support the CINC. Judge advocates will become part of both the CINC’s and components’ battle staffs and will provide legal counsel on numerous legal issues, rules of engagement, and the Law of Armed Conflict. All the components’ legal staffs must alert the CINC’s legal staff to the issues they foresee arising from an operation. Similarly, in legal discussions with superiors,

the judge advocates who advise commanders of air forces must advocate an airman's view of operations. They should ensure, for example, that commanders fashion rules governing identification of aircraft beyond "visual" range, penetration of neutral airspace, and ways to respond when aircraft display a "lame duck" profile indicating a willingness to surrender.

Role of the Judge Advocate in Air Operations Planning

The numbered air force is the senior war-fighting echelon of the US Air Force.⁷⁴ If time and circumstances permit, when a CINC begins crisis action planning, liaison officers from the supporting numbered air force join the CINC's staff.⁷⁵ A judge advocate from the numbered air force may join the liaison team to ensure that legal aspects of the air portion of the operation receive a legal "scrub" as quickly as possible. The CINC may establish a joint task force whose commander⁷⁶ integrates the actions of assigned, attached, and supporting forces into a unified campaign. In order to avoid duplication of effort, the joint force commander synchronizes the actions of assigned, attached, and supporting capabilities/forces in time, space, and purpose.⁷⁷ When air missions require special supervision, the joint force commander may appoint a JFACC, whose responsibilities include planning, coordinating, allocating, and tasking joint air operations based upon the joint force commander's decisions about how to apportion air resources to a variety of competing missions.⁷⁸

The JFACC may come from any service. Normally, the joint force commander will assign JFACC responsibilities to the component commander having the preponderance of air assets and the capability to plan, task, and control joint air operations.⁷⁹ An Air Force JFACC for a large operation is likely to be the commander of a numbered air force. Therefore, a staff judge advocate from a numbered air force and his or her subordinates should

anticipate acting as legal counsel to a JFACC and his or her supporting JAOC. Even if a commander below the numbered-air-force level acts as the JFACC, the staff judge advocate from a numbered air force may advise or perhaps assign augmentees to the JFACC's legal team.

Role of the Judge Advocate in the Strategy and Combat Plans Divisions of a JAOC

Joint Pub 3-56.1 gives general guidance on the air operations planning process. After consulting with component liaisons and experts from several communities, such as special and information operations, planners examine the operational environment. They assess the available forces, rules of engagement, logistics, and intelligence.⁸⁰ In consultation with the CINC's legal staff and those of the other components, judge advocates in the JAOC advise the JFACC on legal implications of the unfolding situation. Judge advocates should also assist planners in evaluating legal issues raised by the operational environment. As planners consider the desired end state and identify objectives based upon guidance from the joint force commander, a judge advocate must evaluate these in view of the rules of engagement and NCA guidance relayed in orders from higher headquarters. A rules of engagement cell exists within the Operations Division (Strategy Division in the Air Force) to determine whether to request supplemental rules of engagement, and a judge advocate serves as an essential member of the team.⁸¹ In addition, judge advocates begin to assess the legal issues that could arise as a result of the operations. They also set up special training programs or briefings to familiarize the JFACC and JAOC staffs with the rules of engagement and the application of the Law of Armed Conflict to each phase and aspect of the operation.

After the choosing of objectives, planners develop a phased strategy to achieve them by exploiting joint aerospace capabilities. The

strategy depends, in part, upon identifying “centers of gravity”—characteristics, capabilities, or localities from which a military force, nation, or alliance derives its freedom of action, physical strength, or will to fight.⁸² The final product of the planning effort is the joint air-and-space operations plan, which integrates the joint air-and-space capabilities and forces in achieving the joint force commander’s objectives, identifies objectives and targets by priority order, accounts for current and potential adversary threats, brings about target development and analysis, and outlines the phasing of joint air operations.⁸³ The judge advocate assigned to the Strategy Division must ensure consonance of the strategy with domestic as well as international law, with a focus on the Law of Armed Conflict. He or she must always evaluate the rules of engagement for each phase of the strategy to ensure they bring about the NCA’s and joint-task-force commander’s objectives and desired end state, while complying with the law. For example, the rules on identification of aircraft beyond visual range become much more restrictive during peacetime, when the threat to military aircraft is lower, than during combat, when the threat is high.

Judge advocates, however, need not restrict themselves only to discussing legal matters. They should bring to the planning effort the judgment of a military officer and the generic strategic and tactical skills of an experienced lawyer. Trained to think logically and to develop alternative methods of achieving goals within the boundaries of the law, attorneys have skills coveted by war planners. Judge advocates should not hesitate to offer opinions on matters outside the law to both the JFACC and his or her planners. In addition, judge advocates are adept at interpreting and drafting language to concisely communicate important ideas; therefore, they may become writers or briefers for important documents, such as demarches and presentations, especially when they involve the media.

The air-and-space operations plan remains the “big picture” but needs further refinement to determine specific targets and air

missions. Many airmen use the terms *battle rhythm* or *air-tasking-order cycle* to refer to the schedule and timing of events that bring about near-term operations. The process begins when the joint force commander consults with component commanders to prepare for operations or assess the results of previous efforts. The joint force commander sets priorities and considers recommendations put forward by the components. Just as importantly, the joint force commander makes an “apportionment” or determination and assignment of the total expected effort by percentage and/or priority that the various air operations and/or geographic areas should receive for a given period of time.⁸⁴ A joint guidance-and-apportionment team meets to develop a recommendation on apportionment for the joint force commander. A judge advocate attends this meeting to lend both legal and general military expertise. Similarly, a judge advocate also attends the briefing that presents the recommendation to the JFACC and joint force commander. The latter’s final apportionment may require adjustments in the rules of engagement or attention to new legal issues.

After the joint force commander makes the apportionment decision, planners turn their focus to target development. The joint force commander may designate either a commander or staff officer to lead a joint target-control board,⁸⁵ which reviews target information, develops targeting guidance and priorities, and maintains a list of restricted targets and areas where special operations forces are operating.⁸⁶ Since military forces cannot strike all targets at once, it becomes necessary to prioritize them in a joint, integrated, prioritized target list. The joint force commander’s apportionment, applied to this list, determines the percentage of various targets to attack in a given air-tasking-order cycle.⁸⁷ Weaponers then enter the process and help determine which weapon systems to use against the targets. The weapons chosen should permit the application of necessary combat power to ensure victory against combatants, but they must also limit disproportionate collateral damage.⁸⁸ Judge advocates

must become part of this process to ensure that weaponeers comply with the Law of Armed Conflict. To do so, they must closely scrutinize the information contained in "target folders" or databases maintained by intelligence personnel.

The final weaponeered target list becomes the basis for the master air attack plan.⁸⁹ Judge advocates attend meetings in which the joint, integrated, prioritized target list and master air attack plan are developed, and the latter is presented to the JFACC for approval. Once again, judge advocates focus on compliance with rules of engagement, the Law of Armed Conflict, and consistency with guidance from higher headquarters. After targets become prioritized and weaponeered, data about all air missions is entered into the air tasking order—which may comprise a database of several hundred pages—that is transmitted electronically to most of its users. Air missions are set out in a matrix, but a narrative portion gives special instructions about a number of topics, including the rules of engagement. Judge advocates ensure that the rules of engagement section of the special instructions gives an accurate, plain-English explanation of the rules governing that air tasking order. They also give rules of engagement briefings to the JFACC and JAOC staffs, often with the help of others when the rules of engagement mention the technical capabilities of weapon systems. Since an air-tasking-order cycle may take several hours—perhaps even a few days—to complete, it is necessary to work multiple air tasking orders simultaneously to ensure that each is ready when needed.⁹⁰ Joint Pub 3-56.1 illustrates this process with a "notional" 48-hour air-tasking-order cycle, but the cycle time may be modified to fit any tactical situation.⁹¹

Role of the Judge Advocate in the Combat Operations Division of a JAOC

The Combat Operations Division oversees the execution of air tasking orders. As air

forces attempt to carry out the taskings assigned in an air tasking order, the fog and friction of operations set in. Because aircraft break, targets change, and the weather inhibits operations, it is necessary to reweaponeer targets. Judge advocates must provide legal counsel to the Combat Operations Division to ensure that changes in the weapon systems used to attack a target will not violate the Law of Armed Conflict. In addition, information about alleged violations of this law, by either enemy or friendly forces, may reach the JAOC. The judge advocate must report this information to the JFACC and to the chain of command in accordance with Department of Defense and Air Force instructions.⁹² Myriad other legal issues arise, many of them anticipated during the planning phase of the operation. But some issues will be novel. Because the JAOC staff may not recognize a serious legal problem, the judge advocate must stay attuned to the ebb and flow of events in all the divisions and teams of the JAOC to report and deal with legal issues as quickly as necessary.

One of the most important areas of the Combat Operations Division is the time critical target cell. The enemy responds to our operations and presents opportunities and challenges in the form of targets not apparent before. To respond to these, Twelfth Air Force, for example, added to its Combat Operations Division a time critical target cell, a multidisciplinary group that compiles and evaluates a great deal of information very quickly and offers the JFACC options in responding to evanescent targets. Team members include, at a minimum, the chiefs of the Offensive and Defensive Operations Branches; representatives from weather, intelligence, and special operations; fighter duty officers; and liaison officers from each of the services.⁹³ A judge advocate assigned to the cell participates as the other members consider the target location, intelligence, enemy defensive measures, risk to friendly forces, weapons options, weather, likelihood of disproportionate collateral damage, and other factors. The judge advocate applies rules of engagement and the Law of Armed Conflict (and a lot of common

sense) while assisting the officer leading the time critical target cell in evaluating the lawfulness of each of the options considered for recommendation to the JFACC.

The advice of a judge advocate can prove indispensable for many other JAOC activities—for example, the information operations team. Some information operations (even those simulated during exercises) involve special technical operations and Air Force special programs that require a very high-level security clearance that some judge advocates may not possess. Nevertheless, judge advocates must offer advice, especially on rules of engagement, the Law of Armed Conflict, restricted target lists, and other matters as their access to information allows. When their access is restricted, they must report this fact to higher headquarters so that superior officers will ensure that attorneys with the appropriate security clearance conduct a legal review.

Conclusion

Although current command-and-control doctrine had its foundations in World War II, today's JAOC traces its lineage to the tactical air control centers used during the Vietnam War. Judge advocates assigned to units in Vietnam were not involved in operations, but the case of 1st Lt William L. Calley and the publication of the Peacetime Rules of Engagement highlighted the necessity of ensuring compliance with the Law of Armed Conflict and the rules of engagement. Lawyers were well suited to carry out both

tasks. Consequently, Twelfth Air Force's judge advocates became very involved in the planning and execution of Operation Just Cause in 1989. Their experience helped prepare Air Force judge advocates who later served during Operations Desert Shield and Desert Storm. Commanders who led American forces during Desert Shield and Desert Storm were well aware of the alleged violations of the Law of Armed Conflict and rules of engagement during the Vietnam War and vowed not to let such misconduct recur. The judge advocates' aggressiveness in ensuring compliance with the law and rules of engagement pleased the commanders.

Now, more than ever, military leaders recognize the importance of operations law and seek the analytical perspective offered by judge advocates. Today, in an effort to further refine the concept of the air and space expeditionary task force, the Air Force is experimenting with "distributed" or "split" operations in which technology, such as video teleconferencing, may make the collocation of all the divisions or teams of a JAOC unnecessary. But split operations will do little to alter the judge advocate's fundamental responsibilities. It is not enough that a judge advocate has mastered an operation order, the Law of Armed Conflict, and the Standing Rules of Engagement. It is equally important that the operations law practitioner learn the details of crisis action planning, strategy development, and air operations planning and execution, as well as become very familiar with the JAOC's processes, procedures, and technology. □

Notes

1. Air Force Doctrine Document (AFDD) 1, *Air Force Basic Doctrine*, 27 September 1997, 23.

2. If a JFACC is not designated, forces are controlled by the joint force commander's staff. See Joint Pub 3-56.1, *Command and Control for Joint Air Operations*, 14 November 1994, v.

3. *Ibid.*, vii.

4. *Ibid.*, II-6.

5. *Ibid.*

6. Joint Pub 3-0, *Doctrine for Joint Operations*, 1 February 1995, III-28.

7. Air Force Manual (AFM) 1-1, *Basic Aerospace Doctrine of the United States Air Force*, vol. 2, March 1992, 113-14.

8. *Ibid.*; and Max Hastings, *Overlord: D-Day and the Battle for Normandy, 1944* (New York City: Simon and Schuster, 1984), 271.

9. According to Field Manual (FM) 100-20, *Command and Control of Air Power*, 1943, "Control of available air power must be centralized and command must be exercised through the Air Force commander if [its] inherent flexibility and ability to deliver a decisive blow are to be fully exploited." See also AFDD 2, "Organization and Employment of Aerospace Power," draft, June 1998, 39.

10. Kent R. Greenfield, *American Strategy in World War II: A Reconsideration* (Malabar, Fla.: Kreiger Publishing Company, 1963), 97-98.

11. AFM 1-1, 114; for an explanation of centralized control of tactical air units of the Northwest African Air Tactical Air Force by Air Marshal Sir Arthur Coningham, see George F. Howe, *Northwest Africa: Seizing the Initiative in the West*, United States Army in World War II (Washington, D.C.: Office of the Chief of Military History, Department of the Army, 1957), 493.
12. AFM 1-1, 114.
13. Maj Gen George S. Eckhardt, *Command and Control, 1950-1969*, Vietnam Studies (Washington, D.C.: Department of the Army, 1974), 38; and Lt Col J. Taylor Sink, *Rethinking the Air Operations Center: Air Force Command and Control in Conventional War* (Maxwell AFB, Ala.: Air University, September 1994), 18.
14. Sink, 18-19.
15. Henry Kissinger, *White House Years* (London: Wiedenfeld and Nicolson and Michael Joseph, 1979), 1112. Secretary Kissinger observed that as soon as aircraft left targets in Route Package One, Gen Creighton Abrams had no further control over them. He could not tell whether the air campaign in the north was easing pressures on forces in the south or diverting resources.
16. Col Michael R. Emerson, interviewed by author, 26 February 1998.
17. Col Richard F. Rothenburg, interviewed by author, 25 February 1998.
18. Col Philip J. Williamson, USAF, Retired, interviewed by author, 15 July 1998.
19. Brig Gen Gordon Ginsburg, USAF, Retired, interviewed by author, 26 February 1998.
20. Maj Gen Walter Reed, USAF, Retired, interviewed by author, 21 February 1998 and 15 July 1998.
21. Col Donald Brewer, USAF, Retired, interviewed by author, 3 March 1998. In 1972 Colonel Brewer served as the deputy staff judge advocate of Headquarters Seventh Air Force. He was later detailed to assist General Lavelle during congressional hearings that investigated whether he violated the rules of engagement and asked subordinates to falsify reports. Colonel Brewer also served during World War II and the Korean War.
22. Ibid.
23. House, *Unauthorized Bombing of Military Targets in North Vietnam: Report of the Armed Services Investigating Subcommittee of the Committee on Armed Services*, 92d Cong., 2d sess., under the authority of House Resolution 201, 15 December 1972, 31. See also Mark S. Martins, "Rules of Engagement for Land Forces: A Matter of Training, Not Lawyering," *Military Law Review* 143 (1994): 35, which discusses the development of air rules of engagement.
24. Maj Lee E. DeRemer, "Leadership between a Rock and a Hard Place," *Airpower Journal* 10, no. 3 (Fall 1996): 87.
25. Ibid., 4-7; and Senate, *Nomination of John D. Lavelle, General Creighton W. Abrams, and Admiral John S. McCain, Hearings before the Committee on Armed Services, United States Senate, on John D. Lavelle for Appointment as Lieutenant General on Retired List of U. S. Air Force and Matters Relating to Authority for Certain Bombing Missions in North Vietnam between November 1971 and March 1972*, 92d Cong., 2d sess., 11-15, 18, 21, and 28 September 1972, 95-99.
26. Harry G. Summers Jr., *Vietnam War Almanac* (New York City: Facts on File, 1985), 227.
27. House, *Unauthorized Bombing*, 9.
28. W. Hays Parks, "Righting the Rules of Engagement," US Naval Institute *Proceedings*, May 1989, 84.
29. Ibid.
30. Ibid.
31. Ibid., 84-85.
32. Joint Pub 3-0, II-28.
33. *United States v. Calley*, 22 US Court of Military Appeals 534 (1973).
34. Lt Col David Tillotson III, *Restructuring the Air Operations Center: A Defense of Orthodoxy* (Maxwell AFB, Ala.: Air University Press, 1993), 47-48.
35. Ronald H. Cole, *Operation Just Cause: The Planning and Execution of Joint Operations in Panama, February 1988-January 1990* (Washington, D.C.: Joint History Office, Office of the Chairman of the Joint Chiefs of Staff, 1995), 27-29.
36. Ibid., 17.
37. Ibid., 2.
38. COMUSSOUTHAF After Action Report: Operation Just Cause, 20 December 1989-8 January 1990, n.d.
39. Ibid., 33.
40. Ibid.
41. Ibid., 35.
42. Ibid., 38.
43. Brig Gen William A. Moorman, interviewed by author, 28 May 1998 and 5 June 1998.
44. Ibid.
45. Ibid.
46. Ibid.
47. Ibid.
48. Randy Witt, ed., *Air Force Tactical Communications in War: The Desert Storm/Desert Shield Comm Story* (Riyadh, Saudi Arabia: Headquarters US Central Command Air Forces, March 1991), 2.
49. Col Dennis E. Kansala, interviewed by author, 23 February 1998. Colonel Kansala served as the Ninth Air Force staff judge advocate during Desert Shield/Desert Storm.
50. Ibid.; see also Harry L. Heintzelman IV and Edmund S. Bloom, "A Planning Primer: How to Provide Effective Legal Input into the War Planning and Combat Execution Process," *Air Force Law Review* 37 (1994): 5; and Col Edward C. Mann III, *Thunder and Lightning: Desert Storm and the Airpower Debates* (Maxwell AFB, Ala.: Air University Press, 1995), 74-81 (for an explanation of the role of the Black Hole planners).
51. Kansala interview.
52. Steven Keeva, "Lawyers in the War Room," *ABA [American Bar Association] Journal*, December 1991, 59.
53. Headquarters USAF/XO and JA, letter, subject: Operations Law, 11 December 1991.
54. Anthony C. Zinni, "The SJA in Future Operations," *Marine Corps Gazette*, February 1996, 17.
55. Sink, 20.
56. Tillotson, 20; and Thomas A. Keaney and Eliot A. Cohen, *Gulf War Air Power Survey Summary Report* (Washington, D.C.: Government Printing Office, 1993), 147.
57. Tillotson, 20-21.
58. Col Maris J. "Buster" McCrabb, USAF, Retired, interviewed by author, March 1998. Colonel McCrabb was one of the several drafters of Joint Pub 3-56.1. He also led the planning effort for Joint Task Force Proven Force as it designed air operations for the northern portion of Iraq during Desert Storm from 2 January 1991 to 16 March 1991.
59. Joint Pub 3-56.1, viii.
60. AFDD 2, 58.
61. Joint Pub 3-56.1, II-7.
62. Ibid.
63. AFDD 2, 58-59.
64. Ibid., 61.
65. Sink, 27-29; see Tillotson, 30, for commentary arguing that the basic structure of the air operations center is sound.
66. The office of primary responsibility for this document is Headquarters Air Combat Command/DRAW, Langley AFB, Va. 23665-2777. See pages 14 and 25-26.
67. AFDD 2, 58-59.
68. Air Force Instruction (AFI) 13-1AOC, "Operational Procedures—Air Operations Center," draft, vol. 3, June 1998, par. 9.6.
69. Joint Pub 5-03.1, *Joint Operation Planning and Execution System*, vol. 1, 4 August 1993, V-1.
70. Ibid., V-2 and III-12.
71. Joint Pub 3-0, appendix B.
72. Joint Pub 5-03.1, V-8.

73. CJCSI 3121.01, *Standing Rules of Engagement*, 1 October 1994, 1.
74. AFDD 1, 67.
75. Joint Pub 3-0, II-17.
76. *Ibid.*, II-13.
77. Joint Pub 3-56.1, v.
78. *Ibid.*, vii.
79. *Ibid.*, II-2.
80. *Ibid.*, III-4.
81. AFI 13-1AOC, par. 5.3.9.
82. *Ibid.*, III-5.
83. *Ibid.*, III-6, 7.
84. Joint Pub 3-56.1, IV-7.
85. Joint Pub 3-0, III-26.

86. *Ibid.*
87. Joint Pub 3-56.1, V-7, 8.
88. Joint Pub 3-0, III-28.
89. *Ibid.*, IV-7, 8.
90. *Ibid.*, IV-5.
91. *Ibid.*, figs. IV-4 and IV-5.
92. Department of Defense Directive (DODD) 5100.77, *DOD Law of War Program*, 5 November 1974; and AFI 51-401, *Training and Reporting to Ensure Compliance with the Law of Armed Conflict*, 19 July 1994.
93. Twelfth Air Force, Air Force Forces, Air Operations Center Standing Operating Procedures, 173; Office of Primary Responsibility: Headquarters Twelfth Air Force/DOY1, 5340 East Gifford Way, Suite 223, Davis-Monthan AFB, Ariz. 85707-4224.



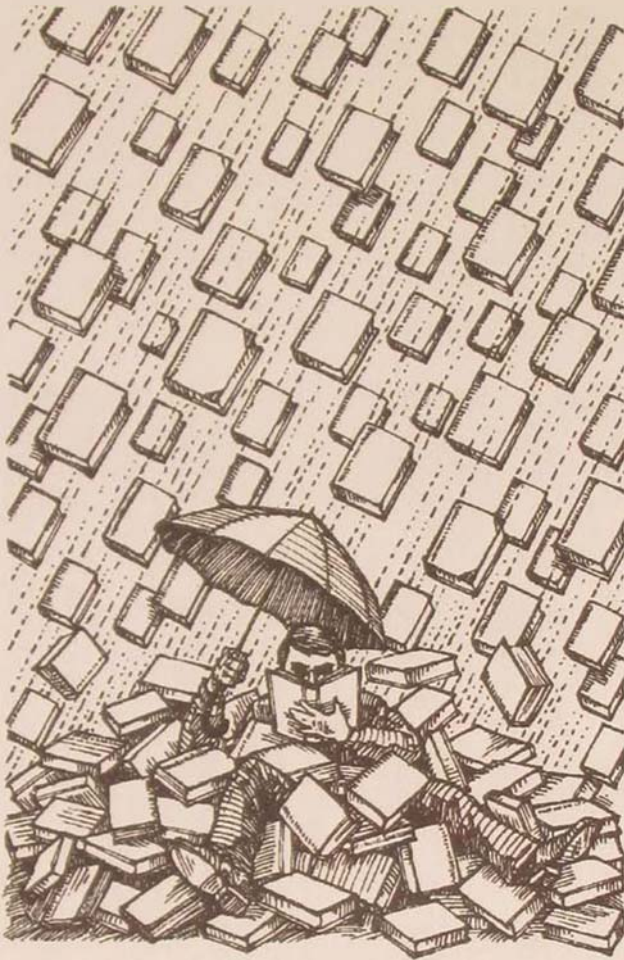
Aerospace Power Course

Air University's College of Aerospace Doctrine, Research, and Education (CADRE) has recently developed a new distance-learning course called the *Aerospace Power Course*. The course was developed as a result of a tasking from the Fall '96 Corona meeting and is intended to better prepare Air Force officers for joint duty by providing them knowledge of aerospace power theory, doctrine, and employment. Progressing through the history of airpower, lessons learned from past applications, and discussions of how aerospace power contributes to attaining national security and theater objectives, the student is exposed to many of the aerospace power doctrinal tools necessary to effectively perform joint-staff duties. The *Aerospace Power Course* is designed to better prepare Air Force officers to articulate and advocate aerospace power principles and beliefs in the joint arena.

The *Aerospace Power Course* is a self-paced, interactive course that uses a variety of distance-learning media. The 11 separate blocks of instruction help students develop a broader comprehension of aerospace-power principles, concepts, and applications through hybrid compact disk (CD) courseware, readings, and Internet connectivity.

The course will be available for distribution to students in the spring of 1999 and will be automatically mailed to all Air Force officers in the grades of O-3 through O-5 who have been selected for joint-duty assignments. Additionally, a limited number of copies of the course will be available to other interested officers on a first-come, first-served basis.

For more information, visit the *Air Chronicles* web site at www.airpower.maxwell.af.mil or call Mr. Barry Fulbright at DSN 493-2630 or commercial (334) 953-2630.



The Mystique of Airpower

The Airpower Professional's Book Club

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

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

—Milton Mayer

IN THE WINTER 1998 issue of *Airpower Journal*, we introduced the Airpower Professional's Book Club. We've had an encouraging response so far and hope to keep hearing from you, our readers. Although it's too early to publish our top-10 list, in this update we identify some of the titles that you have suggested. Perhaps this will help those of you who are still thinking about your own lists.

- *The Air Campaign: Planning for Combat* by John A. Warden III.
- *Air Power: A Centennial Appraisal* by Air Vice Marshal Tony Mason.
- *All Quiet on the Western Front* by Erich Maria Remarque.

- *Breaking the Phalanx: A New Design for Landpower in the 21st Century* by Douglas A. Macgregor.
- *Catch-22* by Joseph Heller.
- *The Command of the Air* by Giulio Douhet.
- *For the Common Defense: A Military History of the United States of America* by Allan Millett and Peter Maslowski.
- *The First and the Last: The Rise and Fall of the German Fighter Forces, 1938-1945* by Gen Adolf Galland.
- *The Future of War: Power, Technology, and American World Dominance in the 21st Century* by George Friedman and Meredith Friedman.

- *General Kenney Reports: A Personal History of the Pacific War* by Gen George C. Kenney.
- *The Generals' War: The Inside Story of the Conflict in the Gulf* by Michael Gordon and Bernard Trainor.
- *The German Air War in Russia* by Richard Muller.
- *Going Downtown: The War against Hanoi and Washington* by Col Jack Broughton.
- *Green Light! A Troop Carrier Squadron's War from Normandy to the Rhine* by Dr. Martin Wolfe.
- *Heart of the Storm: The Genesis of the Air Campaign against Iraq* by Col Richard Reynolds.
- *The Icarus Syndrome: The Role of Air Power in the Evolution and Fate of the U.S. Air Force* by Carl H. Builder.
- *Ideas, Concepts, Doctrine: A History of Basic Thinking in the United States Air Force, 1907-1964* by Robert Frank Futrell.
- *The Impact of Air Power, National Security and World Politics* edited by Eugene M. Emme.
- *The Influence of Sea Power upon History, 1660-1783* by Alfred T. Mahan.
- *The Long March* by William Styron.
- *The Luftwaffe: Creating the Operational Air War, 1918-1940* by James S. Corum.
- *Makers of Modern Strategy: From Machiavelli to the Nuclear Age* edited by Peter Paret and Gordon Craig.
- *The Masks of War: American Military Styles in Strategy and Analysis* by Carl H. Builder.
- *Men at War: The Best War Stories of All Time* edited by Ernest Hemingway.
- *No Margin for Error: The Making of the Israeli Air Force* by Ehud Yonay.
- *The Painted Bird* by Jerzy Kosinski.
- *The Paths of Heaven: The Evolution of Airpower Theory* edited by Col Phillip S. Meilinger.
- *Revolution in Warfare? Air Power in the Persian Gulf* by Thomas A. Keaney and Eliot A. Cohen.
- *1794: America, Its Army, and the Birth of the Nation* by Dave R. Palmer.
- *Soldier and the State: The Theory and Politics of Civil-Military Relations* by Samuel P. Huntington.
- *On Strategy: A Critical Analysis of the Vietnam War* by Harry Summers.
- *Strategy in the Missile Age* by Bernard Brodie.
- *Strike from the Sky: The History of Battlefield Air Attack, 1911-1945* by Richard P. Hallion.
- *Thor's Legions: Weather Support to the U.S. Air Force and Army, 1937-1987* by John F. Fuller.
- *The U.S. Air Service in the Great War, 1917-1919* by James J. Cooke.
- *Victory through Air Power* by Alexander P. de Seversky.
- *On War* by Carl von Clausewitz.
- *Winged Victory* by Victor M. Yeates.

Remember to send your list by E-mail to editor@cadre.maxwell.af.mil or mail it to *Airpower Journal*, Attn: Book Club, 401 Chennault Circle, Maxwell AFB AL 36112-6428.

Although we don't yet have the consolidated list, it will be out soon. For those of you with Internet connections, keep your eye on the *Air Chronicles* home page (<http://www.airpower.maxwell.af.mil>). We'll publish it there first.

If you missed our announcement in the Winter issue and wonder what is going on, *APJ* has inaugurated a new, continuing section—the Airpower Professional's Book Club.

In addition to soliciting titles from the "names" in the airpower arena, we also invited *APJ* readers to submit their own lists of the top-10 books for the airpower professional. Based on the lists we receive, we will develop our own. We hope you will read these books and E-mail (or write) a paragraph or two describing what you thought of the book, its permanence, its importance, and its overall value in the development of an airpower professional. We will publish all appropriate submissions in a section of *Air Chronicles* and will print selected responses in *Airpower Journal*.

To stimulate discussion both on-line and in the quarterly editions, we suggest that as you read one of these books, jot down ideas or comments that come to mind. After reading it, reflect on the central theme or subject and determine how the overall content of the work relates to that theme. Also reflect on any critical observations that you can make about the book. Again, write down your ideas as they occur to you. Then let the project lie fallow in your mind. After several days, peruse the book once again and draft your comments. Use your own words as much as possible. If you choose to quote from the book you are critiquing, do so sparingly. Lay aside your first draft for two or three days and then revise it for proper English and clarity.

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

1. *What is the book about?* This question leads to other questions. Does the book have a central theme? Does it argue a thesis? What is the author's purpose? (The latter may be stated explicitly in the preface or conclusion, or it may be implied within the book itself.) Did the author achieve that purpose? Early on, try to summarize the theme, thesis, or subject in a sentence or two. Strenuously resist any temptation to describe the full contents of the book; as noted

above, your critical *analysis* of the book is what really counts.

2. *Is the book reliable?* The first question to ask about a work of nonfiction is, Is it true? Again, this question prompts other questions:
 - a. *Who is the author?* What are his or her qualifications for writing a book on this particular subject? Has the author written other books? If so, are those other works about a related subject?
 - b. *Where did the author obtain information for the book?* Is the book based on the author's personal observations of events? Is it based on primary sources—letters, diaries, speeches, manuscripts, and archival records—that were contemporary or nearly contemporary with the period or subject about which the author is writing? Or is the book based on secondary sources—that is, on works written after the time of the event using the primary sources? As a related matter, be sure to include some mention of how the author identifies the sources upon which the book is based—by a bibliography, by notes, in the preface or introduction, or simply by casual references within the text.
 - c. *Are the sources reliable?* If the book is based on primary materials, are those materials credible? If based on secondary authorities, are those accounts reputable? Briefly but precisely identify some representative examples of the sources employed.
 - d. *Does the author use evidence with care and discrimination?* Does the author read into the evidence ideas or facts that are not there? Is the author fair to all parties, or is he or she swayed by bias or prejudice? Cite specific examples of bias or prejudice or of fairness. Also consider the following questions: Are the facts correct? Do you consider the interpretations valid? Is the thesis well supported by

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

3. *Is the material well presented?* Is the book understandable? Are the contents well organized? Does the author introduce the subject in clear and simple terms, or does he or she presuppose the reader possesses general knowledge of the subject?
4. *Does the book make a contribution to the field?* What, if anything, did the book

contribute to your knowledge and understanding of the subject? Would you recommend the book to someone else? Explain why or why not.¹

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

Note

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

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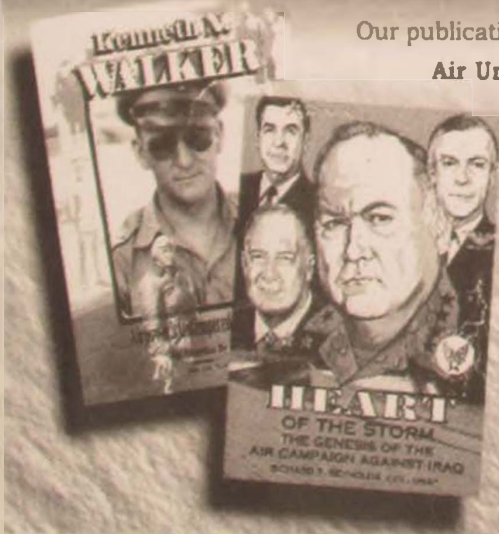
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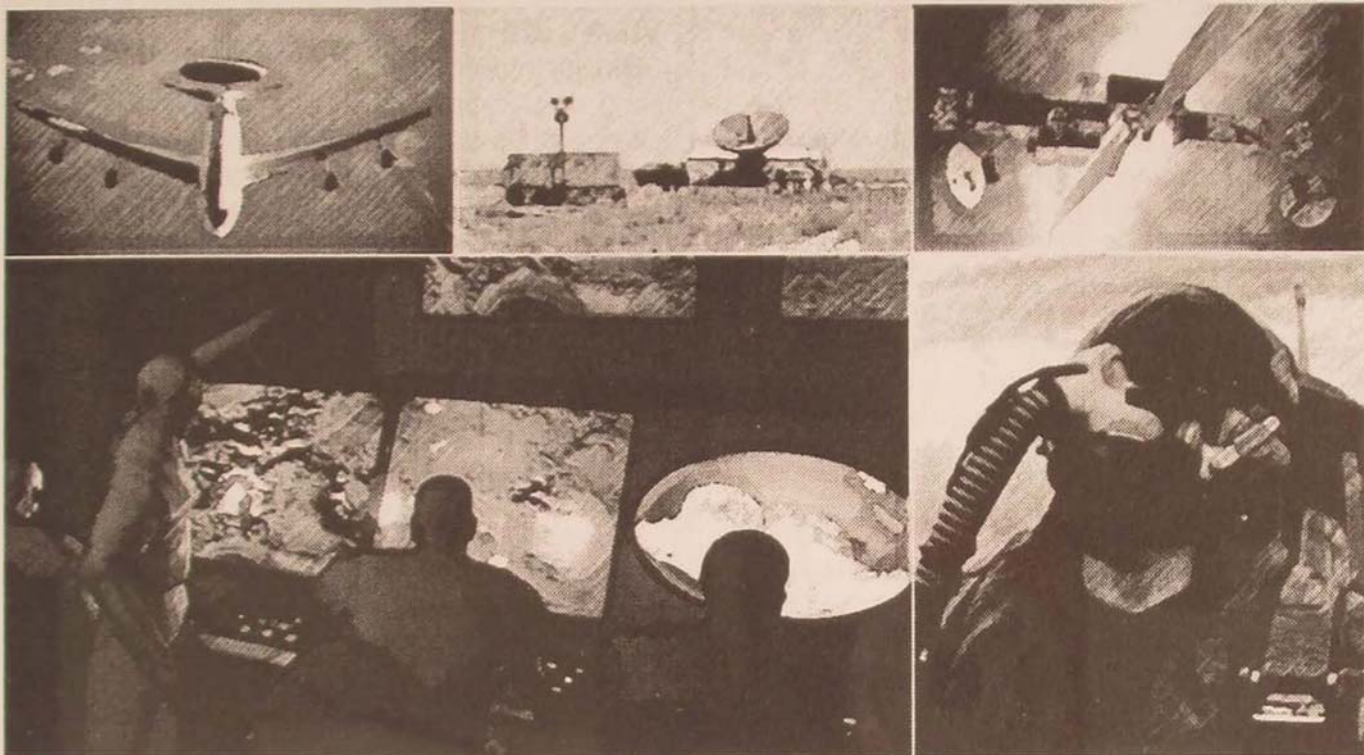
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C^{nth}I^{nth}xyz, TACS, and Air Battle Management

The Search for Operational Doctrine

LT COL JAMES M. LIEPMAN JR., USAF



"WHAT DO YOU DO?" That rather innocent question from a fellow student at Air War College was the genesis of this paper. Instead of a simple, direct answer like "I drive ships" or "I fly planes," my long, rambling response included "equipment" like radar, radios, computers, and scopes; "planes and places" including ABCCC (airborne command and control center), AWACS (airborne warning and control system), JSTARS (joint surveillance, target attack radar system), and CRC (control and reporting centers); and "tasks" such as weapons control, surveillance, identification, weapons assignment, and battle direction.¹

He responded, "Sounds like you're in C²" (command and control).

My answers did sound a lot like "C²"; yet the Air Force recently changed my "command and control operations" career field to "air battle management." The obvious answer to my classmate's question—"I manage the air battle"—simply raises more questions. What does it mean to "manage" an air battle?² Does air battle management describe a product, a process, an organizational structure, some combination of each, or something entirely different? I should have been able to answer these questions with some precision, but I

couldn't. As the prospective commander of the "schoolhouse" that trains air battle managers, I had the harrowing thought that some second lieutenant might, with all sincerity, ask me, "I still don't understand, sir. What do we do?"

At the tactical level, my answer was straightforward—largely junior officer tasks. However, most air battle managers support the joint force air component commander (JFACC) at the operational level of air warfare, where things can be much more murky. Air battle managers work at the interface of the tactical and operational levels of war where the JFACC's intent is translated through tactical action into results that achieve the joint force commander's (JFC) objectives. My search for a coherent answer begins with understanding what occurs inside the box in figure 1:

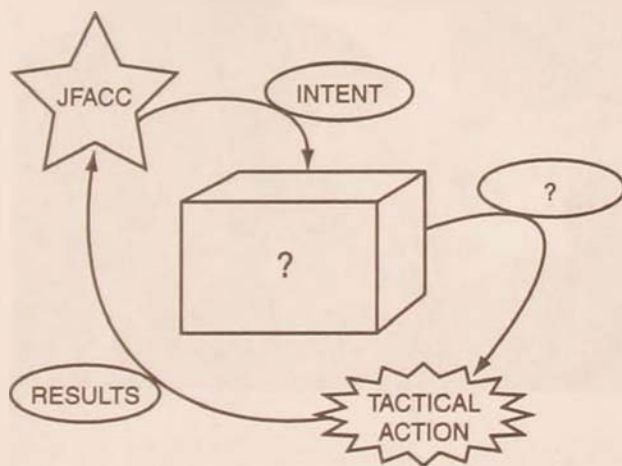


Figure 1. The Link between Intent and Results

Doctrine at the Operational Level of Air Warfare

Operational doctrine should, but does not, clarify what occurs in this box. The area be-

tween the JFACC's intent and tactical results is, unfortunately, confusing—even for supposed experts. Past doctrinal explanations began and ended with the traditional air "missions and roles."³ The operational level of air warfare, however, includes more than the combat operations functions of counterair, interdiction, close air support, and strategic attack.⁴

These critical functions, executed at the tactical level, are actually operational-level "outputs" designed to achieve the "inputs" of the JFC's objectives and the JFACC's intent. Viewed as the enabling link between the intent input and the results output, the operational level of air warfare can best be understood as a system. Several "systems" vie to explain this translation of strategic objectives and operational intent into air warfare results. The principal candidates are C²; theater battle management; the theater air control system (TACS); and command, control, communications, computers, intelligence, surveillance, and reconnaissance (C⁴ISR).⁵ Often used interchangeably, each has both overlapping and unique elements, yet each provides only a partial conceptual explanation.

Air Force operational doctrine should sort out this conceptual confusion and end the proliferation of new explanatory constructs, thereby fostering a shared understanding of the operational level of air warfare—both within the Air Force and in the joint community. That understanding will only come from a coherent framework for operational doctrine—a model for thinking about the box in figure 1.

Operational doctrine is the Air Force's intellectual entree to the joint force. Doctrine provides both the definitional context and operational framework within which future joint force commanders and their staffs will plan to employ the US Air Force in future theater contingencies. As Air Force manning shrinks, organizations disappear, operational requirements expand, and every airman and, nearly as important, the joint community must have a common comprehension of how we intend to operate, not only at the tactical

level but also at the operational level of war. Operational doctrine is the key to such understanding.

The JFACC's operational art is in translating the joint force commander's intent into tactical results that support the joint force's achievement of strategic and theater objectives. The JFACC achieves these results by orchestrating the "when, where, and for what purposes" he employs airpower.⁶ The box in figure 1 is the arena in which the JFACC conducts this orchestration and comprises the bulk of the operational level. A clear understanding of what occurs inside that box is vital to our search for air operational doctrine.

With this fuller understanding of the core function of operational-level airpower doctrine, the output of our box would consist of tasking and controlling the air effort. This omits the critical commander's estimate of the situation process and its result, the joint air operations plan. Also missing is an explanation that goes beyond the "JFACC's responsibilities" and explains the who and how of "C³I requirements," "tasking orders," and "control." This can and should be done in a comprehensive, understandable manner. However, it requires that operational doctrine go beyond the JFACC to the organizations and people who must accomplish these operational tasks and the systems in which and with which they work.

The conceptual confusion among the various system explanations of the box in figure 1 is the central challenge to the Air Force search for a coherent, unified, operational-level doctrine. We will focus on three candidate systems—C², the TACS, and C⁴ISR. These three systems are the most commonly used and have the analytical advantage of having joint approval of definitions. To begin to sort out this confusion, we should be able to compare and contrast the joint-approved definitions in Joint Publication 1-02, *Department of Defense Dictionary of Military and Associated Terms*, of our candidate systems and determine what is unique to each and where the overlap exists.⁷

command and control system—The facilities, equipment, communications, procedures, and personnel essential to a commander for planning, directing, and controlling operations of assigned forces pursuant to the missions assigned.

tactical air control system—The organization and equipment necessary to plan, direct, and control tactical air operations and to coordinate air operations with other Services. It is composed of control agencies and communications-electronics facilities which provide the means for centralized control and decentralized execution of missions. (The Air Force changed "tactical" to "theater" in 1992.)

command, control, communications, and computer systems—Integrated systems of doctrine, procedures, organizational structures, personnel, equipment, facilities, and communications designed to support a commander's exercise of command and control across the range of military operations.

Unfortunately, this approach does not solve our problem. All three definitions focus on the commander and include the same organizations, people, equipment, systems, and facilities. Both the TACS and C² have the purpose of planning, directing, and controlling operations. C⁴ and C² include procedures—also implicit in the TACS definition.⁸ Comparison of the three definitions indicates that they have very large areas of conceptual redundancy. Contrasting the three provides only the notions that the TACS is the Air Force's C² system (but with an emphasis on the "control" of operations) and that C⁴ systems are definitionally unique only in the addition of the idea of integrated systems that support commanders.

While this analysis does not provide many answers, it does illustrate why the three systems are so difficult to differentiate and why official documents often use them interchangeably. One reason we have created new

concepts such as C⁴ISR and battle management (BM)/C² is the unmet need for a unified system model of the operational level of war. We are left to approach our box from a nondefinitional perspective and attempt first to define a generic system that might fulfill our requirements for a coherent, unifying concept and then apply our existing C², TACS, and C⁴ISR explanations to this model.

A generic system⁹ model would, at a minimum, include (1) a *product*, the rationale for the system which relates system inputs and outputs; (2) a *process*, the tasks which must be accomplished to achieve the desired product; (3) an *internal structure*, the organizational

dynamic within which the system assigns responsibilities for the requisite process tasks; and (4) an *external support structure*, the architecture by which the system acquires necessary support from outside the system and connects and distributes these external capabilities within the system. Applying this generic system model to the operational level of air war may allow us to clarify the core rationale of our competing systems, discard the confusing areas of redundancy, and build a new model of the operational level (table 1).¹⁰ Such a unified model of the operational level would require us to complete the following:

Table 1

A Unified Model of the Operational Level

GENERIC CATEGORY	CATEGORY DESCRIPTION	MODEL CATEGORY	MODEL SYSTEM
<i>PRODUCT</i>	The rationale for the system, its output which relates its <i>function</i> to system inputs.	Function	?
<i>PROCESS</i>	The <i>tasks</i> which must be accomplished to achieve desired product.	Tasks	?
<i>INTERNAL STRUCTURE</i>	The <i>organizational</i> dynamic by which the system assigns responsibilities for the requisite process tasks.	Organization	?
<i>EXTERNAL SUPPORT STRUCTURE</i>	The <i>architecture</i> by which the system acquires necessary support from outside the system and connects and distributes these external capabilities within the system.	System Architecture	?

The Product: Airpower Functions

Both US Air Force basic and operational doctrine will, when released, undoubtedly adequately cover the combat operations air functions. They are well understood both within the Air Force and in the joint community. We can begin to rebuild our conceptual model of the operational level with this description of the product of air functions:

air functions—The operational level model products are the combat operations air functions of counterair, air interdiction, close air support, and strategic attack. These systems output tactical results achieve the system inputs of JFACC intent and JFC strategic objectives.

Having defined both system inputs and outputs for our model, we will now turn to the process, internal structure, and external support structure requirements posited in our generic model. As we consider the three candidate systems—C², TACS, and C⁴ISR—it may seem to the reader that all we have demonstrated is that we have three names for the same thing. However, the actual—versus definitionally derived—purposes underlying these concepts are as different as those of the counterair, interdiction, close air support, and strategic attack air tasks. These air tasks may seem the same at the tactical level. At that level, each task involves delivering ordnance from aircraft; but at the operational level, the distinctions are fundamental. Those distinctions are the differing contributions each makes to establishing the conditions necessary for meeting the JFC's objectives. Similarly, we must understand the distinctions among the C², TACS, and C⁴ISR systems and clearly differentiate them in our operational doctrine.

It would take an article at least as long as this one simply to sort out the meanings of all the acronyms associated with these three systems—or what they seem to mean because they are freely interchanged (and proliferated)

without precision, denying us the ability to speak clearly about the operational level of air warfare. We can, however, classify this system *mélange* into three distinct categories from our generic model—process “tasks,” an internal structure of “organizations,” and an external support structure provided through a “system architecture.”

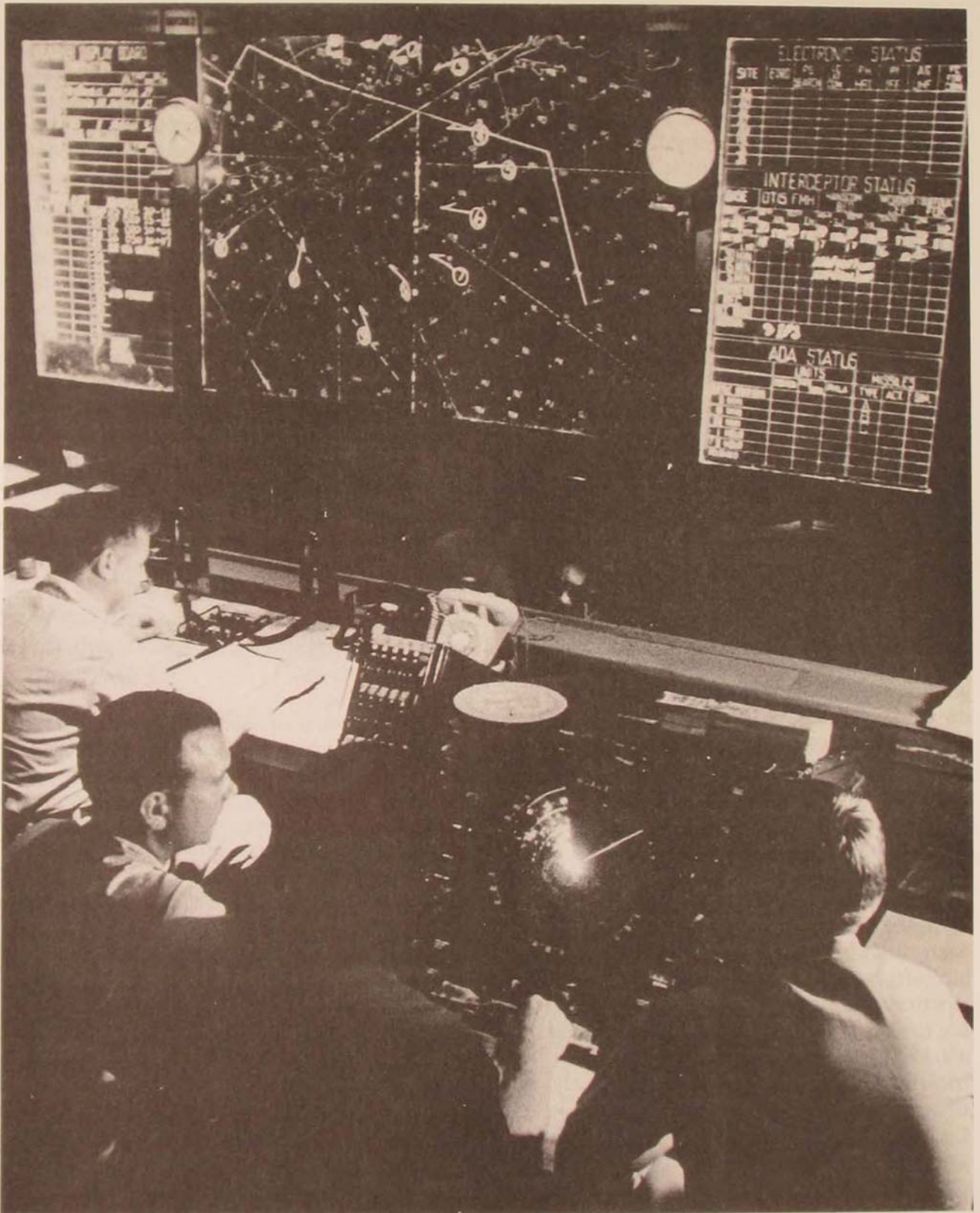
Due to their conceptual overlap and redundancy, neither C², TACS, nor C⁴ISR systems individually provides a comprehensive basis for operational thinking about the entire system entity through which the JFACC employs airpower. Yet, the description of each of these three systems has a distinct (though incomplete) place in our conceptualization of the operational level of war. We will now examine each separately, determine each system's core conceptual value to our quest, then attempt to reformulate them as a coherent whole using our model's categories of product, process, internal structure, and external support structure. This “best fit” approach will allow us to deconflict and reformulate the operational level into a single system. First, we will look at C².

command and control system—The facilities, equipment, communications, procedures, and personnel essential to a commander for planning, directing, and controlling operations of assigned forces pursuant to the missions assigned.

The Process: Command and Control System

Joint Pub 3-0 outlines four basic questions that operational art should resolve:

1. What military conditions must be created in order to realize the strategic objective?
2. What sequence of events must occur in order to create the required conditions?
3. How should forces and resources be used in order to make the sequence happen?



"Does air battle management describe a product, a process, an organizational structure, some combination of each, or something entirely different?"

4. What degree of risk is acceptable at each stage of the enterprise?¹¹

These questions describe the planning output we should expect from the "missing link" in figure 1. Operational planning guides¹² apply this process to air operations planning without reference to either C², the TACS, or C⁴ISR. While the relationship may be implied, it is essential that operational doctrine explicitly make that linkage and explain the process by which these four questions are answered in terms that all airmen and the joint audience can understand. The concept of a C² system provides this commonly understood and accepted conceptual framework.

The emphasized words in the joint definition of a command and control system demonstrate a common functional thread running through the definitions of all three systems. This thread simply and comprehensively explains the process that occurs within our box and provides a straightforward link to the products that are necessary for success. However, to be complete our model of the operational-level process must include all three tasks: planning, directing, and controlling of air functions in the execution of combat operations. Following are some preliminary attempts at definitions:

- **planning**—The planning task is executed through the Commander's Estimate of the Situation process and results in the development of the Joint Air Operations Plan.
- **directing**—The directing task is the translation of the JFACC's intent and concept of operations outlined in the Joint Air Operations Plan into an air tasking order (ATO). Directing is principally a sortie allocation, weaponeering, and targeting task, augmented by real-time changes made during the execution of the air function.
- **controlling**—The controlling task is the extension of the JFACC's authority over operations by monitoring,

restraining, and adapting ATO execution of air functions. Its operational purpose is to support and maintain centralized control of execution of the JFACC's planned and directed operational concept through situation awareness (SA) and authoritative real-time execution adjustment.

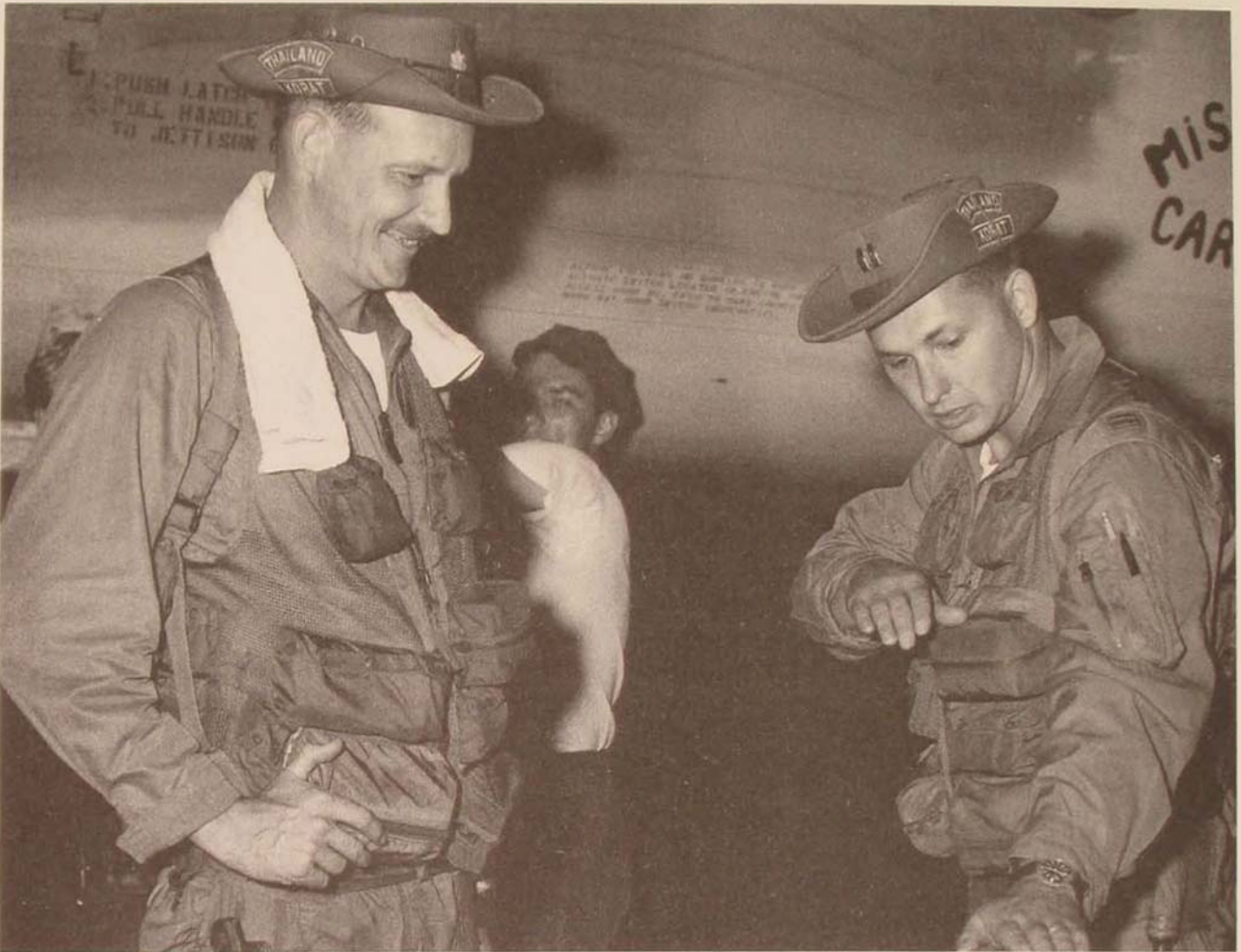
- **operations**—The combat operations air functions are the operational-level products of the planning, directing, and controlling tasks. This system output achieves the JFACC's intent as outlined in the Joint Air Operation Plan's concept of operations and directed by the ATO to achieve tactical results that achieve the JFC's operational objectives.

Incorporating these four descriptions in our conceptual model, the second piece of the model involves results:

tasks—The operational-level model process consists of the command and control tasks of planning, directing, and controlling combat operations. These tasks establish the conditions necessary for air function tactical results that achieve JFC objectives.

The personnel who accomplish the planning, directing, and controlling of combat operations air functions of the C² system are members of the theater air control system. This second, competing systems concept has existed since the World War II birth of radar.

theater air control system—The organization and equipment necessary to plan, direct, and control tactical air operations and to coordinate air operations with other Services. It is composed of control agencies and communications-electronics facilities which provide the means for centralized control and decentralized execution of missions.



The lure of the cockpit. "Only the Air Force's tactical doctrine seems to excite interest. Officers care about what goes into this document because it has a direct impact on how we fly and fight. Unfortunately, no comparable vehicle or level of interest exists at the operational level."

The Internal Structure: The Theater Air Control System

It has been nearly 55 years since a group of officers in the War Department, in response to the debacle of Kasserine and the perceived misuse of airpower, wrote Field Manual 100-20, *Command and Employment of Air Power*.¹³ This manual provided the starting point for understanding the theater air control system:

First Priority.—The primary aim of the tactical air force is to obtain and maintain air superiority in the theater. *The first prerequisite for the attainment of air supremacy is the establishment*

*of a fighter defense and offense, including radio direction finding (RDF), GCI, and other types of radar equipment essential for the detection of enemy aircraft and control of our own. (Emphasis added)*¹⁴

FM 100-20 originated the idea that essential to achieving air superiority is the "establishment of a fighter defense and offense," which depends on equipment capable of detection of the enemy and control of friendly aircraft. This description of equipment and personnel is the doctrinal birth of what we now call the theater air control system.

A great deal was written about the TACS during the 1970s and 1980s. However, the Air

Force has produced very little doctrine since then to explain how the TACS employs air at the operational level. Official publications, primarily the 55-4X series of regulations issued by Tactical Air Command, described in great detail the manning, equipment, responsibilities, and relationships of the many TACS elements. Unfortunately, more recent publications such as the 1992 version of basic doctrine and the *JFACC Primer* barely mention the TACS.¹⁵

Nevertheless, we are today doctrinally clear—on both service and joint levels—on the idea that the theater air control system extends the JFACC's authority throughout the theater of operations. The TACS has expanded to include not just the FM 100-20 capabilities to detect and control but also all the organizations that plan, direct, and control air operations. The core role of the theater air control system, then, is its organizational nature, which provides our model's internal structure.¹⁶

The operational tasks accomplished by the people in the organizations of the theater air control system include each of the command and control functions—planning, directing, and controlling combat operations functions—not just control. We might, then, tentatively define the internal structure of our operational model as follows:

organization—The operational-level model internal structure includes all units subordinate to the JFACC which extend his authority throughout the theater. The TACS, using capabilities provided by external support systems, performs the tasks of planning, directing, and controlling combat operations to achieve JFC objectives.

Multiple systems provide the capabilities in our organizational description. These systems, which exist independently of the TACS, nevertheless have the core purpose of providing the information support necessary to achieve the C² tasks. These systems must be conceptually and technically arranged in a "systems architecture."

The External Support Structure: C^{nth}I^{nth}XYZ

command, control, communications, and computer systems—Integrated systems of doctrine, procedures, organizational structures, personnel, equipment, facilities, and communications designed to support a commander's exercise of command and control across the range of military operations.

Originally, command, the function of authority and leadership on the battlefield, expanded to command and control to explain the process commanders used to exercise their authority and leadership throughout the expanding space of modern battlefields.¹⁷ Driven in part by the size and complexity of cold war force structures and the technical aspects of the emergence of electronics as a contributing factor in warfare, another large body of work grew during the 1970s and 1980s which explained this change by extending the C² concept to command, control, and communications (C³). This extension of C² to C³ was originally a scientific-engineering conceptualization.¹⁸

C³ attempted to explain how the burgeoning electronic systems support structure necessary to employ new technology would be integrated with current systems while achieving the necessary degree of interoperability and connectivity to allow the proliferating systems to share information. This gave rise to the concept of a systems architecture. The addition of "computers" (ergo C⁴) was in keeping with this systems-architecture approach; then came intelligence, integration, and interoperability. Depending on which source you consulted at the time, it appeared we should just call this "thing" C^{nth}I^{nth}XYZ (command, control, communications, computers, intelligence, surveillance, and reconnaissance).

C³, C⁴, C⁴I, C⁴ISR, and all the C² variants are fundamentally scientific representations of sets of electronic hardware and software interoperability and integration interactions—an architecture. This architecture

allows the scientist and engineer to make generalizations about that which they otherwise cannot generalize and, therefore, cannot use to explain other phenomena. This process is legitimate for the furtherance of science; it is problematic for warriors trying to survive in the most chaotic of environments—combat. None of these acronyms represents actual objects. They exist as aids to understanding—heuristics—not actual systems. Thus, they are inappropriate as a stand-alone doctrinal base upon which to build a clear understanding of operational-level airpower employment.¹⁹

This expanding conceptualization of systems supporting the air commander has now stabilized at C⁴ISR—command, control, communications, computers, intelligence, surveillance, and reconnaissance. There have been many efforts over the last decade to help US Air Force senior leaders “get their hands around” these conceptualizations. Strategy-to-task study groups, theater battle management general officer steering groups, the current C² task force, and the recent four-star C² summit, and its resultant Aerospace Command and Control Agency, are only a few of many such examples. This high-level emphasis indicates that Air Force leadership sees the potential benefit in these systems conceptualizations. It also indicates that they are unsure how to maximize that potential or fully integrate C⁴ISR in airpower employment.

Intelligence, surveillance, reconnaissance, and communications systems are conceptually different from command, control, or computers. Intelligence, surveillance, reconnaissance, and communications are distinct systems. Computers, while essential to each of the other elements, do not exist as a separate system. Control is a task, while command is an authority; neither is an independent system. Additionally, if we establish the criteria for such systems as technology-based system capabilities that support the air operation, and we include intelligence, surveillance, and reconnaissance, then why wouldn't we also include, at a minimum, logistics.²⁰ As information warfare tech-

nology develops as an independent system, it too will be a candidate to extend the initials of our C⁴ISR system. Perhaps the best solution is to discard the CⁿIⁿxyz approach and adopt this final piece of our conceptual model:

systems architecture—The operational-level model system architecture provides the connectivity, interoperability, and integration with the external support structure's technology-based capabilities required by the air functions, tasks and organizations.

What's the Solution? A New Model for Operational Doctrine

We began with a generic system model and developed its essential categories of product, process, internal structure, and external support structure. Applying these categories to the C², TACS, and C⁴ISR systems, we found that each makes a core contribution to our operational-level model's output—the airpower product of the combat operations air functions.

The C² tasks of planning, directing, and controlling combat operations fulfill our process category. The planning task results in the Joint Air and Space Operations Plan (JASOP). The JASOP is then translated into an air tasking order as the central product of the directing task. The controlling task produces the situation awareness necessary for successful combat operations that provide the tactical results necessary to achieve the JFACC's intent.

All of these process tasks are accomplished through the personnel of the theater air control system, which provides the internal structure for our operational-level model. This organization includes the air operations center (AOC), ground elements, and airborne elements. The AOC is the JFACC's headquarters and the personnel assigned to it largely accomplish the planning and directing tasks. The ground elements of the TACS consist of the control and reporting centers and smaller control and reporting elements (CRE) along with

tactical air control parties and air liaison officers, who provide the TACS linkage to US Army units through air support operations centers. Airborne elements of the TACS include AWACS, ABCCC, and JSTARS. Both ground and air elements execute the core controlling task, while supporting the planning and directing tasks.

The external support system capabilities necessary for these personnel to accomplish the operational-level tasks are provided by a systems architecture most commonly associated with the C⁴ISR systems. These independent supporting systems provide the capabilities that the operational model's system architecture ties to the TACS or-

ganizations through interoperability, connectivity, and integration capabilities (table 2).

We have redefined the requirements for achieving the JFACC's intent through a model of air functions (product), tasks (process), organization (internal structure), and systems architecture (external support structure). This model of the operational level of air warfare enables the combat operations necessary to achieve the joint force commander's strategic objectives using the capabilities of external support systems through a system architecture and command and control process accomplished by the units of the model's internal structure—the theater air control sys-

Table 2

**Model of Air Operational Level of War
Theater Air Command and Control System**

GENERIC CATEGORY	MODEL CATEGORY	MODEL SYSTEM	MODEL ELEMENTS
<i>PRODUCT</i>	Function	Combat Operations System	Counterair, Close Air Support, Air Interdiction, Strategic Attack
<i>PROCESS</i>	Task	Command and Control System (C ²)	Planning, Directing, and Controlling Combat Operations
<i>INTERNAL STRUCTURE</i>	Organization	Theater Air Control System (TACS)	AOC, AETACS, GTACS
<i>EXTERNAL SUPPORT STRUCTURE</i>	Architecture	Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C ⁴ ISR) System	Supporting Systems: Control, Communications, Intelligence, Surveillance, Reconnaissance, [and Logistics]

tem. Clearly, in addition to the controlling task, the TACS organizations perform both planning and directing tasks of the command and control process. Thus, we should expand the TACS to the theater air command and control system theater air command and control system (TACCS) to properly convey the full organizational responsibility and its relationship to the operational-level tasks. We are now ready to look back at our box and see what this reformulated model looks like. Figure 2 depicts our new representation of the operational level:

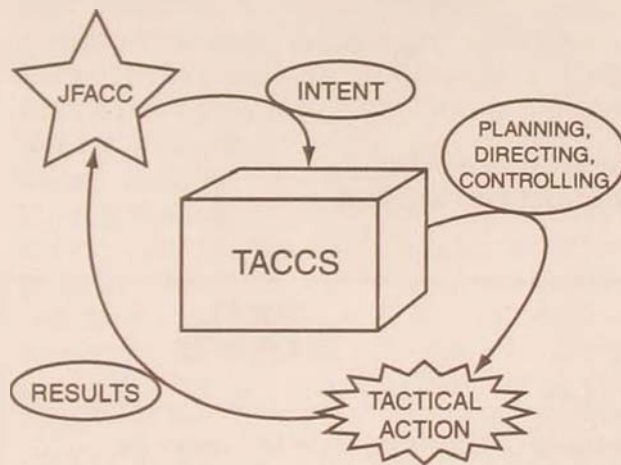


Figure 2. The Link between Intent and Results

Figure 2 shows the system input JFACC's intent to our operational model of the theater air command and control system, while the C² process of planning, directing, and controlling combat operations establishes the conditions that allow air functions to achieve the system output product of tactical action results. The consolidated model components provide its description:

air functions—The operational-level model products are the combat operations air functions of counterair, air in-

terdiction, close air support, and strategic attack. These systems output tactical results achieve the system inputs of JFACC intent and JFC strategic objectives.

tasks—The operational-level model process consists of the command and control tasks of planning, directing, and controlling combat operations. These tasks establish the conditions necessary for air function tactical results that achieve JFC objectives.

organization—The operational-level model internal structure includes all units subordinate to the JFACC which extend his authority throughout the theater. The TACS, using capabilities provided by external support systems, performs the tasks of planning, directing, and controlling combat operations to achieve JFC objectives.

systems architecture—The operational-level model system architecture provides the connectivity, interoperability, and integration with the external support structure's technology-based capabilities required by the air functions, tasks, and organizations.

Summary

Operational doctrine is critically important to the Air Force role as a member of the joint team. This new importance results from both the joint focus on doctrine and the need for the entire joint community to understand how the US Air Force operates at the operational level of war. The decreasing manning and increasing taskings of our operational forces reinforce the need to eliminate functional redundancy and ensure that all airmen understand their role in Air Force operations. The Air Force needs a comprehensive framework for operational doctrine that includes all components necessary for success at the operational level of air warfare.

Air Force operational doctrine should comprehensively explain the tasks of planning, directing, and controlling combat operations and the air functions that produce the tactical action results which achieve the joint force commander's operational objectives. These C² tasks are executed through the organizational dynamic of the theater air command and control system and supported by the technical system capabilities of communications, intelligence, reconnaissance, surveillance, and logistics systems, enabled by the connectivity, integration, and interoperability of the TACCS architecture. This conceptualization of operational air functions, tasks, organizations, and systems architecture provides all airmen and the joint community a common framework for understanding airpower employment at the operational level of air warfare. As the benchmark for developing new operational forms, the TACCS will allow us to break away from hierarchical preinformation-age constructs and approach a new model for accomplishing the timeless requirements to plan, direct, and control air operations.²¹

My Answer to the Lieutenant's "What Do We Do?"

The air battle manager serves at both the tactical and operational levels of war in all units of the theater air command and control system. The air battle manager (1) "plans" implementation of the JFACC's intent as a part of the commander's estimate of the situation planning process; (2) "directs" air tasking order execution and makes changes during the air battle through real-time decisions to adapt air function execution to the changing air battle situation; and (3) "controls" execution

of combat operations as an operational-level extension of the joint force air component commander's authority to ensure the tactical action results achieve the joint force commander's theater objectives. The air battle manager accomplishes these operational tasks through the capabilities of intelligence, communications, surveillance, reconnaissance, and logistics systems, and "manages" those parts of the TACCS architecture assigned to his or her responsibility.

The air battle manager's role is as the symphony conductor of the air battle. Air battle managers start with the air tasking order "score" written by the planners in the joint operations center and ordered by the joint forces air component commander. Just as the symphony conductor integrates the music of the orchestra's string, woodwind, brass, and percussion sections into a coherent whole, the air battle manager brings together the many missions of airpower. These sections of the airpower orchestra range from the counterair, counterland, electronic and strategic attackers, to the critical air refuelers and search and rescue forces, and include the critical elements of information superiority and global awareness provided by the space and intelligence, surveillance, and reconnaissance forces. Each of these "players" provides an indispensable component of the air battle. The air battle manager brings them together to create the "music" of airpower.

Finally, all airmen, but especially the twenty-first century air battle manager, must begin to think today about this system, where it is synchronized and where it is misaligned. When all parts of the TACCS are technologically, functionally, and organizationally aligned, we can begin to think about the possibilities for the future. □

Notes

1. ABCCC, AWACS, and JSTARS, and the CRCs are all elements of the theater air control system. The best sources for explanations of these systems and the history of the TACS are Maj Kevin N. Dunleavy and Maj Lester C. Ferguson, "Command and Control and the Doctrinal Basis of the Theater Air Control System," in

Concepts in Airpower for the Campaign Planner (Maxwell AFB, Ala.: Air Command and Staff College, 1993), 123-48; Lt Col Robert J. Blunden Jr., USAF, *Tailoring the Tactical Air Control System for Smaller-Scale Contingencies* (Maxwell AFB, Ala.: Air University Press, 1992), and *Tailoring the Tactical Air Control System for Con-*

tingencies (Maxwell AFB, Ala.: Air University Press, 1992); Lt Col David Tillotson III, USAF, *Restructuring the Air Operations Center: A Defense of Orthodoxy* (Maxwell AFB, Ala.: Air University Press, 1993); Lt Col J. Taylor Sink, USAF, *Rethinking the Air Operations Center: Air Force Command and Control in Conventional War* (Maxwell AFB, Ala.: Air University Press, 1994); and Lt Col Richard T. Reynolds, USAF, *What Fighter Pilots' Mothers Never Told Them about Tactical Command and Control—and Certainly Should Have* (Cambridge, Mass.: Center for Information Policy Research, Harvard University, 1991).

2. Both "manage" and "battle" are problematic descriptors. This paper deals with "things" and "systems," as well as people. People must be led; things and systems can only be managed. Whether we control—my preference—or manage air battles, engagements, or operations—my preference—is an important distinction. For the purposes of this article, however, this comes too close to unnecessarily tilting at too many acronym "windmills." We must do enough of that in this article, so I'll leave this fight for another day.

3. Past doctrinal explanations began and ended with the traditional air missions and roles, now described as air and space functions.

4. To this list we could add a host of enabling airpower functions such as airlift, space, and reconnaissance; however, the emphasis here is on the critical airpower functions that directly achieve tactical results against the enemy.

5. The principal candidate systems are TACS, the C^2 system and its seemingly never-ending progeny (C^3 , C^4 , C^1 , and the latest, C^4 ISR). Battle management/ C^2 (BM/ C^2), another as-yet-undefined candidate, has now joined the fray and has resulted in the new Air Force specialty code—air battle manager. Making matters worse, the proliferation of vague, future-vision constructs leaves those of us who sense we may have to implement these visions with the uneasy feeling that perhaps we should figure out exactly where we are before we charge off into the twenty-first century. Progress towards the promises of the visions of the next century requires this first critical step: We must understand what happens inside this "box" now to enable the changes implicit in "battlespace dominance" based on "global battlespace awareness" and "information superiority."

6. Air Force Manual 1-1, *Basic Aerospace Doctrine of the United States Air Force*, states in section B, "Aerospace Operational Art," that

the essence of aerospace operational art is the planning and employment of air and space assets to maximize their contribution to the combatant commander's intent. Aerospace power may be employed independently of or in conjunction with surface operations. The air component commander's exercise of operational art involves four tasks. The first is envisioning the theater and determining when and where to apply what force in concert with the combatant commander. The next is creating conditions that give units applying force the best chance of success. The third is directing adjustments to operations in accordance with mission results and the operational commander's revised intent. The final is exploiting the often fleeting opportunities that result from combat. In each task, the key to success lies in an air component commander's ability to achieve objectives by orchestrating aerospace roles and missions so they produce a mutually reinforcing effect. AFM 1-1, *Basic Aerospace Doctrine of the United States Air Force*, March 1992 (Washington, D.C.: Government Printing Office, 1992), vol. 1, 10.

7. Joint Pub 1-02, *Department of Defense Dictionary of Military and Associated Terms* (Washington, D.C.: Government Printing Office, 1994).

8. C^4 ISR has no joint-approved definition (or any other that the author could determine); however, C^4 is its precursor and is adequate for our purposes.

9. Our use of "system" is as "a group of interrelated, interacting, or interdependent constituents forming a complex whole." The operational level fulfills each of the three qualifiers. *Webster's New Riverside University Dictionary* (Boston, Mass.: Houghton Mifflin, 1984), 1175.

10. An indication of the lack of conceptual development and maturity of air operational thinking is the difficulty in sorting out the words to describe these various concepts. *Function, role, mission, task, output, product, category, purpose, and element*—these words seem almost interchangeable across the spectrum of activities when one attempts to be specific in delineating differences. The reader will, no doubt, find the author's choices open to disagreement. Doctrine should settle these terminology questions and allow a new clarity for future discussion.

11. Joint Pub 3-0, *Doctrine for Joint Operations* (Washington, D.C.: Government Printing Office, 1995), II-3.

12. Joint Doctrine Air Campaign Course faculty, "Air Campaign Planning Handbook," Maxwell AFB, Ala.: Air University, 1995.

13. Maj David A. Dellavolpe, USAF, "Command and Control of Tactical Air Forces, North Africa: 1942-1943," in *Theater Warfare Studies*, vol. 9A (Maxwell AFB, Ala.: Air Command and Staff College, 1992), 173.

14. Field Manual (FM) 100-20, *Command and Employment of Air Power*, 1943, 16.

15. The *JFACC Primer*, the Air Force's explanation of "how to best organize, plan and execute joint air operations," provides the following description of the TACS: "The JFACC's primary means of executing assigned duties is the TACS." Other than describing the Air Operations Center as the "JFACC's command post" and warning about the reliability of the "composite recognizable air picture," this "primer" merely outlines the JFACC's "responsibility for putting together a rational command, control, and intelligence system that allows him to accomplish the Joint Force Commander's directives." Headquarters USAF, *JFACC Primer* (Washington, D.C.: DCS Plans and Operations, August 1992), 26.

16. Perhaps the best evidence available for determining the core role of the TACS as a concept for our reformulation effort is simply that people assigned to organizations involved in what might be called the C^2 , C^3 , or C^4 ISR "business" are much more likely to say, "I'm assigned to the TACS" or "I'm in a TACS unit" rather than "I'm assigned to a C^2 (or C^4 ISR) unit."

17. For history and development of command and control, see Thomas P. Coakley, *Command and Control for War and Peace* (Washington, D.C.: National Defense University Press, 1992); C. Kenneth Allard, *Command, Control, and the Common Defense* (New Haven, Conn.: Yale University Press, 1990); Roger A. Beaumont, *The Nerves of War: Emerging Issues in and References to Command and Control* (Washington, D.C.: AFCEA International Press, 1986); and Martin L. van Creveld, *Command in War* (Cambridge, Mass.: Harvard University Press, 1985).

18. The "birth" of C^3 was due to a combination of the civilianization of military thought, the resulting professional requirement for defense academics to publish (and therefore write papers in which connected ideas were continuously reexplained with new approaches), and the scientific-engineering community's need to develop new constructs to explain inadequate paradigms. Engineers and scientists from various fields applied concepts from their disparate, previously mastered disciplines (such as cybernetics, stochastic processes, and systems technology) to the emerging interdisciplinary field of military electronics. This process was, no doubt, quite useful to the scientific community, but it has made life difficult for warriors. For an overview of the conceptual development of C^3 , see George E. Orr, *Combat Operations C^3 : Fundamentals and Interactions* (Maxwell AFB, Ala.: Air University Press, 1983); and John Hwang, ed., *Selected Analytical Concepts in Command and Control* (New York: Gordon and Breach Science Publishers, 1982).

19. We are all familiar with apparently good ideas that didn't pan out and were either thrown in the acronym trash heap or reconceptualized (electronic combat [EC]; battlefield air interdiction [BAI]; command, control, and communications countermeasures [C³CM]; electronic counter-countermeasures [ECCM]; and so on). C^{nth}I^{nth}xyz is directly tied to technology and thus is able to continually regenerate itself every few years, with no diminution of its growth potential in sight. Instead of demanding that concepts with no (or only marginal) utility for fighting be discarded, the military has accepted C^{nth}I^{nth}xyz as if it represented some sort of intellectual Holy Grail. There is no doubt that our technological environment is gaining daily in complexity, but this should actually drive us to simplify our conceptualization of the operational level of war, not make it increasingly more difficult to understand.

20. A modest proposal. We should add "logistics and offensive and defensive operations (LODO)" to the current C⁴ISR. In this final conflation, we would completely obliterate whatever usefulness such epigrammatic approaches to understanding our operational art may have had. Our tireless penchant for finding shorthand paradigms for waging war would then be complete in our new "command, control, communications, computers, intelligence, surveillance, reconnaissance, logistics, and offensive and defensive operations." In this utterly useless affectation of understanding we will have totally subsumed war, thereby creating an acronym demonstrating the futility of our search for operational doctrine through the repackaging of acronyms.

21. There is an example of where that future may take us. Col John R. Boyd provided all airmen a legacy of thought about

airpower that is both rich in content and, at least for the present, badly flawed as a guide for our continuing search for air operational doctrine. His conceptual decision cycle of observe-orient-decide-act is a fighter pilot perspective of decision making as yet not adaptable to our nonflight command and control environment. For all the wondrous advances the microprocessor has wrought, C² remains a manpower-intensive, sequential, deliberative process—a process not yet conducive to the logic of "lead-turning" an opponent's thought processes. Yet, one only need spend a short time dwelling on Boyd's "A Discourse on Winning and Losing" to know that there really is something there. To discover what innovation possibilities might exist, we must first understand the actual system we operate and not allow future visions to delude us into thinking we're ready to leap ahead. An important part of the process of clearing the way for the true innovation that might result in adapting Boyd's ideas to the future of C² is getting our conceptual house in order. Until we are clear on where we are, we can't really begin to move out to either the twenty-first century or C²'s "fast transient" potential. The construct advanced herein will provide one step down this road. Building on this reformulated conceptualization, it should be possible to compare the four models and discern their relative states of technological and functional adaptability to change and how to improve the whole by bringing the four systems into closer technological alignment. John R. Boyd, "A Discourse on Winning and Losing," a collection of unpublished briefings and essays, August 1987, document no. M-U 43947, Air University Library, Maxwell AFB, Ala.

If you once forfeit the confidence of your fellow citizens, you can never regain their respect and esteem. You may fool all of the people some of the time; you can even fool some of the people all the time; but you can't fool all of the people all of the time.

—Abraham Lincoln



US Arms Transfer Policy for Latin America

Lifting the Ban on Fighter Aircraft

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LT COL ANTONIO L. PALÁ, USAF

THE DECISION BY the Clinton administration in 1995 to modify the conventional arms transfer policy and permit the sale of advanced military technologies to Latin America has sparked a heated debate within political, academic, industrial, and military circles. One of the most controversial aspects of this new policy deals with the sale of advanced fighters to Latin America. This article posits that this was the right decision at the right time for the right reasons. The Western

Hemisphere of 1998 is considerably different from the landscape of the 1970s and 1980s. Military regimes, the Central American conflicts, arms races, and the bipolar competition between the superpowers were commonplace throughout the region. Today, the hemisphere is characterized by democratic regimes, declining defense budgets, economic integration, and reduced interstate tension, with Cuba serving as the only reminder of a discredited political experiment.

Our research addresses the main arguments against President Bill Clinton's decision to sell fighter aircraft and outlines the weaknesses of those arguments. For the most part, the discussion focuses on the impact of the new policy on seven countries: Argentina, Brazil, Chile, Colombia, Ecuador, Peru, and Venezuela. These countries have the largest air forces and are the most likely candidates for the purchase of fighters. Since 1995 the Chilean air force has expressed the desire to modernize its fighter aircraft. In 1996, Chile requested technical specifications from the United States for the F/A-18 and F-16 fighters. At the same time, Chile sought similar data from France for the Mirage 2000-5 and from Sweden for the JAS-39 Gripen.¹ By March 1997, the Clinton administration agreed to allow US manufacturers to provide classified technical data on the F-16 and F/A-18 and entered into negotiations for the possible sale of the aircraft.² On 1 August, President Clinton ended the 20-year-old ban and reversed the Carter administration's 1977 Presidential Directive 13 (PD-13), which had blocked the sale of advanced military technology in Latin America. In those 20 years, the US limited its aircraft sales in the region to lower-technology fighters such as the A-4 Skyhawk, the Northrop F-5 in several variants, and the A-37 Dragonfly. The only exception to this policy was the 1982 sale of F-16s to Venezuela by the Reagan administration. Unfortunately, the self-imposed US embargo did not limit, nor influence, the entry of advanced fighters into the region. Over the two decades, the French sold over two hundred fighters in South America. Other aircraft-producing nations followed suit. The Israelis, British, and Soviets also sold their fighters in all the major countries, undaunted by US efforts to limit the sales.

The critics of expanding fighter sales to Latin America focus on some important areas. Primarily, they stress the possibility of a renewed arms race in Latin America and the negative socioeconomic impact of expanded arms sales to these fragile democracies. Others emphasize the fact that these nations do not need advanced fighters for their security. On the other hand, advocates of the sales stress

the economic benefits to the United States and to our defense-related industrial base. Additionally, they propose that these sales will yield security benefits and create closer ties with our regional allies. Furthermore, with the exception of Cuba, all countries in the hemisphere are currently under democratic rule and, as such, enjoy the legitimacy to determine the kind of military force structure they should have to provide for their defense.

This article proposes that the United States sell, on a case-by-case basis, advanced fighter aircraft to select countries. It should do so to enhance interoperability, promote military-to-military contacts in the region, and to help the regional air forces modernize their inventories with USAF-compatible equipment. These sales should conform to the principles set forth in the 1995 Williamsburg Hemispheric Defense Ministerial Conference, which stressed transparency, accountability, and mutual cooperation. This article does not propose the opening of an "arms bazaar," but rather increasing US engagement in the restructuring and modernization of the Latin American air forces.

If the primary purpose of the unilateral embargo on the part of the United States is to maintain fighter aircraft out of the region, it certainly has not accomplished the desired results. Our European allies and other nations have been more than willing to provide the aircraft to the Latin American air forces while US manufacturers stand on the sidelines. A senior executive for the Israeli Aircraft Industry recently highlighted this point: "American companies have been kept out of the market for some time There was a void there that we have filled successfully."³ The United States should engage and promote responsible sales in order to increase our participation in the region and promote interoperability without sacrificing democratic rule and hemispheric peace and security.

Historical Background

The historical record of arms transfers and sales to Latin America, and the associated leg-

isolation, can be best viewed as a series of peaks and valleys. In many cases, the policy has been a direct reflection of the US president and his views towards the region or the current international situation. The Foreign Assistance Act of 1961 served as the cornerstone for weapons transfers during the early stages of the cold war.⁴ Rooted in the Truman Doctrine of containment, this act provided the legal means for the United States to sell or transfer weapons to foreign governments that supported our national security objectives. By 1969, the Nixon Doctrine, which emerged from the quagmire of the Vietnam War, proposed the idea that the United States would use arms transfers as a means to contain Soviet influence. Arming friendly nations would allow them to defend themselves without having to risk American lives. The consequences of the Nixon Doctrine have endured as a point of heated debate. William Hartung argues that these transfers contributed to the rise of authoritarian governments and that many of the weapons sold by the United States were used to repress the civilian populace.⁵ The 1976 Arms Export Control Act, proposed by Sen. Hubert H. Humphrey (D-Minn.), began to limit the presidential ability to transfer weapons to other nations by giving the Congress veto power over sales and extending the notification period to 30 days. Against the wishes of the Ford administration, several countries received even tighter restrictions based on their human rights records. This was the case with Chile in 1976 under Public Law 94-329. This legislation, commonly referred to as the Kennedy Amendment, prohibited security assistance, military training, and arms sales to Gen Augusto Pinochet's repressive military regime in Chile.⁶

In 1977, President Jimmy Carter issued PD-13 with the intent of reversing the Nixon Doctrine. President Carter required that arms transfers be directly linked to furthering US security interests and tied them very closely to the human rights records of the recipient governments.⁷ Among its many limitations, PD-13 placed limits on the dollar amounts of the sales, prohibited the United States from

introducing weapons to a region more sophisticated than those already present, and limited US production of weapons that were developed exclusively for export. Critics of PD-13 argue that "among the many failures of U.S. Latin American policy under the Carter Administration, none has been more complete than the failure of the arms transfer policy."⁸ The Carter presidency was inconsistent with its application of PD-13, and it had great opposition even from within the ranks of his administration. While President Carter restricted aircraft sales to Latin America, he proposed one of the largest aircraft sales deals to Israel, Saudi Arabia, and Egypt in the spring of 1978, providing a clear example of the inconsistencies of his arms policies.⁹

President Ronald Reagan saw weapons transfers considerably different than his predecessor, framing them as "an essential element of our global policy" and subsequently reversing many of the limitations imposed by PD-13.¹⁰ The Reagan administration sought to rearm the United States and its allies and to support anticommunist insurgencies throughout the world. During his first term in office, President Reagan tripled weapons sales to Central and South America, including arms transfers to repressive regimes such as those in Guatemala, El Salvador, and Argentina.¹¹ The Reagan administration approved the sale of F-16 fighters to Venezuela in 1982 to counter the Cuban acquisition of Soviet-built MiG-23 fighter/bombers.¹² The F-16 deal with Venezuela, nearly 17 years ago, was the last sale of a US-built advanced fighter to the region. The lion's share of the arms transfers to Latin America during the remainder of the Reagan years was directed towards Central America to counter the leftist insurgencies in El Salvador and its neighbors.

President George W. Bush continued with the relatively open transfer of weapons but did not sell any of the newer generation fighter aircraft. With the end of the Central American conflicts and the ongoing termination of the cold war, the Bush administration shifted most of its focus in Latin America to the war on drugs. Additionally, most of the governments

in the region returned to civilian control and implemented drastic reductions in the size of their armed forces. Argentina is perhaps the clearest example of this reversal in military spending and influence. Between 1983 and 1993, the Argentine military was reduced from 175,000 men in uniform to 65,000.¹³ For the most part, the Latin American air forces did not acquire any new aircraft in the early 1990s. Their fighter aircraft continued to age, and spare parts became more difficult to purchase. The success of US weapons during the Gulf War and the aging fleets of most Latin American air forces reignited the debate on the sale of advanced aircraft to the region.

Presidential candidate Bill Clinton proposed to curb the sales of US weaponry, but after his election and being faced with the disappearance of countless defense-related jobs, Clinton's approach quickly changed. In 1996, 79 members of the US House of Representatives sent President Clinton a letter suggesting that the ban on fighter aircraft was no longer appropriate under prevailing conditions.¹⁴ These ideas have enjoyed bipartisan support, to include senators Bob Graham (D-Fla.) and Richard Lugar (R-Ind.), who believe that these sales would actually be good for the region by claiming that "other nations are more than willing to peddle their military wares in the Americas, so lifting the moratorium—and subjecting proposed arms sales to the strict checks of the state department will increase our influence over who buys arms in Latin America."¹⁵

These proposals and other economic pressures prompted President Clinton to draft the president's conventional arms transfer policy embodied in Presidential Decision Directive 34 (PDD-34). Under PDD-34, conventional arms transfers are viewed to be a legitimate instrument of US foreign policy when they enable the United States to aid allies and friends to deter aggression, promote regional stability, and increase the interoperability of US and allied military forces.¹⁶ Additionally, PDD-34 stresses that supporting a strong, sustainable US defense industrial base is a key US national security concern, and not purely an

issue of commercial concern. Therefore, PDD-34 raises the value of significant domestic economic considerations in the arms transfer decision-making process to a higher level than in previous legislation.¹⁷ But this reversal of policy, although applauded by US weapons manufacturers, is presently a serious issue for debate.

The Critics: Arguments against Lifting the Ban

The cast of critics condemning President Clinton's decision to lift the ban is long and distinguished. Opponents include Nobel peace laureate and former Costa Rican president Oscar Arias and several US legislators, specifically, Sen. Joseph Biden (D-Del.), Sen. Christopher Dodd (D-Conn.), and Congresswoman Nita Lowey (D-N.Y.). The critics have argued that the costs of selling high-tech arms to the region far outweigh any economic or political gain to US interests. Specifically, the opponents argue that arms sales could undermine the Clinton administration's efforts to promote economic stability and development, strengthen democratic political institutions in Latin America, and ensure hemispheric peace and security.¹⁸

They argue that the sale of high-tech weapons systems, particularly combat aircraft, cannot address the "new" security threats facing the region, such as rampant drug-trafficking, growing economic inequality, social dislocation, unresolved border disputes, and nagging guerrilla movements.¹⁹ In fact, as former presidents Jimmy Carter and Oscar Arias have recently stated, opening an "arms bazaar" to interested Latin American buyers will only exacerbate or reverse the progress achieved in the last 15 years in the area of democratization, macroeconomic stability, and hemispheric cooperation and security.²⁰ In an effort to restore the moratorium via hemispheric consensus, Carter and Arias have received the support of 27 heads of state. The group proposes a two-year moratorium on the acquisition of advanced military equipment. Their recommendation calls for a "cooling-off" period to give the region time to study and address regional security threats and the so-

cial, political, and economic impact of an arms race in the region.²¹

The principal economic argument against arms sales is that an increase in military expenditures will divert scarce resources away from much-needed social and economic programs such as education, health care, and job-creation initiatives. In a period of restrained state spending and macroeconomic stability, the purchase of military equipment further reduces resources available for social investment. According to the World Bank, these countries need to be investing their limited resources in production for local and export markets as well as in physical infrastructure and social services such as education and health care. Latin America needs to spend up to \$1 billion (US dollars) per week to maintain and upgrade crumbling or non-existent communication, water, and transportation systems.²²

Moreover, the critics argue, the shifting of resources to military purchases will further complicate the region's growing social problems. Poverty and income inequalities have increased as a result of structural adjustment and austerity policies implemented by Latin American governments over the past 10 years. The poverty level remains at about 35 percent for the region, and annual per capita growth between 1990 and 1995 increased by only 1.3 percent.²³ Other social indicators such as infant mortality, access to education, and sanitation services have also shown only limited improvement. Poverty is only increasing in absolute terms, but the income gap is growing at a faster pace. According to the Inter-American Development Bank, the top 10 percent of the population increased its share of the nation's income from 58 percent in 1985 to 66 percent in 1995.²⁴ This level of poverty and income inequality will delegitimize democratic institutions, making them vulnerable to violence and other post-cold-war threats. As former Colombian president Ernesto Samper, an ardent critic of US policy, stated recently, "Diverting social spending toward other ends can contribute to the de-legitimization of our democratic system, making them more vul-

nerable to threats such as terrorism and drug trafficking."²⁵ In short, stagnant economic growth and high unemployment coupled with declining social services will produce the very conditions the United States is seeking to avoid: institutional breakdown and regional insecurity. Funds spent purchasing expensive weapons deprive other sectors of the economy of critical resources needed to combat growing poverty. From a political and economic perspective, these countries simply cannot afford these purchases.

Another argument against lifting the ban is its impact on democracy and civilian control of the armed forces. Critics pose that further reductions in social spending will undermine confidence in democratic processes and institutions as poverty levels increase. Moreover, the sale of weapons will have the negative effect of strengthening the one institution that has always threatened democratic rule in Latin America—the armed forces. At a time when democracy and its institutions are still weak and in transition, the sale of arms sends an ambiguous signal, given the situation of continued uncertain or limited civilian control in some countries such as Chile, Honduras, and Peru. The level of consolidation of critical institutions such as legislatures, courts, and political parties remains dubious. As a result, the mechanisms that can ensure civilian control are still in gestation and thus vulnerable to military prerogatives and interference.²⁶

Several of the Latin American armed forces retain considerable institutional autonomy, specifically in the areas of the budget and internal security. Moreover, coup attempts in Venezuela and Paraguay and the continued role of "guardian" provided by constitutions to the militaries suggest that civilian control is far from consolidated despite significant strides in democratic rule in the last 13 years.²⁷ In short, the institutional and legal frameworks continue the threat of praetorianism in Latin America. The critics of US policy maintain that "professionalization" and modernization of Latin American weapons systems can have a similar result to that of the 1960s

when professionalization led to military intervention in the context of socioeconomic distress. In short, selling high-tech weapons systems to Latin America offers no significant advantage to supporting or consolidating fragile democracies or civilian control.

Finally, the opponents of US policy argue that arms sales threaten hemispheric peace and security because of the potential for an arms race among countries with unresolved border disputes. As the conflict between Ecuador and Peru demonstrates, historical animosities or border conflicts can be easily reignited. Arms sales to only a few countries are enough to start an arms race that can lead to the destabilization of the region, particularly if sales such as combat aircraft give nations a clear strategic advantage over their neighbors. Chile's procurement of high-tech weapons can be interpreted by Argentina, Bolivia, and/or Peru as a Chilean effort to obtain a strategic advantage. This may induce them to enter the arms market at a time they can ill afford to do so. Moreover, these weapons systems are completely inadequate to deal with the new, nontraditional security threats facing the hemisphere in the post-cold-war period. Latin America has achieved an unprecedented level of regional peace and cooperation that can be easily undermined by an arms race started by any government's decision to modernize its military hardware. Cooperative security arrangements and other mechanisms, such as defense transparency and confidence-building measures, are still in their early stages, and any attempt to "modernize" weapons systems will obviously undermine these processes.

All of these factors are intertwined. The diversion of resources will lead to a loss of confidence in democracy and eventually to its collapse. Consequently, more powerful military institutions or, if democracy disappears, authoritarian regimes and their new weapons system will surely create an unstable regional environment conducive to the resurgence of interstate conflict. According to the critics, the lifting of the moratorium is not in the long-term interests of the United States. Though

lifting the ban may bring short-term boosts in weapons exports, in the long term it will undermine foreign policy objectives by shifting investment capital away from domestic development and into military spending. This will result in lost export opportunities for non-military industries and a loss of export-related jobs. Moreover, regional conflict as a result of an arms race will have a direct and negative impact on US national security. In short, except for defense contractors in the United States, the lifting of the ban will have very few winners and many losers. In the end, Oscar Arias, the principal critic of President Clinton's policy, concludes that

although democracies exist throughout Latin America, one would be naive to believe they are strong. Introducing high-tech weapons to the region bodes a future of violent eruptions, regional instability [and] a growing arms race. Existing border skirmishes will be intensified; fragile civilian control over traditionally strong militaries will be weakened; national resources will be diverted to satisfy professional soldiers' egos. How can a continent progress into the twenty-first century when governments are busy building arsenals and not schools? How can people continue their struggle for peace when more money is spent on modernizing fighter planes than on hospitals?²⁸

Without a doubt, the arguments made by the critics of expanding military sales express legitimate concerns about the welfare and stability of the region. Their claims appear stronger in light of the current socioeconomic conditions, the interventionist record of the armed forces, and the fragile nature of the democratic regimes. With these factors in mind, what possible advantages, other than increased profits and markets for the US arms industry, could there be for reopening the door for the sale of fighter aircraft?

Flaws in the Critics' Arguments

Before addressing the critics' arguments, it is important to emphasize one key point—the ban has not worked! But even if the United States continues its ban on the sales, there will be another state willing to step in to fill the

need. It is ironic that leaders in a nation that built its economy on the laws of supply and demand fail to understand that as long as the demand exists for fighter aircraft in the region, a supplier will emerge. With the end of the cold war, new actors such as Belarus have emerged on the international arms market selling secondhand military technology. Belarus sold surplus MiG-29s and a complement of air-to-air missiles to Peru in 1995.²⁹ Detailed analysis of the five criticisms against lifting the ban will highlight the weaknesses of their proposals.

The strongest argument posed by the critics is based on economics. Without a doubt, the region would be better served by focusing its limited financial resources on social and economic programs instead of military spending. But there is absolutely no indication that if the United States refuses to sell fighters that the money will be spent on social programs. The zero-sum nature of the argument cannot be proved, particularly if the government had decided to earmark those funds for defense. It is naive to believe that the United States can influence how a sovereign state will spend its resources. In reality, we lose leverage by removing ourselves from the table. This fact was highlighted by Heliodoro Gonzalez in a study of the US arms transfer policy in Latin America: The "so called 'commercial pragmatism' on the part of such countries as France made U.S. efforts to slow the flow of sophisticated equipment to Latin America quite hopeless."³⁰ The United States can link these sales to economic and security initiatives and ensure that the purchases carry some limitations and are technologically feasible for the purchasing state. Research on Latin American motivations for the importation of arms has pointed out that the availability of domestic economic resources is the primary political consideration.³¹ If the civilian government has made the budgetary decision, either because of military pressure or national security, to divert the funding to purchasing aircraft, the "swords to plowshares" argument is moot.

The second criticism of the aircraft sales simply argues that these air forces just do not

need this type of equipment based on their threats and missions. Before addressing the question of need, there is a disturbing dimension to this argument that needs to be brought to bear. Exactly who determines what those countries' needs are? It is not the role of the United States or that of former presidents Arias and Carter to determine, or stipulate, the defense needs of another country. Does the US Air Force truly need the B-2 bomber in an age when it does not face a true peer competitor? Would the US president respect, or follow, an externally imposed moratorium on aircraft purchases or development because some foreign leaders believe they are not necessary for our national defense? But this double standard can be explained away by the realist argument of international relations: "The strong do what they can, and the weak do as they must." Without a doubt, this line of reasoning is a violation of the sovereignty of these democratically elected governments, and a slap in the face regarding their ability to determine their nations' defense policy. Essentially, we are telling them that they must demilitarize, while we continue to maintain our military capabilities.

Moreover, this line of reasoning ignores the current reality that many Latin American states are attempting to integrate themselves into the international community. Several have significantly increased their participation in UN-sponsored peacekeeping missions. They have contributed troops to regional peace initiatives such as the military observer mission between Ecuador and Peru (MOMEPE). Argentina participated in the Gulf War and supported the US position during the Haitian crisis.³² The first aircraft to fly into Baghdad after the cease-fire was an Argentine air force Boeing 707; the Chileans operated helicopters in Kuwait after the Gulf War; and the Uruguayans used their newly acquired C-130 transports to support their peacekeeping troops in Cambodia. It is not inconceivable for these armed forces to incorporate themselves into more complex missions such as the UN-sponsored no-fly zones currently in place in Iraq and the former Yugoslavia. In order to do so,

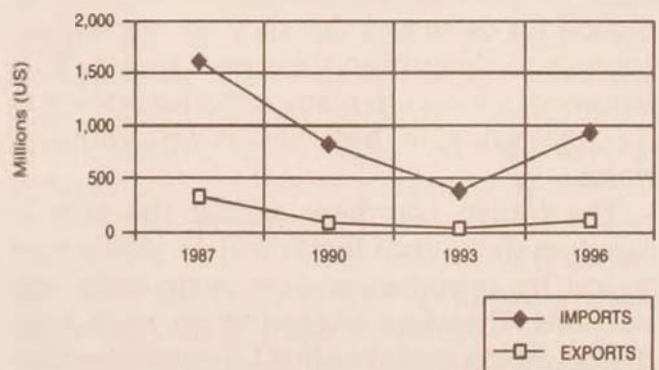
they would require modern fighter aircraft along with the doctrine and training to permit smooth incorporation. The Argentine military has sought involvement in missions that require a higher degree of military expertise or the opportunity to participate with more advanced military forces in order to gain training and prestige for its troops.³³ Additionally, Argentina has recently been named a major non-NATO ally, which should increase its willingness to participate in multinational operations and perhaps even offer the possibility of providing resources to the NATO mission in Croatia. Excluding these armed forces from such operations sends a negative signal to these emerging democracies that they are just not good enough to participate in the international arena. Additionally, it condemns the more advanced countries to the steadily expanding role of global policemen, which is a drain on their national resources and military.

The third line of reasoning assumes that the sale of fighter aircraft, or other advanced military systems for that matter, weakens democratic governments. Realistically, one could argue just the contrary by stating that prohibiting the sales to these governments weakens their prestige in the eyes of the nationalistic sectors of their society and armed forces. Critics of the United States argue that it is our goal to disarm their nations in order to enhance our hegemonic position in the hemisphere.

In the international arena, the richer countries attempt to implement their "new world order," a philosophy which divides nations into two groups: "primary or secondary"; where the latter are condemned to permanent underdevelopment, with the aim of preventing them from ever becoming competitors on the international economic stage. . . . The basic rule for said project is to impose a subservient attitude on the "secondary" countries in order for them to resign themselves to the humiliating state of permanent social, economic, political, and military underdevelopment. . . . It is obvious then that the armed forces of these countries are one of the primary targets of their strategy.³⁴

The comments cited above were made by a commander in the Brazilian air force in 1993,

and they mirror the beliefs of a growing sector of the Latin American military and political establishment. Many leaders in the region believe that their countries are kept in a state of underdevelopment by the developed world. On a grander scale, they frame the argument in a North-South axis, with the developed nations maintaining a "technological apartheid" over developing states. Essentially, we deny them the technology so that we can subordinate them to our will. Additionally, they use this very reasoning to propose that the denial of military technology also weakens their security vis-à-vis their neighbors. This reasoning can lead to the development or expansion of domestic weapons production, which will prove to be more costly than the outright purchase and will cause an even greater burden on their society. Latin American nations, across the board, have reduced or dismantled their domestic weapons production capabilities. These reductions have generated pressure from sectors of the armed forces and labor unions. Between 1980-1987, the US Arms Control and Disarmament Agency ranked Brazil as one of the 10 leading arms exporters to the Third World, but today many of the factories that produced weapons are idle or closed.³⁵ Figure 1 illustrates the decline in both arms exports and imports in South America in recent years.



Source: Stockholm International Peace Research Institute (SIPRI), *SIPRI Yearbook, 1997: Armaments, Disarmament and International Security* (New York: Oxford University Press, 1997).

Figure 1. South American Arms Imports versus Exports

Additionally, this line of thinking places the civilian governments in a peculiar situation by questioning their control over the armed forces. Without a doubt, the degree of autonomy of the armed forces varies from state to state based on their withdrawal from power, the legitimacy of the civilian government, and countless other factors. In Chile, the military has retained a great deal of its prerogatives, while in Argentina the military has little influence or prestige.³⁶ Whatever the case, it is imperative for these governments to be able to formulate, or contribute to, the development of defense policy, and to not appear that they are merely puppets of the United States.

Actually, some regional experts have proposed that liberalizing the arms transfer policy may help improve civil-military relations. Patrice Franko, an expert on the Brazilian defense establishment, stated in a recent interview that easing the policy "will show the militaries that there is a reward for the sort of policies they have been pursuing in greater civilian control and reduced regional tensions."³⁷ Democracy has become the norm in the region, and these democratic regimes have embraced most of the neoliberal economic reforms which have been required of them, but we refuse to recognize their right to unilaterally determine their defense needs. Essentially, we are telling them that we know what is good for them and that they are not mature enough to determine their own policy. This argument appears to many Latin Americans as condescending at best and ethnocentric at worst.

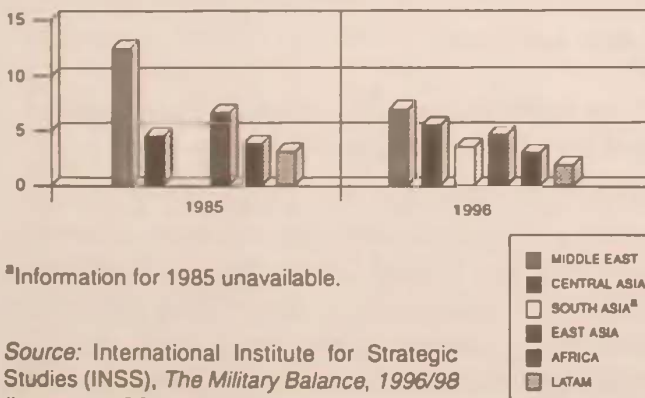
The fourth argument against the sales is based on the notion that it will destabilize the region by introducing new technology and weapons, therefore triggering an arms race. History offers evidence that US embargoes can prove to be counterproductive. A clear example of this occurred in the late 1970s during the Carter administration, when the United States refused to sell aircraft and tanks to Peru. The Peruvian government turned to the Soviet Union and purchased Su-22 fighters and a significant number of main battle tanks, artil-

lery, and helicopters. The sale alarmed Ecuador, Peru's neighbor, which in turn requested that the United States sell them aircraft to correct the imbalance. The United States, in accordance with Carter administration policies, refused the sale and initiated a chain of events that proved the futility of the US position. After being refused by the United States, Ecuador attempted to purchase 24 Kfir fighters from Israel for \$152 million (US dollars). The United States blocked the sale because the Kfir uses the General Electric J-79 engine and Israel must receive US approval prior to any transfer to a third party. Finally, Ecuador turned to France and negotiated the purchase of 24 Mirage F-1s for \$260 million (US dollars).³⁸ The attempt on the part of the Carter administration to limit the entry of fighters into the troubled region resulted in failure at several levels. The aircraft were purchased without using US sources and at a greater cost than initially anticipated. Furthermore, it forced the Ecuadorians to buy the Mirage F-1, an aircraft considerably more sophisticated than they were originally attempting to purchase. Ironically, years later the Peruvians would purchase the Mirage 2000 to counter the threat posed by the Ecuadorian F-1s. Regrettably, history would repeat itself in 1995 after the most recent conflict between Peru and Ecuador. Following the conflict, the Peruvian air force purchased the MiG-29 Fulcrum from Belarus to replace losses incurred in battle. Additionally, the Peruvians acquired over one hundred AA-10 and AA-8 air-to-air missiles for the MiG-29 as part of the purchase. The Ecuadorians, on the other hand, turned to Israel and acquired four Kfir C-7s from the Israeli Air Force.³⁹

The unwillingness of the United States to enter the aircraft market in Latin America has not limited or prevented the entry of such technology or diminished the possibility of an arms race. Over the last few years, the Chilean air force has continued its acquisition of aircraft, including the purchase of 25 Belgian air force Mirage Vs to replace its aging Hawker Hunters. Additionally, the Chileans are negotiating the purchase of additional early warn-

ing (EW) aircraft to augment its single Condor (Israeli-built, Boeing 707 variant, EW platform). This expansion would give the Chileans a significant advantage in EW, intelligence gathering, and battle management, significantly reducing their need for additional fighters.⁴⁰ Furthermore, Chile has made it very clear that the United States is not the only contender for their upcoming purchase of perhaps as many as 60 fighters.⁴¹ During the 1998 *Ferie Internacional del Aire y del Espacio* (FIDAE), a major aeronautical air show in Chile, the French and Swedes aggressively marketed their competing aircraft in an attempt to close that lucrative deal. In a recent interview with a Chilean newspaper, Anders Bjorck, Sweden's former defense minister, stressed that Chile was undoubtedly the highest priority in Latin America for his country and that, unlike the United States, Sweden does not attach restrictions on its arms sales.⁴²

Perhaps the strongest argument against the possibility of an arms race is the historical record. Latin America is not a region known for interstate conflict. In recent years, most areas of potential conflict, such as the *Hielos Continentales* dividing line between Argentina and Chile, will have been resolved. In addition, Latin America has traditionally spent less on defense as a percentage of the gross domestic product (GDP) than in other regions of the world and had fewer interstate conflicts than most regions of the world (fig. 2).



^aInformation for 1985 unavailable.

Source: International Institute for Strategic Studies (INSS), *The Military Balance, 1996/98* (London: INSS, 1998).

Figure 2. Regional Defense Spending as a Percentage of Gross Domestic Product

Even during the years of the military governments, their expenditures were comparatively lower. Analysis of defense spending on a country-by-country basis demonstrates virtually no difference in the outcome. For the most part, Latin American countries maintain their military expenditures below 2 percent, showing a decline over the last 10 years (fig. 3).



^aInformation for 1985 unavailable.

^bInformation for 1996 unavailable.

Source: Stockholm International Peace Research Institute (SIPRI), *SIPRI Yearbook, 1997: Armaments, Disarmament and International Security* (New York: Oxford University Press, 1997).

Figure 3. Defense Spending by Country as a Percentage of Gross Domestic Product

Furthermore, regional leaders have been meeting in an attempt to standardize the calculations of defense expenditures for even greater transparency. In July 1998, during the fifth meeting of the Argentine-Chilean Permanent Committee on Security, leaders from both countries agreed to abide by the defense expenditure guidelines proposed by the UN Economic Commission on Latin America (ECLA).⁴³ This significant milestone is consistent with the spirit of the Williamsburg and Bariloche ministerial conferences.

In their fifth and final argument, the critics accuse the Clinton administration of buckling to the pressures of the US aeronautical industry and other arms manufacturers in their efforts to promote their goods in the region. Former president of Costa Rica Oscar Arias, one of the proponents of this criticism, recently stated:

The engine of the arms trade is no longer fueled by East-West politics. It is now driven by economic motives alone, by greed. Arms merchants aggressively seek new clients, especially in the developing world. And while the governments of these developing countries buy billions of dollars a year in arms, their people remain subject to the chilling reality of poverty.⁴⁴

Beyond any economic benefit that arms sales may accrue to US defense companies, the lifting of the ban can have a direct and positive impact on US interests. In other words, a more interesting question is not so much what a change in policy might accomplish for defense companies and their employees but for broader US goals in Latin America. The argument can be made that sales are needed to maintain the defense industrial base and provide jobs for US workers. Moreover, prohibitions jeopardize competitiveness of US companies in the global market that is further exacerbated by budget cutbacks that reduce funding for research and development programs.⁴⁵ However, this argument is narrow and could be interpreted as too self-serving by critics of arms sales. A broader and more focused argument in favor of how arms sales protect and enhance US interests in the region is more persuasive. In reality, we believe that the unwillingness on the part of the United States to sell fighters may hinder the sale of other aircraft or technologies, such as the T-6 Texan 2 trainer, which would further diminish our presence in-theater. Raytheon, the manufacturer of the T-6, believes that there will be a market for three hundred to four hundred trainers in Latin America in the near future and hopes to capture a portion of this market.⁴⁶ The T-6 would compete against foreign-built trainers such as the Brazilian Super Tucano and the Swiss-built Pilatus PC-9. The inability of US manufacturers to sell trainers in the region would create an even wider chasm between the US Air Force and our regional allies who have traditionally depended on our training manuals, instructor exchanges, and program syllabi for their pilot-training programs.

The Latin American fighter aircraft market is too small to make a significant impact on the US aerospace industry. In all likelihood, several countries would be buying excess military aircraft, such as older models of the F-16. Many of these fighters have been retired from the inventories of the US Air Force, the Air National Guard, or the Air Force Reserve. The drastic downsizing of the US armed forces, particularly since the Gulf War, has forced many of these aircraft to face early retirement in the Arizona desert. The sale of these aircraft could create some "offset agreements" requiring that some assembly or maintenance functions of the fighters be accomplished in the purchasing country. These "offsets" reduce even further the economic benefits of such a sale. This has been the case with the A-4AR Fightinghawk program in Argentina. About two-thirds of the A-4ARs will be assembled in the Lockheed-Martin plant in Cordoba, Argentina, diminishing the economic benefits and job opportunities in the United States.⁴⁷

It is imperative for the United States to remain engaged in the region, and to do so it must be willing to address the security needs and concerns of its neighbors. These needs include the acquisition of fighter aircraft to modernize their aging fleets. If we are unwilling to do so, other actors will step in to fill the void, and our influence will continue to decline. A review of our interests in the region is critical in order to understand the growing importance of US military participation in Latin America.

Arms Sales: US Interests, Security Cooperation, and Socioeconomic Development

Arms sales provide the means to build and sustain military-to-military contacts at a time in which the United States has lost significant influence and leverage with Latin American militaries. Samuel Fitch has noted that US military influence has declined significantly since before the end of the cold war, much of it as a result of dramatic drops in military aid and arms transfers.⁴⁸ The continuing decline in US allocations for international military

education and training (IMET) funding for Latin America (table 1) is further evidence in this loss of influence and diminished engagement. The more intense the defense relationship, the greater the ability of Washington to influence the region's armed forces to respect human rights and democratic institutions and promote professionalism. The overall interest is to engage in military-to-military contacts to enhance security, build economic stability, and promote democracy.

Ultimately, military sales will result in more exchanges, joint exercises, and greater mutual understanding. In other words, transfers allow for more engagement and the establishment of new and broader channels of communication between militaries and governments. Professor Fitch notes that such engagement has limited impact on changing

values and beliefs of Latin American officers. It does, however, provide an important adjunct to US policies in favor of democratization or drug control because it provides "tangible and intangible goods that will be lost if the recipients act in ways counter to U.S. policies."⁴⁹

In fact, arms transfers can also increase US influence in other nonmilitary or security issues. One recent study demonstrated that US arms transfers are an important component of an overall package of carrots and sticks that enhances US leverage over recipient countries.⁵⁰ Consistent with the theory of functionalism which states that power and influence are fungible, military sales and security cooperation can easily translate into influence in other political and economic issues. Arms transfers on a case-by-case basis offer the opportunity to replace lost hegemony by rein-

Table 1

**IMET Expenditures in the Region
(In Thousands of Dollars)**

COUNTRY	1996 Actual		1997 Actual		1998 Estimate		1999 Request	
	Total Allocation	Students Trained	Total Allocation	Students Trained	Total Allocation	Students Trained	Total Allocation	Students Trained
Argentina	\$542	186	\$603	179	\$600	178	\$600	178
Brazil	\$200	38	\$222	42	\$225	42	\$225	42
Chile	\$366	187	\$395	167	\$450	190	\$450	190
Colombia	\$147	30	\$0	0	\$900	100	\$800	89
Ecuador	\$500	135	\$425	118	\$500	138	\$500	139
Peru	\$400	75	\$483	133	\$450	124	\$450	124
Venezuela	\$430	114	\$388	100	\$400	103	\$400	103

Source: Adam Isaacson and Jay Olson, *Just the Facts: A Civilian's Guide to U.S. Defense and Security Assistance to Latin America and the Caribbean* (Washington, D.C.: LATAM Working Group, 1998).

stating the exercise of what Joseph Nye has called "hard power leverage"; that is, restoring the capacity to pressure other countries to conform to its policies by reinstating the levers of influence (e.g., weapons systems) that can be used later by threatening to withdraw or sanction if certain expectations are not met.⁵¹ In short, arms sales will increase the level of contact, leverage, and political camaraderie, which can be used to exercise influence on a range of issues, specifically those related to democracy and hemispheric peace and security.

In recent years, fewer numbers of Latin American fighter pilots have received flight training in the United States, while growing numbers have done so in France and Israel. Within the last 10 years, the US Air Force has deactivated the A-37 training program at Howard AFB, Panama, and the F-5 training squadron at Williams AFB, Arizona. Hundreds of Latin American fighter pilots passed through these schools and were exposed to US Air Force doctrine and pilots. With the exception of the aviation leadership program in T-37s and a limited number of slots in A/T-38 training, few Latin Americans have the opportunity to receive training in the United States. Fighter pilots continue to be a large portion of the current and future leadership in the Latin American air forces and it is imperative for the US Air Force to maintain close ties with these officers.

Former defense secretary William Perry noted that the sale of US aircraft is indeed more stabilizing than destabilizing because it comes with US training, military-to-military contact or dialogues with our democratically controlled armed forces, and control by the US over spare parts.⁵² It provides some degree of leverage over how US equipment is employed. Potential misuse of weapons can be minimized by dependence on US suppliers, training, spare parts, and other support. The degree to which the United States moves to the position of principal supplier for entire groups of countries, the more it can determine the relative balance of weaponry in the region. If the United States provides the same equipment to

neighboring countries, it is in a position to promote confidence-building measures through joint maneuvers with the US Air Force and Navy, since doctrine tends to follow equipment.⁵³

The interoperability of weapons systems among countries in the hemisphere is an important component of the kind of security cooperation that can be achieved through continued joint maneuvers and efficient inter-American operations and peacekeeping missions. Interoperability is a critical means of interacting cooperatively with other nations in the region. With the exception of Venezuela's F-16s, there are no Latin American air forces operating fighters currently found in the USAF inventory (table 2). Additionally, most fighters in the region are more than 20 years old and often lack sources for spares. This is particularly the case with US-built fighters. Even the newly refurbished A-4 Skyhawk purchased by Argentina, Brazil, and Bolivia are old airframes with upgraded avionics and, in the case of Argentina, radars. It is safe to assume that the service life of these A-4s will not be as long as that of an F-16. The latter is operated by many air forces and is scheduled to remain in the USAF inventory for many years to come. Common equipment facilitates interoperability for combined operations for disaster relief, peacekeeping, and the fight against drug trafficking. Much like doctrine follows equipment, interoperability also contributes to the development of shared doctrine, negotiated procedures, routine exercises, and compatible command and control.

Once again, interoperability in these areas not only enhances cooperation but also Washington's ability to influence Latin America in other areas of national interest to the United States. As Brazilian scholar and policy maker Thomaz Guedes da Costa aptly asserts:

The Soviet threat no longer exists, but if, for example, the United States wants more than the symbolic participation of Latin American countries in international collective peacekeeping or peacemaking initiatives, an

Table 2

Fighter Aircraft in Major LATAM Air Forces

Aircraft	Origin	Date of Manufacturer	Air Force and Quantity
AMX A-1	BR/IT	1989	BR (28)
A-4 Skyhawk	US	1972	AR (48) some a/c on order
A-37 Dragonfly	US	1967	CH (35), CO (26), EC (10), PE (16)
F-5 Tiger	US	1972	BR (56), CH (16), VE (18)
F-16A Falcon	US	1978	VE (24)
Jaguar	UK	1972	EC (11)
Mirage III	FR	1965	AR (15), BR (18)
Mirage V	FR	1970	AR (5), CH (29), CO (13), PE (11), VE (?)
Mirage F-1	FR	1976	EC (14)
Mirage 50	FR	1980	CH (15), VE (17)
Mirage 2000	FR	1982	PE (10)
Kfir C-2/7	IS	1975	AR (22), EC (9), VE (12)
Su-20/22	USSR	1970	PE (20+)
Su-25 Frogfoot	USSR	1970	PE (14)
MiG-21	USSR	1958	CU (150)
MiG-23 Flogger	USSR	1971	CU (38)
MiG-29	USSR	1982	CU (34), PE (18)

Source: Lt Col Luis F. Fuentes, "Air Forces of the Americas," *Airpower Journal International*, 5 May 1998, available from <http://www.airpower.maxwell.af.mil/almanac/english/engindex.html>.

effort must be made to build common military operational capabilities in order to permit efficiency in field operations. The lack of common technological, weapons, and tactical standards may frustrate the formation of an international force for joint operations.⁵⁴

Arms transfers also place the United States in a unique and more influential position to strengthen hemispheric security cooperation and confidence and security-building measures (CSBM). Establishing an arms bazaar rather than making decisions on a case-by-case basis does not contribute to hemispheric peace and security. It limits the ability of the United States to maintain links and exercise influence in the establishment of a coopera-

tive security system. Military sales must be coupled with transparency in defense planning, acquisitions and budgets, joint exercises, periodic high-level civilian and military meetings, and other CSBMs that will contribute to building trust, confidence, and mutual understanding among the militaries of the region. The cooperative security architecture developed by the first defense ministerial meeting (July 1995) in Williamsburg, Virginia, provides the framework to safeguard peace and security in the region, thus averting the potential for an arms race and conflict that may result from arms sales to the region. In other words, given better information about a neighbor's weapons purchases and defense plans and capabilities, countries in the region should be able to

more confidently evaluate their own security needs and thus avoid unnecessary arms purchases.

The Williamsburg meeting established a set of principles that have become the cornerstone of a new security arrangement in the hemisphere. First, the resolution of outstanding disputes by negotiated settlement and widespread adoption of confidence-building measures, in a time frame consistent with the pace of hemispheric economic integration. Second, increase the transparency in defense matters through exchanges of information by reporting on defense expenditures and greater civilian-military dialogue. Finally, promote greater defense cooperation in support of voluntary UN-sanctioned peacekeeping operations.⁵⁵ The establishment of the Inter-American Center for Defense Studies at the National Defense University is not only an important effort at enhancing civilian expertise in regional security and defense issues but is critical to building cooperative programs and relationships among civilian and military leaders of Latin America.

Finally, there is little reason to believe that US arms sales will lead to a burst of defense spending and the weakening of democratic institutions, as some critics have argued. First, this assumes that, in an age of economic neoliberalism and fiscal austerity, Latin American governments will embark on a military spending spree. The decision of the Chilean government to suspend its purchase of combat aircraft because of budgetary constraints due to the current global financial crisis demonstrates a level of fiscal responsibility that critics are not willing to accept. Moreover, Latin America spends less than 2 percent of gross domestic product on defense. There is no reason to believe that lifting the ban will inevitably lead to an increase in irresponsible defense spending. In other words, there is no zero-sum relationship between purchasing weapons and socioeconomic development. Finally, the argument that defense spending negatively affects economic growth and social conditions has been consistently disproved by the data.⁵⁶ In fact, some studies have found the

relationship between "guns and growth" to be positive.⁵⁷ Karl DeRouen recently noted that defense procurement in Latin American democratic regimes has neither a positive nor negative effect on poverty and socioeconomic development in the region.⁵⁸ As noted, arms sales, if coupled with transparency and a concerted effort to establish a cooperative security arrangement in the hemisphere via CBMS, will not endanger the security and socioeconomic development of the Americas.

Conclusions

The key element in US arms sales policy to Latin America is to adopt a more realistic approach that allows arms sales to be a component of US influence and leverage, specifically over the region's armed forces, while attempting to maintain or enhance the level of peace and security via confidence-building measures and security cooperation arrangements. Such arrangements were delineated in the defense ministerial meetings in Williamsburg and Bariloche, Argentina. This article has argued against prohibition and an arms bazaar. Neither extreme alternative offers a guarantee of peace, security, and cooperation in the hemisphere. Moreover, there is also no evidence that these alternatives will necessarily contribute to the strengthening of democratic institutions or to the channeling of resources to socioeconomic development. In fact, there is no evidence that arms transfers have a negative effect on democratization, hemispheric peace and security, or socioeconomic development in the region. The critics of arms sales have only provided suppositions and no real evidence that arms transfers will have a deleterious impact on democracy, security, and development in the region.

Rather than tilting civil-military relations in favor of the armed forces, as most critics maintain, arms sales can be an element of a more stable relationship that can contribute to democratization. A well-trained and professional military that is engaged in joint exercises and global operations, such as peacekeeping, will increasingly depoliticize

the armed forces and strengthen civilian control. There is no correlation between providing the Chileans with a squadron of F-16 fighter aircraft and the weakening of democracy. The Chilean armed forces do not need fighter aircraft to undermine democracy. With respect to hemispheric security and militarization, arms transfers will also not necessarily lead to an arms race or conflict if it's within the context of transparency, cooperation, and confidence-building measures such as joint exercises and military-to-military contact. The Williamsburg principles provide the hemispheric security framework or architecture necessary to make transfers a component of peace and security rather than militarization and conflict.

Finally, the critics of arms sales argue that the purchase of weapons systems will divert resources from much-needed social and economic programs. Once again, there is no hard evidence that this is true. In fact, democratic governments in the region have actually reduced defense spending over the last few years with no significant increase in social spend-

ing. Democracies are constrained by constituency preferences that they cannot ignore. If, in fact, there is a zero-sum relationship between arms purchases and socioeconomic development, democracies will always opt for satisfying demands from their constituencies. Wendy Hunter notes in her rational choice analysis that civilian governments will always contest and subsequently erode military influence as a result of democratic practice and the need to satisfy constituent demands.⁵⁹

In sum, arms transfers can, in fact, be used as an instrument for building peace and democracy in Latin America rather than being a source of militarism and conflict. However, arms transfers must be carried out on a case-by-case basis and within the context of a consolidated hemispheric security framework that will enhance hemispheric security and cooperation through CSBMs. In the end, arms transfers can become an integral element of broader US policy and interests in the region: democracy, peace and security, development, and the restoration or enhancement of US influence and leverage in Latin America. □

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It is easier to get forgiveness than permission.

—Adm Grace Hopper

NEW DOCTRINE DEMANDS CHANGES IN THE AEROSPACE FORCE

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THE US AIR FORCE has made a significant but little noted change in the terminology it uses to describe what it does. It is significant not only because it changes the language of the Air Force's guiding principles—its doctrine—but also because the change reflects a more accurate description of the realm of the Air Force's primary operations and responsibilities.

If it's true that "at the heart of warfare lies doctrine," as stated in the Air Force's basic doctrine manual, then revising the central terminology used in expounding its doctrine is a remarkable recognition of an altered understanding of certain war-fighting concepts.

Less than two years ago, in September 1997, Air Force Doctrine Document (AFDD) 1, *Air Force Basic Doctrine*, used exclusively the disjointed term *air and space* to describe the Air Force's single environmental continuum for operations.¹ You can't find the term *aerospace* anywhere in that document. Yet now, with the publication of AFDD 2-2, *Space Operations*, in August 1998, *aerospace* is the preferred term.

Air Force Chief of Staff Michael E. Ryan says of *Space Operations*, "As a keystone doctrine document, it underscores the seamless integration of space into the total aerospace effort." He says also in his foreword to the document that "the United States is the world's foremost aerospace power, and our space forces are essential elements of that power." He states that the US Air Force is an aerospace force comprising "both air and space systems and the people who employ and support these systems."²

This view of the "seamless" nature of operations in the atmosphere and the space beyond is a notable departure from the AFDD 1 basic doctrine document of 1997—which seems to treat the aerospace medium as *divided*—stating, "Warfare is normally associated with the different mediums of air, land, sea and space."³ This concept of disjointed mediums associated with warfare, which also is implied in the three-word term *air*

and space, has been overtaken by the new doctrine document, and much of the terminology—Air and Space Expeditionary Task Force (ASETf), for example—has been changed. The terminology in the basic doctrine document—along with descriptions of some concepts—is no longer consistent with current thinking and is inaccurate to the extent that it speaks a “language” different from the new document.

AFDD 2-2 states, “The aerospace medium can be most fully exploited when considered as a whole. Although there are physical differences between the atmosphere and space, there is no absolute boundary between them. The same basic military activities can be performed in each, albeit with different platforms and methods. Therefore, space operations are an integral part of aerospace power.”

Elsewhere, AFDD 2 states that “within the DOD, the Air Force is in the forefront of space operations. The Air Force provides essential support and expertise for space activities to other military departments and the civil sector. . . . Gaining air and space superiority is a primary goal of a military campaign and must be achieved early to ensure freedom of action. . . . Centralized control and decentralized execution are essential to the successful and optimal use of aerospace power.”⁴

What appears to be a sudden change by the Air Force in its understanding of its primary realm of operations is actually only a restating of a concept that leaders began discussing and promulgating more than 40 years ago. Air Force Pamphlet 11-1-4, *Interim Aerospace Terminology Reference*, published on 30 October 1959, was the first official document issued by the Air Force to explain aerospace terminology. It was compiled by Air Staff representatives because, as explained in its preface, “in the past several years, there has been a large number of ‘official’ Air Force glossaries printed about space, missiles, satellites, and related subjects. Although each was compiled in good faith and for specific purposes, it was inevitable that a large number of terms would be common to most of the glossaries and that the definitions of these terms, when compared, would reflect inconsistencies.”⁵ Along with a rather extensive description of the space environment, the 1959 Air Force pamphlet stated that “aerospace is an operationally indivisible medium consisting of the total expanse beyond the Earth’s surface.”⁶

Gen Thomas D. White was the first Air Force chief of staff to use the term *aerospace*. It appeared in the August 1958 issue of *Air Force Magazine*.⁷ After that, leaders and doctrine experts used the word throughout the Air Force until Gen Merrill A. McPeak became chief of staff in 1990. He preferred *air and space*, and his views were dutifully echoed throughout the Air Force until General Ryan took over in 1997. In fairness to General McPeak’s successor, Gen Ronald R. Fogleman, it must be said that while he seldom used the term *aerospace*, he did state in 1995, “I think as we move into the 21st century, the United States will be defined by the fact that it is an aerospace nation.” General Ryan soon made it clear that the

term *aerospace* was preferable to *air and space* and should be used throughout the Air Force.

It's ironic that the Air Force, which originated *aerospace* some 40 years ago, has at times seen the word embraced more enthusiastically by industry, commerce, and education than by itself. The reason for the word's widespread usage is its plain meaning and proven value. Looking back on decades of its ever-growing use, I see it embodying the most challenging and vital operational realm for military forces dedicated to national defense.

Aerospace is simply another word for sky. It's that heart-thumping "wild blue yonder" that has inspired and excited America's youth from the earliest days of flying. From Earth it extends even farther than the eye can see or human technology can reach.

Aerospace is the region that Pilot Officer John Gillespie Magee Jr., Royal Canadian Air Force, had in mind more than a half century ago when he wrote his immortal poem "High Flight": "Oh, I have slipped the surly bonds of Earth/And danced the skies on laughter-silvered wings. . . /And, while with silent, lifting mind I've trod/The high untrespassed sanctity of space."

There is no better symbol for aerospace than the Air Force's traditional winged star, which is reproduced on the cover of Air Force doctrine documents—the star representing the firmament with its constellations, and the wings for flight closer to Earth. The winged star combines aeronautics with astronautics—two essential human elements of aerospace power.

Aerospace is our planet's natural realm in the universe. It's the Air Force's primary operational medium and area of expertise in support of the people it helps protect.

Clearly, the Air Force's job in aerospace is as big as the sky; its future, unlimited as space. But all its doctrine documents must speak the same language, and all its organizations should acknowledge in their titles the reality of the twenty-first century that *they are engaged no longer in operations confined only to the air—to the Earth's atmosphere—but their planning, training, development, and actions are now and forever interrelated and interdependent with space*. The US Air Force has an obligation to act boldly in demonstrating that it is, in truth, an *aerospace force* comprising "both air and space systems and the people who employ and support these systems." □

San Antonio, Texas

Notes

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6. *Ibid.*, 2-3.
7. *Air Force Magazine* 41, no. 8 (August 1958): 36.

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and communications sites. By the end of the conflict, all aforementioned missions were carried out at night.

4. All equipment given by the United States for FAS to prosecute the war is now on display in museums. Plenty of time and resources were invested in finding shops in the United States to overhaul the C-47 engines. However, the service life of those engines was at times fewer than five hundred hours, even after they were overhauled. The operation of this excellent platform became complicated, given the occurrence of in-flight malfunctions. That led to the conversion to turboprop in the early 1990s. The UH-1Ms, on the other hand, were acquired "as is." That meant that sometimes they were taken directly from boneyards in the United States and made airworthy again. The rationale to request Cobra helicopters was due more to the problems associated with maintaining the UH-1Ms than to power hunger. As to the F-5s, FAS has no high-performance aircraft. Its desire to acquire the F-5 was grounded on the need to fill this void and be on an equal footing with Honduras in that regard. Four years ago a decision was made to remove all UH-1Ms and half of the UH-1Hs from the flight lines due to problems associated with spare parts and maintenance.
5. The FAS officer corps was always small. There was a critical shortage of senior officers throughout the conflict. The major commands were filled by the few available senior officers, and the intermediate commands were filled by dedicated officers who carried the weight of the fighting on their shoulders. In a conflict in which pressure was constantly applied 24 hours a day, FAS leadership was able to maintain very high unit morale in the face of
- adversity. Over 50 pilots lost their lives in that conflict.
6. We still don't fully know why the FMLN did not launch a major attack against FAS facilities at Ilopango and Comalapa during the November 1989 offensive (which differs from what Dr. Corum states on page 36). Their attempts were nothing more than mere harassments, and their actions did not prevent the aircraft based there from operating unimpeded over rural and urban areas. FAS played a decisive role in denying victory to the FMLN on that occasion. The precision level it achieved in support of army units operating in urban areas was outstanding. That precision was achieved in exchange for greater exposure to enemy fire. Several pilots were killed or wounded, and many aircraft were either damaged or destroyed during the offensive.
7. The FMLN's Sandinista allies did not supply them with surface-to-air missiles (SAM) in time for the November offensive. However, from December 1989 on, the FMLN obtained more than two hundred missiles (including SAM-7a, -7b, -14, -16, and Redeye) and fired dozens of them at FAS aircraft, downing three of them—an A-37B, an AC-47, and a UH-1M. Even when the incorporation of the missiles into the FMLN inventory forced FAS to change its tactics and operate more at night, the fire from light weapons caused most of the damage. Virtually all rotary-wing aircraft and many airplanes were hit repeatedly by ground fire. Unscheduled maintenance—more so than lack of experience, ability, or the number of mechanics—created the bottleneck in the shops. Under the circumstances, maintenance support was also outstanding.
8. *El Niño* has helped Salvadoran pilots display their skills in the last few years,

especially when fighting fires. During Hurricane Mitch, FAS rescued more than two thousand people from flooded areas, in addition to providing supplies and medical aid. That shows the skill of the pilots and the ability of their instructor pilots, which, contrary to Dr. Corum's assertion on page 39, have improved since the war years.

9. The FMLN factions outlined two basic strategic courses of action to assume power: insurrection and prolonged popular war. During the January 1981 and November 1989 offensives, FAS was instrumental in denying victory to those who opted for insurrection. The high mobility and range enjoyed by FAS within the small Salvadoran territory enabled them to constantly hit FMLN units, bringing about considerable attrition. FAS was so highly respected by the FMLN that it stopped laying booby traps—a basic tactic when waging a prolonged popular war—by the end of the conflict in exchange for FAS's halting the bombing.
10. FAS was effective in attacking the enemy's strategy, decisively helping force him to change his modus operandi. That created friction within the FMLN leadership since each faction wanted to gain power through its preferred way and be the revolutionary front. Certainly, after all was said and done, neither option led them to victory. The FMLN should have recognized its inability to gain power through the use of arms.
11. The Salvadoran experience shows that neither the US Air Force nor US Army aviation is able to provide support to a country that finds itself fighting an internal conflict of this type. The equipment in the US inventory is technologically advanced and expensive but inappropriate for this kind of war. The previously used equipment is so obsolete that its maintenance and operation become overly complex and onerous. Addition-

ally, even when it is said that this type of conflict will be predominant in the years ahead, there is no low-tech alternative. Lastly, it is clear that the personnel who developed the skills to conduct, operate, or advise in the delicate art of insurgency warfare have now been retired for decades or forgotten.

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RESPONSE TO COLONEL PARRINGTON

I thank Col Alan Parrington for his gracious answer to the critiques Lt Col Dave Howard and I wrote in response to his Winter 1997 article, "Mutually Assured Destruction Revisited." Nonetheless, I find his answers to our criticism somewhat disturbing. I for one believe that he is "100 percent Air Force" (which, he said, we seemed to doubt). Were he otherwise, I would not have written a letter in response to his article. It concerns me that representatives of academia and the other services misunderstand airpower, but I expect misunderstanding from these sources. But when a prominent senior Air Force officer fundamentally misapprehends airpower's role, it disturbs me enough to warrant a response.

Colonel Parrington states that we think the Air Force cannot justify its separate existence without an independent "strategic" mission. This is not true. Just the specialization required to gain and maintain aerospace superiority is, as Colonel Parrington rightly points out, enough to justify an independent air arm. In fact, when he mentions that the Army flies more aircraft than the Air Force does, he fails to take his own argument to its logical conclusion. Army helicopters, although able to employ air mobility, are still essentially a *surface* maneuver element, as tied to the linear battle space as tanks are. Indeed, they are more vulnerable to enemy airpower than tanks and infantry are. They require a force devoted to keeping enemy airpower away from them to enable their operations,

just as tanks and infantry do. This alone justifies a separate air force having the specialized role of aerospace superiority as *one* of its missions. The issue at hand is not the independence of the Air Force, but rather a proper understanding of the nature of war and aerospace power's role within it.

Colonel Parrington is right to say that "airpower has proven itself *the* decisive factor in warfare in the twentieth century." He is wrong, however, in his understanding of why this is so. He implies that this happened because airpower was used exclusively to accomplish what he seems to think is its one true mission: air superiority. Paraphrasing Alfred Thayer Mahan in his response in the Fall 1998 issue, Colonel Parrington writes, "'The principal mission of a navy in war is the destruction of the enemy navy just as the principal mission of an army is the destruction of the enemy's army.' It follows that the principal mission of an air force . . . is destruction of the enemy's air forces . . . and the establishment of air . . . supremacy." Ignoring for the moment the confusion of *supremacy* with *superiority*, the basic contention is just plain wrong. The principal mission of any instrument of national power, military or otherwise, is to achieve objectives that shape a desirable end state to a conflict; that compel an adversary to do our will. Mahan may have made the statement within this quote, but Colonel Parrington took it out of context. The body of Mahan's writings emphasizes that "more almost than armies . . . navies are instruments of international relations" (see Alfred Thayer Mahan, "Navies as International Factors," in *Armaments and Arbitration* [New York: Harper Brothers, 1912], 66). In wartime, control of an enemy's "strategic or vital centres" is the ultimate aim: "Only by military command of the sea by prolonged control of the strategic centres of commerce can . . . an attack [on a nation] be fatal" (Alfred Thayer Mahan, *The Influence of Sea Power upon History, 1660-1783* [Boston: Little, Brown & Co., 1918], 539). Such control, Mahan said, was facilitated by destruction of enemy navies, but the latter by itself was not the ultimate aim. Mahan was his era's greatest pro-

ponent of the independent strategic role of sea power.

To use an example from history, the greatest test of the US Navy of the nineteenth century was its use in blockading Confederate ports during the Civil War. While this effort required a substantial degree of sea superiority (*supremacy*—the total absence of resistance—was never achieved), its aim was economic strangulation and the crippling of war industry. Destruction of the Confederate Navy was incidental to this aim. Indeed, the aim could theoretically have been achieved without firing a single shot (had the Confederates chosen not to contest the blockade). Similarly, on land, Grant's closing of the Mississippi, Sherman's march to the sea, and Sheridan's campaign in the Shenandoah were undertaken with the neutralization of Confederate economic centers of gravity in mind. Destruction of the armies standing in the way was necessary to enable these operations, but was not an end unto itself.

In fairness, armed forces are, more often than not, also strategic or operational centers of gravity. They enable an enemy to act against us, just as do the war industries that support them. Grant's aim in the Civil War's main eastern theater in 1864-65 was the destruction of the Army of Northern Virginia. That army's defense of Richmond was ultimately of secondary importance. Mahan criticized the French and their allies in the mid-eighteenth century for sniping at British commerce and not taking on the Royal Navy itself (a strategic center of gravity) while they had a superior fleet. We should not overlook the importance of disabling armed forces—including air forces—as an end unto itself in many conflicts.

The point is that this is just *one* of the things the various instruments of national power are called upon to do. The nature of a conflict and its intended end state drive the choice of which centers of gravity to affect and which tools should be used to affect them. Sometimes, realization of the end state will require destruction of the enemy's armed forces; other times perhaps not. Even if such destruction is an aim, the best tool for the work may

not require direct attack upon the targeted armed force. For instance, the Royal Navy's blockade of Germany in World War I arguably had more effect on Germany's army by 1918 than had all the shelling and assaults of the previous four years. Air forces, armies, and even economic sanctions may be the tools of choice in other conflicts. In almost all cases, a synergistic blend of all the tools, properly integrated and orchestrated, is better than any one or several used in isolation.

By artificially limiting airpower to the role of destroying other air forces, we risk missing many options airpower's other capabilities give us. Airpower requires some degree of superiority to enable all the things listed below so that air superiority cannot be stinted. But airpower has also been used very effectively to shock, dislocate, and destroy maneuvering surface forces directly; to immobilize land forces behind enemy lines; to destroy surface forces assembling or in port; to deny enemy forces vital supplies; to cripple war industries that fielded forces depend on; and to directly disable economic centers. (The latter two were finally accomplished in World War II, despite missteps like Schweinfurt and Nuremberg, with attacks on the German transportation system.) It also moves, supports, and sustains forces, furnishes commanders with vital intelligence, and (of late) has been used to directly isolate and induce shock on enemy command structures. Armies and navies can also do most of these things, but they must usually plow through enemy forces or maneuver to positions of decisive advantage before they can do so. Air forces have the unique ability to accomplish many deep effects without first having to defeat or outmaneuver enemy surface forces. All of these effects can be accomplished without directly attacking enemy populations (a straw man Colonel Parrington sets up to stand for "strategic" use of airpower). And yes, airpower can (with or without nuclear weapons) help deter war, just as armies and navies can.

Colonel Parrington speaks of maneuver warfare, but I'm not certain from his comments that he understands it fully. Current maneuver warfare doctrine, an extension of

the blitzkrieg concept, uses fire and maneuver to induce shock, confusion, and dislocation in an enemy faster than he can adapt, and to then exploit his disorder before he can react. This is the way the Army and Marine Corps think and fight, and it is the right way to think about land warfare. Its only limitation is that it encompasses only three dimensions (two horizontal and time). Extend the concept into a fourth dimension (the vertical) and you open a whole new range of effects and a whole new arena of decisive maneuver. You can impose shock and dislocation on an entire enemy system, including—but not limited to—its armed forces. Maneuver warfare extended into four dimensions is the soul of air warfare properly understood. Fighting this way requires close cooperation with surface forces throughout the spectrum of conflict but also entails using aerospace forces for much more than just defeating enemy airpower.

Colonel Parrington says that failure to emphasize air superiority might lead to more Pearl Harbors. True, as far as it goes, but artificially constraining the role of air led directly to the original Pearl Harbor by blinding the Navy to the potential of the aircraft carrier. I'm sure Colonel Parrington does not *intend* that we return to industrial meat-grinder, force-on-force conflicts, but an unintended consequence of his limiting ideas might be a return to such warfare were these ideas to lead to artificial constraints on airpower. Prominent and distinguished officers like him should be advocates for *all* of aerospace power's capabilities.

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RESPONSE TO "A FAILURE OF VISION"

Captains Fred Kennedy, Rory Welch, and Bryon Fessler's article, "A Failure of Vision: Retrospective" (Summer 1998), misses the mark. Sure, the United States—as a free and open society—is vulnerable to chemical and biological attack from within our own borders. And yes, our telecommunications infra-

structure is equally vulnerable to attack by a dedicated and competent foe.

But while the targets in "A Failure of Vision" may be strategic centers of gravity, they are not utterly essential to our national health and well-being. A common misconception when discussing information operations is to believe that the constituent elements of a network are incapable of operating independently of the network itself.

So, all that the cabal of adversaries in "A Failure of Vision" accomplished was a derailment of the most centralized elements of our strategic command apparatus—and not a decapitation of the industrial-age forces in the Republic of Korea, on the surface of the oceans, or elsewhere on the globe. Since the three captains are serving time inside the beltway, their seeming disregard for our operational forces' ability to think for themselves is forgivable. However, their implication that "a few simple systems" could avert such a disaster raises both incredulity and suspicion. Are they simply trying to sell more technocentric solutions in the guise of espousing the need for "more complex doctrine"?

America derives its strength not from the impermeability of "Fortress America," but from the resilience of the notion of a government of the people, by the people, for the people.

Shane Deichman
Camp H. M. Smith, Hawaii

SPEECH RIGHTS

I read "The Speech Rights of Air Professionals" (Fall 1998) by Col Lloyd J. Matthews, USA, Retired, with some interest, given the current climate of unprecedented commentary coming from within the Air Force. The Air Force corporately, and its senior leadership in particular, tries to sit on the fence on controversial issues such as free speech. It's my opinion as a junior officer that this lack of leadership leads to confusion in the ranks, and at times open dissension. This is inherently detrimental to the mission and to good order and discipline.

It is only at the end of Colonel Matthews's article that we finally see the type of guidance the Air Force needs to make clear. He discusses something I think is glossed over in all Air Force training, in all leadership symposia, and, frankly, in most articles on the subject: Air Force members voluntarily give up some of their constitutional rights when they join the service. Freedom of speech is one area that is constrained, both to keep order and discipline and to protect operational security and classified information. But this is not a unique case. For instance, freedom of the press is infringed on even in base newspapers and Army and Air Force Exchange Service stores when the government of the United States establishes clear guidelines on what can and cannot be published and sold on military installations. Ever tried to carry a gun onto a military installation? Your right to bear arms is infringed on for security reasons. Ever heard of the Fourth Amendment (unlawful search and seizure)? Once you step on a military installation, you give implied consent to search and seizure, and there is no requirement for the security police to obtain a warrant. The examples of infringements on our civil rights are countless.

But the real message of Colonel Matthews's article, and why I am so glad it was written, is that these things are appropriate. It is necessary to limit the speech of military members (not just airmen). We must keep good order and discipline in the ranks. We must protect information that is essential to our operations. It is good for discipline that the restrictions on publishing exist. You can't really secure an installation where firearms are carried, perhaps covertly at will and without restriction. It is too easy to get into a deadly situation where lives and security are in jeopardy. The bottom line is, that without these necessary and appropriate measures, we as an Air Force, as the United States military, cannot accomplish our mission.

I'd like to see more Air Force leaders in the pulpit preaching the virtues of adherence to military codes of ethics, justice, and yes, free speech. I'm tired of seeing so many outspoken and unprofessional commentaries on the do-

ings of senior civilian leaders, congressional decisions, and so on, regardless of the validity of those commentaries. What happened to the days when military members raised their right hands and swore to obey the lawful orders of their superiors and comply with the Uniform Code of Military Justice? Whatever happened to integrity, doing that which was right, even if it was hard or unfair? We all stood there and swore an oath to support and defend the Constitution of the United States and should have understood that there were sacrifices required to do so. The bottom line is we volunteered to give up these rights for the good of the nation. If you have second thoughts at this point in your career, it's time to get out and move on with your life.

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THE ARMY WEIGHS IN

I gather from the somewhat shrill response that I touched a nerve in my article "Into the Storm: A Review Essay" in the Summer 1998 issue. In a rebuttal ("Ricochets," [Winter 1998]) to my article, an Army representative took me to task for (1) branding Gen Fred Franks a coward, (2) failing to properly credit VII Corps with its legitimate achievements in the Gulf War, (3) failing to understand the mind-crushing complexity of wielding an Army heavy corps as a weapon, and (4) being generally ignorant of history and the operational art. I beg to differ.

Let me dispense with one matter up front: I was not accusing General Franks of personal cowardice or of being a man of timid character. On the contrary, General Franks proved his mettle and superior character in everything he did before, during, and after Desert Storm. The strength and personal courage he exhibited in rebuilding his life after losing a leg in combat during Vietnam should be an inspiration to every American. This is the strongest part of Clancy's book (*Into the Storm: A Study in Command*), coauthored by General Franks. He shows us Franks's struggle as a paradigm of the Army's effort to rebuild

itself and renew its self-esteem in the shadow of Vietnam.

In the larger sense, overly cautious command does not equal personal timidity. Personal bravery is usually a predicate for bold field command, but the converse is not always true. Personally brave leaders are not always good field commanders. I would like to think that General Franks's caution stemmed from a very noble source: his care for the men he had trained and led in VII Corps. Similar feelings have instilled caution before; it's nothing new.

History often forgets such men, but a few stand out whose undeniable personal bravery was overcome by caution in battle. A few examples: the commanders who faced Napoléon during the 1796-97 Italian campaigns (Count Dagobert Siegmund von Wurmser, Gen Josef Alvintzy, Gen Paul Davidovich, and Archduke Charles of Austria) who squandered several opportunities to crush the outnumbered and over-extended French. (Seldom have so many such commanders been assembled at one place and time, but their generalship suffers more than it might otherwise in comparison with their opponent.) There was also French admiral Pierre Villeneuve, whose failures of will sealed his fleet's fate against Lord Horatio Nelson at Trafalgar. In American history, Union general George B. McClellan consistently lost battles and opportunities because his innate caution always led him to overestimate the enemy and delay action. In our own century, British field marshal Bernard Law Montgomery likewise squandered opportunities before Palermo, at Falaise, and in the attempted relief of the Remagen bridgehead due to his cautious nature as a commander. (The victory at Alamein was, of course, as much the result of the Germans running themselves out of fuel as it was of anything Montgomery did.) Unfortunately, despite Clancy's attempt at exculpation, history will probably place General Franks in company with such men.

Now to the meat of the issue: I may not have as thorough an understanding of operational art as I or others might wish, but I understand enough to realize that the objec-

tive is the first and most important principle that guides planning and execution of US military operations. VII Corps was given a clear, decisive, measurable, and attainable primary objective: destroy the Iraqi Republican Guard (RG). This objective was central to the war effort. Its achievement carried profound implications at the strategic level for the conflict's political end state. This objective was not couched in terms of destroying a certain number of enemy divisions, attriting a proportion of enemy equipment, taking certain ground, or proving the capabilities of an Army corps. It meant exactly this: destroy the Republican Guard.

In every aspect short of that objective, VII Corps's achievements were impressive. It's true (as stated in the rebuttal) that "VII Corps, under the able command of General Franks, proved with numbers of destroyed Iraqi combat equipment alone, the capabilities of a most effective armored corps." That may be true—to paraphrase Vietnamese general Vo Nguyen Giap, one of the century's great commanders—but it's also irrelevant. A US Army officer should not have to be reminded that body counts do not equal victory. We killed nearly a million of the enemy in Vietnam and still lost the war. In the end, VII Corps's battle was a lot like Antietam: The enemy lost tactically and quit the field but lived to fight another day. The fact that our cost did not run to a myriad dead does not change a thing. Once again, body counts (large or small) do not win wars. Slice VII Corps's achievements any way you wish, but this underlying fact remains: VII Corps and General Franks failed to achieve their primary objective.

I also know the operational art just well enough to know that the offensive is "the most effective and decisive way to attain a clearly defined objective" (Joint Pub 3-0, *Doctrine for Joint Operations*, February 1995, A-1). It is disingenuous to say, "Political decisions ended the war early before VII Corps was able to fully dispatch the Republican Guards." Certainly, the war ended too soon for specious reasons, but this excuse sounds "McClellanesque": ("I can win the war, Mr. President, if I can only have more time; if I can only have

one more division; if only I can wait until all my siege guns are in place; if only I can wait until my divisions are properly rested or synchronized; if only. . . .") Force protection, synchronization, and logistical coordination are all very important, but they only protect or enable; they do not win. Decisive action wins, and VII Corps had ample time and resources to act decisively against the Republican Guard. General Franks spent nearly 48 hours of the hundred-hour ground war "dressing his lines," concerned that his divisions were not properly synchronized or that bypassed enemy units would rise up in his rear. As it was, the 2d Armored Cavalry Regiment sliced through a brigade of the Tawakalna RG Division like a knife through butter. This unit, and lead elements of the 1st and 3d Armored Divisions, could probably have driven to the area south of Basra in that 48 hours, in time to prevent escape of the RG and the rest of the Iraqi army. Had General Franks thought more in terms of France 1940 than France 1916, he might have pulled his logistical "tail" (things like his heavy expanded mobility tactical truck [HEMTT] fuel trucks) closer to his front-end units and might have used air and slower surface units to screen his flanks and rear. The British 1st Armoured Division, which screened VII Corps's right flank against the bulk of Iraqi regular forces in the corps area, felt as if it was just "holding the door open for the U.S. Army" (Gen Bernard Trainor and Michael Gordon, *The Generals' War: The Inside Story of the Conflict in the Gulf* [Boston: Little, Brown & Co., 1995], 398). There were more than enough air and surface resources for General Franks to screen his rear from the immobilized and dislocated Iraqi units left behind by his main thrust.

Franks's concerns seem to reveal a philosophy of war steeped more in the methodical, set-piece mentality of the eighteenth or early twentieth centuries than in the more decisive strategies of the early nineteenth or later twentieth centuries. He seemed to draw his inspiration more from Leopold von Daun, Sébastien le Prestre de Vauban, and Helmuth von Moltke (the younger) than from Napoléon, Erwin Rommel, or George Patton.

Here's the heart of the issue: Franks's battle in the desert should not have been siege or set-piece warfare writ large; it should have been a blitzkrieg. It should have been dislocation and exploitation warfare; as it was, the dislocation was achieved well beyond expectation (largely by airpower before the surface battle began), but the exploitation did not take place.

However you list the career achievements of General Franks and Gen H. Norman Schwarzkopf, the most important difference between the two was philosophical. The latter intuitively understood maneuver warfare, and the former did not. What's more, General Schwarzkopf appreciated the concept of the blitzkrieg in its truly joint sense: in four dimensions (two horizontal, the vertical, and time), not just the Army's traditional three (minus the vertical). General Schwarzkopf's coup d'oeil enabled him to use airpower to impose dislocation effects and create opportunities for exploitation over the entire Iraqi system, not just on the field of battle. However the two came to their differing understandings of the nature of war, General Schwarzkopf's was the more correct. This may seem "highly tendentious" and "lacking the virtues of statesmanship or objectivity" to elements of the Army (so characterized in Richard M. Swain, *Lucky War: Third Army in Desert Storm* [Fort Leavenworth, Kans.: US Army Command and General Staff College, 1994]), but it has been borne out by history.

Perhaps the problem is that the heavy surface corps is just too cumbersome and complex a thing for any present-day American commander to wield, especially since we don't practice wielding it often enough to become proficient. Perhaps—just perhaps—we need a different paradigm of the operational art for the future. Perhaps it should be based on lighter, leaner, more flexible surface units acting in closer cooperation with the air arm. Perhaps it should recognize that many forms of airpower (not just Army helicopters) are maneuver forces—that air does more than just provide fire support. Perhaps there should be one scheme of maneuver in a campaign, with air sometimes the dominant—and ground

sometimes the subordinate—arm. History has shown this to work on a number of occasions. During the blitzkriegs in France and Russia, the Luftwaffe routinely acted as an integral maneuver force, providing the driving wedge (as at Abbeville in 1940), screening flanks, and so forth. Our own tactical air forces performed similar functions in the drive across France in 1944. At Mortain during the Cobra breakout (1944) and at Khafji in Desert Storm, token ground elements served to fix vastly superior enemy forces while airpower destroyed them. None of this, of course, takes into account the systemwide dislocation effects afforded by modern "strategic" uses of airpower.

As former defense secretary James Schlesinger said recently, "It remains true that airpower 'cannot do the job alone.' That is right—but irrelevant. In most military operations, it can do a substantial job in obtaining quick victory with low casualties. While that is crucial to America's international mission, some Army officers have been reluctant to accept the altered role that airpower can play" (James R. Schlesinger, "Raise the Anchor or Lower the Ship," *The National Interest*, Fall 1998, p. 2). Balance is not a virtue if it's used to defend an idea that is wrong; similarly, bias is not necessarily a bad thing if you happen to be right.

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GREAT SOLDIERS ON AIRPOWER—AN LOC AND FACS

I would like to comment on Col Jeff Barnett's excellent article "Great Soldiers on Airpower" in your Winter 1998 edition. He has correctly identified the great debate which rages and will continue to rage concerning the role of airpower in modern war. But his comments on the use of American airpower against the North Vietnamese invasions of South Vietnam in 1972 and 1975 are, in my opinion, somewhat misleading. Specifically, he quotes Jeffrey Clarke's *Advice and Support: The Final Years, 1965-1973* (US Army Center of Military History) when he says that "An Loc would

never have held without the handful of American [Army] advisors directing the air-strikes and shoring up the local leadership."

An Loc certainly was one of the key battles of the war. The army of South Vietnam stopped the enemy offensive there. That effort was, of course, buttressed by significant US air support. I cannot comment on whether or not the American advisors shored up the South Vietnamese commanders. But the remark about their "directing" the air strikes is incorrect. The air strikes were directed and controlled by USAF forward air controllers (FAC). I know that because I was one of them. Flying over the battlefields of that great campaign, and patrolling over the enemy's interdiction routes, we were the extension of the Seventh Air Force commander and directed the weight of USAF, USN, and USMC airpower against the enemy.

However, when working directly with ARVN and VNMC ground forces, we routinely talked with the US Army and USMC advisors with those units. They would pass us targets which they wanted struck. We did our best to honor their needs and requests. We also received targets from Seventh Air Force intelligence and our own visual reconnaissance, and then attacked the targets. But we—the US Air Force—directed and controlled the air support. Col Barnett reinforces this claim when he further states: "By 1975 American airpower was completely gone (along with the American advisors who would direct the air-strikes)."

Again, the American advisors were not the key to the direction of American airpower. In this case, USAF FACs were still in-theater, as were some USAF strike assets and USN aircraft carriers. Those FACs could easily have worked with the ARVN commanders to direct and control those assets. What was missing was American will to use them once again. By this late date, President Nixon had resigned, and the power of the president to use military force had been severely restricted by the War Powers Act. Additionally, the South Vietnamese air force had been fatally weakened by restrictions on spare parts, ordnance, fuel, SA-7 countermeasures equipment, and any-

thing capable of counteracting the North Vietnamese radar-controlled AAA or SAMs.

Even with all of that, however, the North Vietnamese did not launch their final offensive until they were sure that the United States would not launch air strikes, especially B-52s, against them. They had well learned to fear and respect American airpower. So, perhaps it can be argued that American airpower was decisive in the negative in the Vietnam War—for the enemy only decided to finally commit its forces to the climactic campaign when its leaders concluded that American airpower would not be there.

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COMMAND OF THE AIR IN KOREA

"In the end, the judgment was that the superior combat experience among the American flyers was the decisive thing in generating the overwhelming kill ratios against the MiGs. . . . So there is little left but combat experience to explain it." It is remarkable that Dr. David Mets's quest for the reason of the superiority of the F-86 Sabres did not come up with a somewhat different answer ("To Kill a Stalking Bird: Fodder for Your Professional Reading on Air and Space Superiority," Fall 1998). If one reads between the lines, the author already seems puzzled that experience could make up for all the disadvantages the allied pilot had to face. Let us first stress the differences even more by comparing both aircraft. The author does not mention it, but the MiG-15 outperformed the Sabre in speed, acceleration, ceiling, sustained turn rate and so on. So, how was the allies' stunning 9-to-1 kill ratio against aircraft with such capabilities really possible? If the writer had discussed the matter with somebody who knew the late Col John Boyd, Korean ace and ace in strategic thinking as well, he may have concurred that the answer was not (merely) experience but definitely "agility" also.

One of the reasons for the MiG's superiority in performance numbers was its low weight, the Sabre being far heavier. This was

mainly due to the hydraulic flight control system that the MiG did not have. As a result, however, the Sabre was flyable with fingertips and could transit quickly and easily from one maneuver into another. In the turning fights, the MiG pilot struggled with the controls and needed all his physical strength to fight with the aerodynamic pressures on the control surfaces. Meanwhile, the Sabre would dance around the enemy effortlessly, rendering the MiG pilot's attempts to maneuver futile or even counterproductive. This is what made the real difference and also formed the base of John Boyd's famous control loop or OODA (observe-orient-decide-act) loop doctrine, which stated that he who has the fastest and most accurate action/reaction cycle to influence the fight will win—even against the numbers.

It is remarkable that this lesson was not learned at that time, the F-86 being the last fighter pilot's fighter for a long time. Agility was sacrificed for speed and altitude with the next generation of winged and rocket-like combat aircraft until the appearance of the F-16, designed as John Boyd personally directed, for optimal agility and "energy maneuverability."

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A SPACE SANCTUARY?

In arguing that space should be maintained as a weapon-free sanctuary ("Space Sanctuary: A Viable National Strategy," Winter 1998), Lt Col Bruce DeBlois usefully promotes and broadens the debate of an important issue. Whatever one believes about the near-term requirements for space control and force-application capabilities, space weaponization is one of the major holes in the Air Force's case for "aerospace" as a single operational medium. If we believe in the aerospace construct, we acknowledge the physical differences between air and space but emphasize the similarity and complementary nature of the roles and missions conducted there. We must therefore argue that air and space

should be treated as much alike as possible in the legal and policy realms. As Colonel DeBlois points out, this is not the case today and the Air Force has often been reluctant to aggressively make such an argument for fear that even the limited technology development and strategic conceptualizing we do might be curtailed by Congress or the administration. The only way out of this corner is through informed debate.

Colonel DeBlois makes a number of good points, not the least of which is that military strategists must objectively address all arguments both for and against space weapons. Nevertheless, many of his conclusions seem more emotional than logical. I believe this stems from building the sanctuary case around the fundamentally flawed analogy between space and nuclear weapons. This comparison has always seemed fantastic and rather paranoid to me, since all the space-related weapons (exclusive of the nuclear-tipped antisatellite missiles described in the article and the phantom orbiting nuclear bomb threat of the 1960s) ever seriously proposed do not, together, add up to the explosive force of a single nuclear weapon or to the lethality of a pound of anthrax spores. In terms of effects, the proper comparisons are things like advanced medium-range, air-to-air missiles and conventional air-launched cruise missiles. That space weapons might be near-instantaneous and "next to impossible" to defend against certainly makes them more formidable (though it dismisses countermeasures too easily), but to assert that they are inherently destabilizing to a degree that is "militarily self-defeating" and "will inevitably incite military coalitions against the United States" is quite a stretch! In fact, space weapons need not be any more destabilizing than F-117s, B-2s, or any of many other unmatched weapons the US fields.

Nor will space be a sanctuary one day and massively weaponized the next, as is implied. The first line of the article had it right: "Space 'militarization/weaponization' is not an 'all-or-nothing' affair." The real path to the future will be highly evolutionary. The United States will not embark on a strategy to "weaponize

space." Rather, we (and other nations) will evolve systems that fall under Colonel DeBlois's definition of space weapons as has always been done—on a system-by-system basis in response to operational requirements and as technology and policy permit. If there is an arms race, it will be rooted in a geopolitical context and will neither be limited to nor exclude space. It will be nation to nation or block to block.

A better analogy, even if the United States were to weaponize space to the degree Colonel DeBlois implies, is the US Navy. We are today a "sea hegemon" in the way he describes a destabilizing "space hegemon." No other nation in the world fields a blue-water navy that can remotely compete with ours. It is far and away the preeminent sea-control and sea-based force application force today, the exact functional equivalent of the space-control and space-based force application

force that space sanctuary advocates fear. Is this destabilizing? Just the opposite; every regional commander in chief today would argue that it's one of the most stabilizing tools in his bag.

Geopolitical stability is a complex brew, and care is always needed when changing the recipe. Space weapons have historically been avoided and now carry a lot of baggage regardless of one's position. Nevertheless, we ought not mistake a tractable problem for an intractable one. One space weapon is not like another any more than one air or sea weapon is like another, and one weapon system does not result in or lead to wholesale "space weaponization." Let's banish the bogeymen and conduct the space weapons debate from the perspective of national security requirements and exploiting aerospace power to meet them.

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One of the marvelous things about life is that any gaps in your education can be filled, whatever your age or situation, by reading and thinking about what you read.

—Warren Bennis

This is the best book ever written by any man on the wrong side of a question of which he is profoundly ignorant.

— Thomas B. Macaulay

Restructuring the U.S.-Japan Alliance: Toward a More Equal Partnership edited by Ralph A. Cossa. CSIS Press, Center for Strategic and International Studies, 1800 K Street, NW, Washington, D.C. 20006, 1997, 168 pages, \$18.95.

In 1951 Japan signed a peace treaty with members of the United Nations. At the same time, the United States and Japan signed a security treaty that permitted the United States to station military forces in Japan. The treaty went into effect on 28 February 1952, the same day that the Allied occupation of Japan officially ended. In 1960 this treaty was replaced by the Treaty of Mutual Cooperation and Security, which formed the cornerstone for the US-Japanese security relationship throughout the cold war. The US-Japan Joint Declaration of April 1996 reaffirmed this alliance in today's security environment. *Restructuring the U.S.-Japan Alliance* provides a detailed analysis of today's security relationship.

Edited by Ralph A. Cossa, the book draws on the experience, thought, and perceptions from regional security specialists from Japan and the United States. Cossa divides the book into three sections to discuss the influences on the US-Japan alliance. The first section examines the geopolitical environment in which the alliance must function. Chapter 1 is a commentary by Dr. Ezra F. Vogel, wherein he briefly discusses the relationship between the People's Republic of China (PRC), Japan, and the United States. He concludes that "the issues of how to strengthen the dialogue between Beijing, Tokyo, and Washington should now be at the center of U.S. and Japanese discussions on security." Chung Min Lee, a security analyst currently with RAND, wrote chapter 2. He looks at how the change in thought brought about by the end of the cold war produced a reassessment within East Asia of how they view themselves, relate to each other, and perceive a rivalry between the United States and the PRC. Japan's decision to stay

with the alliance as opposed to building an independent military capability is viewed as a stabilizing influence in the region. Chapter 3, by Prof. Mataka Kamiya, assesses the feasibility of various security arrangements and their effectiveness. He concludes that a "double-layered security system" that uses the Association of Southeast Asian Nations (ASEAN) Regional Forum (ARF) to promote trust and understanding, and the US-Japan alliance to retain US commitment to the region will provide some assurance of security for East Asia.

The second section of the book looks at how the members of the alliance view themselves and what shapes that view. In chapter 4, Ralph Cossa, executive director of the Pacific Forum Center for Strategic and International Studies (CSIS), does an excellent job of defining and clarifying misperceptions that exist about the present relationship and the future relationship. The United States and Japan need to address these myths because they adversely affect public support for the alliance in both nations and in the region. Prof. Yasuhiro Takeda examines the democracy promotion policies of Japan and the United States in chapter 5. He proposes that the two countries coordinate their efforts instead of the almost opposite approaches taken by both governments in relation to nondemocratic governments. Chapter 6 studies some of the external influences on the alliance. Dr. Patrick Cronin looks at four external influences: the internal US debate on defense spending, actions related to peace and stability on the Korean peninsula, the conspicuous position of the PRC on the US diplomatic calendar, and the fate of Russia. Minoru Makihara, president of Mitsubishi Corporation, relates in chapter 7 how shared common interests and combined economic strength require cooperative engagement "with and in third countries" in order to promote stability "at a minimum cost and with maximum benefit to all."

Section three addresses the challenges that confront the US-Japan alliance. Chapter 8 is written by Prof. Haruo Shimada, an economist and chairman of the Okinawa Problem Committee that was commissioned by Japanese prime minister Ryutaro Hashimoto to study the domestic complexities and problems involving US bases on Okinawa. He points out that trust has yet to be developed between the people of Okinawa and those on the

Japanese mainland, and between Okinawa and the United States. Finally, trust with other East Asian nations needs to be developed. Chapter 9, written by Col Noboru Yamaguchi of the Japanese Ground Self-Defense Force, illustrates the importance of having US Marines stationed in strategically important Okinawa. In chapter 10, Dr. Michael Green looks at how the development of theater missile defense (TMD) is a serious issue in East Asia and that any development will have to consider perceptions by the PRC of TMD deployment. In chapter 11, Dr. Masato Kimura looks at the perception of the Japanese military in Japan today and ways in which education and an examination of national security in Japan, as a part of everyday life, are vital to the future security of Japan. Torkel Patterson of the Pacific Forum CSIS, states in chapter 11 that Japan lacks the national will, natural resources, and nuclear weapons that are required for Japan to be a superpower. He then studies possible roles for Japan's Self-Defense Force today and in the future. Finally, in chapter 12, Noboru Hoshuyama of the Japan Defense Material Foundation examines Japan's legal structure and states that Japan is not prepared for emergencies and contingencies.

This study by the Center for Strategic and International Studies, in cooperation with the Okazaki Institute and the Policy Study Group headed by Sen. Moto Shiina, is informative, thorough, and understandable. Each contribution is well written and properly researched. All the contributors support the continuance of the US-Japanese alliance as vital to the best interests of both nations and consider it necessary to maintain stability in East Asia. Periodic review and maintenance of this cornerstone relationship is important simply because "the risks and costs to both Japan and the United States of going it alone make such a choice dangerous and destabilizing."

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The Liberation of Guam, 21 July–10 August 1944

by Harry Gailey. Presidio Press, 505B San Marin Drive, Suite 300, Novato, California 94945-1340, 1997, 256 pages, \$15.95.

The high-rise hotels along Tumon Bay on the island of Guam are evidence of a peaceful and prosperous existence. However, the small remnants of a hot, hard-fought, bloody battle for this island a little more than 50 years ago still lie along the beaches and among the hills. The efforts to retake

Guam have not attracted the attention of historians to the degree of other battles such as Tarawa or Okinawa, but Harry Gailey's *The Liberation of Guam* fills this gap in the historical record.

Guam's first contact with Europeans occurred in 1521, when Magellan's ships made landfall after crossing most of the vast Pacific Ocean. The United States took the islands from Spain in 1898 during the Spanish-American War, when the Spanish governor, who did not know of the war with the United States, warmly greeted the cruiser USS *Charleston*. During the First World War, Japan obtained the nearby German possessions in a move that was sanctioned by the League of Nations after the war. The US territory of Guam was surrounded by the Japanese, who sat astride the lines of communications among Guam, Hawaii, and the US mainland. The United States did not fortify the island, so Japanese forces easily overwhelmed the defenses on 10 December 1941. The Japanese neglected fortification during the first two years of occupation, and through various atrocities, they alienated the people. Japan fortified the Mariana Islands in mid-1943, when the Japanese High Command realized that these islands were vital to the defense of Japan. By the summer of 1944, approximately 18,500 Japanese troops were ready to defend Guam under the command of Lt Gen Takeshi Takeshina.

Adm Chester Nimitz, commander in chief, Pacific, believed that taking the Marianas during the summer of 1944 was vital to the success of US operations in the Central Pacific. Maj Gen Roy Geiger of the III Amphibious Corps commanded the operation to invade Guam, which was initially scheduled for June, following the operation in Saipan. The difficulty taking Saipan delayed the invasion of Guam. As Gailey points out, this was fortunate since the attack was planned against a Japanese force of approximately nine thousand Japanese troops and used outdated intelligence. The additional bombardment and the addition of the Army's 77th Division to the invasion force helped to make up for the hurried planning. The invasion began on 21 July.

The invasion focused on two separate beachheads, one at Asan, which is to the north of the Orote Peninsula, and the other at Agat, which was south of the Orote Peninsula. The objective was to gain control of the high ground just overlooking the beachheads and then join forces, isolating the Japanese on the peninsula before taking it. Despite having tanks and artillery, the US Marines took longer than anticipated due to the difficult terrain; high humidity; frequent rain

showers; difficulty bringing equipment ashore; and the well-entrenched, hard-fighting Japanese. The Japanese defended the island from positions located in caves, tunnels, and from pillboxes situated on the beaches, cliffs, and hillsides overlooking the invasion beaches. During the next several nights, sporadic Japanese counterattacks took place along natural ravines and gaps in the US line.

General Takeshina never took advantage of the precarious position of the invaders by coordinating his attacks except for a single banzai charge on the night of the 25th, when large numbers of Japanese forces unsuccessfully charged well-armed American forces, resulting in many Japanese fatalities. General Takeshina was killed on the 28th by artillery fire during the American breakout. At this point, Lt Gen Hideyoshi Obata, who had only been passing through Guam at the time of the invasion, took over the defense. He shifted the bulk of Japanese forces to the north end of the island. The 77th Division, with great difficulty, crossed the island toward Pago Bay and then turned north as part of a three-pronged attack in concert with the Marines. The terrain was rugged, and the jungle thick. Japanese defenses were organized. Guam's Chamorros bravely functioned as scouts for the US forces, since they knew the terrain and potential hiding places. Finally, on 10 August, General Obata's command post was located in a cave near Yigo. US forces sealed the entrances. Later, over 60 bodies were found inside, including General Obata's. General Geiger declared the end of organized resistance on 10 August. Gailey relates briefly in the closing chapter some of the difficulties encountered by the battered 3d Marine Division and their Chamorro guides while rounding up the remaining Japanese. He also included the ordeal of Japanese sergeant Shoichi Yokoi, who emerged from hiding in 1972. Three airfields were built on the north end of the island for B-29 operations against Japan. During the invasion, US forces suffered almost eight thousand casualties, including more than one thousand killed. Approximately 10,000 Japanese troops were killed during the period specifically covered in this book.

The Liberation of Guam is easy to read. Professor Gailey, an emeritus professor of history at San Jose State University, expertly weaves personal anecdotes, official reports, and other original source material without losing sight of the "big picture." The maps are of sufficient detail to help the reader. Throughout the book, he captures in equal detail the sense of confidence mixed with apprehension that prevailed among US forces, as well as Japanese

expressions of bravery, futility, and adherence to the code of Bushido. Several years ago, my family and I were visiting part of the War in the Pacific Memorial located at the invasion beach near Agat, where a Japanese 40 mm antiaircraft gun was on display. While my two sons studied the open end of the two gun barrels, three Japanese tourists were busy studying the trigger assembly. The two valiant and determined foes are now friends!

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Vietnam: A History, 2d ed., by Stanley Karnow.
Penguin Books, 200 Madison Avenue, New York
City 10016, 1997, 784 pages, \$17.95.

Vietnam: A History is a well-written and very detailed accounting of events in Vietnam from 208 B.C. to 1976. Stanley Karnow takes an objective and refreshing view of events, trying to give both the American as well as the Vietnamese perspectives throughout the book. The result is an enjoyable account of Vietnamese history. Primarily a history book, *Vietnam: A History* provides many valuable lessons for intelligence analysts that should convince them of the necessities of objectivity as well as an understanding of the enemy.

The key to understanding why America became involved in Vietnam and why we failed is that we did not know the adversary. The critical need to understand the Vietnamese culture, or the culture of any adversary, is demonstrated throughout Karnow's writing. He describes how the Vietnamese developed their nationalist culture, refusing to be subjugated by foreign countries. China first invaded Vietnam in 208 B.C., but for sixteen hundred years could not "assimilate" the Vietnamese. The French continued to use the Vietnamese for economic gains with no regard for the people or the land. This attitude would bring about the final downfall of the French at Dien Bien Phu.

Similarly, American strategists would later misperceive Ho Chi Minh, though an avowed Communist, as simply a Soviet instrument. Such an error stemmed largely from an ignorance of Vietnam's history, a long and torturous series of conflicts and accommodations that gave the Vietnamese a profound sense of their own identity.

As Karnow repeatedly demonstrates, the military would continue to ask for more troops in order to win the war, and President Lyndon B. Johnson would okay the requests because losing was not a

political or military option. The assumption was that we would eventually wear the North Vietnamese out. In the end, we realized that our perceptions were wrong, and American will ran out instead.

Karnow illustrates that a major problem of the war effort was that our preconceptions of the enemy were wrong. Intelligence given to the president, instead of being objective, was consistently slanted toward those preconceptions. "Johnson demanded approval from everyone," and Karnow builds a case through numerous examples indicating that the president was misled by "upbeat accounts" of his advisors and "implausibly buoyant 'progress' report[s]," that played to the president's "desires." In one of these, a Central Intelligence Agency (CIA) summary of the air strikes against North Vietnam during 1966 told him only part of the story: "hundreds of bridges had been wrecked, but virtually all of them had been rebuilt or bypassed. Thousands of freight cars, trucks and other vehicles had been destroyed but North Vietnamese traffic was moving smoothly."

The result was the drawn-out war that we could not win and the unnecessary loss of American lives. Intelligence was not the only failure in Vietnam, but it demonstrates how pandering to the leadership's prejudices does a disservice to the leadership.

The lesson from Karnow's analysis that one should not miss is that intelligence has a specific role and should not be misused or abused. Such was sometimes the case with the CIA. If the CIA's role is to conduct intelligence, then one has to question its reasons for performing paramilitary operations. Prior to the assassination of President Diem, CIA agent Lucien Conein acted as middleman between the traitorous Vietnamese generals and the US government. After the peace accords were approved for the eventual reunification of Vietnam in 1954, the CIA created "stay-behind squads" to infiltrate South Vietnamese teams into the North. The CIA also ran the Phoenix program, responsible for the torture and assassination of thousands of people. Through these operations, Karnow shows how the paramilitary mind-set put intelligence in an environment that it is ill equipped to handle. He also demonstrates that these types of operations produce publicity disasters, creating distrust and anger toward the US intelligence apparatus.

Vietnam: A History provides enough history to help a military professional understand how the combatants' experiences shaped their way of thinking, and how their objectivity—or lack thereof—shaped the outcome of the war. This book will help the reader to understand that there are

limits to the roles that intelligence should fill and that they should not be exceeded.

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Cascade of Arms: Managing Conventional Weapons Proliferation edited by Andrew J. Pierre. World Peace Foundation, One Eliot Square, Cambridge, Massachusetts 02138, 1997, 466 pages.

While the world at large and academic communities tend to focus on the proliferation of nuclear, biological, chemical, and missile technology, conventional arms are flooding into crisis and potential crisis areas faster than at any other time. The post-cold-war world has dramatically increased the number of exporters, and a new market for gray (e.g., nonstate) actors in this business has grown disproportionately. Basic military forces around the world remain conventionally armed, and with the advent of smarter, computer-driven weapons, the lethality of conventional weapons has dramatically increased. Thus, the focus of *Cascade of Arms* is on lethal, conventional, high-tech weaponry exported by countries that appear unable or unwilling to regulate themselves for economic reasons. The authors argue that with the end of the cold war, weapons exports no longer increase one's political advantage.

The book is organized into five parts. The first deals with the arms trade in a very general overview but examines important trends that followed the cold war and that emerged in the Persian Gulf War. Such trends include the increasing numbers of suppliers, the globalization of arms-producing industries, and the importance of dual-use technologies. There is also a chapter on the shadowy side of the arms trade, usually not covered in standard texts on the subject. It addresses black-market sales, secret procurement, and concealed sales. The book argues that these "other" sales supply many of the insurgent and ethnic wars currently raging around the globe.

The next part deals with how advanced, industrialized nations have to sell arms to keep their industries producing at an economically viable level and how developing nations are entering the arms-production business and arms market. The production of arms in the third world has destabilized the global arms market, since export controls are non-existent among these arms producers. A close examination of arms-sales policies and practices of

the United States, Western Europe, Russia, and China is the subject of the next part. The United States has long been ambivalent about exporting conventional arms. Thus, the chapter revisits the Carter years to show that domestic policy considerations (i.e., jobs) have upset delicate international agreements but that other policies, such as the Missile Technology Control Regime, have held and could serve as a useful model. The chapter also focuses on new, advanced technology that could be the subject of export restrictions in an attempt to stop its proliferation to the rest of the world.

In Europe, decreased domestic demand has forced arms exporters to seek markets outside their traditional markets. This, in turn, will complicate any international or European Union initiative since European countries have always guarded their national sovereignty. The former Soviet Union and its successor states are all scrambling, trying to get Western currency for their advanced arms. Economic necessity rather than arms policy has taken hold and is unlikely to change as long as conditions do not improve. However, Western fear that unrestrained arms could flood the market should be tempered with the fact that most Russian weapons are considered inferior to Western arms, and their inroads around the world have been small. China's seemingly unrestrained transfers around the world are attributed to the fact that, given the Chinese government's distrust of multilateral arms-control agreements, it uses arms exports as a political lever in the international community.

The book then examines several regions, picked either for their volatility or for the increase in purchasing power of the nations in those regions: the Middle East (examined from both an Arab and Israeli perspective), Asia-Pacific, and South Asia. Arab and Israeli opinions on arms transfers to the Middle East and Persian Gulf are similar. Because the Persian Gulf War has actually fueled the demand for weapons in that subregional arms race, there is little real hope held out for regional arms control in this area. The book examines the Asia-Pacific region against the bust cycle that currently has enveloped that region, characterized by the fact that technology and qualitative rather than quantitative arms purchases are fueling the race. Finally, the section on South Asia notes the backdrop of domestic pressures that force Pakistan and India to spend money on weapons that could be used for social or economic development.

All of the contributors to this very comprehensive text conclude that the proliferation of conventional arms is and will continue to be a critical aspect of regional stability and international secu-

urity. However, as long as the world's arms suppliers cannot come up with formulas to reduce or limit arms, countries will obtain increasingly bigger and more complex arsenals with which they can upset the regional balance or change the status quo. The heightened post-cold-war state of international economic competitiveness has made some agreements useless and will continue to be a hurdle. Placing limits on the import of dual-use technologies and keeping entire classes such as antisatellite weapons from being exported are the best near-term hope. However, the world still has a long way to go.

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War's End: An Eyewitness Account of America's Last Atomic Mission by Maj Gen Charles W. Sweeney, USAF, Retired. Avon Books, 1350 Avenue of the Americas, New York 10019, 290 pages, 1997, \$25.00.

President Truman's decision to drop the atomic bomb on Hiroshima on 6 August 1945 has been the subject of great debate for over five decades. The destruction caused by the blast, and the subsequent nuclear age, resonate to this day in the world's collective psyche. Commanded by Col Paul Tibbets in the *Enola Gay*, Maj Chuck Sweeney flew observation in one of three B-29s participating in that historic mission. Three days later, when he was mission commander in *Bock's Car*, his crew dropped the plutonium bomb on Nagasaki, effectively ending World War II.

In the summer of 1994, America prepared to memorialize the 50th anniversary of the end of the war. The proposed content of a Smithsonian Institution exhibit of the *Enola Gay* caused a great deal of controversy because, among other things, it cast the United States in the role of aggressor in the war against Japan. Sweeney had occasion to review the original script, and what he read stood in direct contrast to his experience in the war. He felt compelled to set the record straight.

Through the hard work of veterans groups and many individual citizens, the exhibit was changed to more accurately reflect the war. But the controversy solidified Sweeney's resolve to memorialize his story out of an obligation to preserve and report on the facts and to give future generations his own eye view of events as they transpired.

Sweeney takes us on a chronological journey, from his first exhilarating flight in an open-cockpit biplane

to his work as a test pilot at Jefferson Proving Grounds. In his 1929 Studebaker he rolls onto Eglin AFB, Florida, where, as base operations officer in September 1943, he would first meet Paul Tibbets. He discusses his role in forming the 509th Composite Group and recalls the long months of training in secrecy at Wendover Field, Utah. Sweeney takes the reader to the rough runway at Tinian Island, which served as the point of embarkation on the historic flights to mainland Japan. He describes in detail the sortie to Hiroshima and provides valuable insight into the fuel problem, targeting challenges, and Japanese defenses that very nearly ruined his mission to Nagasaki. Along the way, he shares personal experiences—a memorable encounter with Gen Curtis LeMay and a walk amidst the ruins of Nagasaki being examples—and the growing burden that was his and Tibbets's alone.

In breaking a silence of 50 years, Sweeney provides evidence that supports Truman's decision: the millions of Asians killed or enslaved by the Japanese military's conquest in places such as Nanking; the appalling losses by American forces in amphibious landings and battles at Saipan, Iwo Jima, and Okinawa; the introduction of horrifying suicide attacks on American forces; the unwillingness of the Japanese military to abandon the fight even as incendiary bombs leveled its cities and killed thousands; and the Japanese military's commitment to execute all Allied prisoners at the start of an Allied invasion. He blames Japan's warlords for not heeding Truman's warnings, instead letting their people remain in Hiroshima and Nagasaki—and die. Clearly, he experienced war in the Pacific firsthand, and he bristles at the revisionists who would distort America's motives, its role in the war, and the recalcitrance of the Japanese military.

Sweeney's work is of particular value because it places the reader in the boots of a young man faced with a great moral decision from which he never shied away from nor, in retrospect, felt remorse. He provides an eyewitness account of the momentous events that would forever change the human experience.

War's End is recommended reading because of its importance as a primary source of history and its contribution to a complete understanding of the motives and emotions of the Pacific War. Notwithstanding the 50 intervening years, Sweeney's recollections are sharp and his conclusions consequential. If, as he writes, "the soul of a nation—its essence—is its history," then General Sweeney has done his part to advance America's collective being.

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The Next War by Caspar Weinberger and Peter Schweizer. Regnery Publishing, Inc., 1130 17th Street NW, Suite 600, Washington, D.C. 20036, 1998, 470 pages, \$16.95.

Having watched the military he created at the height of the cold war deteriorate under the current administration, former Secretary of Defense Caspar Weinberger sat down and wrote a book to illustrate some of the coming crises American administrations could be forced to deal with. Appalled at the emphasis on national and so-called global issues such as pollution and global warming, which have diverted the defense budget away from national security threats, Weinberger has laid out scenarios that could and probably will confront the US defense establishment in the future. The book's purpose is also to serve as a rally against the deep defense cuts in equipment and personnel. The actual scenarios are laced with a multitude of references to the size of the defense establishment during Desert Storm, with the shortfall of ships and aircraft always causing future Washington administrations to find their hands tied in the face of overwhelming odds.

The lack of intelligence in each of the scenarios presented leads the United States to be surprised, and Weinberger makes no secret of the fact that current cutbacks have allowed information shortfalls to occur. The failure of the current Department of Energy to safeguard and ensure the reliability of American nuclear warheads by not producing tritium raises concerns, as does the fact that the Clinton administration, according to Weinberger, is not interested in playing war games. Domestic policy, Weinberger argues, has forced the United States to turn inward and become isolationist, a development he feels will lead to US losses and reduced policy maneuver room.

Using what are best described as Tom Clancy-like best-sellers, Weinberger goes around the globe with a set of crises that Americans are forced to confront: Korea, Iran, Mexico, Russia, and Japan. All scenarios are well written, the only military mistake being that the US Navy flies an E-2C Hawkeye, not an EC-2A, from carrier decks. Each lays out a problem, shows how the administration deals with it, and then sums up where the United States missed key intelligence indicators that could have prevented the outbreak of hostilities or brought about another outcome. They all paint a very bleak, but not unrealistic, picture given current world events.

The book abruptly ends with the last crisis, which forces the reader to again read Weinberger's introduction to understand his central arguments.

In post-Desert Storm euphoria, force structure has been cut back so far that training and readiness have suffered, theater ballistic missile defense has been completely abandoned, and social spending and "peacekeeping" have further drained the already limited defense budget, ensuring that an ever-growing number of aggressors abroad can defeat American allies with disastrous consequences. The book tries to deal with two undercurrents at the same time. On the one hand, Weinberger is attempting to show isolationist Republicans that there is no shortage of threats from abroad and that the United States, as the remaining superpower in a unipolar world, must take up international commitments to meet its own security needs. On the other hand, he addresses the left wing of the Democratic Party, which believes that defense can be cut to serve other utopian concerns such as international peacekeeping or global interests. This is leading to a massive erosion of the defense establishment that cannot be rebuilt. He quotes General Sullivan as saying, "It took twenty years of careful training and acquisition to build the force used to defeat Saddam Hussein." We may not have twenty years the next time.

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Disarming Strangers: Nuclear Diplomacy with North Korea by Leon V. Sigal. Princeton University Press, 41 William Street, Princeton, New Jersey 08540, 1998, 321 pages, \$29.95.

This is an in-depth analysis of how North Korea was able to win diplomatic, economic, and military concessions from the United States by a simple nuclear threat. As the books show, there is little evidence North Korea ever wanted anything except help and recognition. It is also the story of how a former United States president—Jimmy Carter—rode in to save the day. Track II diplomacy, as this type of work is called, was unheard of at this level and, according to the author, caused major problems for the Clinton administration back in Washington, which never was fully aware of the negotiated text until Carter returned to the United States. The author also claims that the United States was an uncooperative and inflexible power unable to deal with a nuclear North Korea. Removing the last bias is somewhat difficult, since most of the world views North Korea as a rogue state, but an informed reader is quickly able to see that North

Korea wanted to go nuclear, not for military reasons but to gain political recognition and economic aid.

As a diplomatic and bureaucratic history written in chronological order, it recounts the political arguments and media reporting that went on during the six-year period. It shows how complex and interrelated the ties are between the United States and the major players in Asia, North and South Korea, China, and Japan with regards to nuclear weapons, deterrence, and political gamesmanship. The inter-agency struggles on the US side, and inter-South Korean squabbles, rarely exposed to Americans, help to illustrate the point that the nuclear question in North Korea is certainly complex, a point that should be of interest to both students of Air Command and Staff College and Air War College.

One of Sigal's overarching points is that the current and previous administrations had no sorting mechanism for establishing priorities, which in turn did not allow time to sustain a coherent line of policy. This was a result of the demise of the Soviet Union and the emergence of domestic rather than international issues on the American political scene.

The standard account of what happened is that North Korea signed the Non-Proliferation Treaty in 1985 but remained determined to acquire nuclear weapons. In an effort to reassure North Korea, the United States withdrew its nuclear weapons from South Korea. The North had signed a nuclear-free Korean peninsula agreement with the South in 1991 but failed to carry it out. The North then signed a nuclear safeguards agreement with the International Atomic Energy Agency (IAEA) only to renege on the necessary inspections. In 1994, when evidence mounted that North Korea was about to remove spend fuel from one of the Yongbyon reactors, the United States moved to impose sanctions in the United Nations Security Council.

The removal of fuel was believed a precursor to separating plutonium from spend fuel and thus producing bomb-grade material. Former president Jimmy Carter then flew to Pyongyang and obtained an agreement wherein the North gave up nuclear arming in return for replacement reactors, a supply of fuel oil, security guarantees, an end to the American economic embargo, and diplomatic recognition.

The author argues that this account is faulty. The Bush administration began this process by not taking enough steps to reassure North Korea, and the IAEA recovering from the post-Desert Storm Iraqi debacle was eager to prove itself in North Korea. In Sigal's view, North Korea never wanted weapons but rather was seeking to protect itself in the post-cold-war world. Washington, Sigal tells us,

failed to use diplomatic give-and-take and threatened air strikes if North Korea did not comply with the Non-Proliferation Treaty.

In Sigal's view, the Clinton administration was no better than the Bush administration when it came to negotiating with North Korea. It did nothing to end the diplomatic gridlock. In six chapters, the reader is presented the facts to make Sigal's case and while it may not convince everyone, extensive footnoting does show that an immense amount of research went into the book. Chapter 8 is a very critical exposé on media reporting on North Korea. Hammering away at the so-called "conservative press," it gives most major newspapers a "black eye," something seldom seen in this type of book.

This is a book about proliferation in the post-cold-war era and thus is a valuable contribution to available literature. Sigal, a *New York Times* editor, is familiar with his subject and also grasps the key concepts within the academic proliferation community, showing in a practical way that theories do apply to real world scenarios and thus are valid. However, he appears to have overlooked the fact that North Korea is an "outlaw" regime operating on the very fringe of world civilization and has done nothing in the last 50 years to earn anything but contempt by the international community. The final warning of the book is that the United States from a policy standpoint could find itself confronting the same option soon with Iran, a secretive country proliferating nuclear weapons, allowing no outside inspection and verification, and outside of the established "international system." It paints a rather bleak picture.

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Wallops Station and the Creation of an American Space Program by Harold D. Wallace Jr. Superintendent of Documents, P. O. Box 371954, Pittsburgh, Pennsylvania 15250, 1997, 167 pages, \$8.50.

As the Air Force marches along its evolutionary path to an air and space force, knowledge and understanding of space operations and space history will become increasingly valuable assets for the airmen shaping space strategy and space policy. Harold D. Wallace Jr.'s book on Wallops Station fills an overlooked gap in the history of US space power development. Wallace is a historian for the Smithsonian Institution's Electricity and Modern Physics Division of the National Museum of American

History. He wrote this book as his thesis for a master's degree in history and technology from the University of Maryland, Baltimore County. Unfortunately, the book reads like a master's thesis, although it certainly is an "A"-caliber paper. Although not dry reading, the work is a clinical historical monograph devoid of the amusing anecdotes that could add spice and spark to an otherwise obscure topic.

Wallace chronicles the political, administrative, and social history of the Wallops Island Flight Facility from 1957 to 1966. The intent of his book is to show how Wallops excelled in launching small rockets and remotely acquiring flight data using radar and radio telemetry. This diminutive role in the space program served an unspectacular yet necessary niche in space science that allowed the larger facilities at Cape Canaveral and Vandenberg Air Force Base to concentrate on the expensive, high-priority, and glamorous projects without interference from low-budget programs. The National Advisory Committee on Aeronautics established the Pilotless Aircraft Research Division at Wallops Island in 1945 to conduct high-speed flight and missile tests. With the Space Act of 1958, the newly formed National Aeronautics and Space Administration absorbed the Wallops facility. The scientists, engineers, and technicians at Wallops developed expertise in data collection and flight testing which proved critical to the Mercury missions, but the modest facility barely occupied a sideline seat in the huge Gemini and Apollo programs. As a gateway to space for universities, nonmilitary government organizations, and foreign research customers, Wallops served a wide customer base and provided comparatively inexpensive access to space—services that protected Wallops from the reductions in the space program during the late 1960s. Wallace concludes that despite its uncelebrated role, Wallops contributed significantly to the early space effort.

The book definitely achieves its primary objectives, although the title is slightly more ambitious than the content. It is well written and thoroughly documented. The work is not uninteresting, neither is it terribly enlightening. It tells an untold story, and in accomplishing that, the book has value. Professional officers wishing to learn about space would be better served investing their limited time and money in other books. If you need a good reference on Wallops Island, borrow this book from the library.

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The Rescue of Bat 21 by Darrel D. Whitcomb. Naval Institute Press, 118 Maryland Avenue, Annapolis, Maryland 21402-5035, 1998, 196 pages, \$27.95.

It's about time someone set the record straight. Darrel D. Whitcomb does it concisely in this powerful tragedy from the American experience in Vietnam. An introduction by Col Harry G. Summers Jr. advises that the book offers lessons that we ignore at our peril.

Bat 21B is the call sign of an EB-66 navigator, Icelal "Gene" Hambleton, who is slammed by an SA-2 missile just south of the demilitarized zone (DMZ) in 1972. The plot thickens when he must parachute into the middle of a vast North Vietnamese Army (NVA) invasion of the south. Search and rescue (SAR) missions launch into an area where the NVA has brought sufficient anti-aircraft weaponry to contest American air superiority. Eleven brave men die, and two more survivors enter the problem. The author details the falls of Mike 81, Blueghost 39, Nail 38, Blueghost 28, Jolly Green 67, and Covey 282. A previous book by William C. Anderson and a movie starring Gene Hackman focused on the 12-day evasion ordeal of Hambleton. Whitcomb's effort brings the full story home with the stark power of what actually happened.

Reading *The Rescue of Bat 21* is like standing near a thundering freight train. The story is powerful, moves quickly, and is vividly told. Thorough research and the author's experience in the forward air control mission facilitate smooth storytelling. As opposed to oversimplified tales in the past, this account gives detailed documentation. The exact chain of events comes to life. The focus is not on survival stories but on the support and decision systems that drive the rescue. This way, the author aims the spotlight at some larger questions.

What is the price of one man's life? A prevailing sentiment held that rescue of a downed brother was the only mission in that conflict that was worth any risk. "A Long, Bitter War" is an apt chapter title for an insight into this inscrutable war without a clear strategy. In the end, Whitcomb holds class on critical aspects of executing joint and coalition operations. He raises issues that go to the heart of Air Force identity.

The Rescue of Bat 21 could serve as a textbook for leaders and planners. It offers all of us a fast but wrenching story of tragedy and heroism from a controversial period in our history.

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Kenneth N. Walker: Airpower's Untempered Crusader by Martha Byrd. Air University Press, 170 West Selfridge Street, Maxwell AFB, Alabama 36112-6610, 1997, 242 pages, \$15.00.

Kenneth N. Walker is an intriguing look at the life and accomplishments of a man who had a direct and significant impact on the development of American airpower theory in the interwar period. As an instructor and key proponent of the theory of daylight precision bombing at the Air Corps Tactical School (ACTS) in the 1930s and as one of the drafters of the famous Air War Plans Division, Plan 1 (AWPD-1), Walker had an impact on Army Air Corps (and later Air Force) thinking that was out of proportion to his rank or position (first lieutenant at ACTS and lieutenant colonel while drafting AWPD-1). His story is one of a man on a mission—perhaps even a zealot—who believed so fiercely in his theories that he died in combat trying to prove their worth. It is also the story of a leader whose vision sometimes clouded his judgment (leading to his unauthorized participation in the bombing mission that cost him his life) but never his understanding of and sympathy for the men under his command.

The late Martha Byrd has written an engaging and highly readable account of this interesting and important man. She approaches her subject chronologically, beginning with Walker's troubled childhood and ending with a discussion of the circumstances surrounding his death (neither the aircraft nor his body was ever recovered, and there is some question about whether he and other members of the crew might have survived the shutdown). The narrative, although interesting, is much too shallow. One is left wondering whether Ms. Byrd wrote this study as an extensive outline for the more in-depth book she planned to complete at a later date.

She touches on all the important aspects of Walker's life and career: his troubled childhood and subsequent failed relationships as an adult, his disputes at ACTS with pursuit advocates such as Claire Chennault, the development of daylight precision bombing as the preeminent US airpower theory prior to World War II, his role in drafting AWPD-1, and his command in the South Pacific. But one is left with the feeling that there is more to be said. These events were tumultuous and had an enormous impact on both the course of US involvement in World War II and the postwar Air Force, but the book seems more of a sketch than a full-fledged discussion of Walker and his impact.

Despite these shortcomings, the work is worth the effort. Its brevity makes it an easy read, and the

inclusion of two treatises on airpower written by Walker at ACTS gives readers excellent insight into the development of his thinking at the time. The bibliography is extensive, providing ample evidence of the primary and secondary sources Ms. Byrd used in her work.

Kenneth N. Walker provides an excellent glimpse into the life of an important thinker in the development of US airpower, but I can't help wishing that Ms. Byrd had been able to open the window more and take a longer look at the man.

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The U.S. Air Service in the Great War, 1917-1919
by James J. Cooke. Praeger Publishers, 88 Post Road West, Westport, Connecticut 06881-5007, 1996, 248 pages, \$59.95.

This remarkable study of World War I air warfare fills a gap in scholarship that seemed unlikely ever to be filled. It takes us into that region of warfare where air and ground forces connect, and at a place and time when tactical aviation first appeared. There is a parallel here to Danny Parker's successes in describing both ground and air operations during the Battle of the Bulge. His efforts produced *The Battle of the Bulge* and *To Win the Winter Sky*, the latter a revealing, detailed account of the air war during the Battle of the Bulge. While writing his acclaimed book, *The Rainbow Division in the Great War*, Prof. James Cooke found himself with the same kind of problem. Noticing that Army planners constantly discussed the air component in their plans and always had attached air units, Cooke looked for a study that would tell him the air side of the story. Finding none, like Parker, he did it himself.

This study might even pass the skeptical eye of airpower historian David Mets. It is a wonderful addition to the handful of analytical studies that attempt to flesh out the airpower history of World War I, including Richard Hallion's *Rise of the Fighter Aircraft*, Lee Kennett's *The First Air War*, James Hudson's *Hostile Skies*, and John Morrow's *German Air Power in World War I*. What Cooke found missing in the literature was accounts of how the air element fit into the Army organization and conduct of battle. Reading through air-combat literature did not reveal how the fighters, observation planes, and bombers fit into the organization; neither did it relate that to the tremendous training, maintenance,

and supply problems facing Gen John Pershing and the American Expeditionary Force (AEF). Cooke wanted to know how the air organization worked, and he did the research to find the answers.

Despite doing this so well, he is still a bit old-fashioned from an airman's point of reference, for he does not question how this new air technology of World War I related to a century of tactical-air history. He was not interested in describing the birth of tactical aviation; rather, he wanted to understand the ground war. That's fair, but someday someone will need to use his research materials to describe events from an airman's perspective.

Cooke asked a standard ground-force question: how did air fit into the work of the artillery efforts? He found that air was crucial for the artillery gunners to locate targets and confirm hits on targets out of visual range. "World War I was an artillerymen's war, and the artillery pieces were the kings and queens on a very lethal game-board" (p. 24). To him, the criticality of airmen was as gatherers of information. Vociferously advocating this view, Pershing asked for a very large number of squadrons, even though his airmen were "there to support and be integrated with the final weapon for victory—the ground soldier" (p. 36). Airmen were integral to the conduct of maneuver warfare but were not a potential instrument for destroying enemy armies or attaining strategic ends.

This might have been a convincing argument going into World War I, but airmen worldwide developed thoughtful new concepts for the employment of air forces during the war, certainly in the early 1920s. New studies by Maj Robert White show that even Pershing saw the purpose in an independent air mission. Cooke exacerbates the habitual problems of thinking about battles in a one-dimensional manner. On the one hand, that is perfectly acceptable, but this is air history—not ground history. There are striking parallels here with Gulf War scholarship, marked by Army historians' practice of ignoring air in their accounts of the ground war. On the other hand, air promoters are not especially effective at promoting new airpower ideas. There are parallels, at both ends of the century, in the difficulty of validating the effect of new airpower technology and organization. Probably the most important factor was the fact that neither war lasted long enough to fully provide satisfying operational experience—and neither war permitted effective battlefield damage assessment.

That said, tactical aviation, defined simply as support of surface forces, has a solid place in modern warfare, and Cooke illustrates how World War I airpower worked with the ground in ways we have not previously understood. Cooke also introduces us to the operational experiences of frontline balloon and observation squadrons in devilish detail. One of his strongest points is a characterization of Pershing's air-mindedness. Pershing understood that amidst all the shortages for his AEF, the Air Service presented a special, perplexing set of demands (p. 17). The commander of the AEF growled constantly at the lack of sufficient air resources, even as he supported the need to develop extensive air training, repair, supply, and field facilities.

Cooke covers tactical operations in the important battle of Saint-Mihiel and the Meuse-Argonne offensives. He describes the interaction of Billy Mitchell with ground leaders, evoking the old theme that Mitchell was good with battlefield operations, inept concerning staff work, and very contentious in his relations with other leaders. Surprisingly, Cooke does not describe the new experiments with attack aviation, a mission close to the hearts of ground commanders. Cooke also missed the mark to a degree by not fully acknowledging the pivotal role of Maj Gen Mason M. Patrick, who as chief of the AEF Air Service set it on a firm course of accomplishment following the mismanagement and debacles of the Mitchell and (Benjamin) Foulois regimes.

Cooke ends with a thoughtful chapter on the collecting of after-action reports, noting that the Air Service recognized their revolutionary place in modern warfare. Air leaders attempted to collect material for later analysis, but they ended up with a "Final Report of the Chief of the Air Service, AEF" so extensive that it remains on National Archives shelves, largely unused to this day. Cooke talks about casualties and alludes to debates in the 1920s and 1930s about future roles for airpower. His final point aptly suggests that experiments with strategic bombing deserved to be ignored. It was airpower working directly with the ground, rather than industrial bombing, that did much to bring about the defeat of the German armies. That appreciation of the strength of tactical aviation lasted through all the other wars and conflicts of the twentieth century.

Dr. Daniel R. Mortensen
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We Now Know: Rethinking Cold War History by John Lewis Gaddis. Oxford University Press, 198 Madison Avenue, New York City 10016-4314, 1997, 425 pages, \$30.00.

Joe Stalin started the cold war. Although both the Soviet Union and the United States built empires, the collapse of the former was inevitable because of its coercive nature, but the latter survived because of its democratic/capitalist character. That is the main thesis of the dean of American diplomatic historians, John Lewis Gaddis, and it is sure to arouse howls among the revisionists of the not-so New Left.

I use the word *dean* without qualifiers advisedly. The former greats in the field—Samuel Flagg Bemis, Thomas Bailey, and Julius Pratt—are no longer practicing. Many of the younger generation have not tried to keep their ideology out of their history. It is hard to think of any diplomatic historian who approaches Gaddis's stature in terms of both quality and quantity. He was born in 1941 in Texas and won all of his degrees from the University of Texas in Austin about as early as could be expected (PhD, 1968). Since then, he has led a most productive life, mostly at Ohio University but including visiting-professor stints at Oxford, Helsinki, and the US Naval War College. His first book, *The United States and the Origins of the Cold War: 1941-1947*, was published by Columbia University Press in 1972, and it was only the first of a distinguished parade about that particular era and subject. Gaddis now teaches at Yale. As to his writing style, Michael Sherry says in the December 1997 issue of *Reviews in American History* that "his prose, lacking in evident passion and invective, reads as self-assured and slightly condescending, as if the Truth written on high" (p. 533). *Kirkus Reviews* (1 March 1997) describes the book as "an elegantly written, vivid history of the early years of the Cold War, culminating with the Bay of Pigs crisis" (p. 349). I go with *Kirkus*.

The opening years of the cold war were a helter-skelter time. The old order had been destroyed. No one had a strong vision of what the new one would be—although many had firm ideas about what it ought to be. A power vacuum existed at the center of gravity of world politics. Even without the paranoid and grasping personality of Joseph Stalin, there would have been a strong tendency for powers on the periphery to rush or stumble toward filling it. Gaddis captures this well. Nobody, not even Stalin, had complete control of things. Nobody had a perfect view of what the world was like and what made it behave the way it did.

We Now Know is a timely arrival. It improves the traditional worldview of Western scholars because of the opening of some of the archives in the East. This new information makes a review of the history of the period imperative. As the *Economist* (15 March 1997) points out, it also tends to undermine the self-flagellation arguments of many of the Western revisionist historians (p. 4). Gaddis organizes his work into a series of topical chapters that flow in a rough chronological order—starting with the turbulence of the immediate postwar period in Europe and Asia and ending with the Cuban missile crisis.

For the practicing air warrior/scholar, perhaps the two chapters on nuclear weapons and the one on the German question are the most important. We have known before now that the nuclear monopoly enjoyed by the United States for four years after Hiroshima was really a hollow threat and that Stalin knew it to be so. Gaddis adds some documentation and interesting detail to that story to make it all the more credible—although the “nukes” were not altogether without effects on the way that things developed. Too, Gaddis adds to the clarity of the idea that the increasing focus on a nuclear strategy as the years passed was close to inevitable, and not the work of wild Air Force officers determined to end the world.

The book at hand properly emphasizes the German question. Neither side particularly wanted a divided Germany, and in the beginning, everyone saw the division as temporary. But neither side could safely contemplate a unified Germany allied with the adversary. After a time, both sides became used to the situation. Often, the United States declared that policy for reunification was little more than lip service. Even Konrad Adenauer was not as interested in reunification as he was in the continuation of prosperity and economic growth in the Federal Republic. So there was a bit of a dilemma in central Europe, and that as much as anything accounts for the long duration of the cold war. Neither side had much enthusiasm for using nuclear weapons to solve that dilemma, and the Europeans themselves clearly had even less.

Gaddis's new book is practically certain to stimulate some passionate responses. Michael Sherry, in the review cited above, has already registered a complaint that its explanation does not give enough weight to American gender and racial discrimination! The revisionists are not going to like Gaddis's explanation of the reason the United States decided to use nukes on Japan. The “realists” will not be entranced with the idea that there has

been too much focus on military factors and not enough on ideological ones. But perhaps the most vigorous response will come from some of the revisionists who were in college and graduate school during the Vietnam War—as was Gaddis himself. Many of them will be repelled by his notion that the American Empire was by invitation and the Soviet Empire was by coercion. Not only does that strike at the intellectual foundations of the entire revisionist school, but also there is a moral dimension to the problem that many will find uncomfortable.

We Now Know is a first-class book written by a first-class scholar. It is central to the understanding of how our foreign policy has evolved over the last half century. That also makes it central to the way in which our national-security policy has evolved. Thus, it is required reading for all air warrior/scholars—but it is so well written that the task should not be at all tedious.

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Postmodern War: The New Politics of Conflict by Chris Hables Gray. Guilford Publications, Inc., 72 Spring Street, New York City 10012, 1997, 305 pages, \$35.00.

The title of this book is misleading. *Postmodern War* integrates computerization, war, the post-cold-war world, and a bit of philosophy to provide a series of predictions about future conflicts and the ways in which the US military has adapted to these changes. It is also an antiwar book.

The introduction hits the reader hard. Some of the predictions mentioned here include the use of nuclear weapons in a regional or terrorist conflict, disputes over resources such as water, changes in world society produced by the internationalization of communications, and the re-introduction of the world to ethnic hatreds long believed gone. This book deals with the broader implications of war and its effect on society. Although it is not something that a warrior might read, it raises issues and questions that most military officers know about but rarely think about—for example, the amount of code required for ballistic missile defense and the ease with which a system can always be overcome by simpler and cheaper methods. Cyborgs, featuring the integration of humans with machines, are devel-

oping as the Army finalizes its twenty-first-century AirLand Battle plans. But humans still play a central role in any computer-game simulation or battlefield use, for no matter how much information machines collect, it is useless unless it is understood and interpreted by humans.

Aegis-class cruisers of the US Navy come away with a black eye, as do predictions regarding various components of AirLand Battle for the twenty-first century. But the best part of the book addresses concepts of artificial intelligence, which Gray has made easy to understand, allowing readers to grasp the essence of what the military is capable of doing.

The author spends a great deal of time wrestling with the term *postmodern*, showing how philosophers and political scientists have attempted to define it. He seems to conclude that with the passing of the cold war, the world's military powers must now come to terms with multipolar forms of warfare, not just political structure. The term *multipolar military engagement* is important in that it defines what the US military does today, including war, peace enforcement, and nation building. Gray also points out that the military now does more domestically than it has in over a century.

The text covers a huge amount of material from 1680 until the present day and then predicts what the military of the next century will be like, citing the all-important integration and use of machines and computers to make the battlefield lethal and more dynamic than it has ever been. Operations research and its impact on weapons, along with the use of drugs to improve battlefield performance are also covered, as well as battle labs, simulation, holographic displays, and the role that science and scientists play in developing government policies and decision making.

In summary, *Postmodern War* is a discourse on technical-military interaction, focusing on computers in the latter half of the twentieth century. Gray spends a great deal of time looking for morality in computer programming, hoping to control machines and thereby end war. At times, however, his argument is hard to follow. Despite the book's academic, liberal emphasis, it is still valuable to people in the military who research and develop how future wars may and can be fought and their effect on military branches.

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The Big L: American Logistics in World War II
edited by Alan Gropman. National Defense University Press, Washington, D.C., 1997, 447 pages.

Although this book is an edited collection of seven essays, the final result is a coherent and a cogent disquisition on an important and complex topic. This outcome is produced by the transformation of the essays into completely integrated chapters of a well-planned and organized book. No doubt much of the credit goes to the editor, Alan Gropman, who also happens to be the contributor of the first chapter, "Industrial Mobilization."

The history of the United States with respect to preparedness for war is represented by a familiar cycle, which begins by finding the country unprepared for war when it comes. Fortunately, because we are protected by two oceans and possess enviable resources and an awesome industrial capacity, we have time to mobilize; and we do so with a vengeance. After cessation of hostilities, we again demobilize quickly; forgetting history's lessons, as though we had collective amnesia.

The end of World War II, however, was an exception because it was followed almost immediately by the cold war, which was the functional equivalent of a "shooting war," so far as size of force structure and defense budget was concerned. With the cold war won, it is quite possible to repeat the same mistakes. Therefore, *The Big L* is recommended reading not only for military logisticians but for military and civilian defense planners, as well as for defense contractors and elected officials.

The first chapter underscores the importance of the existence of a bare-bones bureaucracy dedicated to (1) planning for the manpower and materiel needed in the next war and (2) planning for the bureaucratic underpinnings so essential to mobilization. Fortunately, the United States learned a few lessons from World War I and had some of the preconditions in place as a result of the National Defense Act of 1920. The strengths and weaknesses of the interwar-period efforts are described in rich detail in the first chapter.

In the second chapter, "Acquisition in World War II," Bokel and Clark detail the dynamics of procurement that resulted in the production in 1943 and 1944 of almost as many ships, planes, tanks, and ordnance as were manufactured by Allies and adversaries combined—not to mention the seemingly inexhaustible supplies of medicines, clothing, meals, and an endless assortment of equipment and buildings. In fact, the US economy made good on President Roosevelt's promise to make the United States the "arsenal of democracy."

Much more than just a presentation of charts and figures, this chapter illuminates such vital acquisition issues as the economic environment (excess capacity available due to the Great Depression, allocation of scarce raw materials, sundry bottlenecks, stocks, and flows [the accelerators and decelerators—factories, equipment, and machine tools—that determine stock levels down the road]). Also discussed were the transformation of the workforce, the expansion of energy production, the creation of new industries (e.g., aluminum and synthetic rubber) and the implication of these wartime developments to the postwar period.

The American economy accomplished unimaginable production feats during World War II, and Losman, Kriakopoulos, and Ahalt in chapter 3, "The Economics of America's World War II Mobilization," describe what it took to produce these spectacular results, as well as the problems encountered along the way. Their treatment of capacity expansion through public investment and the concomitant resource reallocation needed to accomplish this daunting task is especially instructive. The authors also enlighten the reader with respect to what had to be done to combat inflation during mobilization and wartime and what the special needs of the agricultural sector were.

"Building Victory's Foundation: Infrastructure," by Conway and Toth, does overlap with material covered in previous chapters, but the depth added by the authors does not cause the reader any regret (e.g., the elaboration of the staggering construction effort in the United States, Europe, and the Pacific theater). Moreover, the unique topics, such as the "Manhattan Project," make the chapter that much more valuable.

Chapter 5, "Lend-Lease: An Assessment of a Government Bureaucracy," by Marcus R. Erlandson, is the shortest and perhaps the most instructive chapter in the book. It demonstrates how a lean bureaucracy, jury-rigged quickly out of necessity, can work miracles. This chapter lends considerable support to the "minimalist bureaucracy" school of thought, which has had little or no impact on government organizations since World War II, but for which there is a great need.

Chapter 6, "Joint Logistics in the Pacific" by Anthony Gray Jr., and chapter 7, "Materialschlacht: The Material Battle in the European Theater" by Barry J. Dysart, are thorough treatments of logistics at every level of the topic in the two major theaters of operations. Both authors are to be commended for their complete candor in describing the "leaky bucket" during the buildup, invasion, and advance phases of the two-ocean Herculean effort. Last but

not least, the appendix, "The War Agencies of the Executive Branch of the Federal Government," and the bibliography are also useful to the serious student of logistics.

This book informs us in vivid detail where we have been. But the Persian Gulf War is the last example of "brute force" logistics. Yet, we must not forget the lessons of World War II as we, perforce, go about creating a "just-in-time" logistics system for the conflicts of the future. We need to be mindful along the way of the fact that the unrelenting march of technology has deprived us of the protection that the two great oceans afforded in the past. During the next major conflict, we will not have time to mobilize.

Jan P. Muczyk

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United States Naval Aviation, 1910–1995, 4th ed., by Roy A. Grossnick. Naval Historical Center, Department of the Navy, 901 M Street Southeast, Washington, D.C. 20374-5060, 1997, 881 pages.

The purpose of this book is summarized in the second paragraph of its foreword: "This work is designed to provide naval personnel, historians and aviation enthusiasts with a general background on Naval Aviation History." *United States Naval Aviation, 1910–1995*, which contains hundreds of black-and-white photographs, is designed to serve as a starting point for professional scholars and amateur hobbyists alike.

Grossnick divides his book into 12 parts and 34 appendices, the latter occupying half of the text. Each part is listed either by decades during peacetime (e.g., the 1920s, the 1930s) or by dates of wars. World War One, World War Two, and the Korean War have their own sections, but the Vietnam War does not. One may find information on the Navy's involvement in Vietnam in the parts covering the 1960s and 1970s. This is probably due to the fact that many other events such as the "space race" happened concurrently with the Southeast Asia conflict. Other combat operations involving Libya, Grenada, and Iraq have their own appendices. Additional subjects covered here include the history of aviation training, naval aviation's contribution to the space program, the history of all aircraft carriers, and a list of all the different types of aircraft employed by the Navy.

Each part and appendix dates and describes important happenings in Navy aviation history, in-

cluding such monumental events as the Battle of the Coral Sea and such obscure facts as the date when naval aviators first received flight pay. Further, one can learn about some overlooked yet important contributions of naval aviation—for example, the Navy's early involvement in the development of early warning radar and guided missiles prior to and during World War Two. Grossnick provides details about the maturation and employment of these systems by the fleet.

Overall, *United States Naval Aviation, 1910-1995* is a book worth having. It does an excellent job of chronicling the evolution of naval air and is an excellent starting point for research and background study.

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The Alaska-Siberia Connection: The World War II Air Route by Otis Hays Jr. Texas A&M University Press, Drawer C, John H. Lindsey Building, Texas A&M University, College Station, Texas 77843-4354, 1996, 200 pages, \$34.95.

The US-Soviet lend-lease program during the Second World War is generally well known, particularly use of the sea route via the North Atlantic Ocean and the sea-land route through the Persian Gulf region. Desperate to acquire military aircraft of all types to make up for heavy losses inflicted by Germany, the Soviet Union reluctantly agreed to accept planes and other critical equipment from its Allies. The Soviets were uneasy about the whole arrangement but had no other choice.

Timeliness of deliveries was a big problem. The approved transportation routes for American-made aircraft often took weeks and even months to complete—if they arrived at all. Early in the war, attrition of transport ships in convoys was high.

So begins, albeit delayed by Red suspicion and red tape, an unusual tale of the war—the “officially secret” establishment and running of an air linkage between Alaska and Siberia for lend-lease aircraft. Otis Hays Jr., author of *The Alaska-Siberia Connection*, knows the subject well. In 1943-44, Hays served as a senior member of the Alaska Defense Command's military intelligence staff and foreign liaison operations.

Part of this ferrying operation involved stationing Soviet military personnel for specific purposes at US airfields in the frontier territory of Alaska. For instance, one of the jobs of the Soviets at Ladd Field

in Fairbanks was to assume responsibility for the arriving planes by placing their own red-star insignia on the fuselages. They borrowed a Texaco service station sign to do this.

The entire undertaking was plagued by cultural, language, and political differences. Female Soviet interpreters were insulted at first by the behavior of the American GIs around them. Further, US interpreters, many of whom were servicemen fluent in Russian, caused much uneasiness because they were from families of Soviet expatriates, whose views were anti-USSR. Political matters on both sides experienced many ups and downs, partly caused by a basic mistrust of each other.

Added to this situation was the inherent difficulty of the Alaska-Siberian delivery (known as ALSIB throughout the war). Not an easy operation, the ALSIB run consisted of a series of flight legs flown by American pilots starting in Montana, working their way through western Canada, and finally arriving in Alaska. There, the aircraft were transferred to the Soviets, whose aircrews flew them on through Siberia and Russia to the eastern front. The route covered thousands of miles and was flown all year long, since the war did not take prolonged breaks. Pilots often encountered extremely adverse weather, and many airfields were not always up to par. Several of the air strips in Siberia gave new meaning to the term *bare base*.

The ALSIB connection was considered a success, since over eight thousand vitally needed aircraft were delivered from 1943 to 1945. For military history buffs, especially those interested in aviation, *The Alaska-Siberia Connection* helps fill a void in the literature. Do not expect an effortless read, however, unless you are good at keeping track of Russian names and following a detailed, sometimes dry, account of this understudied part of the Second World War.

Dr. Frank Donnini
Newport News, Virginia

Fighter Combat in the Jet Age by David C. Isby. Harper Reference, HarperCollins Publishers, 10 East 53d Street, New York City 10022, 1997, 192 pages, \$25.00.

In *Fighter Combat in the Jet Age*, the first book in Jane's Air War Series, David Isby attempts to encapsulate the entire history of jet-fighter operations in 192 pages. Using a broad-brush approach, he does a reasonable job of balancing international jet-

fighter technology, training, and doctrine with photos, sketches, and statistics. He also employs interesting vignettes during his chronological review of popular wars that featured jet-fighter operations.

The author is a special correspondent for *Jane's Intelligence Review*. An attorney and defense consultant, Isby has written a decidedly nonacademic text that is easy to read, straightforward, and engaging. The inclusion of documentation, however, would have added credibility to many of his facts and assertions.

The arrangement is chronological although frequent topical sidebars and inserts appear. Isby begins with Me262s in World War II and touches on Korea, Vietnam, several Middle-Eastern wars, the Falklands, Bosnia, and Iraq. He also reserves four paragraphs for the future of fighter operations. The text concludes with a fighter directory that includes silhouettes and statistics of many popular jet fighters. This attractive book is also replete with hundreds of black-and-white photos and eight pages of color photos.

Included in *Fighter Combat in the Jet Age* are brief discussions of training, tactics, and doctrine as well as interesting subsections on night-fighter operations in Korea, surface-to-air missiles and their impact on fighter operations, and the Royal Air Force's Tornado doctrine in the Gulf War. Going beyond fighter operations, Isby also briefly mentions Boeing Michigan Aeronautical Research Center (BOMARC) missiles, Israeli C-130s, and fighter situational awareness, although he provides few specific details. His reviews of topics such as the Argentinean and North Vietnamese air forces are brief but unique.

Although generally focused on American and British fighter operations and the fighter operations of their competitors, Isby's Middle East section provides other concise perspectives. I was somewhat surprised by his contention that the threat to Israel no longer comes from conventional air attacks. Instead, Isby believes that ballistic missiles and land-attack cruise missiles represent the threat to Israeli security and that future Arab-Israeli wars will include preemptive attacks by the Israeli Defense Force. He does not expand on his reasoning but simply makes the assertion without supporting evidence.

Unfortunately, other assertions were also distracting. For example, in his section on Operation Desert Storm, Isby recounts fighter kills, including the story of an F-15E dropping a bomb on a hovering Iraqi helicopter. Although some people contend that this was an example of successful aircrew

innovation, Isby relates that it is a "recommended" tactic. Recommended and tested by whom? Another contention is that "fighter advocates have never had the strength of a rigid doctrinal framework, as have advocates of strategic airpower." I agree with his statement that fighters must be flexible to deal with unanticipated threats. However, one sentence that broadly compares strategic airpower with fighter doctrine without supporting details does not make for a convincing argument.

Although he has not written an in-depth, critical investigation of all aspects of jet-fighter operations, Isby provides an easy and enjoyable read that is punctuated by terrific photos. The advantages of this first entry in the Jane's Air War Series include the photographs, drawings, and statistics for fighter buffs, plus an easily digested review of a broad variety of fighter operations and related topics. The book's greatest failing is its lack of references, leaving Isby open to questions of validity. I do, however, recommend this book for its readability, broad and interesting fighter-related sections, and exceptional pictures.

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Visions of a Flying Machine by Peter Jakab. Smithsonian Press, 470 L'Enfant Plaza, Suite 7100, Washington, D.C. 20560, 1990, 263 pages, \$15.95.

As the centennial celebrating the birth of aviation approaches, we in the aerospace community will turn more and more to examining our roots, pondering the accomplishments of the pioneers of what may be the greatest single technological achievement of mankind. Peter Jakab's book on Wilbur and Orville Wright and their process of invention is a wonderful place to start. Jakab's background as a curator at the Smithsonian's National Air and Space Museum serves him well as the chronicler of the Wrights' achievement. Their pursuit of aviation actually began with a letter to the Smithsonian in 1899, requesting the latest literature on aeronautics (Jakab seems proud to relate the Smithsonian's prompt and helpful response). The Wrights' resulting accomplishment, the 1903 Wright Flyer, is appropriately the centerpiece in the museum today.

Visions of a Flying Machine is less a biography and more a narrative of the design and technical problems the Wrights faced—and of the thought process

they used to overcome those problems and succeed where aviation pioneers before them had failed. Jakab dissects the Wrights' methods and in so doing demythologizes any conception of the Wrights as incomprehensible geniuses. They were, it would seem after all, simple technicians. But therein lies the beauty of their accomplishment: the pure simplicity of their thinking, their common sense, and their refusal to take anything for granted finally brought them success. Ironically, the Wrights' lack of an extensive engineering background benefited their pursuits, allowing them to question some basic concepts and data that others assumed were true.

Further, according to Jakab, their expertise as bicycle technicians served them well in surmounting the barriers to flight, most notably the control of an unstable machine (a characteristic shared by bicycles and the brothers' aircraft) and the gearing of the first Flyer's power system. Jakab is not reluctant to introduce fundamental aerodynamics and basic engineering equations if they are necessary to understand the steps and directions the Wrights took. He splendidly describes the engineering thought process, especially the wonderfully simple but effective method the Wrights developed to construct completely new coefficient-of-lift tables to replace older ones they felt were suspect. Interestingly, Jakab believes the brothers reached the pinnacle of their invention process with the successful flights of the 1902 glider, which demonstrated the effectiveness of three-axis control for the first time. The addition of power with the engine installed on the 1903 Flyer, although still a formidable task, was to Jakab more of a denouement.

The book left me with two distinct feelings. The first was one of renewed amazement and pride at this triumph of "American ingenuity" truly stranger than fiction: the conquest of the world of aeronautics by two young, enterprising bicycle technicians a mere four years after they first questioned the Smithsonian on the subject. The second feeling was a sense of sadness that we now live in a world of such technological complexity that a feat of grassroots invention such as the Wrights' is probably no longer possible. Designing a machine to alter the course of humankind in a backyard, proving theory with homemade equipment, and vaulting to success in a handmade contraption on a lonesome shore are all achievements relegated exclusively to the golden past.

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Spy Flights of the Cold War by Paul Lashmar. Naval Institute Press, 118 Maryland Avenue, Annapolis, Maryland 21402, 1996, 256 pages, \$29.95.

Perceptions of the cold war often focus on nuclear arsenals and Third World surrogate conflicts, overlooking a persistent war of aerial espionage in which hundreds of airmen lose their lives. *Spy Flights of the Cold War* offers an intriguing yet controversial historical record of US and British aerial reconnaissance against the communist bloc from 1946 to 1963. The author's research reveals numerous harrowing missions by brave aircrews flying deep into hostile territory on missions previously declared "routine." Overlaying this operational history is a political account that indicts the US Air Force (USAF) and, specifically, Gen Curtis E. LeMay for exceeding presidential authority, manipulating intelligence estimates, and using the spy flights in an attempt to instigate another world war. Although it is a tribute to individual airmen, the text openly criticizes USAF leadership.

The annals of aerial reconnaissance span from Gen John J. Pershing's pursuit of Pancho Villa to current-day U-2 operations over Iraq. Lashmar's chronicle, however, begins in earnest with the post-World War II stand-up of Strategic Air Command (SAC) and follows missions by the USAF and US Navy (USN), the Royal Air Force (RAF), and the Central Intelligence Agency (CIA). SAC led the way, originally tasked with conducting maximum-range reconnaissance operations. Project Nanook was its initial effort and entailed a three-year search for undiscovered Arctic land. No land was claimed, but the 46th Squadron did pioneer transpolar routes and navigating methods. In 1947 growing concern over the Soviet bomber force and defenses led to the first collection flights along the Soviet eastern and northern coasts by B-29s. Soviet attempts to prevent "air encroachment" increased in 1950, leading to the first shutdown of a reconnaissance aircraft, a USN PB4Y-2 Privateer. According to Lashmar, one key outcome of the shutdown was a ban by President Truman against future flights over Soviet territory.

The Korean War offered a new battleground for the reconnaissance war. The newly formed 91st Strategic Reconnaissance Squadron conducted operations over North Korea and along the Soviet and Chinese borders. The unit obtained critical intelligence, but the enemy learned of US capabilities through recovery of aircraft wreckage and interrogation of aircrews. Also during this period, Lashmar alleges that General LeMay led an effort to circumvent Truman's ban. At the request of the

Joint Chiefs of Staff, the RAF agreed to pilot overflight missions in the new USAF RB-45C Tornados. These missions, as well as a possible British Canberra mission known as Project Robin against the Kapustin Yar missile test site in 1953, were essential to improving SAC targeting accuracy and verifying Soviet missile advancements.

Lashmar also presents engaging pilot accounts of USAF overflights, which he claims occurred without presidential authority. During one flight near Murmansk, USAF RB-47 pilots narrowly escaped death at the hands of 10 MiG-17 Frescos. With the shootdown of an RB-47 in 1960, President Eisenhower is reported to have been sufficiently angered by USAF activities to establish the Joint Reconnaissance Center to monitor all future operations. President Eisenhower also asserted civilian authority over strategic reconnaissance by granting the CIA control over the new U-2 program after "the air force laughed with contempt at this proposed single-engine reconnaissance aircraft."

Criticism of the USAF and LeMay is a prominent theme. In addition to questionable evidence that LeMay encouraged unauthorized overflight missions, Lashmar devotes an entire chapter to SAC's aggressive use of reconnaissance missions as a political tool intent on provoking nuclear war. If successfully implemented, Project Control overflights would "demonstrate the Russians' military impotency" and possibly create the conditions for a preventive war. In addition to attributing a prolonged cold war to General LeMay and other senior USAF leaders, Lashmar also contends that SAC and the USAF intelligence community inflated Soviet missile, and later bomber, strengths to justify inordinate spending on SAC. Although estimates by the intelligence community later proved high, evidence for a duplicitous USAF agenda is suspect.

Spy Flights of the Cold War represents an ambitious and impressive effort to reveal the truth from a shroud of secrecy. Indeed, the RAF officially denies its role in Soviet overflight missions to this day. Personal accounts by aircrews provide rich detail and offer fascinating insights into the operational and tactical aspects of these courageous missions. Lashmar's effort, however, is undermined by questionable propositions regarding the USAF's unofficial, provocative strategy. This evidence is best judged by the individual reader. I recommend the text for people seeking contrasting views, as we all should, and as a noteworthy supplement to our understanding of airpower history.

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Strategic Exposure: Proliferation around the Mediterranean by Ian O. Lesser and Ashley J. Tellis. RAND, 1700 Main Street, Santa Monica, California 90407-2138, June 1996, 130 pages, \$15.00.

The possibility of Iraq or another aggressive nation launching Scuds tipped with biological or chemical weapons at US forces or at the cities of our allies in the Mediterranean is a common concern among today's US defense professionals. In *Strategic Exposure*, Lesser and Tellis propose that within 10 years, every southern European capital will be in the range of ballistic missiles based in North Africa or the Levant (including Syria, Iraq, and Iran). How would the US national strategy change if a rogue state could use weapons of mass destruction (WMD) in a long-range strike on a European city as easily as that state can now directly attack countries in the Middle East? Is a new cold war possible between Europe and a variety of unstable North African and Southwest Asian nations, based on the potential of the WMD threat? Given the long-term commitment of the United States to the Mediterranean and Arabian Gulf regions, combined with the increasing concern over WMD employment by extremist and rogue nations, this short book provides some important background information.

Strategic Exposure is a relatively balanced and cogent introduction to considerations of WMD and missile proliferation. This study also discusses the motives that cause nations to pursue WMD and the consideration of virtual versus actual capabilities. Lesser and Tellis argue that regional fears can "stimulate" WMD proliferation. Moreover, prestige and political attention might be nearly as important as obtaining a functional nuclear weapon or other WMD capability. Later, in their "Strategic Consequences" section, the authors discuss the need to establish a strategy to reduce proliferation. The book concludes with a detailed appendix, amassed from open sources, that discusses a variety of facts, including WMD, ballistic missiles, and cruise missile capabilities of many countries in the Mediterranean and Levant.

Army partisanship surfaces in emphasized concerns over minimizing the vulnerability of ground forces while asserting that air attack of "strategic targets" might provoke enemy air and missile attacks against "allied population centers." This line of reasoning is unsatisfying because the authors fail to fully explore current and future airpower options to deal with WMD and missile threats. Lesser and Tellis do, however, briefly mention that force

might be useful in "dissuasion, preemption, or retaliation in relation to WMD." Although RAND is frequently associated with USAF research, the US Army and the Arroyo Center's Strategy and Doctrine Program sponsored *Strategic Exposure*. A lack of air-mindedness is distracting but not fatal to the substance of this clearly presented analysis.

The authors conclude that proliferation in the Mediterranean region is a complicated issue and requires further strategic thought. This point appears obvious. Nevertheless, the recommendation that the United States provide mobile, rapidly deployable point-air-defense systems to protect the population centers of the entire Mediterranean region would levy a huge bill on American taxpayers, particularly in light of tight US aid and defense budgets. Indeed, if ballistic missiles travel at supersonic speeds, even the most rapidly deployable "catcher's mitt" system suggested by Lesser and Tellis may arrive too late. Moreover, maintaining standing air-defense bubbles around every major

population center in the region is an untenable proposition. Unfortunately, *Strategic Exposure* does not explicitly provide a resolution to this security conundrum.

I recommend that airmen and other people interested in the topics of WMD, nonproliferation strategy, and missile defense read this short book. The appendix is informative, and the discussion of motives and the complexity of decision making in an unstable WMD environment are certainly worthy of consideration. *Strategic Exposure* is a good overview that will generate further thought on nonproliferation strategy. It is also a reasonable starting point for professionals who desire to explore the military and political complications inherent in dealing with the WMD threat and the strategic implications of proliferation.

Maj Merrick E. Krause, USAF
Maxwell AFB, Alabama

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—Vince Lombardi

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The Editor

Our Contributors



Gen Thomas S. Moorman Jr., USAF, Retired (BA, Dartmouth College; MA, Auburn University; MA, Western New England College), recently joined Booz Allen and Hamilton as vice president after serving over 35 years in the United States Air Force, culminating with his assignment as vice chief of staff. His responsibilities at Booz Allen include developing space-related business strategy and the execution of that strategy across the firm. As vice chief of staff, he oversaw and managed the day-to-day activities of the Air Staff at the Pentagon. Now a member of the Board of Visitors of Air University, Maxwell Air Force Base, Alabama, General Moorman attended Squadron Officer School, Air Command and Staff College, and Air War College (by correspondence) at Maxwell, as well as National War College.



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Hon. Bob Smith (BA, Lafayette College) is a Republican senator from New Hampshire, currently serving as chairman of the Senate Armed Services Subcommittee on Strategic Forces; the Environment and Public Works Subcommittee on Superfund, Waste Control, and Risk Assessment; and the Select Committee on Ethics. Now in his second term of office, he previously represented his state as a congressman from 1984 to 1990. Winner of a number of awards for fiscal responsibility, national defense, and business, Senator Smith served two years on active duty in the US Navy, including one year in Vietnam, and five years in the Naval Reserve.



Dr. Frank O. Mora (BA, George Washington University; MA, PhD, University of Miami) is assistant professor of international studies and chairman of the Latin American Studies Program at Rhodes College in Memphis, Tennessee. Since 1995, he has worked with the School of Advanced Airpower Studies at Maxwell AFB, Alabama, as a guest consultant. Dr. Mora has authored several works on civil-military relations, hemispheric security, and US-Latin American relations.



Lt Col James M. "Skip" Ljepman Jr. (BA, University of Kansas; MS, Naval Postgraduate School; MS, Naval War College) is commander of the 325th Training Squadron, Tyndall AFB, Florida. After completing undergraduate controller training, he served as instructor, chief of training, chief of standardization and evaluation, flight commander, and commander of two air control squadrons. He also served as liaison for the commander of US Atlantic Command (USACOM) to the joint force air component commander in Operation Uphold Democracy. He led the USACOM training team that provided joint training for all CONUS-based personnel deploying in support of the implementing force in Bosnia; and he organized and led teams providing joint task force training to US European Command and US Pacific Command. Colonel Ljepman, a master air weapons controller, was the winner of the "Outstanding Presentation" award at Tactical Air Command's 1987 Tactical Fighter Symposium. He is also a top graduate of Squadron Officer School.



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Lt Col Antonio L. Palá (BA, Florida International University; MA, Webster University) is currently an assistant professor of Spanish and chairman of the Latin American Studies Group at the US Air Force Academy. A pilot with over three thousand hours of flying time in B-52s and trainers, he served from 1984 to 1987 as a foreign language and T-41 instructor at the academy. He has also served as an exchange pilot in the pilot training program of the Spanish air force and as chief of pilot courses and eventually the chief of officer courses at the Inter-American Air Forces Academy at Homestead AFB, Florida, traveling extensively to evaluate the training programs of the Latin American air forces. He has authored several articles and papers and lectured at numerous conferences on the Latin American military. Colonel Palá is a graduate of Squadron Officer School, Air Command and Staff College, and the Marine Command and Staff College.

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The Professional Journal
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Summer 1999

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