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FEATURES

DEPARTMENTS

Flight Lines

MAJ M. J. PETERSEN, SENIOR EDITOR

WITH THIS EDITION, we welcome to our ranks our newest associate editor, Maj Pete Osika. Unfortunately, we also bid adieu to both our editor, Col Bill Spencer, and our editorial board chairman, Col Robert Hylton. They have departed for other adventures.

In many respects, this issue could have taken the subjects of its articles straight from recent headlines. We look at the controversy over air and space, airpower and theater warfare, the war in El Salvador, the teaching of integrity and ethics, weather as an arrow in our quiver, the problem of foreign-language capability, the enlargement of NATO, and a United States beset by biological terrorism.

We lead off with an article by RAND researcher Benjamin Lambeth, who explores space as a new medium of operations and considers its increasing integration with classic airpower. Is space really a separate area of responsibility? Read the article and let us know what you think. I'm certain we all have our own ideas about where the Air Force should go with the folks who are clamoring for recognition at the many space detachments around the world. Are we really an air force, an air and space force, or an aerospace force? Should we even consider space a separate area of responsibility when it is still firmly wedded to this ball of mud we call Earth? Can there be such a thing as a space force when it still relies upon command and control and support from the ground?

Historically, most military professionals see airpower playing a permanently supporting role in theater warfare when the objective requires the defeat of an enemy army. Price Bingham looks at theater warfare, movement, and airpower in the context of JSTARS and the dramatic results produced by that platform during Operations Desert Shield and Desert Storm.

Employing airpower in a counterinsurgency campaign is the subject of Dr. James Corum's probing examination of the 12-year war in El Salvador. How effective was the training provided by the United States to members of the El Salvadoran air force? Was the doctrine and its employment appropriate to the situation? This subject is all the more relevant in light of our increased involvement around the globe. We need to expand the dialogue and closely examine the employment of airpower in such actions. Is there a better way?

Ethics, integrity, authority, and propriety all are in the news. We can hardly have a conversation or read a periodical without some ethical question staring us in the face. Ethical behavior is the binder in the foundation of military culture. Dr. James Toner examines how we teach ethics and asks some hard questions. Whose ethics will we teach? Should we advocate one understanding of ethics even though we are a multicultural country? Do human beings generally know right from wrong, honor from shame, virtue from vice? Or must they be taught?

Lt Col John Lanicci asks whether the United States has become so technologically sophisticated that we have forgotten some commonsense principles of warfare. Is it possible that our increasing reliance upon precision weaponry could combine with a CONUS-based force strategy and restrictive rules of engagement to make us vulnerable to a potential adversary? Lieutenant Colonel Lanicci then outlines a strategy for developing innovative ways of exploiting terrestrial and space weather in battle.

In every war in its history, the US Army turned to native speakers to meet its language needs but did so as a last-minute expedient. Desert Storm was no different. Col Gunther Mueller and Lt Col Carl Daubach examine the

foreign-language and area-expertise capabilities of the Department of Defense and find both appalling.

A serious debate within the Atlantic Alliance about the merits of NATO enlargement is now over. NATO will enlarge. Col Samuel Grier and 2d Lt Jason Arnold carefully examine such questions as the purpose of enlargement, what the Alliance will look like afterwards, and Russia's outspoken opposition to and possible membership in NATO.

In a twist of coincidence, Captains Fred Kennedy, Rory Welch, and Bryon Fessler suggest something straight out of recent headlines—decapitation of the United States by a small plane spreading "inhalation anthrax" over the capital. Their article raises some serious questions about domestic terrorism, especially in view of the recent arrests of two men suspected of transporting anthrax.

Clearly, our authors have addressed issues that deserve considered, informed debate. Respond to their positions in a letter to the editor or in a way point or an article of your own.

As an aside, we would like to see your airpower photograph in *Airpower Journal*, either on the cover or inside. Please submit a glossy color photo for the cover and color or black-and-white photos for articles. In either case, the photo must not be copyrighted; we will credit the photographer. We can return unused photos only if you enclose a mailer stamped with appropriate postage. If we choose your photo, we will request that you sign a release for publication. Please be aware that because we are in the public domain, anything published in *Airpower Journal* can be duplicated without our permission. □

Ricochets and Replies

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@max1.au.af.mil. We reserve the right to edit the material for overall length.*

WHERE ARE THE MITCHELLS?

I am an Air Force Academy graduate and a new captain. This gives me two things relative to Col Timothy Kline, USAF, Retired ("Where Have All the Mitchells Gone?" Fall 1997): limited experience but a fresh perspective. General Mitchell was a military visionary who saw a usefulness for airpower that few others of his era understood. He also possessed the clarity of purpose and tenacity to pursue his vision. What he lacked was the tact and negotiation skills necessary to persuade the establishment to change. His outspokenness limited his effectiveness, and I would contend that the establishment did what it felt necessary to protect itself. Fortunately, men like Hap Arnold, Carl Spaatz, and Ira Eaker adopted Mitchell's vision and possessed the skills necessary to cause airpower to evolve into the Air Force.

Although rigid and slow to change, the Air Force establishment provides stability by minimizing chaos, maximizing resources, and providing discipline. One cannot expect a system to be both stable and completely open to change. Giulio Douhet said that "flexibility is the key to air power," but stability provides the direction necessary to develop practical uses for constantly evolving technologies. At the rate technology is changing warfare, we do not need Mitchells who can see the future but cannot implement the change. We need Arnolds and Eakers who can "play nice with

Continued on page 98

The Synergy of Air and Space

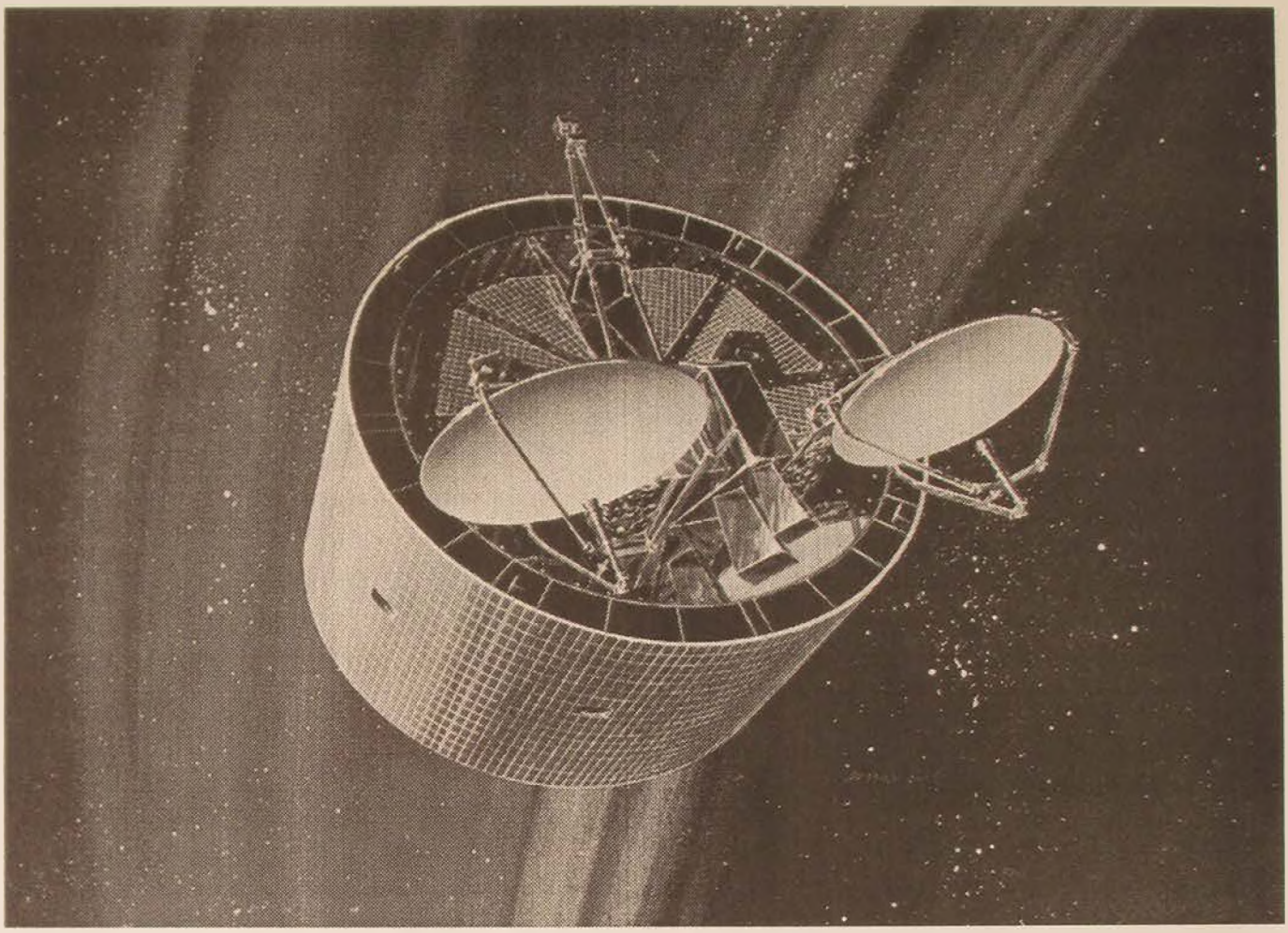
DR. BENJAMIN S. LAMBETH*

UNTIL THE GULF WAR of 1991, Air Force aviators and space professionals lived and worked in almost separate worlds. For their part, rated airmen were quintessential "operators" with an ingrained fingertip feel for the practical uses of airpower, given their responsibility for fulfilling mission profiles, which—unlike those in the nuclear arena—had an all-too-deadly air of plausibility about them. In contrast, USAF space professionals evolved not out of the rated flying community but from the secret world of space and missile research and development (R&D). For the first 10 to 15 years of the space program, those who created military space systems were devoted almost exclusively to ensuring nuclear deterrence and otherwise supporting the nation's strategic-level leadership. Naturally, their career development steeped them not in the warrior arts but in applied science, engineering, and systems management. That made for an almost preordained divide between the air and space components of the Air Force—a divide that became ever more apparent as military space systems increasingly emerged from the compartmented world into the light of day.

There even arose a mutual disdain between the two communities as rated versus nonrated distinctions began to form between the "real men" who wore wings and flew jets and those in the emerging missile and space world who all too often were shrugged off by their aviator brethren as "techies," "pocket rockets" (a pejorative reference to the missileer's badge), and "space cadets"—or, worse yet, "space geeks." For their part, those beset-upon professionals in the fledgling space community took note of their rejection by the operators and, in natural fashion, forged a self-protective sense of separate identity. That, in turn, led to a pressing by many in the space community for apartness rather than closer integration with the flying Air Force—and, indeed, for the development of a separate organizational base and doctrine. The more assertive among them went so far as to fashion themselves as the new Billy Mitchells of the dawning space age, looking to the day when they might become the vanguard of an independent space force.

Only in the crucible of the Gulf War did the synergistic potential of air and space first began to be fully recognized by rated airmen and space professionals alike. In manifold unexpected ways, space demonstrated what it could bring to the new face of air warfare as first displayed in Operation Desert Storm. In the end, the effective exploitation of space by US Central Command (CENTCOM) occasioned a post-Gulf War blossoming of space awareness at all levels offering unprecedented promise, albeit in a way and along a route perhaps least expected by either space professionals or rated operators.

*This article is an excerpt from a larger study on the transformation of American airpower sponsored by Headquarters USAF and written by the author on a year's leave from RAND under a contract to Independent Research and Information Services, Inc.



DSCS II Satellite. Three satellites of the Defense Satellite Communication System constellation on high orbit enabled continuous high-capacity, high-data-rate, worldwide secure voice communications for the allies during Desert Shield/Storm.

Space Support to Desert Storm

When Iraq invaded Kuwait on 2 August 1990, the first coalition assets to make their presence felt on scene were not air, naval, or land forces but space systems already on orbit high above the gathering storm. Although these assets played only a supporting role in the allied buildup and combat operations that followed, they were indispensable in determining the course and outcome of the war.

On the first count, the Navstar Global Positioning System (GPS) came of age by providing real-time navigation and targeting updates to numerous weapons types employed by coalition forces. It proved particularly useful because of the undifferentiated terrain of the Iraqi desert, which presented unusually severe challenges to navigation. Aircrews in combat aircraft equipped only with inertial navigation systems used handheld GPS terminals to augment their less accurate analog navigational aids. Such GPS cues were also used by special operations forces for aircraft positioning, with Pave Low helicopters relying on them entirely for both day and night nap-of-the-earth penetrations into Iraq and Kuwait.

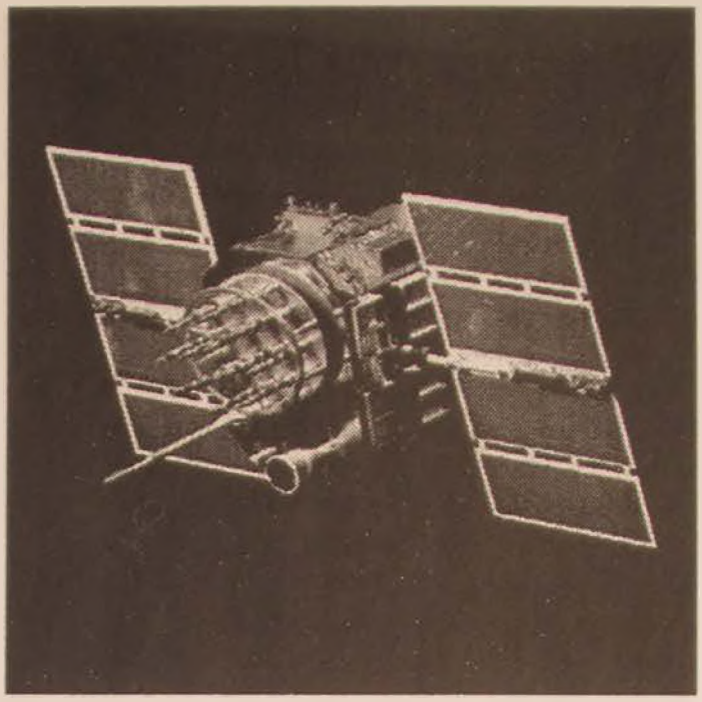
A limited number of handheld GPS receivers were available for use by allied ground personnel as well. At first, only a few hundred of these, popularly known as "pluggers" (for PLGR, an acronym for portable lightweight GPS receiver), were on hand for coalition forces. By the war's end, in what Gen Thomas Moorman Jr. called "the ultimate in opera-

tional pull," there were thousands.[1] As the value of these devices became clear and the demand for them peaked, the GPS Program Office made an emergency buy of 13,000 PLGRs for use on military vehicles, of which some forty-five hundred ultimately made their way to the theater.

As for allied communications, three satellites of the Defense Satellite Communication System (DSCS) constellation on high orbit enabled continuous high-capacity, high-data-rate, worldwide secure voice communications. These DSCS satellites supported 128 tactical terminals throughout the war. One of these was moved from the Pacific Ocean to the Indian Ocean to augment coalition communications—the first repositioning of a Defense Department satellite to support combat operations.

With respect to overhead surveillance and monitoring, satellites of the Defense Meteorological Satellite Program (DMSP) provided commanders and planners with near-real-time weather information. Among other things, they enabled remote analysis of the desert soil's moisture content to help determine the best routes for CENTCOM's "left hook" into Iraq and the Kuwaiti theater of operations. As for combat intelligence and battle damage assessment, classified national space-reconnaissance platforms—along with other allied capabilities—were key contributors toward obtaining electronic intelligence and multispectral images of the theater.

A space surveillance system that proved crucial in providing real-time warning of enemy Scud attacks was the Defense Support Program (DSP) constellation of infrared-sensing satellites, which were able to detect the heat of the Scud's exhaust plume within 30 seconds of launch. Although not originally designed to detect the launch of short-range ballistic missiles, DSP nonetheless helped greatly in alerting Patriot missile defense crews to an incoming attack. Thanks to three practice Scud launches by the Iraqis during the Desert Shield buildup, DSP operators were able to tweak the system for better operations in a quick-response mode. As a result, Air Force Space Command (AFSPC) was ready when the first Iraqi combat use of Scuds occurred on the second night of Desert Storm.



GPS Satellite. During the Gulf War, the Navstar Global Positioning System came of age by providing real-time navigation and targeting updates to numerous weapons types employed by coalition forces.

After the dust settled, Gen Merrill McPeak, the Air Force chief of staff, described Desert Storm as "the first space war," a characterization warmly embraced by many people in the space community.[2] Purists might demur on whether the strictly support functions performed by American space assets in that war were enough to justify such a categorical description. There is no denying, however, that the Gulf War represented the first instance in which the entire panoply of US space assets was employed in direct, if less than fully integrated, support of combat operations at all levels. That fact amply bore out the more telling point by a British defense leader that Desert Storm "taught us that space has changed the whole nature of warfare."[3]

Creation of an Operational Space Culture

At the outset of Desert Storm, commanders and planners had only limited insights into what space could do for them. For their part,

space professionals had little insight into the kinds of support that air, naval, and land war fighters needed. That mutual disconnect suggested a core problem with relationships and understanding between the two communities that sorely needed fixing. At bottom, the problem entailed harnessing America's space assets more closely in support of the needs of the war fighter—a challenge that had never been systematically embraced by *either* side.

The appointment of Gen Charles Horner after Desert Storm as commander in chief of US Space Command (CINCSPACE) proved particularly seminal with respect to bringing the space and flying communities closer together.

The appointment of Gen Charles Horner after Desert Storm as commander in chief of US Space Command (CINCSPACE) proved particularly seminal with respect to bringing the space and flying communities closer together. This was not the first time that a fighter pilot had served as CINCSPACE. However, Horner's recent experience in the Gulf made for a unique difference. As the joint force air component commander (JFACC) in Desert Storm, he had presided over airpower's greatest accomplishment since World War II, made possible by the indispensable contributions of America's space assets. As a grateful beneficiary of those contributions, he well knew what potential he was inheriting in his new assignment and moved with dispatch to get the space community pointed in the right direction.

One of the first milestones in the move to merge space with the war-fighting community was a windfall inheritance by AFSPC of the Air Force's intercontinental ballistic missiles (ICBM) as a by-product of the dissolution of Tactical Air Command (TAC) and Strategic Air Command (SAC). At the outset, Air Combat Command (ACC) found itself the new repository of the ICBM inventory. With the missiles making, at best, for an uncomfortable fit with ACC's primary air-employment focus, however, they were soon transferred to AFSPC.

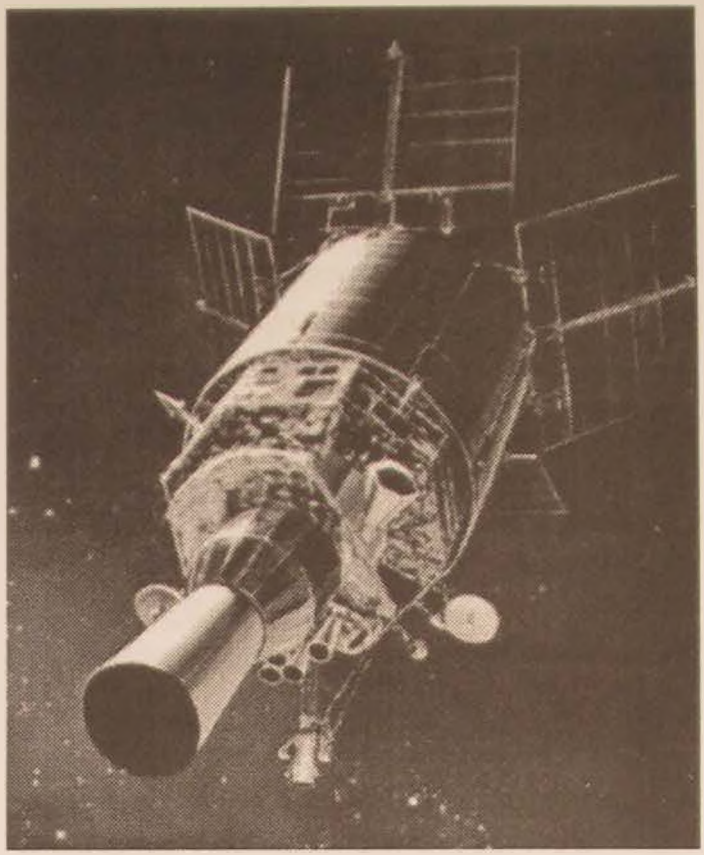
That move proved in hindsight to have been inspired from the perspective of both communities. Shifting the ICBMs from ACC to AFSPC gave the missileers a sense of identity with the space mission and the space technicians a credible claim to war-fighter credentials. The missileers found themselves, at long last, out from under the thumb of "airplane people" and embraced by a more sheltering community of like-minded professionals who spoke the language of space systems fluently. They brought to AFSPC not only a war-fighting function but also the operational mind-set that went with it. This included combatant-oriented habits ingrained by the observance of such rituals as being part of a concrete war plan, following normal and emergency procedures, meeting standardization evaluation criteria, and generally thinking like professionals with a "shooter" role and not just a spectrum of support missions to carry out. During roughly the same time, AFSPC was formally recognized by Title 10 of the National Defense Authorization Act as a "combat air force" (CAF).

Establishment of the USAF Space Warfare Center (SWC) at Falcon AFB, Colorado, on 1 November 1993 provided further evidence of operators imparting a new vector to military space development. Modeled on the USAF Weapons Center at Nellis AFB, Nevada, and the Air Warfare Center at Eglin AFB, Florida, SWC promptly became the cutting edge of a determined effort to integrate space more fully into the daily operating routines of the Air Force. Its avowed goal was not only to make space more relevant to the war fighter but also to breed war fighters out of space professionals along the way.

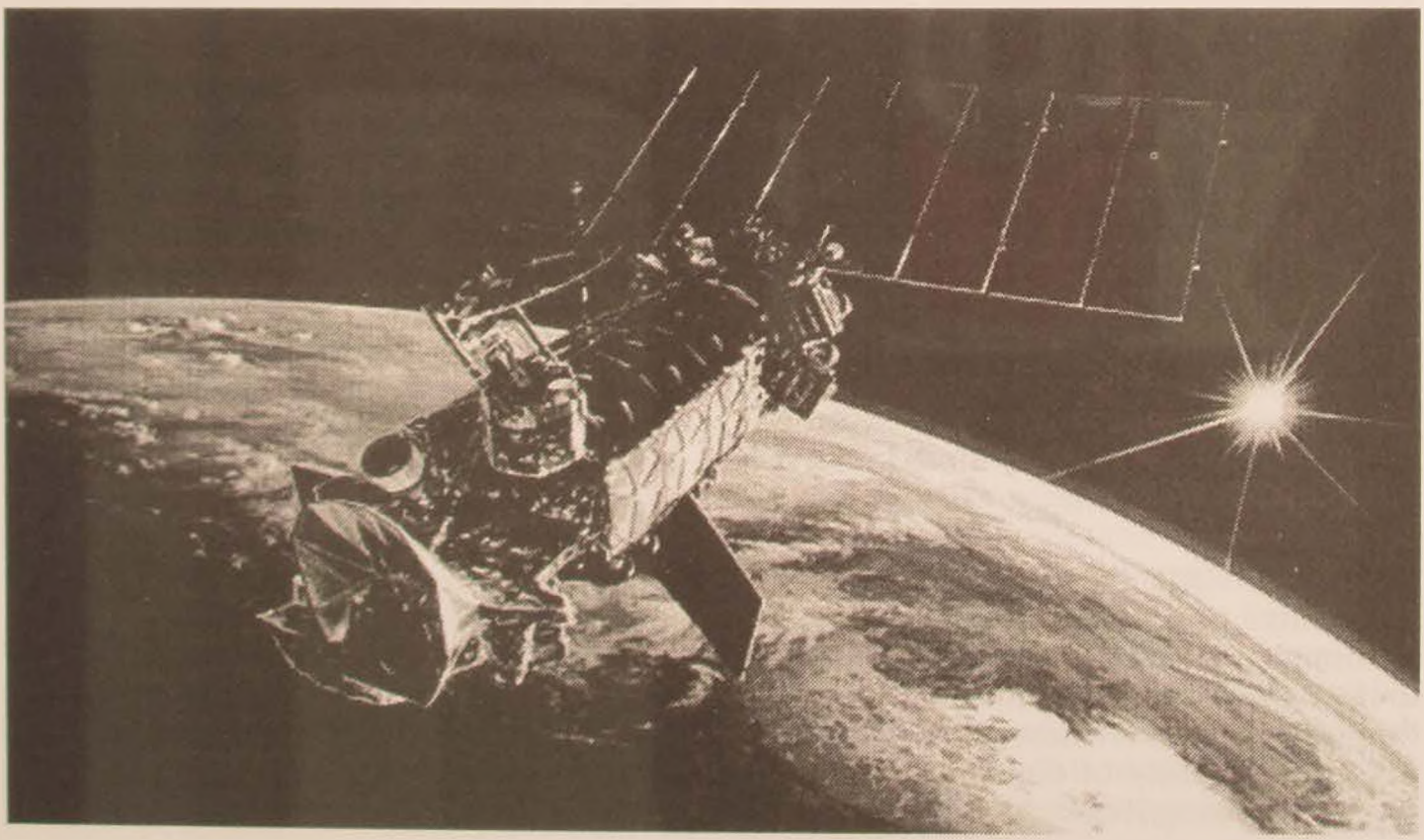
Activities of SWC to date have included the development of tools to exploit the accuracy of GPS information for target location and delivery of precision weapons; the prompt transmittal of space-derived intelligence and weather products to operators; and the use of existing communications systems to deliver

imagery, manifests, mission taskings, and even E-mail directly into the cockpits of airborne aircraft on combat missions. Strike II, a test out of Nellis AFB, provided an impressive demonstration of the potential offered by GPS for real-time mission targeting. In that test, satellite-derived target-location coordinates were used to successfully vector an airborne F-15E to attack a simulated mobile Scud launcher at night.

A related SWC activity involves cultivating a broadened base of expertise to support more fully integrated mission planning and execution for air and space. Innovations have included bringing space to Blue Flag campaign-planning exercises at Eglin AFB, the establishment of a space-training facility at Red Flag, and the addition of a Space Division (an evolution of the former USAF Space Tactics School) at the USAF Weapons School at Nellis AFB. The Weapons School now offers a Space Weapons Instructor Course, as well as hands-on training for aircrews in what space can provide at the sharp end of the lance. In particular, it shows how aircrews can exploit bit streams from the wide variety of military and commercial space systems to improve



Above: DSP satellites provided real-time Scud-attack warnings. Below: DMSP satellites provided near-real-time weather information.



efforts is to build a cadre of "space-smart" operators, both rated and nonrated, and to seed them throughout the CAF at all levels, with the ultimate goal of generating an expanded base of space literacy among those with their fingers on the trigger.

One can chalk up much of the ongoing integration of space with the operational community to the fact that AFSPC and the unified US Space Command have now had three CINCs in a row whose career maturation occurred primarily in the world of combat flying.

Now the "Nellis of space"—as its commander, Brig Gen Glen Moorhead, has called it—SWC has evolved since 1993 from supporting solely combat operations to supporting military operations of all kinds. General Moorhead, yet another career fighter pilot in the new world of space, has brought a warrior attitude to the heart of SWC and has infused it into SWC's day-to-day operating rhythm. Efforts to nurture such an attitude throughout SWC have included the establishment of a space-related Project Checkmate to provide operationally oriented threat assessment and the beginnings of a Multicommand Manual 3-1 publication for military space applications. They have even included initiatives to foster the atmosphere of a flying organization through such small but important symbolic gestures as authorizing space operators on headquarters assignment to wear flight suits or space-crew coveralls and scarves on Fridays, as well as a review of procedures for a space "emergency of the day" at morning staff meetings.

One can chalk up much of the ongoing integration of space with the operational community to the fact that AFSPC and the unified US Space Command have now had three CINCs in a row whose career maturation occurred primarily in the world of combat flying. Following Horner as CINCSPACE was Gen Joseph Ashy, a fighter pilot with comparable background who previously commanded NATO air operations over Bosnia. Ashy, in turn, was replaced by the current CINCSPACE, Gen Howell Estes III, who once served as commander of the USAF's F-117 wing and later became director of operations (J-3) on the Joint Staff.

One can imagine impassioned debate among airmen who have made the career transition to space over whether two or three more CINCs of similar background at Space Command may be necessary to provide enough generational shift to assure the continuing integration of space with joint-force operators. There is little question, however, that—owing to the cumulative influence of Generals Horner, Ashy, and Estes—a sea change has occurred in the orientation and outlook of the space community. For years, space people all but begged for attention and acceptance by the operational Air Force, and "space push"—often to little or no avail—was typically the rule. Since Desert Storm, this rule has changed unmistakably to "operator pull," with former fighter people in senior leadership positions setting both the tone and the example. No doubt, this has elicited a mixed and still-uncertain reaction from some of the more tenured individuals in the space career field, who may privately wonder whether the apparent seizure of military space by these interlopers wearing wings has been a welcome development.

Much road remains to be traveled before rated and nonrated officers thrust together in the space community will learn to speak a common language. The relationship between the two groups is still uneasy in many respects, as old habits and thought patterns on both sides remain slow to evolve and mutual suspicions linger. That said, the bringing of space to the service of the war fighter is no longer something to which the Air Force merely pays lip service.

Perhaps most important as a symbolic testament to this change, the Air Force's latest mission statement, *Global Engagement: A Vision for the 21st Century,* has flatly pronounced that the USAF is now transitioning from an

"air force" into an "air and space force on an evolutionary path to a space and air force."[4] That pronouncement, according to General Moorman, was "incredibly significant" in that it reflected not just the thinking of "a subset of folks doing a focused study, but rather the consensus of the Air Force leadership."[5] Many people in the space community, notably including those who wear wings, would go further and insist that the USAF has *already* become a full-fledged "air and space force." Whatever one might believe on that score, there is no denying that all of the services now depend on space support. Thus, General Moorhead was on target when he pointed out that "space is no longer something that sits in a jar on a shelf with instructions that read 'break glass only in the event of war.' "[6]

Integrating Air and Space

The unprecedented focus on bringing together US air and space capabilities since Desert Storm may have been the single most influential development in making American military power so preeminent in the world today. As General Moorman has summarized the trend line, "An integrated air and space program that combines total battlefield awareness and knowledge with rapid and dependable communications to get information to the decisionmaker or shooter, fully integrated with highly capable, survivable aircraft and a fleet of unmanned aerial vehicles, both with precision munitions, is the wave of the future."[7] Thanks to this new focus, space has now been routinely integrated into joint training and exercise schedules, US Space Command maintains a presence in support of every combatant commander, and every JFACC around the world has a permanent space-support cell.

That said, much remains before the Air Force's transition to a true air and space force is fully consummated. For the near term, the most effective leveraging of space toward the further enhancement of the nation's air assets will come from seeking synergy through closer integration of existing forces (e.g., real-time tying together of inputs from space systems and unmanned aerial vehicles [UAV] to cue an element or flight of B-2s armed with precision, through-the-weather conventional bombs). This is the sort of innovative tactical option that a dedicated Multicommand Manual 3-1 for air and space might usefully codify.

Many people in the space community, notably including those who wear wings, would go further and insist that the USAF has* already *become a full-fledged "air and space force."

Beyond that, developing a more common language among those communities and breaking down the institutional walls that still keep them apart will be crucial for ensuring the completion of such a transformation. This will necessarily involve a two-way street. The good news is that people in the rated world who still characterize their nonrated space brethren as "space geeks" are, more and more, now doing so in a tone of accepting comradeship rather than in their once-dismissive way. This is as it should be, for the latter will have to be treated as fully equal fellow combatants—just as weapons systems operators in the fighter world have gradually come to be over time—if full integration of air and space is to occur.

Toward that end, consciously directed cross-fertilization between the two communities should help greatly in building and further spreading space awareness throughout the armed forces. One such avenue might emerge from greater interaction between Fourteenth Air Force—the organization at Vandenberg AFB, California, tasked with providing space support to the war fighter—and the USAF's other numbered air forces. Another may involve putting greater numbers of fighter pilots in space billets, just as they are now assigned as air liaison officers with Army field units, and bringing space operators with

weapons schooling and SWC experience into mainstream planning and training assignments throughout the CAF.

Any idea of working toward a separate space force, at least today, would be not only premature but also more harmful than helpful.

In tomorrow's air and space community, aviators will increasingly find themselves sharing the spotlight with UAV pilots, space controllers, and information warriors, all of whom will be bona fide trigger pullers with a common operational-level responsibility and outlook. It may be some time before information warriors and space combatants will displace line pilots in the topmost positions of Air Force leadership. However, there is no question that rated operators will have to become more fluent in the instruments of space and information warfare if they are to become truly adept in their use. There is also no question that the the term *operator* will have to be rethought from the ground up in light of the space and information revolutions.

All of this suggests that any idea of working toward a separate space force, at least today, would be not only premature but also more harmful than helpful, considering that the synergy offered by recent developments in space exploitation requires integration with airpower rather than detachment from it. Gen John Jumper struck the right tone in this respect when, as deputy chief of staff for air and space operations, he stressed that

> we want to make sure that as we evolve into the next decade and the next century, we don't suffer the same problem that the air corps had as it articulated its differences with the Army back in the late 1940s, [which] led them to the conclusion that they could only be addressed by creating a separate air corps, and then eventually could only be addressed by creating a separate air force. Our theory here is that in the era of air and space, we're all airmen at heart. . . . We shouldn't be arguing about the line of demarcation up there where the last molecule of air has departed and we enter the vacuum of space. We should be arguing about the effects.[8]

Worst of all would be the establishment of an independent space force for the wrong reason. There is an entirely plausible reason why such an option might seem superficially attractive to some people. As General Horner has rightly observed, "As long as each service is funded at an artificial rate almost equal to one-third of the defense budget, the Air Force will be hard-pressed to fill its core air responsibilities, while expanding its role in space. All of this means that our space force may indeed become a military entity in its own right." Horner was on target in cautioning that "at some point, the nation must ask itself whether our air and space capabilities should remain artificially limited with the present budgeting methodology, when both functions are becoming of greater importance to our defense strategy."[9] That noted, however, it would be a perversion of common sense to address such a problem, in the end, by organizational sleight of hand rather than by rational choice with respect to the proper apportionment of R&D and procurement funds.

Ideally, the military development of space should end up evolving much as airpower did from its modest beginnings in World War I to its maturation in Desert Storm. Physical differences between space and the atmosphere, such as those that distinguish astrodynamics from aerodynamics, will affect the *mode* of space operations but not their purpose. A functional or operational, as opposed to a systems, approach to thinking about the application of space power will make the differences between orbital and atmospheric operations irrelevant. Much as a RAND colleague has said of the USAF's decision to forgo any immediate thought of setting up a separate command for information warfare, one might say as well for space that any such separate service "would retard rather than promote the necessary integration . . . into the whole spectrum of Air Force operations. Operations

[rather than organizational interests] should 'drive the train.' "[10]

Toward Full Mastery of the Vertical Dimension

The combination of the nation's many space assets has become an enabler not just of airpower but of *all* military power. This, in turn, has paved the way for a potential quantum change in the outlines of the interservice debate over roles and missions. Until recently, airmen could fairly claim that only they enjoyed a complete and unrestricted view of the battle space because of their command of the vertical dimension. Now, however, with the growing accessibility of space-derived global information by all combatants, *all* players—surface no less than air and space—can claim to "see beyond the horizon" and will have every incentive to seek an expanded piece of the action as a result. In developing joint space doctrine, the nation's defense leaders must ensure that the new leverage afforded by space is not allowed to feed distracting bureaucratic trench warfare over budget shares among the services, when the desired goal is a rational allocation of resources toward greater force integration by all of them.

Today, the United States stands at a crossroads regarding the next step in leveraging its space opportunities to greatest effect. One pointed question raised by some senior space officials concerns whether the services should take the near-term gamble of minimizing, or even skipping altogether, sizable chunks of the next generation of platform procurement so as to free up the necessary resources for operationalizing the new high ground of space sooner rather than later. Of course, few among them would disagree that the nation must maintain adequate levels of capability in the more developed elements of airpower, such as combat aircraft, precision weapons, and data-fusion systems that will make the most of what they have to offer in the near term. Yet, with no peer competitor on the horizon for at least the next decade and perhaps longer, it has become eminently debatable what "adequate levels of capability" means in practice. A core choice among the many options from which any resource-allocation trades with respect to space are likely to come may thus be between continuing as planned with next-generation platforms and proceeding more aggressively to jump-start the military-technological revolution.

Whatever the outcome, only in the context of a well-conceived and agreed-upon national strategy can such choices be made intelligently and responsibly. One fail-safe way of helping to ensure that the right choices get made will be to have a disciplined space road map that begins with clear concepts of operations and lets these drive requirements, rather than giving technology the lead. Here, America's past experience with airpower theory should be especially pertinent in counseling against repeating the mistake of the early airpower zealots by promising too much too soon.

In all, if one views space from an operational rather than an organizational or systems perspective, one will naturally be driven to see it as simply an extension of the vertical dimension. Airmen should strive to exploit space to the extent of their resources in pursuit of the abiding goals of airpower since the first days of military aviation. After all, just as airpower was the cradle of space exploration, so exploiting space as a part of the vertical dimension will be crucial to the full and final maturation of airpower. General Moorman seemed to have that in mind when he suggested in 1992 that "looking ahead a few years, one can speculate that advocates of both air power and space power will likely be talking about similar issues."[11] As it turned out, he was right. There is great merit to the proposition that space is merely a place, not an independent military mission or function.

People at the leading edge of military space exploitation over the past two decades have, to date, been much like modern-day equivalents of the early pioneers of the US Army's Air Corps Tactical School during the 1920s and 1930s, who struggled hard to earn a place at the table for airpower in the development

of national military strategy and capability. Among the many indicators of this fact, one could include the emergence of "space" as a USAF career field, the issuance of special "space" uniform insignia, efforts to formulate a military "space" doctrine, calling Desert Storm the first "space war," and ultimately the standing up of AFSPC and US Space Command. These and similar occurrences have been inevitable, yet, in all likelihood, also transitional milestones in today's still-embryonic process of making the leap from airpower to air and space power. As such, they will probably become more and more vestigial over time as the seams between air and space ultimately dissolve.

Once that happens, airmen of the twenty-first century will be as comfortable with operations in and around space as they are today with the lower reaches of the vertical dimension. Such a future may also see a gradual dissolution of the current organizational lines that separate space from the more familiar world of air-breathing aviation, much as TAC and SAC disappeared as separate entities with the dawning realization that distinctions between "strategic" and "tactical" had become artificial with the changed nature of air and space warfare. The strongest affirmation of the latter was the spectacle of nominally "tactical" F-117s performing supremely strategic operations during the opening moments of Desert Storm and B-52s providing fire support to friendly ground forces during the final days of the Gulf War. There is every reason to expect a similar withering away of today's conceptual and organizational demarcations between "air" and "space." This will occur as the application of airpower and space power toward terrestrial joint-force objectives becomes second nature to operators, whether or not they wear wings. □

Notes

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Theater Warfare, Movement, and Airpower

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HISTORICALLY, MOST MILITARY professionals have seen airpower as playing a permanently supporting role in theater warfare when the objective requires the defeat of an enemy army. Such a perspective may explain why Air Force officers are not selected to command forces with a regional responsibility. But now developments in surveillance and battle management technologies have dramatically increased airpower's capabilities against armies. Thanks to these developments, airpower has the potential in many situations to be the nation's main instrument for defeating an enemy army.

Warfare and Movement

To appreciate why developments in surveillance and battle management technologies, especially the joint surveillance target attack radar system (JSTARS), have the potential to give airpower a central role in the defeat of enemy armies, it is necessary to understand the importance of movement in land warfare. An examination of military history quickly reveals that movement is the soul of modern warfare.[1] The key role played by movement is apparent in the definition for logistics: "The science of planning and carrying out the movement and maintenance of forces."[2] The

importance of movement, especially rapid movement, is also reflected in the words of successful military commanders and recognized military experts:

> Marches are war. . . . Aptitude for war is aptitude for movement. . . . Victory is to the armies which maneuver. (Napoléon)[3]

> Any slowing down of one's own operations tends to increase the speed of the enemy's. Since speed is one of the most important factors in motorized warfare, it is easy to see what effect this would have. (Erwin Rommel)[4]

> In small operations, as in large, speed is the essential element in success. (George S. Patton)[5]

> Let us organize movement; this is the crucial problem. (J. F. C. Fuller)[6]

> With a time advantage, numbers don't count. (Gen James H. Polk)[7]

> Movement is the essence of strategy. (Stephen Jones)[8]

Why Movement Is Important

Although many are aware of the importance of movement in warfare, there is less understanding of all the reasons why movement can produce immense military advantages.

Besides allowing a commander to gain the advantages of mass and position, movement is one of the main ways a commander degrades the accuracy of an opposing commander's information on the location and strength of his forces. When information on the location and size of an opposing force is inaccurate, it often creates the important advantage of surprise.

In his stimulating book *Race to the Swift,* the late British military theorist Richard E. Simpkin attempted to explain how it is possible to quantify the amount of surprise that can be created by rapid movement. He quantified surprise by measuring the time it takes a commander to make decisions *once* the opposing force's movement is disclosed. Simpkin assumed that movement would be "disclosed" when opposing forces crossed a frontier or seacoast.[9] Simpkin's analysis would have been even more revealing if he had measured the time it takes to "disclose" movement by breaking out the time that is required to collect data on the movement, process the data to produce reliable information on the opposing force's location and strength, and then disseminate the information to the commander and other war fighters. For a truly comprehensive treatment of movement's ability to create surprise, Simpkin should have also addressed the ability of commanders who do not possess exclusive use of the airspace to degrade or even defeat an opposing force's ability to collect and produce reliable information through the use of concealment and deception measures. For example, commanders have learned through experience that when they do not possess complete control of the air, moving their forces at night or in bad weather is one of the most effective methods for denying an opposing commander the ability to collect and produce reliable information.

As seen by the title of his book, Simpkin assigned great importance to rapid movement. According to him, there are two types of armies: those that fight to move (German, Israeli, and Soviet) and those that move to fight (US and British).[10] When armies fight to move, they tend to use rapid movements deep into the opposing force's territory to dislocate the opposing force's ability to conduct effective military operations. The use of movement to dislocate the opposition may explain why the German and Soviet armies assigned so much importance to the operational level of war and the maneuver of large forces over significant distances. In contrast, the US Army, which Simpkin believed tended to focus on moving in order to fight, assigned great importance to the tactical level of war, measuring success in terms of numbers of enemy killed. Although the US Army has begun emphasizing the operational level of war in its doctrine, it has yet to fully institutionalize the operational level of war. It still depends on models that use attrition to determine movement and force structure requirements! Further evidence is found in one officer's obser-

German convoy destroyed around a farmhouse in Normandy, 1944. German commanders believed that one of the most important contributions made by Allied airpower in World War II, especially in Normandy, was through its impact on the German army's daytime movement.

vations on "decisive maneuver" during the recent Army war-fighter experiment. He noted that

> accurate/timely situational awareness was always available and in sufficient detail to highlight opportunities when offensive action could have led to prompt victory. At no time did the brigade assault with unexpected, overwhelming maneuver to decisively overwhelm the enemy. For whatever reason, leaders did not demonstrate the capacity to recognize or seize these opportunities. Instead, attritional/high casualty warfare was always favored.[11]

More evidence of the importance of movement in warfare can be seen by the number of great victories in history that were characterized by the use of movement to create and then exploit the advantages of surprise, concentration, and position. These advantages often allowed the seemingly inferior force to win quickly and at an amazingly low cost. The impact of advances in technology on military doctrine, organization, and training was often related to how these advances enhanced or degraded, directly or indirectly, an army's ability to move. The motor vehicle is one of the advances in technology that enhanced movement, creating an immense impact on military doctrine, organization, and training. By freeing armies from the railhead, motor vehicles greatly enhanced army mobility.

Today, armies depend on motor vehicles for mobility, heavy firepower, armored protection, and supplies. Without its motor vehicles, an army would have to live off the land, making it extremely vulnerable if trapped in place. Without motor vehicles, an army would be limited to light weapons and would have no protection when maneuvering in the open. Dependence on vehicles explains why light infantry can effectively fight heavy forces only in complex terrain such as cities, mountains, and jungles. Although light forces in complex terrain can be costly to defeat in direct attack, the Pacific campaigns of World War II demonstrate that these forces can be bypassed and isolated by forces possessing superior mobility and firepower.

Movement and Intelligence

Given the central role vehicular movement plays in modern army operations, this move-

ment has the potential to be the most important form of an opposing army's behavior for intelligence to assess. In fact, it is very difficult to identify significant military actions that would *not* involve vehicular movement. Compared to vehicular movement, other forms of behavior such as signals and other electromagnetic emissions provide information that often gives only brief glimpses of an army's capabilities or possible intent. Worse, signals intelligence is often unreliable because of deception and concealment measures (e.g., the use of landlines and messengers). In contrast, movement defeats many camouflage, concealment, and deception (CCD) measures. Nature provides many excellent examples of how movement can destroy camouflage and concealment measures.

Despite movement's immense potential value as a source for intelligence, it has been extremely difficult for commanders to reliably and quickly reconstruct the movements of enemy forces using inputs from their surveillance and reconnaissance assets. Contributing to the problem was that until the invention of the aircraft, commanders had to depend on surface-based surveillance and reconnaissance with a field of view that was severely limited by terrain, foliage, darkness, and weather. Although aircraft provided the important advantages of elevation and speed, their value as a surveillance and reconnaissance platform continued to suffer from significant limitations. Besides the human eye, many of the sensors aircraft carried were handicapped by darkness or bad weather. Other sensors, like the synthetic aperture radar (SAR), which is not handicapped by darkness and weather, have a small field of view and cannot see movement. Adding to the problems with sensors mounted on aircraft (and satellites) have been the extensive amounts of time and resources required to process the data they collected to produce information. Plus there remained the problem of communicating this information to the war fighters.

Since movement made information on a unit's location perishable, even with airborne surveillance, the time required for processing and communication often made information on the location of opposing army units provided to commanders dangerously unreliable. As long as the opposing force remained mobile in World War II, Korea, and Vietnam, actual contact between friendly and opposing ground forces was often the most reliable way for an army commander to collect information on enemy ground forces. It was this need for contact between armies that explains B. H. Liddell Hart's "man-in-the-dark" theory of warfare. Liddell Hart compared warfare to two men fighting in a dark room using their extended hands to locate the other while protecting against a surprise attack. When one man found the other with his hand, he would grasp (fix) him and attempt to immobilize him while setting him up for a decisive blow.[12]

MTI Imagery Capability and Potential

But now the old paradigm is changing. JSTARS, with its high performance when operating in the moving target indicator (MTI) radar mode, has suddenly "turned on the light" for US forces. It is important to note here that while other systems may possess an MTI capability, all MTI-capable radars are definitely *not* the same! Thanks to its 24-foot-long antenna, high power, and various other design factors, JSTARS has demonstrated vastly superior performance in *all* of the areas that make it possible for its MTI imagery to be used to precisely track vehicles, even when they move very slowly.[13] Moreover, compared to other MTI-capable radars, JSTARS demonstrates far superior performance even when operating from a much greater standoff distance and while providing a much larger field of view. With JSTARS, US forces now possess the unprecedented ability to reliably detect, accurately locate, precisely track, and, if appropriate, target in real time almost all the unscreened vehicular movement of opposing forces occurring within an area exceeding 40,000 square kilometers, even if this movement takes place at night or during bad weather.

The value of this capability is enhanced because the MTI imagery of JSTARS is frequently updated, easy to quickly exploit, and widely disseminated. Much of the ease with which MTI imagery can be exploited results from its display on board the E-8C aircraft on the high-resolution color graphic displays of the 18 operator workstations. Workstation operators can enhance their display by superimposing MTI imagery on a variety of digitally stored databases that show terrain features as well as other tactically significant information. The operators can replay the recorded MTI at selected speeds using time-compression and integration techniques to further enhance imagery exploitation. They can also superimpose MTI imagery on an SAR image and enhance the image by fusing it with information provided by off-board sources.

Adding to the value of this information is the fact that it is widely distributed to Army forces through an unlimited number of ground station modules (GSM) via an encrypted, highly jam-resistant surveillance control data link (SCDL). The SCDL also permits specified GSMs to uplink radar service requests. Thanks to this dissemination of JSTARS information, air and ground commanders can share the same real-time picture of friendly and opposing movement. Sharing a common picture makes it much easier for them to orchestrate their actions so as to create an immensely powerful joint force synergy.

But to fully realize the potential contribution of JSTARS, it is important that sufficient aircraft be available to provide continuous surveillance. Without continuous surveillance there will be gaps in the information on vehicular movement. These gaps will create uncertainties regarding the location of forces that moved when JSTARS was not present.

When JSTARS surveillance is continuous, it is possible to replay MTI imagery to further reduce uncertainties by tracing the movements of vehicles back in time. For example, if a vehicle was identified as a surface-to-surface missile (SSM) transporter erector launcher (TEL), replaying MTI imagery could make it possible to trace the TEL's movement back to its source, perhaps leading to the location of a previously unknown missile storage area. Once a storage area is found, replaying MTI imagery to follow the paths of other vehicles originating from that area could easily lead to the location of other dispersed and concealed TELs.

Besides continuous surveillance, fully exploiting JSTARS information on movement depends on developing appropriate exploitation tools. Most importantly, it requires changing the mind-set of those responsible for intelligence who have no experience working with MTI imagery. Since warfare, like football, is about movement, the military might want to study how coaches exploit video to better understand how to use the MTI imagery of JSTARS for intelligence purposes.

While this MTI imagery alone is an extremely valuable source of information, it can also be used to dramatically increase the value of other collection sources by cueing their employment. Using MTI imagery for cueing makes it possible for high-resolution, small field-of-view SAR, electro-optical (EO), and infrared (IR) sensors to collect information on unanticipated, fleeting events involving movement that otherwise would be uncovered. The advantage of such cueing was demonstrated during unmanned aerial vehicle (UAV) operations in the Army war-fighter experiment at the National Training Center. The MTI imagery of JSTARS can also be useful for validating information provided by other intelligence assets. For example, comparing its MTI imagery with other forms of information could be especially useful for detecting camouflage, concealment, and deception measures. Knowing where and how the enemy is attempting to hide or deceive would be extremely useful information.

Battle Management: The Primary Role of JSTARS

Despite the immense value of the information provided by its MTI imagery, viewing JSTARS as just another airborne sensor fails to

JSTARS launch. Rather than considering JSTARS to be an "upside down" AWACS, perhaps it would be easier to appreciate its immense joint interdiction battle management potential if viewed as a giant electronic airborne forward air controller (FAC) or killer scout.

recognize the system's immense potential for increasing overall joint war-fighting effectiveness through battle management. The importance of being able to see movement in real time is ultimately determined by whether this information can be used while the information is still fresh. As has been noted, one way information on the movement of enemy forces can be used is in the dynamic management of surveillance and reconnaissance assets. Such a use explains why JSTARS has immense potential as a "mother ship" for UAVs performing surveillance and reconnaissance. Cueing by JSTARS with its wide area view makes it much more likely UAVs will collect information on key events since movement is a part of almost all significant military activities. Similarly, cueing will make it easier to establish exploitation priorities, reducing the time it takes to provide information to the war fighters while possibly also reducing the resources that need to be devoted to exploitation.

However, the most dramatic use of JSTARS real-time information on movement is in the employment of combat forces. By exploiting the unprecedented surveillance *and* battle management capabilities of JSTARS, a joint force commander possesses the ability to conduct dynamic, asymmetric joint warfare. Dynamic, asymmetric joint warfare involves the creation and execution of interdiction and ground maneuver schemes that are designed to exploit the tremendous interdiction capabilities possessed by US forces, while ensuring the two different schemes complement and reinforce each other.

For example, ground maneuver schemes (which can ensure friendly ground forces avoid significant close contact by using JSTARS surveillance) could be designed to force the enemy to attempt moving large forces quickly, making them more vulnerable to US interdiction. The objective of the complementary schemes would be to create dynamic conditions that put the enemy at a tremendous disadvantage, while minimizing the risk for friendly forces. The ability of JSTARS to see movement in real time also makes joint warfare more dynamic by allowing a commander to detect and exploit the often fleeting opportunities that are created when the enemy attempts rapid, large-scale movements. Unfortunately, while the advan-

tages of JSTARS information for ground maneuver appear to be well understood, Joint Publication 3-03, *Doctrine for Joint Interdiction Operations,* indicates that the asymmetrical and revolutionary advantages for joint warfare from JSTARS-supported interdiction are not.[14]

Revolutionizing Joint Warfare through Interdiction

To understand why JSTARS-supported interdiction creates revolutionary advantages for joint warfare, it is necessary to understand that, before JSTARS, interdiction against mobile ground forces did not reduce the need for friendly ground forces to fight, often very costly, close operations where US personnel were in immediate contact with enemy ground forces. The need to fight close operations was directly related to the immense problems involved in detecting, locating, and effectively targeting the enemy's mobile ground forces with airpower and artillery before the enemy's forces could move into close proximity with friendly ground forces. But now the ability of JSTARS to detect, locate, track, and then precisely target enemy ground forces with airpower and long-range missiles while these forces are still far from the nearest friendly forces makes it possible to inflict devastating destruction even when the enemy attempts to move at night or during bad weather. In many situations, this destruction could be so devastating that there will either be no close operations or they will, as was the case during the battle at Al Khafji, pose relatively little risk for friendly ground forces.

Given the importance of movement to warfare, it is extremely important to recognize that the value of interdiction should not be judged solely in terms of the amount of destruction that is actually inflicted. Joint interdiction supported by JSTARS has immense and revolutionary joint warfare potential because the *threat of destruction* that is possible can have the extremely important functional effect of preventing an enemy army from conducting militarily significant movement, even at night or during bad weather. And when the initial interdiction attacks are sudden and intense, it is possible to achieve the desired functional effect relatively quickly and at low cost in terms of both lives and material resources.[15]

The ability of interdiction to influence an enemy army's movement through the threat of destruction is apparent from past experience. For example, although Allied airpower killed relatively few German tanks in Normandy, German army commanders like Field Marshal Erwin Rommel credited it with having an immense impact on their ability to fight effectively.[16] Rather than risking devastating destruction from air interdiction by attempting to move during the day, the Germans waited until darkness or bad weather removed the threat. As the following quotes make clear, German commanders believed that one of the most important contributions made by Allied airpower in World War II, especially in Normandy, was through its impact on the German army's daytime movement:

> The technically superior enemy fighter-bombers neutralized practically all traffic during the day. (Hans Speidel, Rommel's chief of staff)[17]

> This air supremacy manifested itself in mass air commitments in certain front sectors . . . and in the almost ever-present Allied fighter-bomber units to depths varying between 30 and 60 miles in the German rear, the frequency with which they were encountered decreasing with the increasing distance behind German lines . . . [as a result] tactical movements during daylight were impossible or could only be carried out at considerable costs in casualties, materiel losses, and loss of time. (Gen Wolfgang Pickert III, AA Artillery Corps commander)[18]

> On clear days, it was practically impossible to carry out any movement in the rearward areas. This could only be done on cloudy days or by night. (Col Willy Mantey)[19]

In explaining the impact of airpower performing interdiction on the Normandy campaign, the US Army's Twelfth Army Group states that "German commanders agree that a

considerable part of the art of war consists of concentrating more forces at key points than the enemy. When mobility and maneuver are lost, the loss of battles and campaigns follows."[20] If interdiction had this impact on battles and campaigns by preventing significant German movement during the day within 30 to 60 miles of friendly ground forces, imagine the impact on future battles and campaigns when interdiction makes significant movement within one hundred miles impossible even at night or during bad weather!

Allied interdiction influenced German movement in two ways: directly in attacks against mobile forces themselves in the form of armed reconnaissance and indirectly through attacks against lines of communications (LOC) infrastructure and fuel supplies. Just the threat of destruction from armed reconnaissance generally caused the Germans to limit movement to times when armed reconnaissance was not feasible because of darkness or bad weather. A German panzer corps commander in Italy explained the impact of airpower in this way:

> The enemy's mastery of the air space immediately behind the front under attack was a major source of worry to the defender, for it prevented all daylight movement, especially the bringing up of reserves. We were accustomed to making all necessary movements by night, but in the event of a real breakthrough this was not good enough. In a battle of movement a commander who can only make the tactically essential moves by night resembles a chess player who for three of his opponent's moves has the right to only one.[21]

It is also important to note that the threat from armed reconnaissance rapidly decreased with distance from friendly territory because of the range of fighter-bombers and the increasing size of the area the aircraft had to search for movement.

Allied armed reconnaissance proved to be very effective in Normandy at influencing German movement for a variety of reasons. The Allies could generate many sorties. Besides possessing a very large number of aircraft, the Allies quickly established many bases in close proximity to the enemy. The campaign was fought during the summer, when the hours of daylight were long and the weather generally good. Also contributing to the effectiveness of armed reconnaissance was the surprise achieved by the invasion's location, which required the Germans to move units quickly to Normandy. Once their ground units reached the Normandy area, the Germans were forced to shift these units around their defensive perimeter in attempts to contain Allied attacks.

Although it was very effective in Normandy, there are many reasons why Allied armed reconnaissance was also very inefficient. Performing a comprehensive target search of all the LOCs required a great many sorties. Limited range tended to restrict the depth of search to 30 to 60 miles in the German rear, so the frequency with which fighter-bombers were encountered decreased with the increasing distance behind the lines. The increased exposure that was required to perform a low-altitude search resulted in very high fighter-bomber losses to short-range air defenses. Attacks were frequently wasted on previously destroyed vehicles. The search for targets was limited to daylight and good weather. Finally, reliable, timely battle damage assessment (BDA) for attacks against mobile forces was extremely difficult and often impossible.

The ability of enemy armies in World War II, Korea, and Southeast Asia to exacerbate these inefficiencies does much to explain why armed reconnaissance was not always as effective as it was in Normandy. At the same time, the threat posed by air interdiction attacks explains why *all* of our foes (Germans, North Koreans, Chinese, North Vietnamese, and Iraqis) have quickly chosen to restrict the movement of their forces and supplies to periods of darkness and/or bad weather. They also increased the inefficiency of armed reconnaissance by deploying numerous decoys, moving cross-country rather than on roads, concentrating short-range air defenses along LOCs and around LOC nodes, preparing bypasses for LOC nodes, concentrating re-

sources for rapid LOC repair, and using deception to conceal LOC repairs and bypasses.

Now, with the unprecedented capabilities of JSTARS, most if not all of the measures that successfully limited the effectiveness of interdiction attacks against mobile forces will no longer work. But the performance of effective joint interdiction against enemy mobile forces depends on more than just the ability of JSTARS to provide unprecedented surveillance. Effectiveness also requires exploiting its ability to perform lower-level interdiction battle management. The realities of theater communications availability and throughput, span of control, and the need for graceful degradation combine to explain why a platform with the sensor that can see and track enemy movers is also the ideal location for performing target/weapon pairing, providing target information to the shooter, conducting BDA, and determining the need for a reattack.

It is important to realize in this situation BDA should be functionally oriented, assessing whether the target continues to move. If the target does continue moving after an attack, it is important to know in what direction, at what strength, and at what speed. However, knowing immediately whether vehicles stop because they have been destroyed, exhausted their fuel supply, or have been abandoned by their crews is of secondary importance.

The joint force commander and his component commanders must remain responsible for the higher-level battle management activities, managing the planning and execution of warfare at the operational and tactical levels to include oversight of engagements. These commanders are the ones who determine a joint interdiction campaign's objectives, conceive concepts of operations for employing their forces to achieve those objectives, prepare plans to implement those concepts, assign resources to execute the plans, and oversee execution of the plans, to include dynamically modifying their plans

The Highway of Death. With JSTARS, US forces now possess the unprecedented ability to reliably detect, accurately locate, precisely track, and, if appropriate, target in real time almost all the unscreened vehicular movement of opposing forces that is occurring within an area exceeding 40,000 square kilometers, even if this movement takes place at night or during bad weather.

and reassigning resources to ensure the creation and exploitation of powerful joint warfare synergies.

Further rationale for performing the engagement activities of joint interdiction battle management on board JSTARS can be found by comparing the differences between air-to-air and air-to-surface targeting. These differences explain why there is a huge difference between the airborne warning and control system (AWACS) and JSTARS. In air-to-air combat, AWACS is working with fighters that possess their own long-range sensor and employ air-to-air missiles (AAM) that also possess sensors for terminal homing. In this situation, AWACS does not always need to provide the same amount of targeting information (such as the number of vehicles, their spacing, speed, direction, and how the surrounding terrain may influence the attack) that would be needed for effective deep air-to-surface interdiction attacks. In contrast, no fighter or bomber can detect and track moving ground vehicles at anywhere near the same ranges that are possible in the targeting of other aircraft in air-to-air combat. In fact, often the only way the crews of most aircraft can find and target their munitions against ground vehicles is with their own eyesight, perhaps aided by short-range, narrow field-of-view night vision devices. Even then, unless the target is moving, they cannot tell if the target is real or dead or a decoy.

Rather than considering JSTARS to be "an upside down AWACS," perhaps it would be easier to appreciate its immense joint interdiction battle management potential if it was viewed as a giant electronic airborne forward air controller (FAC) or killer scout. Like Fast FACs, such as the F-100F Misty operating over the Ho Chi Minh Trail in Southeast Asia, JSTARS uses its sensor (but a multimode radar, rather than the pilot's vision) to find targets. Also like a FAC, once it finds a target, JSTARS can then provide appropriate targeting guidance (sensor-to-shooter information) to ensure an effective attack.

Despite the similarities, JSTARS is vastly superior to Fast FACs for a wide variety of reasons. The field-of-view radar of JSTARS is immensely larger than the field-of-view of a FAC's eyesight. Thanks to its radar, JSTARS stands off at a significant distance from the area it is watching, providing unobtrusive surveillance and greatly reducing its exposure to air defenses. With its radar, JSTARS surveillance is not degraded by darkness or weather as is the case with the FAC's eyesight. Unlike a FAC, JSTARS can provide far more persistent surveillance and battle management; with air refueling it has an endurance of 20 hours or more. Operators on board JSTARS work in an environment more conducive to their effectiveness (this includes access to databases and outside sources of information) than a Fast FAC maneuvering at low altitude (sweating, breathing hard, and pulling Gs), while attempting to watch the target area and study maps or photos. JSTARS operators are also less susceptible to degradations in their performance from fatigue because there is room to accommodate relief operators. The JSTARS workstation operator can instantly look at an area anywhere within the radar's very large field of vision, while a FAC has to expend the time (and fuel) it takes to fly the aircraft within visual range of the target area. Also, a FAC is limited to providing targeting in one area at a time, but JSTARS with its 18 onboard workstations can support many simultaneous attacks throughout the sensor's field of vision.

Large or Small AGS Platform?

Determining whether an airborne ground surveillance (AGS) system like JSTARS should be on a small (unmanned aerial vehicle or business jet) or large (707) platform requires consideration of a number of issues. One issue is whether the system is to be a "full spectrum" system or stovepiped for only one portion of the spectrum of conflict or only for surveillance, rather than surveillance *and* battle management. Generally, armed forces are sized primarily based on war-fighting considerations and, as has been explained, a large platform possesses far more potential to manage joint interdiction than a small platform. When it is on a large platform, the same

system can support operations across the spectrum and make a smooth transition from one type of task to another (indications and warning [I&W], crisis management, war fighting, and peacekeeping). A large platform also possesses the flexibility to quickly respond to out-of-area situations where surface forces either have not yet arrived or for a variety of reasons (political or threat) may not have been considered. Additionally, a large, manned platform can more easily incorporate and exploit new technologies than a platform with little or no extra internal volume or power. And if there is one system where the mission growth possibilities from advances in technology are barely understood, it is in AGS.

Conclusion: Back to the Past or Forward into the Future?

One of the most difficult challenges armed forces face is change.[22] When faced with new developments, armed forces have often exhibited the tendency to look to the past and not to the future as they made crucial force structure decisions. This tendency was particularly apparent in navies during and after World War II when plans were proposed within the US Navy and British Royal Navy to continue building battleships. As one naval aviator, Adm Arthur W. Radford (later chairman of the Joint Chiefs of Staff), asked in frustration, "Are we to have an air-sea Navy in the future, or is it to be in the immediate future the sea-air Navy of pre-Pearl Harbor days and ultimately no Navy at all?"[23]

Today many recognize the increasing parallels between warfare on land and warfare at sea.[24] For example, during World War II the Battle of the Coral Sea saw the first combat between fleets without the exchange of gunfire between surface ships. Aircraft had transitioned from merely finding the enemy and supporting surface ship gunfire to becoming the primary instrument for defeating an enemy fleet. The Battle of Al Khafji in the Gulf War approaches the Coral Sea as a key transition point in warfare on land. During this battle, Iraqi ground forces were attacked from the air, and a powerful offensive threat was defeated with almost no contact between opposing surface forces. And this occurred with two prototype JSTARS, little doctrine, and next to no training.[25]

Today the challenge facing the US military is determining whether they want to make the changes needed to fully exploit the immense potential of JSTARS. If they do, it is likely they will have to change how they fight (joint and service doctrine) and the role of the forces they use to fight, and these changes could also lead to significant changes in types of forces the United States fields.[26] The choice is brutally stark because the failure to move forward will mean US forces must continue to fight enemy armies the old way, putting large numbers of US personnel at risk in close operations.

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5. George S. Patton, quoted in Robert Debs Heinl Jr., *Dictionary of Military and Naval Quotations* (Annapolis, Md.: United States Naval Institute, 1966), 306.

6. J. F. C. Fuller, quoted in Brian Holden Reid, "Major General J. F. C. Fuller and the Problem of Military Movement," *Armor* 100, no. 4 (July–August 1991): 31.

7. Gen James H. Polk, USA, Retired, "The Criticality of Time in Combat," *Armor* 97, no. 3 (May–June 1988): 10–13.

8. Stephen Jones, "Global Strategic Views," in *The Impact of Air Power: National Security and World Politics*, ed. Eugene M. Emme (Princeton, N.J.: D. Van Nostrand, 1959), 118–28.

9. Richard E. Simpkin, *Race to the Swift: Thoughts on Twenty-First Century Warfare* (London: Brassey's Defence Publishers, 1985), 182–83.

10. Richard E. Simpkin, *Red Armour: An Examination of the Soviet Mobile Force Concept* (London: Brassey's Defence Publishers, 1984), 89.

11. James J. Grazioplene, ATXY, memorandum for leaders, subject: Army Warfighter Experiment, 25 May 1997.

12. Capt B. H. Liddell Hart, "The 'Man-in-the-Dark' Theory of Infantry Tactics and the 'Expanding Torrent' System of Attack," *Journal of the United Service Institution*, February 1921; and Lt Col Robert R. Leonhard, USA, "Shedding Light on the 'Man in the Dark,'" *Army* 47, no. 2 (February 1997): 40–48.

13. The ability to precisely track a moving vehicle depends on the moving target indicator (MTI) performance in *all* of the following areas:

- Minimum Detectable Velocity (MDV). MDV determines whether the majority of military traffic, which often moves very slowly, will be visible. To capture the majority of this traffic, a radar must have the ability to detect the lowest possible radial velocity. As a target's radial velocity approaches zero, the target will fall into the clutter or "blind zone." The clutter spread is a function of a radar's antenna real bandwidth. When a target is in clutter, traditional MTI radars can either detect the target or locate it, but not both. JSTARS uses a patented technique that allows slow-moving targets to be both located and detected, even at maximum ranges in this clutter region. In contrast, short antennas tend to have a high MDV and/or a large number of false alarms.
- Probability of Detection (PD). PD is the probability of detecting a given target at a given range any time the radar beam scans across it. PD is determined by factors that include range to the target, target radar cross section, system false-alarm rate, and characteristics of background noise in the returned radar signal (signal/noise ratio).
- Target Location Accuracy. Location accuracy is a function of platform self-location performance, radar-pointing accuracy, azimuth resolution, and range resolution. A long antenna or very short-wave length can provide fine azimuth resolution. Range resolution is a function of radar pulse width, with shorter pulse widths providing higher resolution. Short antennas tend to have a large azimuth error, increasing with range to the target.
- Surveillance Time. This time equates to the frequency with which the radar beam revisits the target. Frequent revisits are vital for track continuity. When revisit intervals become too lengthy, tracking performance is greatly diminished because of the need to increase the "window" size to compensate for increased uncertainty regarding target location. Increasing the window size increases the probability that more than one radar return (from other targets within the window) or a return from a different target will be processed into the track file, corrupting the track's accuracy. Still other critical areas of performance are standoff and coverage area, which determine how many radars are needed to cover a given area and their exposure to defenses located in the target area.

14. Although the doctrine publication notes that "JSTARS not only enhances situational awareness, but C^4 capabilities as well," it provides little guidance on *how* JSTARS can dramatically change the conduct of joint interdiction. To provide this guidance, the doctrine should provide a discussion of functional or effects-based warfare, explaining that ultimately warfare is about changing human behavior. Too often joint and service doctrine ignore the role and use of fear, which is why so many military officers measure war-fighting effectiveness almost exclusively in terms of physical destruction. Yet fear of destruction is often an excellent way of influencing behavior, as in the case of mine warfare. Besides explaining effects-based warfare, the doctrine should explain the vital role that vehicular movement plays in army operations. After doing this, the doctrine would be ready to explain how the ability of JSTARS to detect, locate, track, and target vehicular movement allows the system to have an impact on interdiction that is very similar to the role Wild Weasels played in suppressing Iraqi radar-guided surface-to-air missiles (SAM) during the Gulf War. Joint Publication 3-03, *Doctrine for Joint Interdiction Operations*, 10 April 1997, III-4.

15. The coalition's suppression of enemy air defenses (SEAD) operation during the Gulf War provides an excellent example of the functional effect. The operation used a combination of surprise and intensity to quickly demonstrate to Iraqi SAM operators the dangers of allowing their radars to emit long enough to conduct an effective engagement. By successfully intimidating most Iraqi SAM operators, the coalition quickly achieved its objective of flying at medium altitudes without a high risk of being engaged by radar-guided SAMs. Thomas A. Keaney and Eliot A. Cohen, *Revolution in Warfare?: Air Power in the Persian Gulf* (Annapolis, Md.: Naval Institute Press, 1995), 202–4.

16. *The Rommel Papers*, 477, 491; and Ian Gooderson, "Allied Fighter-Bombers versus German Armour in North-West Europe 1944–1945: Myths and Realities," *Journal of Strategic Studies*, June 1991, 210–31.

17. "A German Evaluation of Air Interdiction in World War II: Saber Measures (Echo)," US Air Force Assistant Chief of Staff, Studies and Analysis, Washington, D.C., November 1970, 26.

18. Ibid., 28–29.

19. Ibid., 40.

20. Gen Omar N. Bradley and Air Effects Committee, Twelfth Army Group, *Effect of Air Power on Military Operations, Western Europe* (Wiesbaden, Germany: US Strategic Bombing Survey and Air Effects Committee, Twelfth Army Group, 15 July 1945), 181.

21. Fridolin von Senger und Etterlin, *Neither Fear Nor Hope: The Wartime Career of General Frido von Senger und Etterlin, Defender of Cassino* (New York: E. P. Dutton, 1964), 224.

22. See Barry R. Posen, *The Sources of Military Doctrine: France, Britain, and Germany between the World Wars* (Ithaca, N.Y.: Cornell University Press, 1984), 54–56, 277–78. Given the magnitude of the obstacles to change, Posen states that civilian "intervention is often responsible for the level of innovation and integration achieved in a given military doctrine."

23. Stephen Jurika Jr., ed., *From Pearl Harbor to Vietnam: The Memoirs of Admiral Arthur W. Radford* (Stanford, Calif.: Hoover Institution Press, 1980), 77.

24. The US Army's Field Artillery Center has published a concept called "Ascendency of Fires" that describes a potential trend in which "land warfare is becoming more like sea and air warfare . . . forces will fight at increasingly greater ranges in 'demassed formation.' In this setting, combat elements conducting superior information operations and employing state-of-the-art smart/brilliant munitions, robotic vehicles, and swarms of unmanned aerial vehicles can conceivably shape the battlefield and conduct decisive operations, possibly without coming in visual contact with each other." "New Field Artillery 'Roadmap' Espouses 'Ascendency of Fires' Concept," *Inside the Army* 9, no. 1 (6 January 1997): 6.

25. Lt Col John W. Holmes, *Operational Evaluation Command (OEC) Joint Surveillance Target Attack Radar System (Joint STARS), Operation Desert Storm (ODS) Summary Report* (Alexandria, Va.: US Army Operational Test and Evaluation Command, 10 October 1991), 4–7.

26. The National Defense Panel's review of the Quadrennial Defense Review (QDR) notes that "as new technologies mature, very different operational concepts will be feasible and that will lead to demands for quite different forces and equipment. As a result, the fairly conventional approaches used in the QDR's MTW [Major Theater War] assessments may not provide an optimal force structure." "National Defense Panel Sees No Link between QDR Reductions, Strategy," *Inside the Army* 9, no. 20 (19 May 1997): 25.

The Air War in El Salvador

DR. JAMES S. CORUM

THE CIVIL WAR in El Salvador, which lasted from 1980 to 1992, was one of the largest and bloodiest insurgencies that the Western Hemisphere has seen. During the 12-year war, an estimated one hundred thousand people died—fairly horrendous losses for a country of only five million people.

The war in El Salvador saw significant involvement by the United States in the form of military and economic aid, advisors, and training. During the course of the war, the United States poured $4.5 billion of economic aid into the country and over $1 billion in military aid.[1] Almost a quarter of the US military aid was provided to the Salvadoran Air Force.[2] Some aspects of the war in El Salvador and the US involvement have been told in numerous books and publications.[3] Yet, although airpower played a major role in the conflict, its story has not been dealt with in any detail. Indeed, there are no books or major journal articles specifically on the history of the Salvadoran Air Force during the war. Considering that the Salvadoran war provides us with one of the most recent examples of the use of airpower in a counterinsurgency campaign, this is a significant gap in the literature about the use of airpower in modern warfare.[4]

This article is an attempt to fill some gaps in the history of the air war in El Salvador. It begins by outlining the history of the air war and then looks at some issues in greater detail, issues such as the effectiveness of the training and equipment provided to El Salvador by the United States. The doctrine and tactics of the air war also merit discussion. Was airpower used in an appropriate manner? Finally, the article outlines some of the lessons about the use of airpower in counterinsurgency that might be learned from the war.

Background of the Conflict

In 1980, El Salvador was ripe for a major insurrection. It was a small, poor, and densely populated nation long dominated by a small oligarchy and ruled by a series of military governments that had little regard for civil rights. The infant mortality rate was high, and the lack of economic opportunity had pushed hundreds of thousands of Salvadorans across the border into Honduras in a search for land and jobs. Several Marxist-oriented revolutionary groups were already organized in the country. The events of 1979 would set the conditions for an open rebellion.[5]

The successful revolution by the Sandinistas against the Somoza regime in Nicaragua in 1979 provided encouragement to revolutionary movements in Central America. If such a powerful and oppressive regime could be brought down by a poorly equipped popular movement, then the oligarchy in El Salvador could also be brought down. Furthermore, the October 1979 coup that resulted in a new military government in El Salvador left that country in chaos. The Salvadoran armed forces were divided with some officer factions favoring reforms and others violently opposed. As a result of chaos in the government and the unpopular state of the regime, guerrilla war broke out in 1980 and the major rebel factions amalgamated into one large alliance, the Marxist Farabundo Martí National Liberation Front (FMLN), which directed the insurgency. The various smaller factions, however, maintained their identity.

The rightist factions and parties in El Salvador, which included parts of the armed forces, reacted to the insurrection with a ruthless assassination program conducted by "death squads." Anyone suspected of leftist sympathies was liable to be abducted and shot. Dozens of murders by progovernment forces and militia were conducted nightly. Indeed, an estimated 10,000 people were killed in this manner in the first year of the war.[6] However, instead of suppressing the insurrection, the extreme violence by the regime pushed many more Salvadorans into open revolt. The violence escalated, and the Carter administration, in its disgust with the massive level of human rights violations, cut off US economic and military aid. By January 1991, the rebels, who by this time numbered as many as 10,000 fighters, mounted a final offensive with the intent of occupying San Salvador and overthrowing the government. Alarmed at the very real possibility of insurgent victory, the Carter administration in its last days lifted the impounded military aid and authorized new aid.[7] As distasteful as the regime was, in the US view, it was preferable to another Marxist revolutionary government in Central America. The revolution in Nicaragua had alerted the United States and the other Central American nations who all feared a "domino effect." If El Salvador fell, then revolutions might also succeed in Guatemala and Honduras, and the Carter administration did not want Central America to collapse on its watch.

The rebel offensive in El Salvador made significant gains but failed to achieve victory in early 1981. The Carter administration was followed in that month by a conservative Reagan administration that was ready to take a more active role against the expansion of communism in the hemisphere. In 1981 the Reagan administration made the commitment that it would assist El Salvador in defeating the most serious insurgency in the region.

The State of the Salvadoran Armed Forces in 1981

El Salvador had a small armed force of approximately 10,000 military personnel and seven thousand paramilitary police in 1980 when the war began. The army, the largest part of the armed forces, had approximately nine thousand soldiers organized into four small infantry brigades, an artillery battalion, and a light armor battalion.[8] The level of training was low. The training that the army did have was all for conventional war—preparation for a replay of the short war with Honduras in 1969, where the army performed creditably. There was no training or preparation for fighting a counterinsurgency campaign.

The armed forces as a whole had severe leadership problems. The officer corps was disunited after the coup of October 1979. As in most armies in Central America, advancement and selection for command were based more upon political connections and sponsors than merit. In fact, there were no merit promotions in the Salvadoran army. All promotion was by seniority. While officers had gone through a cadet school and many had attended training in US Army courses, they were not members of an especially capable officer corps. On the other hand, there was nothing even resembling a professional noncommissioned officer (NCO) corps in the Salvadoran forces. Most enlisted men were simply conscripted (or "press-ganged") young men, many of them in their midteens. If officer training was mediocre, the training of the enlisted men was minimal. In short, it was an army that was not ready for a serious war.

In comparison with the other branches of the armed forces, the Salvadoran Air Force—the Fuerza Aerea Salvadorena (FAS)—was the most professional service arm. It was a small force of under a thousand men consisting of a small paratroop battalion, a security force, a small antiaircraft unit, and four small flying squadrons with a grand total of 67 aircraft. The main combat force of the FAS consisted of 11 Ouragan ground-attack fighters acquired from the Israelis, who had acquired them from the French in the 1950s, and four Fouga Magister trainers modified for combat (another 1950s aircraft). The combat squadrons also had four Super Mystère fighters and six Rallye counterinsurgency aircraft. The rest of the air force consisted of a transport squadron with six C-47s and four Arava transports. The training squadron consisted of a handful of T-34s, T-6s, T-41s, and four Magisters. The helicopter force amounted to one Alouette III, one FH-1100, one Lama, and ten UH-1Hs.[9]

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An AC-47 gunship of the FAS. This old platform provided the most accurate and effective close air support (CAS) of the war.

The FAS had two major air bases. The primary air base was Ilopango on the outskirts of the capital, and there was a smaller base at San Miguel in the southern part of the country. These remained the two bases of the FAS throughout the conflict. The training in the FAS was, like the army, geared for a conventional war. Unlike the army, the FAS had not done as well in the war with Honduras a decade before and had lost air superiority.[10] Since then, the only action the air force had seen was in the 1972 coup.[11] The air force had only a handful of pilots, and the pilot-training level was only fair. For a small and poor country like El Salvador, an air force is an expensive luxury. There were few funds for maintaining the obsolete aircraft of the force or for providing more than rudimentary combat training for the pilots. Things like joint training or practicing for close air support (CAS) were simply not part of the air force's repertoire.

The Rebels Hold the Initiative, 1981–83

Although the rebel "final offensive" of early 1981 failed, the 10,000 rebels of the FMLN alliance held the initiative during the first three years of the war. Large areas of El Salvador's 14 provinces were held by guerrillas.[12] The rebels were able to put significant forces into the field and fight an almost conventional war with battalion-sized columns. The insurgents were fairly well equipped and supplied with small arms (assault rifles and machine guns), as well as mortars, mines, and explosives. Some FMLN weapons were procured from Cuba and Nicaragua, but many of the rebels' weapons were captured from government troops. The rebels were, however, deficient in antiaircraft armament with only a few .50-caliber machine guns for protection against aircraft and helicopters.

Effective interdiction of supplies and arms to the rebels was not really possible. El Salvador shared a long land border with Honduras and Guatemala and was separated by only 30 miles of water from Sandinista Nicaragua at the Gulf of Fonseca. Light weapons and supplies could be brought in by land, sea, or air. The land borders were hard to seal, although the United States made a major effort in providing Honduran armed forces with aid and helicopters to help close the land border to gunrunners and rebel suppliers.[13] However, light aircraft could also bring arms and supplies into El Salvador at night from Nicaragua using small landing strips set up for crop dusters.[14] One of the FMLN leaders who later left the cause admitted the importance of the air routes from Nicaragua to El Salvador in supplying the insurgents.[15]

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The FAS headquarters and barracks at Ilopango Air Base. This was the scene of heavy ground combat during the 1981 and 1989 FMLN offensives.

The whole country became the rebel infrastructure. Large areas in the mountains along the Honduran border were rebel territory in the early 1980s. The rebels also had several other strongholds under their control including the region around Mount Guazapa—only 30 miles from the capital of San Salvador. In the rural areas and small towns, the rebels could compel the local landowners and businessmen to provide food and pay taxes to the rebel forces—or face destruction of their property and assassination. In short, the rebels were largely self-sufficient for many of their needs.

Early in the war, the tendency of the El Salvadoran armed forces (ESAF) was to conduct sweeps in company and battalion strength. These tactics worked to the benefit of the rebels, who could pick an engagement with company-strength government units and then ambush the reinforcing column. Whole companies of the army were annihilated in this manner. The rebels also specialized in night operations—which nullified the Salvadoran Air Force and the firepower advantage of the army. In the early 1980s, relatively large rebel columns could even seize and hold towns for several days.

With the war going badly for the government, Brig Gen Fred Woerner, later commander of US Southern Command, led a small group of US military specialists to El Salvador for consultations with the Salvadoran government and military leaders. The result was a national strategic plan for waging the war, which was approved by the United States and Salvadoran leadership.[16] Essentially, the US policy was to emphasize land reform, political reform in the form of honest elections, economic development, and the end of human rights abuses. Most of the US aid was to be civilian and financial aid. However, the military and economic aid to be provided to El Salvador would be dependent

upon the willingness of the Salvadoran government and armed forces to go along with the reforms. If serious progress was not made on the issue of human rights, for example, then aid would be halted or delayed until satisfactory progress occurred.

The military strategy was to dramatically increase the size of El Salvador's armed forces and train the ESAF in counterinsurgency operations. Between 1980 and 1984, the ESAF more than tripled in size from 12,000 troops to 42,000 troops.[17] The ESAF would be provided with modern weapons and equipment. Even simple equipment such as adequate field radios for the army were not available to government forces in 1980. Once the army was built up and retrained, a major portion of the counterinsurgency campaign would be carried out by specially trained "hunter" light infantry battalions. These light battalions would patrol aggressively and move quickly to keep the rebel columns under pressure.

Airpower was to have a major role in the national strategy for the El Salvadoran forces. The aircraft of the force would be modernized and increased. Training and weaponry would be improved. However, the primary emphasis was to build up a large and capable helicopter force that could lift a significant infantry force for offensive operations and also provide helicopter gunship support. This type of mobility could provide a rapid reaction force to block and pin down rebel columns that engaged the ground troops.

The United States provided a total of $48,920,000 in military equipment sales, military equipment credits, and military aid to El Salvador in 1981.[18] In 1982, the military assistance and sales program for El Salvador had grown to $82,501,000 with another $2,002,000 for the international military education and training (IMET) program (officer and NCO training).[19] The portion of aid going to the Salvadoran Air Force was significant. A steady stream of new aircraft for the FAS flowed south throughout the conflict. In just the first six months of 1982 the United States delivered four O-2A aircraft for reconnaissance, six A-37B counterinsurgency fighters, and two C-123K transports. All of these aircraft had been fully modified and refurbished before being transferred. An additional $2 million worth of aerial munitions was provided for the FAS in 1982. As fast as equipment transfers were approved by the US Congress, the US Air Force would rush the aircraft and munitions to El Salvador. In June 1982, the USAF sent 12 planeloads of munitions to the FAS while still more munitions went by sea.[20]

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An MD-500 reconnaissance helicopter of the FAS. This is the gunship version at Ilopango Air Base.

In 1982, the IMET program emphasized improving the Salvadoran Air Force. A total of $1.4 million was spent on pilot, aircrew, and technician training of Salvadorans in the United States.[21] The whole issue of training the Salvadorans, however, was very complex. Due to strong opposition from many in the US Congress who remembered how the United States had started in Vietnam with a small group of advisors, the administration imposed upon itself a strict limit to the number of military personnel that could be assigned to the US Military Group (MilGroup) in El Salvador. Throughout the conflict, no more than 55 military personnel at any time could be assigned to the MilGroup.[22] With congressional committee acquiescence, additional US military personnel could serve for brief periods on TDY in El Salvador. Sometimes the total number of US personnel in the country reached as high as 150. However, the nominal restriction of the MilGroup to only

55 meant that the USAF contingent in El Salvador was only five people—one Air Force section chief who acted as the senior advisor to the FAS and four Air Force maintenance officers or instructor pilots.[23] The Army also provided a few helicopter and munitions maintenance instructors to the Salvadoran Air Force, and some US contract personnel (not on the MilGroup official strength) also assisted the FAS. However, this handful of Americans was not enough to make a serious impact on the training requirements of the FAS, so FAS personnel had to be trained outside their country in the United States or at the Inter-American Air Force Academy (IAAFA) at Albrook Field in Panama.

During the period 1981–84, as the ground and air forces of El Salvador were being retrained and reequipped by the United States, the FAS put in a combat performance that can be rated as fair. As small and poorly equipped as it was in 1981, it still represented the primary mobile firepower of the government. The FAS performed well in helping to stop the January 1981 offensive. It was limited in its ability to provide effective support to the army by the lack of training in the ESAF to effectively coordinate air/ground operations.[24] The FAS was also essentially a daytime air force with a minimal ability to operate at night.

The FAS suffered a major blow in January 1982 when five Ouragans, six UH-1Bs, and three C-47s were destroyed and another five aircraft were badly damaged on the ground at Ilopango in a raid by one hundred rebel commandos. At one stroke, most of El Salvador's operational combat aircraft were knocked out of action.[25] It was a well-planned and executed operation and demonstrated the tactical superiority of the FMLN guerrillas over the soldiers at this stage of the war. While this was counted as a major victory for the rebels, it was also something of a blessing for the FAS in the long term. The worn-out Ouragans destroyed by the commandos were quickly replaced by US-provided A-37s, a far more capable and suitable aircraft for a counterinsurgency war. The O-2 reconnaissance aircraft were also provided as well as 12 UH-1H helicopters to replace the losses.[26]

The FMLN strongholds along the Honduran border and in the south of El Salvador were simply too strong in the early 1980s for the government forces to attack directly. On the other hand, the Salvadoran forces were not about to allow the rebels sanctuaries within the borders of their own country. So in 1982 and 1983 the FAS began a program of bombing the rebel-held villages in the strongly FMLN regions of Chalatenango in the north and Mount Guazapa in the center of the country. What the air action amounted to was small harassment attacks in which flights of aircraft would regularly bomb and strafe the rebel areas in a desultory fashion. If no major military progress was made, at least the rebels could be brought under some pressure.[27] Yet, the attacks seem to have made no real impact in terms of rebel morale, infrastructure, or combat capability. At the same time that the FAS began its bombing campaign—which it never actually acknowledged—the rebel forces managed to win a number of victories in the field, to destroy several army companies, and capture army weapons and ammunition.[28]

The Government Gains the Initiative, 1984–88

By 1984, the US military aid program was starting to pay off in terms of increased effectiveness of the government forces. While the rebel forces had not increased past 10,000 combatants, the Salvadoran army now outnumbered the rebels four to one. Moreover, new battalions had been formed and intensively trained by the US Army in the United States, in Honduras, and in Panama, and then returned to El Salvador. These forces were ready to use a more aggressive strategy and take the war to the rebels. The FAS had also been strengthened, had an improved level of training, and was ready to take on a larger role in airmobile operations and air support operations for the army.

Even so, 1984 started off badly for the government forces when a large rebel force managed to overrun and capture the army's 4th Brigade headquarters at El Paraiso on New Year's Eve.[29] However, the army recovered from this setback, and throughout 1984 and 1985, government forces started to gain the initiative throughout the country. Airpower in the form of the A-37 fighters, helicopter gunships, and helicopter lift played a major role in the government's success. The FAS operational tempo increased notably. There had been a total of only 227 A-37 strikes in all of 1983. In June 1984 alone, there were 74 A-37 strikes.[30] The army went on the offensive in the spring of 1984 in order to protect the national elections from disruption by the FMLN. The UH-1H gunship missions were increased by three or four times their previous rate of operations during March to May 1984.[31] During 1984, US military assistance enabled the FAS to increase its helicopter inventory from 19 at the start of the year to 46 by year's end.[32] The air attacks on the rebel strongholds surged throughout 1984 and 1985 despite strict rules of engagement issued by President Jose Napoléon Duarte in September 1984.[33]

According to former FMLN leaders, the improvement of the FAS played a major role in turning the initiative over to the government forces. The US-supplied O-2 light reconnaissance planes covered the country thoroughly. The rebels could no longer operate relatively openly in large columns. Larger formations made lucrative targets that could be easily spotted from the air and then subjected to attacks by aircraft or heliborne troops.[34] Instead, the rebel forces operated in smaller columns, which would combine for larger operations such as the attack on El Paraiso.[35] Rebel forces had to stay on the move, making it more difficult for the rebels to coordinate several columns to participate in an operation. However, the rebels learned to adapt to the increased danger of aerial attack. After the FAS was able to successfully insert company-sized reaction forces to deal with FMLN attacks, the FMLN—like the Vietcong before them—learned to spot likely helicopter landing zones and prepare them for ambush.[36]

The Salvadorans by the mid-1980s had built up a group of small, well-trained elite units. Some functioned as light infantry patrol forces that could be inserted by helicopter to search out the enemy and establish outposts

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A UH-1M helicopter gunship of the FAS. These aircraft played an important role in the ground fighting during the later years of the war.

deep in enemy territory. If contact with the rebels was made, the FAS could quickly transport company-sized forces to reinforce the light troops and block rebel units. The helicopter force was the only practical means of transporting troops in much of the country due to the mountainous terrain and the bad roads. With effective reconnaissance and light heliborne forces, the government could, for the first time in the war, initiate combat at places of its own choosing.[37]

One of the US advisors rated the FAS as "particularly effective" in the government operations of 1984 and 1985.[38] One of the most important events in the air war came in late 1984–85, when the United States supplied two AC-47 gunships to the FAS and trained aircrews to operate the system.[39] The AC-47 gunship carried three .50-caliber machine guns and could loiter and provide heavy firepower for army operations. As the FAS had long operated C-47s, it was easy for the United States to train pilots and crew to operate the aircraft as a weapons platform. By all ac-

counts, the AC-47 soon became probably the most effective weapon in the FAS arsenal.

The tempo of aid to the FAS increased during 1984 and 1985. Five O-2A aircraft were delivered between September and November 1984. Two more O-2As and two O-2Bs along with three A-37s were prepared for delivery in early 1985 along with an additional five C-47 transports that had been modified and refurbished for the FAS at a cost of almost $1 million each.[40] However, the increased flow of aircraft to the FAS in 1984 and 1985 did not result in a rapid increase in the number of aircraft available for combat, as the attrition rate as a result of operational accidents was heavy. For example, in early 1994, an O-2A and one C-123K were lost to accidents.[41] However, the United States tried to replace aircraft as soon as they were lost. For example, a replacement C-123K was on the way from the United States within a month of the loss of the FAS C-123 transport.[42]

The United States also increased the training funds available to the FAS during 1984. In 1984, 117 FAS personnel took courses at the Inter-American Air Force Academy in Panama in contrast to 98 personnel the year before. The IMET program funded training for 118 Salvadorans in the United States in 1984.[43] US military aid was also committed to building up the infrastructure of the FAS. The FAS received $16.4 million in assistance funds in 1984, some of which went to building new hangars and repair shops at the main air base at Ilopango. By the mid-1980s, Ilopango had become a well-equipped air base.[44]

Despite all the training and expense, the FAS remained hampered by the exceptionally low operational readiness rate of its aircraft. While the FAS could muster well over one hundred aircraft by 1985, only 50 percent or fewer of the aircraft were operational at any time due to severe maintenance problems and a shortage of qualified pilots.[45] The helicopter readiness rate was lower than that of airplanes. The FAS was only able to maintain a small proportion of its helicopter inventory at any one time.[46] The FAS suffered continually from a lack of competent mechanics. Part of this is a cultural disdain for maintenance found in the Central American officer corps. The pay and conditions for the enlisted mechanics in the FAS were poor, and the most talented maintenance personnel would leave to find much higher-paying civilian jobs as soon as their term of enlistment was up. An even more serious problem was the pilot shortage. The pilot officers of the FAS had to be graduates of the military academy, and, with the rapid expansion of the armed forces, there were not enough graduates to meet the needs of all the services. Even with a serious training effort by the United States, the FAS had only about half the pilots it needed. In 1987, the FAS had only 70 active pilots for 135 aircraft.[47]

With a slowly growing capacity to airlift troops by helicopter, the FAS and its airborne reaction force began to make a real impact in the war. In June 1984, an FMLN force attacked the Cerron Grande Dam, El Salvador's largest hydroelectric plant. Two companies were quickly airlifted to reinforce the small garrison at Cerron Grande. The rebel attack was successfully beaten back, albeit with heavy losses.[48] However, the FMLN also proved that it would not be easily cowed by the FAS's firepower. In October 1984, six hundred FMLN insurgents attacked an army "hunter" battalion at Watikitu. The guerrillas were attacked by aircraft that inflicted heavy casualties on the rebels. Still, the FMLN troops persisted in the attack and by afternoon, the army battalion had simply disintegrated.[49]

The wider use of helicopters in support of the ground campaigns also resulted in heavy losses for the FAS. In the October 1984 fighting, one UH-1 was shot down. In November of that year, three more UH-1s were shot down and four heavily damaged in the fighting around Suchitoto.[50] While the A-37s and the AC-47 gunships proved to be relatively safe from enemy ground fire, the small arms of the FMLN proved to be lethal against helicopters.

Throughout 1985 and 1986, ground and air operations increased, while the competence of the army in counterinsurgency warfare continued to improve. In 1985 and early 1986, the FAS aircraft and helicopters sup-

ported several large army offensives, which finally reduced some of the FMLN's major strongholds in Guazapa and Chalatenango. The population and the rebel forces in these enclaves were bombed heavily as army troops swept in and forcibly evacuated thousands of civilians in FMLN areas and resettled them in refugee camps. It was a harsh campaign, but it succeeded in depriving the FMLN units of their civilian infrastructure in what had been their most secure strongholds.[51]

One of the FMLN leaders credits the greater airmobility of the army in the mid-1980s and the willingness of some army units to move by air deep into rebel country as having caused "a very significant turn in the war."[52] However, it should also be noted that the improvement of the air force's and army's tactics and firepower was not the primary cause for the demoralization of the FMLN alliance in the mid-1980s. The rebels were just as capable as the government of making major strategic and tactical mistakes. By 1984, the infighting within the FMLN groups became severe and, in true communist fashion, was resolved by purges and executions within the ranks of the FMLN. Soon FMLN leaders were ordering the killing of rival leaders. By 1984 and 1985, the membership of the FMLN began to decline as the rebel forces saw some of their own officers abandon the FMLN cause in disgust.[53] Yet, despite the internal dissension, being outnumbered six or seven to one, and under steady pounding by army and air force firepower, the FMLN was still a formidable force by the end of 1988 and could still field approximately seven thousand combatants throughout the country.

From Stalemate to Peace, 1989–92

By 1988, the government of El Salvador could bring a tremendous superiority of military power against the rebels. The army had grown to 43,000 troops organized into six brigades. There were 20 light infantry battalions and six counterinsurgency battalions that were able to take the war to the enemy.

COURTESY OF DR. JAMES S. CORUM

An O-2 Skymaster at Ilopango Air Base. This simple aircraft proved to be a very effective reconnaissance tool for the FAS in the war.

The artillery force had been tripled since the start of the war and communications and support improved. The tiny 1980 navy of three patrol craft had been expanded to a fifteen-hundred-man force by 1988 and included a marine battalion, marine commandos, and 30 patrol craft.

The FAS had more than doubled in size since the start of the war. By 1987, The FAS was a force of twenty-five hundred with an airborne battalion, a security group, five airplane squadrons and a large helicopter force. The airplane force was organized into a fighter squadron, with eight Ouragans, a counterinsurgency squadron with 10 A-37Bs and two AC-47 gunships. A reconnaissance squadron of 11 O-2As supported the counterinsurgency squadron. The transport squadron consisted of five C-47s, one DC-6, three Aravas, and two C-123Ks. The training squadron had one T-41 and six CM-170 Magisters. The helicopter force had expanded into a force of nine Hughes 500MD attack helicopters, 14 UH-1H gunships, 38 UH-1H utility helicopters, three SA-315 Lamas, and three SA-316 Alouette IIIs, for a total of 67 helicopters.[54]

Progress in El Salvador's internal political situation had been made since the mid-1980s after free elections and the election of a moderate reformer, Duarte, as president. Human rights abuses by the armed forces had been curbed. US aid was continuing to flow.

Throughout the mid-1980s, the direct US military role had grown especially in the aviation side of the war. US Army OV-1 Mohawk reconnaissance planes of the 24th Military Intelligence Battalion stationed in Palmerola

COURTESY OF DR. JAMES S. CORUM

An A-37B fighter-bomber at Ilopango Air Base. These fairly low-tech aircraft took the place of the Salvadoran Air Force's old Ouragans and Fouga Magisters. However, due to the FAS's low level of training, the A-37s could not be counted on for accurate CAS.

Air Base in Honduras conducted regular reconnaissance flights over El Salvador.[55] The counterinsurgency campaign progressed, and the election of the right wing Arena Party government in 1989, a party that ran on a "law and order" platform, indicated that there was considerable support among the populace for the counterinsurgency campaign.

This impression of progress was spoiled on 11 November 1989, when the FMLN guerrillas launched a surprise offensive against military and civilian targets across the nation. For three weeks, the guerrillas attacked military units and government installations in San Salvador, San Miguel, Santa Ana, and other cities. The military incurred heavy losses, but the FMLN sustained heavy losses as well. The FMLN reportedly suffered 1,773 dead and 1,717 wounded by the end of the offensive on 5 December.[56] The rebels did not gain their primary objectives, but the power of the offensive as well as the surprise factor was a real shock to the government and military. The main FAS base at Ilopango was a major target of the FMLN, and the rebel forces came close to overrunning the main air base in the country. If the rebels had been successful, they could have destroyed 80 percent of the FAS. As it was, only with heavy fighting and reinforcements did the FAS manage to hold on to the base.

A further disturbing development for the air war in 1989 was the acquisition of handheld SAM-7 antiaircraft missiles by the rebels.[57] The attrition of FAS helicopters to the light weapons of the rebels had been heavy all through the war. However, until 1989, the A-37s and AC-47s had been relatively immune from the short-range ground fire of the FMLN. Now the guerrillas had a weapon that could knock down the best combat aircraft of the FAS.

The war continued into 1990, and the FMLN was still able to conduct numerous guerrilla attacks against the armed forces and economic targets despite the heavy losses of the 1989 offensive. In 1990, the FMLN forces inflicted over two thousand casualties on the Salvadoran armed forces and police, an almost 5 percent casualty rate.[58] By this time, the nation was simply exhausted by more than a decade of war. Both sides finally agreed to serious peace talks in 1990. A national cease-fire was agreed to in 1991, and peace accords were signed between the government and the FMLN in early 1992.

The war was ended by a compromise solution. The FMLN disarmed its forces and became a legal political party. Amnesty was granted to FMLN members. More than half of the army would be demobilized, and all of the paramilitary security forces—including the notorious Treasury Police, which operated under the Defense Ministry and was identified as having one of the worst human rights records—were disbanded. A new national police force was created, and former FMLN guerrillas were brought in. United Nations and Organization of American States observers remained in the country to help ensure that the disarmament was properly carried out and free and fair elections were held.[59] Some of the American commentators would complain that the military strategy had failed and that the Salvadoran armed forces were never able to de-

feat the FMLN on the battlefield. That might be true, but in retrospect, the program of military aid to El Salvador was a genuine success for the United States. The primary objective of keeping El Salvador from becoming a communist state was realized. Moreover, El Salvador ended the war with a democratic government that remains friendly to the United States and committed to working peacefully with its neighbors. The peace accord may have been a compromise, but it has been recognized as fair by both sides and provides a solid basis for peacefully developing El Salvador—and a favorable peace is, after all, the primary objective in waging war.

Comments and Observations

The second half of this article focuses on some specific comments and observations about the air war in El Salvador. The war in El Salvador was one of the longest-lasting combat operations supported by the US military since the end of World War II. In many respects, it was a classic counterinsurgency campaign fought by the United States and El Salvador. Because of the long duration and recent nature of the operation, it is likely that the conduct of the air war in El Salvador can offer insights that are useful for US air doctrine and for executing future counterinsurgency campaigns.

A Prolonged Conflict

Most insurgencies tend to last for years. In Malaya, the British faced a 12-year-long insurgency (1948–60). In the Philippines, the United States supported the Philippine government through an eight-year campaign (1946–54). Colombia has faced an insurgency for more than 20 years. The 12-year duration of the war in El Salvador fits the typical pattern.

Mao's teachings notwithstanding, neither the insurgents nor governments that oppose them usually expect a campaign of many years' duration. The FMLN intended to win quickly in 1981. The government thought that the rebels could be crushed in a rapid campaign. General Woerner shocked the chairman of the Joint Chiefs of Staff and some members of the Reagan administration in his 1981 report when he outlined a five-year plan (the five-year time frame was used as an outline only, and Woerner was careful not to predict the length of the war) and estimated that defeating the rebels would cost $300 million in military aid. Woerner's analysis was seen as unduly pessimistic.[60] In reality, General Woerner's assessment was way off. The counterinsurgency campaign cost over $1 billion, lasted for 12 years, and still did not lead to outright military victory.

Part of the problem in conducting a counterinsurgency campaign is the long lead time in creating and training military and police forces that can effectively wage a counterinsurgency campaign. As is typical with countries that face insurgencies, El Salvador was unprepared. Even with massive US support for a small country, it took three or four years before the Salvadoran armed forces could conduct operations effectively. Air forces in particular require a long time to build infrastructure, acquire equipment, and train pilots to operate in the kind of joint operations required by counterinsurgency campaigns. It did not help that the US Army and Air Force, suffering from the effects of post-Vietnam syndrome, had largely dropped counterinsurgency operations out of the doctrine and training repertoire in the late 1970s. Despite the many Vietnam veterans in the force, the US military was not ready to train the Salvadorans in unconventional warfare. The bureaucratic requirements of the US military system also got in the way of a timely response to El Salvador's situation. The requirement that foreign pilots training with the US Air Force first take a six-month language course slowed down the pilot training program for the Salvadorans. Finally, when the shortage of helicopter pilots became truly severe, the US Army conducted a one-time effort at Fort Rucker, Alabama, to train Salvadoran pilots with Spanish-speaking flight instructors.[61] Ideally, the FAS pilots and technicians should have been fluent in English, if only to read the

technical manuals for the equipment. However, the immediate needs of the war overruled this requirement.

For various reasons, US military schools were slow to create the courses that the Salvadoran military urgently needed. For example, the US-run Inter-American Air Force Academy in Panama only initiated an advanced training course for the A-37B in 1985, three years after that model aircraft had been supplied to the FAS.[62]

Most commentators on the war in El Salvador agree that by the mid-1980s, the FAS could operate fairly effectively. However, the ability to conduct more complex joint operations came very slowly. It was not until 1986–87 that the FAS intelligence section was reorganized for the needs of the counterinsurgency operations and a special analysis center was set up at the FAS headquarters at Ilopango. The center was able to integrate reconnaissance, area intelligence investigations, aerial photography, and special intelligence into one coherent system. This had much to do with the improvement of FAS combat capabilities.[63]

In short, even if the United States had responded to the crisis in El Salvador in 1981 with massive aid coupled with the right kinds of training programs given in a timely fashion, it still would have taken the FAS two to three years to become a capable force. Supporting an air force involved in a counterinsurgency is likely to involve a long commitment by the United States.

The Effect of US Aid Restrictions

At the start of the war, human rights abuses by the Salvadoran armed forces and government were so bad and the government so mired in its traditional authoritarian culture, that the US government had no realistic choice but to use a carrot-and-stick approach in providing military and economic aid to El Salvador. The military and the government would be encouraged to reform by the offer of generous aid. If reforms were not enacted quickly enough, the aid would be withheld or delayed. Thus, the aid to El Salvador was made contingent upon a program of national land reform, fair elections, and judicial reforms.[64] This approach by the United States caused constant friction between the two governments, but, in the end, it pushed the government to make necessary reforms.

However, aid restrictions and the strong objections of many US congressmen towards aid to El Salvador's armed forces resulted in unpredictable funding in the military aid program. This, in turn, inhibited long-term planning and resulted in many inefficiencies in the military aid.[65] Fiscal year 1983 began with no congressional appropriations for El Salvador. A $25 million dollar continuing resolution was provided instead of the $60 million that the US military support program required. Without adequate funds in the ammunition account, the army and FAS cut back operations and maintained a policy of hoarding ammunition and supplies until a continuation of the aid flow was assured.[66]

In the case of a small and poor country like El Salvador, such funding disputes had a major impact upon operations and doctrine. El Salvador's leaders were encouraged to look on an expensive asset such as the air force as too valuable to risk in combat if replacements, munitions, and funds were not assured. In the first half of the war, the attitude existed that the FAS was an "insurance policy" for the government. One might not win the war with airpower, but airpower would keep one from losing. Therefore, the air force was sometimes held back as a reserve for use only in emergencies.[67] Although a practical doctrine from the view of the Salvadorans, this was not a way to conduct effective joint operations in the field or keep the rebels under constant pressure.

The most problematic restrictions on the US military aid program for El Salvador were those governing the military trainers and advisors in the country. The MilGroup throughout the war was limited to a total of only 55 advisors in order to deflect disapproval of a Congress worried about another Vietnam. With so few advisors and trainers in the country, the US military had to create numerous

expensive and inefficient workarounds to train the Salvadoran army and air force outside the country. Some troops were trained, at enormous expense, at Fort Bragg, North Carolina. A new training center had to be built in Honduras, where US Army trainers could train whole battalions of the Salvadoran army.[68] Salvadoran Air Force pilots had to do virtually all their training outside their country. However, when the pilots returned, there was virtually no infrastructure to enable them to maintain proficiency or develop advanced skills. Due to the shortage of pilots and the variety of aircraft models flown by the FAS, each pilot had to be able to fly three or four types of aircraft. As a result, the FAS pilots could not become truly proficient in any one aircraft.[69] Another serious problem was the lack of qualified instructor pilots in the FAS to oversee individual and unit training. This translated into a high accident rate and only a fair level of competence for the average FAS pilot.[70]

One very clear lesson from the war in El Salvador is the need for a far larger number of US trainers and advisors to be present in the country in order to effectively support a country at war. An advisor/instructor group sent in early to support the FAS would have been far more effective in improving the combat efficiency of the force and would have been far less expensive than all of the training workarounds that the US had to improvise to train the FAS. An early commitment of instructor pilots and maintenance instructors would have improved the operability rate of the FAS and brought it to a respectable level of combat capability in one to two years instead of the three to five years that it actually took.

The Problem of Internal Politics

The military culture of El Salvador was not only authoritarian and corrupt, it was also highly politicized. Despite training and advice from the United States, old habits were very hard to break. The internal politics of the armed forces played a large role not only in appointing officers to command, but also in the way the war was fought.

Gen Juan Rafael Bustillo, who served as the chief of the FAS from 1979 to 1989, was a competent pilot and probably one of the more capable of the senior officers in El Salvador when the war started. However, he also played a highly political role in the armed forces and used his position as air force commander to defy and even threaten the civilian government. In 1983, one of the most right wing of the army officers, Col Sigfrido Ochoa, demanded the firing of defense minister Gen José Guillermo Garcia and declared his military district to be in rebellion against the government. General Bustillo supported Ochoa and refused to fly in troops to oppose him. Eventually, a compromise was worked out that allowed Ochoa to remain but removed the defense minister.[71]

As was typical with the senior military leadership in El Salvador, the FAS under Bustillo was scarcely a meritocracy. An officer's politics and connections tended to count for more in promotions and gaining coveted assignments than competence on the battlefield. It was alleged by army officers that Bustillo often reserved the helicopter force for the air force paratroop battalion and tended to give air support to army units commanded by his friends while withholding air support from units commanded by his rivals.[72] There is also considerable evidence that US military aid funds were diverted to an FAS slush fund. In 1989, the US General Accounting Office found that the FAS had sold more than one hundred thousand dollars worth of US-supplied aviation fuel to the Nicaraguan Contras in violation of US rules.[73] For years, the FAS DC-6 that carried pilots and cargo to Howard Air Force Base, Panama, returned full of liquor and appliances which were sold on the black market.[74]

Unfortunately, in a military culture such as El Salvador's, such behavior was to be expected. It is also argued that the United States tolerated this behavior and the diversion of funds because General Bustillo allowed the Ilopango Air Base to become the hub of the US National Security Council's supply net-

work for the support of the anti-Sandinista rebels in Nicaragua. Some 109 clandestine flights for Contra support shuttled in and out of Ilopango.[75] In any case, Americans who become involved in supporting counterinsurgency campaigns need to be ready to face the political friction generated from within the armed forces of a third world state.

The Bombing Dilemma

The most controversial aspect of the air war in El Salvador was the bombing of civilians by the FAS. From 1981 to 1986, the FAS regularly bombed the rebel-controlled areas of the country, especially the strongholds of the Guazapa and Chalatenango regions. The bombing campaign was virtually the only means to keep the rebels under pressure in these areas until they were overrun and occupied by government troops in the campaigns of 1985 and 1986. The air attacks, carried out primarily by the A-37s, but also by helicopter gunships, were aimed at villages that supported the rebels. Civilian casualties were a consequence of the campaign. The Salvadoran forces were sometimes open about the bombing campaign. Colonel Ochoa, commander in the Chalatenango district, told the US press that he had declared a dozen free-fire zones in his area and that anything in those areas would be presumed hostile and bombed.[76]

Both the critics and supporters of the government of El Salvador provided testimony about the bombing of civilians to the US Congress that was so propagandistic as to border on the absurd. On the left, American critics testified about the brutality of the FAS. For example, the mayor of Berkeley, California, testified in 1986 that 60,000 civilians had already been killed by aerial bombardment in El Salvador—a very implausible figure.[77] On the right, Assistant Secretary of State Elliot Abrams rounded up testimony that was just as implausible. Abrams argued that there had been no indiscriminate bombing in El Salvador, despite the admissions made by Salvadoran officers.[78] Others supporting Abrams's view provided the US Congress with anecdotes about FAS pilots complaining that they were denied permission to attack rebel troop concentrations because of the fear that civilians might be caught in the cross fire.[79] It was even argued that the AC-47 gunships were used so carefully in battle that in the course of the war they never fired a short round or even accidentally hit civilians.[80] If true, this is a record for accuracy in aerial warfare that far surpasses the competence of the United States or any other major air force.

In reality, the bombing campaign was neither so brutal as the critics alleged nor as careful of civilians as the US State Department argued. The bombing campaign seems to have had no decisive results aside from harassing the insurgents and forcing the FMLN units to remain dispersed. According to witness accounts and US journalists who traveled in the rebel-held areas, the air attacks caused relatively few civilian casualties. Civilians who lived in the free-fire zones quickly adapted to being the targets of aerial bombardment. They dug bomb shelters, learned to camouflage their homes, and took cover as soon as a helicopter, an A-37, or an O-2 reconnaissance aircraft was spotted.[81] The best estimates of casualties are provided by Tutela Legal, the human rights office of the Catholic Church in El Salvador. This organization estimated that in 1985, a year of heavy combat, 371 civilians had been killed by air bombardment.[82] Since the air attacks in civilian areas were carried out between 1981 and 1986, an estimate of approximately two thousand civil-

ians killed by air bombardment for the course of the war is probably close.

The dilemma of a counterinsurgency campaign is that the government is bound to bomb rebel areas and inflict civilian casualties even if no decisive effect is likely to occur. The government forces cannot allow the rebels to hold sanctuaries within the country where they can rest, rearm, recruit, and stage operations unmolested. Even if the government is not in a position to clear an area by a ground offensive, it can at least apply some pressure to the guerrillas by airpower. In fact, civilians in rebel strongholds have normally been subjected to bombing in modern counterinsurgency campaigns. The Philippine Air Force bombed rebel villages in the 1940s and 1950s with warplanes supplied by the United States.[83] The United States provided 40 dive-bombers to the Greek Air Force in 1949, which used them to bomb rebel strongholds during their civil war.[84] The RAF in the Malayan insurgency even used the heavy Lincoln bombers (the British equivalent of the B-29) to bomb the jungle strongholds of the insurgents.[85]

The brutal reality of insurgent and counterinsurgent warfare is that there is no such thing as a "clean" war, either on the ground or in the air. In virtually every insurgency mounted since the end of World War II, the majority of casualties have been civilians. In El Salvador, both sides conducted campaigns designed essentially to assassinate, maim, and terrorize civilians. As for an assessment of the FAS's bombing campaign of civilian areas, it probably had some effect in harassing and disrupting the rebel strongholds, but it is doubtful that these benefits of the bombing campaign were greater than the considerable propaganda benefits that the rebels gained by being portrayed as victims of a repressive government in the international media.[86]

The Operational Effectiveness of Airpower in El Salvador

Airpower played an important role in the Salvadoran civil war. The air force was used primarily as an army support force, and certain weapon systems proved very successful for this mission. The low-tech O-2 spotter aircraft and the AC-47 gunships were used effectively by the FAS in close support operations. The slow, easy-to-fly A-37, a modified trainer, carried a moderate bomb load and machine-gun armament. It was not a heavy weapon system, but it still gave the army a major firepower advantage in battle with the lightly armed rebels. It proved very survivable in the low-threat counterinsurgency environment.[87] The AC-47 was one of the real success stories of the war. These easy-to-operate weapons were probably about as much as the Salvadoran pilots, aircrew, and support personnel could effectively handle at the time.

Of the aircraft supplied by the United States to the FAS during the war, the most effective was probably the UH-1 helicopters used for medevac and troop lift. Even though the operability rate was low, the limited lift was essential for transport in a mountainous country with few roads. The next most useful aircraft were the O-2 light reconnaissance planes that forced the rebels to operate in smaller columns and start a move out of the rural strongholds and back to the cities. The third most useful aircraft of the war was the AC-47, the only truly accurate and reliable CAS weapon. The A-37 fighter comes way down on the list of useful aircraft simply

COURTESY OF DR. JAMES S. CORUM

A 1940s-vintage FAS Ouragan ground attack aircraft at Ilopango Air Base. In the early years of the war, these cranky and obsolete aircraft were a mainstay of the Salvadoran Air Force.

COURTESY OF DR. JAMES S. CORUM

The rugged terrain of eastern El Salvador. The mountains and lack of roads in the region inhibited army movement and made the area a haven for the FMLN until helicopter-borne ground units could take the fight into the field after 1985.

because it was hard to bomb accurately with it and the training levels of the FAS pilots were rarely up to where they could reliably and accurately provide close air support.[88]

Probably the most effective single air unit in the war was the five medevac helicopters of the FAS, coupled with the improved medical care for the Salvadoran army made possible through the US aid program. The availability of rapid medevac as well as good medical care cannot be underestimated as a major factor in improving the morale and fighting ability of the army. Soldiers fight much harder if they know they are likely to survive their wounds. Even though the army took more casualties due to the increased level of combat in 1985, there were fewer fatalities due to helicopter medevac operations.[89]

However, airpower in a low intensity conflict has its downside. Air forces are very expensive for small countries to man and operate. The FAS soaked up a disproportionate share of the aid and defense budget, yet its real capabilities were very limited due to the low operational rate of aircraft, the shortage of pilots, and the deficiencies in training. Certainly through most of the war, the FAS was not employed very efficiently against the enemy. An array of US Army officers who served in El Salvador, as well as a USAF-sponsored RAND study, all expressed misgivings about the large number of helicopters as well as the heavy equipment provided to the Salvadorans.[90] These military critics of our military policy argued that the Salvadoran army and air force were trying to become a mini-US Army and Air Force and were trying to substitute airpower for basic military skills—a very dangerous strategy for a poor country with few resources. The large airmobile force that the United States supplied to El Salvador was likely to make the army behave much as the United States had done in Vietnam, with the army flying over the population rather than working on the ground and operating closely with the civilian population. What was needed, it was argued, was a greater emphasis on training more ground troops and saturating the country with light infantry forces that are always patrolling and always present. If one has limited resources to allocate, the counterinsurgency experience of the last 50 years would tend to support a policy of greater numbers of ground troops and a pervasive presence over a smaller army with more technology.

Of course, the US military is not alone in preferring high-tech solutions. The FAS, which could barely operate and maintain the A-37s, AC-47s, and UH-1Hs it was equipped with, requested that the United States provide F-5 fighters and AH-1 Cobra gunships.[91] So enamored was the Salvadoran army with the airmobility concept that its leaders insisted on buying the much more expensive air-transportable 105 mm howitzers from the United States instead of the very capable—and much cheaper—heavier and older model. It was probably a blessing for the Salvadoran forces that their plans for a relatively high-tech, airmobile force never came to fruition. By the mid-1980s, they hoped to have a helicopter force large enough to airlift at least a battalion anywhere in the country. However, the low operational rate and the pilot shortage ensured that the high command never could deploy more than a company or two at a time. Like it or not, the Salvadoran army had to learn to be an infantry force.

There are more than a few lessons to be learned about the role of an air force and the employment of airpower in a low intensity conflict from the war in El Salvador. As a case study, it is excellent in that most of the operational and political problems that one is ever likely to face in supporting a nation in a counterinsurgency campaign are all found in El Salvador. The 12-year US experience shows how airpower can be used well—and used badly. While the contribution of the Salvadoran Air Force to that war was significant, the final analysis indicates that counterinsurgencies still do not lend themselves to a predominately airpower solution. □

Notes

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4. I was fortunate to have some valuable assistance and advice in writing this article from Gen Fred Woerner, USA, Retired, former CINC SOUTHCOM; Ambassador David Passage, deputy chief of the US Mission in El Salvador, 1984–1986; and Dr. Judy Gentleman of the Air War College faculty, who has interviewed former FMLN leaders. Comments and interviews with these three experts were tremendously helpful in conducting research.

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22. Gen Fred Woerner, former CINCSOUTHCOM, interview with author, 26 January 1998.

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27. A good description from the rebel viewpoint of these operations in 1982 and 1983 is found in Charles Clements, *Witness to War* (New York: Bantam Books, 1984).

28. Manwaring and Prisk, 132–41.

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31. Ibid.

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61. Waghelstein, 46–47.

62. History, US Southern Command, 1985, USAFHRA, K463.01, 50.

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68. The cost of building the training facilities in Honduras in FY 83 was $14 million. History, Programs and Evaluation, DCS, July–December 1982, USAFHRA, K145.01, 181.

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77. Statement of Gus Newport, mayor of Berkeley, House Committee on Foreign Affairs, *Congressional Record,* 14 May 1986, 17, 20, 21.

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80. Ibid.

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86. General Woerner interview, 19 January 1998.

87. Bateman, 77.

88. General Woerner interview, 19 January 1998.

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Mistakes in Teaching Ethics

DR. JAMES H. TONER

HAVING HAD THE unique opportunity of teaching ethics at the Air War College at Maxwell AFB, Alabama, for seven years—preceded by 13 years of experience teaching at a military college, one year at Notre Dame, plus service as an Army officer and as a baseball coach in college and high school—I have probably committed most of the mistakes I outline below. In writing this short piece, I am not trying to point an accusing finger at any person, group, or institution. In fact, readers will recognize that what I label *mistakes* can be intelligently defended by someone else. Moreover, what I present here is not necessarily approved or endorsed by the Air War College, Air University, the Air Force, or, in fact, anyone else in this hemisphere.

I simply cannot imagine anyone's staking out a position *against* ethics or against teaching ethics. Indeed, throughout history, almost all aggressors have *shot back;* that is, they represent themselves as being the victims of aggression rather than the perpetrators of it. So it is with ethics. The most unethical people, groups, and institutions enjoy being seen as paragons of virtue. Were the devil himself to appear, I suspect that he would choose the guise of a saint. So we can dispose of one notion—namely, that some people do not want ethics to be taught. To claim that position is rather like being opposed to motherhood, apple pie, and baseball. Some people may not like any of those three things, but, customarily, they don't argue vigorously against them.

Whose ethics will we teach? We could spend a great deal of time debating this topic. Some people argue that, in a multicultural country, we are hard pressed to delineate *one* understanding of ethics. One can advance a number of arguments to buttress that contention, all of them fallacious, most of them obviously foolish: because we have different religions or none at all; because we are different colors; because we have conflicting political viewpoints; because some of us like chocolate, some vanilla, and some strawberry. None of these points makes any negative impact on this fundamental truth: *Human beings gener-*

ally know right from wrong, honor from shame, virtue from vice.

People entering our forces today already have the power of ethical judgment. We do not have to reinvent the ethical wheel.

Mistake Number One

We sometimes suppose, as teachers of military ethics, that, despairing of today's youth, we must "build from the bottom up." We sometimes suppose that our E-1/O-1 candidates don't know that they don't know. We think that they are so estranged from truth and goodness that we have to teach them the basics, the rudiments, the essentials of the ethical life. My point, simply put, is this: If the people we receive into today's armed forces are the ethical cretins we sometimes make them out to be, our prospects of enlightening them in basic training or boot camp—and thereafter in "ethics refresher training"—are slim to none. I believe[1] that we human beings know—innately, naturally, and inherently—the difference between good and bad, truth and falsity, right and wrong. Let's suppose that we do not know such differences. If everything we know about ethics is the product only of teaching and of experience, how is it that closed political systems and totalitarianism have been unable to create the "perfect" citizen? Can it be that despite a flood tide of perverted propaganda and egregious education, people can somehow—seemingly miraculously—tell what is right from what is wrong?

I think so—at least I hope so. If there isn't a spark of eternal goodness somewhere in the heart, mind, and soul of people, what is it that we can appeal to when we talk to gang members and thugs, to political charlatans, and to military monsters who apparently recognize no "good"? I have studied history and politics too long to be quixotic and "idealistic." If I see a spark of good in people, I have lived and learned long enough to know that there is ample evil around as well. Good ethics and wise politics agree in this: A good system, whether political or military, encourages the best within us and discourages the worst within us. If we assume that people entering today's military forces are ethically blighted and benighted, our ethics instruction will fail, for it will be too condescending, patronizing, simplistic, and imperious. *First correction: People entering our forces today already have the power of ethical judgment. We do not have to reinvent the ethical wheel.*

Mistake Number Two

Imagine that you have begun to teach a college-level course in algebra. Believing that your students are mathematical illiterates, you begin by saying, "We must all learn the following: one and one are two; two and two are four; four and four are eight"; and so on. With very rare exceptions, most students beginning a college-level course in algebra will have some understanding of algebra—although it will of course vary from student to student. The good instructor develops and builds upon the base that already exists.[2]

Just as it is a mistake to assume that people have no ethical judgment, so is it *a mistake to assume that they have superior ethical judgment.* The US military for many years has collectively argued that leadership can be taught; at the same time, I think I have never heard anyone say that leadership can be taught regardless of intellect and instinct. To develop leaders, we develop and focus the human potential of our people. So it is, exactly, with ethics education. None of us, not one, is ever *done* with ethics education—until the moment of death. We know that when we fail to exercise our bodies, we begin to lose our physical "edge." Why should we think it is any different with learning? Our ethical development is lifelong; it is a process, never a product; it is never "completed."

But the fact that we do not know everything does not mean that we do not know some things. Practically without exception,

people understand what "fairness" is all about.[3] If their understanding of right and wrong depends ultimately upon someone's preaching or professorial eloquence to acquaint them with the idea of fairness, all is lost. We do not create the idea of fairness; people already know it. But we do develop it and build upon it. In education, we must never underestimate the student's intelligence; and we must never overestimate his or her learning. If the first major mistake of military ethics education is to assume that trainees know hardly anything, the second major mistake is to assume that they know a great deal. In a word, most knowledge of ethics is inchoate, which my dictionary defines as "not yet clearly or completely formed or organized." *Second correction: Our task as teachers of military ethics is to impart some sense of order, some overarching scheme of discipline, to the ethical sense and awareness that already exist.*

Mistake Number Three

Have you heard it said—I have, many times!—that ethics education is the task and property of the chaplain? It is his or her job to teach ethics; it is the commander's task, well, to command. But if a commander is bereft of ethical sense—if he or she is without conscience—that commander fails before issuing one order, because the commander is and must be a model of excellence. Competence without character is perversion.[4]

In the military, ethics will be caught more often than it is taught. I mean nothing at all against chaplains, but they are, after all, *expected* to preach ethically. But when the boss—from O-10 to the most junior E-4 or E-5 noncommissioned officer—acts ethically, one deed is worth a thousand words. When I tell the kids on my baseball team never to use nonprescription drugs, they expect me to say that; but if a former thug-turned-good-citizen says that, his testimony will likely carry more weight. Imagine measuring the "ethical fitness" of a command by assessing its chaplains' attendance at church. It would be a useless "measure of merit." There is simply no doubt that organizations improve ethically when the boss is a gentleman (or a lady).

The fact that the boss is ethical does not mean that the organization will be a moral exemplar; and the fact that the boss is corrupt does not mean that everyone in the unit will be infected with ethical disease.

Everyone understands what the Uniform Code of Military Justice says about "conduct unbecoming." But if ethics is to be taught well, commanders at all levels have to "walk the talk"—current jargon for "setting the example." *Third correction: The fact that the boss is ethical does not mean that the organization will be a moral exemplar; and the fact that the boss is corrupt does not mean that everyone in the unit will be infected with ethical disease. But isn't there some common sense here? If people desire an ethical organization, they should choose ethical leaders. It is not a guarantee of ethical success, but it is a much better bet than choosing ethical slackers as leaders.*

Mistake Number Four

Commanders have the responsibility to "model ethics." *But we must not expect them, necessarily, to present formal ethics lectures in the base theater or, more particularly, to be conscience stricken by every act and every order.* I must be careful how I put this, so please read slowly here, lest I give the wrong impression. Commanders must be ethical people, but they are not chaplains. Commanders do not exist, principally, to save souls; they exist to deter, wage, and prepare to wage war, as well as to kill people and break things.[5] Military people sometimes have to do difficult deeds; in so doing, they risk

their own (and their people's) lives—and souls. A commander cannot be so paralyzed by corrosive fear of doing the wrong thing that he or she does nothing.

We simply cannot have commanders who become catatonic at the prospect of making an ethical misjudgment.

"Don't just stand there; do something!" is an old, and I think largely correct, leadership axiom. Sometimes commanders will make mistakes. Some commanders will push people too hard or demand too much or set standards too high. Chaplains counsel; commanders lead and decide. *Fourth correction: Not every word and not every action are deeply troubling moral quandaries. We simply cannot have commanders who become catatonic at the prospect of making an ethical misjudgment.* A commander must have the physical and moral courage to act in a timely and decisive manner, usually before all the facts about a situation are known. The commander does the best that he or she can reasonably be expected to do. The mission is attempted and accomplished, and the commander's actions and orders are then subject to professional scrutiny.

The commander knows that his or her actions will be—and should be—subject to review, but that knowledge cannot and must not inhibit vigorous prosecution of a path of action that seems wise at the moment of decision. The commander who, at that juncture, is seized by spasms of nail-biting self-doubt and by overwhelming ethical uncertainties is, quite simply, a failure. Chaplains—and scholars like me—have the wonderful benefit of hindsight and of unhurried reflection in the privacy of offices or in the safety of library carrels. Commanders must act—often *now!* I am not saying that commanders ought to disregard ethical considerations, but I am saying that they may have to take actions, the likely result of which will be ethically questionable.

Let me put it this way: Ordering a bombing raid is *always wrong;* the raid will almost certainly kill people, which is evil. But the question is this: Is there a greater evil which that bombing raid will likely help to eradicate? The GI who killed a German soldier in World War II *ought* to feel bad about it; his bullets took someone's life. But did that US soldier, in killing his enemy on the field of battle, help to end the horrors of the Nazi regime? If so, it seems to me that his action on the battlefield is, however regrettable, still necessary. This is not to contend that everything can or should be judged by its outcome or consequence,[6] but there can be no doubt that, insofar as we can discern the likely results of our actions, we must consider them in determining what we should or should not do. I am not suggesting that this kind of moral calculus is enough to ensure wise judgment;[7] it is, however, necessary if not of itself sufficient.

Someone once said that there are two kinds of people—those who make simple things complex and those who make complex things simple. Military ethics is not a simple matter, which leads to another mistake.

Mistake Number Five

It is very nice to think that commanders can present lectures about ethics in base theaters, thus showing "command interest." After all, someone can present a canned "briefing" to the boss so that he or she can, in turn, "train" his or her people in "core values." I have never flown an airplane in my life. But I am literate and reasonably intelligent. Why then can't I be given a canned briefing and serve as an instructor at a pilot or navigator school? The very idea is nonsense. I have no knowledge, no experience, and hardly any reference points to use as teaching aids. But I would have the slides! Why is it that so little in the Air Force can be taught unless it's on "slides"? Can it be because speakers are scared half to death to talk straight to an audience, speaking from mind and heart—that is, *to*

teach? Teachers—or commanders—who need canned talks, beautifully prepared color slides, and other pyrotechnics may well be good pilots and even good leaders, but they are, by the very fact of employing canned lectures, incompetent as teachers. *The idea that every commander is an ethics teacher is absolutely correct; the idea that every teacher is thereby a competent classroom instructor is absolutely wrong.*

The principal rule of medicine and of teaching is, First, do no harm. What will any reasonably bright airman or young lieutenant think when he or she sees the boss mumbling through some mandatory training about core values? Maybe the boss can interject a story or joke or anecdote that will enlighten and enliven the discussion. But because the material is formally different from what they have dealt with in their education and training, commanders are out of their depth. We do not expect them to deliver lectures on the anatomical elements of physical fitness; we do expect them to be reasonably fit. Why, then, do we expect commanders to deliver (even canned) briefings on ethics (while still expecting and demanding that they be "ethically fit")?

Fifth correction: In teaching courses on military ethics, I want students to read good sources about military ethics and not to assume, necessarily, that the commander is an expert in the field of teaching military ethics. Of course the commander should impart his or her blessing to the enterprise; of course the commander must let it be known that ethical action and ethics instruction are vital to the command; of course the commander must be prepared to discuss ethical implications of actions and orders. But it is nonsense to think that commanders, however imbued they may be with *Little Blue Books*, official slides, or colorful briefing charts, are thereby magically transformed into instructors of ethics. There are materials, resources, and people frequently outside local commands that ought to be trusted with ethics instruction rather than depending upon commanders to serve as instructors in a discipline about which, formally, they may know little or nothing. (That, again, is not in the least to excuse them from ethical action and reflection.)

Get out of the way and let teachers teach. *Monitor, sure; sit in, of course; challenge and criticize, certainly. But do not substitute "approved curriculum" for the spontaneity of lively, creative, dynamic teaching by someone deeply in love with the subject and with an almost desperate need to explain it to others! . . . Good teachers create good curricula; good curricula, of themselves, cannot make good teachers.*

A major problem with ethics education is that it cannot be crammed into neat compartments and nice-sounding, desired learning outcomes. I wholly agree that there is a moral literature with which people ought to be familiar, and I completely agree that knowledge of certain religious, philosophical, historical, and literary sources can help us all find our way through the ethical jungle. But there is no "magic bullet"—no always-certain ethical compass. We must teach moral reasoning, not just "core values" or "ethical checklists."

Mistake Number Six

At so many levels in the Air Force, we make the mistake of thinking that *curricula make teachers.* We talk endlessly about levels of learning, "desired learning outcomes," and other such drivel that hardly anyone at any reputable university takes seriously. I do not argue that good curricula are unimportant; of course they are. But good teachers create good curricula; good curricula, of themselves, cannot make good teachers.

Remember the great teacher you had in, say, the fifth grade. Now, quickly—name the

textbook he or she used that so impressed you. Of course we learn from materials! But how much more do we learn from people who choose materials—fair, organized, diligent, enthusiastic, creative, reflective people? Give me someone with a minor or marginal interest in a subject, and I will then send that person to teacher training. Now give me someone with passionate interest in the same material and with a commitment to teach it to someone else but without formal teacher training. I will bet, in every instance, that the second teacher will be far superior to the first. I don't refer merely to teaching, say, philosophy. Watch a good mechanic explain something about an automobile to someone he is trying to teach. If that mechanic loves his subject and has some facility and flair for instruction, his teaching will be far superior to the dull, desiccated instruction that passes for learning in some quarters.

People who want to reduce ethics education to "training"—who want to reduce ethics to slogans or shibboleths; who want commanders to teach moral reasoning (beyond their critical responsibility of always setting the right example); who insist on* Little Blue Books, *checklists, desired learning outcomes, and pretty visual aids—will not help improve ethics education.

We still occasionally hear nonsense about "active" and "passive" learning as though listening to a dynamic lecture from a fervent speaker who is, in fact, *thinking out loud and thus modeling learning,* were anything other than "active learning." We can call the occasional pooled ignorance of what passes for a seminar "active learning" if we choose to delude ourselves. But most serious scholars I know relish listening to good lectures; they listen, they think, they challenge mentally (or orally), and they *actively learn!*

Sixth correction: Get out of the way and let teachers teach. Monitor, sure; sit in, of course; challenge and criticize, certainly. But do not substitute "approved curriculum" for the spontaneity of lively, creative, dynamic teaching by someone deeply in love with the subject and with an almost desperate need to explain it to others! We must not fear dynamic teaching, and the kind of teaching-by-committee so often used in military circles may drive out precisely the kind of inspired instruction needed—especially in ethics.

People who want to reduce ethics education to "training"—who want to reduce ethics to slogans or shibboleths; who want commanders to teach moral reasoning (beyond their critical responsibility of always setting the right example); who insist on *Little Blue Books*, checklists, desired learning outcomes, and pretty visual aids—will not help improve ethics education. We must realize that men and women enter the Air Force with some fundamental understanding of right and wrong; that there is still a need to deepen that understanding and to provide for it an Air Force context; that leaders of competence are also leaders of character who teach by deed, if not necessarily by word; that leaders must be able to act in circumstances of moral ambiguity when simple slogans offer them precious little advice; that the ability to reason well morally is critically important; and that using traditional military training techniques in ethics instruction will not work.

One can train a rifleman or a pilot. One does not train someone to be ethical. Here, in a nutshell, is why ethics training is an oxymoron. We can speak forever about "integrity," "excellence in all we do," and "service before self." We can put those words on calendars, desks, and walls. But when we have to *apply* those words, what do they mean? What do they mean to the lieutenant colonel preparing officer performance ratings (OPR) on three fine young captains? Does the colonel inflate the OPRs, knowing that these captains, although very good, are perhaps not the best in

the Air Force? Does the colonel tell the absolute truth, thus possibly wounding the careers of three fine officers? Or does the colonel reason that service before self here means that loyalty to the Air Force requires suspension of his or her own very high standards and a little lenience on the OPRs for the benefit of three fine officers? What does "excellence" mean here?

In situations of moral ambiguity, there is no manual, there are no checklists, there is no consultant to resolve the difficulty. One is left with one's religious and philosophical convictions, with one's education, with one's service culture and character, with one's sense of honor and shame and of right and wrong, to do what must be done. Sometimes there are difficult decisions to be made. In those circumstances, I do not want simply rules or simply considerations of outcomes or simply examination of pressing circumstances or simply patterns of thought; I want all of them, considered as prudentially as possible by a man or woman who has learned to reason wisely and well. Such people are not produced quickly or easily or even commonly. But without them, we will have no Air Force worthy of respect. □

Notes

1. I mean that I literally believe. See Rom. 2:14–15.

2. And so it is with ethics. I concede that there are "ethical idiots": people so twisted and evil that they have no ethical base. In this world there are monsters—and devils.

3. I do not want to turn this into an academic article by having long lists of readings. Let me cite just two: C. S. Lewis, *The Abolition of Man* (New York: Collier, 1955); and James Q. Wilson, *The Moral Sense* (New York: Free Press, 1993).

4. At the same time, great character without competence is dangerous. Is the surgeon who is removing your appendix today just "a great fellow" but not so hot as a surgeon?

5. I am leaving out of consideration here other duties as assigned, such as noncombatant evacuation operations.

6. This is known as teleological (or utilitarian) ethics.

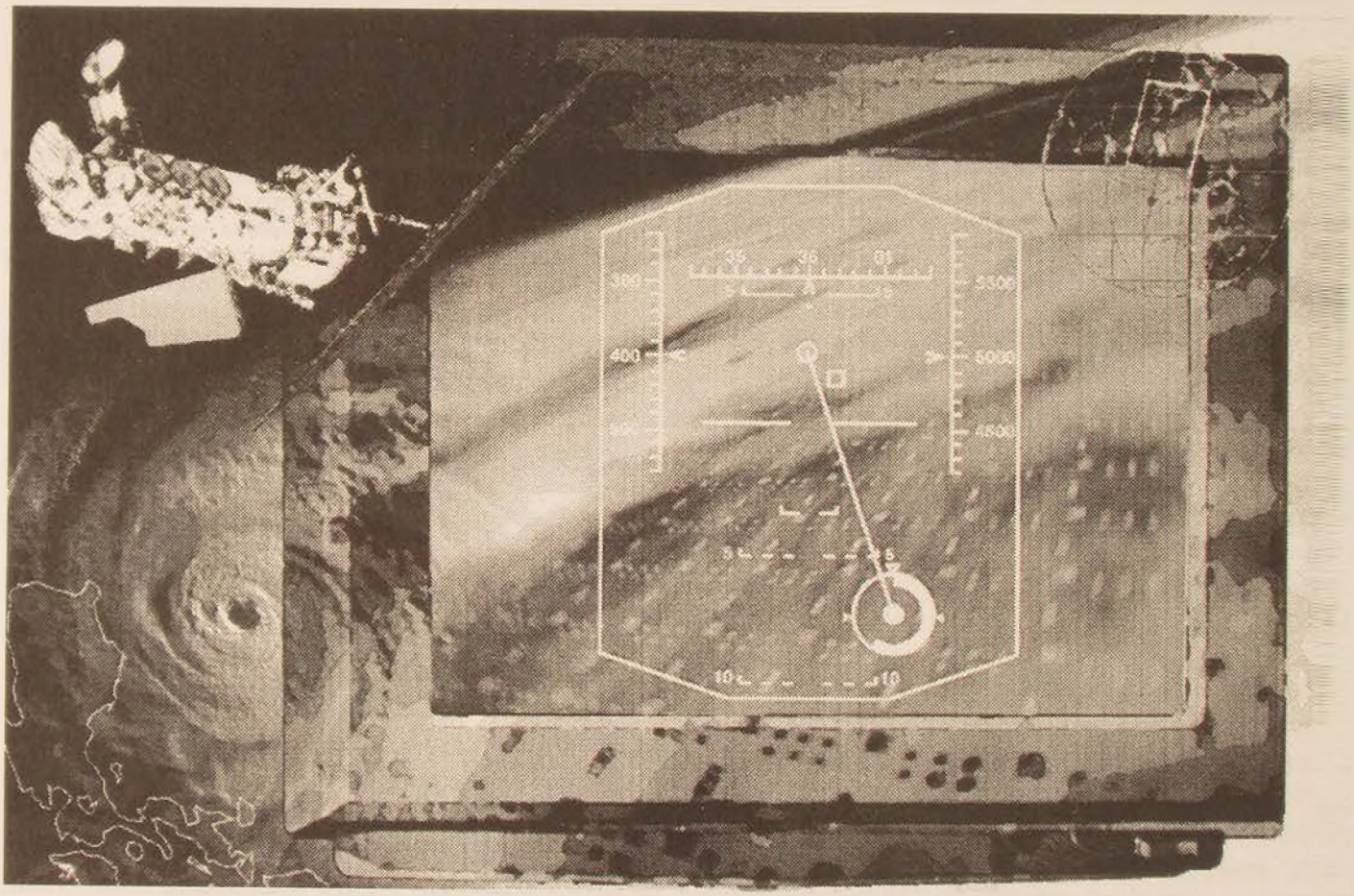
7. When we discuss "core values," we too often forget what the *real* core values are: wisdom, courage, temperance, and justice. See Plato's *Laws* (I, 631); or Wisd. of Sol. 8:7.

Experience should teach us to be most on our guard to protect liberty when the government's purposes are beneficent. Men born to freedom are naturally alert to repel invasion of their liberty by evil-minded rulers. The greatest dangers to liberty lurk in insidious encroachment by men of zeal, well-meaning but without understanding.

—Louis D. Brandeis

Integrating Weather Exploitation into Airpower and Space Power Doctrine

LT COL JOHN M. LANICCI, USAF



The theater commander nervously pondered his options. The success of this combined operation would depend heavily upon the weather. He needed accurate predictions to execute several key parts of the operation, such as cloud cover and low-level winds for airborne operations and favorable moon, tide, and sea states for the amphibious portion. Deception played a significant part of this mission as well; his forces needed to conduct diversionary bombing runs over another portion of the littoral region to deceive the enemy into thinking this would be the main

area of invasion. The weather in-theater had been marginal to unfavorable for the last three days. The enemy, an industrialized nation, had a capable weather service, so if favorable weather were predicted by the friendly side, chances were the enemy would know this too. One big advantage the friendly forces had was the availability of additional weather observations over the ocean and land areas to the west and north of the theater of operations. They could possibly apply this "information superiority" by using the additional data to make a more accurate forecast than that of the enemy. Finally, the forecasters predicted a period of slightly improving, although still operationally marginal, conditions. Weighing the weather factors against the operational objectives and knowing that the next favorable opportunity for this combined operation wouldn't occur for another two weeks, the theater commander made the decision to launch.

THIS EXAMPLE of weather exploitation is neither hypothetical nor futuristic—it occurred over 50 years ago. The theater commander was Gen Dwight D. Eisenhower, and the combined operation was Overlord—the D-day invasion of Europe in World War II. Exploiting the natural environment in military operations is nothing new. Sun Tzu, the Chinese general, said as much nearly twenty-five hundred years ago: "Know yourself, know your enemy; your victory will never be endangered. Know the ground, know the weather; your victory will then be total."[1]

So what is new? For starters, the explosion in both information and technology is beginning to affect the way we think about warfare, especially in air and space. Although these technological changes are daunting enough, we should consider the simultaneous changes in the political and military "landscape" within the last five years (e.g., the change from the monolithic Soviet threat to multipolar, ill-defined threats; rethinking traditional service roles and missions; and the emergence of military operations other than war [MOOTW] as a rapidly growing mission area). Unprecedented changes in technology and the world order have brought new questions about time-honored principles of war fighting that have been developed and battle tested over so many years. Has the United States become so technologically sophisticated that it is "forgetting" some commonsense principles of warfare? Will the increasing reliance upon precision weaponry combine with restrictive rules of engagement (ROE) and a force strategy based in the continental United States (CONUS) to make us more vulnerable to a potential adversary instead of less vulnerable? According to a RAND study on the future of warfare,

> we expect opposition attacks on US air forces because of the importance of these forces. An opponent attempting to overcome US air power might do so by a campaign that focuses on limiting the number of US aircraft in a theater area, reducing the number of sorties that the aircraft in theater can fly, and/or limiting the effectiveness of sorties against targets. In turn, the number of sorties can be limited by damaging airfields, damaging national logistics (for example, destroying POL [petroleum, oil, and lubricants] distribution and refining capabilities), *or timing a conflict to correspond (to the extent controllable) with bad weather.* (Emphasis added)[2]

This article outlines a strategy for developing new and innovative ways to exploit terrestrial and space weather in battle—a "weather exploitation doctrine." A key part of the strategy requires building sophisticated weather-effects models and simulations and employing them to enhance the ability of airpower and space power to exploit the environment at all mission levels, from individual engage-

ments to theater and campaign planning and execution. The article briefly discusses how weather exploitation complements the four-dimensionality of airpower and space power by adding another "dimension" (information) to the battle space. The discussion continues by outlining five policy areas that are converging to make the employment of airpower and space power more challenging—and more vulnerable to the natural environment. The article then describes weather services in their role as an integral part of command and control (C^2), followed by a formal definition of weather exploitation. Finally, the article addresses the motivation for using modeling and simulation (M&S) as the means for developing a weather exploitation capability and integrating it into airpower and space power doctrine.

Background and Motivation

The USAF mission is "to defend the United States through control and exploitation of air and space." Air Force Doctrine Document (AFDD) 1 describes the advantages of the air and space media in terms of three-dimensional maneuver.[3] No one would argue against the ability of airpower and space power to capitalize upon the atmospheric and space media (e.g., space power's ability to "see" the entire battlefield or airpower's ability to penetrate deeply into the enemy's interior to mass overwhelming firepower within a very short time).

This article proposes that we apply the medium of information—in the form of "weather intelligence"—to develop better ways for airpower and space power to exploit the vertical and time dimensions in combat. Although air and space do not have solid obstacles such as mountains and forests, they do have "physical" obstacles, such as clouds, fog, thunderstorms, and ionospheric storms. Land and sea forces have learned to take advantage of their environments by turning their "obstacles" into exploitable allies (e.g., designing forces to operate in "close terrain" and building submarines to exploit the acoustic environment of the deep oceans). The time has come for airpower and space power to fully exploit information about atmospheric and space weather obstacles in the same ways that land and sea forces do in their environments.[4] One can illustrate the reasons for looking at such a strategy by examining several recent policy trends that are putting an increasing strain on the ability of airpower and space power to accomplish their missions.

If the United States is to rely increasingly on space-based assets for force enhancement and information dominance, it must remain aware of its own vulnerabilities to the space environment, as well as those of its adversary.

Shrinking Force Structure and a CONUS-Based Force

Commanders are less able to tolerate "weather aborts" and diversions from primary and secondary targets in a resource-constrained environment. A key capability of airpower in a CONUS-based force structure is its capacity to project power quickly and decisively into a theater. Airpower projection can range from a single surgical-bombing mission to "send a message" and a multiple-sortie raid against a number of targets, to a large-scale deployment of personnel and equipment during a developing major regional contingency (MRC). Given a lack of forward basing, weather becomes a greater factor in logistics and long-duration missions with multiple aerial refueling. Today, as much as ever, adverse weather could spell disaster for a 20-hour round-trip mission from CONUS to some overseas location; extended periods of adverse weather could seriously delay critical

deployment of heavy equipment and troops into theater.

Increasing Reliance on Precision-Guided Munitions

The success of PGMs in Operation Desert Storm was both a blessing and a curse. In the next combat operation, the expectation for PGM accuracy will be at least as great as that in Desert Storm, if not greater.[5] What if the next contingency were in a much more complex climatic and topographic region, such as Bosnia or Korea? Because of the great cost of PGMs (over $100,000 per copy), we cannot afford to waste these assets due to weather-related reasons; naval aviation has an even more serious problem in that aircraft *must* expend ordnance before returning to the carrier. Given the enormous costs of PGMs and the appearance of "brilliant" weapons on the technology horizon, it is more important than ever for environmental-technology developments to keep up with airframe-technology developments such as stealth.[6]

Space-Based Assets and the Solar-Disturbance Maximum

Desert Storm was truly the first "space war." Over 90 percent of in-theater, out-of-theater, and into-theater communications were borne by military and commercial satellites.[7] In the next contingency, we will rely even more heavily on satellites for intelligence, communications, navigation, and battle-space monitoring. Threats to these systems come not only from terrestrial sources (e.g., sabotage to receiving stations and launch facilities and damage from severe weather) but also from the space environment itself. For example, geomagnetic storms can increase satellite drag, causing orbital changes that affect sensor performance, satellite control, and space-object tracking.[8] If the United States is to rely increasingly on space-based assets for force enhancement and information dominance, it must remain aware of its own vulnerabilities to the space environment, as well as those of its adversary. This is especially true as we approach the next sunspot-maximum period, projected to occur between 1998 and 2002. Any advantage in the information war gained from superior access to space could quickly evaporate if we lose satellite access due to damage from electrical charging, or if we experience degradation of communications by upper-atmospheric disturbances.

Evolving Rules of Engagement

Two recent policy trends regarding ROEs will make the employment of airpower more complex: (1) minimizing friendly casualties and (2) minimizing collateral damage. Although the United States has always been sensitive to the problem of friendly casualties, recent trends toward reducing fratricide and unnecessary enemy casualties (disable versus destroy) will also tax airpower's ability to deliver weapons in more accurate and effective ways. Sensitivity over excess collateral damage will require that air strikes be planned more precisely and executed with a much higher degree of accuracy than ever before. Both of these trends and restrictions, when combined with adverse weather conditions, complicate airpower's ability to accomplish the mission. A case in point is Operation Deliberate Force (NATO air strikes against Serb military targets in the fall of 1995), in which the "zero tolerance" policy on collateral damage combined with adverse weather to limit airpower's ability to strike targets effectively.[9] In this case, it was not the weather alone so much as the weather *combined with* restrictive ROEs that caused the problem.

Military Operations other than War

An increasingly visible proportion of the US military's operations tempo today is dictated by MOOTWs. In contrast to MRCs, for which much study and training have been done, MOOTWs frequently occur in climatically challenging areas, usually with no indigenous weather-observing network. These operations are often short-notice, with a greater potential for weather to become a "single point of failure" due to the unpredictable nature of the

Table 1

Translation of Weather Analysis and Forecasting Products

WEATHER ANALYSIS/FORECAST	TAILORED WEATHER APPLICATION	OPERATOR DECISIONS
Cloud cover, visibility	Tactical decision aid	Target/weapon selection, battle damage assessment
Flight-hazard forecast (turbulence, icing)	Aerial-refueling forecast	Target route planning, air tasking order decisions
Ionospheric forecast	Maximum usable frequency Lowest usable frequency	Availability of HF support (communications)
Precipitation accumulation	Trafficability forecast	Ground-forces maneuver, river crossings

KNOW → APPLY → EXPLOIT →

missions themselves. To date, weather-service requirements in MOOTWs have been driven largely by ground forces, which need high-resolution, accurate weather data. The ever-present possibility of mission swing requires rapid updating of current conditions and forecasts in order to develop responses to a quickly changing operational environment.

Weather in Conventional Operations

It is useful to view the collection, analysis, and dissemination of weather information to the war fighter as an integral part of C^2. Four steps occur in this process (fig. 1).

Historically, the Department of Defense (DOD) has made nearly all of its science and technology (S&T) investments in the "data collection" and "weather analysis and forecasting" portions of the atmosphere and space environmental areas. For example, S&T funds spent on weather satellites and tactical observing systems contribute to our ability to collect data, and a considerable amount of funding has also been invested to improve weather analysis and forecasting. We should not downplay the importance of data collection, analysis, and forecasting in delivering quality environmental services to the operator; however, the weakest area in terms of development efforts has remained "tailored weather applications for operators." We believe that

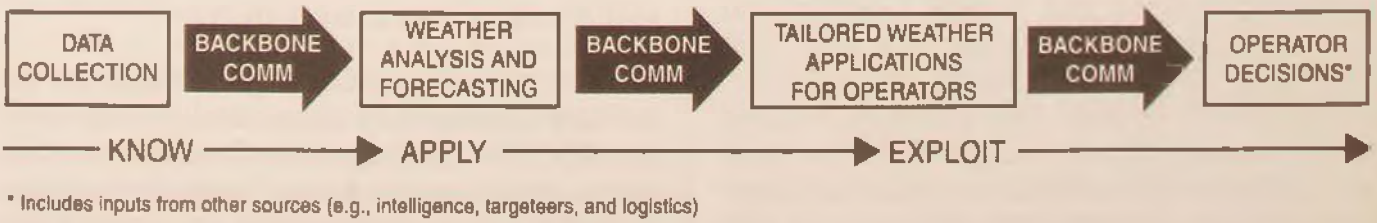


Figure 1. Collection, Analysis, and Dissemination of Weather Information (adapted from Lt Col H. L. Massie Jr., Col D. C. Pearson, Maj K. S. Smith, and R. Szymber, "Knowing the Weather" [paper presented at the Battlespace Atmospherics Conference, US Army Research Lab, White Sands, New Mexico, 1995])

models and simulations incorporating realistic environmental effects will have the greatest potential impact to the operations community in these tailored applications and "operator decisions," although the latter is really the bottom line. In order to understand why, we can illustrate how a few military weather-analysis and forecasting products can be translated to weather-effects information—and ultimately to weather impacts on operations.

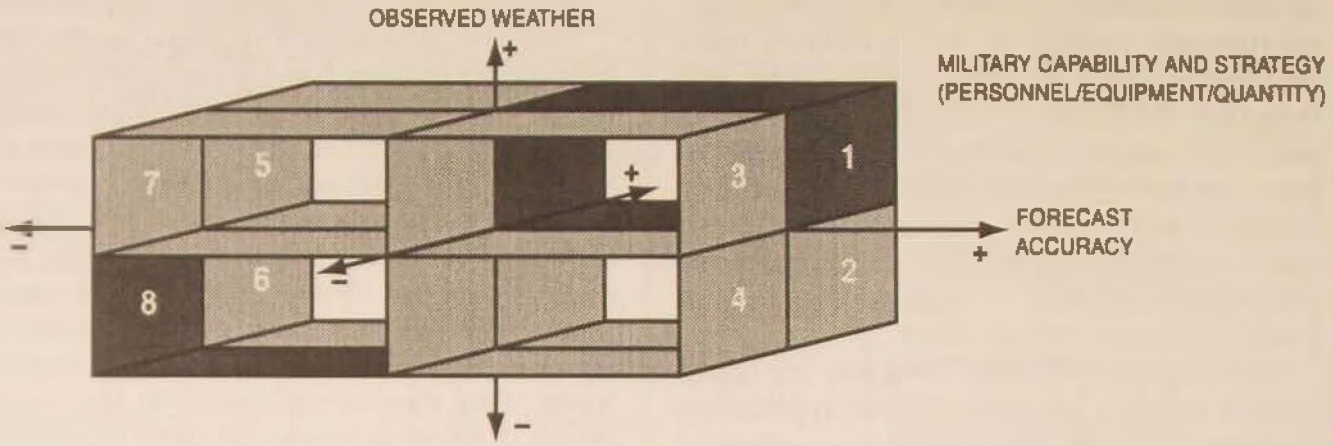
Weather analyses and forecasts are translated to mission-tailored weather application products (table 1). This service is usually provided by a highly trained staff weather officer or noncommissioned officer (NCO). Translation of the weather application product to an operator decision is the least understood link in the process. Suppose that a decision tool were available to help joint force component commanders (air, land, or sea) account for the effect of weather on their operations and for uncertainties in the weather prediction—or even help factor weather into the strategy. What if such a tool were available during campaign *planning* in addition to execution? It could be either a stand-alone capability or part of a comprehensive operational planning and execution system, allowing weather service to become more integrated into the information operations of the joint force commander's (JFC) team. With the advent of sophisticated, computer-based models and simulations, the technology is now available to develop such tools to aid the JFC's staff in its planning and execution duties, as well as to make these tools available for mission planning and rehearsal.

Weather Exploitation Defined

At this point, one might logically ask what weather exploitation is. Concisely put, weather exploitation is the deliberate use of knowledge about friendly and enemy operating capabilities under given natural environmental conditions *to set the terms of battle,* resulting in optimal performance of the friendly force and reduced effectiveness of the enemy force. Using this definition, one can examine and assess three aspects of weather exploitation.

The first, and most important, is the capability of the military force in terms of personnel (experience and training), equipment (quality and quantity), and doctrine (the correct way to employ the military force to accomplish the mission). Taken as a whole, a nation's military capability is largely independent of the natural environment. However, individual engagements, missions, or even campaigns can be significantly affected by the natural environment. This idea is embodied in the second aspect to be considered—the effect of *relevant*[10] observed weather on the military operation(s) (favorable, marginal, or unfavorable). This area requires the most improvement in terms of learning the vulnerabilities of both sides and incorporating that intelligence into air and space campaign strategy. The third aspect of exploitation is the accuracy of the prediction of relevant observed weather, which is particularly important in the planning phase, when forces/weapons mixes and strategy decisions such as target selection and route of attack are determined. Modern air and space forces can improve the ways they incorporate weather prediction into their planning cycle, especially with the advent of new and faster ways to access and visualize relevant, real-time weather information.

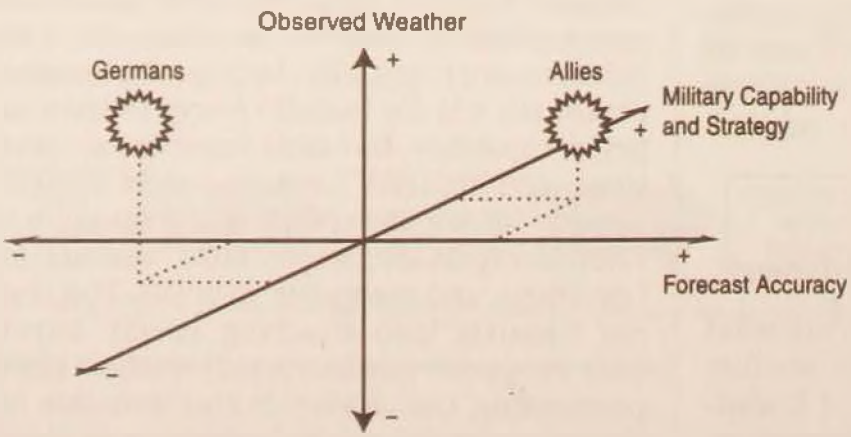
One can depict the three aspects of weather exploitation for both friendly and enemy forces in terms of eight combinations of military capability, observed weather, and forecast accuracy (fig. 2). The ideal goal of weather exploitation is for friendly forces to have superior capability, favorable weather for operations, and accurate forecasts, while simultaneously forcing the enemy into a situation of inferior capability, unfavorable weather for operations, and inaccurate forecasts. This does *not* translate into attacking enemy targets only in "good" (unobstructed) weather since, presumably, the weather is also favorable for the enemy to defend. But achieving the ideal exploitation situation is very difficult. The goal of DOD weather services should be to put friendly forces into situations with favorable weather and accurate forecasts (fig. 2,



	Forecast Accuracy	Observed Weather	Military Capability
1.	+	+	+
2.	+	–	+
3.	+	+	–
4.	+	–	–
5.	–	+	+
6.	–	–	+
7.	–	+	–
8.	–	–	–

	Forecast Accuracy	Observed Weather	Military Capability and Strategy
+	Good	Favorable for operations	Trained troops, good equipment, strategy
0	Marginal skill	Marginal for operations	Fair training, fair equipment, strategy
–	Poor to no skill	Unfavorable for operations	Poorly trained troops, inadequate or poor equipment, poor strategy

Figure 2. Aspects of Weather Exploitation



	Forecast Accuracy	Observed Weather	Military Capability
Allies	+	+	+
Germans	–	+	–
Exploit by	Allies	Germans*	Allies

*Although the Germans actually had more favorable weather for defensive operations than the Allies did for offensive operations, they could not exploit it because they forecast the weather to be unfavorable for the Allied invasion!

Figure 3. Weather Exploitation during D Day

boxes 1 or 3), while avoiding situations with inaccurate forecasts (boxes 5-8). Unfavorable weather for operations (boxes 2 and 4) may be unavoidable under certain operational circumstances, but at least alternative strategies could be planned and executed, based on accurate foreknowledge of the upcoming weather conditions in-theater.

One should not infer that weather effects and forecast accuracy constitute two-thirds of the problem to be considered by military planners. However, this *is* the correct perspective for the military meteorologist who is knowledgeable about data collection, weather analysis, and forecasting, and is also an expert on the ways in which the natural environment affects military operations in terms of weapon systems, tactics, and combat operations.

One can use the matrix in figure 2 to examine the D-day invasion (fig. 3). Although the Allies had superior military capability and a highly accurate weather forecast for the invasion, the observed weather was *very* marginal for the amphibious landing. Interestingly, the Germans actually had an advantage over the Allies in terms of observed weather, since it was more favorable for defensive than for offensive operations—if they had only known it! The pessimistic forecast made by the Germans caused their forces to stand down, increasing the Allies' advantage along the military capabilities axis (fig. 3).

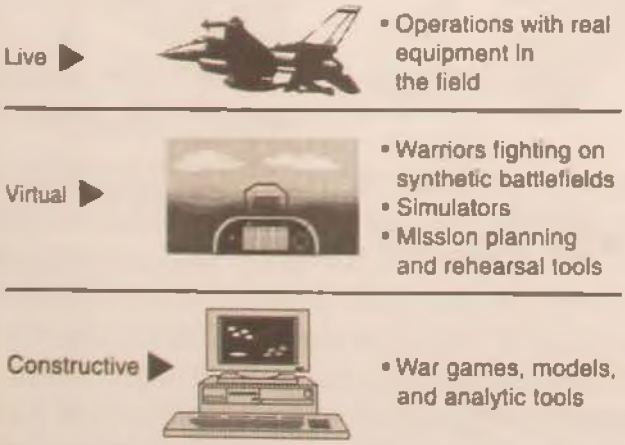


Figure 4. Types of DOD Models and Simulations

Figure 5. Modeling and Simulation Mission-Application Areas

Why Use Modeling and Simulation?

Many of us have heard the familiar arguments (e.g., cost-effectiveness and saving "wear and tear" on equipment and the environment by limiting live-fire testing) used by the services and DOD agencies to advocate M&S. There are three types of models and simulations (fig. 4). Live simulations involve real operators and real equipment (traditional); virtual simulations involve real operators with computer-generated equipment; and constructive simulations involve synthetic equipment and operators.

Another important point about models and simulations is their myriad uses, especially in terms of application to DOD mission areas (fig. 5). Indeed, simulation is becoming more ingrained into the way DOD does business. For example, "computer-generated" forces such as those being developed by the Defense Advanced Research Projects Agency's Synthetic Theater of War program, complete with doctrinally correct behaviors, will soon be available to develop, test, and evaluate strategies and tactics in ways never before possible. This capability would allow simulation of an amphibious assault using different tactics,

force-mix structures, troop-experience levels, and environmental conditions before actually executing it in live training. More importantly, it would also allow mission planning and rehearsal during the critical weeks and days before the actual operation takes place.

Exploiting Weather Using Modeling and Simulation: Our Plan of Attack

Integrating air and space weather and its effects into models and simulations (fig. 6) is based on the modeling-and-simulation pyramid concept, building from the highest level of fidelity (most detailed: system level) to the lowest (most aggregated: campaign level).

Understanding Environmental Effects on Systems

Most atmospheric and space environmental-representation models produce analyses and forecasts of the basic meteorological or space environmental fields (e.g., wind, temperature, moisture, and density) and cannot by themselves produce environmental effects. The basic physics models must be adapted for M&S applications, such as building a weather scenario based on the local climatology of a potential "hot spot" for use in simulation of a sensor that is under development. At this step, we will also build sophisticated environmental-effects models that will be "hooked into" system-level simulations. These simulations will be used to develop a knowledge base about system-component weather sensitivities (e.g., effects of ceiling, visibility, and obscurants on PGM lock-on range; and effects of Van Allen radiation belts on a satellite's shielding capabilities).

Simulating Environmental Effects on Engagements

At this step, we integrate the natural environment into simulations such as the Joint Modeling and Simulation System (JMASS) for simulating the environmental effects on individual engagements (e.g., the effects of ceiling, visibility, and obscurants on PGM lock-on range for an F-22 mission that engages

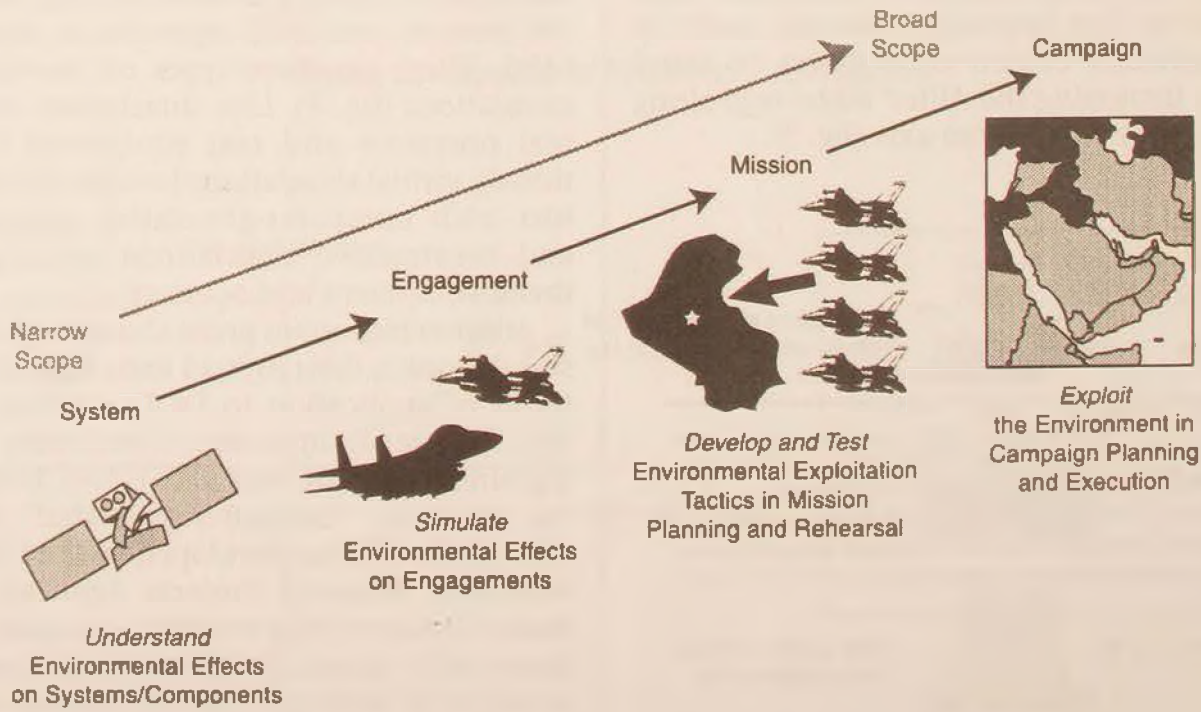


Figure 6. Integrating Weather into Models and Simulations

armor). The simulations would be used to understand weather sensitivities in an engagement scenario and develop exploitation strategies. When we know what these exploitable weather situations are, we will direct our research into improving our abilities to observe, analyze, and predict them.

DOD weather services must identify, analyze, and predict weather regimes that are exploitable by US airpower and space power.

Developing and Testing Environmental Exploitation Tactics in Mission Planning and Rehearsal Simulations

When we begin to understand weather's effects on the performance of individual weapons, aircraft, and satellites, we will use this information to simulate environmental effects that can occur when the systems are operating together in-theater, as in a mission rehearsal for a surgical strike. The results of these studies will allow the cumulative results of environmental effects to be aggregated into environmental "impacts" on theater-level operations. These studies will yield valuable information about using weather as a force multiplier to enhance the four-dimensionality of airpower and space power.

Exploiting the Natural Environment in Campaign Planning and Execution

By this stage, many studies of environmental effects on individual systems, one-on-one engagements, and mission planning and rehearsal will have been completed. At this step, we begin building these aggregated environmental impacts into campaign-level models such as the Joint Warfare System (JWARS) and the models of the Joint Simulation System (JSIMS). Here, the synergy between various factors (e.g., ROEs and political factors) can be modeled so that the effects of weather do not operate in isolation from other factors in the simulation. The resulting simulations can be used to address such issues as how our theories of weather exploitation affect the planning and execution of the air campaign.

Applying "Weather Intelligence" during the Early Stages of a Major Regional Contingency

A JFC operating in an austere environment in the early stages of a developing MRC may have limited assets in-theater and a less than fully developed infrastructure. Target selection will be influenced significantly by the theater mission objectives and the actions of the enemy. With limited resources, the JFC wants to adopt a conservative strategy to buy time until more assets arrive in-theater. One of the ways the JFC implements the strategy is by asking the weather staff to take a conservative approach to weather prediction (i.e., to err on the pessimistic side). Previous campaign planning simulations had revealed the effects of such an overall cautious approach to the campaign strategy, using measures of effectiveness such as "missed target opportunities." These same simulations also used real-time weather as inputs into their deployment modules, so weather's effects on the deployment schedule are also known to the JFC staff. These effects are factored in with other considerations, such as movement of enemy armor. Subsequent adjustments are made, based on new mission-planning simulations using this strategy. *Everyone* is involved—the staff weather officer, intel staff, targeteers, logisticians, operators, and so forth.

Conclusions and Recommendations

The above scenario lies well into the future. Making it happen will require considerable "front loading" to build the models and do the studies in order to get the return on investment. Even so, we cannot rely totally on computer models and simulations to get us where we want to go; live operations will be a key

component of this strategy. Is exploitation feasible, given the outline presented here? The recent appointment by the undersecretary of defense for acquisition and technology of three M&S executive agents for the natural environment (terrain, oceans, and air and space) is a step in the right direction.[11] These executive agents can provide the necessary leadership to the teams of scientists, analysts, and operators for incorporating the effects of the natural environment into the next generation of models and simulations. None of the above groups alone has the entire picture, but together they can accomplish a great deal. Operators have a special role to play, in that they can provide advocacy and feedback to developers of models and simulations used for training, operations, acquisition, and analysis.

Recently published Air Force executive guidance states the need for US airpower to exploit an adversary's inability to operate in adverse weather, as well as a requirement for incorporating atmospheric effects into models and simulations.[12] Developing proper strategies for exploitation will be a team effort and will require some fundamental changes to weapon-system development policies and our approach to atmospheric research and development. The following recommendations lay the groundwork to begin this process:

Test and evaluate Air Force systems in as many types of adverse environmental conditions as possible. If US air and space forces are to exploit weather, we must first know what types of weather phenomena are "exploitable." Testing under ideal environmental conditions does not allow measurement and analysis of this sensitivity, and cost and safety considerations limit the amount of adverse-weather testing that can be done on new weapon systems. Therefore, we should use simulations with sophisticated weather-effects representation for much of the adverse-weather testing.

Emphasize analysis of weather effects and weather prediction on military operations. There is little quantitative data on the effects of weather and forecast accuracy on military operations.[13] Since any doctrine is based on "tried and true" strategy and tactics tested live in the field, we need much data collection and analysis before we can incorporate weather exploitation into Air Force doctrine. In today's shrinking force, with all its expectations and limitations, the opportunities for collecting necessary data and developing exploitation strategies are extremely limited. The only hope for collecting enough data, as well as developing and testing the resulting strategies and tactics, lies in a combination of live, virtual, and constructive simulations. Once collected and analyzed, this information can be placed in a location such as the M&S Resource Repository, where (with proper security) it can be made accessible for reuse and new applications.

Just as US forces now exploit the night, so will they be able to fight smarter and more efficiently by exploiting the weather—and the resulting savings in human life and materiel will be immeasurable.

Identify, analyze, and predict weather regimes that are exploitable by US airpower and space power. The best chances for exploiting adverse weather will be in those situations in which US forces have superior tactics, training, and sensor/weapons technology. These "exploitable" situations will likely occur when atmospheric conditions are on the verge of becoming "weather-restricted" and when the atmosphere likely does not fit well-known, conceptual (mental) models of weather systems. Much of today's academic and laboratory research in meteorology focuses on "extreme," nonexploitable events (e.g., "Storm of the Century"—March 1993 US East Coast storm) that conform to well-researched conceptual models of the atmosphere. We advocate funding research efforts aimed at developing capabilities to identify, analyze, and

forecast those environmental conditions that are exploitable by US airpower.

With strong advocacy from senior leaders in the Air Force and the Office of the Secretary of Defense and with technical direction from the executive agents, it is possible to build a future air and space doctrine that will speak of exploitation in the vertical, time, and information "dimensions." This effort can serve as a building block for unsurpassed C^2 and information-operations capabilities into the twenty-first century. Just as US forces now exploit the night, so will they be able to fight smarter and more efficiently by exploiting the weather—and the resulting savings in human life and materiel will be immeasurable. □

Notes

1. Sun Tzu, *The Art of War,* ed. James Clavell (New York: Delacorte Press, 1983), 20. The actual quote is, "If you know Heaven and know Earth, you may make your victory complete." In this context, "Heaven" refers to "night and day, cold and heat, times and seasons," and "Earth" refers to "distances . . . danger and security; open ground and narrow passes; the chances of life and death" (page 7).

2. Bruce Bennett, "Initial Observations on the Future of War," in *JICM 1.0 Summary* (Santa Monica, Calif.: RAND, 1994), 23-27.

3. AFDD 1, "Air Force Basic Doctrine," September 1997, 21-22.

4. The Army, for example, has made a commitment to "owning the weather" as part of its battlefield-support vision for Force XXI. See Mary Ann Seagraves and Richard J. Szymber, "Weather: A Force Multiplier," *Military Review,* November-December 1995, 69-76.

5. See, for example, Gene Myers's remarks in "A Commentary: Interservice Rivalry and Air Force Doctrine: Promise, Not Apology," *Airpower Journal* 10, no. 2 (Summer 1996): 63. He describes one view of airpower as the source of "'immaculate interdiction'—a quick way to punish offenders while not risking many American lives or exposing the resultant blood and destruction to much media scrutiny" (page 63).

6. Lt Col Edward Mann, "One Target, One Bomb: Is the Principle of Mass Dead?" *Airpower Journal* 7, no. 1 (Spring 1993): 36.

7. Comdr Dale R. Hamon and Lt Col Walter G. Green III, "Space and Power Projection," *Military Review* 74, no. 11 (November 1994): 64.

8. AFW 96-01, *Air Force Weather Impact on Operations,* 1996, 2-1.

9. Air Force News Service, "Collateral Damage Edict Challenges Pilots," 8 September 1995.

10. In this context, "relevant" weather is defined as those environmental parameters pertinent to military operations. For example, soil trafficability is pertinent to ground troops, cloud ceilings and line-of-sight visibility are pertinent to tactical air, and frontal positions and vertical motion are pertinent to the forecaster.

11. "Department of Defense Appoints Executive Agents for Modeling and Simulation of the Natural Environment," *Bulletin of the American Meteorological Society,* August 1996, 1890.

12. United States Air Force, *Air Force Executive Guidance* (Washington, D.C.: Department of the Air Force, January 1996), 14-15, 20-21, 25-26.

13. AFW 96-01, 2-2, 2-16, 8-1.

GLOBAL SKILLS

Vital Components of Global Engagement

COL GUNTHER A. MUELLER, USAF
LT COL CARL DAUBACH, USAF

Throughout my 35 years of commissioned service, I lived in a world where the good guys spoke English and the bad guys spoke Russian. Today, our world is a very different place. We live in a "global village" where information, commerce, and even CNN pay little attention to national borders—much to the chagrin of some nations that would try to keep those influences out. As technology brings our world closer, culture, tradition, and history remind us how we differ. Around the world today, we see regional, religious, and ethnic differences becoming more pronounced—and tensions mounting. Throughout our force, we need to establish a presence of officers proficient in foreign language and area studies—officers who can be effective in shaping events or responding to a contingency anywhere in the world on a moment's notice.

Our vision for the Air Force of the twenty-first century is Global Engagement, which mandates the capability to take immediate action—to deploy anywhere in the world, no matter how primitive the airstrip or how remote the location, in a few hours' time. In our globally engaged Air Force, there's no time for 18 months at the Defense Language Institute. We need people with language and cultural skills in place and ready, *just as we need pilots and satellite controllers. I highly commend Colonel Mueller and Lieutenant Colonel Daubach for the work they've done to show why we need this cadre of foreign-language experts and how we plan to acquire, train, and retain them.*

—Gen Henry Viccellio Jr.
USAF, Retired

Just as we were ill-equipped to deal with the technological threats of the Cold War era, today we lack the linguistic and cultural skills and resources fundamental to competing in the new international environment.

—Former Senator David Boren (D-Okla.)
Chairman, Senate Intelligence Committee

THE UNITED STATES still lacks adequate foreign-language capabilities despite the best intentions (and many dollars) of the National Defense Education Act of 1958 and the similar National Security Education Act of 1991. The 1979 "wake-up call" from the Presidential Commission on Foreign Language and International Studies, which called this situation "scandalous," went unheard. According to former congressman Leon Panetta, "the situation is no longer scandalous, as it was described; our current national situation with regard to international skills and understanding is merely appalling."[1] Consistent with national trends, the foreign-language and area-expertise capabilities of the Department of Defense (DOD) are equally appalling:

> In every war in its history, the US Army has turned to native speakers of one kind or another to meet its language needs. Each time, it was a last-minute expedient. Desert Storm was no different. . . .
>
> In Desert Storm, all four services met their linguistic requirements in one fashion or another, yet all faced potentially crippling shortages.[2]
>
> We had to put 500,000 American men and women in our armed services in harm's way because our intelligence community failed to anticipate an impending military crisis. . . . The lesson is clear. We need policy-makers, diplomats and intelligence analysts expert in cultures and languages that encompass all regions of the world.[3]

DOD, Air Force, and other governmental-agency studies, audits, inspections, and reports have consistently criticized the dearth of foreign-language and foreign-area skills in the military services. A Defense Intelligence Agency (DIA) assessment of 1988 found that military attachés "lacked functional language skills." A Government Accounting Office (GAO) report of 1990 determined that defense language programs "did not adequately accomplish their objective in training participants to be proficient in languages." A Defense Language Institute Foreign Language Center's (DLIFLC) study of 1992 found that "short courses for contingencies were of limited value for students to reach proficiency." A Functional Management Inspection of 1991 by the Air Force's Inspector General (IG) found that "personnel with regional knowledge or foreign language proficiency were not identified or effectively utilized" and that "language training and proficiency maintenance methods were not satisfying Air Force requirements for language capability." In 1993 the DOD IG found "incomplete and unclear plans, policies, roles, and responsibilities for managing and executing the Defense Foreign Language Program." And a GAO report of 1994 noted that "the Air Force does not have a Command Language Program."[4]

These well-documented deficiencies during more predictable challenges bode poorly for the less predictable and far more diverse challenges of a new engagement-and-enlargement strategy. The Air Force's Global Engagement vision, which implements airpower and space power in support of that strategy, makes a discussion of global skills relevant, timely, and necessary. For purposes of this article, we define global skills as language proficiency within a cultural and regional context.

Former Security Environment: Old Paradigm for Language Skills

DOD's language-training efforts of the cold-war era mirrored the prevailing contain-

ment strategy and focused on the language of potential adversaries. "Our unfortunate experience has been that foreign language capability in the American armed forces has been restricted primarily to only one sphere of military activity. . . . The military significance of foreign language competence is pigeonholed into the category of military intelligence—strategic and tactical."[5]

"While it takes longer to acquire minimal competence in a language than to train for most military occupations, there is less opportunity for and less emphasis placed on, the maintenance of the more expensive skill."

Military language programs reflect the American mind-set on language skills, which accounts in large measure for our national failure in the language and area-studies arena. Unlike most other nations, the United States has traditionally attributed a "short-term, mechanical value to foreign languages" and neither understands nor appreciates (and therefore does not accept) the relationship between language and culture. In 1989 a survey of 32 American international business leaders, for example, found that these leaders believed that

- language is divorced from its cultural context;
- cross-cultural understanding is important for doing business in the global economy, but few considered foreign language as a key element in this understanding; and
- foreign language was not a problem since it could be "managed"—when needs arose, appropriate skills would be located.[6]

Relying on the "managed" model, the military has scrambled in contingencies to locate the necessary skills in groups as diverse as Kuwaiti exchange students and cabdrivers from New York City and Washington, D.C. Because military leaders have accepted this short-term, mechanical view of language skills and because we have been able to manage this problem, we largely ignore language-maintenance programs. "While it takes longer to acquire minimal competence in a language than to train for most military occupations, there is less opportunity for and less emphasis placed on, the maintenance of the more expensive skill."[7]

The misguided American mind-set on foreign-language skills also drove us to the prevailing "just-in-time" language-training model used throughout government. Although we successfully managed our way through the cold war and recent contingency operations, this model is destined to fail in a long-term, engagement-oriented national security strategy.

New Security Challenges, Missions, Strategies, and Skills

In *Global Engagement: A Vision for the 21st Century Air Force,* the Air Force leadership profoundly and directly redefines the service's mission in light of a new international-security arena, stating that "the ability of the Air Force to engage globally, using both lethal and non-lethal means is vital to today's national security of engagement and enlargement. At present almost a quarter of USAF personnel are deployed overseas at any one time."[8] Humanitarian, peacekeeping, and peace-enforcement missions; security assistance; coalition building and maintenance; treaty enforcement; and drug interdiction account for many of these deployments. Rooted in the political, economic, and military realities of emerging global-security concerns, the Air Force's new strategic vision is cogent and compelling.

Moreover, implied but not stated in the vision is an unprecedented need for global skills to enhance the engagement process and to support the shift from cold war to

Global Engagement strategies. Purely mechanical language skills that served—albeit poorly—strategic and tactical intelligence purposes, for example, will not serve the broader requirements of emerging engagement strategies. As Samuel P. Huntington has pointed out, "In the post-Cold War world, the most important distinctions between peoples are no longer ideological, political, or economic. The distinctions are cultural."[9] Future Air Force leaders must recognize the importance of these cultural distinctions in order to implement effective engagement strategies, especially at lower levels. In a bygone era, Air Force people raining down fire and steel had few motives for cross-cultural understanding. In the future, a lack of cross-cultural perspective will, at best, create obstacles to Global Engagement and, at worst, lead to disengagement and isolation—fostering the kind of regional instability we seek to combat.

As the only true superpower in today's multipolar world, the United States is the only power with a national identity, clearly defined political and economic values, and the capability of exercising international primacy and influence.[10] For the Air Force in the late 1980s and early 1990s, building US influence meant controlling and policing former Soviet client-protectorates turned regional renegades. A national security strategy paradigm shift began for the Air Force with "forward presence," "global reach," and "global power projection" supplanting age-old, cold-war, forward-based, nuclear-readiness posturing.[11]

DOD's *Bottom-Up Review (BUR)* of 1993 framed the baseline for the further evolution of our national security strategy paradigm.[12] It remains today the doctrinal underpinning of the Joint Chiefs of Staff's *Joint Vision 2010* and the Air Force's new strategic vision. The *BUR* is clear on DOD's core values: the promotion of democratic governments and human rights, the peaceful resolution of regional conflicts, and the maintenance of open international economic markets stand at the heart of defense guidance. Moreover, US national security strategy hinges on expanded political, economic, and military engagement around the world. Further, according to the *BUR*, our Global Engagement must be conducted within a twofold goal: reducing dangers to our national interests (threat prevention) and enlarging international cooperation (partnership) for freedom and peace.[13]

Foreign-language/area skills must be developed—over the long haul, not overnight—as necessary tools for the Total Force.

DOD's commitment to Global Engagement as a national security strategy acknowledges that US military forces will increasingly be called upon for operations short of war such as peacekeeping and peace enforcement.[14] Furthermore, the Office of the Secretary of Defense posits that "defense by other means"—namely targeted economic aid, cooperative military education and training, and robust military-to-military contact programs—fosters mutual understanding and cooperation through engagement. Finally, the *BUR* establishes several "global cooperative initiatives." In addition to cooperative international threat reductions and counterproliferation programs, the US military is seen as having an increased role in providing humanitarian assistance and disaster relief to counter the rise of regional instabilities that could lead to armed conflicts.[15] In short, our national security strategy employs US military forces in an unprecedented global way to which this decade's military-deployment record and operations tempo bear witness.

Flowing from our "new National Security Strategy," *Global Engagement: A Vision for the 21st Century Air Force* recognizes the changing global-security environment, with projection of forces based in the continental United States, unpredictable missions, and constabulary-humanitarian roles becoming the operational norm. Moreover, the strategy mandates that the Air Force's future lies in a capability for "immediate action, operations in non-traditional environments" and the capacity to

operate "as partners in regional (coalition) operations."[16] Clearly, many of these operations will be in non-English-speaking regions and with non-English-speaking coalition partners, making a level of global skills mission-essential.

We must consider these [language] skills as part of the accessions decisions and create incentives for those members who have the skills.

Implementing a New Plan

Recognizing the need to review the Air Force's foreign-language capabilities, the commander of Air Education and Training Command and the Air Force's deputy chief of staff for personnel commissioned a 13-agency Total Force process action team (PAT) in 1994. The PAT completed its report in December 1995, and the Air Force leadership endorsed many of the team's recommendations in early 1996. Some of the recommendations have already been implemented; others are currently in Air Staff coordination. According to an article in *Air Force Times,* "increased deployments overseas, whether for war or peacekeeping, have the Air Force taking new stock in the foreign language capabilities of its members."[17]

The PAT suggested one overarching consideration and 31 specific recommendations falling into four broad categories. Of foremost importance is the notion that foreign-language/foreign-area skills are required to do Air Force missions in the twenty-first century. The Air Force should create no new specialist career field—for enlisted or officers—from which the service could plug linguists into contingencies. That is not the nature of Global Engagement. Further, everybody doesn't need to be a linguist—that's overkill for many Air Force people with a growing myriad of technical and professional responsibilities. Instead, a fresh look at the missions of engagement and a commensurate change in the Air Force attitude regarding these skills will best serve our needs.

Specifically, foreign-language/area skills must be developed—over the long haul, not overnight—as necessary tools for the Total Force. It is difficult to incorporate a skills-development model in a requirements-based training system wherein one cannot predict the requirements accurately. The "create 'em overnight" tactic is no solution; instead, it contributes to the problem. To meet the long-term needs of our engagement strategy, the PAT proposed building a pool of resources across all Air Force specialties in the Total Force. Moreover, by carefully tracking and managing language-skilled Air Force people, we can reduce unnecessary training costs. Again, new missions equal new thinking. Within expected funding constraints, a "pool-building" model would likely serve us better than the traditional requirements-based model.[18] Toward that end, the PAT also made specific recommendations in four general areas.

First, we should *identify and track* the skills we already have, as well as those coming through the accession door. Currently, the system tracks only those members who have taken the Defense Language Proficiency Test (DLPT): personnel who demanded to be tested, those who filled a language-designated position, and those who graduated from the Defense Language Institute. From the PAT-recommended Foreign Language Self Assessment (FLSA) survey, completed in November 1996, of all active, Guard, and Reserve members, the Air Force Personnel Center (AFPC) identified over 72,000 people with skills in 207 languages or dialects. Thus, the FLSA identified new language resources enabling rapid identification of individuals with language capabilities to respond to mission needs. Clearly, this new database will help to identify personnel for special training, assignments, and contingencies.[19]

Second, our foreign-language, just-in-time training model is all wrong. Language proficiency comes with time. We simply cannot train people quickly to be proficient in a

foreign language. For difficult languages, we cannot do it in even two, three, or more years. Just-in-time language training follows a requirements-based planning model that just does not fit. For example, when AFPC has a requirement for somebody with foreign-language skills for a normal assignment rotation, it reviews the force for verified DLPT scores. In rare cases, a person with the skills volunteers, and the mission is complete (warm space, warm face). More often, a volunteer or nonvolunteer is sent to just-in-time training, reports to the assignment unable to speak the language, and the mission is complete (warm space, wrong face). It's even worse in a contingency (hot space, no face), when there's no such thing as just-in-the-nick-of-time language training. Instead, we must change the model to *find them if we can, train them only if we must.* That means homegrown foreign-language skills from the accession points. We must consider these skills as part of the accessions decisions and create incentives for those members who have the skills. It is far more sensible, effective, and efficient to identify language-proficient people at the door than to train them years later.[20]

Third, "home growing" is useless if we don't "home groom." We must *maintain and use* the foreign-language skills of Air Force people. We need robust foreign-language maintenance resources in the Base Education Office and undergraduate and graduate academic-degree programs in foreign languages and foreign-area studies. We need command-sponsored foreign-language immersion programs as well as a flexible and responsible personnel-assignment system in which otherwise qualified people who have language skills receive priority for foreign-language-related assignments.[21]

Fourth, we must *create and support institutional incentives* for Air Force people to identify, acquire, and maintain foreign-language/area skills. We must explore monetary increases in foreign-language proficiency pay, with parity in pay for Guard and Reserve personnel and bonuses for successive years of higher DLPT scores. We need to give assignment priorities to language-qualified people for foreign locations. Finally—and this is an emotional issue—we should look at factoring language proficiency into the promotion process.[22]

Taken at face value, *Global Engagement: A Vision for the 21st Century Air Force* guarantees a future for more and more Air Force people acting as ambassadors and interfacing with other nations for the good of our country's national objectives. This means that change is in the air for the Air Force. Of course, there will be resistance to this change, and some of it will come from the top. With only 11 serving general officers (out of three hundred in the active Air Force) and 185 colonels (out of four thousand) fluent in a foreign language,[23] the importance of yet another capability and demand on our Air Force people is bound to be questioned. But *Global Engagement: A Vision for the 21st Century Air Force* is exactly about change, and by 2025 a new Air Force crew, highly capable of dealing with a new Air Force culture, will never doubt that Global Engagement requires Global Skills. □

Notes

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3. George Lardner Jr., quoting Sen. Sam Nunn in "Language Education for National Security," *Washington Post*, 19 July 1991, A19.

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9. Samuel P. Huntington, *The Clash of Civilizations and the Remaking of World Order* (New York: Simon & Schuster, 1996), 21.

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11. Gen John M. Loh, "Advocating Mission Needs in Tomorrow's World," *Airpower Journal* 6, no. 1 (Spring 1992): 6.

12. Les Aspin, *The Bottom-Up Review: Forces for a New Era* (Washington, D.C.: Department of Defense, 1993).

13. Ibid., sec. 1, p. 3.

14. Ibid., sec. 2, pp. 8–10.

15. Ibid., sec. 6, pp. 71–76.

16. *Global Engagement*, 1, 5.

17. Bryant Jordan, "Linguistic Skills Grow in Importance," *Air Force Times*, 4 November 1996, 6.

18. "Foreign Language Skills Process Action Team Report and Recommendations" (Colorado Springs, Colo.: USAF Academy, 1 December 1995), 6, 7, 34, 35.

19. Ibid., 63–76; and Headquarters USAF/DPPE, Talking Paper on Foreign Language Proficiency Requirements, 22 December 1996.

20. "Foreign Language Skills Process Action Team Report and Recommendations," 47–62.

21. Ibid., 77–89.

22. Ibid., 77–79.

23. AFPC/DPS, DIN PDS Report, 31 December 1996.

There are people who strictly deprive themselves of each and every eatable, drinkable, and smokable which has in any way acquired a shady reputation. They pay this price for health. And health is all they get for it. How strange it is. It is like paying out your whole fortune for a cow that has gone dry.

—Mark Twain (Samuel Clemens)

NATO Enlargement

Issues and Answers

2D LT JASON ARNOLD, USAF
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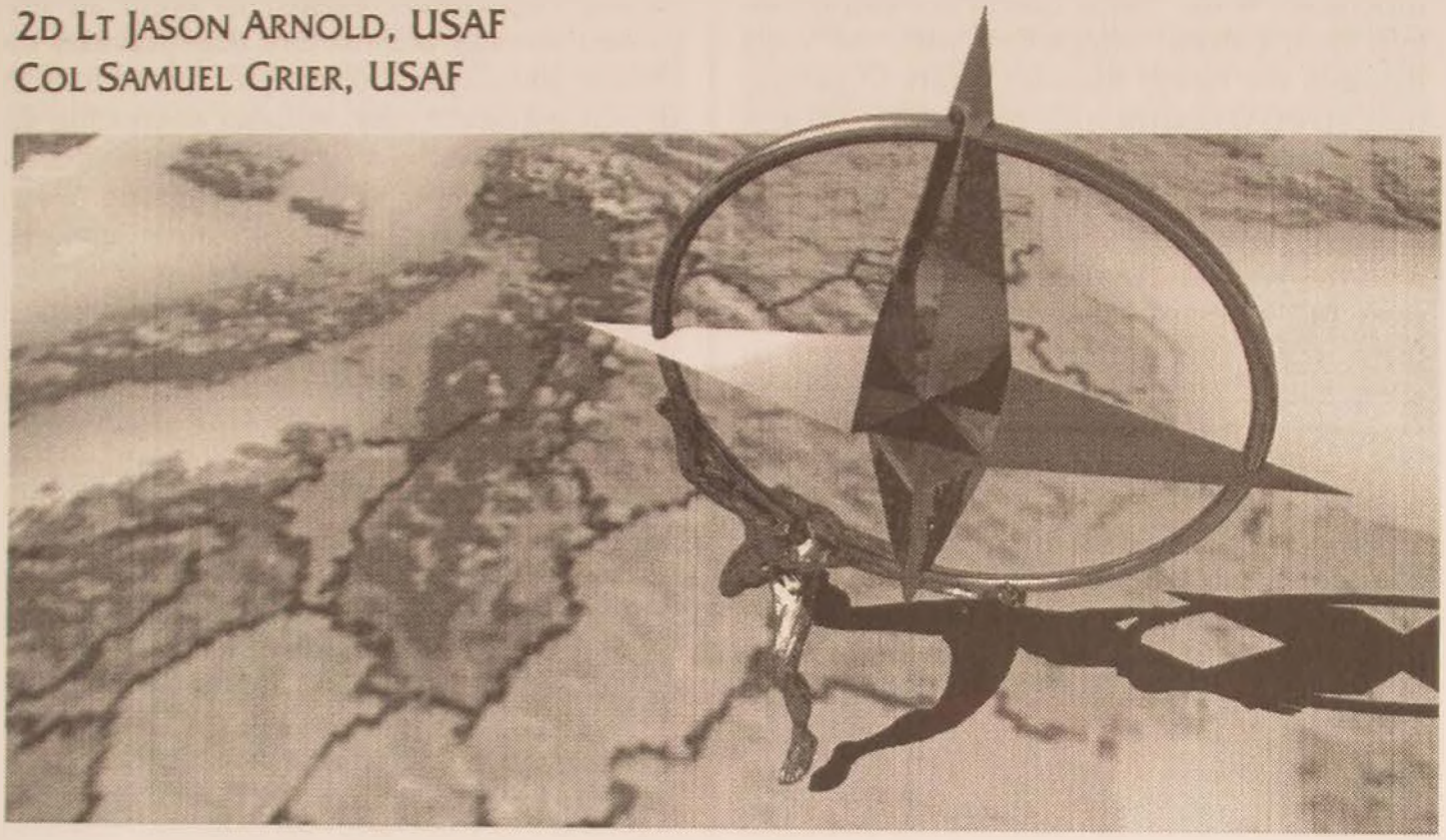

IN THE MIDST of radical political restructuring, abiding economic quandary, and enduring cultural tension, the nations of Eastern and Central Europe have arrived at a crossroads. For the first time since World War I, they have the opportunity to experience lasting change in the form of democratic development and economic reform. However, reform comes with a price, and barring unforeseen and substantial increases in annual revenues, expansion of their economic and social spending necessarily means less spending for national defense. Consequently, the potential for lasting economic change is predicated upon the ability of these nations to merge with a security architecture that shelters them from external conflict.

Four security architectures are available to these former bloc countries since the dissolution of the Warsaw Pact and the disintegration of the Soviet Union; it is useful to look briefly at each of them. The first option is for the new democracies to fall under Russian influence once again as Russia recovers its footing, both economically and politically. Such an option appears at the present time to be unacceptable to the democracies of East Central Europe and could occur only through Soviet-era intimidation combined with a complete hands-off policy by the West, both of which seem unlikely.

The second option is for the emerging democracies to seek an alliance among themselves, creating some type of new security organization. Formation of such an alliance would certainly be difficult and force them to

turn their attention East when they stand poised on the threshold of Western integration.[1] Furthermore, given the disparity and disarray among the nations that might join such a hypothetical organization, it would almost certainly be doomed before it began.

The third option available to the new democracies is the status quo. They can maintain their current interaction with the West through the North Atlantic Treaty Organization's (NATO) Partnership for Peace (PFP) and continue their attempts to join the European Union (EU). This option permits continued military, political, and economic cooperation with the West and avoids the costs associated with full military integration. However, reform under this option could be slowed or even halted altogether without at least the prospect of full military integration with the West and the security guarantees that come with it.

Therefore, the fourth security option—NATO membership—is the only practical one. NATO membership carries with it acceptance into the circle of Western democracies, projecting stability and security to the East. It permits Eastern and Central Europe to concentrate their development almost exclusively in the areas of internationalism, free trade, and democratic practices.

Failure of NATO to accept new members could mean a loss of public support for NATO in its member nations and a slow lapse into irrelevance. In contrast, expansion offers revitalization and an enhanced role in Europe's emerging strategic landscape.[2] Hence, whether one views NATO enlargement from the perspective of the East or from the West, the conclusion is the same: the time for enlargement is upon us.

The Purpose

In 1982 NATO invited post-Franco Spain into the Alliance with the clear intent of strengthening democracy and providing the Spanish people with an opportunity to enter the European Economic Community.[3] The integration of Spain has been a resounding success. Opening NATO to additional members must be part of the wider process of Europe's naturally growing together in the post-cold-war era. Failure to open the Alliance contributes to an artificial demarcation that no longer corresponds to European realities.[4]

With the end of the cold war, an unprecedented opportunity existed to build an improved security architecture that provides increased stability and security for all nations in the Euro-Atlantic area, without re-creating dividing lines.[5] Instead of seizing this opportunity, EU and the Western European Union (WEU) were effectively re-creating dividing lines in Europe by stalling the entry of new members and by deciding—unilaterally—which nations of Europe were fit for integration into the West. NATO, on the other hand, offered a strong and vibrant PFP program. Now, with a commitment to enlargement, NATO promises greater inclusion and the elimination of divisions between all interested and willing parties. This larger vision—the provision of increased stability and security for all of the Euro-Atlantic area—is the underlying purpose of NATO enlargement.

NATO after Enlargement

The cold war era was one of low risk and high stability. In the wake of collapsed bipolarity, the world has entered a period of high risk and low stability—a situation best illustrated by events in the former Yugoslavia.[6] Bloc confrontation has been replaced by diffuse conflict scenarios, with all the risks they entail.[7] These risks are multifaceted and multidirectional and—most significantly—they are difficult to predict and assess.[8]

Consequently, NATO must forge a new vision of its core purposes and missions. The Alliance must transform itself from a traditional military alliance into an organization for addressing Europe's new security challenges: maintaining the capacity for territorial defense but at the same time placing greater emphasis on contingency force projection.[9] NATO must become an organization of both collective defense and conflict prevention,[10]

taking on new responsibilities in the area of crisis management throughout Europe[11] and drawing hard lessons from its failure to act with more determination and purpose in the former Yugoslavia.[12]

There are currently three forms under which NATO allies contribute to NATO's collective defense.[13] However, we believe that only one—full participation in the integrated military structure and the collective defense-planning process—should be offered to new members. The lack of participation of certain allies in the integrated military structure has caused many difficulties. Repeating those difficulties during a time when nations are seeking entry into the Alliance en masse is a strain that it should not have to endure during the stresses of enlarging. Despite our reservations, NATO has agreed to adopt a flexible approach when assimilating new members.[14] The latter are expected to participate in the entire spectrum of Alliance missions with proper consideration given to respective capabilities, taking into account the need for case-by-case consideration of non–Article 5 missions.[15]

As part of enlargement's earlier phase, the allies began a comprehensive review of the internal adjustments in command structure, force posture, roles and missions, cost sharing, and NATO staffing.[16] Yet to be discussed—and possibly of importance equal to other current PFP activities—is how PFP partners might be integrated into the NATO committee structure, where they can have direct influence on Alliance developments. That PFP lacks political content is underscored by the fact that Russia achieved a political relationship with NATO outside of PFP and that the North Atlantic Cooperation Council (NACC) remains the only forum for political exchanges and consultations between NATO and its closest neighbors. It has been suggested that the intensification of PFP should eventually include regular 16+1 political consultations within PFP; such a facility could be particularly useful during the enlargement process for its three newest members.[17]

It has also been suggested that NATO should form a North Atlantic Council "plus" (NAC+) similar to WEU's expanded council that meets routinely at the ambassadorial and ministerial levels. NATO might also create a Political Council Plus to more effectively coordinate the activities of the recently enlarged Political-Military Steering Committee. Finally, NATO could create one-to-three-month, civilian-and-military-partner internships on both the International and the International Military Staffs in nonsensitive areas and continue inviting partners to attend the NATO Defense College,[18] as has been done since Course 87. NATO could also expand the Senior Civil Emergency Planning Committee to include partners.

After enlarging, the Alliance must ensure that it maintains its ability to make important decisions quickly. All decisions made in NATO bodies are expressions of national sovereignty and are therefore achieved through consensus. If there is no consensus, there are no decisions. If there are no collective decisions, there is no collective defense.[19] NATO is only as strong as the consensus of its members[20]—without the ability to reach consensus, the Alliance cannot commit. So instead of hindering the consensus process, enlargement should better enable the Alliance to carry out both its core functions and its new missions. Willy Claes, former NATO secretary-general, expressed this concern: "We must respect the principle of consensus. How can this be done with 22 or 24 members?"[21]

With the same democratic values yet with different histories, traditions, work cultures, geostrategic preoccupations, military capabilities, and neighbors, the current 16 NATO allies have different viewpoints on the same set of issues. Adding more members with an even greater diversity of traditions is bound to increase the difficulty of reaching consensus and potentially increase the amount of time required to reach a decision. But there are numerous advantages to consensus decision making, and the one essential element of the process is the willingness to compromise.[22] Consequently, NATO expects from its new allies a commitment to build consensus within the Alliance in a spirit of cooperation on all issues of concern to them.[23]

EU has adopted a "weighted consensus" voting mechanism, and some individuals support moving to a similar paradigm, anticipating difficulty reaching agreement in a larger NATO. But if the Alliance can no longer reach consensus, perhaps its working methods are at fault rather than the consensus mechanism itself. Furthermore, Greece and Turkey have prepared the Alliance to negotiate sensitive issues—and if Greece and Turkey can agree upon numerous issues despite their differences, the predicted death of consensus in an enlarged NATO may be premature. For the present time, NATO is determined to keep its consensus mechanism, and a successful pattern of cooperation within an enlarged NATO may give impetus to better cooperation within other European organizations such as EU and WEU.

Russia

Although NATO maintains that no nation will exert a veto over its enlargement, it would be counterproductive to enlarge the Alliance with the intent to enhance stability while at the same time alienating Russia.[24] From their inception, enlargement talks roused Russian objections, as illustrated by Defense Minister Igor Rodionov's assertion that his country would take "appropriate measures" necessary to counter expansion.[25] The recent Russia-China agreement may be one of the appropriate measures to which he alluded.[26]

The Russian elite cannot comprehend the means by which NATO escaped its brief post-cold-war identity crisis, since the Soviet Union and the Warsaw Pact disintegrated in the face of change. For many Russians, NATO still has a hostile flavor; we should expect Russian opposition to NATO enlargement simply because NATO has always been opposed by Russia. Paradoxically, Russians do not focus exclusively on the increased military threat from a larger NATO—rather, they worry about political-psychological impacts on domestic social, political, and economic stability that may result from what they view as "unnecessary expansion." There was also vague talk of renewing a strategy of confrontation using the Commonwealth of Independent States,[27] but it is unlikely to coalesce, given the lack of enthusiasm on the part of most members and Russia's own inconsistent leadership.

Claims that another cold war is possible are exaggerated. The truth is that Russia is not in a position to engage in another such confrontation. In an irony of history, it may be that Moscow's weakness rather than its strength is the cause of concern in Russia with regard to NATO expansion.[28] It also seems unlikely that the US public, in its dash to cash in on the "peace dividend," would support another era of bloc confrontation. The US response to the end of the cold war has been across-the-board force reductions, reducing the likelihood of any future confrontation.

In any case, Russian perceptions must be taken seriously,[29] and NATO enlargement must occur within a Europe where democratic Russia has its rightful place. Thus, while NATO responds to the legitimate expectations of Central Europe to be integrated into a Euro-Atlantic security structure, it should also build a strong NATO-Russia relationship.[30]

NATO is prudently avoiding formal treaties with Russia that place it in the position of having to coerce Russia to take certain actions. Signing agreements that make NATO a willing partner and require voluntary compliance on Russia's part removes the Alliance from an enforcement role and lessens the potential for friction. The recently signed *Founding Act on Mutual Relations, Cooperation, and Security between NATO and the Russian Federation* is one such agreement. For its part, Russia was seeking some formal agreement that might limit, if not the enlargement process itself, then the expansion of NATO's military infrastructure.[31]

To lessen tensions still further, the Alliance has clearly stated there is no a priori requirement for the stationing of NATO troops on the territory of new members; nor is the peacetime stationing of forces on other allies' territories a condition of membership.[32] The Alliance realizes that stationing allied forces on the territory of new members could give a misleading impression of Alliance con-

cerns[33]—unspoken but clearly vis-à-vis Russia. These positions emphasize the point that there is no perceived external threat to Central Europe and that the forward deployment of troops and the fortification of borders are not required.[34]

Russia cannot be expected to cooperate on some issues, and NATO must be sensitive to the perceptions of its partners. Recent signs of a stable political situation with almost no evidence of unrest and reports that the Russian economy shows signs of stabilizing after six years of decline are promising indications that Russia may finally be pulling out of its downslide[35]—and provide hope for better cooperation. Tense though the relationship may sometimes be, NATO and Russia appear to be making headway in establishing a strong, stable, and enduring partnership that properly recognizes their common interests in security and cooperation on the European continent.[36] The current dialogue offers the best assurance for the peaceful enlargement of NATO and provides an atmosphere in which credible security guarantees can be established and defended.

The Ukraine

With no desire to actually gain full membership, the Ukraine plans to seek associate membership in NATO when the Alliance expands. However, the Alliance has rejected appeals for associate membership, opting for nothing less than full membership, which is deemed essential to maintain collective defense. Anything less could be perceived as a "paper guarantee,"[37] undermining expansion efforts.

Security Guarantees—What Do They Mean?

Although security guarantees are important to most of the nations struggling to enter the Alliance, one can argue that Article 5 will do little to meet what some people claim are the real threats facing Central Europe: political and economic turmoil and ethnic tension.[38] These problems may be better addressed by setting standards that new members will be expected to meet, either before their admission to NATO or after they enter the Alliance.

Criteria for Admission

The Alliance has indicated there are ways for nations to prepare for entry, although it has not issued a list of rigid criteria. Active participation in PFP, for example, is expected to play an important role in preparing countries for accession, though it does not guarantee Alliance membership.[39] Similarly, new members will not be required to achieve full interoperability of their forces with NATO standards before joining the Alliance, but they are expected to meet certain minimum standards.[40]

Nevertheless, at some point the Alliance must insist that selected applicants either meet certain criteria or forgo membership—both to maintain ideological and political compatibility among members and to ensure that enlargement is completed in a reasonable time frame.[41] During the integration process, the Alliance must guard against NATO members' attempts to put undue pressure on invited nations to settle personal differences with NATO countries to their disadvantage before they join, which might cause future friction and conflict. The prospect of joining NATO has proven to be the most powerful incentive for reform and resolution of ethnic and territorial conflict among aspiring members.[42] This fact alone should be a clear signal to doubters of NATO enlargement that it is the right course of action.

In the end, NATO must guard against creating too much competition among nations vying for membership. There is friction enough now that the first group of new members has been announced by the Alliance.

"The Who"

Stated in its simplest terms, "the who" was a political decision. Poland, Hungary, and the

Czech Republic were on the shortlist of virtually everyone who endorses NATO expansion. Verbalizing the potential of these nations to become members of NATO built a general expectation that lessened any negative reaction on the part of Russia; it also prepared for rejection those nations who were not admitted with the first wave. "Second tier" candidates included Slovenia and Slovakia. Romania was considered a "dark horse" by some proponents, a status granted in consideration for its enthusiastic participation in PFP.

It might prove useful to examine what made some countries good candidates and why certain countries were not good risks for the first wave. Nations more distant from NATO and closer to Russia were not good candidates for admission. The Baltics are a prime example: adding them to NATO at the present time might be construed as a direct affront to Russia and add unnecessary friction to the enlargement process. However, inviting Poland to join compensated for not adding the Baltics to the first wave; as a prosperous neighbor and member of NATO, Poland can strengthen the Baltic economies as well as their identification with the West.

The corollary to our earlier observation is that countries in geographic proximity to NATO were good candidates for early admission. That those nations in proximity—Poland, Hungary, and the Czech Republic—have developed the furthest democratically and have the strongest free-market economies made them easy choices. If contiguity had been an issue, then Slovenia could have provided a link between NATO and Hungary. Slovenia was a solid candidate for early admission, having adapted quickly to democracy and a free-market economy. However, Slovenia borders the Balkans, potentially reducing its attraction. As an aside, contiguity was apparently not a primary consideration when deciding which nations were invited to join. As core functions of the Alliance are changing, collective defense—and the importance of common borders—has become less important.

Although the political leaders of Poland, Hungary, and the Czech Republic wanted very much to join NATO, the views of their populations varied. Public opinion polls in these three nations indicated that the majority of their populations strongly or somewhat supported their entry into NATO; when asked if they would defend another country, permit NATO exercises in their country, or permit NATO troops to be based in their country, the majority of the populations in Hungary and the Czech Republic said no. All three nations opposed spending a larger share of their budgets on military needs.[43] These sentiments may in fact drive the Alliance toward adopting criteria for membership that keep accession costs to a minimum.

Timing of Admission

Equally important to the question of who would join the Alliance in the first wave was the question of when enlargement would actually occur. NATO's position is that the only criterion for timing should be that the manner and speed of the enlargement process increase stability in the whole of Europe.[44] Speculation regarding expansion's exact timing centers around April 1999—NATO's 50th anniversary. This symbolic date provides a unique opportunity to mark historic change in the nature of the Alliance.

The enlargement issue was the focus of NATO's December Ministerial of 1996. Specific names and dates when new members would be asked to join were not announced; such an important decision lay more appropriately with NATO's member states. Consequently, final discourse on the subject took place at the July 1997 summit in Madrid,[45] where the Alliance extended membership invitations to Poland, Hungary, and the Czech Republic.[46]

Subsequent Waves—Who and When

The Alliance should make clear that enlargement is expected to be an evolutionary process that will continue indefinitely. Presi-

dent William Clinton made the US view of the enlargement process public when he promised to thousands of disappointed but eager Romanians, "Stay the course and Romania will cross that milestone."[47] In the meantime, PFP must be maintained, enhanced, and deepened not only as a stand-alone instrument of European security,[48] but as the gateway to a larger NATO.

How Big Is Big Enough?

There are concerns that NATO would evolve from a security organization into a round-table forum if it expands beyond some "magic" threshold. The maintenance of a common worldview is unlikely in a large community of states, and it can be argued that institutional integrity cannot be maintained with too many members. Although we have earlier defined "evolutionary enlargement" as an indefinite process, we recognize that "infinite expansion" is not possible. The purpose of gradual enlargement is not only to identify and eliminate problems in the process, but also to cautiously approach the boundaries of an effective threshold without crossing the line. Conventional wisdom calls for limiting the size of NATO to about 25 countries, most likely due to the very real problems already faced by EU at 20 full members and six associates.

As NATO reaches some maximum size, the important question of who will be left out must be considered. It is important that nations not invited to join understand that new dividing lines are not being drawn on the Continent. We believe that this imperative calls for a new NATO to be comprised of nations with common values and common worldviews—nations that are naturally aligned. Such a membership strategy ensures that those nations not invited to join feel less on the outside, since they are unlikely to share the viewpoint of NATO members on numerous issues anyway.

It might also be important to consider for membership those nations whose borders include territory that has historically been the object of contention. Leaving such nations outside the Alliance may create a vacuum that could lead to unnecessary strife. Placing such nations into the Alliance—much like NATO did with Greece and Turkey—could be expected to increase stability in the region. Regardless of NATO's final composition, making PFP a worthwhile cooperation program can bring some sense of security for its partners with the result that NATO may never have to hang the "no vacancy" sign over the door.

Will Russia Ever Join?

Although Russia seems to have accepted that it will never be in a position to join EU and seems satisfied with the cooperation agreements recently signed, it has consistently tried not to foreclose the option to join NATO, however remote such a development may seem.[49] Russians seem to accept the fact that many allies oppose their entry into NATO—especially while the internal situation in their country is insufficiently stable and unpredictable, which would prohibit them from meeting reliably the obligations and responsibilities expected of them as members. The fact also remains that the political leadership of the former Warsaw Pact countries would object to finding itself in the Russian shadow in the new NATO, that many parts of Russian society are not ready for NATO membership, and that Russia's own military leadership rejects the idea.[50]

The following arguments have been or could be used to exclude Russia from membership:

- Russia is not a North Atlantic or European state.
- Russia is too unstable.
- Russia might not compromise to reach consensus.
- Membership would give Russia a right of veto within NATO.
- NATO would find it difficult, if not impossible, to extend security guarantees to Russia due to its large border.[51]

- NATO offers its member states no protection against a fellow ally.

Certainly, any new command structure would have to be huge to absorb Russia's size, and the addition of Russia could reorient NATO overnight toward events in China and the Pacific. Anecdotal evidence also suggests that Russian integration may not work. For example, the Poles are learning English for entry into NATO, but the Russians want NATO members to learn Russian.[52] It has also been argued that Russian membership might remove NATO as the shield of Western Europe, since NATO obligation does not extend to protecting its members against each other.[53] For nations that wish to join, NATO's value lies in its potential to restrain what may be an increasingly unpredictable Russia, and some do not believe that NATO's members can restrain Russia if the latter is a member.[54] We believe that the history of animosity between NATO allies Greece and Turkey proves otherwise: were it not for the Alliance restraining their actions, Turkey and Greece might have gone to war years ago.

If Russia does not fit into any existing organization, then a new Russia-NATO forum must be created to respect Russia's status and to lessen the perception that expanding NATO eastward is an anti-Russian strategy.[55] Ideally, this forum should reach a point where Russia's membership in NATO doesn't matter because that country has been integrated into all European institutions—economic, political, and military—and all are working closely together.

The NATO/EU/WEU Link

EU, WEU, and NATO claim the same objectives: to enhance stability in Europe as a whole and to create a security environment in which the countries of Central and Eastern Europe can accomplish their reform processes and further their economic and political development.[56]

Certain NATO allies believe that EU membership should come before NATO membership, since security guarantees will not be credible if they have no solid political and economic foundation.[57] Further, there cannot be a lasting Alliance without the affirmation of a strong European pillar.[58] At the present time, it's not clear that EU has the necessary capabilities to respond to the new security challenges facing Europe, whereas NATO does.[59] EU's shortcomings might be addressed using combined joint task forces (CJTF), which could serve as a basis for creating available force structures that are separable but not separate from NATO.[60] But even with the advent of CJTF, enlarging EU may prove to be much more difficult than enlarging NATO, particularly in light of the strict economic criteria required by the former. It is noteworthy that EU extended invitations for membership to Poland, Hungary, the Czech Republic, Slovenia, and Estonia only after NATO announced its own first wave of new members.[61]

NATO should continue to take advantage of the cold war's lingering military emphasis in its new partners and expand ahead of EU—using its influence to better prepare its new members for entry into EU. However, if the Alliance continues to expand first, fledgling NATO members who are not also participants in EU may not learn to "think European" and instead adopt an Atlanticist view. This might inhibit WEU's ultimate goal of becoming the dominant security pillar on the Continent. In the short term, the key issue might well be to preclude NATO and EU from becoming interblocking rather than interlocking institutions. Both organizations seem committed to that end.

The Alliance has categorized its enlargement as a parallel process designed to complement expansion of EU. Though the two organizations are expected to enlarge autonomously, each organization is expected to consider developments in the other during the process.[62] EU's recent decision to invite Poland, Hungary, and the Czech Republic to join the union so soon after NATO extended its invitations is an indication that this strategy is already in place. Linking the enlargement of NATO with the enlargement of EU serves four primary purposes. The first is that

concurrent expansion invigorates the efforts to promote stability eastward.[63] Second, EU can provide what Central Europe needs most: economic growth and political integration into Western Europe. Third, the impact of military integration can be downplayed through a carefully paralleled economic integration, minimizing the risk of backlash in Russia.[64] Fourth, and most importantly, coordinated enlargement provides for common memberships in NATO and WEU.

At the present time, all full members of WEU are members of NATO. Because of security guarantees provided by NATO and WEU to their respective members, the Alliance states that maintaining common member states is essential.[65] There is also general agreement within NATO that forces of European allies should be "separable from NATO" but not "separate";[66] one can infer from this agreement that members of WEU should also be members of NATO.

Finally, there are other important membership issues. What the neutral nations eventually decide to do in post-cold-war Europe could affect both NATO and WEU. Should EU and WEU develop a common foreign policy, they must remember that five nations in EU are not members of WEU and that four nations are not members of NATO. With a membership invitation from EU now also extended to Slovenia and Estonia, the issue promises to generate continued debate.

US Role after Enlargement

A significant degree of US involvement in Europe is crucial to counterbalance a potentially unstable Russia[67] and to support further European integration. The current US administration views NATO as the foundation of American policy in Europe and identifies it as the essential organization for peace on the Continent.[68] The trans-Atlantic link serves the interest of both sides of the Atlantic,[69] and the United States should remain a European power and help its NATO allies forge a strategic vision for the future.

The Cost

Although cost estimates may dampen NATO's enthusiasm for enlargement, numerous options are available to lower costs: spread them over a greater period of time, limit the degree of change that new members will be required to make to their forces and their infrastructures after they matriculate, and do not station NATO forces on the territories of new members.

NATO makes it clear that potential members face considerable financial obligations when they join.[70] However, NATO member nations must also be prepared to expend resources and make sacrifices.[71] The bottom line is that membership means there is no free ride on defense, but it also means that new members do not have to embark on an ambitious armaments program. The goal should be to provide new members with enough security so they can concentrate on rebuilding their societies and economies—the components of stable democracy.

If NATO decides to configure new members' forces only in the areas of command, control, communications, and intelligence (C^3I) and logistics support, the cost of enlargement will be relatively low.[72] If new members are permitted to contribute strategic position rather than strategic forces—as did both Iceland and Spain—then costs can be driven much lower. Current cost projections we have seen in the literature seem to indicate that NATO plans to build a new Maginot Line, and that is clearly not the case. Sen. Mike DeWine (R-Ohio) estimated most recently that the US share of NATO expansion costs would be $5 billion to $19 billion over a 15-year period.[73]

Perhaps the most attractive option available to the Alliance involves improving the existing militaries of new members by upgrading them sufficiently so that integration with NATO air defenses, logistics organizations, and communications networks is feasible. This option capitalizes on the ability of NATO's in-area assets to extend their umbrella eastward, while still operating from bases in Western Europe, and would involve few costs in the short term.

Costs can be expected to be significantly larger if steps are taken to develop the military infrastructure of new members so that NATO forces can deploy. If their infrastructures were upgraded, new members would gain access to NATO airpower, intelligence, and resupply. To absorb the full benefits of NATO logistics and communications, however, new members would also be required to improve existing port, rail, and road facilities. These so-called baseline improvements for Poland, Hungary, the Czech Republic, and Slovakia alone are estimated to cost about $60.6 billion.[74]

Should NATO determine that new air base facilities were needed or seek to permanently station ground forces, estimates for adding new members to the Alliance could reach $124 billion.[75] Other estimates put high-end costs at around $110 billion.[76]

Depending on the choices the Alliance makes, costs will vary widely. Assuming that the midlevel $60.6 billion figure is credible, even this amount may be plausibly affordable. By comparison, the life-cycle cost of a US Army division is about $60 billion, and the acquisition cost of individual US weapon systems often runs $20–30 billion or more.[77] Furthermore, the $60 billion figure amounts to only 2–3 percent of what NATO already plans to spend in defense of its current borders.[78]

Based on traditional NATO practices, new members can probably be expected to pay for 20–30 percent of the total amount needed to fund national programs and their fair share of common infrastructure spending. The remainder will presumably come from NATO's current members.[79] If $60 billion is a reasonable figure to pay for expansion and if the new members can be expected to pay for at least 20 percent of the total, what are the implications? The Visegrad states (minus Slovakia) have a total combined gross domestic product (GDP) of about $354.2 billion.[80] If they are expected to contribute their fair share of at least $12 billion (20 percent x $60 billion) over a 10-year period, then joining NATO would cost them just over 0.3 percent of their GDP each year—not including other financial obligations they will owe to the Alliance. Hungary, Poland, and the Czech Republic already spend about 1.5 percent of their GDP on defense.[81] Expecting them to increase their defense budgets by over 20 percent is in our view unrealistic in the short term. We therefore believe that NATO should require the configuration of new members' forces only in the areas of C^3I and logistics support, while permitting the gradual integration and modernization of the rest of their military capabilities over an extended period of time.

The Confirmation Process in NATO Capitals

If NATO drags out the ratification process, especially with regard to the first accession of new members, then its failure to act quickly could be interpreted that the West is unsympathetic to the Central and Eastern European states—that it views them at best as unimportant and at worst as "outside of Europe," undercutting reform in the new democracies.[82] Consequently, we believe that ratification of the first wave will take place at a steady pace in NATO capitals now that invitations have been issued and once negotiations for entry are completed.

PFP/NACC after Enlargement

PFP was expected to die a natural death when NATO enlarged. But PFP has worked so well that after the first group of nations is admitted to the Alliance, it is expected to play an important role both to help prepare new members for membership and as a means to strengthen relations with partner countries unlikely to join the Alliance. NACC is expected to play a significant role in establishing confidence-building measures between NATO and its cooperation partners.[83]

Goals established for the continued development of PFP sound remarkably similar to the contributions to be made by NATO enlargement.[84] The character of the projected relationship between new members and

NATO and the relationship between PFP partners and NATO is blurring, and suggestions have been made to convert NATO's entire structure so that it does less NATO-unique work and caters equally well to both partners and members.

NATO's goal for PFP should be to offer to its partners—those who do not wish or cannot presently attain membership—all benefits of membership except a security guarantee and a vote at the table: to treat them the same as NATO members on a day-to-day basis in both political and military cooperation. Partners must be made to feel that they are important to the West, and they should be brought to a point where they are as close to a security guarantee as is possible in the existing political climate. One can argue that one of the unintended consequences of PFP has been to make the Organization for Security and Cooperation in Europe obsolete and that NATO should recognize the implications of that reality as it continues to strengthen and develop its Partnership Program. It has been suggested that Russia might reject a continued role in PFP. However, through PFP, Russia has a historic opportunity to join the larger community of industrialized democracies and to emerge from the isolation that characterized its international role during most of this century.[85]

Crisis Management in a Bigger NATO

In addition to performing its traditional role in collective defense, NATO must develop a strategy that includes flexible procedures to undertake new roles in changing circumstances. NATO forces must become more mobile, able to react to a wider range of contingencies, and flexible enough to respond quickly to crisis situations. The growing proliferation of countries with ballistic missiles could seriously complicate NATO operations in out-of-area contingencies and even deter NATO intervention;[86] it may be important for the Alliance to consider the benefits of a layered missile defense system for deployed forces. As the delivery range of ballistic missiles grows longer, NATO might also have to consider wide-area defenses for the protection of its territory and population.[87] If the Alliance is serious about making CJTF work in the context of effective crisis management, then procedures for making separable, but not separate, NATO resources available to the Europeans must be formalized.[88]

NATO's most pressing current priority is the Implementation Force (IFOR) operation in Bosnia. The spring of 1996 was the first in four years without a major military offensive, and NATO led the IFOR that both built and kept the peace in that area. The 18-month extension of IFOR's mandate was probably deemed necessary to preserve the work that NATO accomplished and to ensure the mission's continued success. The success of the IFOR mission is clearly essential since it proves that NATO can effectively manage crises that affect the whole of Europe, while inspiring extraordinary and unprecedented cooperation.[89]

Command Structure

Regardless of the final command structure adopted by the Alliance, effective coordination of forces by the integrated military structure in an enlarged NATO will be challenging. NATO must look at new adaptations for its headquarters and simplify its command structures.[90]

The NATO enlargement study acknowledges that a broad plan is necessary to ensure that maximum effectiveness and flexibility are maintained following the accession of new members.[91] Now that the decision regarding "the who" of new members has been made, work on the command structure can begin in earnest. We believe that the final command structure should be flexible enough to absorb the effects of future enlargements.[92]

Nuclear Posture

In this era of emerging Russia-NATO cooperation, it would be counterproductive to in-

sist on the right to maintain Alliance nuclear weapons in the territory of new members. In no other way could NATO more effectively undermine its efforts to cast itself in a new role. It would be extraordinarily difficult to insist that NATO is no longer an alliance directed against the former Soviet Union, while at the same time holding fast to the old concept of strategic one-upmanship.

European security no longer relies on proliferation as an avenue for deterrence, and if the Alliance ever hoped to gain Russia's outright approval, or even its grudging acknowledgment of enlargement, it had to concede the nuclear issue.[93] In the words of the director of the Marshall Center, the new way ahead for NATO-Russian relations has been marked: partnership instead of deterrence.[94] NATO's current nuclear posture will, for the foreseeable future, continue to meet the requirements of an enlarged Alliance, and we believe there is no need to change or modify any aspect of NATO's current nuclear posture or policy.

Operation Provide Promise—Sarajevo. The cold war era was one of low risk and high stability. In the wake of collapsed bipolarity, the world has entered a period of high risk and low stability—a situation best illustrated by events in the former Yugoslavia.

Conclusions

The time is right for NATO enlargement. It is an idea consistent with historic pressures and offers the Alliance revitalization and enhanced relevance in Europe's emerging strategic landscape. The most monumental task facing the West since the cold war, NATO enlargement represents the true spirit of the emerging international order: removal of dividing lines, evolution of cooperation, and joint maintenance of regional stability to mutual benefit. Inviting Poland, Hungary, and the Czech Republic to join is a modest beginning and in keeping with NATO's goal to enhance security and project stability. Although lingering distrust between cold war enemies and the inherent problems caused by conflicting priorities promise to be a source of contention between current NATO countries and its new members, one can expect that the new NATO will renovate European security and ultimately strengthen the trans-Atlantic relationship. □

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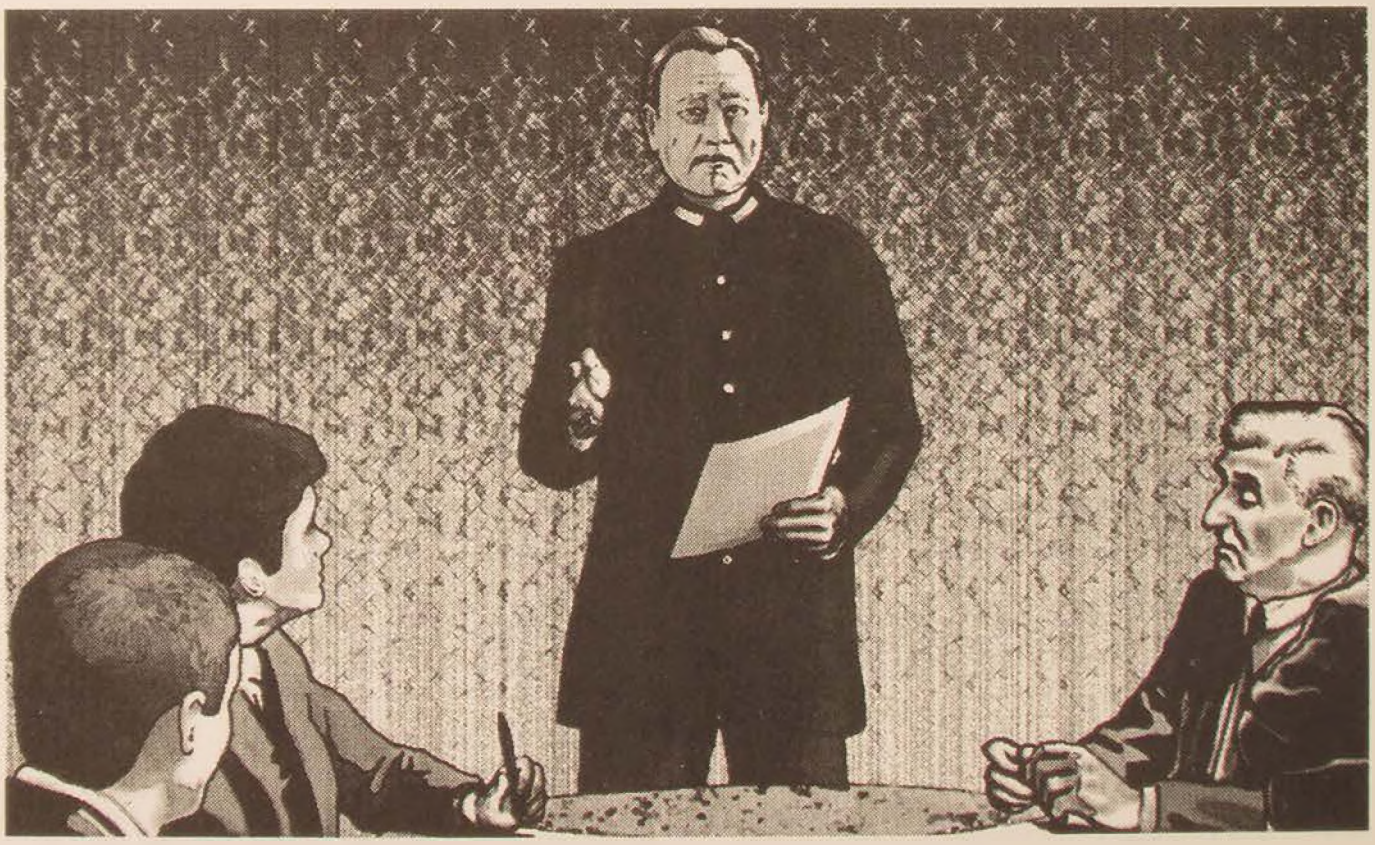
A Failure of Vision

Retrospective*

CAPT FRED KENNEDY, USAF
CAPT RORY WELCH, USAF
CAPT BRYON FESSLER, USAF

PYONGYANG, KOREA, 2013. "Defeating the United States was a much easier task than we thought possible," Col Myong Joo Kim said in precise English. Educated at Harvard and CalTech, the haggard 45-year-old North Korean stood at the head of a small table around which sat interested representatives from nine nations. The room was harshly lit, without windows, and electronically screened from the outside world by systems "borrowed" from their prostrate foe. Colonel Kim's speech would never be heard again outside this forum, and the representatives would rapidly disperse after the briefing. However, it was essential for each representative to understand the nature of the successful campaign against the Americans and the implications for his nation. Colonel Kim announced:



*This article was written in the fall of 1997, before the present Iraqi crisis over UN inspections and the recent anthrax scare in Las Vegas. It appears that we are at least beginning to take biological warfare seriously. The authors would like to thank the following individuals for their invaluable assistance in producing this work: Capt Daniel Dant and Capt John Shaw, who provided excellent insight into what kind of story to tell; Capt Kathy "Gus" Viksne, who gave us some useful pointers on air defense; Capt Bryan Haderlie, who enlightened us on the subject of optical systems for space surveillance; Col Chris Waln, USAF, Retired, who provided the seeds for the Decapitation scenario; and Col Michael Mantz.

> Our plan has succeeded. We have inflicted—to paraphrase the words of an American airpower theorist—a "strategic paralysis" on the United States so that it is incapable of acting.[1] Following our attack on their homeland, the Americans have become defensive, turning decidedly inward. Their influence is rapidly waning around the globe; no longer do they deserve the title, "superpower." The remainder of the twenty-first century is wide open.

Some congratulatory glances were exchanged. Colonel Kim noticed these, then glanced down at his notepad. He spoke louder:

> Please do not make the mistake of assuming that this outcome was a foregone conclusion. The United States remains very powerful. There were specific steps that the Americans could have taken that might have prevented us from succeeding, or stopped our efforts in the planning stage. However, to be blunt, they suffer from a rather distressing lack of vision. Their own military strategy documents of the late 1990s anticipated much of the multipolarity and rapid change that have shaped the world of the twenty-first century—something that we in part helped to precipitate. As the world's last superpower, they acknowledged the dangers posed by aspiring regional powers, the proliferation of advanced weapons, terrorists, and attacks on their homeland.[2] However accurate their predictions of the future might have been, they made the mistake of continuing to structure their armed forces for combat between large numbers of conventional forces[3] while paying only lip service to the threat of asymmetric attack. Their arrogance blinded them to the possibility that a potential adversary might actually try to achieve their ends by other than a direct military confrontation. Their folly allowed us to exploit vulnerabilities in their most vital high-technology systems, making the dominance of their conventional forces irrelevant.[4] We should not fault them too much. Events have proceeded apace. Without an easily understood and measurable foe, the Americans have floundered for almost 20 years. It is certainly true that they have upgraded their systems along the way, but they never were able to fully realize the true value of their most technologically advanced systems, those that operate in two closely coupled media—space and information. We were able to take maximum advantage of their plodding and uncertainty. Let me start at the beginning.

Like any other nation, the United States is a complex system, and despite its many protests to the contrary, it has systemic weaknesses and leverage points that can be exploited by a knowledgeable adversary.

The Plan

Rangoon, Myanmar, 2009. The first meeting was shrouded in the utmost secrecy. The principals, with a suspicion verging on outright paranoia, shuttled through several unlikely ports of call before finally arriving at their destination. Initial communications were by word of mouth. There would be no "smoking gun" in the form of a document or cellular phone call to betray those involved. All participants prepared decoys who appeared prominently in foreign cities to distract the attention of the American intelligence-collection system. One joked nervously that he was less concerned with potential Central Intelligence Agency (CIA) ferrets than with the ubiquitous representatives of the US media. One reporter might suspect a ruse and inadvertently stumble on a story larger than he or she could easily imagine.

The Iranian envoy spoke first. He had not only originated the initial plan but had taken the potentially risky step of personally contacting the other members—representatives from North Korea, China, Iraq, and several multinational corporate concerns. He spoke of the "artificial restraints" currently imposed upon the world by American might, the inability of nation-states to exercise their freedom, and the absolute preeminence of the United States in the technical, industrial, and military realms. "Rome was no greater a power in its day," he remarked, "and Rome

endured for centuries. The Pax Americana is less than a century old. How long must we endure it?"

Nods and shrugs. The discussion quickly turned to the magnitude of the problem facing the cabal. The Iraqi envoy noted that his country had attempted to stand its ground with the best weapons it could afford only a generation previously but that it had been thoroughly trounced by the American war machine. The Iranian countered that the Iraqi challenge had been foolhardy, based as it was on meeting American strength directly. "Let us not tempt their stealth fighters and their carrier battle groups. We cannot best them. We are not—with the possible exception of my able Chinese friend—'peer competitors.' "[5]

"What, then?" asked the North Korean. "Terrorist attacks? Car bombs and suicide squads? What you seem to be suggesting is a route that has been attempted but that is felt to be no more than a pinprick by such a giant." The Iranian smiled and gave his reply:

> Like any other nation, the United States is a complex system, and despite its many protests to the contrary, it has systemic weaknesses and leverage points that can be exploited by a knowledgeable adversary. First, we will attack its leadership directly and audaciously. We will then undertake to seriously damage its command, control, and communications infrastructure. Finally, we will assault the economic infrastructure of several major cities.
>
> Some of you are clearly asking, To what end? The answer is simply put: to make them withdraw, to turn inward. The Americans are insular by nature, and they are still not entirely comfortable with the leadership role history has thrust upon them. Our attack will exceed their "cost-tolerance"[6] for continued conflict, at which point they will retreat to North America and wall themselves in. Such a course of events will permit us a free hand to take what is rightfully ours, unhindered by American intervention.

There were nervous shuffles and uncomfortable looks around the table. The Chinese representative spoke up. "We must not provide the United States with a valid target. They will want to lash out, and may perhaps do so irrationally. Therefore, all strikes must be covert strikes. We shall undertake no high-profile efforts that could warrant direct retribution against a specific nation."

"That is precisely what I have in mind."

Stage 1 (Decapitation)

11 July 2012, 8:35 A.M. EST. The day dawned hot, humid, and calm, typical of this time of year in the Washington area. Commuters inching north along I-395 glanced up through sunroofs to notice a low-flying twin-engined plane following the freeway at an altitude of only 100 feet. Of these, only four had the presence of mind to call in complaints on their cellular phones, but these calls were ignored by dispatchers as likely cranks. The aging 1972 Beechcraft King Air E-90 had already been airborne for over three hours, angling northeast across farmland and forested hills after an uneventful predawn takeoff from a private field east of Roanoke, Virginia. This course had been selected after only the most careful consideration of the alternatives—including a launch from one of the numerous supertankers plying their way up and down the East Coast. The conspirators had decided that the US air defense network of phased-array radars, Air National Guard and Customs patrols, aerostats, and the occasional overflight by low-orbit satellites carrying synthetic aperture radars (all enlisted in the continuing war on drug trafficking) was sufficiently daunting to make an unnoticed approach to the coast a chancy proposition. However, one member of the team pointed out that the North American Aerospace Defense Command (NORAD) was not nearly as interested in happenings within the interior of the country. Furthermore, US air traffic controllers often viewed only their transponder data, not bothering with the cluttered and headache-inducing radar return. A light plane running low and with its transponder off could thus be virtually invisible. Acquiring the plane and smuggling in the "munition" became the largest stumbling blocks, but the North Korean "team" overcame these obstacles with relative ease.[7] All had dispersed

within minutes of the plane's takeoff and were headed for international flights from several different airports in the Southeast.

Guided by a vastly improved global positioning system (GPS) network[8] and assisted by sophisticated terrain-mapping software[9] (downloaded from a French web site), the King Air carried no living human cargo—although a freshly thawed corpse was strapped into the pilot seat. The airplane dipped to under 50 feet as it passed between the Pentagon and Washington National Airport, cruising within the ground clutter, and then it abruptly began climbing, dispensing innumerable spores of multiply resistant *Bacillus anthracis* across much of the central capital area.

Suddenly alerted to the small plane's presence, air traffic controllers at the airport and at Andrews AFB, Maryland, tried at first to contact the aircraft and then began to narrowcast warnings to the Secret Service and other agencies. After several minutes, however, the aircraft veered to the northwest, dove rapidly, and crashed into the bluffs above the Maryland side of the Potomac, across from CIA Headquarters. The resulting fireball was extremely hot, leaving eager investigators and media little evidence other than melted wreckage and charred bone fragments. One observer reported weeks later that she had seen the small aircraft drop a cylindrical object as it flew over the Potomac, just prior to impact.

"Inhalation anthrax"[10] announces itself with initial symptoms easily mistaken for the flu or a common cold. Within two days, approximately 250,000 people—including the president, the vice president and her husband, 160 senators and representatives, senior leaders from numerous federal agencies, three service chiefs, and more than 11,000 Pentagon employees began to experience low-grade fever, fatigue, and a slight cough. Of the few that bothered to notify their doctors in the critical hours following the attack, none received the correct—and fatal—diagnosis. Ninety percent of those infected would die within a single week. The ensuing chaos would plunge the entire country into confusion.

Colonel Kim continued:

> We killed a significant portion of their national leadership with a single blow—the president, vice president, and several cabinet members, along with a host of their military leadership. Yet we left no traces for them to follow, and there was little opportunity for a coordinated investigation in any event, given our next actions. Now, the Americans could have prevented this if, for instance, they had carried out their plans for a space-based radar or global air traffic control system. Their current surveillance is spotty at best—and despite their professed concern about terrorism, they are egregiously poor at deterring internal threats. Even a fairly rudimentary low- or medium-orbit constellation of radar satellites providing continuous wide-area coverage could have detected our aircraft in time to take action.

The Iranian envoy frowned and said, "We had initially thought that their space systems were among their strongest assets." Kim replied,

> Yes, and you were correct to think so. However, we quickly discovered significant gaps in their existing reconnaissance and surveillance architecture. Certainly, they were—and are—able to detect virtually anything that moves on or above the earth, but in very circumscribed regions, and for only short periods of time. Without a global network, they must deduce which areas are of interest for observation, and either wait for their satellites to pass over the target or command them to modify their orbits. The first is time-consuming, while the second wastes precious fuel.
>
> In short, the United States failed to capitalize on its initial investment—and continued to rely on an immature intelligence architecture. It hid

behind its superior technology but failed to close the gaping holes in its systems.

US leaders never succeeded in developing either the doctrine or the systems required for space denial and space protection. In fact, their national policy proscribed such activities, despite the obvious vulnerabilities of their vital space assets.

Stage 2 (Disruption)

15 July 2012, 11:40 A.M. EST. Thousands of cases of severe respiratory distress were being reported all across the national capital region—alarming doctors and patients alike. Some two thousand people had already succumbed to "an unknown viral or bacterial infection." Widespread panic engulfed the District of Columbia metro area following the Center for Disease Control's (CDC) announcement of a regional quarantine on travel. With very little yet to go on, investigators from the CDC and the Army's Institute for Infectious Diseases were out in force, searching for answers. A regional manhunt was on, with few obvious suspects. Even as it was becoming clear that the national capital had been subjected to a catastrophic biological attack, it was evident that there was very little that could be done for the victims. The president was said to be gravely ill and several of his advisors incapacitated. Major news outlets were scrambling for information. Cable News Network (CNN) placed the story at the top of the lineup for its midday news summary, despite the skimpy nature of the material. Most other networks followed their lead. These reports were destined to never make it on the air.

Some 35,000 kilometers overhead, a nondescript Chinese telecommunications satellite, Dong Fang Hong (DFH) 91, sat idle in a "supersynchronous" orbit.[11] The Chinese had launched the satellite over a year and a half earlier, but it had suffered a series of highly publicized technical problems and was grudgingly relegated to the "junk belt" beyond geosynchronous earth orbit (GEO) in January 2012. Perhaps as a final insult to its builders, DFH 91 failed completely after performing its apogee boost and now revolved in a "useless" 26-hour orbit, returning to geosynchronous altitude at a slightly different longitude every day.

In reality, DFH 91's status as a derelict applied only to its ability to transmit digital TV to Chinese viewers on the planet below. Beginning in April, an observer positioned near the satellite would have noticed something out of the ordinary. Upon each descent of DFH 91 to the geosynchronous belt, a small dark object not much larger than a football would be ejected from a rear panel of the satellite. As it floated away from its parent, the small object would flare brightly and begin to recede, braking its way into a true geosynchronous orbit.[12] DFH 91's patient ground controllers would time these events to occur only over the daylit side of the planet; after all, even an enterprising amateur astronomer might have spotted the brief but brilliant pulse during an evening's comet hunting.

By late June, nearly 90 of these odd vehicles had been deposited around the GEO ring like so many spaceborne mines. All had benefited from the GPS's recent addition of "aft horns," allowing satellites in GEO to take advantage of America's premier navigation system to find their way. All had performed co-orbital approaches and were scant meters from their targets, awaiting the final order to rendezvous. The targets, 86 diverse satellites built and launched by a half dozen nations, sat blissfully unaware, most receiving and transmitting video and voice data to waiting customers on the planet below. Other "birds" gathered weather data or listened to the encoded electronic whispers of a billion conversations. Some waited patiently to report the telltale bloom of a ballistic missile launch or nuclear detonation.

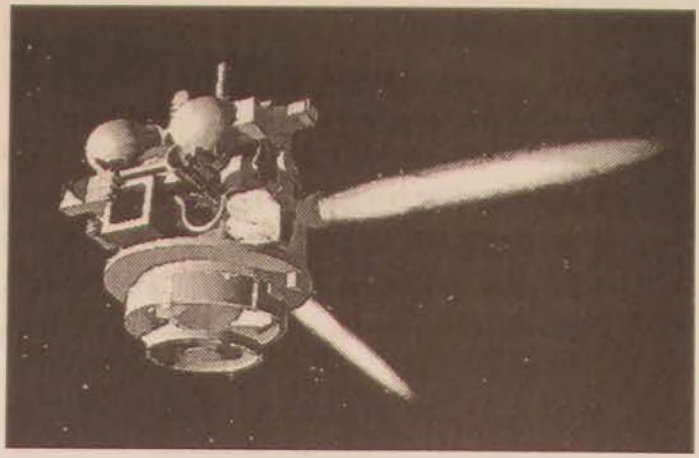
The targeting itself was indiscriminate—and purposefully so. The Chinese knew that they would lose three satellites of their own in the attack. This was deemed an acceptable loss, and a useful misdirection. After all, there were still fewer than 20 states that could have managed the launch of a geostationary satellite, and suspicion would quickly settle on just one or two.

The final order was in fact no order at all. In the event of an abort, DFH 91 would have suddenly and surprisingly come to life, broadcasting a strong encrypted message to its kill vehicles strewn throughout the GEO ring. The vehicles would have immediately shut down, and the Chinese would explain the anomalous event as one more example of the satellite's bizarre behavior.

No abort was issued; the kill vehicles obligingly proceeded to "dock" with their targets. Most satellites are "hardened" against the severe radiation environment of space; some are further hardened to withstand the radiation concomitant with a nuclear blast. Few are armored against physical assault, other than to mitigate the effects of continuous micrometeoroid bombardment. After all, armor is heavy, and weight is at a significant premium when the cost of lifting a single kilo to orbit exceeds $50,000.[13] Thus, it was quite unnecessary to construct sophisticated kill vehicles. The simple devices simply exploded in close proximity to their satellites, sending shrapnel through solar arrays, battery systems, onboard computers, guidance systems, and sensors alike.

Sixty-two satellites were completely destroyed. Ten more were severely damaged and able to provide only marginal capability. Fourteen were apparently undamaged—most likely due to a faulty trigger on the kill vehicle or badly executed terminal maneuvers. The roster of casualties included Intelsat 919 (broadcasting 20 channels of video to various Arab nations), Thaisat 7 (providing mobile communications to Southeast Asia), and Gorizont 80 (a Russian military communications satellite).

None of these losses were made immediately apparent to Americans. However, at 9:43



A.M., Mountain Standard Time, controllers at the Space Based Infrared Systems (SBIRS) II[14] ground station at Falcon AFB, Colorado, were startled by the simultaneous loss of signal from fully three of their GEO birds. These satellites surveilled the planet for the infrared signature of ballistic missile launches. Without them, the United States would have to rely entirely on its groundside radar sites for detection of incoming missiles. A mad search for answers began to leap up the chain of command. A similar panic was setting in at the control center for Milstar III[15] communications satellites, where half of their birds had suddenly gone dark. Automatic rerouting systems looked for the next satellite in line to relay the growing backlog of message traffic, and, finding none, began sending queries and alarms to the control centers. Secure communications were crashing across the planet. In the anarchy that followed, the secretary of defense was forced to use land lines, ordering US military forces around the globe to their highest state of alert. No opponent had yet bothered to raise its head.

As the military scrambled to respond to an unknown threat, civilian controllers watched in horror as CNN's five network broadcasts went down simultaneously. Iran's Voice of the Islamic Republic, broadcast on nine channels, vanished into static. Viewers in Southern California lost all 460 channels of GlobalNet LA. Local television affiliates, adrift without their normal satellite feeds, began placing calls to network broadcast centers, looking for answers that were simply unavailable. In a matter of minutes, the United States had lost

43 of its satellites in GEO, devastating military and civilian constellations alike. Fully two-

What the United States needed was a few simple systems and the doctrine to tie them together.

thirds of the data shuttling between GEO and earth suddenly had nowhere to go.

Despite this, none of the personal communication and mobile telephone systems, provided by satellites orbiting at much lower altitudes, were destroyed. Between 11:30 A.M. and 1:30 P.M., call volume over these systems tripled, then quadrupled. By early evening, it was virtually impossible to secure a phone line anywhere in the country. The ubiquitous World Wide Web, repeatedly overhauled and massively enhanced during the first decade of the twenty-first century, was suddenly jammed with billions of demands for news. The information flow first slowed, then stopped. There was little enough to be had in any event.

Colonel Kim pointed to the statistics flowing down the wallscreen behind him:

> In all of this, we never engaged a single American weapon system. US leaders never succeeded in developing either the doctrine or the systems required for space denial and space protection. In fact, their national policy proscribed such activities, despite the obvious vulnerabilities of their vital space assets. The unspoken consensus among their commanders was clearly that space itself was too vast and the technologies needed were sufficiently difficult to develop that few other nations could devote the necessary resources to acquiring them.[16] Further, it is now clear that the United States was confident that it could spot a "rogue" launch and antisatellite attempt, trace it to the offending nation, and mete out punishment through more conventional means—via air strikes, for instance. The highly clandestine nature of the Chinese attack thwarted this, and left the United States without an adversary on which to concentrate.

"Yet we must certainly be high on their list of suspects," the Chinese representative pointed out. Kim nodded and said:

> Yes, and for this very reason we insisted on a plan which would foil even a determined investigation. Even so, discovery after the fact was not our greatest fear. In the midst of the confusion we created, with the chain of command disrupted, it was entirely possible that the United States might jump to conclusions and lash out blindly.

Colonel Kim shook his head in mock concern, then continued:

> The biological attack might have been seen as domestic terrorism, but an attack on space assets could be attributed to none other than a foreign power. Yet, even today, US leaders remain uncertain. Their ground-based assets were able to tell them that their satellites had been physically damaged or destroyed, but the lack of space-based reconnaissance systems has severely hampered their attempts to identify their foe.
>
> What the United States needed was a few simple systems and the doctrine to tie them together: a highly mobile reconnaissance platform to perform on-demand, close-in imagery; perhaps a variant of the same platform to damage a hostile satellite or tow it to a nonthreatening orbit; some form of proximity detection and defense for their most prized assets, such as their early warning satellites; and a rapid, ultra-low-cost launch capability to replenish constellations during a crisis. Finally, and most importantly, there was the need for an overarching concept of operations to integrate these basic missions. Without these elements, the US space architecture was immature, completely wedded to remote sensing and communication—in essence, subservient to their information architecture. Unable to conduct either offensive or defensive space operations, the existing American space order of battle—if we can so dignify it—calls to mind nothing so much as their Civil War–era ballooning efforts, the first crude attempts at overhead reconnaissance: virtually unmaneuverable, vulnerable to fire from below but unable to return fire. And yet, the United States was eventually able to achieve a fearsome mastery of air warfare, despite a somewhat unpromising beginning. In space, however, it

remained stubbornly unwilling to make the logical leap.

The Iraqi piped up irritably, "For what purpose do you tell us where the Americans failed?" Kim pointed a finger at the Iraqi and said:

> I tell you this because our coalition must now begin to consider these very issues if we wish to someday gain hegemony. We have learned much from the US defeat, and if we do not take advantage of this momentary lapse in American attention, our efforts will have been for naught. In a very real way, we have surpassed them.
>
> They believed themselves to be, technologically, several generations ahead of their competition, which made them complacent. They chose to forget that a true revolution in military affairs—I use their terminology—requires not just the systems but a sophisticated operational doctrine to support them.

Stage 3 (Pandemonium)

15 July 2012, 1:54 P.M. EST. The CDC issued a sporadically heard statement at this hour, declaring the capital a victim of a biological attack. Emergency Broadcast System messages began playing at local Washington, D.C., affiliates just before 2:00 P.M., asking the populace to remain calm and stay in their homes. This warning went unheeded. Highways around the region were closed to inbound traffic entirely, freeing up additional lanes to the fleeing public. National guardsmen from Virginia and Maryland, requested by the president early in the afternoon as riots began to erupt around the District, found themselves stranded along the shoulders of major arteries, waiting out the passage of hundreds of thousands of panicked residents in the D.C. area.

As panic gripped the national capital region and the military groped for answers, the final phase of the coalition attack began. It had already been initiated by a scrambled cellular call, placed from Teheran to Norway at just after 9:50 P.M. Iranian time. In a quiet Oslo suburb, a "go" was given. Led by the notorious hacker "Whisper," three seasoned programmers set to work, bouncing the ignition signal of a particularly potent virus off three telephone switching stations in Britain, and

They [the Americans] chose to forget that a true revolution in military affairs . . . requires not just the systems but a sophisticated operational doctrine to support them.

finally through commercial web sites on both the East and West Coasts of the United States. The effect was immediate: automated teller networks in six major cities—Los Angeles, San Francisco, Seattle, New York City, Miami, and Washington—were instantly brought down. Those that returned to service began to behave erratically, releasing thousands of dollars at the touch of a button. Los Angeles–based banks responded almost instantly, closing their doors on mobs of angry account holders in the early afternoon. Lending institutions across the country began to follow California's lead, creating a growing ripple of uneasiness. The run on hard currency was beginning. The New York Stock Exchange suspended trading half an hour before the closing bell; the market had already slipped an ominous 15 percent. Despite the frustrating communications backlog, realization was spreading that the United States appeared to be under some form of diverse, coordinated assault. In Oslo, Whisper prepared to unleash a second attack.[17]

The target was the already overloaded US telephone network and its collection of switching and routing stations.[18] Cellular grids and telephone exchanges in the D.C. area received special attention, although outages were initiated in seemingly random locales from Colorado Springs to Charleston. The net effect of the attack was to bring nationwide commercial telecommunications to a standstill. Coupled to the crippling blow dealt the banking industry, economic trans-

actions ground to a halt. In contrast, vital national communications were left untouched. The military's workhorse Defense Switching Network (DSN), the Joint Chiefs of Staff Alert Network (JCSAN), and the Secure Voice Teleconferencing System (SVTS) remained fully operable.[19] Information warfare experts were awakening to the fact that they had been as effectively bypassed as the Maginot Line in 1940.[20] What none had yet understood was the magnitude of the disaster. Whisper's viruses would confound some of the best American programmers for months. The heavily encrypted Iranian software had been designed to resist the most concerted decoding attempts.

Word of the president's death by severe respiratory distress arrived shortly after the dinner hour on the East Coast, and reached the rest of the nation and the world primarily through shortwave radio transmissions. With the vice president already dead, the Speaker of the House, a senior Democrat from Pennsylvania, was transferred by helicopter to Andrews AFB. At 6:55 P.M., the Speaker boarded the nation's single E-5D, a highly modified Boeing 777, and the latest in a long line of aircraft that had waited to perform this mission. As the plane became airborne, one of the three surviving Supreme Court justices administered the oath of office to the badly shaken congressman, whose first act was the declaration of martial law nationwide. His second act, perhaps more controversial, transferred the official seat of government from Washington to Philadelphia "for the duration of the crisis."

Americans in all walks of life awaited their opponent's next move. Colonel Kim pointed to the Iraqi envoy:

> In 1990, the United States perceived your incursion into Kuwait as a serious threat to its national security. Why? Your nation hadn't fired on any Americans. Your crime was to endanger their oil supplies. They responded with prompt action, and you and your countrymen were humiliated.
>
> The Americans saw the threat to their information networks even as they were constructing them. Their military built elaborate security measures to resist intrusions into secure areas, protecting sensitive data and preventing unwelcome visitors from wresting control. Yet even as they strengthened these defenses, they did not pay sufficient attention to the massive growth of their nation's commercial information infrastructure, and their economic reliance upon it. The analogy between oil and information could not be clearer—banking networks and telecommunications systems are, if anything, more essential to the day-to-day operation of their country, and far more vulnerable to disruption.
>
> Our Iranian allies chose well, attacking vulnerable civilian systems and ignoring the heavily protected government networks. By itself, such an effort would have resulted in irritation and annoyance. Coming on the heels of the other attacks, however, our information strike resulted in a mass hysteria which, for all practical purposes, temporarily shut down the United States. While they were able to reconstitute their government fairly quickly, they have still failed to fully recover. Their citizenry is up in arms and demanding answers. For the past year, their legislators have been calling for a "retrenchment."

"I trust that you all understand why I am spending some time on how the Americans might have defeated us?" Kim asked. There were nods of assent around the table.

> One lesson we have learned is that information warfare is not to be applied in a vacuum.[21] In concert with other forms of war, it can have useful synergistic effects. Taking out a city's electrical power is an inconvenience, but is not typically life-threatening. But to the same city gripped in the throes of rioting, such a move can be devastating.
>
> Countering our information strikes would have required a coordinated effort on the part of the American military establishment to protect "critical sectors"[22] of the commercial information infrastructure. This would have been a daunting task. American corporations are noted for their fierce independence; they would have chafed under any form of regulatory guidance the government imposed. Yet forgoing any form of protection is

foolishness—after all, one should not depend on that which one cannot defend.

Colonel Kim switched off the wallscreen. In a grave tone, he continued:

> The United States was able to marshal its enormous scientific and engineering expertise to create invention after invention for space and information applications. Americans built high-technology houses of cards and congratulated themselves on their innovation without taking the time to fully understand the full implications of what they had wrought. They dabbled in remote sensing, providing themselves an illusory sense of security at odds with their actual capabilities, and leaving themselves open to unconventional attack. They refused to apply their own lessons of airpower to space power, preferring to maintain a fragile and highly vulnerable information architecture in the sky. Lastly, they chose not to tackle the admittedly difficult problem of safeguarding their civilian information infrastructure. Taken in isolation, each of our attacks was painful but not threatening to their national integrity. Together, however, they very nearly brought the United States to its knees.

The North Korean envoy rose and bowed expansively, "Thank you, Colonel Kim. Your analysis is a cogent one, and I assure you it is greatly appreciated by each of us. I apologize for not remaining; I go now to oversee the last of the mopping-up operations around Pusan. Please, know my gratitude and that of your nation."

Epilogue

History will record that the United States suffered a resounding defeat in 2012 by an anonymous adversary employing a combination of low- and high-technology thrusts that skillfully brought the world's last superpower to its knees. Emboldened by the emergence of this power vacuum, numerous nation-states rushed to pursue territorial expansions that would have been unthinkable in another era. North Korea, hanging on long after pundits had predicted its fall from famine, brutally seized the South with chemical and biological weapons in 2013; three years later, China moved southward into the newly emergent industrial powers—Laos, Cambodia, and Vietnam—of the Asian Dynamo. After initially threatening a nuclear response, an exhausted Israel capitulated to a combined Islamic force in 2029. In all of these crises, the worldwide question was the same: Where were the Western powers? Without strong US backing, Europe was essentially impotent, unable or unwilling to come to consensus decisions. Russia, continually wracked by internal civil strife, could not shift its focus away from preserving the remains of its shattered empire. While the United States was able to recover and rebuild itself following the initial shock, it was simply incapable of responding to foreign crises. Fortress America had been breached, and the citizenry was adamant that it would never happen again. The rest of the world would, for the most part, be left to its own devices. □

Notes

1. John A. Warden, "Air Power for the 21st Century," in Barry R. Schneider and Lawrence E. Grinter, eds., *Battlefield of the Future: 21st Century Warfare Issues* (Maxwell AFB, Ala.: Air University Press, 1995).

2. These potential threats to US interests are discussed in the *Report of the Quadrennial Defense Review (QDR)* (Washington, D.C.: Department of Defense, 1997), 3–4. The full text is on-line at http://www.defenselink.mil/pubs/qdr/.

3. Ibid., v.

4. The *Report of the QDR* did acknowledge that future adversaries may use terrorism; nuclear, chemical, and biological (NBC) threats; information warfare, or environmental sabotage to attack our forces or interests overseas and at home. However, such threats were viewed only in the context of how they might adversely impact our conventional military operations (p. 4).

5. The *Report of the QDR* notes, "The security environment between now and 2015 will also likely be marked by the absence of a "global peer competitor" able to challenge the United States militarily around the world as the Soviet Union did during the cold war. Furthermore, it is likely that no regional power or coalition will amass sufficient conventional military strength in the next 10 to 15 years to defeat our armed forces, once the full military potential of the United States is mobilized and deployed to the region of conflict" (p. 5).

6. *Cost-tolerance* is defined as the point at which the cost of accepting an adversary's policies, in terms of deprivation and

suffering, is less than the cost of continued resistance. Dennis M. Drew and Donald M. Snow, *The Eagle's Talons: The American Experience at War* (Maxwell AFB, Ala.: Air University Press, 1988), 6–7.

7. Airplanes On-Line advertises numerous light planes for sale (http://www.airplane.com/). One of the authors was easily able to locate several aircraft with the necessary range, one right over the Virginia border in North Carolina, and the asking price was not exorbitant.

8. The US Naval Observatory's web site (http://tycho.usno.navy.mil/gpsinfo.html/) speaks to current GPS capabilities. The Standard Positioning Service (SPS) permits a vertical fix accurate to approximately 156 meters (511 feet), insufficient to fly "nap-of-the-earth." GPS's Precise Positioning Service (PPS) provides substantially improved performance, allowing for a fix of 28 meters (92 feet) or better. Originally, PPS was to be made available to nonmilitary users on a case-by-case basis; however, a 1996 presidential directive specifically called for the more accurate signal to be made available to civilian users by 2006. Differential GPS—using ground reference receivers—makes "sub-meter" determination possible, without any of the additional enhancements currently planned by the NAVSTAR GPS Joint Program Office for its Block IIF satellites. Some discussion of this can be found at http://www.arpa.mil/ARPATech-96/slides/ganz/100.

9. Digital terrain modeling software is easily available today via the Internet through numerous commercial outlets. The authors were able to download demonstration versions of both American and New Zealand models. It is not unlikely that 12 years from today highly accurate terrain maps, updated via imaging satellites (such as France's SPOT) will be available for perusal almost in real-time. This practice is not limited to commercial concerns; the US Geological Survey maintains a web site (http://www-nmd.usgs.com) where precise topological maps of the nation's countryside can be purchased.

10. Part II (Biological) of the *Handbook on the Medical Aspects of NBC (Nuclear/Biological/ Chemical) Defensive Operations* describes the effects of inhalation anthrax as well as the woeful state of potential countermeasures. It can be found on the World Wide Web at http://www.nbc-med.org/amedp6/PART II. A more detailed discussion is available in Dr. Malcolm Dando's *Biological Warfare in the 21st Century* (London: Brassey's [UK], 1994). On page 34, Dando notes, "Infection through the lungs is particularly dangerous . . . [inhalation anthrax] has a mortality rate approaching 100 percent."

11. Dong Fang Hong 91 is depicted as the latest of an existing series of Chinese satellites. For instance, DFH 41, a telecommunications satellite launched 29 November 1994, was retired only a few months later, ostensibly due to a fuel leak. Numerous satellites sit in the "junk belt" beyond GEO, moved out of their precious slots to make room for other, newer assets. These moribund devices are said to have been "supersynched." For an excellent description of current satellites on orbit, point your web browser at http://www.telesatellit.com/tse/online/, the on-line edition of the *Satellite Encyclopedia.*

12. Boeing's Kinetic Energy Anti-Satellite Technology (KE-ASAT) program is a potential prototype of the Chinese "kill vehicles" aboard DFH 91. See "KE-ASAT Prototype Tracks Target in Edwards Hover Test," *Aerospace Daily*, 13 August 1997, 239.

13. The Developmental Planning Directorate at Air Force Materiel Command's (AFMC) Space and Missile Systems Center (SMC/XR) estimates the current cost of a Titan IV launch to approximate $500 million. Since Titan IV, coupled with a Centaur upper stage, can deliver 5,200 kg to geosynchronous orbit, the cost per kilogram to GEO is slightly more than $95,000 per kilo.

14. SBIRS (Space-Based InfraRed Systems) is the follow-on to the Defense Support Program (DSP) series of satellites, and is intended to provide missile warning, missile defense, and "battlefield characterization" information to earthside users. SBIRS is currently considering a bifurcated architecture of "high" (GEO- and Molniya-based) and "low" (low earth orbit-based) vehicles. The first SBIRS high satellites is likely to come on-line in early 2002. Mission and schedule information were found on the SBIRS web site http://www.laafb.afmil/SMC/MT/sbirs.htm.

15. Milstar III is a fictional extrapolation of the existing series of secure military communications satellites. More information can be found at http://www.laafb.af.mil/SMC/MC/Milstar/.

16. These commanders were also supported by the pacifistic nature of extant space law: "States Parties to the Treaty undertake not to place in orbit around the earth any objects carrying nuclear weapons or any other kinds of weapons of mass destruction, install such weapons on celestial bodies, or station such weapons in outer space in any other manner." Taken from Article IV of the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and other Celestial Bodies, signed 27 January 1967. Liberally interpreted, this passage has been used to attack the emplacement of any form of weapon in space. The full text of the "Outer Space Treaty" is on-line at http://www.spfo.unibo.it/spolfo/SPACELAW.htm.

17. Spectre-Press's web site (http://www.spectre-press.com/) offers its customers a "monumental" instruction book on a vast array of dubious activities, including guidance on sending fake electronic mail messages, "cracking" Novell Netware, and getting into all manner of systems (from credit bureaus and banks to government networks). Numerous other hacker sites exist, catering to a growing subculture of covert cyber-criminals.

18. Richard Szafranski, "A Theory of Information Warfare: Preparing for 2020," *Airpower Journal* 9, no. 1 (Spring 1995). Colonel Szafranski notes on pages 61–62, "In the case of advanced societies or groups, attacks against telecommunications systems can wreak havoc with an adversary's ability to make effective decisions in warfare." This article can be found at the College of Aerospace Doctrine, Research, and Education (CADRE) site (http://www.cdsar.af.mil/apj/szfran.html).

19. The Defense Information Systems Agency (DISA) maintains a list for these and other frequently used acronyms at http://www.disa.mil/org/acronym.html. JCSAN permits the joint chiefs access to secure, on-call voice communications with all specified and unified commands. SVTS is described as an executive-level network (president/White House to secretaries) that includes packetized data networking, broadcasting, and video teleconferencing capabilities. Systems such as these are likely candidates for enhancement and expansion over the next decade.

20. Martin C. Libicki echoes this concern in the introduction to his excellent *Defending Cyberspace, and other Metaphors* (Washington, D.C.: National Defense University Press, 1997). He states, "Global computer and media networking carries risks, even if these risks are easily exaggerated. Computer networks might permit enemies to use hackers to attack the information infrastructure of the United States, rather than its military forces. The conventional defense establishment has been described as a Maginot Line, in which hackers are equivalent to Guderian's Panzer Korps, wheeling past prepared defenses to strike at the nation's unguarded flanks." The full text is available at the Institute for National Strategic Studies' home page on NDU's web site, http://www.ndu.edu/.

21. Ibid. The author rightly wonders, "How much damage could a digital Pearl Harbor cause? Suppose hackers shut down all phone service (and, say, all credit card purchases) nationwide. That would certainly prove disruptive and costly, but as long as recovery times are measured in hours or even days, such an attack would be less costly than such natural events as a hurricane, snowstorm, flood, or earthquake — events that have yet to bring the country to its knees."

22. Ibid. Key sectors should include telecommunications, energy, funds distribution, and safety systems.

Loyalty to petrified opinion never yet broke a chain or freed a human soul.

—Mark Twain (Samuel Clemens)

INTO THE STORM: A REVIEW ESSAY

MAJ J. P. HUNERWADEL, USAF

Popular author Tom Clancy created the "technothriller" genre almost single-handedly. His novels sell phenomenally well because they are concise, tightly plotted, and filled with technical details and jargon that impart an air of plausibility. Clancy admits to being fascinated with the technical details that fill his books, and the general reading public trusts his command of them. In the last few years, he has capitalized on this trust by publishing a series of nonfiction books that explain, often in excruciating detail, how various real-world military units or systems operate. These books have been valuable to the military by helping popularize, even glamorize, American war fighters and their capabilities.

In a recent book, however, Clancy seems to aim at a deeper understanding of military matters. *Into the Storm*,[1] coauthored by retired Army general Fred Franks Jr., is a great deal more ambitious than Clancy's previous efforts, which were narrowly focused and acronym-intensive. The book purports to be a "study in command," part one of a four-volume study "of how leaders learn and grow." If Clancy indeed intended a study of such weighty matters, he could have chosen better material. What his book in fact seems to be is a high-profile riposte to his coauthor's critics. Clancy is clearly out of his depth here and should have recognized Franks as a poor subject for a study of inspired field command.

His coauthor is the same General Franks who led US Central Command's VII Corps in Operation Desert Storm. Franks became embroiled in controversy during and after the war, accused by critics of not moving aggressively enough toward his—and the entire ground campaign's—most important objective: destruction of the Iraqi Republican Guard. The theater commander, Gen H. Norman Schwarzkopf, had identified the Guard as the campaign's most important operational center of gravity—the nexus of Saddam Hussein's power. He assigned Franks's heavy corps the job of destroying the Guard while the Marines on his right pinned Iraqi regular units in Kuwait and the XVIII Airborne Corps on his left maneuvered to cut

off any Iraqi retreat. Franks's corps failed in its most important task, and much has been written since the war trying to explain why that happened.

Into the Storm is Franks's attempt to exculpate himself. One of his harshest critics has been General Schwarzkopf, who blamed Franks's slowness and indecisiveness for the failure. Franks seems to be using Clancy's name to fire back at Schwarzkopf, whose best-selling memoir, *It Doesn't Take a Hero*,[2] recounts the accusations. Clancy is apparently unaware of all this, preferring to get lost in the nuts and bolts of corps operations. He lets Franks recount the war himself in the book's final three hundred pages—in numbing detail.

The details help to highlight a valuable lesson for airmen. General Franks's approach to war represents the wrong paradigm for future warfare. Certainly, the philosophy that made armored formations so effective in World War II and the Arab-Israeli wars is still valid. The philosophy of dislocation and exploitation embodied in blitzkrieg—and more recently in AirLand Battle doctrine—works for everything from infantry attacks to information operations. But the means of achieving blitzkrieg's effects have moved away from the wallowing corps-sized land leviathans, weighed down with tanks and other heavy industrial-age baggage. These days, airpower provides the best means of finding, fixing, striking, and exploiting enemy systems. In the foreseeable future, space and information power may have similar capabilities.

Another lesson specifically for airmen is awareness of a ground commander's perspective on airpower. Franks, obsessed with the prebattle maneuvering of his corps, was barely aware that airpower existed during the 30 days prior to the ground campaign. When he began to maneuver against the Iraqis, he discovered that he didn't have enough of it. Steeped in AirLand Battle doctrine, he regarded airpower as part of his fire-support plan, its sole purpose to support his ground scheme of maneuver. When interdiction targets nominated by him were overlooked in favor of deeper targets favored by Schwarzkopf, who thought they deserved higher priority, Franks complained that the joint force air component commander was trying to wage an Air Force–only war.

In fairness to Franks, he was not the only ground commander with this perspective. Most of them seemed to fight the war as if they were wearing blinders—as if nothing existed to either side or even in front of them beyond a certain range. What makes *Into the Storm* valuable is that this perspective comes through more clearly than in other writings. Airmen must understand that the nature and complexity of ground commanders' tasks bind them to this limited perspective of war. Their focus *must* be tactical; as airmen, we must have a wider view.

What Franks and the other ground commanders lacked—and what Schwarzkopf possessed—was a truly joint vision of what the forces arrayed in the Gulf could do. Franks moved up strictly through Army channels to the pinnacle of field duty—command of a corps. Schwarzkopf moved to

theater command from a variety of joint staff jobs. Some Army circles resented him for achieving "CINCdom" without having paid some Army dues. Franks is too gentlemanly to play to these notions, but something of the same attitude comes through between the lines in his and Clancy's book.

It was precisely Schwarzkopf's broader vision that made him the right man for the time and place. His joint experience gave him the necessary background to understand a type of warfare more ambitious than the one envisioned by his ground and air commanders. Schwarzkopf's insistence on an air campaign with an operational and strategic focus extended the concepts of blitzkrieg to the entire enemy system and achieved Desert Storm's objectives.

Into the Storm's biggest lesson, one that has been taught several times throughout military history, is for all war fighters. Franks was brilliant when building or training a force for battle. As head of the Army's Training and Doctrine Command, he created several innovative "advanced war-fighter experiments" designed to move the Army forward intellectually. He was instrumental in remotivating the post-Vietnam European Army. Franks was also highly regarded by the troops he led. His careful, deliberate manner and his intellectual depth made him nearly the perfect peacetime general. On the field of battle, however, his innate caution took over. He missed great opportunities to dislocate and exploit the enemy because he was too focused on what the enemy might do to him.

Ultimately, Franks's battle against the Republican Guard looked a lot like the battle of Antietam: the enemy conceded the field, losing the tactical battle—but the victor missed a larger opportunity. Antietam helped accomplish some political goals, but it could have shortened the Civil War by years. Similarly, destruction of the Guard might have accomplished the coalition's second-order goal: the overthrow of Hussein's regime. Schwarzkopf's criticisms of Franks seem exactly in this context. Schwarzkopf stood in relation to Franks much as Abraham Lincoln stood in relation to Union general George McClellan—prodding and cajoling him into action. Both cases provide a valuable lesson: when cautious commanders focus more on what the enemy can do to them than on what they can do to the enemy, they will not win. General Franks did not lose his fight, but he certainly did not win it either. All of Tom Clancy's writing skill and all of General Franks's exculpatory detail cannot hide that fact.

Maxwell AFB, Alabama

Notes

1. Tom Clancy with Fred Franks Jr., *Into the Storm: A Study in Command* (New York: G. P. Putnam's Sons, 1997).

2. H. Norman Schwarzkopf with Peter Petre, *General H. Norman Schwarzkopf, the Autobiography: It Doesn't Take a Hero* (New York: Bantam Books, 1992).

Ricochets and Replies
Continued from page 3

others" and work within the system to stretch the boundaries of the establishment.

Finally, I think Colonel Kline is implying that a lack of leadership exists in the Air Force. Gen Ronald Fogleman was an excellent leader, and history may one day honor his sacrifice. The Air Force will always develop a few great leaders like him. What it is lacking is clarity of purpose and consistency in leadership that will provide the stability to carry our service into the next millennium.

Capt Kelley Vanderbilt, USAF
Kadena AB, Japan

THEY'RE GONE

I agree totally with the letter by Col Terry Paasch, USAF, Retired (Spring 1998), concerning what I and other dismayed professional officers call the "careerist Air Force." Unfortunately, from my experience, the Air Force officer corps at all levels is completely dominated by careerists—as opposed to professionals—whose main concern is to advance to the next grade. Indeed, the level of careerism in the Air Force now is sickening.

What caused this steep decline of mission-oriented professionals who garnered promotions because of leadership accomplishments? What caused the ascent of the careerists? Was it the great reduction in force of 1992 and the associated post-cold-war drawdown that generated the "my career first" mentality that dominates the officer corps? Or has this mentality always been inherent in military society?

I can only rejoice that I have guaranteed retirement benefits as a former enlisted officer, because if I ever advance to the senior-officer ranks, it will be because I did my best as a professional. Then, perhaps, people will ride on my coattails as "careerist crushers."

Capt Timothy J. Hall, USAF
Goodfellow AFB, Texas

AIR OPERATIONS, LOW INTENSITY CONFLICT, AND CHECHNYA

At the narrative level, Timothy L. Thomas's article "Air Operations in Low Intensity Conflict: The Case of Chechnya" (Winter 1997) was a thorough and informative description of the poor strategy, dismal materiel situation, and unskilled employment of Russian air forces during their intervention into Chechnya from December 1994 to August 1996. Clearly, were it not for its strategic nuclear forces and residual reputation from its Soviet days, the Russian air force would be classed as a third-rate institution and a first-rate example of how *not* to exploit airpower.

At the theoretical level, in contrast, Thomas's assessment of the meaning of the Russian air force experience in Chechnya is flawed. His description of that experience hardly would suggest that it could form a foundation for making comprehensive assessments about the limited utility of airpower in low intensity conflict (LIC), but that is just what Thomas tries to do. Through the linkage of quotes by Benjamin Lambeth and his own evidence from Chechnya, Thomas implies that the failures of the Russian air force demonstrate a general case that airpower doesn't work well in LIC. "The air force," Thomas quotes Lambeth as having said, "had a golden opportunity in Chechnya to see that air power cannot invariably work its reputed magic in circumstances where the target set is elusive, problems predominate in target location and identification, and there is ever-present danger of unintentional harm to combatants."

Well, I guess so! But given all the mitigating circumstances Thomas lays out, one could make the same judgement about the use of land and sea forces in LIC as well. In other words, Lambeth's caveats make his conclusion, or at least Thomas's use of it, not very useful in a general sense. To imply that botched operations in the *specific* case of Chechnya proves the *general* ineffectiveness of airpower is logically not supportable. As a logical case, Thomas's argument is akin to finding that heart surgery is proven ineffective by the failed operation

of a nearsighted surgeon who operated with dirty instruments and without the help of trained nurses, and who carved on the liver instead of the heart. LIC is too broad a category of warfare and too complex in its tactical, operational, and strategic details to be summarized in any authoritative way on the basis of one case study.

Moreover, in places as diverse as southern Africa, Oman, Malaya, and even the in-country US war in Vietnam, one finds plenty of examples of how *intelligently and effectively applied* airpower has contributed to the successful attainment of end-state or at least intermediate military objectives in LIC. In these cases, one should add, airpower achieved those results only when coordinated with effective political support, strategies, and objectives. Further, airpower usually achieved its successes when employed in coordination with *intelligently and effectively applied* surface power. In short, LIC is joint.

The bottom line is that, to be useful, any effort to link a case study to a broad assessment of the utility of airpower (or anything else) must incorporate appropriate assessments of the relevant political and military factors. One should use appropriate caution and tentativeness to express any broad assessments springing from a single case study. The airpower debate, in short, needs analyses that stay within the supporting data—not ones that try to build general arguments from the actions of demonstrable amateurs, such as the Russian air force in Chechnya.

Col Rob Owen, USAF
Maxwell AFB, Alabama

MAD AGAIN

I read with great interest Col Alan J. Parrington's "Mutually Assured Destruction Revisited: Strategic Doctrine in Question" (Winter 1997). After finishing it, I had a nightmarish vision of the USAF's future—one populated with senior officers who, like the author, apparently believe that airpower is best used in a supporting role for the land- and maritime-component commanders. I've found so many points of contention over such a wide variety of issues that I cannot adequately cover them all in the confines of a letter to the editor.

First, what is the exact subject of this article? It certainly is not strictly about mutually assured destruction. Is it about *strategic bombing* in the classic sense of the term? Strategic attack as used in the Gulf War? Or the nonutility of nuclear weapons? All of these subjects are present, but their link to the title is often tenuous at best. In the opening of his article, the author discounts the "nuclear peace" provided by the cold war, basically saying that nuclear weapons did not prevent war—only nuclear war. One must be very careful when making sweeping generalizations. Any change in the past would be to a dynamic system that would respond to the change. The author could be right. On the other hand, in a nonnuclear world, an equally likely outcome of conflicts such as the 1967 and 1973 Arab-Israeli wars, Vietnam, or Korea could be a conventional World War III between Soviet and American forces. What the cold war does show is that nuclear weapons did not prevent conflict between nuclear have-nots nor between nuclear haves and have-nots. It did prevent open conflict, *both nuclear and conventional,* between nuclear haves, for fear of escalation.

The statement that strategic bombardment is counterproductive because it enflames the population of the target nation also deserves a look. After 55 years, the jury is still out on how strategic bombing affects a population. The Dutch capitulated quickly after the terror bombing of Rotterdam in May 1940, and the British showed a "stiff upper lip" in the blitz. These attacks, however, were of relatively short duration. The campaigns against Germany and Japan were different. Sources I have read do not talk of the passionate resistance which the author mentions but of an acceptance or resignation to the numbing effect of the bombing. The population carried out its usual routine of work because that was what it was used to; work provided some order in a world that was becoming more and more chaotic. The notion that strategic attack will

categorically arouse a nation's "passions" and dramatically increase resistance is therefore, at best, situational.

The strategic bombing of Japan has a somewhat different story line than the one presented in the article. The author misses the key point that regardless of what the emperor and his political aides wanted, the Japanese army was in complete charge of the war effort. Political leaders opposing the army did so at great peril to themselves; their assassination by junior and midlevel army officers had been in vogue for 20 years in Japan (see John Toland's *The Rising Sun*). ULTRA intercepts indicated that Japan would fight to the finish. The Allied high command got mixed signals about Japanese intentions. In *Truman and the Hiroshima Cult,* Robert Newman points out that the emperor was not "running for his life"; rather, he used the opportunity created, sequentially, by Hiroshima, the Russian invasion, and Nagasaki to end the war in spite of the army. Had the emperor not intervened at this point, the war would have continued. Newman's review of the interviews of the top two hundred Japanese military and political leaders, contained in the *US Strategic Bombing Survey,* supports the position that it took all three events to bring about the surrender conditions, the bombings probably being the biggest factor. The author's almost sole reliance on David Bergamini's aged *Japan's Imperial Conspiracy* as the basis of his argument is unfortunate. There are several other far more accurate works about the end of the war in the Pacific. Collectively, they discredit the portions of Bergamini used to support this article.

The section on the Gulf War deserves some comment. Soon after the war's end, the last edition of Air Force Manual 1-1, *Basic Aerospace Doctrine of the United States Air Force,* was released, and the term *strategic attack* replaced *strategic bombing.* The key difference is that "bombing" implies strikes by aircraft or missiles; "attack" is not medium-specific. Strategic attack can be accomplished by air, land, or maritime forces and may or may not require actual physical destruction of the target. The *intent* behind selecting a specific target determines whether it would be a strategic attack or some other function (to use the terminology of Air Force Doctrine Document 1, *Air Force Basic Doctrine*). How does that apply here?

Quantifying the effects of a strategic attack, short of the out-and-out capitulation of the enemy, is difficult. Since airpower did not force Saddam to leave Kuwait and since he was not overthrown and did not surrender, strategic attack did not work. Although the precise impact of the strategic attacks may never be fully known, the coalition saw no coordinated movement of any Iraqi land element larger than a division. The Iraqi movements were autonomous, with no guidance from corps, army, or national headquarters, the result of a series of what I call mostly strategic attacks.

The author's praise for TACAIR is noteworthy. It played the "decisive role . . . in every major war of this century." What about World War I, Korea, and Vietnam? If TACAIR was so decisive, why do we have *two* Koreas and *one* Vietnam today? In Operation Desert Storm, the coalition had such an asymmetric dominance in the air that we could afford to pursue attrition warfare and strike strategic targets simultaneously (a key attribute of airpower). Our next foe will probably not be nearly as cooperative as Saddam, and we will not have the force structure we had then. For the joint force commander (JFC) today, it should not be an "either-or" decision for airpower functions. The JFC will likely need all of them at the proper time and place—and in the proper mix.

The lasting impression this article made on me is probably not what the author intended, though he certainly implied it: "Airpower has never been and will never be decisive by itself. It achieves decisiveness only when used to support other services." What a bitter pill for air advocates to swallow.

One last thought: *Airpower, in all its facets, can be decisive and can accomplish national objectives by itself*—not in every case, certainly, but no single service can. To be decisive, it must be understood and applied in a manner fitting the situation, objectives, and strategy. It must be focused on appropriate centers of gravity. When used in this manner, airpower

offers the JFC its best attributes, whether in a supported or supporting role.

Lt Col Dave Howard, USAF
Maxwell AFB, Alabama

I was both surprised and disappointed to read Col Alan J. Parrington's article on mutually assured destruction. I was surprised that *APJ* would lead off the issue with this article when such superior efforts as Col Charles M. Westenhoff's "Airpower and Political Culture" (same issue) were available.

The author's vision of airpower is an intellectual step backward to a world of 30 or 40 years ago, when airmen believed that the "strategic" use of airpower meant attempts to coerce civilian populations to surrender through indiscriminate city bombing. He correctly points out that such bombing never succeeded in breaking the will of any nation's population. He is also right in saying that this theory became entrenched in Air Force thinking because of nuclear weapons and that it was the wrong paradigm with which to fight brushfire wars like Vietnam.

The author seems to advocate, as does Richard Pape in *Bombing to Win,* that airpower can *never* be useful in war except as an adjunct to surface warfare. Both men imply that efforts to achieve decisive results through airpower alone have never worked; therefore, airmen should stick to what they do well: providing flying artillery for the Army and Marines. This and counterair functions constitute what the author calls "tactical" airpower, which, he says, "did play *the* decisive role . . . in every major war of this century." This is wrong outright, but it is also an old notion of how airpower works.

The distinctions between *tactical, operational,* and *strategic* are becoming blurred. We are moving away from wars centered on the battlefield toward warfare in which a whole enemy state can be paralyzed and its battlefield forces bypassed or easily dealt with, through systemic attacks of several types, including air attack. This was the vision of early airpower advocates like Giulio Douhet, Billy Mitchell, and Hap Arnold. They wanted to break the stalemate of land attrition warfare by going "straight to the vital centers" of an enemy (the same thing, in a way, that the blitzkrieg theorists were trying to do on the surface). They lacked the technology and doctrine necessary to see this vision realized in their lifetimes, but their vision is being vindicated in the way we fight today. It is irrelevant that their vision was perverted into terror bombing and mutually assured destruction during the intervening years.

Terms like *strategic paralysis, cascading effects,* and *synergy* have become buzzwords, but they are more than that. They embody a new philosophy of air warfare and are akin to ground-warfare theories of dislocation and exploitation embodied in blitzkrieg and Air-Land Battle. This new form of air warfare complements other military instruments but also transcends them. It *may* be decisive in and of itself in a particular conflict, but that's irrelevant. It has its most decisive effect when used synergistically with the other instruments of power. Fighting a war with this instrument alone is justified only when other forms of power aren't available. The problem is that we likely *will* have to fight future conflicts (at least in their initial stages) with airpower alone because airpower, in some form, is usually "Johnny-on-the-spot." With diminishing resources, we probably won't have a choice, even though we know this is not the best way of doing business. We must therefore continue to research and improve our ability to be decisive, independent of significant surface forces.

In this article, the author is mainly against nuclear-deterrent strategy, which he says dangerously destabilized the world, was ineffective, and (paradoxically) was unnecessary anyway. He consistently confuses *nuclear* and *strategic.* Concerning destabilization, he says that "nuclear weapons have only deterred nuclear war and, ironically, very nearly caused one in the process" (he refers to the Cuban missile crisis). In the absence of nuclear weapons, the Cuban crisis would never have happened, of course. But some sort of Agadir incident or, worse, a Sarajevo would still have

taken place as we faced off the Soviet bloc. Twice before in this century such face-offs led to war. Why didn't this one? America's nuclear deterrent, perhaps? The world would probably have gone to war during the Mideast crisis of 1973—after purely "conventional" provocation—had it not been, again, for America's nuclear deterrent.

Colonel Parrington further contends that, while it's "impossible . . . to calculate the cost of the strategic arms race," the monetary cost alone was "staggering, not to mention the environmental, psychological, and opportunity cost factors." Does the author really think it would have been cheaper to match the Soviets in conventional arms, or does he think that no deterrent was ever really necessary?

An article like this, by such a prominent officer, makes me wonder about where we're headed. Are such ideas to be the future of the Air Force? If we follow the author's understanding of airpower, one that denies air's independent role, we will be doomed forever to refight this century's bloody industrial meat grinders, facing our enemies toe-to-toe, rifle-for-rifle. I, for one, want no part of such a future.

Maj J. P. Hunerwadel, USAF
Maxwell AFB, Alabama

WHAT IS TRUTH?

I just finished Maj Carl Rehberg's article "Is Character Still an Issue?" (Spring 1998) and feel compelled to respond. I heartily agree with the author's assessment of the Air Force's core values program, particularly his discussion of the importance of the spiritual dimension in character development.

There is one aspect I'd like to add to the discussion of character in the military today. The notion that we need a program to foster development of (positive) character in our membership trumpets to me that the battle is already lost! Furthermore, it seems that character issues, as with the quality movement, need to be lived out before us by our leaders. Those of us who are followers by position become jaded and even resentful at the implication that there is something lacking in us which only another highbrow program can remedy.

I've read the *Little Blue Book*—and then filed it in the back of a desk drawer. Until our leaders (both civil and military) demonstrate consistently the type of character traits they wish to develop in us, they have little credibility with me.

TSgt William Campbell
Washington Air National Guard
Fairchild AFB, Washington

Maj Carl Rehberg begins his arguments for increased character development and chaplain involvement in the core values initiative by arguing that "throughout history, people who have served in the military have always known that effectiveness and success rest far more on the moral quality of officers and other personnel than on technical expertise." Victors may make such a claim, but it simply isn't true. History is filled with the victories of immoral technical experts, and the world's battlefields are fertilized with the blood of people who relied upon morality and prayer over training and technique.

The article seems to judge the core values program solely on its religious content. If the program is to "acknowledge the spiritual dimension," it must either take the stance that the specifics of the soldier's spiritual dimension are irrelevant or that some faith systems are better than others. There are significant moral conflicts between the many religions represented in the military. When these are stripped away and common religious, moral principles are compared to common secular, moral principles, they line up like soldiers on a parade field. It is both divisive and unnecessary to include spiritual training as part of Air Force core values.

Is character still an issue? Of course it is. "Integrity first, service before self, and excellence in all we do" are essential elements of the character we want in all Air Force personnel. Like most philosophical laundry lists,

these elements are somewhat arbitrary. Unlike many lists, though, these elements are the result of years of serious thought and conscientious effort. In spite of William Bennett's wholly insupportable assertion that lack of religious belief has dire circumstances (page 83), religious faith, belief in God(s), or even acknowledgment of the spiritual dimension cannot be considered core values in the Air Force. Right now, there are officers and airmen with strong moral character who are Buddhist, agnostic, Muslim, Jewish, Catholic, atheist, Protestant, and so on and on and on. The *Little Blue Book* is correct to say that "the Core Values Strategy attempts no explanation of the origin of the Values except to say that all of us, regardless of our religious views, must recognize their functional importance."

Major Rehberg appears to believe that character without overt spirituality is impossible. Is character, then, achievable only through his particular spirituality, or will any spirituality do? Over time, the Air Force has wisely separated partisan religious principles from military ethics training as the importance of religious tolerance in a pluralistic society has become increasingly clear. In order to maximize combat effectiveness, we must foster technical competence and ethical behavior, including the necessary tolerance to work with and trust people with different faiths.

Maj Bill Gray, USAF
Edwards AFB, California

THE AUTHOR RESPONDS

I am happy to respond to Major Gray's several criticisms of my article "Is Character Still an Issue?" I welcome the interest. First, Major Gray takes exception to a statement that I made regarding the importance of the moral quality of officers versus their technical expertise. The theme in this section was the importance of character and its rightful place as a foundation for officers, noncommissioned officers (NCO), and other leaders. Certainly, one can argue with this point, but once it is placed in the context of the book *To Serve with Honor,* one would understand the full meaning of the term *moral.*

The moral quality of personnel does not mean the lack of technical expertise or competence. Quite the contrary, for an officer or NCO, the technical expertise that is integral with competence is the sine qua non of being moral. Gen Mal Wakin, USAF, Retired, has made the case at the Air Force Academy (since its inception) that one's competence lies at the very core of being a military professional. There is no disputing that there are instances throughout history of immoral technical experts achieving victory. The real question is, What do we want for our Air Force of the twenty-first century? I can find numerous historical examples of victories having gone to the side with lesser technology. Does that mean we should eliminate high-tech weapons, based on those historical facts? I think not.

Second, criticism that I have judged Air Force values solely on religious content is preposterous. First of all there is no religious content in the core values program. Somehow, I find that the statements about religion certainly do not stem from tolerance. The two main points of my article address (1) a move away from character development (philosophical) and (2) a lack of chaplain involvement (primarily a policy issue). On those points, I see no response. The disagreement seems to be over my reasons and my supporting arguments. Ironically, the Army is enhancing chaplain involvement (since Aberdeen), while the Navy and Marine Corps still have their chaplains involved in their core values program.

The premise that the "soldier's spiritual dimension [is] irrelevant or that some faith systems are better than others" sets up a false argument. Even in today's environment, public schools are allowed to talk about religion. I would encourage readers to examine California School Board policy on teaching religion. Additionally, I would encourage Major Gray to examine the numerous chaplain programs that the Air Force has to offer.

Major Gray asserts that "spiritual training" (which I did not recommend) is both divisive

and unnecessary, yet he provides no supporting arguments or documentation. He also states that "there are significant moral conflicts between the many religions represented"—again, with no examples or supporting documentation.

"Is character still an issue? Of course it is." The mere statement that "it is" does not create reality or reflect a tautology. The policies that I quoted assert otherwise. Major Gray is right when he states that the core values are essential elements. Essential elements, yes; character education, no!

According to Major Gray, "Major Rehberg appears to believe that character without overt spirituality is impossible." I do not assert that concept anywhere. In fact, I claim that it is possible. I would encourage Major Gray to read note 22 of my article.

Finally, I may agree with Major Gray's last statement. My only question concerns what definition of "tolerance" he is talking about. Tolerance would respect the legitimate role of character and the use of chaplains. If he means the tolerance of postmodernism and political correctness, then we disagree.

Maj Carl D. Rehberg, USAF
Washington, D.C.

Net Assessment

An ordinary man can . . . surround himself with two hundred books . . . and thenceforward have at least one place in the world in which it is possible to be happy.

—Augustine Birrell

Citizen Soldiers: The U.S. Army from the Normandy Beaches to the Bulge to the Surrender of Germany, June 7, 1944 to May 7, 1945 by Stephen E. Ambrose. Simon & Schuster, Rockefeller Center, 1230 Avenue of the Americas, New York City 10020, 1997, $27.50.

You will not want to miss this book! Stephen Ambrose, author of *D-Day* and *Undaunted Courage,* has done it again, writing a superb historical account of the war in Europe. What makes this book so special is Ambrose's skillful use of actual soldiers' accounts combined with skilled narrative to link the events. The result—a historical account that actually reads like an action novel.

Citizen Soldiers begins where Ambrose's best-seller *D-Day* left off. The Allies have achieved their objective of establishing a beachhead on the shores of Normandy. Now they must begin the arduous task of beating the *Wehrmacht* back from defensive positions and ultimately into submission. As Ambrose freely admits, *Citizen Soldiers* is not a comprehensive history of the campaign in northwest Europe. Nor is it about the generals and their operational strategies for the campaign. Rather, it is written from the individual soldier's perspective.

The frontline soldier takes center stage, recounting his experiences in his own words and providing his perspective on the war. The author draws on hundreds of interviews to bring this story to life, from the stalemate in the hedgerows of Normandy, the breakout in France, the Hurtgen Forest, and the Battle of the Bulge, to the final overrunning and surrender of Germany. Although he focuses on the individual, Ambrose successfully keeps the reader apprised of the bigger strategic picture, thus placing the soldiers' comments in context.

Who were the frontline soldiers? They were the 18-year-old privates and 21-year-old lieutenants fresh from high school and college and thrown into the hell of the European theater of war in 1944. Nothing they trained for prepared them for actual combat. Many lessons could be learned only through experience.

Prior to D day, the Allies extensively researched Normandy but missed one of its key topographical features: the hedgerow. Institutionally, the Army failed to realize the great defensive advantage the hedgerows provided the Germans, so it took individual American ingenuity to solve the problem. One such example was Sgt Curtis Culin, a prewar mechanic who was one of the men responsible for developing, in the field, a blade attachment that would allow the Sherman tank to penetrate the hedgerows and defeat German defenses. *Citizen Soldiers* is filled with similar examples of individuals finding a way to accomplish the mission. In many cases, American troops prevailed through sheer determination, perseverance, and raw courage.

The book is divided into four parts: "The Battle for France," "At the German Border," "Life in the European Theater of Operations," and "Overrunning Germany." Ambrose dedicates only 20 pages exclusively to the air war. In other chapters, however, the book provides numerous examples of the positive impact of the air war in securing victory—specifically, the great advantage the Allies enjoyed because of air superiority and the great limitations imposed upon the enemy. The book successfully draws out the human element at its best and worst, from the killing of prisoners of war to soldiers taking risks to save wounded enemy soldiers. By referencing 60 oral histories, memoirs, and letters from German soldiers, Ambrose provides a very clear picture and a balanced perspective. The book contains 48 pages of interesting black-and-white photographs, 11 useful maps, and complete chapter notes.

In summary, I recommend this book without hesitation. I found it factual, well researched, and exciting. My only caution is that readers will have a difficult time putting the book down. It readily highlights the great sacrifices these warriors made for their country.

Lt Col Chris Anderson, USAF
Maxwell AFB, Alabama

Touched with Fire: The Land War in the South Pacific by Eric Bergerud. Viking Press, 375 Hudson Street, New York City 10014, 1996, 566 pages, $34.95.

With this book, historian Eric Bergerud uses his unique narrative style to describe the campaigns in the Southwest Pacific Area (SWPA) of 1942–43, presenting a *Face of Battle*-type portrait of some of the most decisive battles of the war. Bergerud focused on SWPA because, until 1944, the war in the Pacific was fought almost exclusively in this theater; the two sides were generally evenly matched (thus, his study provides a comparison of the antagonists); and, finally, the combat in SWPA was unique in this century. This book will be of interest to airmen because, although the author focuses on land combat, he shows that airpower was a key and indispensable ingredient to victory.

Thanks to Hollywood—and better Navy/Marine public relations—most people still view the Pacific war as a Navy/Marine-dominated theater. Bergerud argues that Adm Chester Nimitz's Central Pacific offensive beginning in 1944 siphoned resources away from Europe and was unnecessary because Gen Douglas MacArthur's forces in SWPA turned the tide of the war. Bergerud explains that the Japanese defenses were not a defense in depth but a periphery defense. Once the cordon sanitaire was broken, Japan's defensive strategy was compromised. Nimitz's offensive served only to divert badly needed forces from the main thrust and get Americans killed.

In today's world of joint operations, *Touched with Fire* explains the fighting on New Guinea and the surrounding area as a combined campaign between the Australian and US forces and a joint campaign between the US Army, Army Air Forces, Marines, and Navy. Unlike the islands in the Central Pacific, which were generally coral atolls, the terrain in MacArthur's SWPA was a disease-infested jungle with large islands that had to be taken or bypassed on the drive to Tokyo Bay. The reader learns that war in SWPA was extremely brutish, with quarter neither given nor asked.

Bergerud weaves the interdependence of land and air forces into the narrative—no small feat considering the fact that many military historians continue to write their narratives seemingly unaware of the critical role airpower played in every campaign. Bergerud argues that, early in the war, both antagonists realized the importance of airpower. One of the key elements of Japanese strategy was to seize strongpoints (a fortress perimeter from which to defend the empire) and establish an air umbrella over these strongpoints. The Imperial Navy would resupply and reinforce these points as needed, slowly wearing the enemy down to achieve a negotiated settlement. The Japanese knew that in order to guarantee this strategy and protect their navy, they had to own the skies. The American way of war was to outmaneuver the enemy—knock him off balance—before bringing overwhelming firepower to bear. For example, MacArthur used his naval forces to land in the enemy's rear, build airfields, bring in fighters, and gain air superiority. Once this was accomplished, it was only a matter of time before MacArthur's infantry destroyed the weakened opponent. As Bergerud says, "The air supremacy enjoyed by the Japanese in the early months of the war would prove short-lived" (page 7).

In order to outmaneuver and outflank the enemy, the Allies demonstrated more flexibility than the Japanese. They surveyed areas to establish airfields and then planned operations around these airfields. In New Guinea, for example, Gen George Kenney flew elements of the 32d Infantry Division into a new airfield just miles from the Japanese garrison at Buna. Although the Allied forces faced months of hard fighting ahead, this flanking maneuver shortened the campaign considerably. Incidentally, after securing air superiority over the battlefield, Kenney's airfield continued to supply the American ground forces and served as an evacuation point for the wounded, greatly improving survival rates. Meanwhile, the enemy garrison slowly withered in the mosquito-infested swamps nearby. In another example, instead of charging into the teeth of enemy defenses, Allied troops landed on a relatively weakly defended part of Bougainville in late 1943, built air bases, and waited for the Japanese to attack. With air superiority and overwhelming firepower from the Navy and artillery, Allied troops decimated the attacking hordes.

MacArthur could even treat New Guinea as if it were a series of smaller islands. The vast distances and dense jungle between strategic points created "virtual islands." Without air superiority, the Japanese could not resupply their troops. Without resupply, garrisons quickly reverted to subsistence living and succumbed to jungle diseases. By the time MacArthur's infantry closed with the enemy to dig him out of his bunkers, airpower had already decided the campaign. Bergerud convincingly argues that the Allied strategy of isolating Japanese redoubts created the largest prisoner of war camp in the world. In fact, the Japanese funneled over two hundred thousand troops into SWPA, most of whom never saw combat as they drained resources away from the empire.

Although I recommend this book, some caution is warranted. Bergerud grants the veterans liberal space to describe, in their own words, what combat was like. By page five hundred, this can get rather tedious and may require some patience from the reader. Also, the maps are rather unconventional, having the appearance of being hand drawn. For those who are interested in how Americans adapted to combat and how airpower figures into that adaptation, the $35 price tag is well worth it. For the average reader, however, breaking the $30 threshold will be difficult. Waiting for the paperback or checking the local library would be a more appropriate strategy.

Besides these minor criticisms, *Touched with Fire* is an interesting, thought-provoking, and informative book. It describes the brutal campaign in the SWPA that doomed the Japanese to defeat and showed Allied ingenuity at its best. Bergerud, unlike most historians, smoothly blends airpower and sea power into his narrative to show their key role in victory. Without sea power, MacArthur could not have conducted his flanking movement around the enemy positions. Without airpower and air superiority, he could not have won the campaign.

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Von Richthofen: The Legend Evaluated by Richard Townshend Bickers. US Naval Institute Press, 2062 Generals Highway, Annapolis, Maryland 21401-6780, 1996, 172 pages, $27.95.

Unfortunately, *Von Richthofen* is an incredibly weak and inconsistent attempt by Richard Townshend Bickers to conduct an in-depth exploration of the mystique, intrigue, fact, and indeed fiction surrounding arguably the most highly recognized and well known combat aviator in history. After all, who has actually never heard of the "Red Baron"? What could easily have been an interesting historical endeavor by exploring the enigma of this man's life, death, and career in detail is instead something much different.

The author, who is no newcomer to the world of aviation writing and research, has published more than 70 books, including fiction, biographies, and military history. He served in the Royal Air Force (RAF) during the Second World War, and it is suspected that his English lineage has much to do with the negative review of this book.

Instead of delving into the career of von Richthofen and trying to uncover new information or give us new insight into the personality of the man, the book tells us very little new about the Red Baron. Likewise, many of the conclusions reached by the author concerning von Richthofen's character, attitude, and moral courage are perhaps interesting but highly questionable. Bickers, for example, considers the Baron "inconsiderate" for writing his parents a letter that discusses life and death at the front, while a similar letter by English pilot Albert Ball is an indication of his being "close" to his parents. Likewise, the author ignores the significant operational effects of the Red Baron's downing reconnaissance aircraft versus single-engine fighter aircraft. Unfortunately, what the book degenerates into is nothing more than an advocacy book espousing the supposed or imagined superior merits of English pilots and their aircraft to those of other nations. The author actually has the audacity at one point to write that "the victors who inflicted such horrors on them [the enemy] were decent people of various nationalities, including British, who would never have been deliberately cruel to anyone."

During his soapbox diatribe on English superiority, Bickers offers us the extremely tired, inaccurate, and historically incorrect argument that German Luftwaffe victories on the Eastern Front in the Second World War were easy since Russian pilots were "poorly trained" and their equipment "much inferior." At the same time, however, RAF victories were that much more impressive since "the RAF never fought any unskilled and poorly equipped enemy except in the early days of the North African campaign and in Greece, where some of the Italian aeroplanes they knocked out were second-rate, even though the pilots had been well trained." I guess the Luftwaffe pilots entering combat from the second half of 1944 on with sometimes fewer than 20 hours on fighter aircraft were, in his opinion, well trained.

Similarly, the author attests that perhaps the "one literally fearless pilot in the Second World War" was British flight lieutenant Richard Playne Stevens, and "the one universally well-known pilot of World War Two," Douglas Bader, was coincidentally another Englishman. It is interesting to know that German Stuka pilot Hans Rudel, with his 2,530 combat sorties and 519 tank kills, was not a fearless warrior and that names like Bong, Boyington, and Galland are not as universally known throughout the aviation world.

Bickers also puffs his chest when he relates the unmatched feat of Pilot Officer Charles Harold Dyson, who luckily shot down seven aircraft in 15 seconds. Unfortunately, this man died in combat

shortly thereafter and drifted into historical anonymity. Although Dyson's feat was a significant aerial achievement, the long-standing accomplishments of many other pilots, such as Erich Hartmann's 352 kills, rate more impressively than this man's single lucky day in combat against a formation of clueless and unimaginative Italian pilots. Lastly, while discussing potentially excessive claims by Luftwaffe pilots, the author conveniently avoids similar issues concerning the RAF and other Allied pilots.

When readers ask themselves what all of this information has to do with the legend of von Richthofen, the answer is, Not much! This is one of many shortfalls of this book. *Von Richthofen* seems to lack focus and a train of thought; further, it jumps around too much from the basic premise of the book—the legend of von Richthofen. What of his character and personality? What about the fact that von Richthofen died wearing pajamas under his flight suit? There exist countless stories, lies, fabrications, and embellishments concerning von Richthofen, yet the author either didn't know about them or chose to ignore them.

Instead of espousing the English contribution to the air war by making poor historical claims that top English pilots like Mannock, Ball, McCudden, and Collishaw, as well as other Allied pilots, could have topped the Red Baron's score "if" they had gotten certain breaks during their career, Bickers could have done much more to relate information directly to von Richthofen. Arguments like that rarely solve anything; besides, one could easily argue that had von Richthofen not violated his own tenets of air combat, he would not have died on 21 April 1918 and possibly would have lived to kill many more Englishmen and Frenchmen.

In addition to comments regarding the relative superiority of blue/gray-eyed pilots over those with brown eyes, the author even goes so far as to make excuses for one of the earliest English fighter leaders, Lanoe Hawker, who was gunned down by von Richthofen in combat. The author writes, "When they met in combat Manfred won because, although Hawker was the more polished flyer, Manfred flew the faster, more heavily armed aircraft. . . . Also, Hawker's engine was suffering from impeded petrol flow, which robbed it of full power." What about Hawker's headache and his lack of sleep the night before? Perhaps he was abused as a child, or his dog just died. Please! In the words of Hans-Joachim Marseille, one of Germany's best combat pilots in the Second World War, the quality of the pilot—not the type of plane—mattered most. After a 35-minute dogfight, had Lanoe Hawker been the clearly superior, highly polished pilot the author argues, then the Red Baron's career would have been cut short, and I wouldn't be writing this book review.

Certain technical aspects of the book are incorrect as well. For example, Werner Moelders became General of the Fighters in 1941, not 1939; the F-86 Saber Jet used 50 caliber, not 50 mm, bullets; and between 12 May 1940 and 8 November 1941, Galland could not have shot down 103 aircraft since he claimed his 94th confirmed kill on 18 November 1941.

I cannot recommend this book to anyone other than the casual reader who wants general information concerning von Richthofen. Although it does have a table listing all of the Red Baron's kills and does address some interesting aspects of his flying techniques and philosophies, *Von Richthofen* loses its focus, dedicates entire chapters to Allied pilots and their careers, and includes chapters on pilots of the Second World War and the Korean War. When dealing with von Richthofen, one should recognize that perhaps the most significant part of his mystique is his death and the identity of the person who actually shot him down. This book gives these matters only a cursory glance, and Bickers seems simply to say, "Well somebody killed him; don't know who; let's leave it at that." Perhaps the author is unwilling to discuss it in detail because he can find no glory in giving credit to Australian ground gunners for downing the Red Baron. I am sure that if he honestly believed that a flyer, albeit a Canadian, had downed von Richthofen, he would have given full glory to Capt Roy Brown, another child of the Commonwealth.

The book is a fast read, and perhaps under a different title such as *A Comparative Analysis of von Richthofen and Other Fighter Leaders*, and with a little more work and less ethnocentric delusions, it might have actually gotten off the ground. But for $27.95, I would recommend that you keep your money. If you happen to come across *Von Richthofen* in a library, check it out, read it quickly, and put it back before any of your friends see you with it.

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Intervention: The Use of American Military Force in the Post–Cold War World by Richard Haas. Carnegie Endowment for International Peace, 2400 N. Street NW, Washington, D.C. 20037, 1994.

According to Richard Haas, the post-cold-war world is characterized by a loss of political control,

a resurgence in ethnic nationalism, and the proliferation of advanced military technologies. It is in the context of this "international deregulation" that Haas sees increased opportunity for the effective use of military force. *Intervention* is a concise, objective, and often controversial effort to provide guidelines on whether and how to intervene.

Realistic about the unlikely prospects for the emergence of a new US policy paradigm, Haas accepts the fact that future decisions governing force employment will be made on a case-by-case basis. Critiquing the intellectual debate influencing decisions, he contends that "just war theory" and jurists of the past three centuries have strengthened the moral, political, and legal norms against using force. Moreover, modern scholars such as Thomas Schelling and Henry Kissinger created further constraints by emphasizing gradualism. Together, they have reinforced the norm of state sovereignty and its inviolability, embraced by the United Nations charter.

Although this right to self-defense is internationally accepted, gaining in authority is the idea of humanitarian interventions, evidenced by current US military involvement in Somalia, Iraq, and the former Yugoslavia. Regarding force application in these cases, Haas reviews guidelines proffered during the past decade by Colin Powell, Les Aspin, George Bush, the Clinton administration, and others. The original texts of these policy makers are usefully provided as appendices. He also draws on traditional military strategists, such as Clausewitz and Jomini, finding their guidance eternally salient.

Haas admits that interventions are hard to define and offers further elucidation by positing an exhaustive list of 12 intervention categories. Included are traditional cold war missions of deterrence, compellence, and war fighting. Addressing the contemporary debate, he describes a range of humanitarian interventions, whose definitions falter for their imprecision. Peacemaking, for example, is broadly defined as those "activities between peace-keeping and war-fighting," while nation building refers to situations more in tune with political endeavors incorporating military aspects. As a whole, however, these categories can be useful in clarifying policy objectives.

Following an efficient review of 12 case studies that include significant military operations since 1979, Haas sets forth both conventional and more controversial guidelines for intervening. These guidelines are reapplied to the studies with all the benefits of hindsight. Regarding whether to intervene, he counters the recommendations of the Reagan and Clinton administrations by rejecting congressional and public support as necessary for action. Not only do some actions preclude prior consultation, but also leadership and success engender their own support, as was the case following the 1983 Grenada invasion and the protection of Persian Gulf shipping, beginning in 1987.

Haas decries "victory" or an exit date as prerequisites, arguing for a "sustainable strategy" tied to some achievable situation on the ground, such as Haitian elections. He considers the "national interest" to be an abused notion to which the public is numb. National interests figured minimally in the decision to enter Somalia, which was greatly influenced by humanitarian concerns and press coverage. Avoiding a media-driven policy, anticipating enemy reaction, and realizing the difficulties of affecting internal politics are also outlined.

Turning to the question of means, Haas refutes gradualism and just war theory, which run the "risk of missing the moment when force would be most effective." He sides with Clausewitz, supporting military employment sooner rather than later. Proportionality and discrimination are accepted, but Haas prefers the 1991 Gulf War standard of erring toward more force than necessary. Weapon inventories are insignificant unless employed to support objectives. Somalia is a case in which relevant force was not brought to bear and UN forces were initially "outgunned." He heralds the importance of airpower but draws attention to its inability to seize ground and protect populations through no-fly zones, as in southern Iraq. Safe havens are asserted as a feasible means of humanitarian intervention, but—unlike the situation in Bosnia—relevant force is required to guarantee their defense.

Haas's recommendations are meaningless without recognizing that "judgments of desirability cannot be divorced from assessments of feasibility." Truly, the effect of recent military reductions is a constraint on the capacity of American armed forces to respond without selectivity. Haas contends in the concluding chapters that policy choices based on order in an anarchic international system are likely to dominate, but a policy of "justice" allowing for humanitarian interventions must be prepared. He elaborates on the guidelines and caveats his partial dismissal of the "national interest," submitting that these interventions should be based on the scale of the problem, the existence of nonhumanitarian interests, and the availability of cost-effective military options. During execution, burden sharing and multilateralism may often be necessary but should be minimized as US stakes increase.

While carefully avoiding any attempt at establishing a new paradigm for US post-cold-war policy, Haas is to be credited for prescribing a path through the void previously filled by containment theories and associated gradualism. His efforts are worthy of consideration by persons concerned with the future application of military force.

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Cavalry Trooper to Fighter Pilot . . . and Three Wars by Col Jack W. Hayes, USAF, Retired. Sunflower University Press, 1531 Yuma, Manhattan, Kansas 66502-4228, 1997, 262 pages, $23.95.

Here is a blunt, tactical history of the Air Force from 1940 until 1970. From open cockpits to F-4s, Jack Hayes was a fighter pilot all the way, with some colorful detours into the bomber business. He began a military career on horseback in a Citizens' Military Training Camp in the late 1930s. From the panic and confusion of World War II, demobilization, "SACumcision" in the fifties, and Vietnam, this book gives the lowdown on the business end of flying operations.

Hayes was a colonel for over 17 years, and his story moves quickly from assignment to assignment in a distinct pattern: where and what he did, what was good and bad, and how he responded. He retains credibility by stopping just short of bitterness, and he is unafraid of examining human frailty, including his own. His style is earthy and real but not quite coarse, although he describes his first loop in the B-47 as leaving a "brown contrail" (page 166). Colonel Hayes indicts the lack of courage and integrity in senior leaders and describes failed policy and strategy as he sees it. He paints Air Force interdiction in Vietnam as "six Thuds for a bamboo bridge" (page 201).

Much of his story focuses on the rise of Strategic Air Command (SAC) and the relegation of Tactical Air Command and then the whole Air Force to SAC standards. He disdains the unending paper stream, illogical command structures, and a maintenance system that misuses personnel and equipment. Twice he disparages the appearance of two dozen ribbons that one could earn without facing any risk at all. At one point, he predicts that Air Force missions might go to the other services and that the Air Force would either dissolve or become "Space Command" (page 51).

Recent Air Force reorganization has eliminated SAC, returned wing leadership to one powerful wing commander, and provided operations group commanders control of their maintenance support. These reforms take the Air Force back to an earlier structure and validate many of Colonel Hayes's observations.

Cavalry Trooper to Fighter Pilot is a well-told story of the past, and historians should enjoy connecting the tactical events it describes to more widely known service history and doctrine. Pilots and flight-line troops will relate to the "good old days," and SAC advocates might feel inspired to offer another perspective.

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Winning My Wings by Marion Stegeman Hodgson. US Naval Institute Press, 2062 Generals Highway, Annapolis, Maryland 21401-6780, 1996, 304 pages, $29.95.

Marion Stegeman Hodgson's experience as a Women's Airforce Service Pilot (WASP) makes interesting reading for people seeking a personal narrative of one woman's contribution to World War II. Writing in an epistolary format, she shares letters to friends and family that describe milestones through flight school and the subsequent ferry flights of her follow-on assignment. Her work is also a love story. She chronicles her relationship with a Marine pilot, Ned Hodgson, who fights for his life after a harrowing aircraft accident. Although inspirational in its tale of one woman's determination, *Winning My Wings* contains unsettling social commentary on women's roles.

The first half of Hodgson's book details her life as one of the first female student pilots to train at Avenger Field in 1943. As she learns to fly the PT-19A, BT-15, and AT-6, she also experiences considerable discrimination from her male colleagues. For example, her commanding officer's opening remarks make it clear that he expects—and hopes—every woman will wash out. A male check pilot who sees Hodgson's class arrive for training sneers, "More women pilots! I'd like to give a U to every damn one I ride with. I'm putting in for a transfer" (page 24). The female trainees are given male coveralls to wear as a uniform, most so ill fitting that the women have to roll up the shirt sleeves and pants legs. These obstacles, however, only redouble Hodgson's determination to "win her wings" as she proves that merit and qualification—not gender—make a pilot. At the same time Marion fights to overcome discrimination against

women, Ned Hodgson struggles to recover from burn injuries he received after crashing his A-29. The determination of these two individuals is inspiring.

Hodgson's memoir is valuable for its insight into women's roles in the 1940s. When Hodgson's roommate washes out of pilot training, for instance, she laments that she can't "go back" to being a wife and mother after experiencing the independence of military life and the excitement of flying. In other words, once these women became military members, many could not return to the confines of a narrowly defined, domestic role. This experience was shared by many American women, symbolized by Rosie the Riveter, in the 1940s. At one point, Hodgson concludes that she can't "go back"; in fact, after she completes flight school and begins a successful career ferrying AT-6s, AT-7s, AT-11s, UC-78s, and C-45s, she rails at her mother's suggestion that she marry and return to her prewar job as a stenographer.

Although Hodgson has most feminist readers cheering at this point, she soon has them cringing. In the second half of the book, she does an about-face, writing that a woman's natural role (to use her words) is to be a wife or mother. This is a painful revelation to those readers who had viewed her as capable of hurdling roadblocks of discrimination for all women. By way of explanation, she writes, "If we were tampering with the role nature had intended for us, I reasoned, it was because there was a war on" (page 67).

When the Allied powers near victory and the US Army no longer "needs women," Hodgson reasons that it is time for her to marry Ned and become a wife and mother because her job as a WASP was "to release men, not to replace them" (page 245). Hodgson's rationale for ending her career demonstrates a common, if not dominant, way of thinking among both men and women in the 1940s; although I don't endorse her essentialist view of women's roles, I acknowledge that it was a signature of the era. However, Hodgson's letters of 1940 are punctuated with social commentary of 1990. It is in this latter genre that she grossly misses an opportunity to reach those readers who initially were so touched by her resolution to overcome discrimination. Ironically, Hodgson fought to prove that jobs (such as flying planes) should be given to people qualified to do them—regardless of their gender. As soon as the war is over, however, she jettisons both this principle and her career.

In total, *Winning My Wings* offers a snapshot of Marion Stegeman Hodgson's life in the 1940s. I recommend this account of one of only 303 women to become a WASP to readers interested in a personal account of women's experiences in flying military aircraft during World War II. Although Hodgson's resolution to succeed in a male-dominated world is inspirational, one should be aware of the book's flaws. If readers truly seek a genuine voice from the past, replete with outdated social values, their expectations of this book will exceed its shortcomings.

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Russia's Air Power at the Crossroads by Benjamin S. Lambeth. RAND, 1700 Main Street, Santa Monica, California 90407-2138, 1996, 265 pages.

When the commander in chief of the Russian Federation Air Force (RFAF), Gen Petr Deynekin, was asked recently to describe the condition of his force, he replied that it is "in crisis and all aspects of the situation have a rigid tendency toward further decline." As the United States and Russia continue their efforts to develop a strategic partnership in place of cold war confrontation, USAF men and women interested in those efforts might want to understand the context of General Deynekin's grim but all-too-accurate statement. Benjamin S. Lambeth's *Russia's Air Power at the Crossroads* is an important starting point towards that understanding.

Lambeth describes his book as "an assessment of trends and prospects in Russian military aviation." In a relatively modest 265 pages, he delivers just that while delving into issues of organizational and doctrinal reform, peacetime and combat operations, funding problems, and force modernization. The book's main strength is its synthesis of a decade's worth of Soviet and Russian press reports on the country's military aviation. Lambeth sifts and analyzes the disparate sources to describe the current state of Russia's airpower and provide some background to its current crisis. The result will give most readers a good overview of Russian airpower, but the book's broad-brush approach may not satisfy readers seeking great detail on any of the book's many topics. However, even specialized readers will find that the extensive footnotes are useful guides to further research.

Although Lambeth provides a comprehensive outline of Russian airpower issues, it is clear that his heart is in the operational level of his topic, where he devotes close attention to undergraduate pilot training, continuation training, peacetime operations, and the air war in Chechnya. Here, Lambeth, a senior

analyst at RAND, provides a unique viewpoint since he has had more exposure than most Western analysts to the Soviet/Russian air force leadership and its operational environment. He has visited air bases in Russia and was able to discuss his project several times with RFAF commander Deynekin. In 1989 he became "the first American citizen to fly a MIG-29 fighter and the first Westerner invited to fly a combat aircraft of any type inside Soviet airspace since the end of World War II." It is a sign of the times that joyriders can now buy this once-unique privilege through magazine ads touting "the ultimate adventure—fly a MIG!"

Besides accomplishing his aim of describing trends and prospects in Russian military aviation, Lambeth provides food for thought on several issues larger than his stated theme. First, his description of the RFAF's desperate condition illustrates the extreme perishability of airpower and shows that neglect of any of its vital components—people, equipment, and industry—can speedily cripple even the most advanced air force. Second, Russia's humiliation in Chechnya, despite early commitment of the RFAF to an intense bombing campaign, reminds us how a resilient foe in rugged terrain may withstand even an all-out air effort. Finally, and most disturbing, one has to wonder about the ultimate cost of Russian airpower's strategic and operational impairment. If aviation is as vital to national security and regional stability as its advocates claim, are we concerned enough about the state of Russian military aviation, and do we fully understand the potential consequences of an airpower vacuum in Eurasia?

Russia's Air Power at the Crossroads is a valuable contribution to the English-language literature on Russian military aviation. The book is well researched, and its appearance is particularly timely in light of the Russian armed forces' recently renewed efforts to reform themselves. Readers hoping to understand events still unfolding in post-Soviet Russia will find much of value in Ben Lambeth's aptly titled book.

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Unconventional Warfare: Rebuilding US Special Operations Forces by Dr. Susan Marquis. The Brookings Institution, 1775 Massachusetts Avenue, Washington, D.C. 20036, 1997, 319 pages, $49.95.

Readers should not look to *Unconventional Warfare* to find tales of special operations forces (SOF) engaged in Rambo-like acts of bravery. Instead, author Susan Marquis treats us to stories of unconventional warfare conducted by SOF supporters in Washington, counterinsurgency efforts of the Department of Defense's (DOD) bureaucracy, and psychological operations taking place throughout the halls of Congress and the corridors of the Pentagon.

Unconventional Warfare tells of the rebuilding of SOF through the creation of the United States Special Operations Command (USSOCOM) and the Office of the Assistant Secretary of Defense for Special Operations and Low Intensity Conflict (SOLIC). While other nations were enhancing their SOF capabilities, such forces were decimated in the United States following the Vietnam War. Public perception of SOF excesses in Southeast Asia and the identification of special operators with an unpopular war, coupled with conventional commanders' suspicions of SOF, led to a massive reduction in special operations capability. The government still called upon SOF when their unique capabilities were needed, but problems in Iran and Grenada showed that the United States cannot ignore such forces and then expect them to perform well in a contingency.

Dr. Marquis, a senior official in DOD, provides an incredibly detailed look at the battles waged between the supporters of SOF, both military and civilian, and the conventional military community, who wished the whole thing would just go away. Through numerous interviews and careful documentation, she re-creates Pentagon meetings and congressional hearings, allowing the reader to sit off to the side and watch the proceedings.

The attacks on SOF discussed in the book were as varied as they were plentiful. The Navy considered moving the SEALs to the Reserves, and Air Force special operators were assigned to the Military Airlift Command, hardly considered a combat organization by the rest of the military. Dr. Marquis travels the path from the disastrous 1980 attempt to rescue Americans from Iran to the 1986 legislation mandating the creation of USSOCOM and SOLIC. Along the way, she interviews senior military officers, DOD officials, and congressional staffers who drafted the law known as the Nunn-Cohen Amendment, providing the reader with a firsthand look at how to overcome well-entrenched biases. Through case studies and a discussion of SOF history, she conveys to the reader the importance of a solid special operations capability.

Unconventional Warfare demonstrates that merely passing a law doesn't guarantee that changes will occur. The first problems centered

around DOD's "interpretations" of the law, which had the potential to halt the revitalization efforts. The logistics of setting up a new command also raised some high hurdles. Finally, Dr. Marquis has a solid understanding of the SOF culture and discusses how difficult it was for special operators to adapt to the structured environment of a unified command.

It's easy to see where the author's sympathies lie. She mentions that the conventional military has an inherent mistrust of SOF but doesn't examine those concerns too closely, seemingly dismissing them as unfounded. It's important to understand the basis for these concerns as well as the reasons why they were unnecessary. This not only would strengthen the case for SOF but also would help the military avoid those problems in the future—not just for SOF but for any force that is unique.

SOF has come a long way in the last 10 years. The current secretary of defense is one of the sponsors of the 1986 legislation, and a special operator has been named chairman of the Joint Chiefs of Staff. The revitalization of our special operations capability did not happen overnight, though, and *Unconventional Warfare* does an excellent job of explaining the difficulties involved in bringing it about.

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Breaking the Phalanx: A New Design for Landpower in the 21st Century by Douglas A. Macgregor. Praeger Publishers, 88 Post Road West, Westport, Connecticut 06881, 1997, 283 pages, $65.00 (cloth), $24.95 (paper).

A new scientific truth does not triumph by convincing its opponents and making them see the light, but rather because its opponents eventually die, and a new generation grows up that is familiar with it.

—Max Planck

Douglas Macgregor's seminal work attempts to break down just such a generational barrier by proposing a new organizational structure and operational concept for America's Army of the twenty-first century. He brings a wealth of operational experience to the discussion, having served in Operation Desert Storm and winning the Bronze Star with "V" device for valor. His actions in combat include decisive leadership of his cavalry squadron at the Battle of 73 Easting. He holds a PhD from the University of Virginia, and his accomplishments and ideas have brought him to the center of the debate over the future of Army force structure, military strategy, and service doctrine. *Breaking the Phalanx* has become a "must read" within the senior Army leadership because it contains a fresh approach to the question of the role of American land forces in the twenty-first century.

During his cavalry squadron's rotation at the National Training Center (NTC) in California in 1993, Lieutenant Colonel Macgregor's employment and tactics were so "out of the box" from normal Army tactical doctrine that he went 3-1-1 in his battles, despite the fact that the norm is, at best, one win and a tie. Shortly after his trip to NTC, Macgregor was promoted to full colonel and given a fellowship to one of the more prestigious think tanks in Washington—the Center for Strategic and International Studies, where he wrote this book. For some people, this would seem a plum, but in Army circles, not going to higher command is a sign of displeasure from above. Departure from established doctrine is seldom rewarded in our Army.

So what is in this book that the senior Army leadership likes? Simply, it presents a template for a *very* different US Army than exists today—one that, if allowed to become the standard, would likely result in dramatic shifts away from traditional "heavy," manpower-intensive, large combat formations that are the Army's legacy as far back as World War II. This new Army can rapidly dominate the battlefield of the future by being lighter and relying on information technologies, precision, speed, and maneuver. The author offers up everything needed to reshape the Army to make his vision happen.

Macgregor's case is a simple one: "Land power will be an essential feature of statecraft and deterrence" in the foreseeable future. To achieve this goal, he "suggests reorganizing the Army into mobile combat groups positioned on the frontiers of American security, ready to act quickly and decisively, primed to move with a minimum of preparation." Macgregor discusses the problem of today's policy makers overlooking "the importance of the right organization for combat within a coherent doctrinal framework." The Roman Legion is selected as an example of finding a new method for victory. As Rome sought to expand, she subdued the previously "invincible" Macedonian Phalanx using new tactics and organization against a tried-and-true army formation—not unlike his own efforts in Desert Storm and later at NTC. To make this happen, Army units will need to be restructured to take advantage of new technology and leverage our growing ability to rapidly decide and act, as well as

"provide the foundation on land for coherent joint military operations in a new and uncertain strategic environment."

Breaking the Phalanx is an interesting read, and many of its chapters stand on their own. Macgregor allows outsiders to see how someone in one service views his own service as well as others. His use of history as support for some of his conclusions will no doubt cause airmen to toss the book aside, much as I did several years ago when I read Michael S. Sherry's 1987 work *The Rise of American Air Power: The Creation of Armageddon*. We must read things we do not like if we are to understand another point of view. Macgregor is quick to suggest how high technology such as stealth will be overcome and never play as key a role in national defense as land forces do. This is hardly a "joint" point of view—or is it?

Beyond his "boots on the ground" versus "silver bullet" force arguments, he presents a serious discussion of how a land force can be relevant in the wide range of conflicts that our future will likely hold. From actual organization tables to a specific Iranian scenario, Macgregor places his service on the horns of a dilemma: keep today's status quo and struggle to modernize over decades or get serious about changing the Army to be decisive through "dominant maneuver" at all points on the conflict spectrum. His message is to get light, lethal, information rich, and mobile. J. E. B. Stuart would have been proud.

If we accept the fact that there will be an Army in our national defense, then reforming the Army on information-age principles instead of the current industrial-age formations centered on heavy combat (read "tank") divisions makes good sense. His groups are task-organized to meet a wide range of operations under the Joint Task Force concept. His new force mix includes heavy combat, air assault, and heavy and light recon/strike groups, all sized for rapid mobility. As students of national defense, we should become concerned when anyone pushes a servicecentric solution at the expense of other service programs.

Macgregor is "fair" with his budget knife, offering up 10 major weapon systems for cuts or elimination, including the Army's next self-propelled artillery system, the 70-ton Crusader. Unfortunately, six of the systems are airpower-related, including the F-22, joint strike fighter, F/A-18E, and V-22. Space is indirectly cut by substituting unmanned aerial vehicles for satellites, based on the principle that air is more flexible than astrodynamics. Is he devaluing the very forces that allowed him to overwhelm his foe in the deserts of Southwest Asia and California?

There is hope for airmen in Macgregor's thesis. In his future land force, he clearly has latched on to several recognizable attributes: speed, range, freedom to maneuver, flexibility, firepower, and information superiority. Most of these info-age "grunts" will arrive by air, receive support from air, and attack by air. Macgregor may be a cavalry officer, but he thinks airmen's thoughts.

What needs to be said in this book is hidden in his design: without the capabilities of the other services, any army becomes very naked in the battle space of the twenty-first century. The real questions are, Who supports and who is supported in future fights? The current field-grade generation is wondering if it can wait for another generation to pass before the Army "sees the light."

Lt Col William T. Eliason, USAF
Washington, D.C.

Lt Col Douglas Macgregor's book *Breaking the Phalanx* lays out a framework to reshape US land forces for the twenty-first century. Although his ideas for the Army are visionary, his views on airpower are of some concern. Airmen need to be aware of Macgregor's positions because he has the potential to be the "Army's John Warden."

Macgregor's prevailing criticism of airpower advocates is their "silver bullet" approach to war. He criticizes America's and Great Britain's fascination with aviation in the pre–World War II era as a shortsighted attempt at deterrence. In his opinion, the fascination with and subsequent diversion of resources are (mostly) responsible for the ill state of allied ground forces during the 1930s. However, one of the motivating factors for advancing the use of airpower was to avoid the slaughter of the trenches during World War I. Isolationist sentiment, reinforced by the Army's great losses in World War I, was prevalent throughout the United States during the 1930s and did not end until the attack on Pearl Harbor.

He also ignores America's long-standing resentment of large standing armies and the effect the Depression had on the West's ability to support such armies. Macgregor acknowledges FDR's hope that airpower (and sea power) could avoid the large-scale use of troops. He states that "President Roosevelt's strategy to exert political influence through the exclusive reliance of seapower and later airpower did nothing to dissuade Germany, Japan, Italy, and Soviet Russia from aggressive action between 1938 and 1942." This failure to deter aggression cannot be blamed solely on the reliance on sea

power and airpower. Also, even if there had been numerous US forces deployed overseas, deterring the aggressive acts of Hitler, Mussolini, and Tojo would not have been a forgone conclusion.

Regarding the Vietnam conflict, Lieutenant Colonel Macgregor cites how airpower was ill prepared for anything but a full-scale nuclear war with the USSR. However, he glosses over the fact that the Army's training at that time was primarily focused on a Warsaw Pact versus NATO scenario. The Air Force, Navy, and Army did not foresee a prolonged war in the jungles of Southeast Asia (SEA). Subsequently, the Department of Defense had very little doctrine or preparation for a drawn-out guerrilla campaign. When airpower was allowed to operate freely, it did achieve the desired results (Khe Sanh and Linebacker II). The complex politics and policies of the SEA conflict hamstrung all US forces, including airpower.

For the Gulf War, Macgregor criticizes airpower advocates for selectively using TV news to advance their themes. He also quotes several surveys that highlight the inefficiency of airpower during Desert Storm. He believes that the strategic bombing campaign's effects on Iraq were overrated and that the force-on-force engagement during the "100 hour war" was decisive. He believes that Operation Desert Storm was a four-day land war with 38 days of battlefield preparation, not a 42-day full-spectrum campaign. However, during a taped interview with novelist Tom Clancy, Macgregor (unintentionally) describes the effects of constant bombardment on enemy forces. In reviewing the tank battle of "73 Easting" (a reference to map coordinates in Iraq), Macgregor stated that "the Iraqis initially thought it [the US tank attack] was an air strike—some of them jumped out of their tanks." Evidently, airpower had devastated that Iraqi tank unit's combat effectiveness and morale.

Lieutenant Colonel Macgregor is not totally anti-airpower. He even wants the Army Tactical Missile System and Apaches to be under the control of the joint force air component commander (JFACC) during the initial phase of a theater campaign. However, he later states that "control of the air in contemporary concepts of future warfare has become synonymous with centralization of control over all land-based and sea-based deep strike assets in the hands of the JFACC. This approach does not admit the possibility that the success of future operations may depend on more in the [battle space] preparatory phase outlined earlier or that aircraft will 'not always get through.'" He later states that "centralization of control [of airpower] may be the answer at the outset or at the end, but not throughout the conduct of operations in future war." This implies a return to "penny packets" of airpower. Early failure in World War II and the relearned lessons of the Vietnam War prove that airpower must be orchestrated by one conductor. Centralized control prevents fratricide and the wasting of weapons. The cascading effects that properly applied airpower can deliver upon an enemy must not be parceled away by a landcentric point of view.

Breaking the Phalanx is a thought-provoking book. Macgregor's ideas for modernizing the Army are truly revolutionary. The author may not fully appreciate the strategic effects of airpower, but his book is worth reading by military officers.

Maj Kevin J. Cole, USAF
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The Mother of All Hooks: The Story of the U.S. Navy's Tailhook Scandal by William McMichael. Transaction Publishers, Rutgers, The State University of New Jersey, New Brunswick, New Jersey 08903, 1997, 377 pages, $32.95.

The Mother of All Hooks is a detailed account of the Tailhook scandal that rocked the US Navy and its leadership. The bacchanalia that took place at the 1991 Tailhook Association Convention in the Las Vegas Hilton Hotel is not the central theme of this book. Although the sordid facts are recounted in shocking detail, the author has focused this work primarily on the Navy's corporate response to the misconduct, once it was brought to light. Through hundreds of interviews with the witnesses, suspects, lawyers, investigators, commanders, and political leaders who were involved in this case, the author exposes the Navy's traditional attitudes towards men (primarily pilots) and women. Perhaps most compelling are the revelations of the Navy's ingrained, outdated approach towards leadership, accountability, and due process and the ways in which those attitudes affected the ultimate disposition of the case.

McMichael, a senior reporter for the *Daily Press* of Newport News, Virginia, gathered much of the material for this thoroughly and carefully researched book while he was covering the Tailhook scandal for his newspaper. Although the author clearly has shaped the book with his own interpretations and opinions, his conclusions seem to be well supported. A review of the book's numerous footnotes shows that the author relied primarily on personal interviews, media reports, and documents from administrative and ju-

dicial hearings. As one would expect from a journalist, some of the author's sources are unnamed, to protect them from possible retaliation for providing evidence. Unfortunately, this practice detracts slightly from what is an otherwise authoritative treatment of the Tailhook incident.

The book is written in a nonacademic, easy-to-read style. At times, the author's writing style strays into the "pulp fiction" approach ("with his soft, blue eyes and easygoing manner, he didn't fit the mold of a hot-shot, hard-charging flier"). But overall, I thought that the book was well written and that the author's writing style tended to accentuate the various human aspects of this amazing story.

Through a careful telling of the Tailhook story, McMichael has painted a very compelling picture of a regrettable aspect of the US Navy's history. In recent years, several nationally recognized books have delved into various other tragedies and scandals that have plagued the Navy. For the people who have read these other volumes or for readers merely interested in learning more about Tailhook, *The Mother of All Hooks* will be a welcome addition to their libraries.

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Follow Me I: The Human Element of Leadership; Follow Me II: More on the Human Element of Leadership; Follow Me III: Lessons on the Art and Science of High Command by Maj Gen Aubrey "Red" Newman. Presidio Press, 505 B San Marin Drive, Suite 300, Novato, California 94945-1340, 1997, $15.95 each.

When I was asked to review this series, I was skeptical; I'd never heard of General Newman. Since I am unfamiliar with many retired major generals, I conducted a quick Internet search that revealed two items which cemented my interest in writing this review. First, I read about General Newman's World War II leadership in the Philippines. Second, I read a quotation I had heard before. The "Remember Me?" quote (vol. 1, page 106) contained all the information that I, as a former enlisted member, needed to decide to read these three volumes. This review discusses the value I've found in General Newman's books, one minor criticism, and—most importantly—the value one should find in these volumes.

I read these books voraciously. Each volume is divided into three parts and consists of collections of short articles originally written by General Newman for *Army* magazine and its predecessors. Volume 1's sections are "Command Presence," "Command Techniques," and "Command in Battle." As with many chapters, "Standards for Bachelors" provides interesting insight into history and what life in the Army used to be like. "The Best Course Is Frankness" argues that direct communication between officers and noncommissioned officers forms the foundation for mutual respect and long-term success. "Quick and Needless Changes Have No Place in Command" advises the reader to avoid change for the sake of change. The third section contains a particularly valuable series of essays since few of us have personal battle experience. Naturally, reading this section will not make us seasoned combat veterans, but it may help us make smarter decisions. "Sleep and the Soldier" illustrates a valuable lesson too often ignored. Frequently, people fail to realize that sleep deprivation produces disturbances in behavior on par with those caused by narcotics, alcohol, and oxygen starvation. General Newman emphasizes the value of sleep and the critical effect it has on our decision-making powers. Too often, we find ourselves burning the candle at both ends while we strive to meet work requirements and still maintain families and personal lives. Wise leaders will heed the advice offered in this section.

Volume 2 is divided into "Primarily Company Level Topics," "Principles for All Levels of Command," and "Reflections on Combat Situations." These sections appear to mirror those in volume 1, but such is not the case. The first section, although geared for younger officers, must not be ignored by more experienced officers. Some of the more interesting topics discussed by General Newman include hobbies, proper employment of lieutenants, a supervisor's responsibility to help the lieutenant learn and develop, and the value of the honor code in day-to-day living. He also discusses the extraordinary value of the Uniform Code of Military Justice in maintaining a service member's rights. Some topics bear repeating. General Newman felt the need to reiterate that sleep is not only a personal need but also a military duty. Further, I gained a clearer understanding of why commanders need aides. Although an aide is more crucial in wartime, General Newman reminds us that how we function in peacetime largely determines how we respond in the heat of battle. One of my supervisors once advised me to continually seek the "big picture." I was reminded of this advice as I read "The Unreasonable Is Sometimes Reasonable." General Newman offers the following guideline, which has

served me well through the years: "When receiving what seems to be an unreasonable order or decision, look for facts or considerations that could make it reasonable."

Finally, in volume 3, Newman takes as his theme "What men do reveals who and what they are—and . . . the human element pervades all levels of military service." He reminds us to periodically review lessons learned long ago to prevent us from falling into bad habits. A critical, timeless aspect of leadership remains the need to get along with people. He also reminds us of our responsibility to be self-starters. The book's information for field-grade officers will entice most people searching for ways to hone their leadership talents into reading and heeding much of what this volume offers. "Responsibility Cannot Be Delegated" provides a concise discussion of this important fact. One may disagree with "The Purple Heart Should Rank Higher Up," but it bears reading nevertheless. Finally, in the "General Officers" section, General Newman discusses how to become a general officer. But readers searching for a checklist that will ensure general rank will be disappointed. General Newman offers several examples of the requirements for becoming a general officer, but character seems to be the key.

In all volumes, each chapter introduces the topic, supports it with anecdotal examples, and usually closes with summary bullets of the chapter's main points. Since the articles were written from the 1960s to the 1980s, one may fear that the material is outdated, but the principles are timeless. General Newman has preserved many valuable lessons for future generations who may never have had access to them in their serialized form. Newman's sharing of the experience gained during his near-40-year career gives the reader valuable inside information into the workings of the Army.

Although I am overwhelmingly enthusiastic about this collection, I must note that the author discusses men exclusively. When I'm reading, I can usually apply a gender-neutral connotation to male pronouns, but in this case, General Newman is clearly referring exclusively to men. I repeatedly reminded myself that his career ranged from 1921 to 1960 and that the original versions of these volumes were published in 1981. In 1980 Air Force leadership was still reminding people that women were no longer members of Women in the Air Force. I have been much more tolerant of General Newman's perspective after recalling these facts.

In conclusion, these three volumes are superb! I offer an unqualified recommendation of them for anyone interested in honing his or her leadership skills. Even if you already know this material, it's worth revisiting.

Capt Jean Schara, USAF
New York, New York

Britain's Strategic Nuclear Deterrent: From before the V-Bomber to beyond Trident by Robert H. Paterson. Frank Cass and Company, Ltd., Newbury House, 900 Eastern Avenue, Ilford, Essex IG27HH, England, 1997, $45.00 (cloth), $24.50 (paper).

With so much attention devoted during the cold war to the US-Soviet arms race, it becomes easy to forget that there were other countries with nuclear weapons—the medium-sized nuclear powers possessing relatively small, but nonetheless important, nuclear arsenals. Following in the footsteps of the United States and the Soviet Union, Britain became the third member of the nuclear club when in 1952 it demonstrated a nuclear capability and soon began acquiring a limited delivery system organized around "V" bombers specifically designed for such purposes. Later, as its planes became obsolete and as Soviet air defenses improved, Britain moved to what it considered a less vulnerable and more cost-effective, sea-based deterrent relying on US-designed Polaris nuclear submarines.

The broad outlines of Britain's nuclear program have been well known for years, and this book, written almost exclusively from secondary sources, adds few new details. An analytical account, it gives meticulous attention to the policy-making process from a variety of standpoints—political, economic, and military. But it does so in a wholly bloodless fashion that either overlooks or downplays the many heated, internal debates that drove the British government's decisions over the years to become and remain a nuclear power. Ignored entirely, for example, is the bureaucratic infighting that accompanied the decision in the 1960s to disband Bomber Command and to shift to a sea-based deterrent. Perhaps the author's reticence on this and similar matters stems from his experiences and perspective. A retired British army officer, he has an innate regard for the strictures of British military discipline, a healthy respect for the Official Secrets Act, and, last but not least, an apparent abhorrence for telling tales out of school.

Still, what the author has to say is generally worth reading. More than half the book deals with historic background—the decision after World War II to acquire a nuclear capability, despite the enormous cost; the development of a basic strategy

similar to the American concept of "massive retaliation"; the transition from an airborne deterrent to a sea-based one; and the decision in 1980 to replace Polaris with Trident. Other chapters deal with arms control, the impact of public opinion on Britain's nuclear weapons program, and a comparison with the French nuclear experience.

Although the author seems to feel that Britain's decision to develop and maintain a nuclear capability was the right one at the time, he has no illusions about the subsequent costs and consequences. Not only did nuclear weapons drain funds from other defense programs, especially conventional forces, but also they failed in their ultimate objective of maintaining Britain's global position as a world power. Even so, Paterson accepts the argument that allocating resources to nuclear weapons has been less wasteful than critics claim, since it yielded a strategic asset out of all proportion to the conventional capability that could have been procured with the same amount of money.

Paterson is also reasonably confident that, even with the end of the cold war, Britain will want to preserve its nuclear deterrent, both to support NATO and for prestige purposes. Indeed, as the United States and Russia reduce their nuclear arsenals, Paterson feels that Britain's comparatively small nuclear force will count for more, thus strengthening Britain's geopolitical importance. But as Britain's nuclear history clearly indicates, its weapons program is firmly tied to that of the United States. For Britain to remain a nuclear power, it must preserve its "special relationship" with Washington.

Regrettably, there are factual flaws in this book that can lead readers astray. For instance, none of the B-29s loaned to Britain by the United States in 1950 was ever nuclear capable, nor is the American B-1B a "stealth" bomber, as the author suggests. But, on the whole, *Britain's Strategic Nuclear Deterrent* is a useful and insightful introduction to the evolution of British nuclear strategy and policy.

Dr. Steven L. Rearden
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Pilot: A Tale of High Adventure by Joe Patient. Leo Cooper, 190 Shaftesbury Avenue, London WC2H8JL, 1997, 241 pages.

Joe Patient was a 10th child, born in 1917 in London's East End. Perhaps his parents did not have time to teach him about boundaries. Eighty-one years later, Joe has drafted a shallow memoir of his life as a pilot—one that might be more accurately subtitled *A Tale of High and Low Adventure*. The main features of the story are lying, cheating, gambling, smuggling, adultery, and flying. I wish I could be more positive, because I love to read, and the cover led me to expect a deep and riveting story of operating the plywood bomber in hostile skies.

Joe quit school at age 14 and worked at 20 different jobs before joining the Royal Air Force (RAF). His skill as a pilot earned him an officer's commission. At some point, he married Lucy and fathered two children, but he gives no names or details of them. To his credit, he earned a Distinguished Flying Cross during 59 missions over Nazi Germany in the Mosquito, a light bomber. He reached the rank of squadron leader and served in the Middle East after World War II.

Joe Patient left the RAF in 1948 and began a roller-coaster career, generally involving aviation in the postcolonial turbulence of the Middle East and Africa. Near the end of the book, he gives only the names of three more children that were born to him. Some readers might conclude that the legitimate hero of the story is Lucy Patient, Joe's wife, although he offers very little explicit detail of her life or his feelings for her. She tolerated his incessant philandering and reared his five children, an extraordinary feat since she saw him only when a desperate situation drove him home.

Four fundamental problems slow the movement of the story. The author names hundreds of geographical locations but provides no map. Also lacking are pictures or detailed descriptions of the 80-odd aircraft types that he flew. (About half the photographs included are of mistresses.) The pace of the story is quick, but the author jumps from one side-issue to another, regardless of its relevance to the main story. Finally, the pervasive use of passive voice gives the narrative a halting quality. A critical reader might conclude that Joe Patient got this effort published the way he put together all his deals—by some scheme that got around the editing department.

This book might interest RAF veterans of World War II. Even Joe's amorous trysts lack sufficient depth and detail to arouse much general attention there. And the reader can only surmise his relationships with his closest family members. When Joe's fortunes turn sour near the end, he admits a deterministic view that he might be paying for "past sins" (page 194). Readers with a conscience would probably agree.

Col James E. Roper, USAF, Retired
Montgomery, Alabama

Airpower Synergies for the New Strategic Era: The Complementary Roles of Long-Range Bombers and Aircraft Carriers by Charles M. Perry, Laurence E. Rothenberg, and Jacquelyn K. Davis. Brassey's Inc., Herndon, Virginia, 1997, 250 pages.

The debate concerning the long-range bomber versus the aircraft carrier of bygone days has resurrected itself in this era of reduced budgets and the consequently smaller military. A concurrent phenomenon is the withdrawal of US forces from many forward-deployed locations at a time when the world is less stable and more likely to generate hostilities that will involve US forces. The last 10 years have witnessed a quantum leap in the number of times US forces have deployed into hostile situations. The increased tempo and the smaller budget create new challenges for those people who oversee US defense policy. The Quadrennial Defense Review (QDR) was an attempt to address perceived future requirements with the correct force structure. Among the QDR's critics are Dr. Charles M. Perry, Laurence E. Rothenberg, and Dr. Jacquelyn K. Davis of the Institute for Foreign Policy Analysis, the authors of *Airpower Synergies*.

Described as a "special report," this book strives to show that the United States can achieve greater synergies through a more cost-effective strategy by providing additional funding for long-range bombers (e.g., the B-2) and carrier-based fixed-wing aircraft (e.g., the F/A-18E/F and the naval variant of the joint strike fighter). The first reason for shifting away from land-based, forward-deployed aircraft involves basing. The reduction in the number of forward bases has a profound impact on how the United States may be able to respond in the future. Concerns in Japan, South Korea, and the Middle East caused by opposition from local populations are discussed. Limitations imposed by hosts serve to restrict operations from many of these forward bases. As an example, the authors mention Italy's not permitting F-117 operations from Aviano during 1995's Operation Deliberate Force.

Further, the authors spend much time describing the danger to US forces from the proliferation of weapons of mass destruction (WMD). Concurrent with this threat is the growth in delivery capabilities that may deny access to forward bases and restrict operations in littoral areas. *Airpower Synergies* uses the Khobar Towers bombing in Dhahran, Saudi Arabia, to illustrate the growth of terrorist targeting of US forces in forward locations. Tables, data, and extensive discussion throughout the text support all of these points.

The main point of the book is that long-range bombers based in the continental United States and carrier-based aircraft are less vulnerable to the problems of forward land-based forces due to distance and maneuverability. (The vulnerability of aircraft carriers operating in littoral areas to WMD is discussed in a footnote, not in the main text.) The writers contend that policy makers need to recognize that joint operations between bomber and carrier-based aviation produce synergies in a crisis response that land-based tactical air would be hard pressed to match in today's environment. Both can operate relatively independently of constraints imposed by other nations. Both can respond quickly and operate together. According to the authors, long-range bombers and aircraft carriers offer an excellent "swing" capability in the event that a second major theater of war emerges. It is basically for these reasons that this book advocates an increase in funding for long-range bombers and long-range carrier-based aviation—not in competition for funds as in the past but to utilize the synergy between bombers and carrier-based airpower.

Despite the book's documentation and well-supported arguments, the authors quickly "gloss over" the value of forward-deployed land-based airpower. They briefly mention that the presence of forward-deployed air and ground forces makes the strongest statement of US resolve and interest. Long-range bombers and carrier-based airpower must also consider the interests and concerns of nations in the areas where they operate, even if they launch from far away. Land-based air still provides an astounding sortie-generation capability, providing accurate firepower for counterair, counterland, and countersea operations (to name a few missions) across the entire area of responsibility, wherever and whenever the joint task force commander needs it. However, the book never addresses the value of space assets.

Airpower Synergies provides food for thought since it shows that the QDR is not the only potential solution to our nation's defense needs. In light of the arguments put forward in this study, increased investment in long-range bombers and carrier-based aircraft is worth consideration, but only if the approach is balanced and not at the expense of other equally valuable needs.

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The Forgotten Air War: The Royal Air Force in the War against Japan, 1941–1945 by Henry Probert. Brassey's Inc., 22883 Quicksilver Drive, no. 100, Dulles, Virginia 20166, 1995, 381 pages, $44.95.

The title of this book is a bit misleading because the subject matter is much broader than the title suggests. The focus of the book is on the operational history of the Allied air forces in Burma and Southeast Asia during World War II. Although the Royal Air Force (RAF) gets top billing, the US Army Air Forces (AAF) that fought in this theater are also covered pretty well.

Probert begins with the story of the small and obsolete RAF force in Malaya and Burma at the start of the world war and its rapid destruction by Japanese airpower. He then details the efforts to rebuild the Allied air forces in India in 1942 and 1943. Most of the book deals with the last half of the war in 1944 and 1945. After slowly reequipping and building a formidable force, the British and Americans won air superiority over Burma and Thailand and proceeded to conduct a masterful air campaign in support of the Allied offensive in Burma. Probert, an experienced US Air Force officer and historian, provides a well-written and thoroughly researched operational history of the whole campaign.

The characterization of this war as "forgotten" is apt. Because the Southeast Asia theater of war was at the bottom of everyone's strategic priority list, it took a long time for the Allies to build up a respectable air force. Creating an air force infrastructure and capable logistics system was a much more difficult task than it was in Europe. Finally, it was one of the most difficult theaters of war in which to fight. The terrain was mostly trackless jungle; forward airstrips had to be cleared by hand; the climate was hard on men and equipment; and the monsoons made flying exceptionally hazardous for much of the year. Indeed, in 1944 and 1945, the terrain and weather proved more formidable than the Japanese. However, if an Allied pilot was unfortunate enough to get shot down, the chances of survival were minimal compared with the Allied pilots shot down over Germany.

The author outlines how the air war in Southeast Asia was much more of a coalition war than in other theaters. With relatively few assets, the British and Americans had to effectively pool resources. In 1943 the US Tenth Air Force under General Stratemeyer was placed directly under the command of the RAF's Air Chief Marshal Sir Richard Peirse, who served as the Allied air commander for Southeast Asia from 1943 to 1945. The British and American lines of command were completely mixed. Stratemeyer served as the Tenth Air Force commander as well as deputy commander for Peirse. The RAF and AAF heavy and medium bombers in the theater were combined into one bomber command with an American brigadier general commanding. The fighter units, which included some American fighter squadrons, were consolidated into a tactical air force with a British commander. The reconnaissance forces of the AAF and the RAF were completely integrated into a single combined photoreconnaissance force. The British and Americans worked remarkably well together with little friction.

It was a very complex type of air war. In addition to numerous close air support and airlift missions, the theater witnessed aerial-interdiction campaigns, antisubmarine operations, insertion of paratroop and glider forces, and even the first helicopter medevac operations in history. By early 1944, the Allied air forces could insert and support whole brigades in northern Burma by air transport alone. By 1945 whole divisions could maintain the offensive and operate behind large Japanese forces with air transport as their sole means of supply and reinforcement. A very effective forward air control system was developed to provide heavy aerial firepower to the light infantry divisions outmaneuvering the Japanese on the ground. Good leadership and doctrinal flexibility found solutions to many especially difficult problems.

The airpower history of World War II has tended to focus upon the strategic bomber campaigns in Europe. I am glad to see that the air war in Southeast Asia now has in Probert's book an appropriate operational history. For all the interest lavished upon the study of the air war in Europe, the little-studied air war in Southeast Asia has been far more typical of air warfare in the last 50 years. Composite units such as the US 1st Air Commando Group that could base forward in rugged terrain proved their worth. Airlift came into its own as a major weapon of war. Lightly armed ground units proved they could substitute aerial firepower for artillery. Since so many recent wars have been fought in conditions similar to those of Southeast Asia, a study of this campaign might provide some worthwhile lessons in leadership, organization, and doctrinal flexibility that are relevant to modern operations.

The author has done a fine job. This book ought to be on the reading list of anyone interested in the war in Asia in World War II. Certainly, military officers interested in the application of airpower in small wars should read this book.

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Easy Target: The Long, Strange Trip of a Scout Pilot in Vietnam by Tom Smith. Presidio Press, 505 B San Marin Drive, Suite 300, Novato, California 94945-1340, 1996, 268 pages, $24.95.

This book is difficult to read for today's military professional. Although its true purpose is to tell the personal story of the author during the Vietnam War, it paints a candid picture of our force during the late 1960s and early 1970s. If ever anyone needed a justification for an all-volunteer force, this book is it.

The author tells his story of evading the draft for a few months only to enlist later to fly Army helicopters. This brief history recounts the author's trip through basic training, into Army helicopter flight school, and on to the jungles of Vietnam. There is perhaps something to be gleaned from this book about how Scout pilots operated during that phase of the war, but the stories of drug use, prostitutes, and AWOL trips to rest and recreation (R&R) areas and Saigon are just as powerful.

Although no one questions the physical courage of the Army Scout pilots of the 1st Cavalry, in which the author served, the characters he describes are far from model soldiers, demonstrating a strange blend of courage and irresponsibility. Perhaps the author intended to emphasize this contrast. The pilots' courage is documented by their fierce pride in the job they did and the risks they took in order to support their fellow servicemen. The most vivid of these risks is the author's account of flying into a heavily defended area to evacuate two wounded infantrymen, for which he was awarded the Distinguished Flying Cross. The book contains many such accounts of bravery in action and wounded comrades.

This selflessness contrasts with an irresponsibility that is difficult to comprehend. Taking a combat helicopter to an R&R area for two days without permission, on the flimsy excuse of picking up parts is just one example. The author's opinion of the officer corps and of the Army as an institution is obviously affected by the perceived overreaction from his superiors to this type of antic. The story ends after the author has been rescued from a serious crash, his injuries forcing his early release from active duty. The reader is left with the stereotypical Hollywood view of the military services and servicemen from the Vietnam era.

Although this book provides no new insights into the Vietnam War, it serves as a benchmark for how far our armed services have come in the past 25 years. It provides a window into a past state of readiness that makes one wonder how the men and women of today's services will be viewed in the next 25 years.

Capt Rob Lyman, USAF
Keesler AFB, Mississippi

The Role of the Chinese Military in National Security Policymaking by Michael D. Swaine. RAND, 1700 Main Street, Santa Monica, California 90407, 1996, 100 pages, $15.00.

In March 1996, two US aircraft carriers were deployed to Taiwan as a response to the launching of theater ballistic missiles by the People's Republic of China (PRC) into areas that bracketed the island nation, while the People's Liberation Army (PLA) conducted a large amphibious-assault exercise in relative proximity. Many pundits speculated that the PRC's belligerence was PRC president Jiang Zemin's method of placating the PLA and saving face after suffering the double ignominy of the US Senate's approval of Taiwan president Lee Teng-hui's visit to the United States and Taiwan's first free presidential elections. However, this is only conjecture because the PRC's actual national-security decision-making processes are unknown, both to the world and to China's citizens. Such opacity only deepens the potential that US-Sino confrontations will lead to conflict as a consequence of mutual misassessment.

Michael Swaine, director of RAND's Center for Asia-Pacific Policy, attempts to cut through China's dangerous turbidity and investigate the role of the PLA in China's national-security policy making. Swaine divides his study into four categories: the influence of the PLA in (1) national strategy; (2) foreign policy; (3) defense policy; and (4) strategic research, analysis, and intelligence. The ultimate authority over national strategic objectives rests with Jiang Zemin, Premier Li Peng, Adm Liu Huaqing, and Gen Zhang Zhen. Foreign affairs, in turn, are managed by Li Peng, and his key deputy is Liu Huaqiu, director of the State Council Office of Foreign Affairs—not the better-known Foreign Minister Qian Qichen. Whereas the PLA has little direct input into foreign affairs, the uppermost tier of defense policy is guided by the Central Military Committee, consisting of Jiang Zemin, Adm Liu Huaqing, Gen Zhang Zhen, as well as Gen Zhang Wannian and Gen Chi Haotian. Readers may recognize the names of the admiral and Chi Haotian because of the former's Mahanian enterprise to create a blue-water navy and naval doctrine for the PRC, and the latter's discussion of military modern-

ization during a visit to Washington, D.C. Strategic research, analysis, and intelligence also constitute an arena in which the Chinese military exerts considerable influence. To a large extent, the perceptions of senior and midlevel leaders in both the national strategy and foreign policy arenas are shaped by the PLA's lower-tier strategic-studies groups and its intelligence gatherers and analysts.

Overall, Swaine successfully presents a picture of the PRC's national-security bureaucratic structure. Yet, his monograph does not provide detailed examples that argue for or against the theorem that the Chinese military is the final arbiter of Chinese politics. Swaine's text also lacks a portrait of the personal agendas, party politics, and power struggles inherent to the PRC and PLA. Swaine does admit the likelihood of lengthy deadlocks and messy compromises within the PRC and PLA in future times of crisis, and there are many illustrations throughout Chinese history of internal leadership struggles that have ignited wars with foreigners.

Inasmuch as it is critical that the United States understand the internal political processes and interests of important nations such as the PRC in order to avoid miscalculations that could result in war and regional instability, so it is vital for the United States to comprehend the influence of the PLA upon China's policy making. Swaine's monograph contributes to such comprehension not only by providing a diagram of the PRC's national-security policy making, but also by displaying how little we really know about one of the most prominent nations in the world. I enthusiastically recommend it to people who are studying Asian security issues.

Capt Jeff Kojac, USMC
Yuma, Arizona

Five Star Leadership: The Art and Strategy of Creating Leaders at Every Level by Patrick L. Townsend and Joan E. Gebhardt. John Wiley & Sons, 605 Third Avenue, New York City 10158-0012, 1997, 254 pages, $24.95.

According to the authors, the current corporate climate forces employees to do more with less, creating a turbulence that confuses, alarms, and tires. When the competition is on the move, we have no time to find a manager. To survive, we must lead from positions without power. Naturally, we traditional followers and newly fledged leaders feel stressed and confused. We need both leadership philosophy and practical tools for fighting confusion and feelings of powerlessness. Townsend and Gebhardt have given us both in *Five Star Leadership*.

The first few chapters cover the philosophy. This section contains more than a few points worth pondering. Leadership comes from how we act, not where we sit. Leadership includes instilling leadership in others. Building leaders should make our workplace more productive, our jobs more rewarding, and our lives more fun.

Leadership is not management. Leadership is an art; management, a science. Management is a subset of leadership but not integral to it. According to the authors, "a manager is a potential leader who hasn't finished evolving yet" (page 9).

For leaders to grow, managers must learn to let go. The hardest thing for a leader to do is to trust. But trust is the prerequisite for the confidence, both in self and in others, that underpins leadership. Leaders, confident and trusting, can empower. And empowerment makes leaders of stressed and confused followers.

The authors' definition of leadership comes from John Mellecker: "The creation of an environment in which others are able to self-actualize in the process of completing the job" (page 64, repeated on page 141). Such leadership requires a commitment to hands-on practice. It is no armchair exercise, for "trying to learn leadership by studying Golda Meir is akin to trying to learn construction by looking at pictures of skyscrapers" (page 194).

Leadership can be flowcharted because it is not a position but a path. Chapters three through 10 trace that path. The authors take us progressively from the early step—transcending followership—to the acme—the training of other leaders. Each chapter overflows with examples and lists as well as useful tools for self-assessment, measurement, and development. An atypical list, 14 leadership traits, receives an 11-page discussion. More commonly, lists have only a page or two of discussion. Representative lists are a four-step approach to developing leadership skills by assessing strengths and weaknesses and 16 traits of creative people. Also addressed are communications, ethics, discipline, and the multitude of knowledges and skills all leaders must master.

Scattered throughout are reminders that leadership development is not a neat and simple linear process. Theoretically, each step on the path builds on the preceding step. In practice, because each of our interactions has a discrete leader-follower relationship, we must tailor our behavior to fit the specific situation. Consequently, we find ourselves

at several levels of leadership maturity at any given time. We are all followers, we are all leaders, we are all students and teachers—all almost simultaneously.

If we are to become leaders—and we must become leaders—it behooves us to practice, practice, practice. If we are wise leaders, we will take an occasional refresher. We will wear the pages of this book thin.

This book presents no new concepts. Nor does it break new ground. Such is not its purpose. *Five Star Leadership* collects the best currently available lists of leadership techniques. As a book of lists, it is a convenient reference and a good resource. As a collection of pertinent examples and skillfully turned phrases, it is a good read.

Dr. John H. Barnhill
Oklahoma City, Oklahoma

Death So Noble: Memory, Meaning, and the First World War by Jonathan F. Vance. UBC Press, University of British Columbia, 6344 Memorial Road, Vancouver, British Columbia, Canada V6T1Z2, 1997, 319 pages, $39.95.

History is something of a collection of memories—by definition, the memories of the survivors and, in most cases, the victors. Jonathan Vance takes a look at the memories of the First World War from the Canadian perspective and notes the tremendous difference in the recollections, the assessments, the glorification, and the memorialization of this defining Canadian experience from the real experience of Canadian soldiers in combat.

His point in doing this is to demonstrate the long-term effect of the war, not only on the generation of Canadians who participated but also on those who did not participate and the generation that followed in their footsteps to fight the Second World War. The First World War defines Canada's nationhood much as the Civil War did for the United States. Despite a lack of direct threat or attack, Canada answered the call from the motherland and performed admirably. It is not surprising that the recollections of Canadian veterans, widows, orphans, and families tend to minimize the horrific aspects of the western front in deference to a heroic memory of true and pure soldiers fighting to defend God, country, and the king from the evils of the German kaiser. This perception of the First World War manages to soften an inherent Canadian pacifism and fuels a second war effort for Canada 20 years later.

I find this account of Canadians' memory of warfare less than illuminating. Vance portrays Canada's softened version of the war with barely disguised contempt and surprise. The notion that a people will memorialize its war heroes and forget about the baser aspects of warfare is not a particularly novel idea although it might be new to Vance. American history and its coverage of the Civil War, the taming of the West, and modern wars are replete with examples of such glossing over. Vance and some Canadians are just particularly sanctimonious about it—as if they were immune to such human frailties. Vance writes as if he were surprised that Canadians would do such an American thing.

Canadian experience in warfare is minimal. This nation was born in the throes of the decline of the British Empire, it was dragged into two world wars by its imperial ties, and it has notionally participated in combat in the latter half of this century through NATO and the United Nations. Canadians can be forgiven if they tend to glorify the participation of their corps of infantry in the indecisive and forgotten quagmire of the western front when they seized the long-since-forgotten Vimy Ridge for little or no reason in 1916. It's all they have.

Lt Col James Diehl, USA
Fort Monroe, Virginia

Warhogs: A History of War Profits in America by Stuart D. Brandes. University Press of Kentucky, 666 South Limestone Street, Lexington, Kentucky 40508-4008, 1997, 384 pages, $39.95.

If you are looking for another polemic on the evils of war profiteering, keep looking. Rather than offering yet another version of the old munitions-banker thesis, Stuart Brandes presents a reasoned, scholarly survey of the history of war profits from the earliest colonial settlements to the period immediately after World War II. While most of us have grown up with the standard historical view that profiteering was rampant during many of this country's wars, Brandes presents a slightly more revisionist interpretation. Beginning with the earliest settlers, Brandes follows the history of profiteering from the colonial period down to the twentieth century. His analysis of the mobilization for World War I through World War II is particularly well done with an insightful scrutiny of the motivations of those who conducted the interwar investigations into profiteering. While he does not discount that massive fortunes were made, his

analysis indicates that much of the controversy probably was politically motivated. For instance, Brandes cites the investigations of the Nye–Vandenberg committee and their investigation of the munitions industry as one of the most influential during the interwar period. Although the text lacks some depth of analysis, particularly in the pre–World War I years, Brandes does a credible job describing the interaction between the government and industry. Unfortunately, his study ends abruptly with the victorious outcome and does not cover the cold war in any detail. The author's concluding comments that defense manufacturers' profits had come into line with commercial producers may be somewhat contradicted by $600 toilet seats and $150 coffeemakers.

From the view of a policy analyst, the book provides an excellent study of the evolution of public policy towards regulating profits. Brandes tracks the development of the laissez-faire attitude of government control over profiteering during the Revolutionary War to the command economy required by the massive mobilization of World War II. As the book begins, Brandes describes the limited controls of the colonial period. For the most part, such controls were confined to General Washington's exhortations against profiteering. Although a few were severely punished, most punishments simply consisted of dismissal from the military. Profiting by inflating prices garnered moral condemnation, but little legal action. By the end of the period under study, Roosevelt's establishment of the Office of War Mobilization to oversee virtually the entire economy illustrates the pervasive efforts to eliminate not only illegal profits, but also profits arising from scarcity and inflation. Brandes illustrates the slow shift in attitudes and the movement towards the acceptance of greater control of the economy by the government. For anyone interested in the historical legacy of policy-making efforts to regulate defense industries and contractors, the book offers a reasoned, scholarly approach to a subject that is generally treated with more heat than light.

Warhogs is well researched and documented. Brandes supplements his narrative with copious notes and references. For a student desiring further study in a certain period, Brandes's citations provide an excellent point of departure. For anyone interested in a relatively dispassionate analysis of war profiteering, the book provides an excellent overview.

Lt Col Eric Reffett
Maxwell AFB, Alabama

A-Train: Memoirs of a Tuskegee Airman by Lt Col Charles W. Dryden, USAF, Retired. The University of Alabama Press, Box 870380, Tuscaloosa, Alabama 35487-0380, 420 pages, $29.95.

A-Train: Memoirs of a Tuskegee Airman is an exciting and motivating personal account of Lt Col Charles Dryden, one of the first black American combat pilots of the original 99th Pursuit Squadron. It is an interesting and even modestly successful attempt to tell readers about the life of an American aviator who happens to be black and happened to grow up in a dark era in American history during which a large percentage of the population honestly felt blacks were incapable of flying aircraft, let alone flying aircraft in combat. Unlike many autobiographies, memoirs, and combat diaries, the author's story has transcended the average gung ho, "let's kill as many of the bad guys as we can" kind of book. His story is much more personable than many others of its type and traces his burning desire to fly airplanes from the time of his youth through World War II, Korea, and indeed throughout his entire life.

The author is uniquely qualified to write this book since it is a memoir of his own life adventures and experiences. The book is tastefully written with little need for the rigorous documentation required or expected in a book of specific combat or unit history. The factual content, tail numbers, take-off times, sortie numbers, formation sizes, and the like are not particularly necessary for this book to achieve success. The author does an admirable job of keeping the reader interested in his story without having to rely on the use of heavy documentation and cross-referencing in order to prove his point.

A-Train is a very good, well-written book. It makes a significant contribution to the field of aviation history but many historians may not find it such an important study because of the lack of documentation. I would have to disagree with them. The value and power of this book rests in the author's ability to show the reader what a black American had to endure just to secure his right to fly airplanes and fight and possibly die for a country that was supposedly fighting tyranny and oppression around the world. Meanwhile, back at home, a significant portion of American citizens were being abused, mistreated, and denied personal freedoms guaranteed by our own Constitution. Among many stories, he tells of the better treatment given to German POWs than to himself and the other black pilots that were in his unit, his court-martial for "buzzing" the South Carolina town of Walterboro, the incident involving black officers being denied

access to the officer's club at Selfridge Field, Michigan, in 1944, and the impact of Jim Crow laws on the black servicemen stationed in the South during World War II. But through all of the adversity he had to endure, perhaps the most significant aspect of this memoir rests in his strength, desire, and willingness to succeed, his love of his family, his belief in God, and the respect he had for those white Americans who chose a difficult path and believed enough in his and other blacks' abilities to fly airplanes. These values are expressed over and again in the book and serve as lessons for all who will dare to read this book.

In all, this is a very enlightening and interesting book about a man and his passion for his God, his family, the human spirit, and his flying. If the reader is more inclined toward a detailed combat history of the Tuskegee Airmen, then *A-Train* is probably not what you are looking for. However, if you are interested in the personalities of some of those men who learned to fly and fight from the airfield in Tuskegee, Alabama, then this book is well worth the time to read.

Maj Robert F. Tate
Maxwell AFB, Alabama

More than a Uniform: A Navy Woman in a Navy Man's World by Winifred Quick Collins. University of North Texas Press, P. O. Box 13856, Denton, Texas 76203, 1997, 240 pages, $16.95.

As the top-ranking woman in the Navy from 1957 to 1962, Capt Winifred Quick Collins was more than a pioneer in a world dominated by men—a feat in itself. She was also a visionary who did more to further women's issues than perhaps any other member of the Navy. Whether improving enlisted women's access to technical training, increasing the number of female officer billets, or designing completely new uniforms, Collins used a repertoire of strategies to achieve her goal of proving to the Navy that women are as essential to the mission—and as capable of executing it—as their male colleagues.

Collins's autobiography chronicles the evolution of women in the Navy from 1942 to the present by outlining her 20-year career as a personnel officer. One of the first women to receive a commission, she became the personnel director of the Midshipmen's School, responsible for classifying six thousand women officers who would later join the Navy. Because there were so few women in the service and women were needed to supplement manpower in gearing up for World War II, even Collins's decisions as a newly appointed ensign had far-reaching impact on women's roles. Ultimately, Collins advanced to the highest rank obtainable by women (and limited to only one woman at a time) as the chief of Naval Personnel for Women, where she formulated and implemented policy that evened the playing field for male and female personnel. The book blends formal policy statement, statistical data, and Collins's career experiences in a mix of historical fact and personal anecdote. As a result, it is informative and easy to read.

Perhaps the most impressive aspect of this book is Collins's professional attitude: she repeatedly describes the success of each program she improves in a pragmatic manner. If "x" is broken, she fixes it. In other words, the book is not an exercise in self-gratification. Instead, it is testimony to how to effect change amid a climate where change was often neither welcomed nor encouraged. Collins combined hard work, candor, initiative, diplomacy, and a sense of humor to integrate women into the Navy. As one example, Adm Hyman Rickover (an expert on nuclear submarines) called her once explicitly to say he didn't like the women's new uniforms. Collins responded, "Admiral, I am very disappointed that you don't like it, because I worked for a year on the design. It was been tested by many women and it has met the easy-care requirements of navy women around the world. They all find it very attractive and are eager to have it available to them. On the other hand, Admiral, I don't know a darned thing about submarines." Replying "Message understood," Rickover hung up the telephone (p. 181). This exemplar of tact is just one of many provided in the book.

More than a Uniform should be mandatory reading for all women in the Navy because it traces the evolution of women's roles from World War II, providing a sense of history rarely portrayed in traditional texts. In fact, I wish a similar book would be written about women in the Air Force. In a more general sense, I also recommend this book to readers interested in learning various tactics for effecting change when it is resisted. If more military members were like Captain Collins, there would be less political maneuvering around "women's issues" and a greater focus on how to accomplish the mission and take care of our people better.

Capt Rosemary King
Phoenix, Arizona

Mission Debrief

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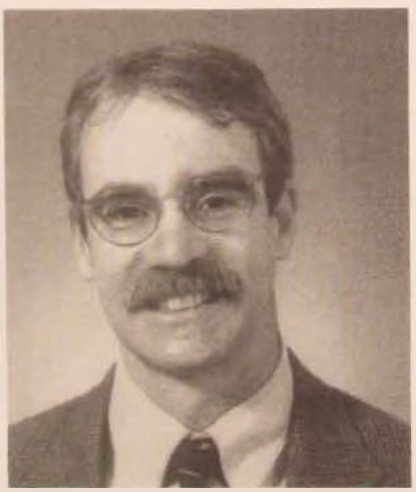

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Lt Col Carl Daubach (BS, Pennsylvania State University; MA, University of Iowa; PhD, University of Kansas) is director of international programs at the United States Air Force Academy. An Air Weather Service officer, Lieutenant Colonel Daubach was previously an assistant professor of Russian history at the USAF Academy.

Col Samuel Grier (USAFA; MS, University of Colorado; PhD, University of Texas) is permanent professor and head of the Department of Computer Science at the United States Air Force Academy. A KC-135 command pilot with over twenty-four hundred flying hours, he has previously served as chief of NATO's Situation Center in Brussels, Belgium. Colonel Grier is a graduate of Squadron Officer School, Marine Corps Command and Staff College, Air Command and Staff College, and NATO Defense College.

Col Gunther A. Mueller (BA, MA, West Virginia University; PhD, Ohio State University) is professor and head of the Department of Foreign Languages at the United States Air Force Academy. He previously served as an air intelligence officer and chief of the Indications and Warning Branch, Headquarters US European Command, Stuttgart, Germany. He serves as executive director of the Defense Exchange Committee on Language Efforts and recently conducted a comprehensive review of USAF officer foreign-language skills as chairman of a 13-agency process action team. Colonel Mueller is a graduate of Squadron Officer School, Air Command and Staff College, and Air War College.

Capt Fred G. Kennedy III (BS, MS, Massachusetts Institute of Technology; MA, George Washington University) is an action officer in the Acquisition Program Integration Directorate, Office of the Undersecretary of Defense (Acquisition and Technology). He was previously assigned to the USAF Phillips Laboratory, Kirtland AFB, New Mexico, as program manager of the Integrated Solar Upper Stage and Bimodal Programs and later as branch chief of the Upper Stage Systems Branch. In 1997 Captain Kennedy served as chairman of the First Conference on Synergistic Power and Propulsion Systems, Albuquerque, New Mexico. He has authored or coauthored a number of publications on propulsion and power systems and their space applications and was named an Air Force Association Von Kármán Scholar in 1990.

Capt Bryon Fessler (BS, Wilmington College; BS, MS, University of Maryland; MS, Arizona State University) is an Air Force Intern, Deputy Chief of Staff for Personnel, Headquarters USAF. His previous assignments within the Office of the Secretary of Defense include chief, Communications, Computers, and Information, and Bosnia political-military advisor. He has had a number of assignments within the Office of the Air Force Deputy Chief of Staff for Operations and the Office of the Secretary of the Air Force, and he also was Air Force advisor to the DOD Education Resource Internet Action Team. Captain Fessler is a distinguished graduate of Squadron Officer School.

Capt Rory D. Welch (BS, Worcester Polytechnic Institute; MA, George Washington University) is a program analyst, Directorate of Programs, Deputy Chief of Staff for Plans and Programs, Headquarters USAF. He was previously assigned to the 3d Space Operations Squadron, Falcon AFB, Colorado; the 564th Missile Squadron, Malmstrom AFB, Montana; and the Deputy Chief of Staff for Air and Space Operations, Headquarters USAF. He is a distinguished graduate of Squadron Officer School.

Lt Col Price T. Bingham, USAF, Retired (USAFA; MA, University of Alabama), is a manager for business development for Northrop Grumman Corporation's surveillance and battle management systems, Melbourne, Florida, facility. He was chief of the Current Doctrine Division, Airpower Research Institute, Center for Aerospace Doctrine, Research, and Education (CADRE), Maxwell AFB, Alabama, at the time of his retirement in August 1992. During his 30 years of military service, he flew fighters in the United States, Europe, and Southeast Asia. He served as a fighter and tanker duty controller in the Military Assistance Command, Vietnam (MACV)/United States Support Activities Group (USSAG) tactical air control center and as an air operations officer at Headquarters USAF. Colonel Bingham is a frequent contributor to *Airpower Journal* and has published in numerous other professional journals.

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