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THE AIR FORCE PROFESSIONAL DIALOGUE

Fifty Years and Counting

THIS EDITION concludes our yearlong celebration of publishing—for 50 years—the best ideas in the Air Force. Twelve other editors and I have shared the honor of serving as caretakers of the Air Force's professional dialogue. Allow me a moment's reflection to mark the passage of time.

Gen Muir S. Fairchild's vision to stimulate reading, writing, and reflection on the part of Air Force members assumed the physical form of *Air University Quarterly Review* in the spring of 1947. Gen Curtis E. LeMay expanded its size, and the bi-monthly publication *Air University Review* debuted in 1963. Although some wags characterized the end of *Air University Review* and the advent of *Airpower Journal* as the Air Force's "unilateral disarmament in the war of ideas," the facts show, at best, a retrenchment of the professional dialogue. Available publishing space for potential contributors was cut in half, and the editorial focus was narrowed—allowing publication of ideas only at the operational-art level of warfare.

The *Journal* remains a creative work in progress. Everything we've accomplished in the most recent past has been aimed at providing you an open forum to debate the best ideas on how to improve our policies, apportion our resources, and employ our forces. Dealing with us has given many of you a first impression of how the publishing world works. A number of you have successfully submitted articles for publication, while others have suffered the disappointment of rejection. Although we've tried to "ramp up" the flow of ideas and the number of articles, many of you are discovering that it's tough to get published.

As of press time, our acceptance rate for feature articles is approximately 12 percent. You could write us a letter.

Did you notice that there weren't any letters to the editor in the summer issue? That's tantamount to reporting that we're "C-3" (not combat ready) for ability to accomplish our mission. Letters are the life of our debate; without them, we fail. You seem to be more inclined to write articles for publication than letters to debate those ideas already posted. Our on-line publication (www.cdsar.af.mil/air-chronicles.html) offers an even greater opportunity for publishing your ideas. Yet, many of you remain reticent to do so. In discussions with other journal editors throughout the Department of Defense, I've discovered that *APJ* is not alone. The pipeline of letters simply dries up from time to time. Are you unwilling to comment on what you read here? Are we meeting your needs for relevant professional discussion?

The liveliest debate we've run in the last dozen years has been about the debate itself. Perhaps the greatest challenge remains dealing with perceptual scars from the era when officialdom spoke volumes about free and open debate in a government publication. We sense that questions about just how free a forum we are have deterred some of the best and the brightest from contributing. In lieu of regurgitating that debate here, I encourage you to read the following items, which chronicle the greatest problem to beset the *Journal's* mission effectiveness to date:

- William S. Lind, "Reading, Writing, and Policy Review: The Air Force's Unilateral Disarmament in the War of Ideas," *Air*

University Review 36, no. 1 (November–December 1984): 66–70.

- Alan L. Gropman, "On Nonconformity," *Air University Review* 37, no. 6 (September–October 1986): 100–101.
- Various letters in *Air University Review* 36, nos. 2–6 (January–October 1985); *Air University Review* 38, no. 2 (January–March 1987); and *Airpower Journal* 1, no. 1 (Summer 1987).

Perceptual problems with the professional journal are the toughest and take the longest to solve. What can we do to encourage the young Mitchells out there? Have we really cultivated a generation of Air Force leaders who have so closely embraced technology that they can't even articulate the doctrine that guides its use or the plan for its contribution to the joint force commander? With the specter of a one-major-regional-conflict, \$150 billion defense budget framing the next Quadrennial Defense Review, are we really disarmed entering the next "war of ideas"?

Nothing we can publish speaks more to our collective future than Col Timothy E. Kline's "Where Have All the Mitchells Gone?" which first appeared in the May–June 1982 issue of *Air University Review* and is reprinted in this edition. His article kicks off a recurring section, sponsored by the Air Staff's Strategy and Policy Division (AF/XPXS), that seeks to rekindle the flame of strategic thinking among airmen. Working in concert with *Airpower Journal*, AF/XPXS looks forward to mentoring new Mitchells. If you've missed the announcements in previous editions, just call us for more information. Enjoy Colonel Kline's article; it could easily have been written in 1997. (In all

fairness, I'd opine that suffering a "shoot-down" meant something different in 1982 than it does in 1997.)

Look at the cover. Notice anything different? Four-color processing is a huge upgrade for us, and our graphics staff at Air University Press is hard at work designing the best for the professional flagship publication of the Air Force. Look for other improvements as we enter our next 50 years. Our electronic-publishing initiatives continue to grow and expand in the dynamic Internet medium. The many people who ask us for reprints are surprised to discover that they're immediately available on-line.

Perhaps the future is leading us in a new direction. If the official nature of Air Force Recurring Publication 10-1, *Airpower Journal*, continues to discourage the best and brightest from offering needed criticism, then perhaps we need to remove our service's dialogue from officialdom. Coupled notionally with the Aerospace Education Foundation, a fledgling USAF Academy Press, and privatized elements of Air University Press and CADRE, perhaps a new USAF Institute Press could emerge to stimulate debate the same way US Naval Institute *Proceedings* and *Marine Corps Gazette* manage their lively forums. Maybe giving up our official publication status might cure some perceptual ills and encourage what we all need: an open forum for exchanging ideas. As the incumbent caretaker, help me convince you we have that forum today in *Airpower Journal*. Write us a letter.

The best and the brightest ideas await the boundless future. Happy birthday, US Air Force and your professional dialogue! □



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.

NOT A SILVER BULLET

In the Spring 1997 issue of *Airpower Journal*, William Arkin suggests in "Baghdad: The Urban Sanctuary in Desert Storm?" that the Air Force did not achieve its goal of isolating Saddam and his regime through strategic attacks on Baghdad during Operation Desert Storm. He further states that because the strikes were so precise, the campaign was actually reassuring instead of disconcerting to the civilian populace. We are left to conclude that the effort was a twofold failure.

Ever since Giulio Douhet postulated the dramatic effect of strategic attack on enemy population centers, airmen have looked to bombing as the silver bullet to bring the enemy to his knees. But strategic bombing failed to do so in Germany, interdiction failed to do so in Korea and Vietnam, and Instant Thunder failed to do so in Iraq. Does that mean that any of these efforts were failures? Only for the silver-bullet faithful.

Can't we get past the idea that with just a little more intel, just a little more firepower, and just a little more precision, wars can be dispatched cleanly and quickly? Yes, Arkin is right to conclude that the strategic bombing of Baghdad probably did not have the decisive effect that airmen hoped for. But he is wrong to disparage the ironic side effect of strategic bombing's soothing an enemy populace

rather than demoralizing it. I'm sure that a more classic campaign of annihilating an entire city sector night after night would have been political suicide. Precision bombing did reassure spectators both within and without Iraq that the storm's rage was responsive and deliberately measured, which in turn furnished vital political sustenance for the war. That sounds like an extremely successful strategic result to me. So, I take my hat off to the planners and executors of the air storm over Baghdad and Iraq, and count it as a brilliant employment of airpower—just not the silver bullet we keep fantasizing about.

Lt Col Dale W. Fry, USAF
Fort Lewis, Washington

REGARDING CORE VALUES

I found the piece by Col Charles R. Myers on the core values of the Air Force (Spring 1997) interesting in light of the Kelly Flinn brouhaha. It was especially ironic for me because I was also reading Secretary Sheila Widnall's essay entitled "Perspectives on Leadership" (AU-24, *Concepts for Air Force Leadership*, 1996, 421-24) as part of my Air War College correspondence studies. Secretary Widnall writes that "young people coming into the Air Force often have to shed past habits and think deeply about character in order to meet our standards." More importantly, she avers that "we must hold people responsible for their own actions" and that "inconsistent behavior sends mixed signals" to the force, exacerbating uncertainty among subordinates about fairness and the nature of Air Force professionalism.

It appears that the secretary does not practice what she preaches and has therefore sur-

rendered whatever moral authority she might have had in educating Air Force personnel regarding ethics and the responsibilities of leadership. Vice Adm James Stockdale, USN, Retired, a former prisoner of war, once wrote that "when the crunch comes, people cling to those they know they can trust." It seems that we can no longer trust Secretary Widnall: Lieutenant Flinn was not held to the high standards the secretary herself articulated as forming the "bedrock" of our core values as Air Force officers and airmen. The net result is confusion among many young personnel about the azimuth that Secretary Widnall has set, as judged against the moral compass she propounds.

Ironically, only days before her decision to allow Lieutenant Flinn to "escape" court-martial (as *The Washington Times* so aptly put it), Col Dave Rauhecker of Hurlburt Field, Florida, was held to a higher standard for his alleged transgressions and now sits in a cell at Fort Leavenworth, Kansas. The lesson to me seems clear. Faced with the prospect of a media firestorm, core values are jettisonable, and the Air Force will surrender the moral high ground and promptly retreat—regardless of the impact on the force. Conversely, the

lesson for future Lieutenant Flinns is to immediately take their case to the media and hire a good lawyer with impeccable public relations credentials. But perhaps there is some hope—General Fogleman stood fast (God bless him), which makes it all the more regrettable that the civilian leadership abdicated its responsibility.

Lt Col Wray R. Johnson, USAF
Washington, D.C.

KUDOS

This retired four star agrees almost completely with Gene Myers ("Return of the Antinuclear Warriors," Spring 1997). He is right on track, and I would estimate that most of my colleagues would concur.

Well done. I hope some of our national leaders read, heed, and act on his analysis and wise recommendations.

Gen Robert W. Bazley, USAF, Retired
Chapel Hill, North Carolina

There are dangers in allowing oneself to become mesmerized by technological promise.

—Jonathan Alford



The Balkans Air Campaign Study: Part 2

COL ROBERT C. OWEN, USAF

*Part 1 appeared in the Summer 1997
issue of Airpower Journal.*



Execution

GIVEN THE protracted political and military run up to it, the actual start of DELIBERATE FORCE was almost anticlimactic. The specific “trigger event” for the campaign was the explosion of a mortar bomb in Sarajevo’s Mrkale Marketplace that killed 37 people on the morning of 28 August 1995. In the normal course of events for the unfortunate city, a mortar explosion was unremarkable, but this one caused exceptional and immediately televised bloodshed. Further, its timing made an interventionist response virtually certain. Since General Jan-



vier was in Paris at the moment, Adm Leighton Smith contacted COMUNPROFOR, Lt Gen Rupert Smith, in Sarajevo as soon as he heard the news. The two commanders agreed that, while UN investigators worked to assign certain blame for the attack, Admiral Smith would begin preparing for bombing operations, if required. At 0200 on the 29th, General Smith called Admiral Smith to report that he was now certain that Bosnian Serb forces had fired the shell and that he consequently was "turning his key." The UN general, however, asked CINCAFSOUTH to delay launching attacks for 24 hours to give peacekeeping units in Bosnia time to pull into positions they could defend, should the Serbs

launch retaliatory attacks against them. Also, it was necessary for General Janvier to return and approve the final list of targets for the initial strikes. After a number of conversations with Admiral Smith during the day, Janvier finally did approve 10 of 13 initial targets that had been proposed by Generals Ryan and Smith, and already tentatively approved by Admiral Smith.⁶²

Meanwhile, General Ryan and his staff at the CAOC worked feverishly to ready the assigned NATO air forces for battle. In fact, Ryan had arrived in the CAOC on the morning of the 28th to exercise the VULCAN protection plan for Sarajevo. With an actual crisis at hand, the general canceled VULCAN and

focused his staff on activating and modifying, as necessary, the operational plans and unit reinforcements that comprised what amounted to the DELIBERATE FORCE plan. While waiting for orders to start operations and approval of the initial target list by General Janvier and Admiral Smith, the AIRSOUTH commander concentrated on alerting his units, refining the air tasking message that would guide their operations for the first day of bombing, and bringing additional air and support forces into the theater, as required. The delay on starting operations was useful here, in that it provided time to flow additional US Air Force, Navy, and Marine aircraft into Aviano and to swing the carrier *Theodore Roosevelt* into the Adriatic in time to launch aircraft on the first strikes. He also reaffirmed to his staff that he intended to ensure that the weapons and tactics utilized by NATO would be selected and flown to accomplish the required levels of destruction at minimum risk of unplanned or collateral damage to military and civilian people and property. Ryan and Admiral Smith were in full agreement that the diplomatic sensitivities of the campaign made collateral damage an issue of pivotal strategic importance. Ryan believed that a stray bomb that caused civilian casualties would take the interventionists off the moral high ground, marshal world opinion against the air campaign, and probably bring it to a halt before it had its intended effects.⁶³ Ryan's command was ready for operations by the end of the 29th. Then, after waiting out the 24-hour delay to allow UN peacekeepers time to hunker down in their defensive positions, the first NATO jets went "feet dry" over the Bosnian coast at 0140 on the 30th, laden with bombs to make the first strike. The strikes would continue, as the UN had just warned the Bosnian Serb army (BSA) commander, General Mladic, until "such time as . . . the threat of further attacks by the BSA has been eliminated."

The physical and temporal dimensions of the ensuing campaign were fairly compact, particularly when compared to the scale and scope of a major air campaign, such as Operation DESERT STORM during the 1990-91 Gulf War.

Compared to the vast reaches of Southwest Asia, NATO air attacks in DELIBERATE FORCE occurred in a triangular area only about 150 nautical miles wide on its northern base and stretching about 150 miles again to the south. The weight of the NATO attack also was relatively limited. DESERT STORM lasted 43 days. But during the 22 calendar days of DELIBERATE FORCE, NATO aircraft and a single US Navy ship firing a volley of tactical land attack missiles (TLAM) actually released weapons against the Serbs on just 12 days. Two days into the campaign, at the request of General Janvier, NATO commanders halted offensive air operations against the Serbs for four days to encourage negotiations. When useful negotiations failed to materialize, they resumed bombing on the morning of 5 September and continued through the 13th. When notified by Gen Rupert Smith on 14 September that General Mladic and President Karadzic of the Serb Republic had accepted the UN's terms, CINCSOUTH and General Janvier jointly suspended offensive operations at 2200. They declared the campaign closed on 20 September.

The total air forces involved included about 220 fighter aircraft and 70 support aircraft from three US services, Great Britain, Italy, Germany, Holland, Greece, Turkey, Spain, and France—all directly assigned to AIRSOUTH and based mainly in Italy—and a steady stream of airlift aircraft bringing forward units and supplies. On days when strikes were flown, the AIRSOUTH-assigned forces launched an average of four or five air-to-ground "packages," involving perhaps 60 or 70 bomb-dropping sorties and another one hundred to 150 other sorties to provide combat air patrol, defense suppression, tanker, reconnaissance, and surveillance support to the "shooters." In total, DELIBERATE FORCE included 3,515 aircraft sorties, of which 2,470 went "feet dry" over the Balkans region to deliver 1,026 weapons against 48 targets, including 338 individual desired mean points of impact (DMPI).⁶⁴ These figures equated to just about a busy day's sortie count for coalition air forces during the Gulf War—and only a tiny fraction of the 227,340 weapons those air forces released against the Iraqis in the 43 days of DESERT STORM.

For all of DELIBERATE FORCE's brevity, limited scale, and operational one-sidedness, the various researchers of the BACS all discovered that the execution phase of the operation offered many insights into the application and usefulness of airpower in a complex regional conflict. Summarized here are only those of their discoveries that seem to have the broadest importance to the general community of airpower thinkers. Some of these discoveries stem from the operational context of the conflict. Others stem from the continued, even increased, political and diplomatic complexity of DELIBERATE FORCE in its execution phase.

From the inception of its study, the BACS team anticipated that leadership would be a broadly interesting area of inquiry. Reports from the field and subsequent interviews highlighted the exceptionally close control General Ryan exercised over DELIBERATE FORCE tactical events. Reflecting his and Admiral Smith's conviction that "every bomb was a political bomb," General Ryan personally oversaw the selection of every DMPI in every target. He also personally scrutinized every selection—or "weaponizing"—decision made for the actual weapons to be used against DMPIs, and he examined or directed many tactical decisions about such things as the strike launch times, the specific composition of attack formations, and the selection of bomb-run routes. In his words, Ryan felt obliged to exercise such close control to minimize the risk of error and, if mistakes were made, to ensure that they would be attributable to him—and him alone.⁶⁵ Ryan's approach to leadership, in other words, was consciously chosen and appropriate to the circumstances as he saw them.

To place General Ryan's acute attention to tactical details in a broader historical context, Maj Chris Orndorff pointed out that it had much in common with the great captaincy of field commanders in the period up to and including the Napoleonic era. Great captains and great captaincy, Orndorff explained, were epitomized by Napoléon and his art of command. He was the master practitioner of an art of command characterized by close attention to the logistical and tactical details of

armies, as well as with their strategic guidance. Great captains practiced this broad range of intervention because it was vital to their success and because they had the means to do so. Because armies were small, individual tactical events assumed great importance, and contemporary communications allowed a single commander to monitor and control such details in a timely manner. But as the industrial revolution progressed through the nineteenth century, the size of armies and the scope of their operations vastly increased. Great captaincy, at least to the extent that it involved close oversight of logistical and tactical details, became impractical in wars between large industrial states. In response, the Prussians led the world in developing a military system based on centralized strategic command, generalized planning by trained staff officers, and decentralized execution of operations and logistical support by standardized units in accordance with the guidance of the first two groups. Among the many features of this system was a division of labor that had senior commanders thinking strategically and eschewing close management of tactical details. These cultural arrangements, coupled with a sophisticated approach to military training and education, were, in the summation of one historian, an effort by the Prussians to institutionalize a system whereby ordinary men could replicate the military genius of a great captain, such as Napoléon, on a sustained basis and on an industrial scale.⁶⁶ Given that perspective, Orndorff suggested that General Ryan's close supervision of DELIBERATE FORCE's tactical details merits close examination of the conditions that made it apparently successful in an age when the staff system seems to have otherwise supplanted great captaincy in war.

In net, Major Orndorff's conclusions reflected the universal consensus among everyone interviewed for the study that General Ryan's exceptional involvement in the tactical details of DELIBERATE FORCE reflected both his prerogatives as the commander and an appropriate response to the political and military circumstances of the operation. Such was the case, Orndorff believed, because the

circumstances of DELIBERATE FORCE conformed in important ways to circumstances that gave rise to preindustrial command practices. Tactical events, namely the destruction of specific targets and the possibility of suffering NATO casualties, potentially carried profound strategic implications. The NATO air forces involved were small in relation to the capacities of the command, control, communications, and intelligence systems available to find targets, monitor and direct forces, and maintain command linkages. Drawing on the analogy of an earlier commander standing on a hill, Orndorff suggested that General Ryan had the sensory and cognitive capability to embrace the air battle comprehensively, assess the tactical and strategic flow of events, and direct all of his forces in a timely manner. In the words of one senior US Air Force leader, therefore, General Ryan not only could exercise close tactical control over his forces, but also was obliged to do so.⁶⁷

Major Orndorff and other members of the team did identify some potential drawbacks of General Ryan's great captaincy. Most notably, it focused a tremendous amount of work on the general and a few members of his staff. Individuals working closely with Ryan in the CAOC, such as Col Daniel R. Zoerb, AIRSOUTH director of plans, Col Steven R. Teske, CAOC director of plans, and Col Douglas J. Richardson, CAOC director of operations, worked 18-hour days throughout the campaign.⁶⁸ After two weeks, they were, by their own accounts, very tired. At the same time, other members of the CAOC staff were underutilized, as some of their corporate tactical responsibilities were absorbed, at least in their culminating steps, by the small group of officers working around Ryan. Meanwhile, some of the higher responsibilities that might have fallen on Ryan, in his capacity as the senior operational commander, devolved on his chief of staff in Naples, Maj Gen Michael Short. Acting as the rear echelon commander of AIRSOUTH, General Short became responsible for, among many things, aspects of the public affairs, logistical, political, and military coordination functions of DELIBERATE FORCE. In retrospect, General Short believed that while this division of labor made good

sense under the circumstances, he felt that he and General Ryan had not fully anticipated all of the staff and communications requirements needed to keep him up-to-date on operations and other issues. As a consequence, General Short sometimes found it difficult to prepare timely answers to higher-level inquiries about operations or General Ryan's plans.⁶⁹ Taken with the effect of General Ryan's centralized leadership style on the CAOC's division of labor, General Short's experience indicates a need for airmen to anticipate that leadership style is an important choice—one that can shape staff processes and morale significantly.

Maj Mark Conversino wrote the BACS chapter on DELIBERATE FORCE operations, with a primary focus on the activities of the 31st Fighter Wing at Aviano AB.⁷⁰ In net, his research revealed that the wing's great success in the campaign reflected the professionalism and skills of its personnel, ranging from its commander to individual junior technicians working on the flight line. From July 1995, the 31st Wing formed the core of the 7490th Wing (Provisional), an organization established to embrace the numerous USAF fighter and support squadrons and US Navy and Marine air units brought to Aviano for DENY FLIGHT. These units made Aviano a busy place. At its peak strength, the 7490th Wing included about one hundred aircraft, all crowded onto a base with only one runway and designed to handle normally a wing of about 75 fighters. The crowded conditions of the base made the choreography of maintaining, servicing, and moving aircraft about the field so tight and difficult that many of the people working there began calling it the "USS *Aviano*," in allusion to the conditions normally prevailing on the deck of an aircraft carrier. Moreover, the commander of the 7490th, Col Charles F. Wald, and his staff were responsible for tactical coordination with other NATO squadrons scattered around Italy. Time pressures and limited communications channels made this task daunting. Had the 31st Wing's permanently and temporarily assigned personnel not performed at such a high level across the board, DELIBERATE

FORCE in reasonable probability would have fallen flat on its face.

At the same time, Major Conversino's chapter identifies several sources of psychological stress at Aviano that, over a more protracted campaign, might have undermined the provisional wing's high performance and morale. The presence of families was one potential source of stress. Aviano was the 31st Wing's permanent base. Consequently, the families of many of the wing's personnel lived in the vicinity. During DELIBERATE FORCE, these families could be both a source of emotional strength for the combat aircrew and a potential source of worry and distraction. On the one hand, spouses brought meals and moral support to the units. On the other hand, they and their children were *there*, complete with their school problems, broken cars, anxieties, and so forth. While, in general, morale stayed high at Aviano, it is important to realize that the campaign lasted only two weeks and that the wing took no casualties. Many of the individuals and some commanders interviewed by Conversino and other BACS members expressed concern at what would have happened to the emotional tenor of the base community and to the concentration of the combat aircrewmembers, had the campaign gone on longer with casualties or with the materialization of terrorist threats against the families. During operations, one squadron commander even considered evacuating dependents if DELIBERATE FORCE dragged on.⁷¹

Another source of stress stemmed from the unfamiliar nature of the DELIBERATE FORCE mission. Actually, at the level of tactical operations, the operational tempo, tactics, and threats of the campaign were much like those that 31st Wing airmen would have expected to face in a high-intensity conflict. Daily flights as elements of "gorillas" of attack, defense suppression, electronic warfare, escort, and tanker aircraft—potentially in the face of radar-directed antiaircraft defenses—look pretty much the same tactically, regardless of the "limited" or "conventional" nature of a conflict at the operational and strategic level. But these conflicts do differ at the operational and strategic levels, and therein lay a source of

confusion and tension between the field units and the CAOC. Airmen in the field found themselves fighting a tactically conventional campaign at potentially substantial risk from enemy action. The CAOC made plans and issued orders that reflected the operational- and strategic-level constraints and restraints inherent in the air campaign's identity as the military arm of a limited peace operation. The difference between these perspectives was manifested in the confusion and frustration felt by some interviewed airmen over such things as the rules of engagement, outside "interference" with their detailed tactical plans and decisions, apparent restrictions on the flow of intelligence information to the field, and so forth. Since these things came to the field via the CAOC, a number of the BACS interviewees expressed a sense that they were fighting one war and that the CAOC was fighting another one, with the CAOC's version of the war tending to put the flyers at greater and unnecessary risk.⁷²

Major Conversino also identified several logistical problems that might have undermined the power of the air campaign, had it gone on longer. Under the US Air Force's "lean logistics" concept, air bases normally do not have large stocks of supplies and spare parts on hand. The concept assumes that modern logistics techniques can move supplies and parts from homeland depots quickly enough to meet demands and, thereby, reduce the size of the warehouse and maintenance operations a base has to maintain to sustain operations. At Aviano, one manifestation of lean logistics was that the base experienced shortages in several areas of supply as soon as operations began. One of the more critical shortages was in aircraft tow vehicles ("bobcats") and their tires. Compounding the problem, the "war" began on a Wednesday, meaning that stateside depots, which stayed on a peacetime schedule, were closed for the weekend, just as urgent requests for supplies began to flow in from Aviano. Quick calls to supervisors opened up the depots, but some supply problems, such as bobcat tires, were not solved during DELIBERATE FORCE operations.

Complementing Major Conversino's broad review of DELIBERATE FORCE operations, Lt

Col Rick Sargent, in a massive chapter, shifted the focus of the BACS to a more microscopic assessment of the weapons, tactics, and targeting aspects of the air campaign.⁷³ After a detailed discussion of the types of manned and unmanned aircraft employed during the operation, Sargent described the precision-guided munitions (PGM) used and their fundamental importance to its conduct and outcome. Because NATO air commanders were concerned with getting the fastest possible results from their operations, while minimizing collateral damage and casualties, Sargent argued that "precision guided munitions became the overwhelming weapons of choice during air strike operations." Of the 1,026 bombs and missiles expended during DELIBERATE FORCE, 708 were PGMs. Most of Lieutenant Colonel Sargent's detailed discussion of specific weapons and employment tactics remains classified. In general, however, his work demonstrates that PGM employment has become a complex science. There are now numerous types of PGMs available, each with distinct characteristics of target acquisition, range, terminal effects, and cost. Tacticians and "weaponeers" must know and understand those characteristics to be able to make suitable decisions about their employment within the boundaries of time, targets, and ROE. The criticality of those decisions will only increase for many likely conflicts, for, as Sargent reports General Ryan as having said, "dumb bombs are dead." Unguided weapons likely will retain their utility in many circumstances, but in cases in which time and tolerance for unwanted effects are in short supply, they are becoming unnecessarily risky to use.

Sargent's research, as well as that of other members of the BACS team, also highlighted the need for air planners and weaponeers to recognize that PGMs not only differ in their technical characteristics and effects, but also may differ in their political and emotional effects. The case in point here was the employment of 13 TLAMs on 10 September. General Ryan requested, and Admiral Smith approved, the use of these long-range, ship-launched missiles mainly on the military grounds that they were the best weapons available to take out key Bosnian Serb air defense

systems in the Banja Luka area, without risk to NATO aircrews. As it turned out, these missiles were more than just another weapon in the context of Bosnia. TLAMs represented the high end of PGM technology. Their sudden use in Bosnia signaled to many people that NATO was initiating a significant escalation of the conflict. That was not the intent of the military commanders, but the action was taken that way. Many members of the NAC were also upset by the fact that they had not been consulted on the use of these advanced weapons before they were fired.⁷⁴ At the same time, Admiral Smith reported that he subsequently learned from an American diplomat in contact with the Bosnian Serbs that the TLAMs "scared the [slang word for feces] out of the Serbs." It was, according to the admiral, more evidence to the Serbs that NATO's intent was serious and that they "did not have a clue where [they] could go next."⁷⁵ Clearly, the term *weaponeering* must carry a broad meaning for the senior commanders and the technicians involved in the process.

In a similar vein to Lieutenant Colonel Sargent's effort, Maj Mark McLaughlin examined the nature of NATO combat assessment during the air campaign. Beginning at the theoretical level, McLaughlin wrote that combat assessment is the process by which air commanders determine how they are doing in relation to attaining their objectives. Through a three-step process of battle damage assessment (BDA), munitions effectiveness assessment, and reattack recommendations, commanders learn if their attacks and the weapons with which they make them are bringing the enemy closer to defeat at the best possible rate. Effective combat assessment, therefore, is a vital tool for evaluating and refining tactics and operational concepts.

At the practical level, McLaughlin wrote that, while the CAOC's combat assessment process worked well, there were problems—particularly in the area of BDA. Notable even before DELIBERATE FORCE were the near absence of NATO BDA doctrine and the uneven experience and training levels of the various national personnel doing BDA in the CAOC. The different NATO air forces had

different standards and methods for assessing damage. For the sake of standardization, CAOC BDA managers attempted to train their subordinates in US doctrine and procedures. But that process was undermined by the rapid turnover of their staffs, engendered by the practice of manning the CAOC mainly with TDY personnel. The net effect of these problems, according to McLaughlin, was a somewhat sluggish pace in the flow and assessment of BDA data into, within, and out of the CAOC. In turn, the potentially negative effects of the slow pace of BDA, at least in terms of avoiding conflicting public assessments of how the bombing campaign was going, were minimized by the compactness of the air campaign and its target list, by General Ryan's decision to make all definitive BDA determinations himself, and by Admiral Smith's close hold on the outflow of combat assessment information to the press and even to NATO member governments. Whether or not the flow of the combat assessment process was painfully slow, neither commander intended to or had to make judgments under the pressure of public scrutiny and perhaps countervailing analysis.

In the shortest chapter of the BACS, Major McLaughlin also offered a succinct assessment of the effectiveness of DELIBERATE FORCE. Recognizing that the perspectives of Bosnian Serb leaders had to be the foundation for assessing the campaign, McLaughlin proposed that its effectiveness "should be judged for [its] direct impact . . . in light of the concurrent victories by Croatian and Muslim (Federation) ground forces, American-sponsored diplomatic initiatives, and Serbia's political pressure on its Bosnian Serb cousins." Following this prescription, McLaughlin illustrated the effects of the bombing on the psyche and calculations of the Serb leaders through the accounts of the various diplomats who dealt with them. As the campaign proceeded through active bombing, pause, and more bombing, McLaughlin traced a steady deterioration in the will of President Milosevic, President Karadzic, and General Mladic to resist NATO and UN demands. Croatian and Muslim (Federation) ground of-

fensives going on at the same time served to increase the pressure on Serb leaders. In rapid shuttle diplomacy, Ambassador Holbrooke exploited these pressures to coax and bully the Serbs into making concessions. A major barrier to progress went down on 8 September, when regional leaders met with Holbrooke at Geneva and agreed that the future Federation of Bosnia would include a Bosnian Federation of Croats and Muslims and a separate and coequal Serb Republic. The agreement also allowed the two entities to "establish parallel special relations with neighboring countries," and it recognized that the Federation and the Serb Republic would control 51 percent and 49 percent of Bosnia's territory, respectively—a division of land long established in the so-called Contact Group's proposals.⁷⁶ Thus, the Bosnian Serbs had in hand what they most wanted—autonomy. Under continuing pressure from ground and air attacks, they found it easier to accept UN demands, and on 14 September Holbrooke and Milosevic successfully pressured Karadzic and Mladic to end their active military pressure on Sarajevo.

DELIBERATE FORCE was about diplomacy—getting the Bosnian Serbs to end their sieges on the safe areas and to enter into productive negotiations for peace. Consequently, several BACS researchers, Major McLaughlin particularly, examined the interconnections between DELIBERATE FORCE and the ongoing diplomatic process.⁷⁷ What they found, in general, was that these interconnections were difficult to "package" and describe in a manner that was distinct and separate from other events and forces influencing the course of diplomacy. Despite its brevity and limited military scope, DELIBERATE FORCE turned out to be a complex diplomatic event, one influenced by military operations other than the air campaign—and by the conduct of diplomatic activities in several venues. A useful and defensible description of the relationship between airpower and diplomacy in this case, therefore, requires a clear understanding of these other operations and activities.

One of the more immediate effects of the bombing campaign was that it underscored

and, to some degree, mandated a temporary shift of the intervention's diplomatic lead from the UN to the Contact Group. Formed in the summer of 1994, the Contact Group represented the foreign ministries of the United States, Great Britain, France, Germany, and Russia. The group's sole purpose was to provide an alternative mechanism to the UN for negotiating a peace settlement in the region. Since it had none of the UN's humanitarian and peacekeeping responsibilities to divert its attention or weaken its freedom to negotiate forcefully, the group's relationship with the Bosnian Serbs was more overtly confrontational than the UN's. This suited the US representative to the group, Ambassador Holbrooke, just fine. As the assistant secretary of state for European and Canadian affairs, he had been involved closely with Balkans diplomacy for some time, and he was an outspoken proponent of aggressive action against the Serbs.⁷⁸ Upon hearing of the Mrkale shelling, for example, he suggested publicly that the proper response might be a bombing campaign against the Serbs of up to six months.⁷⁹ Holbrooke's opinion was important because by the summer of 1995, he was the de facto lead agent of the Contact Group, and it was his small team of American diplomats and military officers that conducted face-to-face shuttle negotiations with the Serbs and other belligerent leaders during the bombing campaign. These shuttle negotiations took the Holbrooke team to Yugoslavia at the start of the bombing, to Brussels and the NAC during the pause, to Geneva for a major face-to-face meeting of the factional leaders on 8 September, to the United States, back to Belgrade on the 13th and to a host of other points in between.

The irony of Holbrooke's call for robust bombing was that the UN and NATO could not and did not initiate DELIBERATE FORCE to influence the peace process. Officially and publicly, NATO initiated the campaign to protect the safe areas. But as Ambassador Hunter pointed out, it would have been naive to think that the air attacks would not undermine the Serbs' military power and coerce them diplomatically. Nevertheless, Hunter believed that the bombing had to be "represented" merely as an effort to protect the safe

areas. The consensus within the NAC for air action rested solely on support for the UN Security Council resolutions. There was no overt general commitment to bomb the Bosnian Serbs into talking.⁸⁰

Also during the time of DELIBERATE FORCE, the intervention was conducting two military operations of consequence to the course of diplomacy. UN peacekeeping forces remained in the region though their role was mainly passive during the period of offensive air operations. In the weeks prior to the start of bombing, the UN had quietly drawn its scattered peacekeeping units in from the field and concentrated them in more defensible positions. This process rushed to conclusion in the final hours before bombing actually began. During the bombing, these forces mainly held their positions or conducted limited patrol operations, but they did not go on the offensive. At the same time, elements of NATO's Rapid Reaction Force (RRF) took an active, though limited, role in the intervention's offensive. The RRF deployed into the Sarajevo area, beginning in mid-June. During the first two days of DELIBERATE FORCE, its artillery units shelled Bosnian Serb military forces in the Sarajevo area. These bombardments certainly had some effect on Serb military capabilities, and they probably had some effect on their diplomatic calculations. However, given the lack of emphasis placed on them by the diplomats interviewed by the BACS teams, the effects of these activities on diplomatic events probably were limited, at least in relation to the effects of the air campaign and of the military operations of regional anti-Serb forces. At the same time, the passive value of the peacekeeping forces as a brake on the ability of the Serbs to more or less walk into the remaining safe areas and take them, or to take intervention peacekeepers hostage, certainly must have been a factor in military calculations—though one not explored in depth by the BACS.

All diplomats and senior military commanders interviewed by the BACS attributed great military and diplomatic importance to Croatian and Bosnian offensive operations against local Serb forces, which had begun

before DELIBERATE FORCE and which continued in parallel to it and afterwards. These offensives began in the spring of 1995, and they marked the end of the overwhelming military advantages of Serbian forces. In May the Croatian army began a successful offensive to reestablish government control of western Slavonia. Then, in late July, the Croatian army launched a major offensive—Operation STORM—to retake the *krajina* and to relieve the Serbian siege of the so-called Bihac Pocket—a small area under Bosnian control. In a few days, a Croatian force of nearly one hundred thousand well-equipped troops penetrated the *krajina* at dozens of places and captured Knin—a vital center of Croatian Serb power. Over the next several weeks, the Croats systematically cleared the *krajina* of Serb resistance, moving generally from west to east.⁸¹ At the same time, forces of the Bosnian Federation launched a series of operations against the Bosnian Serbs. Under pressure from the United States and other intervening governments, the Bosnian Croat and Muslim factions had reestablished the Federation in March 1994 and, since that time, had worked to improve the combat capabilities of its army. By the summer of 1995, the Bosnian army was ready to go on the offensive, and—as the Croats swept around the northern borders of Serb-held Bosnia—it struck west and north to push the Serbs back from the center of the country. Caught between a hammer and an anvil, the Serbs retreated precipitously, and by mid-September the Croatian government controlled its territory—and the proportion of Bosnia under Serb control had shrunk from 70 percent to about 51 percent.

The existence of a powerful ground offensive in parallel to DELIBERATE FORCE complicates any determination of the air campaign's distinct influence on diplomacy. Undoubtedly, the Croat-Bosnian offensives drastically altered the military prospects not only of the Serb factions in the two countries but also those of the Serbian leaders of the former Yugoslavia. Even before the Croats launched their *krajina* offensive, Slobodan Milosevic offered to act as a peace broker between the Bosnian Serbs and the interven-

tion. At the time, some observers attributed Milosevic's move to his concerns over the growing strength of non-Serb military forces and over the worsening economic condition of his country, brought on by UN sanctions.⁸² In this light, one regional specialist, Norman Cigar, argues that the Serbian military reverses on the ground were more important than the air operations of DELIBERATE FORCE in getting them to accept UN demands. Ground operations, Cigar argues, confirmed for the Serbs that they were losing control of the military situation and, thus, had a profound impact on their diplomatic calculations. In his view, the air campaign had minimal direct effect on the Serbs' military capabilities and, consequently, had little impact on their diplomacy.⁸³

Senior diplomatic and military leaders interviewed by the BACS—and some analysts—generally saw a more synergistic relationship between air, ground, and diplomatic operations in terms of their effects on the calculations of the Serbs. Though most people emphasized that the simultaneity of the two campaigns was unplanned, they also recognized that their conjunction was important to the ultimate outcome of negotiations.⁸⁴ Just as the Bosnian Serbs were facing their greatest military challenge on the ground, the air campaign drastically undermined their ability to command, supply, and move their forces. The combination of effects placed them in a much more immediate danger of military collapse than would have the land or air offensives separately. Also, the Bosnian Federation offensive established a division of territory between it and the Serb faction that almost exactly equalled the 51/49 percent split called for in intervention peace plans and reconfirmed at the Geneva peace talks on 8 September 1995. Ambassador Holbrooke maintained that this event greatly eased the subsequent peace negotiations at Dayton, Ohio, since it placed the Serbs in the position of merely acknowledging an existing division of territory, rather than in a position of giving up hard-won territory that they previously had refused to relinquish.⁸⁵

Moreover, every diplomat and senior commander interviewed believed that the air campaign distinctly affected the moral resistance of the Serb leaders and, consequently, the pace of negotiations. Prior to the bombing, Ambassador Christopher Hill observed that President Milosevic "always had a rather cocky view of the negotiations, sort of like he's doing us a favor," but after the bombing began, "we found him . . . totally engaged . . . [with an] attitude of let's talk seriously."⁸⁶ Not surprisingly, Holbrooke and Ambassador Hunter perceived that Serb diplomats relaxed somewhat when the bombing pause began on 1 September. When the bombing restarted on 5 September, Holbrooke perceived that Serbian diplomatic resistance weakened rapidly, to the verge of collapse.⁸⁷ This effect was clear at the meeting between Holbrooke's negotiating team and the Serbs on 13–14 September. At the meeting, Holbrooke found Mladic "in a rush" to end the bombing⁸⁸—so much so that the meeting had hardly begun when Milosevic produced President Karadzic and his military commander, General Mladic, to participate directly in the talks. Mladic, who had the figurative noose of an indicted war criminal around his neck, arrived at the meeting looking "like he'd been through a bombing campaign."⁸⁹ After six hours of negotiations, the Serbs unilaterally signed an agreement to cease their attacks on and remove their heavy weapons from Sarajevo, without a quid pro quo from Holbrooke or the UN of stopping the bombing. Ambassador Hill attributed this capitulation to the threat of further bombing.⁹⁰ Interestingly, as he left the meeting, Karadzic plaintively asked Holbrooke, "We are ready for peace. Why did you bomb us?"⁹¹

NATO diplomats on the North Atlantic Council also recognized the importance and value of the bombing campaign. Their collective decision to authorize air operations in the first place was clear evidence of their expectation that the potential benefits of the operations outweighed their risks. Ambassador Hunter learned the depth of his compatriot's commitment to the bombing operations at the very beginning of the bombing pause. On the same afternoon that the pause began,

Secretary-General Claes called a meeting of the NAC to confirm that the members remained willing to let operations resume when the commanders deemed necessary. For his part, Hunter anticipated some resistance to allowing the campaign to restart. To his surprise, all members favored resuming the bombing if the Serbs failed to show evidence of complying with UN demands. Having gotten over the question of restarting the campaign with unexpected ease, Hunter recalled that the real debate—one that consumed "about an hour-and-a-half" of the Council's time—was over whether to give the Serbs 48 hours or 72 hours to comply.⁹² Having taken the international and domestic political risks of initiating DELIBERATE FORCE, the members of the NAC were determined to see it through.

Ambassadors Holbrooke and Hunter offered two distinct but interrelated explanations for the profound and immediate influence of the bombing on Serbian diplomatic resistance. Ambassador Holbrooke's explanation was to the point. Serb leaders, he felt, were "thugs and murderers" who consequently responded well to force.⁹³ Ambassador Hunter painted a more calculating picture of the Serbian leaders. In his view, they understood in the late summer of 1995 that their sole remaining diplomatic advantage in the Bosnian conflict lay in their ability to manipulate the internal divisions within and among the NATO and UN member states. The Serbs knew, Hunter believed, that neither organization could take decisive action against them unless consensus existed in the NAC and at least in the UN Security Council. For that reason, they should have taken the NAC's endorsement of the London agreement and the UN secretary-general's transfer of the airstrike "keys" to his military commander as disturbing omens. Based on past experience, however, the Serbs also had reason to hope that neither organization was really serious and would back off after a few halfhearted air strikes. The bombing pause probably rekindled that hope. The NAC debate of 2 September, which Hunter believed the Serbs were privy to, and the resumption of the bombing itself shattered that hope.⁹⁴ The action was

hard evidence that the UN's and the NAC's expressions of unanimity and commitment were real. Thus, even more than the ongoing advances of the Bosnian Federation forces and the initial start of the bombing, the knowledgeable participants interviewed by the BACS team all agreed that resumption of the bombing became the pivotal moment of the campaign. In Ambassador Hill's estimate, the bombing "was really the signal the Bosnian Serbs needed to get to understand that they had to reach a peace agreement."⁹⁵ Hunter believed that the decision and the act of resuming the attack clearly signaled to the Serbs that the UN and NATO were committed to winning a decision and that their opportunities for military success and diplomatic maneuver were running out.

An interesting feature of DELIBERATE FORCE, given the close connection between air operations and diplomacy, was that the direct operational commander, General Ryan, and the principal negotiator, Ambassador Holbrooke, never spoke to one another during the operation. Holbrooke spoke frequently during the campaign with UN commanders and on several occasions with Admiral Smith and General Joulwan, SACEUR. He even conferred with the NAC during the bombing pause. But he never spoke with the individual making the immediate decisions about the sequence, pace, weapons, and other tactical characteristics of the air attacks. Thus, for his part, General Ryan never spoke to the individual who most directly exploited the diplomatic effects of his operations. What they knew of one another's perceptions, priorities, and intentions was derived indirectly from information flowing up and down their respective chains of command.

From a legalistic perspective, the lack of contact between Holbrooke and Ryan was proper and politically necessary. First, as a US State Department representative and the leader of the Contact Group, Holbrooke had no formal place in either the UN or the NATO chains of command. Properly, any contact between him and Ryan should have moved up through State Department channels over to the secretary of defense or to the NAC and then down through those chains of command

to Ryan, who acted both as the commander of the USAF Sixteenth Air Force and as a NATO air commander. Given the circumstances, the NATO chain of command was really the operative one. Second, any direct contact with the air commander possibly would have established the perception that the bombing was supporting Holbrooke's diplomacy—something that neither the UN nor NATO wanted to happen. Ambassador Hunter suggested that members of the NAC wouldn't have wanted any direct contact between Ryan and Holbrooke, "other than to keep one another vaguely informed, that is to exchange information." All political decisions related to the air campaign, he said, had to be made at the NAC. Hunter believed that any "tactical" cooperation between the general and the diplomat would have been a "very big mistake"; had Ryan adjusted his operations in response to information passed to him by "any negotiator," the NAC would have "had his head"—especially if something went wrong.⁹⁶ As a consequence, during DELIBERATE FORCE, Admiral Smith wanted no direct contact between his air commander and Holbrooke. The admiral avoided operational or targeting discussions with Holbrooke or his military deputy, US Army lieutenant general Wes Clark, because he "did not want either of them to even think they had an avenue by which they could influence [him]."⁹⁷ Fully aware of his exclusion from the NATO and UN command channels, Ambassador Holbrooke never based his pre-DELIBERATE FORCE negotiating plans on a bombing campaign, even though he believed that it would greatly facilitate a successful outcome.⁹⁸

Unavoidable as it was under the circumstances, the lack of contact between Holbrooke and Ryan appears to have allowed disconnects in their understandings of key issues. Those disconnects, in turn, appear to have influenced the way the two individuals pursued their missions. For example, General Ryan's concern over collateral damage at least probably exceeded that of the US diplomats involved. While the general was concerned that a significant collateral-damage event, particularly one causing the deaths of civilians, might rob the air

campaign of its political support before it had decisive effect, the US diplomats involved generally believed that the air campaign had enough political support perhaps even to carry it through a serious incident of collateral damage.⁹⁹ In regards to the climate of opinion in the NAC, Ambassador Hunter pointed out that too much domestic political capital had been invested by the member states to start bombing operations for them to be brought to a halt by the unintended death of civilians and soldiers.¹⁰⁰ No one was advocating casual slaughter, but the net focus of the intervention's diplomatic community was on getting results from what may have been NATO's last bolt in Bosnia, rather than on preventing or reacting to incidents of collateral damage.

Whether closing this disconnect between NATO air leaders—mainly Ryan and Admiral Smith—and their diplomatic counterparts—mainly Holbrooke and Hunter—would have changed the flow of events is, of course, speculative. Even had they known that the diplomats were not poised to end the air campaign at the first incident of significant collateral damage (whatever "significant" meant in this case), Smith and Ryan certainly would not have reduced their efforts to minimize collateral damage and casualties from the bombing. For military, legal, and moral reasons, neither leader had any intention of doing any more harm to the Bosnian Serbs than was required by their mission to protect the safe areas. Likely, Admiral Smith would have still expected Ryan to worry about every DMPI, weapon, and other decision relevant to getting maximum effect at minimum collateral cost. But knowing that the diplomats were not as sensitive to collateral damage as they thought, might have given the military commanders a sense that they had more time to conduct their operations. That, in turn, might have let them slow down the pace of the bombing—something that might have been desirable, even if just to reduce the wear and tear imposed by the actual pace of operations on everyone, from General Ryan to the personnel in the flying units in the field. Indeed, at one point during the bombing, some CAOC staffers briefly discussed slowing down the pace of the campaign in the interest of

safety. People, including the aircrews, were beginning to show signs of fatigue. But they rejected the idea in short order, believing that the diplomatic vulnerability of the operation required maximum effort to ensure that it had a decisive effect before it was shut down for political reasons.¹⁰¹

There was also a disconnect between Ryan's and Holbrooke's understandings of the dynamics of the bombing campaign and its possible duration. With his jets focusing their attacks almost exclusively on the targets covered in options one and two of OPLAN 40101, around 10 September General Ryan passed up word to his commanders that he would run out of such approved targets in a couple of days at the present pace of operations. For their part, Ryan and his planners did not necessarily equate running out of currently approved targets as meaning that the campaign had to end automatically. There were several targeting options available that could have permitted a continuation of the bombing. These included (1) hitting or rehitting undestroyed DMPIs among the targets already approved, (2) adding and/or approving new option-one-and-two targets to the list, or (3) hitting option-three targets. In fact, AIRSOUTH planners were already looking at new option-one-and-two targets, and General Joulwan had already raised the option-three issue with the NAC, with a negative response.¹⁰² Nevertheless, in the second week of September, AFSOUTH had several options for usefully extending the air campaign, should that be politically or militarily required. However, that was not the information that got to Ambassador Holbrooke and his boss, Secretary of State Warren Christopher. Based on his conversations with Admiral Smith and a report to the National Security Council on 11 September by the vice-chairman of the Joint Chiefs of Staff, Adm William Owens, Ambassador Holbrooke recalls that he and the secretary understood unequivocally that running out the existing target list meant the end of bombing operations. Because that news had such drastic implications for his negotiations, Holbrooke relates, he immediately asked Admiral Owens to see if there was some way to extend the campaign.¹⁰³ Interestingly, General Ryan later could not recall ever hear-

ing about the ambassador's interest in stretching things out.¹⁰⁴

Whatever the causes of the informational disconnect between Ryan and Holbrooke, it had an immediate effect on American and, it follows, Contact Group diplomacy. After the NSC meeting, Holbrooke relates, Secretary Christopher directed him to return immediately to Belgrade to resume negotiations with President Milosevic. The two statesmen had been planning to wait a week longer before reengaging the Serbians, in the hope that the continued bombing would further soften their obstinate resistance to meeting both the UN's and the Contact Group's demands. In other words, Holbrooke was determined to get the Serbs to halt their attacks on the safe areas and to begin making the territorial concessions necessary to give reality to the just completed Geneva Agreement. But with the end of offensive air operations apparently imminent, Christopher adjusted his diplomatic plan, and Holbrooke left for Serbia immediately, to get what he could from the Serbs before the bombing ended.¹⁰⁵ Fortunately, although it was already becoming public knowledge that NATO was running out of option-two targets and was unlikely to shift to option three, the Serbs were beaten and ready to accept the UN's demands at least.¹⁰⁶ Consequently, Holbrooke got little for the Contact Group other than promises to participate in some sort of peace conference, but he did get the Serbs' commitment to lift the sieges and pull their heavy weapons out of the Sarajevo exclusion zone. Attributing his partial success to the need to get a settlement before the Serbs realized the impending halt to the bombing, Holbrooke later related that "I would have been . . . willing to continue the negotiations, if Smith or Joulwan had said, 'Boy we have a lot of great targets left out there.'" ¹⁰⁷

Again, arguing that closing the disconnect between Ryan and Holbrooke on this issue might have reshaped the air campaign remains a matter of speculation, even if it had been possible to do so. After all, Ryan was still functioning as a NATO commander, and Holbrooke was not in his chain of command; further, for reasons of political sensitivity, he was not even free to discuss operations openly

with the air commander. However, in actual practice, the operational and political boundaries between the UN and NAC, on the one hand, and the United States and the Contact Group, on the other, were not as sharp as the formal diplomatic arrangements suggested. To be sure, the bombing was under way to secure the safe areas and protect peacekeepers, but most leaders involved understood that those objectives were not likely to be obtained unless the Serbs were humbled militarily and at least agreed to serious negotiations over the political and territorial proposals of the Contact Group. Similarly, while the UN officially had the political lead in terms of sanctioning and benefiting from the bombing, it was Ambassador Holbrooke who exercised the practical diplomatic lead during DELIBERATE FORCE. It was he, in fact, who extracted the concessions from the Serbian leaders on 14 September that allowed the UN and NATO to announce success and "turn off" their keys. He was, therefore, acting as a *de facto* diplomat for the other international organizations, even if none could say so. Thus, while the political-military arrangements existing around DELIBERATE FORCE made good *formal* sense at the time, their artificiality, in terms of what was going on operationally, clearly influenced the course of diplomacy and air operations in ways that arguably were undesirable. In point of fact, the indirectness of the flow of information between Ryan and Holbrooke created a situation, in effect, in which the commanders pressed their operations to get their full diplomatic effect before the *diplomats* arbitrarily cut off the bombing. This occurred even as the diplomats scrambled to get what diplomatic effect they could before the *commanders* arbitrarily cut off the bombing. The irony of the situation is notable.

Even after it ended, DELIBERATE FORCE—or at least its memory—remained an active factor in the shape and pace of subsequent negotiations for Bosnian peace. Formal talks were taken up in November at Wright-Patterson Air Force Base, near Dayton, Ohio. Holbrooke considered it a fortuitous choice of venue. Arriving Serb diplomats walked from their airplanes past operational combat aircraft parked on the ramp nearby. Hill arranged to

hold the welcoming banquet on the floor of the United States Air Force Museum, where the Serbs literally sat surrounded by "an awesome display of airpower," including some of the very aircraft and weapons recently used against them.¹⁰⁸ According to their American escort officer, the Serbs remained tight-lipped about their impressions of the event.¹⁰⁹ But there is no doubt of the importance that the key interventionist diplomats attached to keeping airpower before the Serbian diplomats.

Implications

During the course of their research, the BACS team members observed and described a number of things about DELIBERATE FORCE that carry important implications for the planners of future air campaigns. Once again, this article only summarizes those implications that some—though not necessarily all—of the team members felt had value beyond the specific circumstances of DELIBERATE FORCE. For all its uniqueness, DELIBERATE FORCE offers broadly useful implications because one can describe its key characteristics with some precision. For the NATO airmen involved, it was a strategically limited, tactically intense, high-technology, coalition air campaign, conducted under tight restraints of time and permissible collateral damage; further, it was aimed at coercing political and military compliance from a regional opponent who had no airpower. To the extent that military planners will plan future air campaigns in the context of some or all of these characteristics, they should first understand what the DELIBERATE FORCE experience suggests theoretically about how things might work under similar circumstances.

As a first observation, *the determined and robust character of DELIBERATE FORCE was essential to its near-term success.* The campaign's objectives were limited, but to achieve them, NATO airmen had to be free to make their plans and execute their operations within the full limits of appropriate boundaries of political objectives and the laws of war—all of which should have been, and generally were, encap-

sulated in the rules of engagement. A half-hearted, overly restrained, or incomplete air campaign likely would have been disastrous to NATO and UN credibility—and it certainly would have prolonged the war. As RAND researcher Steven Hosmer recently concluded, a weak air campaign probably would have "adversely conditioned" the Bosnian Serbs and other factions to believe that both bombing and the interventionists were indecisive and, therefore, that they should fight on. "To reap the psychological benefits of airpower," Hosmer wrote, "it is also important to avoid adverse conditioning. The enemy must not see your air attacks as weak or impotent. The hesitant . . . bombing campaign against North Vietnam in 1965 is a prime example of adverse conditioning. The hesitant use of NATO airpower in the former Yugoslavia prior to mid-1995 is another example of adverse conditioning."¹¹⁰ In parallel, Ambassador Holbrooke felt that the actual targets struck during DELIBERATE FORCE were less important to its effect on Bosnian Serb leaders than the fact that the NATO campaign was sustained, effective, and selective.¹¹¹

As a second observation, *precision-guided munitions made DELIBERATE FORCE possible.* Given the campaign's restraints of time, forces available, and its political sensitivities, NATO could not have undertaken it without a relatively abundant supply of PGMs and air platforms to deliver them. Precision weapons gave NATO airmen the ability to conceive and execute a major air campaign that was quick, potent, and unlikely to kill people or destroy property to an extent that would cause world opinion to rise against and terminate the operation. The BACS team found no substantiated estimates of the number of people killed by DELIBERATE FORCE.¹¹² The simple fact that Bosnian Serb leaders made no effort to exploit collateral damage politically indicates that they had little to exploit. Had NATO and UN leaders expected enough collateral damage to give the Serbs a political lever, they probably would not have approved initiation of DELIBERATE FORCE, or if such damage had begun, they probably could not have sustained the operation politically for long. Indeed, as Ambassador Hunter recalled, trust

in the implied promise of NATO airmen to execute their air campaign quickly and with minimal collateral damage permitted the members of the NAC to approve its initiation in the first place.¹¹³ Had those diplomats doubted that promise, DELIBERATE FORCE never would have happened, and had NATO airmen failed to deliver on either part of their promise, the campaign almost certainly would have come to a quick end.

The third observation follows from the first two: *NATO's primary reliance on air-delivered precision weapons during DELIBERATE FORCE shielded the international intervention in Bosnia from "mission creep."* Had NATO chosen to conduct a joint air and ground offensive against the Serbs or to rely on non-precision aerial weapons in the bombing campaign, DELIBERATE FORCE certainly would have involved greater casualties on both sides. Instead of a series of just over a thousand carefully placed explosions and a few seconds of aircraft cannon fire, DELIBERATE FORCE likely would have involved protracted operations by tens of thousands of troops, systematic air and artillery barrages in support of their advance across the land, and thousands more explosions of not so precisely placed bombs and artillery shells. Put another way, in any form but an independent air campaign, DELIBERATE FORCE would have given the Serb faction a vastly greater opportunity to fight back and inflict casualties on NATO and UN forces. Reasonably, the Serbs would have fought back, at least long enough to see if killing some number of interventionist troops would break the will of their political leaders. The problem with such casualties, however, is that they could have reshaped the political, normative, and emotional nature of the operation. Televised reports of rows of dead Bosnian Serb soldiers, shelled towns, lines of refugees, and NATO body bags likely would have reshaped every participant's view of the conflict, and there would have been more time for those changed views to have political effect. Of course, there is no way to tell if a protracted air-land campaign or nonprecision bombing campaign would have changed

what was NATO's "disciplinary" peace-enforcement mission into "real war" missions of retreat, conquest, or retribution. The very uncertainty of the direction in which the interventionist mission would have crept underscores the value of airpower's characteristics of precision, control, and security in this particular peace operation.

The fourth observation is that *contacts between military leaders and some key diplomats do not seem to have kept up with the pace of events just before and during DELIBERATE FORCE.* Because of limitations of the interview information the BACS team collected, the width of the gap in the diplomatic and military discourse is not clear, but it is clear from the evidence collected that the gap existed and that it shaped political and military events to some degree. Perhaps most significantly, Ambassador Holbrooke and General Ryan made plans and took actions in ignorance of one another's positions in key areas such as collateral damage and extending the air campaign. Reflecting on the possible diplomatic consequences of the disconnect between him and Ryan over the practicality of the campaign, Holbrooke wrote, "I regret greatly that . . . I did not have direct contact with Ryan; it might have allowed us to follow a different, and perhaps tougher, strategy."¹¹⁴ Moreover, while the bureaucratic distance between these individuals may have been understandable under the circumstances of this operation, it may not have needed to extend to an absolute proscription of contact between them. Speaking from his perspective as a member of the NAC, Ambassador Hunter, for one, indicated that a passage of factual information between the commander and the diplomat probably should have happened. At the same time, it is clear from the context of Hunter's statement that he still thought that no contact between Ryan and Holbrooke could have been allowed to give the impression that they were actually coordinating their efforts.¹¹⁵

In contrast to the reflections of the diplomats, Admiral Smith and General Ryan remained convinced, nearly two years after the fact, that any direct contact between Holbrooke and AIRSOUTH would have been improper and too risky diplomatically to be

worth trying. Both commanders believed that such contact would have violated the established military chain of command and the proper interface between the diplomatic and military leadership. In Admiral Smith's view, had he allowed Holbrooke and Ryan to talk, he would have placed the whole operation at risk diplomatically, and he also would have undermined his boss, General Joulwan.¹¹⁶ In separate comments, General Ryan echoed that position, maintaining that to "even hint" at direct coordination between him and Holbrooke was "ludicrous." Since part of Holbrooke's sanction to negotiate in the Balkans came from the UN, and since NATO was likewise operating at the behest of the UN, Ryan argued that the proper level of coordination between the diplomat and soldier should have and could only have occurred at the "strategic level." Thus, Ryan suggested that the real area of inquiry in this issue may lie in the possible inadequacy of the information flow between the NAC and UN leaders.¹¹⁷

The operative point remains, however, that Ryan's and Holbrooke's activities were intertwined during the bombing, regardless of the bureaucratic and diplomatic arrangements and fictions maintained, and that those arrangements did not adequately support their requirements for information. The implication of this for the future architects of politically charged, fast-paced military interventions is that they must pay close attention to keeping the formal and informal communications channels and boundaries between soldiers and diplomats current, coordinated, and flexible. It also will be important to make sure that the right soldiers and diplomats are talking to each other at the right time, within limits and on topics appropriate to the circumstances. This may mean that they remain linked cleanly and traditionally at the tops of their respective chains of command. But it also may be that in the close-coupled political-military environments of future peace operations, for example, some linkages at subordinate levels will be appropriate. This observation certainly does not justify diplomats mucking about with tactics or soldiers hijacking diplomacy. Nor does it bow to gen-

eralized beliefs that diplomats and soldiers operate in separate realms. The reality is that war is about diplomacy and that diplomacy's final sanction is war. Diplomats and soldiers will always be in each other's "mess kits." The real issue is how both groups can anticipate and educate themselves and one another on the appropriate boundaries and rules of their relationship under given circumstances. The political-military experience of DELIBERATE FORCE should prove to be an interesting case study in that educational process.

Fifth, and in a similar vein, *while the focus and style of Lieutenant General Ryan's leadership was mandated by and appropriate to the immediate task of keeping the air campaign politically viable, they also created stresses within AIRSOUTH staff elements that may have become problems had the campaign continued much longer.* Given the necessity of ensuring that the targets, weapons, and tactics of every attack sortie were selected and controlled to minimize the possibility of collateral damage, General Ryan's decision to centralize such decisions to himself made sense. But making all those decisions day-to-day locked the general into 18-hour workdays with minimal time and energy to consider the other responsibilities that fall to a senior component commander. Part of this load was picked up by Major General Short, Ryan's chief of staff, who stayed in Naples to oversee AIRSOUTH's administrative, logistics, personnel, and public relations tasks and to maintain day-to-day liaison with Admiral Smith. Short was up to the task, but he did comment to the team that at times he lacked the continual contact with the CAOC that he needed to fulfill his liaison and press responsibilities in a timely manner. From the CAOC itself, several staffers commented that Ryan's centralization of technical decisions of targeting and weaponeering created a division within the CAOC staff. On one side of this division, they felt, was a small group of a half-dozen officers who also worked unsustainably long days to help the general make his tactical decisions. On the other side was the bulk of the several-hundred-strong CAOC staff who did little more than gather and distribute data and who

tended to feel underutilized in comparison to General Ryan's arguably overworked inner core. Obviously, one can make too much of this issue, particularly since the BACS was not chartered and equipped to collect the comprehensive sociological and organizational data necessary to credibly describe the real effects of Ryan's or anyone else's leadership. But the patchy evidence collected by the team does suggest that future air commanders and their subordinates should be aware that the stylistic—as well as the substantive—elements of leadership will have far-reaching effects on the work, morale, and endurance of their staffs. Further, it suggests a potentially valuable line of inquiry for future research.

Sixth, *despite the relative smallness of their force structure, NATO commanders chose to conduct their operations for operational- and strategic-level effects, rather than tactical ones.* In US force-planning terms, AFSOUTH conducted DELIBERATE FORCE with about a two-fighter-wing-equivalent combat force and an appropriate support slice of reconnaissance, surveillance, electronic warfare, SEAD, lift, and other aircraft. AIRSOUTH commanders had the option of conducting their attacks for primarily tactical effects, by concentrating on the Serbian materiel targets encompassed in option one. Instead, they elected to focus their attacks on option-two targets to achieve broader and quicker operational and strategic results, namely by destroying the mobility and command infrastructure of the BSA and thereby coercing its leaders to accede to UN demands. In other words, the NATO air force was not the giant fielded for DESERT STORM, but it still had a strategic option. This is an important point for US air planners pondering the problems of conducting air war in secondary theaters, where they perhaps will be allocated relatively small forces to accomplish big jobs in a hurry. It is also important for the planners and commanders of smaller air forces. The possession of a strategic or lead-force option is less dependent on the size of an air force than on the military-political circumstances, doctrine, materiel, and available targeting options. It follows then that the leaders and budget masters of air forces

of even moderate size should not reject the strategic- and operational-level options of air warfare out of hand. If their anticipated employment opportunities suggest the utility of strategic attack, broad-ranging interdiction operations, or other asymmetric ways of bringing airpower to bear against their enemies, then they should step up to making the appropriate investments in air vehicles, munitions, support infrastructure, command and control systems, and so forth.

Seventh, and at a more tactical level, *for NATO airmen, the operational features of this limited conflict differed little from those of major war.* They attacked the Bosnian Serbs in 1995 with the aircraft, tactics, weapons, and operational tempos that they would have expected to employ against the Warsaw Pact seven years before, at the close of the cold war. That observation suggests several things about the flexibility of airpower. First, it implies that airpower's role in the sphere of low intensity conflict (LIC) continues to expand as new strategies, weapons, and sensor systems improve the ability of airmen to find and destroy important targets of all types under varying conditions. To the extent that a given LIC or operation other than war requires military surveillance and attacks (and most do), the DELIBERATE FORCE experience suggests that airpower is becoming an ever more equal partner with ground power. Moreover, the fact that ordinary air tactical units flew DELIBERATE FORCE speaks to the relative ease with which one may shift such units between conflicts, as compared to ground forces. Ground units often require months of training to prepare for the differing tactical tasks of various types of conflicts. Training a battalion for peace operations, therefore, can reduce its capabilities and availability for conventional war. That is less often and less extensively the case for air units. Squadrons preparing for strike operations in Korea, for example, would not find strike operations over Bosnia much different in concept and basic technique; of course, they might find some adjustment for local conditions of geography and weather. Once again, one should not overstate this point. For example, airmen involved in DENY

FLIGHT report that some of their specific battle skills, such as flying high-performance air combat maneuvers, degraded in the course of patrolling the skies over Bosnia for months on end. Moreover, the relative flexibility of surface forces, as compared to air forces, becomes a variable factor as one begins to look at specific missions and tasks—and at different branches, such as infantry and artillery.

This summary of the Balkans Air Campaign Study now turns to a final observation about the decisiveness of DELIBERATE FORCE's contribution to ending the conflict in Bosnia. In general, airpower was a decisive factor in ending the 1992–95 Bosnian conflict, but one must understand its specific contribution in relation to the state of the conflict and to other events unfolding in the region. Like all struggles, the Bosnian conflict was going to end someday. Either exhaustion or the victory of one side or the other would bring it to a close. The creation of the Bosnian Federation in March 1994 and the sudden successes of its forces in the spring and summer of 1995—in concert with those of Croatia—suggested that military dominance and victory were slipping, perhaps permanently, from the grasp of the Bosnian Serbs. Norman Cigar, a long-time analyst of the Balkans region, convincingly argues that some Bosnian Serbs and certainly Slobodan Milosevic realized that at the time.¹¹⁸ Moreover, for domestic political reasons of his own, Milosevic needed the fighting to stop and, accordingly, tried to position himself as a peace broker in July.¹¹⁹ Nevertheless, the long-term outcome of the conflict and its likely length still were not in sight at the end of August 1995. No one had solid reasons to think that the bloodshed in Bosnia would not continue for at least another campaign season or longer. Significantly, the Serbs were still advancing against the safe areas in eastern Bosnia, even as they gave up ground in the western areas. But the outside world had seen about as much butchery and mindless inhumanity in Bosnia as it could stand. To put it bluntly, they wanted the war to end—or at least to get off the Cable News Network. At the London conference in July, the interventionists announced that

they intended to mitigate or, if possible, end the horror—by using airpower. And that's what DELIBERATE FORCE did. It did what three years of factional ground fighting, peacekeeping, and international diplomacy had yet to achieve. Almost at the instant of its application, airpower stopped the attacks on the safe areas and made further large-scale fighting over Bosnian territory largely pointless. In so doing, it drastically altered the military situation on the ground, and it gave the UN and NATO control of the pace and content of the peace process.

In summary, then, the present period of peace probably came to Bosnia in the following way: First, Bosnian Federation and Croatian ground advances in the spring and summer of 1995 gave the Serbs a long-term signal that their opportunities for further military gains were coming to an end. American diplomats interviewed by the BACS team suggested that the Federation advance also had the fortunate consequence of bringing the distribution of land under Federation and Serbian control almost exactly to the 51/49 percent split being called for at the time in UN and Contact Group peace plans.¹²⁰ This development probably influenced the peace calculations of several Serb leaders, but the diplomats generally agreed that its greatest value may have been to facilitate the final settlement at the Dayton peace talks in the following November. Second, the DELIBERATE FORCE air campaign "broke" the Serbs and was the proximal cause of the cessation of large-scale fighting in Bosnia and of the Serb agreement to participate in future peace talks according to a timetable set by the intervention. Third, the provision for a federal government in the peace plan made acquiescence to UN and Contact Group demands more palatable for the Serbs. Since the Federation potentially offered them one of their dearest objectives—a degree of political autonomy—it seems reasonable that it lowered their willingness to fight on in the face of simultaneous NATO air attacks and ground offensives by their regional enemies. This last point requires further research, once it becomes possible to interview Bosnian Serb leaders on their views

of the linkage between DELIBERATE FORCE and their political decisions. As one should expect in any conflict, then, the interventionist coalitions achieved their aim of stopping the fighting in Bosnia by blending diplomacy and military force, by plan and by happenstance, into a combination that simultaneously coerced the Bosnian Serbs and made it easier for them to give in to UN and Contact Group demands.

As a consequence, DELIBERATE FORCE ultimately impressed the BACS team as the creation of doctrinally and operationally sophisticated diplomats, air leaders, and planners. As they had done in the general case of DENY FLIGHT, NATO airmen crafted and executed the bombing campaign against the Bosnian Serbs in an optimal manner that accommodated the conflicting political, diplomatic, operational, and technological limitations and constraints of their situation. At the same time, many of the key forces and events that shaped the context and success of DELIBERATE FORCE were, in fact, beyond the control or the cognizance of even the senior planners involved. Like most, if not all, military operations, the outcome of DELIBERATE FORCE was the product of good planning, courage, and luck. Certainly, the campaign plan was not perfect in its conception and execution. Where possible, the BACS team

tried to identify and describe its more important imperfections, all the while keeping in mind that hindsight does not guarantee a clear vision of what was or was not the best way to do something. In the main, however, the various team members tended to be more impressed by the success of the campaign than with possible errors of planning and execution.

The conclusion of this report, then, is that airpower delivered what it promised in DELIBERATE FORCE. It was a decisive element in bringing a new period of peace to Bosnia—quickly, cleanly, and at minimal cost in blood and treasure to the intervening states and, indeed, to the Bosnian Serbs. For the United States, if its national security strategy of global engagement is to last very long, its military forces will have to provide similar successes at similarly low costs—perhaps many times. It is useful to know, therefore, that in the case of Bosnia in mid-1995, airpower not only was the lead arm of American involvement in the region but also was almost certainly the only politically viable offensive arm available for use by the United States and any of its partners to end in a controllable way an ugly war of indeterminate cause and uncertain future. □

Notes

62. See Rick Atkinson's "Air Assault Set Stage for Broader Role," *Washington Post*, 15 November 1995, for an early published account of these events, which Admiral Smith expanded upon in his presentation of 9 November 1995. See also Leighton Smith, "Further Comments on 2d Draft of BACS," fax transmission, 2 August 1997, 2.

63. General Ryan has made these points numerous times, including during an interview with Lieutenant Colonel Owen and Lieutenant Colonel Sargent at Naples. See Lt Col Robert C. Owen, "Synopsis of Interview of General Michael Ryan, COMAIRSOUTH, AFSOUTH HQ, Naples IT, 1030-1200, Tuesday, 5 Dec 1995," AFHRA, BACS files.

64. AIRSOUTH, Fact Sheet, 2-8.

65. Gen Michael Ryan, Headquarters AIRSOUTH, Naples, Italy, interviewed by author and Lt Col Richard Sargent, 5 December 1995.

66. For this argument, see Col Trevor N. Dupuy, *A Genius for War: The German Army and General Staff, 1807-1945* (New York: Prentice-Hall, 1977).

67. Maj Gen Charles D. Link, assistant deputy chief of staff, plans and operations (AF/XO), Headquarters USAF, discussion with author on the progress of the BACS study, 28 February 1996.

68. Richardson was outspoken in his praise of the leadership of General Ryan and General Hornburg, and in his amazement at how they sustained the workload they did. See Maj Mark

Conversino, transcript of oral history interview by Col Douglas J. Richardson, Vicenza, Italy, 16 January 1996, AFHRA.

69. Maj Gen Michael C. Short, chief of staff, AIRSOUTH, Naples, Italy, interviewed by author, 4 December 1995.

70. Chap. 6. Information extracted is unclassified. The focus on Aviano was a product of the research time and resources available to the BACS team. Certainly, US naval forces and the air units of the other participating countries also have "stories to tell." But the BACS team had little time to reach out to those forces, so the author decided early on to focus the team on Aviano and to rely on the US Navy and the other countries to report on their experiences and lessons learned from DELIBERATE FORCE.

71. Major Conversino expanded on this issue in BACS chap. 6, which is still classified.

72. Maj Gen Hal Hornburg, director, CAOC, interviewed by author et al., USAF Wargaming Institute, Maxwell AFB, Ala., 14 March 1996; and chap. 6.

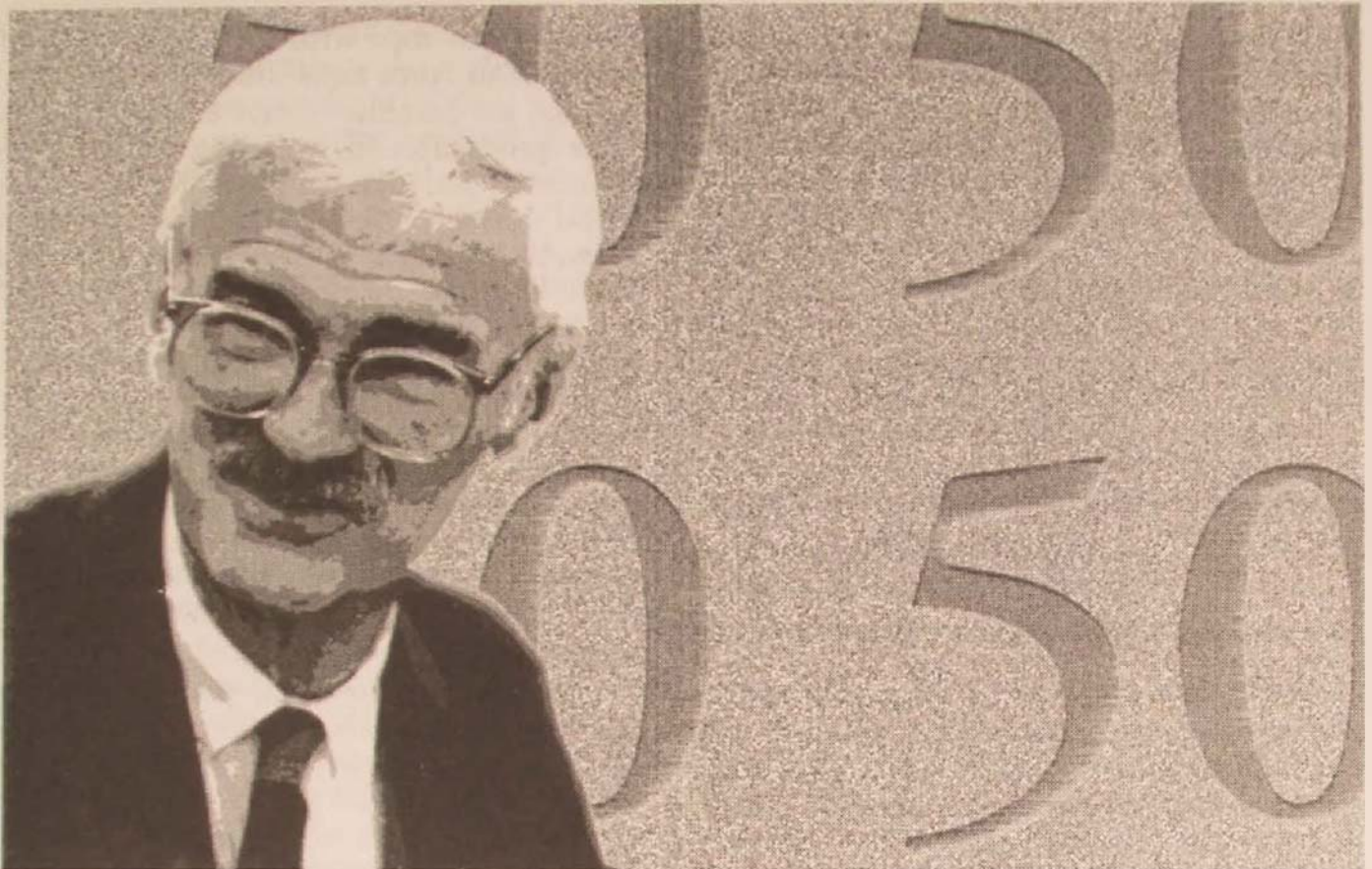
73. Chap. 9. Information extracted is unclassified.

74. Hunter interview, tape 1, side A, index 1042-1100.

75. Smith, "Further Comments."

76. For details, see President William Clinton's press statement, "Establishing a Basis for Peace in Bosnia-Herzegovina," *U.S. Department of State Dispatch*, 11 September 1995, 679; and "More Talking, More Bombing," *Time Magazine*, 18 September 1995, 76-77.

77. Chap. 8.
78. For an early expression of Holbrooke's position, see Robert J. Guttman, "Richard Holbrooke," *Europe*, December-January 1994-1995, 12.
79. Steven Greenhouse, "U.S. Officials Say Bosnian Serbs Face NATO Attack If Talks Stall," *New York Times*, 28 August 1995, A1*.
80. Hunter interview, tape 1, side B, index 1114-1300.
81. Kevin Fedarko, "The Guns of August," *Time*, 14 August 1995, 44-46.
82. Karsten Prager, "Message from Serbia," *Time*, 17 July 1995, 24-25.
83. Norman Cigar, "How Wars End: War Termination and Serbian Decisionmaking in the Case of Bosnia," *South East European Monitor*, January 1996, throughout.
84. Holbrooke said that the relationship between the bombing, the land war, and diplomacy was an "accident." Negotiations were already under way when the bombing began in response to the Mrkale mortar attack. The conjunction of events "just happened." Holbrooke interview, tape 1, side A, index 064-080; see also "Silence of the Guns," *Time Magazine*, 25 September 1995, 41, for a journalistic discussion of the military dilemma presented to the Bosnian Serbs by the conjunction of the bombing and the land war.
85. Holbrooke interview, tape 1, side B, index 1534. See also Bruce W. Nelan, "Not-So-Rapid Response," *Time*, 19 June 1995, 30.
86. Christopher Hill, transcript of interview by author and Maj Mark McLaughlin, 27 February 1996, 4-5, AFHRA, BACS files.
87. Holbrooke interview, tape 1, side A, index 001-028, 135-40.
88. Richard Holbrooke, "Annals of Diplomacy: The Road to Sarajevo," *The New Yorker*, 21 and 28 November 1996.
89. Hill interview, 9.
90. Holbrooke interview, tape 1, side A, index 300-60; Hill interview, 9-10.
91. Holbrooke, "Annals of Diplomacy."
92. Hunter interview, tape 1, side A, index 2045-2120, 2245-3100.
93. Holbrooke interview, tape 1, side A, index 400-13; and idem, "Annals of Diplomacy."
94. Hunter interview, tape 1, side A, index 2045-2310.
95. Hill interview, 19.
96. Hunter interview, tape 2, side A, index 030-150.
97. Smith, "Further Comments."
98. Holbrooke interview, tape 1, side A, index 051-58.
99. *Ibid.*, index 369-400, 484-500; and Hunter interview, tape 2, side A, index 800. The BACS team did not attempt to interview the domestic leaders of the NAC member states to determine if they also were prepared to ride out the political repercussions of a major collateral-damage incident.
100. Hunter interview, tape 1, side A, index 1550-95, 1800-1815, 2830-3000.
101. Col Douglas Richardson, director of operations, CAOC, said that this deliberation took place as an informal "hallway discussion" between him and "several" other senior CAOC leaders, who may have included Generals Sawyer and Homburg. Interviewed by author and Lt Col Richard Sargent, 7 December 1995.
102. Admiral Smith reports that all of these options had drawbacks. In the cases of adding new option-one-and-two targets to the list or "revisiting" targets, Admiral Smith advised his commanders that there were not many left off the existing list that would have enough effect to be worth the risk to the aircrews to hit them. Consistent with the opinion of Ambassador Hunter and his own feedback from General Joulwan, Smith did not believe that there was any political support for striking option-three targets. See Smith, "Further Comments"; and Hunter interview, tape 1, side B, index 1026-1112.
103. Holbrooke, "Comments to 2d Draft of BACS," 2.
104. Gen Michael E. Ryan, discussion during interim briefing of BACS by Lt Col Robert C. Owen, USAF/XO conference room, Ramstein Air Base, Germany, 24 August 1996.
105. Holbrooke, "Comments to 2d Draft of BACS," 2.
106. As an example of the permeability of NATO security in this issue, "More Talking, More Bombing," which was clearly written before the results of the meeting of 13-14 September were known, explicitly says that "the allies will run out of so-called Option 2 targets—as early as next week," and that a decision to move to option three presented NATO with "a problem."
107. Holbrooke interview, tape 1, side A, index 306-57; and Hill interview, 8.
108. Holbrooke interview, side A, index 104; and Hill interview, 17.
109. Capt Dave Miller, telephone interview by author, 21 March 1996, synopsis in AFHRA, BACS files. The other two liaison officers interviewed were Maj Kieth Yockey, who escorted the Croatians, and Maj Mark Dipadua, who escorted the Bosnian Croats and Muslims during the Dayton talks.
110. Steven T. Hosmer, *Psychological Effects of U.S. Air Operations in Four Wars, 1941-1991: Lessons for U.S. Commanders* (Santa Monica, Calif.: RAND, 1995), 198.
111. Holbrooke interview, side A, index 078.
112. At the time of this writing, the number of casualties caused by DELIBERATE FORCE remains uncertain. The BACS team received an unsolicited videotape, "US/NATO Bomb Serb Civilians, 9/95," reporting that civilian casualties and collateral damage were widespread and intentional. The origins of the tape, which is on file in the BACS archive at the AFHRA, are unclear, as is its usefulness as an indicator either of the truth or of general Bosnian Serb perceptions of the intent and impact of the air campaign. Ambassador Christopher Hill recounted to his BACS interviewers that President Milosevic told him that his investigation indicated that about 25 people died as a result of the bombing. Hill interview, 16.
- This estimate conforms in magnitude with the findings of an investigation conducted by the Red Cross shortly after the bombing, which identified 27 civilian deaths and damage to civilian property as probably caused by the bombing. From the Red Cross's account, it appears that all of these deaths and damages were collateral consequences of attacks on other targets of military significance, including bridges, cantonment areas, a water reservoir, and a former Bosnian Serb field headquarters. International Committee of the Red Cross, "ICRC Report on Certain Aspects of the Conduct of Hostilities and the Consequences from a Humanitarian Point of View of NATO Air Strikes," November 1994, AFHRA, BACS files. What seems reasonable to say, then, is that the 1,026 weapons released during DELIBERATE FORCE killed fewer than 30 people.
113. Hunter interview, tape 2, side A, index 2835-2900.
114. Holbrooke, "Comments to 2d Draft of the BACS," 2. It is important to emphasize here that Holbrooke was responding to my initial analysis of this issue, so his assessment rises or falls on the credibility and accuracy of my information and case. I would be responsible for any error that might later be proved or attributed to his position.
115. Hunter interview, tape 2, side A, index 113-75.
116. Smith, "Further Comments."
117. Gen Michael E. Ryan to Col Robert C. Owen, E-mail, subject: Further Comments on the Second Draft, 20 August 1997.
118. Cigar.
119. *Ibid.*
120. Hill interview, 19.



Fifty Questions for Doctrine Writers

Means Are As Important As Ends

MAJ GEN I. B. HOLLEY JR., USAFR, Retired*

LET ME BEGIN with a historical analogy. Early in his career, when he served as a congressman from Illinois, Abraham Lincoln was confronted with the necessity of voting for or against the declaration of war against Mexico in 1846. Ever the high-minded idealist, he voted against declaring war. It was, he said, an immoral landgrab. His constituents thought differently. They saw the war as an ideal oppor-

tunity to expand the territory of the United States. So they voted him out of office.

Lincoln never forgot that lesson. He came to realize that idealism must always be tempered with realism and practicality. He came to realize that the workable way was a case of "eyes on the stars, feet on the ground." During the Civil War, for example, he wanted to free the slaves. But when he issued the Emancipation Proclamation, he excluded all those

*I wish to acknowledge the contribution of my former graduate student, Maj Robert Taguchi, USA, who propounded a checklist for doctrine writers at my urging, which I found helpful in preparing this article.

slaves held in states such as Maryland, which sided with the Union. Lincoln needed the votes and the manpower of those states to wage war effectively against the Confederacy. So the Emancipation Proclamation was a compromise. In the eyes of many abolitionist critics, it was a seriously flawed document—a sellout. The only slaves it “freed” were those behind the Confederate lines—the very ones the Union forces didn’t yet control. But as we now know, though flawed and compromised, the proclamation worked.

The ends we seek are implicit in the means we use.

What am I trying to say here? The means we employ when we undertake to formulate doctrine are every bit as important as the ends we seek. The ends we seek are implicit in the means we use. That is one of the fundamental philosophical principles that undergird this great republic in which we live. I repeat: the ends we seek are implicit in the means we use.

I have devoted much of my professional life in the Air Force to the quest for suitable air doctrine. I have written books and articles for this purpose. It now appears that my efforts have been without much success, for we are still groping for a better path to sound doctrine. Our procedures for devising doctrine at all echelons are still far from ideal. Look about you. Do we anywhere have a comprehensive set of instructions to guide those people who are assigned the difficult task of producing Air Force doctrine?

I propose to ask a series of searching questions to help those people who are launching a new doctrinal center at Air University. First, what should we ask about the composition of the team—the officers selected to formulate doctrine for the Air Force? What past experience and education uniquely qualify them for this duty? In prior assignments, have they given evidence of creative imagination? Have they demonstrated a capacity for rigorous evaluation of conflicting evidence? Does the doctrine team reflect an adequate spectrum of

experience to cope with the whole range of potential Air Force capabilities?

Next, are doctrine writers employing adequate procedures in gathering evidence on air-arm experience in order to formulate sound doctrine? Do they cast their research net widely enough? Do they survey the fullest possible range of after-action reports and similar sources from the field? If after-action reports are a primary source of air-arm operational experience, have doctrine writers taken steps to insure that the scope and quality of such reports are adequate for doctrinal purposes? Are after-action reports as objective as they ought to be? In the view of this observer, very little is currently being done to enhance the quality of such reports and the regularity with which they are submitted.

Has the doctrine team comprehensively studied the experience of foreign air forces? Has it guarded against the bias that arises from relying only on those reports of foreign experience and practice which have been translated, while ignoring contrary evidence which happens not to have been translated? Has appropriate account been taken of cultural or material differences underlying foreign experience and practice when weighing the utility of foreign doctrinal ideas?

What can we learn from the ways and means employed by foreign air forces in formulating doctrine? Has our doctrine team ever undertaken any systematic effort along this line? Do foreign air forces have procedural manuals or regulations on the formulation of doctrine that might offer us insights on their methods, if not their doctrines? In recent years, I have been much impressed with the way the Royal Australian Air Force (RAAF) has grappled with the problem of doctrine. A small air force with limited funding, the RAAF has been driven to think deeply about doctrinal issues. Has the USAF studied this source in depth?

Before publishing USAF official doctrine, what steps should doctrine writers undertake to test the validity of their formulations? Have they launched “trial balloons” in the form of journal articles to elicit feedback? How successful is the practice of holding symposia in

developing new or revised doctrine? Does the current practice of circulating drafts to the Air Force major commands (MAJCOM) for comment elicit constructive replies? Do the MAJCOMs evaluate proposed doctrine comprehensively? Or do they respond critically only when some vested interest of the command seems threatened? Has the doctrine team undertaken a systematic survey of knowledgeable individuals to supplement the written record of after-action reports and other such evidence? Has it been at pains to interview individuals at all echelons—not just senior officers—to secure the widest possible perspective on a given body of experience? What steps should be taken to prepare interviewers to elicit objective evidence? Are the interviewers sensitive to the danger of asking, wittingly or unwittingly, leading questions that elicit the answers desired—answers that conform to their presuppositions? Do doctrine writers have adequate funding to permit the travel that might be required to elicit the kind of testimony needed—especially that of junior participants with actual operational experience?²

Have doctrine writers paid appropriate heed to support functions, or have their efforts been almost exclusively devoted to operational concerns? Doctrine applies to logistics as well as tactics. Do we have suitable logistical doctrine? Do we have suitable research and development doctrine? At a time when preserving the industrial base is an acute problem, what guidance can doctrine suggest? This nation has experienced earlier and even more drastic reductions in defense spending that have savaged the industrial base. What generalized experience from such past history can inform our doctrine writers today?

When doctrine writers assess success or failure in past operations, do they ask if flawed performance or faulty doctrine led to failure? Can extant doctrine be effectively evaluated without a conscious awareness of many other factors that may have contributed to success or failure? Will the same or similar “other factors” be present when our current doctrine is applied?

What have been the sources of significant doctrinal innovation in the past? Will a study of such patterns of innovation lead to a prompter development of appropriate doctrine? Because technological advances are a major factor in forcing doctrinal revision, what procedures should doctrinal writers establish to insure an adequate response to “on the horizon” technologies?

I have devoted much of my professional life in the Air Force to the quest for suitable air doctrine. . . . It now appears that my efforts have been without much success.

Given that all thinkers and writers are subtly influenced by their assumptions, wittingly or unwittingly, what steps should doctrine writers take to insure that their assumptions are valid? Should doctrine writers reach outside their immediate organization to invite critical evaluations of their assumptions to avoid parochial bias? Should some such outside critics be drawn from the other military services or even foreign services?

Beyond probing our assumptions, what steps should the doctrine team take to test the validity of its formulations? Beyond feedback from various Air Force echelons, what actual field testing should be undertaken in peacetime via maneuvers, exercises, and the like? Have the doctrine folk established effective liaison with such ongoing operations as Red Flag? Should doctrine writers solicit high-command support for more far-reaching testing of key doctrinal formulations?

Should our doctrine team give thought to what is now often referred to as asymmetrical hostile actions? Does the Air Force have a valid role in countering terrorism? If so, then surely we must spell out suitable doctrine for dealing with such threats. And what about nonviolent terrorism or economic mischief making? In 1995 a Russian hacker in Saint Petersburg broke into Citicorp's computerized cash management system in New York and capriciously transferred \$12 million to

various banks around the world. The Russian police cooperated with the FBI in apprehending this scoundrel, but what he did may have been a blessing in alerting us to the potential for such nonviolent acts of terrorism.¹ I'm not convinced that the Air Force has a role or a responsibility in confronting such threats. I mention them only to suggest that our doctrine writers must decide what threats require a doctrinal response.

What generalized experience from such past history can inform our doctrine writers today?

Have our doctrine writers given adequate attention to the means by which doctrine is promulgated or disseminated? Are doctrine manuals the best way to communicate doctrine? Do manuals as now conceived employ the most effective format?² What alternative or supplemental means of promulgating, communicating, or distributing doctrinal ideas might we employ to insure greater circulation and penetration within the officer corps?

Today the Air Force is much concerned over cooperating with people engaged in developing joint doctrine. To what extent does human nature operate to inhibit the successful application of joint doctrine? All military organizations need to achieve cohesion—the bonding of members in a given service. But such bonding tends to generate a “them versus us” outlook, which is detrimental to jointness. Does our Air Force organizational culture thus adversely influence the practice, if not the words, of joint doctrine?³

Can writers of joint doctrine overcome the inherent differences which exist, for example, between the ground-arm perspective and the air-arm perspective? Whereas the ground folk stress coordination, we stress flexibility. As my friend Roger Spiller of the Army Command and General Staff College once asked, Is the search for joint doctrine “a continuing process of negotiation and reconciliation be-

tween interests” the object of which is “the triumph of one over the other”? Can we devise ways to overcome this parochial service rivalry? Must those people who negotiate joint doctrine always regard concessions as “giving up the farm”—a surrender of control? Does the personality of individuals who negotiate the formulation of joint doctrine make a critical difference? If so, what considerations should enter in the selection of such negotiators?

One might go on proliferating a hundred more questions of the sort I have already posed. But now let me consider other approaches to the problem of improving the ways we generate doctrine. Gen Donn Starry, one of the ablest thinkers of the Army, now retired, a dozen or so years ago wrote an article entitled “To Change an Army,” which offers some provocative guidelines that should be of interest as we go about developing a new approach to doctrine writing.⁴

General Starry, who toward the end of his career headed the Army's Training and Doctrine Command (TRADOC), asked, “What are the factors required to effect change?” This I take to mean, “What does it require to introduce significant new doctrine?” This he follows with a checklist which strongly suggests that promulgating doctrine involves far more than publishing a manual. Let's look at the steps he offers:

- There must be an institution or mechanism to identify the need for change, to draw up parameters for change and to describe clearly what is to be done and how that differs from what has been done before.
- The educational background of the principal staff and command personalities responsible for change must be sufficiently rigorous, demanding and relevant to bring a common cultural bias to the solution of problems.
- There must be a spokesman for change. The spokesman can be a person, one of the mavericks; an institution such as a staff college; or a staff agency.
- Whoever or whatever it may be, the spokesman must build a consensus that will give the new ideas, and the need to adopt them, a wider audience of converts and believers.

- There must be continuity among the architects of change so that consistency of effort is brought to bear on the process.
- Someone at or near the top of the institution must be willing to hear out arguments for change, agree to the need, embrace the new operational concepts and become at least a supporter, if not a champion, of the cause for change.
- Changes proposed must be subjected to trials. Their relevance must be convincingly demonstrated to a wide audience by experiment and experience, and necessary modifications must be made as a result of such trial outcomes.⁵

We would do well to reflect on these suggestions as we build the new doctrinal center at Air University.

Finally, I want to turn from the doctrinal writers and their problems of procedure and organization to consider the recipients—the readers and users of doctrine. Do Air Force officers understand what doctrine really is? Do they know what the intended use of doctrine is? Does the Air Force in its whole system of professional military education (PME) ever explicitly instruct officers in the proper use of doctrine? I suspect not, when we hear a senior flag officer asserting that doctrine is “bull crap.”

Can we improve our PME to achieve a better understanding, Air Force wide, of what doctrine is and is not? Surely this should be one of the initiatives of the new doctrinal center. Doctrine is not and was never meant to be prescriptive. Doctrine is suggestive. It says, “This is what has usually worked best in the past,” but this in no way frees decision makers from the need to form their own judgment in any given situation. If the study of war tells us anything, it is that the only

constant is war’s inconstancy—that it is filled with surprises, contingencies, and unknowns.

Does the Air Force in its whole system of professional military education (PME) ever explicitly instruct officers in the proper use of doctrine? I suspect not, when we hear a senior flag officer asserting that doctrine is “bull crap.”

We have seriously neglected educating our officers in how to read doctrine and how to use it. Well-educated officers must engage in a critical intellectual activity, with the doctrinal options available to them. Doctrines are not a series of universally valid maxims or positive prescriptions. They are points of departure for the thoughtful decision maker, who must judge each situation individually. When we say doctrine is “authoritative,” all we mean is that it is objectively recorded experience that remains worthy of and requires the critical attention of the decision maker. □

Notes

1. Timothy L. Thomas, “Deterring Information Warfare: A New Strategic Challenge,” *Parameters* 26, no. 4 (Winter 1996-1997): 81.

2. Maj Gen I. B. Holley Jr., “A Modest Proposal: Making Doctrine More Memorable,” *Airpower Journal* 9, no. 4 (Winter 1995): 14-20.

3. R. S. Parkin, “The Goodwill of the Services and the Problems of the Lesser Partner: The Creation of the Australian Manual of Direct Air Support, 8 June 1942,” Paper no. 42 (RAAF Base Fairbairn: RAAF Air Power Studies Centre, March 1997).

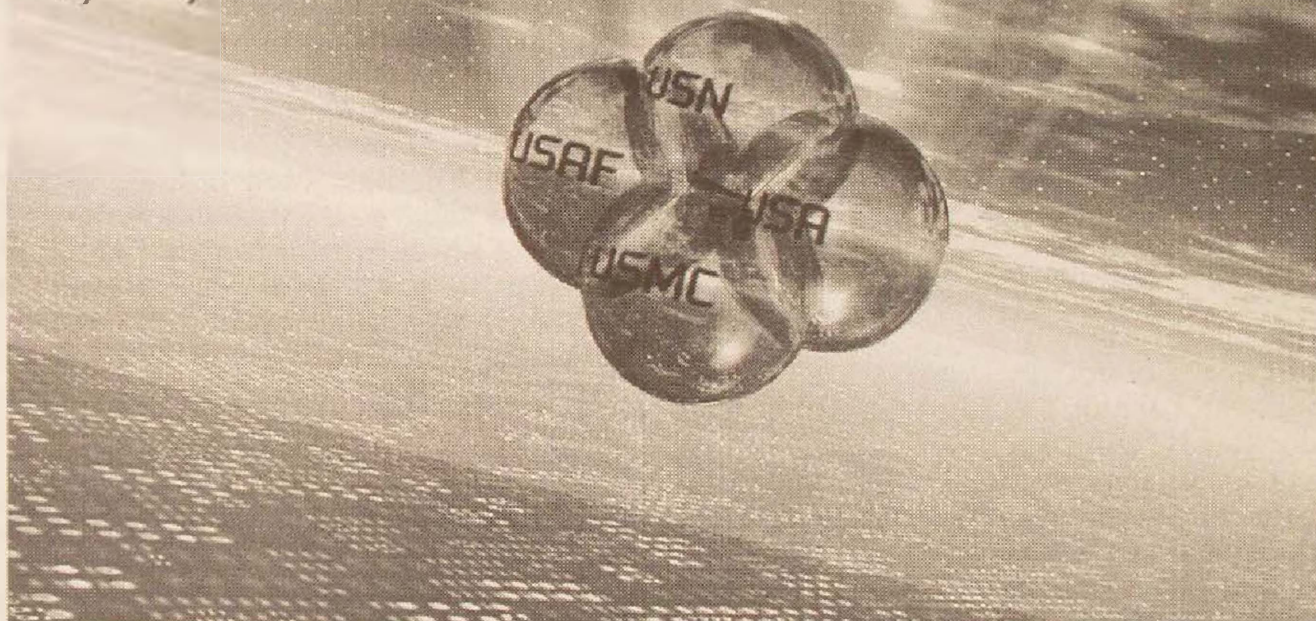
4. Gen Donn A. Starry, “To Change an Army,” *Military Review* 63, no. 3 (March 1983): 20-27.

5. *Ibid.*, 23.

Joint Mission-Essential Tasks, **Joint Vision 2010**, Core Competencies, and Global Engagement

Short versus Long View

DR. JAMES J. TRITTEN*



IF THE US armed forces are to fight in the future, at the operational or strategic levels of warfare, they will do so jointly. A joint national military strategy sets the requirements for joint plans to be developed in the short term. These plans set objectives for all unified commanders in chief (CINC) in their areas of responsibility (AOR). The requirement that CINCs create various contingency and other plans leads, in turn, to the creation of joint mission-essential task lists

(JMETL) by CINC staffs and subordinate joint commands. JMETLs, which identify the performance of specific tasks to execute these plans successfully, are then used by the CINCs and the Joint Staff to identify and fund joint training, determine the direction of joint doctrine development, and provide joint justification for various programs.

With this identification of the CINCs' immediate needs, the Joint Staff has recently moved to a vision of future directions, found

*The views expressed by the author are his alone and do not represent those of the US Atlantic Command.

in the publication *Joint Vision 2010 (JV 2010)*.¹ Requirements provided by the CINCs, services, and Joint Staff, as well as advances that emerging technology hopes to deliver in the next few years, all influenced *JV 2010*.² One can use *JV 2010* (for the long run) and JMETLs (for the short run) to identify joint training and programmatic requirements. They will soon play a role in determining joint operational readiness criteria.

The US Air Force has just published its future vision in *Global Engagement: A Vision for the 21st Century Air Force*, which also purports to provide guidance for the conduct of future military operations, associated training, and materiel the Air Force will buy.³ *Global Engagement* is the Air Force's input to joint processes. Like the other services' vision documents, it must come to grips with the new JMETL process, *JV 2010*, and the obvious move to subordination of service training, doctrine development, and procurement to jointness.

This article reviews the concept of JMETLs and joint vision and assesses their impact on the long-range training, procurement, and readiness of the US armed services. Further, it assesses the need for improvements to the current process of identifying needs for training and procurement prioritization that balances the immediate requirements of war-fighting CINCs with longer-term interests of the uniformed armed services.

JMETL Development and Planned Uses

One finds scenarios for possible future combat in the current versions of the *National Security Strategy*, the *National Military Strategy*, the *Defense Planning Guidance*, the *Joint Strategic Capabilities Plan*, and applicable treaties.⁴ Scenarios contained in these documents, in turn, drive contingency planning by the war-fighting unified CINCs, who, after analyzing their various contingency plans and other guidance, derive JMETL tasks. To appear on a CINC's JMETL, a task must be performed by a joint staff or force, derived from a mission

assigned to a CINC by higher authority, and considered so critical that failure to successfully complete it would jeopardize the mission.

Similar JMETL development takes place by subordinate joint commanders within the AORs of each CINC. For example, commanders of regional or functional areas would have JMETLs for their staff headquarters. Standing or potential joint task force (JTF) headquarters that plan to operate within a CINC's AOR would also have their own JMETLs. Logically, these subordinate JMETLs would be prepared to achieve joint goals and objectives identified by the CINCs.

Some tasks to be performed by subordinate commands are joint, but others remain primarily under the cognizance of the service component commander. A CINC's air force component commander, such as the commander of Air Combat Command, would have service mission-essential task lists (METL) designed to attain service tasks in support of the CINC. A numbered air force might have a subordinate METL identifying tasks to be completed in support of the air force component commander. It could also have JMETL tasks associated with its role as a potential JTF headquarters in direct support of a CINC.

Some JMETL tasks are combative—others are not. Although the *National Security Strategy*, the *National Military Strategy*, the *Defense Planning Guidance*, and the *Joint Strategic Capabilities Plan* contain primary combat missions to be performed by the unified CINCs in their AORs, these CINCs also have other guidance that shapes their priorities. One finds this guidance in such documents as the Unified Command Plan, treaties, and other regional policy documents. Thus, a CINC might have JMETL tasks in support of humanitarian operations, military support to civil authorities, and other similar noncombat missions.

When the CINCs assemble a list of joint tasks—combative and noncombative—within their AORs and determine that these tasks are mission essential, they have thus assembled their JMETL.⁵ This list need not be approved by a CINC's service component commanders,

who are expected to produce JMETLs that support their CINC as well as METLs that support their service.

As complicated as this process sounds, it reflects and meets the desires of Congress to subordinate training, equipping, and readiness of the US armed forces to joint warfare. At the heart of this system of JMETL development, however, is the subordination of joint-force and component training, programming, and readiness to meet current contingency plans.⁶ In other words, JMETL-based prioritization will result in the training, equipping, and readiness of the US armed forces to meet theoretical contingencies envisaged within the next few years. Such an approach, however, does not take the long view.

Problems with Joint Mission-Essential Tasks

Tactical units, such as squadrons, perform tasks at the tactical level of warfare. Wings perform a combination of tactical-level joint tasks and tactical service tasks. Numbered air forces, as potential JTF headquarters and providers of joint force air component commanders, primarily perform joint tasks at the operational level of warfare. The unified CINC's JMETL contains joint tasks to be performed at the theater/strategic level of warfare, although there are exceptions to this generalization. For the most part, Washington handles national strategic tasks, although CINCs perform this function also.

Military departments have national and theater-/strategic-level responsibilities involving training, equipping, and organizing the US armed services as outlined in various congressional statutes and Department of Defense (DOD) and Joint Chiefs of Staff (JCS) administrative regulations. These include roles specifically assigned to the services in the National Security Act of 1947; Titles 10 and 14 of the US Code; DOD Instruction 5100.1, *Functions of the Department of Defense and Its Major Components*; and Joint Pub 0-2, *Unified Action Armed Forces*, as well as other such laws and regulations. These training,

equipping, and organizing roles of the services include both short- and long-term efforts and have been referred to as "core competencies."

Current contingency plans—therefore JMETLs—are driven by current, not emerging, threats.

Because of this long-term responsibility, services publish visions such as *Global Engagement* that indicate where they are going in the future. What is the relationship between the services' views of what they need and the views found in *JV 2010*? The services have all agreed with what appeared in *JV 2010*; one view maintains that they need only provide details on what they would do to execute this joint vision. Real joint vision that drives future programmatic requirements is somewhat new and signals a potential major erosion of the prerogatives of the military departments to train, organize, and equip.

Current contingency plans—therefore JMETLs—are driven by current, not emerging, threats. Hence, it is not surprising that the newly issued *JV 2010* and *Global Engagement* are devoid of any mention of limited or regional war or reconstitution against a resurgent or emergent global threat.⁷ The spectrum of conflict for which all the armed services have prepared includes global nuclear war (unlikely but at least listed) and, at the high end of the conventional spectrum, a major regional contingency (MRC)—recently renamed major theater warfare (MTW).

Let us recall from the days of the cold war what the armed forces of the United States were supposed to be able to handle.⁸ This included global nuclear war as well as global conventional war involving multiple AORs. Until recently, the US military also had a category for regional war—a major war in one AOR. In the "old days," the next lesser category was the MTW—Korea and Southwest Asia. *Global Engagement* makes clear that the MTW, not limited or regional war, is now the

most demanding conventional combat scenario for which the Air Force must train and equip.

If future combat at the operational level is joint, then why does Army training still include preparation for combat by three-star corps commanders operating as a single-service force?

Core Competencies

Now that we understand the context of the MTW, we can better comprehend the core competencies of the Air Force. Listed in *Global Engagement*, they include air and space superiority, global attack (rapid strikes anywhere on the globe), rapid global mobility, precision engagement, information superiority, and agile combat support. These competencies, however, are expressed in the context of conventional combat no more demanding than an MTW. They are *not* understood to involve a regional war or global conventional war. Hence, the Air Force must train for and/or procure for the following in the context of an MTW: the air expeditionary force, future concepts for unmanned airborne vehicles with the capability for suppression of enemy air defenses, and agile combat support from the continental United States to a forward theater.

Although the Air Force core competencies contained in *Global Engagement* are compatible with those found in a CINC's JMETLs and in *JV 2010*, the degree of support for those core competencies might strain the otherwise good relationships between Air Force commanders and staffs and joint commanders and staffs. For example, in prioritizing programs that will receive joint support, joint commanders might view global attack as a task that a single composite wing could perform, whereas the Air Force might have a

larger capability in mind. Needing to respond only at the MTW level, the joint commander could assume that other non-Air Force assets were available for rapid strikes anywhere in the world; thus, one would need smaller numbers of Air Force units within a bigger joint capability.

Similarly, precision engagement in the context of global nuclear war might have two meanings, depending upon one's view of the requirement. Not long ago the Air Force and the White House agreed on the need for precision nuclear strikes as part of both nuclear war-fighting and deterrent strategies that justified the use of manned bombers capable of penetrating the air defenses of our most worthy potential adversary. Is this view still shared by the Air Force and the White House or JCS?

Would our CINCs, charged by the White House and JCS with nuclear war-fighting and deterrent missions, be able to describe their requirements for nonprecision strikes using only ballistic missiles? Has the national nuclear war-fighting or deterrent strategy shifted towards punishment, thus undermining the need for manned penetrating bombers capable of striking various defended, mobile, or hard targets with precision?

Other Service Issues

One also finds in the Army, Navy, and Marine Corps this potential disconnect between new joint requirements and traditional services' views of how to conduct warfare. With an MTW as the most demanding scenario for future combat, would any unified CINC create a JMETL requirement for an Army corps to fight as a single-service force at the three-star level? Or would an Army corps commander more likely operate as a JTF commander?

If future combat at the operational level is joint, then why does Army training still include preparation for combat by three-star corps commanders operating as a single-service force? Does the answer change if we assume that operational-level combat in the



Part of a carrier battle group. Should naval campaigns exist?

future is multinational and not necessarily joint? What JMETL or METL requirements of Army corps commanders drive the Battlefield Command Training Program?

This three-star role in combat is not an Army-only issue. The Air Force's view of an air "campaign" involves a single service performing an operational-level mission not required in a joint environment. According to joint doctrine, all campaigns are joint. Thus, a single service would perform only an operation, at most.

Is Blue Flag at the level of a single-service operation, or is it a joint exercise? What are the JMETL or METL requirements of the Air Force to run this exercise? If Blue Flag is more joint than single service, then why does the Air Force run it without the oversight of a CINC?

Similarly, there should be no such thing as a naval campaign, even if naval warfare is multiservice in nature. Today, very few people would acknowledge the existence of a credible military threat to maritime forces in the deep-ocean environment. A unified

CINC's contingency plans for an MTW environment would not likely assume credible threats to shipping or naval forces transiting the deep oceans en route to a trouble spot. Therefore, one probably would not find a capability for open-ocean combat against a determined high-seas threat on any unified CINC's JMETL or in any maritime JTF commander's JMETLs designed to support current plans.

If unified CINCs assume a "free ride" across the oceans, there would be no need to train maritime forces to meet hostile open-ocean threats, to program future convoy capabilities, or to assess readiness to cross sea lines of communications in a contested environment. Without any JMETL requirement for such training, should Navy METLs drive Navy or multinational naval training for just such an eventuality?

This Navy issue addresses whether forces should be trained under "most likely" threat conditions or "worst case" conditions. No one questions the need to transit the oceans; rather, one questions whether train-

ing and force procurement should assume the existence of any opposition on the high seas. JMETLs with an MTW as the most demanding scenario would drive Navy training to assume no threat. But Navy METLs might posit a completely different training environment.

There should be no such thing as a naval campaign, even if naval warfare is multiservice in nature.

The Air Force issue addresses whether Air Force precision-engagement forces would be required to penetrate sophisticated national or theater air and missile defenses or those associated with preferential defense of specific targets. Current joint guidance discusses “most likely scenarios” but says at the same time to assume “worst case” conditions.⁹ Should Air Force METLs assume a set of training conditions associated with combat more robust than an MTW even if no JMETL requirements exist?

The Marine Corps’s view of combat now includes operational maneuver from the sea, but the Marines’ embracing of maneuver warfare concepts has not been shared by the joint community. Nor is it clear that these concepts have been expressed in terms internalized by the Air Force and Navy.¹⁰ Today, we see the Marines pursuing operational maneuver from the sea and the general concepts of maneuver warfare without a clear mandate from the CINCs’ JMETLs or even *JV 2010*.¹¹ Marines have a history of leading the way in innovative war-fighting concepts, but as regards maneuver warfare, they seem to be leaning forward in the straps. Do parallels in doctrinal development exist within the Air Force?

JMETLs Are Not Enough!

Although the US government and allied nations are doing everything in their power

to ensure that the current political-military environment gets no worse—and therefore that the global conventional war and regional war scenarios associated with a resurgent or emergent global threat do not return—this effort might not succeed despite our collective best efforts. If the worst were to happen and a resurgent or emergent global threat or regional war threat did emerge, then the guidance from the *National Security Strategy*, the *National Military Strategy*, the *Defense Planning Guidance*, and the *Joint Strategic Capabilities Plan* would change, which in turn would change JMETLs—but only over time. The unified CINC who had previously not considered large numbers of Air Force global-attack forces, manned penetrating bombers, Army corps that would fight as service elements, open-ocean combat in contested seas, or maneuver warfare as mission essential would face the immediate need to have forces trained, equipped, and ready for these tasks.

In such a situation, the unified CINCs would turn to the services for trained and equipped forces to meet the new conditions. That none of these forces might have trained for such conditions of combat or that forces to perform such missions might not exist would exacerbate an already troublesome dilemma. Further, if no hardware existed to support more demanding missions, the situation could become intolerable.

Under congressional, DOD, and JCS mandate, the uniformed services—not the CINCs—are responsible for training, equipping, and organizing the armed forces. These responsibilities are not limited to conditions assumed by the CINCs as they make up their current JMETLs or to the future of combat as envisaged in *JV 2010*. The services have a responsibility to develop a force beyond that required to meet the current threat. In other words, the services have a long-range view as opposed to the short-range view of the unified CINCs.

Because the services have a longer view, they have the primary responsibility for the development of new weapons systems, evaluation of emerging technologies, and associated research and development functions.

The services—not the unified CINCs—have the primary responsibility for the procurement of weapons systems and the equipping of forces for the future. If this function were subordinated to the more short-range view of the JMETL process, or even that found in *JV 2010*, a drastic change would occur in what the armed services buy.

Apparently the new advanced concepts technology demonstration (ACTD) process is removing some procurement decisions from the services. Promising advanced technologies are put directly into the hands of unified CINCs, who must determine military utility and impact on joint doctrine. The ACTD process puts the CINCs rather than the service chiefs initially in the driver's seat on certain major procurement programs. *JV 2010* states that this new joint vision will also have a role in the ACTD process, but that role is still being formulated.

This is not to say that either the long-range service view or the short-range CINC view is superior. On the contrary, the nation needs the input of both if it is to make informed decisions on the allocation of resources to support DOD programs. Nor should the reader infer that the author is advocating the backpedaling of service support for jointness. This article does argue, however, that even in an era of jointness, the nation needs to ensure that the services are able to perform nonjoint and non-mission-essential tasks that may be required in the future. In short, JMETLs are not enough!

How to Determine Service Core Competencies

The *Report of the Commission on Roles and Missions* of 1995 foresaw some of these problems and used the phrase "core competencies" to refer to those tasks in which the services should maintain expertise. The report stated that "core competencies are the set of specific capabilities or activities fundamental to a Service or agency role." It also said that "we affirm the role of the Military Services in developing concepts, doctrine, tactics, tech-

niques, and procedures that derive from their core competencies." The commission did not feel that service core competencies conflicted with the preparation for joint warfare. Instead, the report said that those core competencies "define the Service's or agency's essential contributions to the overall effectiveness of DOD and its Unified Command" and that they are "a prerequisite to improved joint military effectiveness."¹²

The Marines' embracing of maneuver warfare concepts has not been shared by the joint community.

The core competencies of the uniformed military services are those roles and functions assigned to them by higher authority. They define, for example, the overall responsibility of the individual service in the training, equipping, and organizing of its military forces. This would include, but is not limited to, procurement, mobilization, education and training, preparation of doctrine, organization, personnel management, transportation, and so forth. Most of these competencies are outlined in legislation and administrative regulations that delineate the differences between military departments and combatant commanders. War-fighting core competencies, however, are more difficult to ascertain.

Just what are the specific war-fighting core competencies of each service, and how should they be determined? The Air Force has published its list. The Navy might argue that open-ocean combat is a core competency. The Army might argue that core competencies include the ability to maneuver a corps, while the Marine Corps might argue that it would include the amphibious assault capability for a Marine expeditionary brigade-sized force in an opposed-landing environment.

Should each service have the right to argue for its own version of its war-fighting core competencies, or should it remain supportive of *JV 2010*? Should service core competencies

be based upon service or joint doctrine? Perhaps historical use or expected future uses of that service should be the deciding factor. Another approach entails reviewing the legislation and administrative regulations that assign war-fighting roles to the services and deriving tasks from them. After all, if Congress, DOD, or JCS has directed that a service be capable of performing a role or a function, one would assume that it ought to be able to do so.

Whatever the method, the services should agree on a general approach to the problem and understand that their role is complementary to supporting jointness. Services need to support the war-fighting unified CINCs with their abilities to perform current tasks. But they also need to take the long view and maintain capabilities that currently do not appear on the unified CINCs' various JMETLs.

The issue of how much the nation should support the long and short views needs to be consciously addressed with solid analytic methodologies. We must balance the ability to meet current tasks against the need to address potential future threats with emerging technologies and doctrine. Although we probably don't have sufficient resources to adequately fund both, an informed nation can make intelligent choices.

Notes

1. *Joint Vision 2010* (Washington, D.C.: Joint Chiefs of Staff, c. 1995).
2. Gen John M. Shalikashvili, "A Word from the Chairman," *Joint Force Quarterly*, no. 12 (Summer 1996): 5.
3. Department of the Air Force, *Global Engagement: A Vision for the 21st Century Air Force* (Washington, D.C.: US Air Force, c. 1997).
4. Chairman of the Joint Chiefs of Staff Instruction (CJCSINST) 3500.01, *Joint Training Policy for the Armed Forces of the United States*, 21 November 1994, 18; and CJCSINST 3500.02A, *Joint Training Master Plan for the Armed Forces of the United States*, 8 December 1995, A-13.
5. For additional information on JMETL development, see John R. Ballard and Steve C. Sifers, "JMETL: The Key to Joint Proficiency," *Joint Force Quarterly*, no. 9 (Autumn 1995): 95-98.
6. CJCSINST 3500.02A, A-22.
7. Barton Gellman, "Pentagon War Scenario Spotlights Russia," *Washington Post*, 20 February 1992, 1.
8. Joint Chiefs of Staff, *1990 Joint Military Net Assessment* (Washington, D.C.: Government Printing Office, c. March 1990),

Conclusions

The United States should and could have armed forces that operate jointly. Consideration of service-specific core competencies is not a retreat to the days before the Goldwater-Nichols Department of Defense Reorganization Act of 1986. Jointness is the right answer—but it is not the *only* answer. The basis of sound joint military operations lies in the armed services' mastery of their own core competencies. Only then can they advance to the more complex levels of training and skill required when they operate with each other.

The obvious rub to all this is resourcing. Will the nation provide the resources to build and train a military that is capable of doing more than fighting in an MTW-level scenario? If the answer is no, then the military must provide not only a risk assessment but also a backup plan to handle regional wars and global conventional wars. That plan cannot just assume there will be strategic warning and sufficient time to prepare for more demanding requirements. In the absence of any serious planning to handle more than an MTW and with cost driving the solution, nuclear weapons become the low-cost hedge. □

V-1 and V-2; and idem, *1991 Joint Military Net Assessment* (Washington, D.C.: Government Printing Office, March 1991), 1-5 and 9-2.

9. CJCSINST 3500.02A, A-3.

10. The Air Force came closest to coming to grips with the concept of maneuver warfare in Martin van Creveld with Steven L. Canby and Kenneth S. Brower, *Air Power and Maneuver Warfare* (Maxwell AFB, Ala.: Air University Press, July 1994).

11. *Joint Vision 2010* states that "dominant maneuver" is one of the four new operational concepts required to obtain full spectrum dominance in the next century. A careful assessment of the requirements of dominant maneuver demonstrates that it includes some ideas from maneuver warfare theory but has not fully embraced maneuver concepts.

12. Commission on Roles and Missions of the Armed Forces, *Directions for Defense: Report of the Commission on Roles and Missions of the Armed Forces* (Washington, D.C.: Government Printing Office, 1995), 2-4 and 2-20.

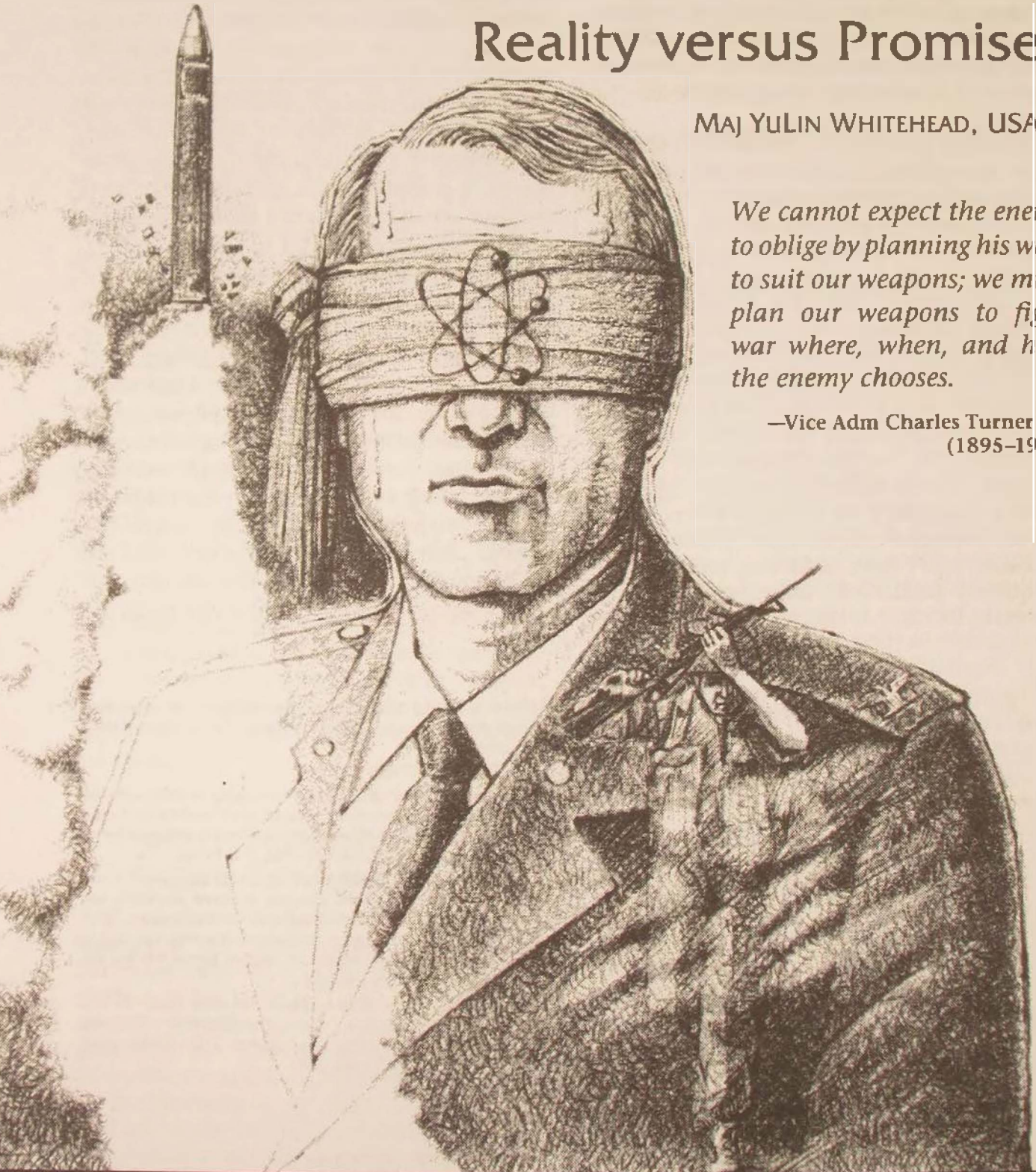
Information as a Weapon

Reality versus Promises

MAJ YULIN WHITEHEAD, USAF*

We cannot expect the enemy to oblige by planning his wars to suit our weapons; we must plan our weapons to fight war where, when, and how the enemy chooses.

—Vice Adm Charles Turner Joy
(1895–1956)



The instruments of battle are valuable only if one knows how to use them.

—Ardant du Picq, *Battle Studies*

THERE ARE MANY views of what constitutes information warfare (IW). The differences in interpretation are understandable given the subtle (and sometimes not-so-subtle) variations in the definitions of IW. Also, the various terms used as substitutions for IW add to the differing views of the topic. The differences in interpretation have translated into a virtual explosion of literature written by authors with their own definitions of IW.

The literature may be grouped into two broad categories based on the authors' thematic approach to IW. The first category involves a concept that discusses IW in terms of the more traditional notion of the use of "information warfare" to support decision making and combat operations. This first theme does not address the question of whether information is a weapon and is therefore inappropriate for this article. On the other hand, the second category is a wholly different approach and one that directly provides evidence to support or refute the question of whether information is a weapon. Authors in this category regard "information as a weapon" in warfare.

Dr. George J. Stein, a professor at the US Air Force's Air War College, also sees a clear separation between using "information in warfare" and using "information as a weapon" or what he terms *information warfare* or *information attack*.¹ He believes that there is significant difference between the two categories. Specifically, he explains information in warfare as

all those papers and briefings that begin "Information has always been central to warfare . . ." and then go on to explain that "our

new computer system will get information to the warfighter" so he can "achieve information dominance on the battlefield" and thus demonstrate our service's mastery of IW, confuse information-in-war with information warfare. Whether we are digitizing the cockpit or digitizing the battlefield, this is not IW.²

The US Air Force document *Cornerstones of Information Warfare* makes a similar distinction by distinguishing the difference between *information age warfare* and *information warfare*. It explains the former as "us[ing] information technology as a tool to impart our combat operations with unprecedented economies of time and force,"³ such as cruise missiles exploiting information age technologies to put a bomb on target. Information warfare, however, "views information itself as a separate realm, potent weapon, and lucrative target"⁴ and fits in the category of using information as a weapon.

Using this typology, it appears many of those who claimed Operation Desert Storm was an information war are actually describing the use of information in warfare or information age warfare.⁵ For example, Alan D. Campen, a former undersecretary of defense for policy, states that "this war differed fundamentally from any previous conflict [and] the outcome turned as much on superior management of *knowledge* as it did upon performances of people or weapons."⁶ Further, using this definition, he and others argue that Operation Desert Storm was not only an information war, but the first one in history. This argument holds little credibility because it was not the first time an armed force failed to attain victory for lack of knowledge.⁷

The USAF and Dr. Stein's categorizations of the use of "information as a weapon" and "information in warfare" provide a logical method to separate the two main themes of information warfare literature. However, it is not the author's intent to argue the merits or

¹Special thanks to Dr. Daniel J. Hughes, professor of military history, Air War College, and Maj Mark J. Conversino, professor of airpower history and theory, School of Advanced Airpower Studies, for their invaluable advice and guidance in the writing of this article. Also, thanks to my husband, Ray, for his constant love and support.



During Desert Storm, Lt Gen Frederick Franks, VII Corps commander, sketches his plan to envelop remaining Iraqi forces. Instead of just contemplating whether the information weapon will affect an enemy's will to fight, one should ask how US military leaders would react if an adversary blinded friendly command and control systems.

faults of their delineations. Rather, this article uses those writings that profess the use of information as a weapon rather than those that boast the effective use of information in warfare in supporting combat operations, since the latter is not relevant to the question of whether information is a weapon.

The Information Weapon

Identifying literature that advocates information as a weapon is fairly elementary. The authors usually declare their beliefs with such definitive statements as "The electron is the ultimate precision guided weapon";⁸ "Information is both the target and the weapon";⁹ "The day may well come when more soldiers carry computers than carry guns";¹⁰ "The US

may soon wage war by mouse, keyboard and computer virus";¹¹ "Information may be the most fearsome weapon on the emerging techno-battlefield";¹² "The most potent new US weapon, however, is not a bomb, but a ganglion of electronic ones and zeroes";¹³ and "In Information Warfare, Information Age weaponry will replace bombs and bullets."¹⁴ Certainly this is not a comprehensive list of information warfare-related writings that proclaim information as a weapon, but it does represent a cross section of ideas that appear in publications that range from official government documents to more popular books and magazines meant to attract the average reader.

After one gets past the attention-getting steps of pithy statements proclaiming infor-

mation as a weapon and a target, one significant theme emerges. Specifically, the "information weapon" advocates believe "information warfare can enhance power projection by diminishing an adversary's will and capacity to make war."¹⁵ Linking the information weapon to the enemy's war-fighting capabilities and will to fight is significant because US military thinking has evolved to accept that diminishing these two aspects of an opponent will lead to victory for our own forces.¹⁶ The US Army field manual on information warfare explains the significance of this linkage by equating the information weapon to the purpose of firepower in combat—"the generation of destructive force against an enemy's capabilities and will to fight."¹⁷

Similarly, literature not under the purview of the Department of Defense (DOD) also expounds on the ability of the information weapon to affect the enemy's ability and will to fight. The most apparent difference between official DOD publications and popular literature is that the latter may not employ the exact phrase of using information to affect "the adversary's will and capacity to make war." Nevertheless, this is a firmly established concept that appears frequently in writings about information warfare. For example, Col Richard Szafranski, USAF, Retired, a former Air War College professor who has written extensively on various military-related topics, equates subduing the enemy's will to "neocortical warfare," which "strives to influence, even to the point of regulating the consciousness, perceptions, and will of the adversary's leadership: the enemy's neocortical system."¹⁸

Other advocates of the information weapon either do not specifically address what constitutes a "target" or tend to agree in principle with the Air Force definition. While the latter group of advocates agrees that the target is information, their description of the "information target" may be more esoteric. As a case in point, Stein explains that "information attack, while 'platform-based' in the physical universe of matter and energy, is not the only counter-platform," and he believes that doctrinal thinking must move away from

the "idea that information attack involves only the use of computers and communications."¹⁹ He incorporates John Boyd's "observation-orientation-decide-act" (OODA) loop²⁰ in defining the targets of the information weapon. Stein sees indirect information warfare attacks as affecting the "observation" level of the OODA loop at which information must be perceived to be acted on.²¹ On the other hand, direct information warfare corrupts the "orientation" level of the OODA loop to affect adversary analysis that ultimately results in decision and action.²² Thus, to him, the information weapon may or may not be used against a counterplatform. Stein's bottom line is that "information is both the target and the weapon: the weapon effect is predictable error."²³ The weapons effect of "predictable error" resulting from the use of the information weapon is an incredible notion because it assumes that one can predictably induce errors an adversary will make in "observing" and "orienting" information that ultimately results in decision and action.

In another example, Szafranski, in the most general terms, appears to agree that the information weapon affects the information target but wants his readers to focus on the "enemy mind" as a whole. He states that

the target system of information warfare can include every element in the epistemology of an adversary. *Epistemology* means the entire "organization, structure methods, and validity of knowledge." In layperson's terms, it means everything a human organism—an individual or a group—holds to be true or real, no matter whether that which is held as true or real was acquired as knowledge or as a belief.²⁴

In Szafranski's construct, the "acme of skill" is to employ the information weapon to "cause the enemy to choose not to fight by exercising reflexive influence, almost parasympathetic control, over products of the adversary's neocortex."²⁵

Thus, the prototypical advocate of using information as weapons espouses the aim of such weapons as to influence an adversary's will and capacity to make war. Further, with information as the weapon, its target, in the simplest sense, is also information. A more

esoteric definition of the target is the enemy mind or his cognitive and technical abilities to use information. Finally, the explicitly stated and sometimes implicitly assumed weapons effect is predictable error. Specifically, the use of the information weapon will allow one to predict how an enemy will err in judgment, decisions, and actions.

Enemy Will and Capacity to Fight

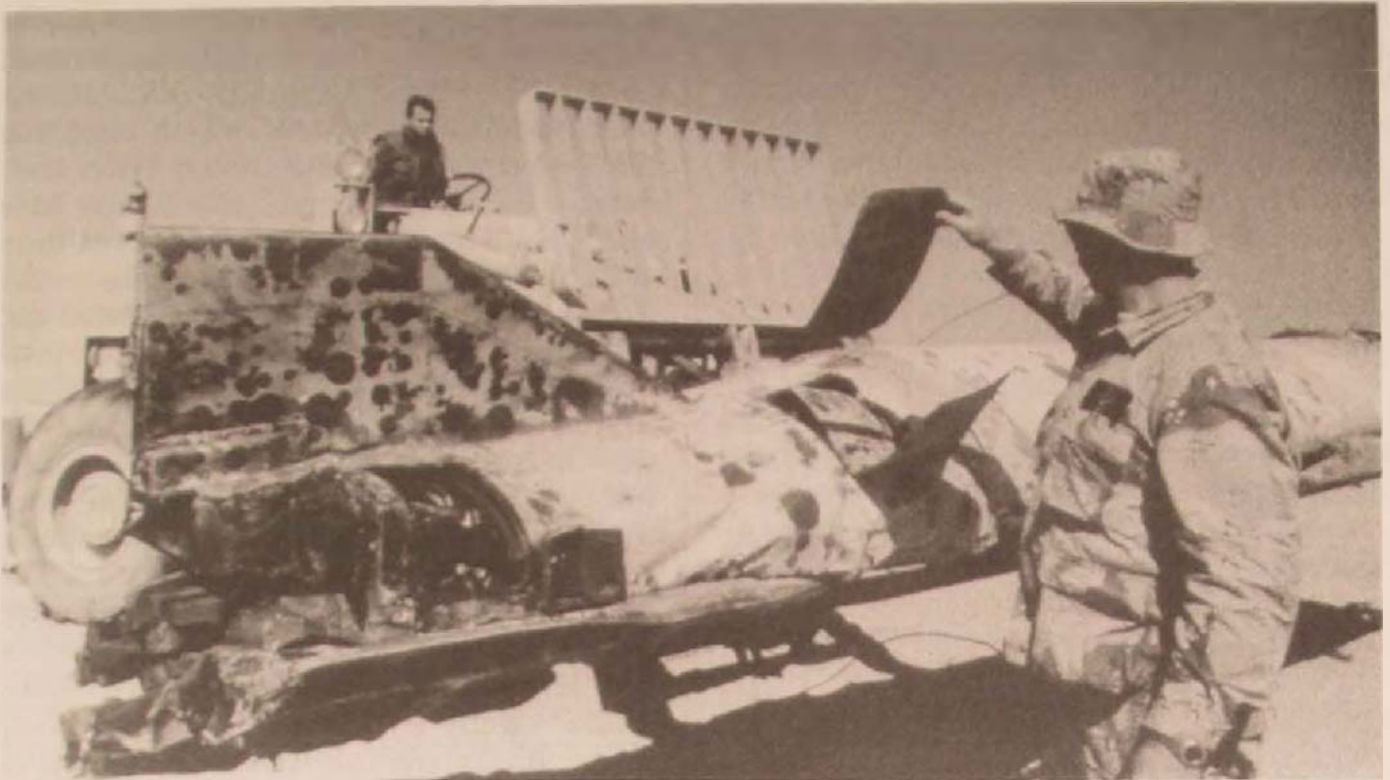
There is a paucity of evidence available for analysis in addressing the information weapon's effect on the "adversary's will and capacity to fight." Most of the literature tends to identify either "information" or the "enemy mind's ability to observe and orient" as the targets of the information weapon. Unfortunately, these two concepts can either encompass every target or are so esoteric that it is difficult to identify specific targets. The remainder of this portion of the analysis will first address the "information" target and then tackle the target of the "enemy mind's ability to observe and orient."

It appears that the US Air Force has recognized the difficulty of identifying specific information targets and has attempted to address the issue through its *Cornerstones of Information Warfare* pamphlet and draft doctrinal documents. For example, the Air Force has stated, "Information warfare is any attack against an information function, regardless of the means."²⁶ Therefore, "bombing a telephone switching facility is information warfare. So is destroying the switching facility's software."²⁷ Similar types of targets may then include elements of the enemy integrated air defense system (IADS). In defining the information target, the US Air Force is attempting to focus information warfare as "a means, not an end, in precisely the same manner that air warfare is a means, not an end."²⁸ However, an unintended consequence may result from this overarching target definition: if information warfare encompasses nearly every target, then the concept merely becomes a new label

for traditional military operations (such as psychological operations, deception, physical destruction, etc.) that military forces have conducted for thousands of years.

Do the information weapon attacks against communications and control facilities, the enemy's IADS, and their computers diminish the adversary's will and capacity to fight? Well, yes and no. Certainly, "hard killing" elements of the enemy information functions or "soft killing" through introduction of viruses and logic bombs into the enemy's computer systems would affect his capacity to fight. Hard kills result in the physical destruction of information systems and interconnections, while soft kills render computer screens "blank" or cause the systems to present faulty displays.

Given that the information weapon could affect an enemy's capability to fight, will it also be able to affect his will to fight? While the enemy computer terminal operator may feel frustrations and even decreased morale resulting from leaders' demands for unavailable information, the latter's will to fight may or may not be affected. In other words, how would "blinding" enemy leaders affect their will to fight? Would they actually surrender, or would US blinding operations actually backfire and force adversary leaders to panic and resort to the use of weapons of mass destruction? For example, Russia adopted a military doctrine in November 1993 that indicated a belief that during an East-West conflict, an attack on Russia's early-warning system for strategic nuclear forces is possible.²⁹ In such a situation, the Russians may assume the worst—the invasion of Russian territory by foreign military forces. With their sensors blinded and command and control systems destroyed by information weapons, Russian leaders may not be able to obtain information and may resort to whatever means necessary to protect their homeland. In essence, they will be "blind," but their strategic nuclear weapons will still be intact and operable. How can the information weapon advocate be certain that Russia will not employ the nuclear weapons?



The Scud problem during Desert Storm demonstrated that coalition efforts to blind and paralyze the enemy, while impressive and important, did not in themselves diminish the capability or will of the Iraqis to fight.

Instead of just contemplating whether the information weapon will affect an enemy's will to fight, one should ask how US military leaders would react if an adversary blinded friendly command and control systems. Would US military leaders lose the will to fight if their computers went blank? The will to fight is an elusive target, and it is difficult to assess whether the information weapon is capable of affecting it. Certainly, other factors such as political objectives and the question of whether the enemy is fighting for his own survival or for more limited goals would surely figure into the will-to-fight equation.

Despite the value of "will," some information weapon advocates, drawing from Col John Warden's view of the enemy as a system, argue that the relationship of will (morale) and the capacity to fight (physical) can be expressed in the following equation:³⁰

$$(\text{Physical}) \times (\text{Morale}) = \text{Outcome}$$

Specifically, they believe that a weapon need not affect both will and capacity to fight to put the enemy in such a condition that he

can no longer carry on the fight. In fact, Colonel Warden states that the physical part of the equation is easier to target than morale, so US forces should focus on the physical. He asserts, "If the physical side of the equation can be driven close to zero, the best morale in the world is not going to produce a high number on the outcome side of the equation."³¹ Clausewitz cautioned against this type of reductionism and wrote, "If the theory of war did no more than remind us of these elements, demonstrating the need to reckon with and give full value to moral qualities, it would expand its horizon, and simply by establishing this point of view would condemn in advance anyone who sought to base an analysis on material factors alone."³²

Indeed, numerous historical cases support Clausewitz's warning of not underestimating the importance of morale or the will to fight. One of the most distinct examples for the United States remains the Vietnam War during the 1960s and early 1970s. Despite the US military's efforts in destroying the Vietnamese communists' material resources and sig-

nificantly reducing the movement of their lines of communication along the Ho Chi Minh Trail, the communists retained their will to fight.³³ In the end, it was their tremendous will to fight and, arguably, the US lack of will to fight that allowed North Vietnam to defeat the United States and the Saigon regime.³⁴

Nevertheless, advocates of the information weapon's effectiveness use the "information warfare" actions in Operation Desert Storm to show that destruction of the capacity to fight (physical) affected the will to fight (morale):

Coalition forces spent the early days of Desert Storm gouging out the eyes of Iraq, knocking out telephone exchanges, microwave relay towers, fiber optic nodes and bridges carrying coaxial communications cables. By striking Hussein's military command centers, the coalition severed communications between Iraqi military leaders and their troops. With their picture of the battlefield—their battlefield awareness—shrouded in a fog, the Iraqis were paralyzed.³⁵

Noticeably lacking from this illustration is the explanation that after the supposed "paralysis" of the Iraqis, deployed coalition military forces fought an air and ground war in Iraq. The combination of coalition air forces that bombed Iraqi targets from 17 January to 2 March 1991 coupled with the coalition ground attack that began on 24 February 1991³⁶ ultimately led to Iraq's agreement to accept all terms of the United Nations cease-fire resolution.³⁷ In other words, the efforts to blind and paralyze the Iraqis, while impressive and important, did not by themselves diminish their capability or will to fight. Rather, the blinding efforts made the Iraqis more vulnerable to conventional coalition military attacks and operations.

The Operation Desert Storm illustration, besides being a reductionist argument that distorted the nature and causes of US and coalition military successes against the Iraqi forces, also ignored other realities. First, several Desert Storm analysts suspected that after coalition forces destroyed Saddam Hussein's more advanced telecommunications systems

(satellite, microwave, and cable systems), he continued to relay launch orders to his Scud missile batteries via courier.³⁸ Second, the often simplistic method depicted regarding the ease with which the United States took down the Iraqi command network may have been overstated.³⁹ Specifically, while coalition airpower greatly reduced the capacity of the communication links between Baghdad and its field army in the Kuwaiti theater of operations, sufficient connectivity remained for Baghdad to order a withdrawal from Kuwait that included some redeployments to screen the retreat. Therefore, the ambitious hope that bombing the leadership and command, control, and communications targets would lead to the overthrow of the Iraqi regime and completely sever communications between the Baghdad leadership and their military forces "clearly fell short."⁴⁰ Third, the Iraqi forces, the Republican Guards notwithstanding, were poorly trained and motivated, and lacked high morale prior to any coalition information attack. Thus, it was not the effect of the information weapon alone that weakened the enemy's will to fight.

There are other examples of military forces that continued to fight after being isolated from higher headquarters when their communications became inoperable. During the Normandy campaign in 1944, German forces often fought under emissions control or radio silence. Yet, their effective training, sound tactical leadership and doctrine, and adherence to *Auftragstaktik*, or mission-type orders, enabled them, for almost two months, to fight the numerically superior Allies to a stalemate before attrition finally wore down their effectiveness.⁴¹

Perhaps those who advocate using the information weapon against the second type of information target, the "enemy mind's ability to observe and orient," place more importance on the morale factor than the physical. Champions of attacking this type of information target have coined this form of information warfare as "perception management,"⁴² "orientation management,"⁴³ or "neocortical warfare."⁴⁴ While these terms may imply some "new" types of warfare, in actuality they are

merely amorphous terms for what had been traditionally called psychological operations, propaganda, and military deception. For the purpose of discussion, this article addresses this form of information weapon as perception management.

The same question posed about information as a target also applies to the second information target, the enemy mind. The key question is whether information warfare will necessarily reduce the mental ability and will to resist. While it is true that perception management can deceive, surprise, add to the enemy's fog and friction, and even affect the morale or the will to fight, it will not likely produce a "predictable error" as Dr. Stein assumes.⁴⁵ The concept of producing a "predictable error" implies that one can predictably induce advantageous errors in an adversary's actions and decision making. In essence, it assumes that human behavior and reactions are totally predictable and may be precisely manipulated. This concept ignores Clausewitz's philosophy of the unpredictability of humans and warfare as illustrated through the following syllogism:

If $A \neq B$ (If humans do not behave according to laws)
 And $C = A$ (And warfare is a human event)
 Therefore, $C \neq B$ (Therefore, warfare will not follow laws)

Not only does the concept of "predictable error" ignore Clausewitz's theory regarding human nature and warfare, it also seems to challenge common sense. For example, is it really possible to predict the actions, intent, and decision-making rationale of such disparate minds as those of Adolf Hitler, Joseph Stalin, Ho Chi Minh, Ayatollah Ruhollah Khomeini, Mu'ammarr Gadhafi, Saddam Hussein, Mohammed Aidid, and Kim Jong Il? Hitler thought he could achieve a predictable outcome when he drew up the Operation Barbarossa plan and "believed nothing less than the Soviet Union could be defeated in four months."⁴⁶ Yet, in April 1945, Soviet tanks entered Berlin, almost four years after German forces invaded the Soviet Union in

May 1941. A "predictable error" may be extremely difficult to predict, much less to induce.

In the same vein, perception management will likely have minimal impact on the enemy's capacity to fight, unless, of course, the "information attack" deceives the enemy regarding the disposition and location of friendly forces. As an illustration, the World War II Allied deception plan, Operation Fortitude, contributed to Adolf Hitler's preconceptions of the location of the impending invasion of France. Consequently, invading Allied forces at Normandy did not face the bulk of the German troops in France and Belgium guarding the Pas de Calais and the Belgian and Dutch coastline.⁴⁷

Somewhat more troublesome is the view of many of these advocates who believe it is possible to use the perception management weapon to target the enemy mind with "the aim of subduing hostile will without fighting."⁴⁸ They balk at the view that this type of attack should supplement and enhance more conventional forms of warfare. Again, the literature is sparse in terms of specifics on how perception management will "subdue hostile will." But it does not lack in promises to stop a war before it starts. One example of how this type of attack might target hostile will was posed by Thomas Czerwinski, a professor in the School of Information Warfare and Strategy at the National Defense University. "What would happen if you took Saddam Hussein's image, altered it, and projected it back to Iraq showing him voicing doubts about his own Baath Party?" While it is not possible to state with absolute certainty the reactions of the Baath Party, Saddam Hussein, or the world community, it is unlikely that such perception management attacks will completely subdue hostile enemy will. Those who predict it is possible to subdue enemy will with perception management seem to assume, as in this example, that enemy leaders will have no interactions with their followers.

Civilian and military leaders have used perception management, or propaganda, throughout the history of warfare. The difference today is brought about by the ad-

vent of the microprocessor, which allows another medium, cyberspace, for friendly forces to propagate the perception management message to the enemy. Unfortunately, propaganda has had, at best, limited utility. To elevate its stature above that of a supplemental role in war is unrealistic.

It is inconceivable to expect perception management alone to subdue a hostile's will to fight, especially when history has shown otherwise. The idea that perception management will enshroud the enemy in "fog" and "friction" and subsequently subdue his morale assumes the enemy will react exactly as the propaganda plan expects. This assumption discounts historical cases. For example, during World War II, the US military, having nearly destroyed Japan's capac-

ity to fight, targeted the will of the people through leaflet drops and firebombings of cities with populations over one hundred thousand, along with the release of two atomic weapons on Hiroshima and Nagasaki. Despite the horrific death and destruction, Japanese military commanders refused to surrender, and the Japanese people were in despair after hearing of their emperor's decree to surrender.⁴⁹ How realistic, then, is the information weapon advocates' vision that enemies will surrender through information attacks targeted at the enemy mind or "neocortical" system? Will the enemy stop fighting because the United States, through perception management attacks, tells him to stop? Unfortunately, the enemy may not always be so cooperative.



The results of a blinded and paralyzed Iraqi military. Scuds were being launched throughout the war.

The Information Weapon: Use with Caution

In analyzing whether information is a weapon, this article tested the ability of information itself to target "information" and the "enemy mind's ability to observe and orient" for the purpose of destroying the enemy's will and capacity to fight. The results indicated that while information may be considered a weapon, it is one that must be used with caution. The more enthusiastic proponents of the information weapon tend to overestimate its ability to diminish enemy capacity and will to fight.

Information is not a technological "silver bullet," able to subdue the enemy without battle. Unlike other, more conventional, weapons, the effects of the information weapon are not necessarily predictable because it often targets the human mind and emotions. Thus, in employing the information weapon, one must not rely solely on its use for success. Rather, the strategist must prudently use the information weapon to supplement more traditional weapons of war or as a precursor to conventional attacks and operations.

While this article has answered the question it set out to investigate, other factors have emerged in the course of this analysis. The extreme claims for information warfare, even when employing the information weapon as envisioned by its advocates, are particularly unconvincing and even irresponsible. The most zealous advocates of information warfare describe information as a low-cost weapon with a high payoff, a method to eliminate the fog and friction of war for friendly forces yet enshroud the enemy in the same, and a tool to allow attainment of quick and bloodless victories.

Regarding the first characteristic, a low-cost weapon with a high payoff, the cost will depend on the specific information weapon itself. Certainly, introducing a virus or logic bomb into a computer system may be a relatively low-cost option, whereas physical destruction of the enemy IADS will likely accrue

significant costs. The claim of a high payoff is also debatable. As previously discussed, "predictable errors" may be extremely difficult to predict and induce as the information weapon often targets human reactions and emotions.

In an ideal world, fog and friction would be eliminated for friendly forces and yet maximized against the enemy. However, the exact information weapons intended to increase the enemy's "fog of uncertainty" may lead to totally unintended consequences that are inconsistent with the original intent of the weapon. Worse, the nth-order effect may actually prove counterproductive to the original intent and objective. In a complex, hierarchical command and control system, destruction of selected communications connectivity may actually result in a more streamlined and efficient command and control system. At least three unintended consequences may result. First, the enemy leader, without the intermediate command and control steps, is now able to send his orders directly to the lower echelons. For example, during Operation Desert Storm, after coalition forces destroyed Saddam Hussein's more advanced telecommunications capabilities, he continued to relay launch orders to his Scud missile batteries via courier.⁵⁰ Second, if communications connectivity is severed, lower echelons will likely operate in autonomous modes. While they may lack the complete situational battlefield picture that upper echelons would normally provide, the lower echelons benefit by not having to wait for launch orders to flow from the top. Third, destroying or degrading enemy command and control systems may deny friendly forces the ability to collect vital enemy communications and signals. Thus, employment of the information weapon may actually simplify enemy operations and increase friendly fog and friction, since friendly collection assets will not be able to collect against emitting enemy electronic systems.

Perhaps the most disturbing claim is that of the information weapon's capability to attain quick and bloodless victories and its extreme view of preventing a war before it starts. While the information weapon may be able to prevent bloodshed in a limited number of

scenarios, expecting it to end a war before the first shot is fired is pure speculation. A more realistic consequence resulting from the employment of the information weapon would be a degraded enemy that lacks complete battlefield situational awareness because leaders are blinded and cannot communicate with troops in the field. There is a lack of historical evidence that supports the concept that a blinded enemy would simply surrender without fighting. On the contrary, history shows military forces, isolated from higher headquarters, do continue to fight. As previously mentioned, the German military, during World War II, emphasized *Auftragstaktik*, which relied on general guidance from above combined with lower echelon initiative.⁵¹ This philosophy resulted in German forces fighting under radio silence, without upper echelon guidance, as during the Allied Normandy campaign.

Maj Gen Michael V. Hayden, commander of the Air Intelligence Agency, summed it best when he called the "notion of a bloodless war played out on computers as fanciful" and said that he does not foresee the United States mothballing its stockpile of conventional and nuclear weapons in the near future. Further, he stated, "Can I imagine a time in which we won't have destructive war? No. But I think it's easy to imagine a time when we can use information as an alternative to traditional warfare." General Hayden relayed the following incident to describe the use of the information weapon to help create the zone of separation between warring factions in Bosnia:

Some of the factions didn't comply completely. But the Implementation Force goaded, forced, cajoled and pressured them to do it. One of the things they did was take clear evidence [and] information that they had not complied with the treaty. The IFOR commander turned to the Serb, the Croat and the Muslim and said, "Move those tanks." Their response was "What tanks?" The commander says, "These tanks," pointing to the concrete evidence. "Oh, those tanks," they said. And then the tanks were moved. In Bosnia, I think it's fair to say, information is the weapon of first resort. To back that up is the potential for heat, blast and fragmentation. But

in this case, information was used as an alternative. We achieved an objective without going immediately to some sort of destructive approach.⁵²

It is clear that while information may be used as a weapon, strategists must use it with caution and common sense. It is not a silver-bullet weapon. Rather, the strategist should plan the use of the information weapon in conjunction with more traditional weapons and employ it as a precursor weapon to blind the enemy prior to conventional attacks and operations.

The US military arsenal includes a variety of weapons, and the strategist must ensure their most effective use in future wars. The strategy of the future will likely include the use of the information weapon in conjunction with more conventional weapons. In developing the plan, the strategist must realize that the use of the information weapon will demand prudence and carry implications that may impact the employment of the weapon. The last section warns of the additional cautions that a strategist planning to employ the information weapon must consider.

Implications

One characteristic of the US military and its way of war is its fascination with technology and the associated search for the high-tech silver bullet that will allow quick victories with minimal collateral damage.⁵³ Hence, it is not surprising that extremists have embraced information warfare as the magic weapon that would allow the US military to win bloodless victories and end wars before the first bullet is ever fired. The use of the information weapon demands caution, and its employment carries with it implications that the strategists must consider.

First, perhaps one reason for the vast interest in the application of information warfare is that the United States may be the most vulnerable to its effects. As Lt Gen Kenneth A. Minihan, director of the National Security Agency, explained, "Information is both the



During Desert Storm, the blinding efforts made the Iraqis more vulnerable to conventional coalition military attacks and operations. A destroyed Iraqi helicopter and its shelter (above) and damaged Iraqi equipment at a Euphrates River crossing (below).



greatest advantage and, given American dependency on information, the greatest weakness of the US."⁵⁴ Consider the following assertion: "Under IW, the enemy soldier no longer constitutes a major target. IW will focus on preventing the enemy soldier from talking to his commander. Without coordinated action, an enemy force becomes an unwieldy mob, and a battle devolves to a crowd-control issue."⁵⁵ Is this actually an analysis of the vulnerability of our own US military to information warfare? Given the US system of assigning specific targets to individual aircraft via the air tasking order (ATO), the descriptions of enemy vulnerability to the information weapon may actually be a reflection on the American air campaign process. Could an information weapon bring the air operations center (AOC) to a standstill if it destroyed computers within the AOC, leaving it with no capability to develop and transmit the ATO to flying wings?

A second implication concerns the importance of maintaining US combat readiness with conventional military forces. Eliot Cohen, noted author and professor at Johns Hopkins University, warned, "Transformation in one area of military affairs does not, however, mean the irrelevance of all others. Just as nuclear weapons did not render conventional power obsolete, this revolution will not render guerrilla tactics, terrorism, or WMD [weapons of mass destruction] obsolete."⁵⁶ The US military must, therefore, remain capable of fighting less technologically advanced enemies as well as peer competitors. History is full of examples of less technically developed militaries overcoming and defeating more "capable" foes. The most vivid example for the United States remains the Vietcong, who were able to defeat technology with rudimentary tactics and a willingness to sacrifice their soldiers. In facing a Vietcong-type adversary, can the United States realistically expect to defeat an enemy without resort to heavy destruction, or at least having in place the potential to do such destruction?⁵⁷

A third implication that civilian and military leaders must seriously consider is the

legality of information warfare. This question is especially important when one considers "preemptive" information attacks. One envisioned characteristic of information warfare regards the use of the information weapon to end a war before the first shot is fired. How will the international community react to this type of preemptive attack by the United States, a superpower, especially if it is against a third world rogue power? Is the United States willing to risk an information attack that would blind a peer competitor and risk escalating the conflict with the use of weapons of mass destruction? Is an information attack an act of war? Further, the use of perception management, especially one that alters an enemy leader's image to tell his people to surrender, is comparable to faking surrender with the use of the traditional white flag. This and other actions may violate the "principle of chivalry which addresses the use of trickery," both permissible ruses and impermissible perfidy and treachery."⁵⁸

Obviously, the potential consequences of the employment of the information weapon are new and evolving, and the implications of information warfare raise many issues that have no clear legal precedent.⁵⁹

Conclusion

The information weapon may be an effective tool to supplement the military's arsenal of more traditional weapons. Further, its use as a precursor may enhance conventional attacks and operations against a blinded and degraded enemy, thus decreasing effective enemy defense and counterattacks. However, the United States should not consider the information weapon a "silver bullet" that will completely subdue an adversary's will and capacity to fight. Further, strategists must refrain from uncritically assuming the information weapon is capable of terminating wars before the first bullet is even fired.

The US civilian and military leaders should strive to understand why information warfare

appears so attractive, in order that realistic and useful doctrinal guidance may be developed for its employment and incorporation into the overall war-fighting strategy. The

consequences of not accomplishing this self-examination could result in the military promising too much, too fast. □

Notes

1. Dr. George J. Stein, director, International Security Studies core and professor of European Studies at the US Air Force Air War College, Maxwell AFB, Ala., interviewed by author, 9 October 1996. Dr. Stein's interest in information warfare began with his participation in the Air Force chief of staff-directed SPACECAST 2020 study at Air University, Maxwell AFB, Ala., in academic year 1994/1995.
2. Dr. George J. Stein, "Information Attack: Information Warfare in 2025," in *2025 White Papers: Power and Influence*, vol. 3, bk. 1 (Maxwell AFB, Ala.: Air University Press, November 1996), 98.
3. USAF, *Cornerstones of Information Warfare* (Washington, D.C.: Department of the Air Force, 1995), 2.
4. *Ibid.*
5. Soon after Operation Desert Storm, several noted authors claimed that Operation Desert Storm was the "first information war." They include Alan D. Campen, ed., *The First Information War* (Fairfax, Va.: AFCEA International Press, October 1992); and Alvin Toffler and Heidi Toffler, *War and Anti-War: Survival at the Dawn of the 21st Century* (New York: Little, Brown & Co., 1993).
6. Campen, vii. Other examples include Toffler and Toffler, 69. The Tofflers stated that the Gulf War represented a completely "new form of warfare." They asserted that "a revolution is occurring that places knowledge, in various forms, at the core of military power." Three RAND defense analysts asserted that "Desert Storm represented the first modern 'information war,' in that every aspect of military operations depended to some degree on information provided by many systems operating in various media and at all echelons." James A. Winnefeld, Preston Niblack, and Dana J. Johnson, *A League of Airmen: US Airpower in the Gulf War* (Santa Monica, Calif.: RAND, 1994), 182 and 219.
7. Col Edward C. Mann III, *Thunder and Lightning: Desert Storm and the Airpower Debates* (Maxwell AFB, Ala.: Air University Press, April 1995), 146. Colonel Mann directly challenged Alan Campen's claim that Operation Desert Storm was the "first information war" by pointing out that "Campen tacitly avers the truth—suggested by Sun Tzu 2,500 years ago—that the ultimate goal of the struggle is to dominate the enemy in knowledge—not information. Collection and analysis of information is, of course, a part—but not the whole—of the issue."
8. Quoted in John T. Correll, "Warfare in the Information Age" (editorial), *Air Force Magazine* 79, no. 12 (December 1996): 3. John M. Deutch, former director of Central Intelligence (DCI), testified on 25 June 1996 before the US Senate Committee on Government Affairs on the subject of "Foreign Information Warfare Programs and Capabilities." Deutch had served dual-hatted roles as both the DCI and director, Central Intelligence Agency (CIA). The National Security Act of 1947 designates the DCI as the primary adviser on national foreign intelligence to the president and the National Security Council. The DCI is tasked with directing and conducting all national foreign intelligence and counterintelligence activities. To discharge these duties, the DCI serves both as head of the CIA and of the US intelligence community. It was in his DCI capacity that Deutch testified before the US Senate. In discussions regarding offensive information warfare capabilities, Deutch told Congress that "the electron is the ultimate precision guided weapon." His opening remarks during this testimony are on-line,

Internet, 17 March 1997, available from http://www.odci.gov/cia/public_affairs/speeches/dci_testimony_062596.ht.ml.

9. *Cornerstones of Information Warfare*, 2-3; and Stein, "Information Attack," 105.
10. Toffler and Toffler, 71.
11. Douglas Waller Washington, "Onward Cyber Soldiers," *Time*, 21 August 1995, n.p.; on-line, Internet, 26 January 1997, available from <http://pathfinder.com/@LL1c6QYAspdOHacM/time/magazine/domestic/1995/950821.cover.html>.
12. Peter Grier, "Information Warfare," *Air Force Magazine* 78, no. 3 (March 1995): 34.
13. Richard J. Newman, "Warfare 2020," *U.S. News and World Report* 121, no. 5 (5 August 1996): 35.
14. Winn Schwartz, *Information Warfare: Chaos on the Electronic Superhighway* (New York: Thunder's Mouth Press, 1994), 15.
15. US Air Force Doctrine Document (AFDD) 1, "Air Force Basic Doctrine," 21 May 1996 (second draft), 9.
16. Carl von Clausewitz, *On War*, ed. and trans. Michael Howard and Peter Paret (Princeton, N.J.: Princeton University Press, 1976), 90. The concept of defeating an adversary's will and capacity to make war may be traced to the writings of Carl von Clausewitz as he defined three broad objectives of war "which between them cover everything: the *armed forces*, the *country*, and the *enemy's will*." This concept has permeated US military thinking as demonstrated by its inclusion in military doctrine, including Joint Pub 3-0, *Doctrine for Joint Operations*, 1 February 1995; US Army Field Manual (FM) 100-5, *Operations*, June 1993; Air Force Manual (AFM) 1-1, *Basic Aerospace Doctrine of the United States Air Force*, vol. 1, March 1992; and AFDD 1.
17. FM 100-6, *Information Operations*, August 1996, 1-12.
18. Col Richard Szafranski, "Neocortical Warfare? The Acme of Skill," *Military Review*, November 1994, 42.
19. Stein, "Information Attack," 114.
20. John R. Boyd, "A Discourse on Winning and Losing," briefing slides, Air War College, Maxwell AFB, Ala., August 1987. Boyd's "observation-orientation-decide-act" (OODA) loop is based on the concept that "every individual operates an OODA loop that is unique in speed and accuracy. Speed is based on the individual's mental capacity and capability to deal with information and changing environments. John Boyd asserts that one can paralyze an enemy by operating inside the opponent's OODA loop, meaning that the individual is operating a faster cycle speed than the enemy's. Accuracy is determined during the orient part of the cycle by what information is filtered and how it is organized. Boyd considers the orientation as the most important part of the cycle because 'it shapes the way we interact with the environment—hence orientation shapes the way we observe, the way we decide, the way we act.'" This description of Boyd's OODA loop is taken from "Information Operations: A New War-fighting Capability," Lt Col William Osborne et al., in *2025 White Papers: Power and Influence*, vol. 3, bk. 1, 49.

21. Stein, "Information Attack," 114. Stein explained that "in many cases, indirect IW will be platform-to-platform as, for example, offensive and defensive electronic warfare, jamming or other interference systems, and psychological operations via the successor systems to *Commando Solo*. It may, however, rely on nonelectronic old-fashioned military deception and psychological operations."

22. Ibid. Stein described corruption of the "orientation" portion of the OODA loop: "adversary analysis, whether artificial-intelligence or information-technology based or, most importantly, based in the mind of the human decision maker, decides and acts with full confidence in either the information observed or the integrity of his (machine or human) analytic processes."

23. Ibid.

24. Col Richard Szafranski, "A Theory of Information Warfare: Preparing for 2020," *Airpower Journal* 9, no. 1 (Spring 1995): 60.

25. Ibid., 44.

26. *Cornerstones of Information Warfare*, 4.

27. Ibid.

28. Ibid.

29. Sumner Benson, "How New the New Russia? Deep-Strike Weapons and Strategic Stability," *Orbis*, Fall 1996, 509.

30. Col John A. Warden III, "The Enemy as a System," *Airpower Journal* 9, no. 1 (Spring 1995): 43.

31. Ibid.

32. Clausewitz, 184.

33. Eduard Mark, *Aerial Interdiction: Air Power and the Land Battle in Three American Wars* (Washington, D.C.: Center for Air Force History, 1994), 363. Mark explains that "the greatest single advantage of the Communists in resisting interdiction, other than their low logistical requirements, was that they were usually free to give battle or to decline it at will."

34. Earl H. Tilford Jr., "The Prolongation of the United States in Vietnam," in *Prolonged Wars: A Post-Nuclear Challenge*, ed. Dr. Karl P. Magyar and Dr. Constantine P. Danopoulos (Maxwell AFB, Ala.: Air University Press, 1994), 371 and 389. Tilford proclaims that "Hanoi won the Vietnam War." He explains that North Vietnam and the Vietcong forces sustained their will to fight. "For the communists, their fight with the United States and the Saigon regime was purposeful. Their objectives were constant, achievable, and better defined. Their political and military leaders, in working to achieve those objectives, devised superior strategies which, eventually, produced victory. The communists wanted to make the Americans suffer—over an extended period of time—until they gave up."

35. TSgt Pat McKenna, "Info Warriors: Battling for Data Dominance in the Fifth Dimension," *Airman Magazine*, September 1996, n.p.; on-line, Internet, 22 January 1997, available from <http://www.af.mil/pa/airman/0996/info.htm>.

36. Thomas A. Keaney and Eliot A. Cohen, *Revolution in Warfare? Air Power in the Persian Gulf* (Annapolis, Md.: Naval Institute Press, 1995), 236-37.

37. James P. Coyne, *Airpower in the Gulf* (Arlington, Va.: Aerospace Education Foundation, 1992), 190.

38. Michael R. Gordon and Gen Bernard E. Trainor, *The Generals' War: The Inside Story of the Conflict in the Gulf* (Boston, Mass.: Little, Brown and Co., 1995), 246-48; and Steven K. Black, "Information Warfare in the Post-Cold War World" (paper submitted as part of the Air Force Fellow Program to the Matthew B. Ridgway Center for International Security Studies, University of Pittsburgh, 1996), 16.

39. John R. Levine and Carol Baroudi, *The Internet for Dummies*, 2d ed. (San Mateo, Calif.: IDG Books Worldwide, Inc., 1994), 12. The authors ask, "Can the Internet really resist enemy attack?" and answer, "It looks that way. During the Gulf War in

1991, the US military had considerable trouble knocking out the Iraqi command network. It turned out that the Iraqis were using commercially available network routers with standard Internet routing and recovery technology. In other words, dynamic rerouting really worked. It's nice to know that dynamic rerouting works, although perhaps this was not the most opportune way to find out."

40. Keaney and Cohen, 60.

41. Col Trevor N. Depuy, *A Genius for War* (Fairfax, Va.: Hero Books, 1984), 4. Also R. L. DiNardo and Daniel J. Hughes, "Some Cautionary Thoughts on Information Warfare," *Airpower Journal* 9, no. 4 (Winter 1995): 76.

42. Roger C. Molander, Andrew S. Riddile, and Peter A. Wilson, *Strategic Information Warfare: A New Face of War* (Santa Monica, Calif.: RAND, 1996), 22-23. Perception management is "manipulating information that is key to perceptions."

43. Stein, "Information Attack," 91, 114. Dr. Stein states, "Information attack is not so much perception management as orientation management. Information is both the target and the weapon; the weapon effect is predictable error."

44. Szafranski, 45.

45. Stein, "Information Attack," 91, 114.

46. Richard Overy, *Why the Allies Won* (New York: W. W. Norton & Co., 1995), 13.

47. Ibid., 151.

48. Szafranski, 42.

49. Thomas B. Allen and Norman Polmar, *Code-Name Downfall: The Secret Plan to Invade Japan and Why Truman Dropped the Bomb* (New York: Simon & Schuster, 1995), 258-89.

50. Gordon and Trainor, 246-48. Also, Black, 16.

51. Depuy, 4. Also DiNardo and Hughes, 76.

52. McKenna, n.p.

53. Several noted authors have warned of this phenomenon regarding the US fascination with technology and with finding a silver-bullet weapon that allows quick victory with minimum collateral damage. They include Earl H. Tilford Jr., *The Revolution in Military Affairs: Prospects and Cautions*, report (Carlisle Barracks, Pa.: Strategic Studies Institute, US Army War College, 23 June 1995), 4; Charles J. Dunlap, "How We Lost the High-Tech War of 2007: A Warning from the Future," *The Weekly Standard* 1, no. 19 (29 January 1996): passim; DiNardo and Hughes, 69; and Black, 1.

54. John A. Tirpak, "Shifting Patterns of Air Warfare," *Air Force Magazine* 80, no. 4 (April 1997): 26.

55. Capt George A. Crawford, "Information Warfare: New Roles for Information Systems in Military Operations," *Air Chronicles*: n.p.; on-line, Internet, 26 January 1997, available from <http://www.cdsar.af.mil/cc/crawford.html>.

56. Eliot A. Cohen, "Revolution in Warfare," *Foreign Affairs* 75, no. 2 (March/April 1996): 51. Cohen is professor of strategic studies at the Paul H. Nitze School of Advanced International Studies, Johns Hopkins University.

57. Frank C. Mahncke, "Information Warriors," *Naval War College Review* 47, no. 3 (Summer 1994): 133. This piece appeared as a book review of the Tofflers' *War and Anti-War: Survival at the Dawn of the 21st Century*.

58. Richard W. Aldrich, "The International Legal Implications of Information Warfare," INSS Occasional Paper 9 (US Air Force Academy, Colo.: Institute for National Security Studies, April 1996), 1 and 16.

59. Ibid., vii.



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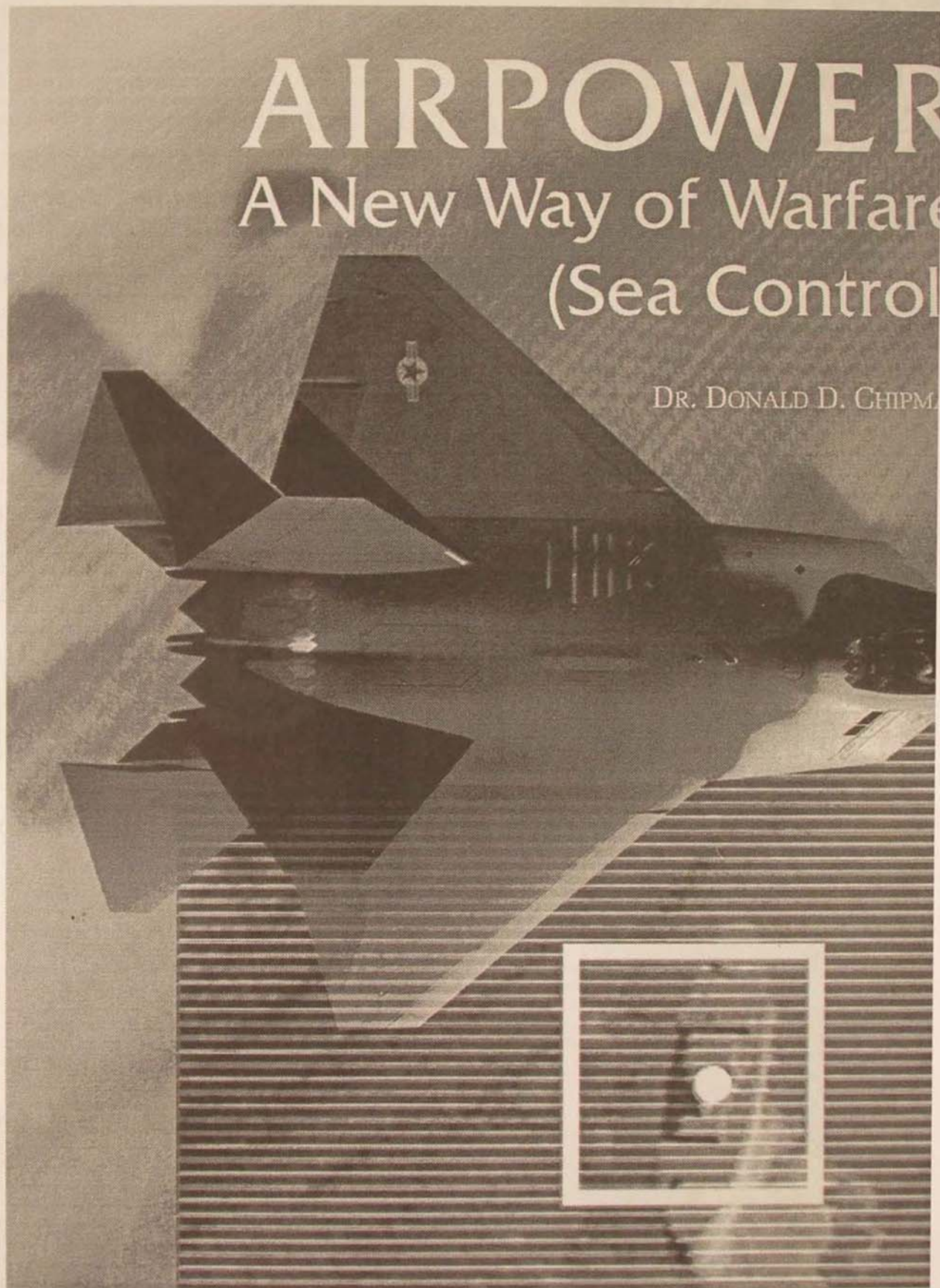


AIRPOWER

A New Way of Warfare

(Sea Control)

DR. DONALD D. CHIPMAN



As our nation approaches the dawn of the twenty-first century, we have enough indication to tell us that air power has really changed the American way of war.

—Gen Ronald R. Fogleman
Former Chief of Staff, United States Air Force



VAGUE MILITARY THREATS and reductions in arms manufacturing are forcing new strategic considerations. Gone are the days when America could quickly mobilize and use brute force to overcome the enemy. According to General Fogleman, a new way of war is emerging, one based on technology and airpower. These advantages, he stated, must be exploited "to compel an adversary to do our will at the least cost to the United States in lives and resources."¹

Historically, America based its strategy on superior numbers fortified by mass production. In 1943, because industries such as the Kaiser Corporation could build a 10,800-ton Liberty ship every 10 days, the United States launched more than fifteen hundred vessels.² During World War II, American industries sent more than 19,200 B-24 Liberators to the front.³ Today, because fewer corporations are involved in the arms business, some industrial experts surmise that the production miracles of the past are no longer possible.⁴

Airpower: America's New Way of War

RAND, however, believes that these gaps can be bridged by the extensive use of technologically sophisticated airpower. Their study claims that "with concentration on air power, U.S. forces could manage concurrent crises, in say, the Persian Gulf area and Korea."⁵ Echoing this theme, General Fogleman believes airpower can "provide a tremendous

US NAVY



A Libyan guided missile corvette burns in the Gulf of Sidra after a confrontation with airpower. In this and other operations, airpower delivered a violent and startling psychological message to Mu'ammar Gadhafi.

leverage to resolve future crises rapidly at low cost."⁶

When properly applied in the past, airpower has achieved some great successes. At Normandy, it gained command of the air and thus provided valuable support for the D-day landings. Against Japan, it helped the US take command of the seas and deliver a war-ending blow.

Not all air campaigns, however, were effective. In Vietnam, even after one million fixed-wing sorties, airpower did not prevent the enemy from continuing to advance and to eventually force the United States out of the war.⁷ While airpower helped bring the North Vietnamese to the diplomatic table, it was not able to defeat the elusive guerrillas. Ultimately, explained one historian, "at the lowest level of the conflict, protracted guerrilla-style war poses a problem the US military has been unable or unwilling to solve."⁸

Against Iraq, coalition forces found an enemy who was particularly vulnerable to airpower. Still, the lessons from the Gulf War are neither necessarily universal nor applicable in other conflicts. Although airpower dominated the Gulf War as no other, concluded Eliot Cohen, "no military technology (indeed, no technology at all) works all the time." Ultimately, enthusiasts have to realize that airpower is not necessarily a "shining sword."⁹

Yet, airpower is a critical competency in the adoption of a new American way of warfare. Given the right circumstances, it can be effective in acting alone or in the joint arena. "American leaders at the end of this century," acknowledged Cohen, "indeed have been vouchsafed with a military instrument of a potency rarely known in the history of war."¹⁰

In its past spectrum of achievements, airpower helped control the seas, occupy land, support armies, and supply others. Against

Mu'ammarr Gadhafi, it delivered a violent and startling psychological message. During the Gulf conflict, in a "war of a thousand cuts," it forced upon Iraq extensive strategic paralysis and ultimately a decisive defeat.¹¹ As recently as 1995, airpower aided the Bosnian peace negotiations by conducting a "Deliberate Force" air campaign against the Serbs that ultimately encouraged them to sign the Dayton Accords.¹² Within this spectrum of achievements there were many great successes. Among the more prominent, but seldom cited, was the use of land-based airpower to control the seas.

Sea Control: Land-Based Airpower versus Ships

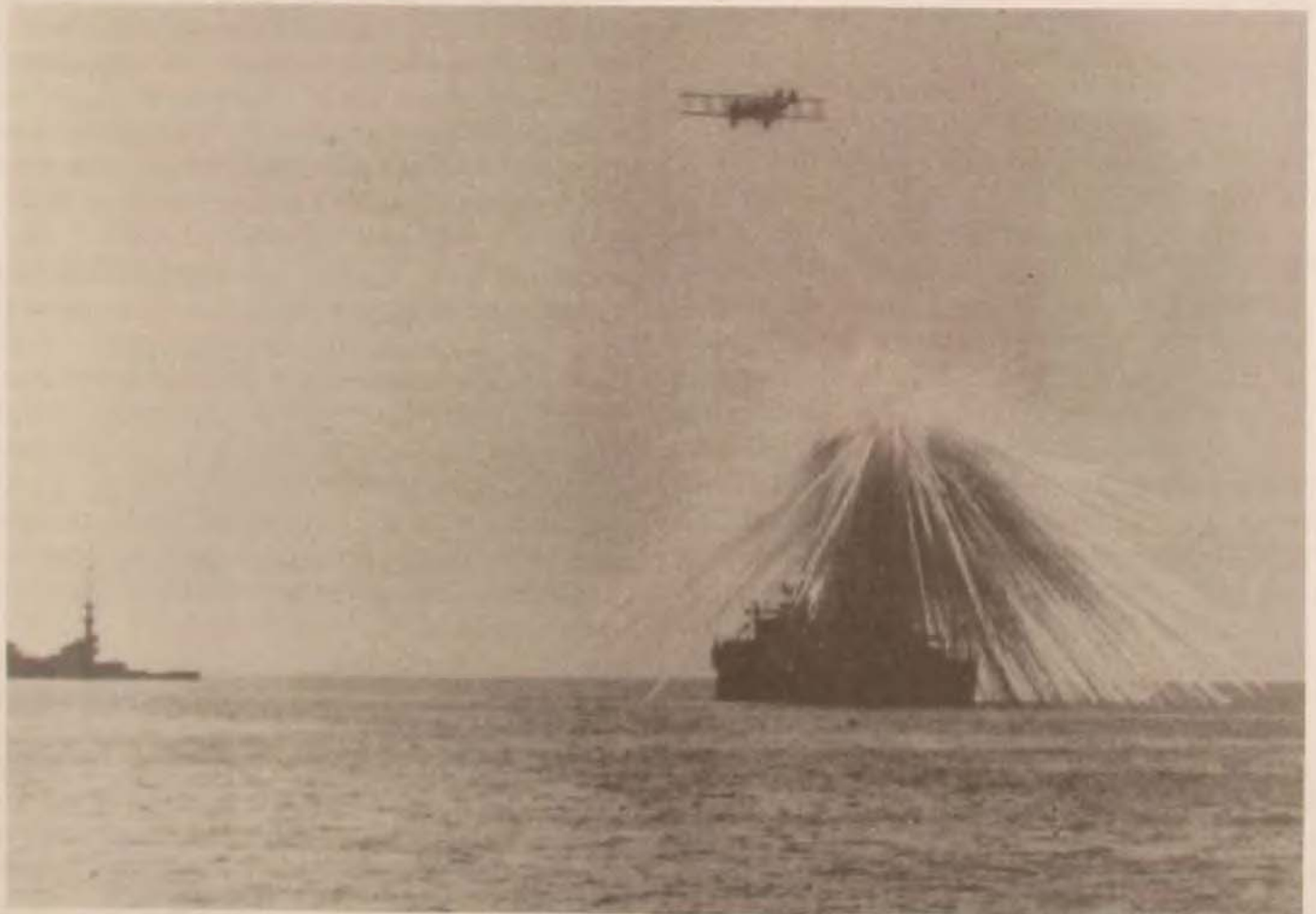
In 1919, Lt Comdr B. G. Leighton, US Navy, began the first serious American dialogue on the use of airpower for sea control. His article,

"Possibilities of Bombing Aircraft," outlined how airplanes could attack and destroy the enemy's naval forces.¹³ Building upon this concept, William "Billy" Mitchell described a maritime scenario in which dirigibles conducted ocean reconnaissance, fighters gained command of the air, and bombers attacked enemy ships.¹⁴

In 1921, after sinking the battleship *Ostfriesland*, Mitchell proved that many of these theories were possible. Agreeing with both Mitchell and Leighton, an Army and Navy board declared that "aircraft carrying high-capacity, high-explosive bombs of sufficient size have adequate offensive power to sink or seriously damage any naval vessel at present constructed, provided such projectiles can be placed in the water alongside the vessel."¹⁵

These concepts, however, remained dormant until 1937, when the Japanese marched

Billy Mitchell proved a point in 1921 when his bombers sank the captured German battleship Ostfriesland, which had been considered unsinkable.



out of Manchuria and invaded China. In their assault against Shanghai, the Japanese sent

Historically, America based its strategy on superior numbers fortified by mass production.

the cruiser *Idzumo* into the Yangtze River, where it began firing upon the city. Several miles away, in Nanking, Col Claire L. Chennault, advisor to the Chinese air force, tried to disrupt this attack by sending Northrop 2E bombers against the warship. Piloted by the Chinese, these planes flew over Shanghai and dive-bombed the cruiser. Following behind in a reconnaissance aircraft, Chennault claimed that a five-hundred-pound bomb exploded on the deck and that the ship later sank. "At the end of the war," he explained, "a nose count of the Jap Navy showed the alleged *Idzumo*, sunk in the mud at Kure."¹⁶ Most authorities, however, agree that the bombs fell short and that the cruiser remained unscathed.¹⁷ In any case, this was one of the first attacks by land-based airpower against a ship in World War II.

Before America became involved in World War II, the British began fighting Germany for control of the seas around the British Isles. In this struggle, known as the Battle of the Atlantic between 1939 and 1942, 153 German U-boats successfully sank 1,124 British and neutral ships. These losses included the British aircraft carriers HMS *Courageous* and HMS *Ark Royal* and the battleships HMS *Royal Oak* and HMS *Barham*.¹⁸ German submarines sank another 1,160 Allied ships in 1942 and reduced Britain's oil imports to a trickle.¹⁹ "The U-boat attack," acknowledged Winston Churchill, "was our worst evil."²⁰

When the war began, Germany had 56 seaworthy submarines. By 1943, however, they had more than three hundred, many of which were patrolling in the mid-Atlantic just south of Greenland. Known as the "Black Pit," this arena was free of Allied air coverage.

Because of the submarine's great successes, Churchill told an anti-U-boat committee in October 1942 to find better methods of fighting this menace.²¹ One recommendation focused on converting B-24 Liberators into long-range antisubmarine aircraft and deploying them into the Black Pit.²²

Three months later, 11 Liberators from the Royal Air Force (RAF) Coastal Command's 120th Squadron landed in Iceland. From here they flew into the Black Pit and began patrolling. Armed with machine guns, acoustical homing torpedoes, and fifteen hundred pounds of depth charges, each Liberator had a range of over twenty-three hundred miles and could remain on station for about three hours.²³

Because Great Britain and the Allies successfully defended several of her convoys, May 1943 became a key turning point in the Battle of the Atlantic. One particular convoy, SC-130, departed Halifax, Canada, on 11 May, with 37 merchant ships and six naval escorts. Proceeding toward England, they sailed for eight days unthreatened through the North Atlantic. The Germans, however, were aware of the convoy's route and prepared for an assault. With approximately 30 submarines in the Black Pit, they planned to coordinate their strikes by using *Rudeltaktiks*, or wolf-pack tactics.²⁴

On 19 May, the convoy sighted a distant U-boat and detached naval escorts to drive it underwater. At about 0400, the first RAF B-24 arrived over the convoy. Using airborne radar, it discovered a surfaced submarine and forced it to submerge. Diving down to one hundred feet, the plane crossed over the enemy vessel and dropped three 250-pound depth charges and two acoustic homing torpedoes. After an explosion, U-boat 954 became the B-24's first confirmed kill.²⁵

Continuing its patrol, the Liberator sighted five more U-boats. It successfully forced four to crash-dive and then flew over one submarine that remained on the surface. After the plane sprayed it with machine-gun fire, the U-boat submerged. In each attack, the aircrew marked the spot and called in naval escorts to continue the pursuit. By the end of the three-

hour patrol, the Iceland-based B-24 had destroyed one submarine and forced five others to submerge.²⁶

During the rest of the day, five more aircraft rotated in and out of the Black Pit. Upon arriving over the convoy at 0915, the second B-24 attacked one submarine and forced six others to crash-dive.²⁷ In the afternoon, three more planes continued the surveillance.

Air coverage was suspended during the night and restored at first light. During the two-day battle, seven Liberators sighted 24 U-boats and forced 16 to submerge. Of the eight submarines attacked, three were destroyed.²⁸ When results of these air attacks reached Germany, the high command decided to withdraw their submarines from the Black Pit. Thus unopposed, Convoy SC-130 arrived in Great Britain four days later.

Until this battle, the Germans believed that their U-boats in the Black Pit could fight with impunity. The presence of land-based airpower and other factors such as better intelligence, radar, and the eventual introduction of escort carriers forced a tactical change. During May 1943, Germany lost 41 submarines; of these, 28 were destroyed in the mid-Atlantic.²⁹ At this point, acknowledged Adm Karl Doenitz, commander of all German U-boats, wolf-pack operations "were no longer possible."³⁰ "I accordingly withdrew the boats from the North Atlantic."³¹ One historian summarized this campaign in these terms:

The VLR [very long range] B-24 Liberator aircraft of RAF 120th Squadron was the weapon system which tipped the battle in favor of the Allies. What made the aircraft such an effective weapon against the U-boat was their high speed relative to a surface vessel, a speed which permitted them to search a much greater area than a ship.³²

Doenitz, however, redeployed his submarine forces into the South Atlantic. Since most of the U-boats departed from French ports, patrols began by sailing across the Bay of Biscay. Incapable of transiting totally underwater, these submarines had to surface periodically. As a counter, the British sent long-range aircraft into the bay and began a

sea-control campaign later known as the "Big Bay Slaughter."³³

The lessons from the Gulf War are neither necessarily universal nor applicable in other conflicts.

In October 1942, the US Army Air Forces entered the Atlantic war by creating several land-based antisubmarine squadrons. Officially known as the US Army Air Forces' Antisubmarine Command, these units were designed to help the US Navy hunt for enemy submarines, which, at the time, were patrolling along the Atlantic coast and in the Caribbean.³⁴

As the ferocity of battle in the Bay of Biscay increased, two Army Air Forces antisubmarine squadrons joined the hunt. In November 1942, 21 American B-24s landed in South England and began flying out of St. Eval, Cornwall. Between December and March, they flew several patrols across the bay searching for and attacking various German submarines. On occasion they encountered German Junkers Ju-88 aircraft and had to fight their way back to England.

During the bay campaign, the Americans found 20 U-boats and attacked eight. One was a confirmed kill, and three others were classified as damaged.³⁵ Of the 21 Liberators that began the operation, one plane was lost in combat and six in various accidents.³⁶

In March 1943, the two American squadrons were redesignated the 480th Group and sent to Port Lyautey, French Morocco. Here they joined a US Navy squadron of PBY Catalinas, which patrolled primarily along the littoral, up to two hundred miles out. The 480th, however, extended this Atlantic coverage to over one thousand miles.³⁷

After several successful submarine attacks, a B-24 crew sighted a U-boat on 17 July about two hundred miles west of Portugal. As the Americans began their attack, the enemy sent a hail of fire into the plane's cockpit, wound-

ing the navigator, bombardier, copilot, and radio operator. Despite damage, the crew dropped a 350-pound depth charge and then struggled back to Port Lyautey. Photos confirmed that the submarine was destroyed.³⁸ In total, the 480th sank three U-boats and damaged four others.³⁹ After a four-month tour in Morocco, the 480th deployed to Tunis, where it provided air coverage for Mediterranean convoys.

While the Battle of the Atlantic continued to the end of the war, the spring of 1943 was a turning point. In that year, in addition to land-based airpower, the Allies deployed more convoy escorts, including carriers, and thus extracted a heavy toll on the German U-boats. "The combination of support groups of carriers and escort vessels," acknowledged Winston Churchill, "aided by long-range aircraft of the Coastal Command, which now included American squadrons, proved decisive."⁴⁰

In the Pacific, victory over Japan ultimately depended on the Allies' ability to destroy the enemy's maritime capabilities. As an island nation, Japan depended heavily on imported materials to fuel its steel mills and other industries. Thus, land-based aircraft were used early in the war to attack the Japanese naval and merchant ships. Beginning in September 1942, Fifth Air Force planes, flying out of Port Moresby, New Guinea, started bombing the port city of Rabaul. Through continuous attacks, the Americans eventually sank over 373,000 tons of shipping.⁴¹ After Rabaul, the Fifth flew strikes against enemy vessels in the New Guinea harbors of Wewak and Hollandia.⁴²

One of the most successful sea-control strikes occurred off the east coast of New Guinea in March 1943. In that battle, known as the Battle of the Bismarck Sea, approximately one hundred Allied planes, including modified B-25s carrying five-hundred-pound bombs, attacked and successfully destroyed an entire Japanese convoy.⁴³

Flying at one hundred feet above the ocean surface, American B-25s skipped their bombs across the water and into the hulls of these ships. At the battle's conclusion, 12 cargo

ships and four Japanese destroyers were sunk or severely damaged. Commenting on the Bismarck Sea battle, one historian claimed that airpower "finally achieved what General Billy Mitchell had so breezily predicted 15 years before. They had destroyed an enemy fleet at sea unaided by naval surface forces."⁴⁴

In China, Chennault's Fourteenth Air Force flew against ships in the Gulf of Tonkin, Haiphong Harbor, and Hong Kong and helped close down the Yangtze River. During the fall of 1943, his planes conducted a six-day blitz in which they recorded great achievements. In addition to 71 Japanese aircraft destroyed, contended Chennault, these successes included "three ocean-going ships sunk and damage to docks, coal piles, supply depots, and airdrome installations."⁴⁵

In the fall of 1944, with the Battle of Leyte Gulf under way, the Allies began a campaign to sever Japan's southern sea lanes located in the South China Sea. Initially, though, Fifth Air Force helped secure the Leyte landings by attacking Japanese reinforcement ships in Ormoc Bay, located on the east side of Leyte Island. Each time enemy ships entered the bay, Allied airpower attacked and turned back an estimated 70,000 enemy reinforcement troops.⁴⁶ In addition, noted the US Bombing Survey, "twelve merchant ships and 15 naval vessels carrying troops and supplies or performing escort duties were sunk by United States aircraft in or near Ormoc Bay." Of these, Fifth Air Force sank eight.⁴⁷

With the capture of Mindoro in December 1944, land-based airplanes extended their coverage across the entire South China Sea. From these bases they conducted maritime raids against the ports of Saigon, Phan Rang, Cam Ranh, and Hong Kong, and they flew as far north as Shanghai. Japanese merchant and naval ships in or near Hainan Island and Formosa were also successfully assaulted. On 13 June 1945, 62 B-24s loaded with 55-gallon drums of napalm attacked ships in Hong Kong harbor. As they departed, the crews claimed that the bay was a "sea of flames."⁴⁸ By March 1945, affirmed the United States Strategic Bombing Survey, "Japanese shipping through the South China Sea had ceased."⁴⁹



"In the spring of 1945, . . . B-29s began mining Japanese waters. . . . From March to the end of the war, these planes flew 1,529 sorties and dropped more than 12,000 mines in various channels, harbors, and straits."

Japan's ability to import iron ore and other raw materials now focused on a few sea lanes crossing the Sea of Japan from Manchuria. To further strangle the enemy, airpower was used in the spring of 1945 to plant mines in Japan's inland seas, straits, and harbors.

One of the first successful aerial mine operations occurred in February 1943, when B-24s of the Tenth Air Force closed Rangoon's harbor.⁵⁰ This attack was followed by a series of airborne mining campaigns in the Solomon Islands, Bangkok, Netherlands East Indies, South China Sea, and the Bismarck Archipelago.⁵¹

During the summer of 1944, B-29 Superfortresses of the 20th Bomber Command began flying out of Kharagpur, India. From here, they flew over the Himalaya Mountains and into Chengdu, China. Then they headed out on bombing missions against Japan and Manchuria. One of the first B-29 missions, however, involved a bombing and mining operation against Palembang, Sumatra. On 9 August, 56 B-29s departed Kharagpur and flew to an advance base on the island of Ceylon. Here the planes refueled, remained overnight, and then headed across the Indian Ocean to Palembang. While most of the air-

craft bombed the city's oil installation, eight B-29s descended to one thousand feet and planted mines in Moesi River channels leading to the refinery.⁵² While the bombing attack accomplished little, the mining operation caused seven ship casualties and closed the river to oil traffic for over a month.⁵³

In the spring of 1945, flying out of Mariana Islands, B-29s began mining Japanese waters. Nearly half of these missions were launched against the Straits of Shimonoseki, located between the islands of Kyushu and Honshu. From March to the end of the war, these planes flew 1,529 sorties and dropped more than 12,000 mines in various channels, harbors, and straits.⁵⁴

This aerial effort complemented an ongoing US naval submarine campaign designed to strangle Japan. By the spring of 1945, Japanese imports had declined to about 10 percent of its prewar years, and maritime traffic in the Shimonoseki Straits decreased by nearly 90 percent.⁵⁵ In total, B-29 aerial mines sank 287 enemy ships and damaged 323 others. According to the US Bombing Survey, the effects of these operations were devastating:

The accumulated results of the mining campaign left Japan little hope of continuing

the war for long. Resultant shortages of coal, oil, salt, and food contributed so completely to paralyzing industry that shortly before surrender leading industrialists indirectly informed the militarists that industry could not continue. They estimated further that 7,000,000 Japanese would have starved to death if the war had continued another year.⁵⁶

More than anything else, the 1982 Falklands War reemphasized the lethal effects of land-based aircraft armed with antiship missiles.

The mining campaign, however, exacted a toll. Twentieth Bomber Command lost 15 B-29s, and of these, 11 were lost over the Shimonoseki Straits.⁵⁷

The fight for sea control in the Pacific involved more than just American strikes against an unresourceful enemy. Indeed, the Japanese retaliated with one of the most effective antiship weapons yet designed, a manned airborne guided missile. At the time, it was called the kamikaze.

Initial strikes occurred in 1944, during the Battle of Leyte Gulf, when the Japanese sent their kamikazes against the American fleet protecting the landings. One kamikaze dove onto the carrier USS *Santee* and destroyed it. Another hit the carrier USS *Suwanee* and ripped a 10-foot hole in the flight deck. A third struck the carrier USS *Saint Lô* and ignited stored munitions.⁵⁸

After this battle, when the American fleet redeployed to the waters off Okinawa, the kamikazes attacked again. According to one historian, "the Kamikaze was the deadliest aerial antishipping threat faced by Allied surface warfare forces in the war. Approximately 2800 Kamikaze attackers sank 34 navy ships, damaged 368 others, killed 4900 sailors and wounded over 4800."⁵⁹ At war's end, the Japanese still had hundreds of kamikazes ready to attack any naval amphibious assault made upon their homeland.

After World War II, US land-based aircraft participated in several other sea-control missions. One of these occurred on 12 May 1975—a Khmer Rouge gunboat crew boarded the American merchant ship *Mayaguez*.⁶⁰ After firing a rocket and several machine-gun rounds, the enemy pulled alongside and captured the vessel. Thus began a short conflict in which land-based airpower played a key role.

Shortly after taking the ship, Khmer Rouge guerrillas removed the *Mayaguez* crew and escorted them ashore. At this point, US military forces entered the conflict. While Navy P-3 Orions conducted airborne reconnaissance, USAF A-7s and C-130 gunships attacked several Khmer Rouge gunboats. Three were immediately sunk, and several others were severely damaged.⁶¹

In an effort to neutralize any remaining enemy soldiers on the *Mayaguez*, an Air Force A-7 Crusader skimmed across the ship's bow and dropped tear gas canisters. While US marines began searching for the American crew on Koh Tang Island, a US Navy destroyer pulled alongside the American merchant ship and recaptured it. After four days of hostilities, the guerrillas suddenly freed their captives.⁶²

To this day, there is speculation on why the Khmer Rouge released the crew. Some believe they simply wanted to avoid escalating the conflict. Others claimed that destruction of the gunboats forced the guerrillas to reconsider their plight. One prominent historian, who participated in the battle, contends that "the air presence proved the capability to impose pain, and the sinkings proved the willingness to do so."⁶³ In any case, with the aid of land-based airpower, "a very short war" came to an end.⁶⁴

In the 1950s, 1960s, and 1970s, the US Air Force considered sea control a secondary mission. However, during the 1980s, the Air Force upgraded airborne maritime attacks to a primary mission. According to the 1984 Air Force Manual (AFM) 1-1, airpower should be used to "neutralize or destroy enemy naval forces and to protect friendly naval forces and shipping."⁶⁵

The growth of the Soviet naval threat and a maritime war in the Falklands were two



A B-52 armed with Harpoons. "In 1984, B-52Gs began flying sea-control missions out of Loring AFB, Maine, and Andersen AFB, Guam. . . . Along with planting mines, B-52s conducted simulated Harpoon missile attacks against a variety of ships."

factors that encouraged the Air Force to value its sea-control missions. During the 1980s, Soviet naval warships were seen around the world in the Atlantic Ocean and the Caribbean, Mediterranean, and South China seas. In one major naval exercise, the Soviets sent more than 50 ships and submarines into the North Atlantic. Included in this exercise was the extensive use of simulated airborne missile attacks against their own ships.⁶⁶ By mid-decade, Norman Polmar suggested that "the Soviet Navy appears to be moving toward a long-range capability of confronting Western or Third World forces at several levels of crisis or combat, including the ability to fight a conventional as well as a nuclear war at sea."⁶⁷

More than anything else, the 1982 Falklands War reemphasized the lethal effects of land-based aircraft armed with antiship missiles. After Argentina invaded the Falkland Islands, the British sent their naval forces into the South Atlantic with the objective of recapturing their territory. Using land-based airpower, the Argentines tried to disrupt these plans.

Early on 4 May, two Argentine naval Super Etendards carrying AM-39 Exocet missiles departed Rio Grande Air Base and headed eastward toward the Falklands and the British fleet. Once en route, the two aggressors acquired vectors from a patrolling Argentine P2-V Neptune aircraft. Then, about 150 miles offshore they refueled from a KC-130 tanker and continued on their trek. Just before entering into shipboard radar range, the two aircraft descended and began skimming across the waves. About 27 miles from their target, they climbed to five hundred feet and launched their Exocet missiles.⁶⁸

With no reconnaissance aircraft to warn of the oncoming Argentines, the Royal Navy was vulnerable. Because the British ships were unable to detect the incoming Exocets until the last moment, one missile hit the destroyer HMS *Sheffield*. Without exploding, the weapon opened a hole in the ship's side. Fuel from the missile caught fire, and by the end of the day, the British warship sank.⁶⁹

After this success, several other Argentine air force A-4 Skyhawks and Mirages assaulted

the fleet, trying to disrupt British amphibious landings in San Carlos Sound. Although unsuccessful in their missions, these planes managed to damage two more ships.⁷⁰

In the US Air Force's new global engagement strategy, sea control must remain an important consideration.

During the war, the Etendards were Argentina's most effective sea-control weapon. On 25 May, two of these planes flew northeast from their base and attacked the British ship *Atlantic Conveyor*. After one missile struck the vessel, a fire broke out and eventually, the ship sank.

Fortunately for the British, the Argentines had only four operable Etendards and very few Exocets. In total, they flew 12 sorties and launched five Exocets. Of these, only two missiles hit their targets. However, because of this threat, the British redeployed their aircraft carriers further eastward, away from the Falklands. Thus, to provide close air support, Harriers had to fly long distances.⁷¹

While most agree that the Falklands victory was the product of effective British sea power, a few scholars claim that if Argentina had properly planned its sea-control campaign and if it had had a few more antiship missiles, the results might have been different. One particular Falklands War study claims that the Argentines should have sent their Etendards against the British carriers:

Although they inflicted tremendous damage upon the British, the Argentines failed to strike successfully at Britain's most vulnerable centers of gravity, its carriers. Destroying the carriers would not only have granted Argentina near total air superiority, it would have reversed the outcome of the war. A significant lesson of the air war over the Falklands is that sound operational planning is vital to

the air superiority task as it is to all aspects of warfare.⁷²

The maritime lessons of the Falklands War were not lost on the Soviets or the Americans. In the Soviet navy digest *Morskoy Sbornik*, one admiral claimed that the British use of self-defense anti-aircraft missiles and guns "turned out to be ineffective."⁷³ In America, US Air Force chief of staff Gen Charles A. Gabriel claimed that the Falklands conflict demonstrated the importance of sea control. Therefore, he reported, "we will be putting more emphasis on such collateral roles as sea-lane protection, aerial minelaying and ship attack."⁷⁴ Earlier the US Air Force and US Navy had signed a memorandum of agreement that opened the way for arming B-52s with an antiship missile called the Harpoon.⁷⁵

In 1984, B-52Gs began flying sea-control missions out of Loring AFB, Maine, and Andersen AFB, Guam. For the next several years, these squadrons participated in a variety of maritime exercises designed to test the sea-control mission. Along with planting mines, B-52s conducted simulated Harpoon missile attacks against a variety of ships. After 1989, however, both the Andersen and Loring squadrons were deactivated.⁷⁶ Today, sea control is no longer a primary Air Force mission. Consequently, only a few B-52s flying out of Barksdale AFB, Louisiana, and Minot AFB, North Dakota, continue to train in maritime operations.

Although there are no current major naval threats, there are signs that indicate this is changing. A few experts believe Red China is in the process of adopting a forward *Jinhai*, or green-water, maritime strategy in which it plans to extend its control of the seas outward to over one thousand miles. This Pacific maritime frontier would extend from Vladivostok in the north to the Strait of Malacca in the south. One source estimates that by the year 2000, China will possess a fleet capable of conducting a green-water strategy, and "a blue-water capability is envisaged by the year 2020."⁷⁷

A recent *Foreign Affairs* article entitled "China: The Coming Conflict with America" claims that there are factors which could promote war between the two countries. One of these is Red China's determination to acquire Taiwan. The Chinese have poured extensive money into their military and recently have embarked on a program of weapon modernization. They have acquired early-warning technology, 72 Russian-made Su-27 fighter-bombers, and Kilo-class submarines. Since 1994, on their own they have constructed "thirty-four modern warships."⁷⁸ In addition, noted another new source, there are signs that China may acquire

"a naval version of the Russian-designated Su-27 for deployment aboard aircraft carriers."⁷⁹

Despite the questionable future of Red China's maritime strength, one strategic fact remains constant: water covers approximately three-fifths of the globe. Thus, in the US Air Force's new global engagement strategy, sea control must remain an important consideration.⁸⁰ In the past, airpower was often successful. Among the spectrum of achievements, one of the more significant triumphs was the use of land-based airpower against ships. □

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For good or for ill, air mastery is today the supreme expression of military power, and fleets and armies, however vital and important, must accept subordinate rank.

—Sir Winston S. Churchill

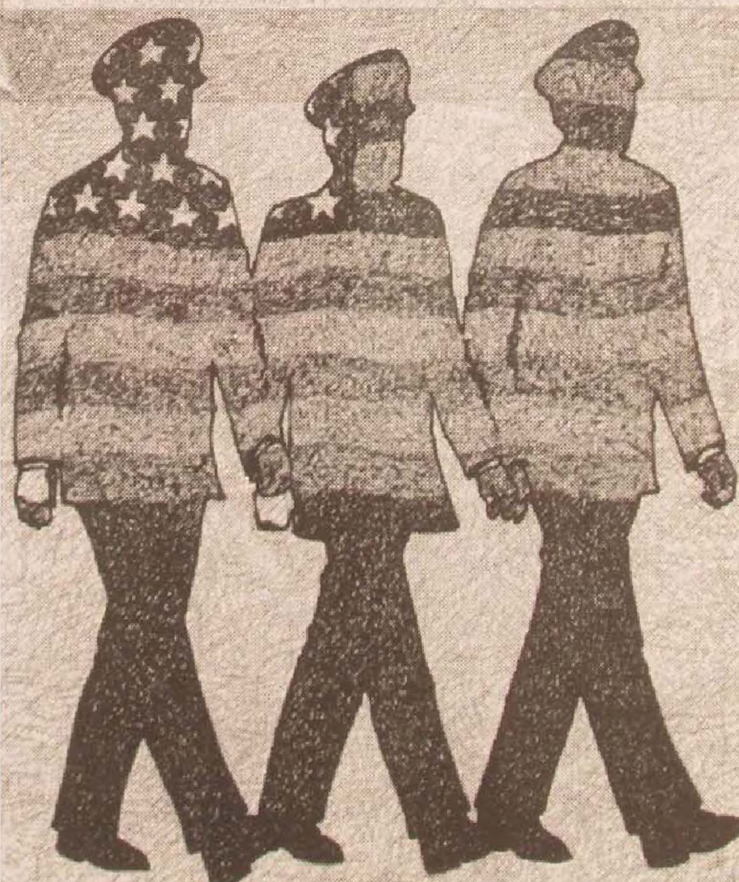


Where Have All the Mitchells Gone?

LT COL TIMOTHY E. KLINE, USAF

*Lord, God of Hosts, my life
is a stewardship in Your
sight . . . I ask unfailing
devotion to personal
integrity that I may
ever remain honorable
without compromise.*

From the Cadet Prayer
USAF Academy





THE LONE PORTRAIT leans forward at the base of a raised platform where guests and staff take meals in elevated splendor within the US Air Force Academy's glass and aluminum centerpiece, Mitchell Hall. The entire wing appears three times daily before the stern glare of that leathery face, which, more than any other, is the face of airpower ascendant—American airpower. It is reassuring to a budding generation of military-aviation specialists that things of the spirit can transcend career considerations—that nation and honor supersede the narrower traits of group conformity and safety which mark the serviceman's routine.

William "Billy" Mitchell seems an ironic professional focal point for a military service characterized today by careful managers on the leading edge of American technology. Yet, each of the famous architects of the bright legend that spawned an independent US Air Force rode the shock wave of Mitchell's defiant vision. Henry "Hap" Arnold, Carl "Tooney" Spaatz, and Ira C. Eaker were famous disciples of a combat leader whose cashiered career set in motion a triumph he would not live to see. He received the Medal of Honor posthumously. In a lucid piece recounting the legacy in detail, Lt Col George M. Hall, US Army, wrote of Mitchell, "The individual who responds to the imperatives of honor under circumstances when honor encompasses duty may be tempted to act against the grain of duty when it does not coincide with the same imperatives."¹

Mitchell, in an Army uniform, cut across the grain of a tradition that considers "military individualism" a potential spoiler of democracy. Speaking independently, he precipitated an expected reaction by the institutional leadership of the older services.² Prof. Stanley Falk, in examining the "apparent incompatibility" of the national predilection for military leaders who are independent

heroes while at the same time operatives in a "precise bureaucratic imperative," determined that "individualized values are a threat to the entire range of traditional military norms."³ Mitchell was the upshot, deliberately and quite legitimately dispatched by a military tribunal that recognized him as a threat to its order and stability. Yet, he looms large at the Academy, where a thousand and more formative minds can collectively consider his compelling gaze and reflect that rugged countenance. What must the enshrinement of such a noble man mean to young people still being nurtured on the rudiments of airpower? Should they incline themselves to emulate the principled performance of that exemplar? Could they succeed by doing so?

As it fell from Elijah to Elisha, so the mantle of Mitchell passed smoothly to the next generation of airmen. The people who witnessed his banishment to Fort Sam Houston, Texas, his reversion to the rank of colonel, the dramatic court-martial, and his resignation, were ardent personal boosters. They had stood by Billy Mitchell despite threatened careers. Arnold, Spaatz, Eaker, and even Mitchell's immediate boss, the sagacious Mason Patrick, backed him fully.⁴ Arnold won five stars. Spaatz and Eaker launched an air war in Europe that finally set the Air Force free. Their mentor's words became their own words. "Wars will be won or lost with the military capability possessed when war starts," echoed Eaker.⁵ "The nation that hangs its destiny on a false preparation will find itself hopelessly outclassed from the beginning," Mitchell warned long before.⁶ The fruitfulness of that first wave of Mitchell adherents was impressive: the combined bomber offensive was their unique achievement. But how potent is that impulse in the Air Force today?

Models of success in the new Air Force tend to be managerial. Caution is in the wind. Everyone knows that courage can boost a career only so high. Robin Olds and Charles



Billy Mitchell.



"A Billy Mitchell every now and then would provide just the right flavor to make service life more savory."

"Chuck" Yeager are handy examples of such eclipsed glory. They shone brightly, served rather long, and were quietly dismissed by fiat. They were good, solid heroes who each got a star, as Mitchell did, but they went home to intact legends, books, talk, conventions, and memory. Of course, they balked at times, but neither one was pressed by honor to lift the banner of national unpreparedness, as Billy Mitchell was. Theirs was another calling. They retain useful personal images of immense benefit to a service that must still justify its existence by wielding a glittering sword borne up on wings by men of bone and blood.

The apparent dichotomy of the Air Force leadership ideal is strange. The officer corps is bound by an effectiveness rating system that emphasizes careful husbanding of resources over boldness; it values caution over

ardent spirit or daring innovation. Individuals occupying officer billets must wonder whether the familiar Mitchell image is a valid behavior model or whether it is a warning that outspokenness will bring swift and sure retribution.

Since Mitchell, no dissenting military leader has suffered or, for that matter, has been offered the forum of a public court-martial.⁷ Modern generals are kept in line by a tight infringement of First Amendment freedom-of-speech rights. Free expression of ideas among military men is understood to disturb civilian control. Maj Felix Moran, commenting on the case of Maj Gen John K. Singlaub, US Army, Retired, noted, "When civilian supremacy has actually been at stake, administrative actions, such as removal, reassignment, and forced retirement have been taken against the errant officer" in lieu of rigorous

enforcement of Article 88, Uniform Code of Military Justice, concerning prohibitions of free speech.⁸

The general-officer environment now seems so politically precarious that most senior officers must feel wholly submerged in a pervading atmosphere of intimidation. Maureen Mylander examined this situation with bemusement in *The Generals: Making It, Military Style*. Later she would write, "It took me some time to discover that beneath the facade of 'supreme power,' generals themselves act more like frightened little boys than the conspiratorial heavies of *Seven Days in May*."⁹ What is it that emasculates modern leadership? Blame an inordinate fear of outspokenness or controversy, other generals with more stars, and civilian bosses who, "even on a whim, can pack a hapless general off to Camp Swampy where, like General Haltrack, he will wait month after month for the message the Pentagon will never send."¹⁰

Instead of simplifying military life and streamlining military mores, the impact of burgeoning aviation and electronic technologies has brought increasing complexity to the employment of airpower. Force application, like the enforcement of discipline, has suffered from "greater reliance on explanation, expertise, and group consensus"¹¹ as the Air Force moves farther and farther from the dominance of authoritative leadership. Perhaps the trend to less personal, less vivid leadership was inevitable. Yet, the old order gives way grudgingly. We want to stick with comfortable images. Small things such as colorful nicknames brand the halcyon days of that past with a certain bright distinction. Why don't we label modern leaders with affectionate tabs like "Tooey," "Hap," or "Jimmie"? What about "Possum" Hansell and "Rosie" O'Donnell?¹² Is it possible the present generation brooks no affection for authority until it proves worthy of admiration in combat? Was it only the infusion of civilian recruits on a massive scale in World War II that boosted informality in such a pronounced way? Nonetheless, they were good times for airmen.

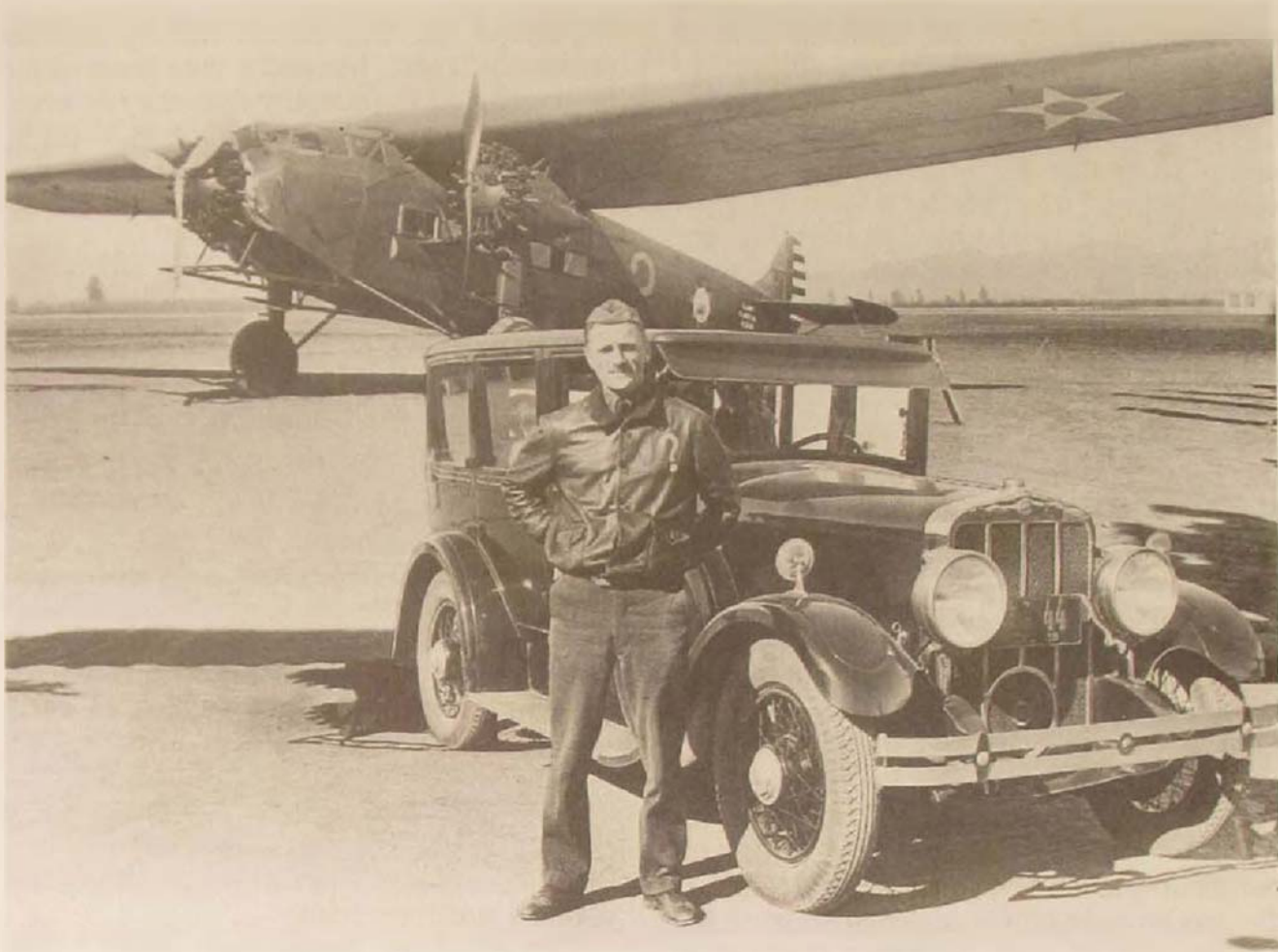
Perhaps it is symptomatic that we seem to revere our leaders less and accuse them of far more distance from reality than they deserve. It may well be true, as Col Robert D. Heinl Jr. observed, that "the uniformed services today are places of agony for the loyal, silent professionals who doggedly hang on and try to keep

The officer corps is bound by an effectiveness rating system that emphasizes careful husbanding of resources over boldness; it values caution over ardent spirit or daring innovation.

the ship afloat."¹³ If so, the patient performance of duty that marks the modern hierarchy is most praiseworthy. Still, a Billy Mitchell every now and then would provide just the right flavor to make service life more savory. The large, relatively docile officer corps yearns for a cause célèbre to forge a renewed commitment to airpower, amid all the promise those colorful words portend.

The Air Force desperately needs a new Mitchell—not to do battle with the establishment but to provide a vision for airpower's future. This need surpasses the requirement for another iteration of computer chips and reaches well beyond bean-counting exercises to determine new life expectancies for tired airframes. The sobering reality of knee-jerk reactions to successive revelations of Soviet weaponry has benumbed us all. It is time for a visionary—maybe even a prophet. Someone must articulate a direction for the Air Force from within its most vital constituency—the officer corps. We have rested too long on the pen of Ira C. Eaker. He has been the most widely read airman. He spoke when no one else would speak. His scenario for the future was bleak, pending emergence of a will to contend:

One day, over the hot line from Moscow, may come this message to our commander in chief in the White House: "Mr. President, we order you not to interfere with our operations against



"Models of success in the new Air Force tend to be managerial. Caution is in the wind." Where would air refueling be today if General Spatz had been a "managerial" type?

Israel. Obviously, you will comply, for your own chiefs of staff will confirm that we have overwhelming military superiority!" If present conditions continue much longer, no president of the United States will have any option but to comply with that ultimatum, amounting to surrender.¹⁴

General Eaker and company won a costly combat victory that provided a place in the sun for airpower. Why has the burden of spokesman been thrust on such a valiant standard-bearer for so long? People who have followed his words in critical editorials over the years may realize now how bold each stroke has been. One should not discount his warnings because he issued them from the safety of retirement; rather, one should remember Mylander's caution about generals:

Ultimately he will fade into retirement where—under Title 10, Section 888 of the U.S. Code, threat of court-martial and loss of retirement pay—he will be forbidden to use "contemptuous words" in speech or print against the President, Vice-President, Congress, Secretary of Defense, Secretary of a Military Department, Secretary of the Treasury, or the governor or legislature of any state.¹⁵

Admiring the sagacity and skill of American airpower's foremost spokesman comes easy.

Are all the doors of military opinion sealed by the caution of careerism? The few attempts by officers on active duty to counter corporate-style logic or challenge the incoherencies of civilian control have met dismal fates. One of the most poignant of these was an Air War College commandant's attempt to examine

critically, in a forum that ostensibly protected his remarks with a nonattribution policy, the folly of high-level management of the air war in Vietnam. Sadly for Maj Gen Jerry D. Page, remarks to a closed professional audience proved just as damning as a letter to a left-wing daily.¹⁶ He nearly disappeared, except for the *Pueblo* incident. During that drama, he emerged briefly as a minor but positive actor. His memory sounds a warning Klaxon to incipient free speakers.

A number of surveys were proffered in the last decade to Air Force Academy graduates electing to depart active duty for the allures of the civilian marketplace. Not the least of their registered complaints involved the integrity of Air Force commanders.¹⁷ Some observers have suggested that these young officers were too easily dismayed by a rigid outlook on officership produced by four years of training under the Academy's Honor Code. Such intimations miss the mark widely. In a time of general adherence to situational ethics, it is not surprising that many commanding officers do succumb to disturbing societal norms that the young Academy graduates find abhorrent. Repugnance for unethical behavior is matched, however, by disgust with rampant toadyism.

Having sat through all those Walter Cronkite-narrated airpower films as "doolies," the cadets expected to find a sense of professional certainty in the real Air Force. Mitchellism had been a daily fare. To discover that those few in the officer corps who most nearly epitomized that ideal were often subjected to close scrutiny and low effectiveness ratings must have provoked a terrific reaction in many of the most idealistic neophytes. Their pressing question was not "Why are there so many toadies in the service?" They were far more likely to ask, "Where have all the Mitchells gone?"

Those who serve know how important a single, galvanizing officer of vision and in-



The Air Force desperately needs a new Mitchell—not to do battle with the establishment but to provide a vision for airpower's future.

tegrity can be in motivating a person's career. Many even know a budding Mitchell, Spaatz, or Eaker. But how confident are we that such an officer will survive, when the slightest divergence can derail a career? The Air Force must preserve a way to the top that permits room for its prophetic nobility to take a stand, suffer a shutdown, and rise like a Phoenix toward a vision like Mitchell's. The alternative? No more Mitchells, no more Eakers, no more certain trumpet for airpower. □

Notes

1. Lt Col George M. Hall, "When Honor Conflicts with Duty," *Air University Review*, September-October 1980, 46.

2. General Eaker wrote, "The fact is that General Mitchell welcomed the court-martial as it gave additional publicity to his

cause, which was, of course, to obtain a separate Air Force." Correspondence with author, 11 March 1981.

3. Stanley L. Falk, "Individualism and Military Leadership," *Air University Review*, July-August 1980, 97.

4. Lt Gen Ira C. Eaker, USAF, "Introduction to Some Observations on Air Power," speech, US Air Force Academy, 19 October 1978.

5. *Ibid.*

6. William Mitchell, *Winged Defense* (New York: G. P. Putnam's Sons, 1925), xv.

7. See Alfred F. Hurley, *Billy Mitchell: Crusader for Air Power* (Bloomington: Indiana University Press, 1975). Hurley quotes Mitchell, who viewed his unprecedented trial as a "necessary cog in the wheel of progress, a requisite step in the modernization and rehabilitation of the national defense of the country" (page 105).

8. Maj Felix F. Moran, "Free Speech, the Military, and the National Interest," *Air University Review*, May-June 1980, 109.

9. Maureen Mylander, "Fear of Generals," *The Nation*, 12 April 1975, 429.

10. *Ibid.*

11. Morris Janowitz, "Prologue to the Second Edition of *The Professional Soldier*," Working Paper no. 176 (Chicago: University of Chicago, n.d.), 12.

12. See Bruce Callander, "The 'Hap'less Nicknames Up in the Air," *Air Force Times*, 9 March 1981, 20, for a marvelous sketch of endearing wartime personalities.

13. Col Robert D. Heini Jr., "The Collapse of Armed Forces," *Armed Forces Journal*, 7 June 1971, 30.

14. Eaker, speech.

15. Mylander, 429.

16. Maj Gen Jerry D. Page, correspondence with author, 20 April 1981. Hanson W. Baldwin drafted a full description of the impact of the dramatic incident for the *New York Times*, 27 January 1967, pages 1 and 3; 3 February 1967, page 34; 7 February 1967, page 25; and 17 February 1967, page 15. See also, *U.S. News and World Report*, 6 February 1967, 81.

17. USAF Academy Alumni Association Graduate Survey, Check-Points, Fall and Winter 1980. Col Jock Schwank possesses a detailed compilation of the latest Alumni Association findings. In this regard, I suggest that interested parties contact the association.

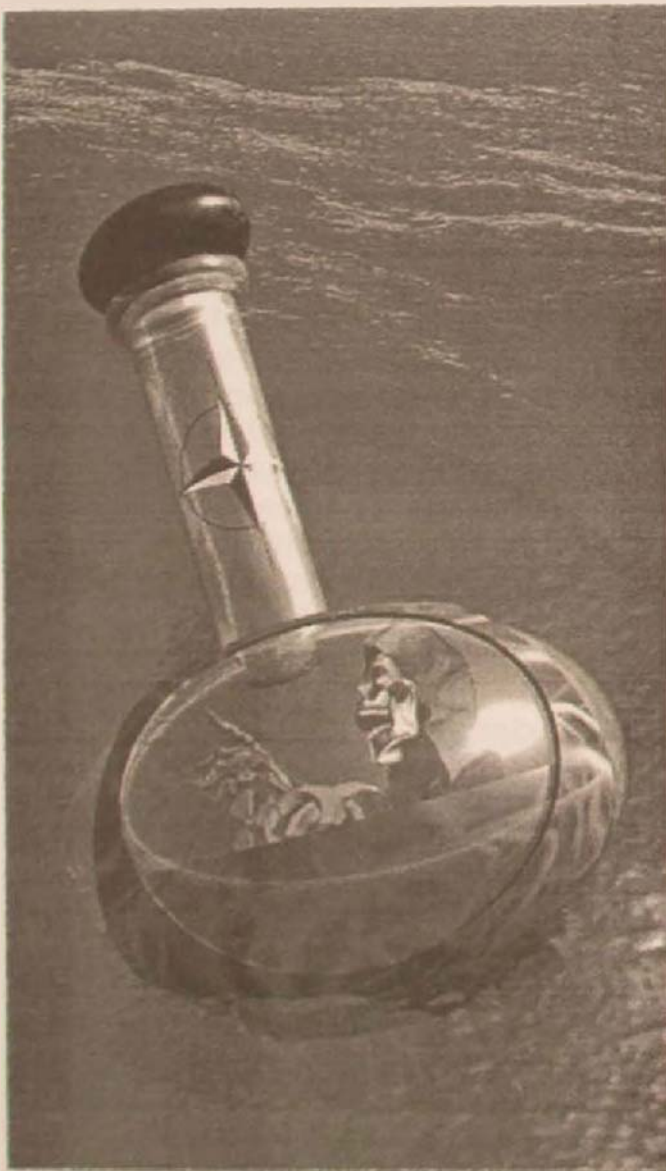
I believe it is an established maxim in morals that he who makes an assertion without knowing whether it is true or false is guilty of falsehood, and the accidental truth of the assertion does not justify or excuse him.

—Abraham Lincoln

Reality Check

NATO's Ambitious Response to the Proliferation of Weapons of Mass Destruction

Col Guy B. Roberts, USMC



The policy of prevention through denial won't be enough to cope with the potential of tomorrow's proliferators.

—Secretary of Defense Les Aspin



ALTHOUGH WE MAY rejoice at the end of the cold war, a host of scattered and dangerous challenges remain. We must recognize the bedeviling troubles to the United States that loom ahead: economic stagnation; overpopulation; environmental degradation; international crime and drug trafficking; ethnic, religious, racial, and nationalistic conflict; terrorism; and the spread of infectious diseases. Of all the perils facing us today, the newest and most serious is the global spread of nuclear, biological, and chemical (NBC) weapons—commonly called weapons of mass destruction (WMD)—and their means of delivery.

This threat poses serious challenges to US national security interests in this post-cold-war environment. To meet this challenge successfully, we must seek a common approach with like-minded allies. A key component in addressing the evolving proliferation risks will be a collective US/North Atlantic Treaty Organization (NATO) political and military response.

As detailed here, a number of would-be proliferators are actively involved in the acquisition of materials and the technology to develop these weapons. Recent events in the former Soviet Union make the illicit diversion or theft of weapons and materials ever more likely. Consequently, after much prodding, NATO has embarked on a program to develop and field capabilities to counter the growing proliferation threat.

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This article argues, however, that the recently approved program adopted by NATO is not affordable in full and that a number of NATO partners are not interested in actively participating. The reasons include philosophical differences over the defensive nature of the Alliance, counterproliferation efforts being subsumed in larger defense-cooperation efforts, and strong resistance from the public sector to match NATO's political rhetoric with the necessary funding—which must come from diminishing military budgets. The article further suggests that NATO, because of these realities, should scale back its current program and extend the time lines for implementation.

There are, however, more modest but no less effective functional approaches to the proliferation problem. Three initiatives proposed here focus on intelligence requirements, a program of cooperation, and doctrine/training—all essential to a successful collective response to this threat. Perhaps these proposals will stimulate thought about realistic, unified approaches to counter this threat and will encourage useful dialogue on how both the United States and NATO can

successfully meet the proliferation challenge within current fiscal and political realities.

Clear and Present Danger: The Proliferation of Weapons of Mass Destruction

The paradox of the end of the Cold War is that there is less threat, but also less peace.

—Manfred Wörner
NATO Secretary-General

The threat of WMD proliferation continues to grow despite long-standing, concerted measures to stem the tide.¹ Proliferators of these weapons include some of the largest and smallest, richest and poorest countries, led by some of the most reactionary and unstable regimes. Although unclassified estimates vary, at least 20 countries²—nearly half of them in the Middle East and South Asia—already have or may be developing these weapons.³

The Arms Control and Disarmament Agency's annual arms control compliance report gives a gloomy assessment of the continuing efforts of would-be proliferators to acquire these weapons and delivery systems.⁴ For example, Syria and Iran continue to develop biological warfare (BW) capabilities,⁵ and Libya has demonstrated a well-publicized capability of developing chemical weapons in addition to its attempt to establish a biological warfare capability.⁶ New disclosures arise almost daily about Iraq's NBC programs.⁷ That would-be proliferators continue to see a use for these types of weapons despite nonproliferation efforts is illustrated by the recent report that evidently Bosnia is now also producing and stockpiling chemical weapons.⁸

Growing evidence indicates that Russia has failed to fully dismantle its chemical and biological weapons programs,⁹ and frighteningly loose controls and lax security over Russia's nuclear weapons and materials stockpiles have raised serious concerns

within the international community.¹⁰ Political turmoil and economic problems faced by the former Soviet Union have increased the likelihood of nuclear proliferation, with over two million pounds of weapons-usable uranium and plutonium scattered throughout Russia and the Newly Independent States. Further, the potential for transnational terrorist groups or other state actors to acquire "loose nukes" or the materials to make other NBC weapons is a frightening reality.¹¹

This "creeping" proliferation is becoming militarily more significant. The fact that US forces will operate with other NATO or coalition forces raises questions about the political and military impact of NBC weapons on Alliance cohesion. For example, in the event of an NBC threat, it will not be sufficient for US forces alone to have adequate protective equipment. An adversary might exploit gaps in the passive-defense capabilities of coalition partners, thereby undermining the coalition and posing acute problems for political leaders and military commanders alike.

Given the extensive efforts of certain states and transnational groups to acquire these weapons, one can make a number of assumptions about the threat. First, like our efforts to counter drug smuggling, no matter how effective our nonproliferation efforts may be, we will never achieve complete success. Second, we cannot assume that our deterrence strategies are credible or will work.¹² Third, fixed-site military installations and urban centers will comprise the most attractive targets and will prove more difficult to defend than deployed combat forces. Unscrupulous states may employ transnational terrorists to expand major regional conflicts by conducting NBC assaults against US and allied targets elsewhere—especially inside Europe or the United States. Recognizing the validity of these and other concerns, NATO eventually began to develop new policies and programs to improve its abilities to defend against countries that seek such weapons.

NATO Framework for Response to WMD Proliferation: A Work in Progress

We attach the utmost importance to preventing the proliferation of weapons of mass destruction . . . and, where this has occurred, to reversing it through diplomatic means. . . . As a defensive alliance, NATO is addressing the range of capabilities needed to discourage WMD proliferation and use. It must also be prepared, if necessary, to counter this risk and thereby protect NATO's population, territory, and forces.

—NATO Defense Planning Committee, 8 June 1995

As early as 1991, NATO leaders, by adopting the NATO strategic concept, recognized the risks posed by "the proliferation of . . . weapons of mass destruction and ballistic missiles capable of reaching the territory of some member states of the Alliance" and acknowledged that the proliferation of WMD required special attention by the Alliance.¹³ NATO recognized that "Alliance security must also take account of the global context" of the multifaceted, multidirectional risks to NATO security and "be capable of responding to [WMD proliferation] if stability in Europe and the security of Alliance members are to be preserved."¹⁴ Nevertheless, initial response to a US proposal of 1993 to undertake a "counterproliferation"¹⁵ initiative (CPI) similar to the US undertaking was lukewarm.¹⁶

Although some Alliance partners shared the Clinton administration's evaluation of the WMD threat, most did not—and none have felt the need to respond as strongly as did the United States. Evidence of this attitude includes (1) disagreements over export controls on dual-use technologies, (2) the inability of the United States to prevent the sale of nuclear reactors and other technologies to Iran, and (3) the debate over how to redress North Korea's nuclear¹⁷ and missile activities.¹⁸ Many Alliance members chafed at US efforts to impose penalties against designated "rogues."¹⁹

US counterproliferation efforts have been addressed and criticized exhaustively elsewhere,²⁰ and the Department of Defense (DOD) has provided detailed reports on its program.²¹ Briefly, the major objectives of the

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US defense counterproliferation initiative are to prevent the acquisition of WMD and missile capabilities, roll back proliferation, deter the use of WMD, and adapt US military forces and planning to operate against and defeat a WMD-armed adversary.²² In 1995 the Joint Chiefs of Staff adopted a prioritized list of 15 "Areas for Capability Enhancements [to] meet the challenges posed by WMD proliferation threats."²³ DOD estimates that in fiscal year 1995 it spent about \$1 billion of its budget to fund uniquely nonproliferation/counterproliferation applications and another \$3 billion on strongly related programs.²⁴ It spent about \$3.8 billion in fiscal year 1996²⁵ and expects to spend \$4.3 billion for fiscal year 1997 (including approximately \$2.9 billion for missile defense).²⁶ Setting aside missile defense, these amounts far exceed current and anticipated expenditures by our NATO partners. As of this writing, NATO has not projected any estimates for its proposed counterproliferation efforts.

Although key NATO allies expressed misgivings over the US counterproliferation initiative,²⁷ growing awareness existed within NATO that nonproliferation efforts had failed to prevent proliferators from developing WMD capabilities.²⁸ In particular, Southern Flank members became increasingly concerned over the well-publicized efforts of some Middle Eastern states at acquiring NBC weapons and missile capabilities. Subsequently, with US prodding, at the North Atlantic Council (NAC) summit of January

1994, the Alliance directed that "work begin immediately . . . to develop an overall policy framework to consider how to reinforce ongoing prevention efforts and how to reduce the proliferation threat and protect against it."²⁹

This marked a new stage in the Alliance's growing recognition of the need to expand NATO's political and defense efforts against the proliferation threat. France identified WMD proliferation as a "serious danger to the nation's vital interests."³⁰ Great Britain, who, like France, had interests outside the NATO arena, also supported measures to allow for out-of-area responses by Alliance forces against a potential proliferator but saw less risk and therefore less need to respond to such threats to the United Kingdom (UK).³¹ Other NATO members, however, saw less urgency in embarking on an Alliance initiative to counter proliferation threats.³²

Two expert groups were established in accordance with the decision of the summit of January 1994. The first group, designated the Senior Political-Military Group on Proliferation (SGP), was responsible for consulting on specific proliferation threats, developing the broad policy framework for the Alliance approach to proliferation, and—on a continuing basis—determining how NATO could best complement ongoing prevention efforts in other forums. The second group, the Senior Defence Group on Proliferation (DGP), focused on the defense aspects of proliferation. Its task involved identifying the security implications of proliferation for Alliance defense planning, assessing allied military capabilities to protect against and discourage WMD proliferation, and recommending additional as-required capabilities.³³ The group was also asked to consider how NATO's defense posture might complement the Alliance's prevention efforts.³⁴ A Joint Committee on Proliferation (JCP) consolidated and harmonized the work of the two groups. However, since the JCP, chaired by the NATO deputy secretary-general, meets irregularly, the real focus of work remained in the DGP.

The SGP quickly drafted an "Alliance Policy Framework" document that was subsequently

issued as an agreed statement of NATO policy during the meeting of foreign ministers in Istanbul in June 1994.³⁵ Here, for the first time, the Alliance endorsed a work program to address the military capabilities needed to deter threats or use of WMD.³⁶ The DGP was tasked to (1) conduct a comprehensive assessment of the risks to the Alliance posed by proliferation, (2) identify a range of capabilities needed to support NATO's defense posture against WMD, and (3) assess Alliance and national capabilities with the objective of identifying current efforts to overcome vulnerabilities and recommending specific measures to meet existing deficiencies.

In a recent article, Ambassador Robert Joseph discussed at length the DGP's accomplishments and findings in fulfilling the first two tasks.³⁷ Essentially, the assessment of risks, completed in December 1994,³⁸ parallels in most respects US assessments, although because of political sensitivities over identifying specific regions and countries of proliferation concern, the report remains classified. As with public pronouncements by the United States,³⁹ the report differentiated between the different types of threats and the kinds of weapons the Alliance might face. Subsequently, the Alliance publicly recognized that a number of states on the periphery of the Alliance continue to develop or are acquiring the capability to produce WMD and that these efforts pose a potential threat.⁴⁰

The next report, among other things, addressed the implications of NBC proliferation for NATO defense planning and identified a range of capabilities needed by the Alliance.⁴¹ These findings emphasized the need for the Alliance to possess a "core" set of capabilities, such as

- strategic and operational intelligence, including early-warning data;
- communications to provide automated and deployable command and control;
- the capability to locate and track mobile targets continuously by wide-area ground surveillance;

- capabilities for the detection, identification, and warning of chemical and biological hazards;
- protection for deployed forces against the threat from manned aircraft, tactical ballistic (theater ballistic missile defense) and cruise missiles;
- individual protective equipment for deployed forces against biological and chemical agents;
- computer modeling and simulation;
- specialized capabilities to attack NBC targets, to include special munitions for NBC-agent defeat and hardened NBC targets; and
- collective protection equipment and decontamination facilities.⁴²

The identification of these needed capabilities tracks with the CPI of the United States.⁴³ The report further stressed the need to integrate these core capabilities since a mix of capabilities would provide the firmest basis for deterring or protecting against proliferation risks.⁴⁴

The third and final DGP report identified deficiencies or shortfalls in Alliance military capabilities; identified requirements for embedding proliferation concerns in Alliance and national policy, doctrine, planning, training, and exercising; examined areas for improvement and cooperation; and established a work plan to address identified shortfalls. The NAC subsequently endorsed the DGP recommendations for improvements to Alliance military capabilities as well as the program of work and time line set forth in the report.⁴⁵ A key shift in focus occurred, however, at the meeting of 13 June 1996 in Brussels, when the defense ministers emphasized that, in view of NATO's new (non-Article 5) missions,⁴⁶ they would place greater emphasis and a higher priority on the protection of deployed forces rather than homeland defense.⁴⁷

The report accomplished several things. First, it identified a number of capability shortfalls. The shortfalls and needed capabilities parallel in large extent those identified by the report of the US Counterproliferation Program Review Committee (CPRC)⁴⁸ and those

previously discussed.⁴⁹ Second, it prioritized the requirements of defense systems. Finally, it recommended that NATO institutionalize the assessment process in the Alliance's future defense planning efforts. The report prioritized the shortfalls into three "tiers." Tier one includes those "core, integrative capabilities" discussed in the second report.⁵⁰ Shortfalls were identified in each of the needed capabilities, and the first 23 of 39 "action plans" were developed to address tier-one shortfalls.

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Tier two includes those military capabilities that—when combined with the core, integrative capabilities—would contribute significantly to Alliance political aims and operational objectives, as well as respond to existing conditions and expected near-term trends. These capabilities include

- computer modeling and simulation;
- layered defense against tactical ballistic missiles for deployed forces;
- unmanned aerial vehicles, unattended ground sensors, and land-sensor vehicles;
- medical countermeasures;
- deep strike and interdiction;
- deep-penetrating munitions;
- special munitions for defeating chemical or biological agents;
- collective protection against chemical/biological agents; and
- personal and site decontamination.⁵¹

The rest of the action plans were designed to address shortfalls identified in these areas.⁵² Finally, tier-three capabilities are those identified as important but not essential at the present time in addressing proliferation risks; consequently, they were not considered.

The DGP recommended pursuit of a time-phased approach for implementing the recommended capability improvements. Near-term (undefined but probably no later than 2002—the current five-year planning period)⁵³ efforts include implementation of an initial program of work (identified in 39 action plans contained in the report) by the end of 1997. The DGP recognized that, given the normal two-year planning cycle, it was not possible to include the shortfalls in the force proposals for 1996, although it did recognize that existing force goals already addressed some of the capabilities.

Consequently, the DGP proposed the initiation of "catch-up" force proposals as an extension of the Force Goals process of 1996.⁵⁴ It suggested the utilization of common funding or procurement and recommended the initiation of additional force proposals to meet described shortfalls, including revision of existing force goals, where necessary, to supplement the already approved Force Goals package.⁵⁵ The DGP recognized, however, that further weighing and prioritization of capability improvements would need to occur in the context of NATO's overall requirements.

The DGP recommended (and the ministers approved) that these revised goals focus on the protection of deploying out-of-area forces through both defensive and responsive capabilities.⁵⁶ Based on the approved DGP recommendations, the NATO military authorities and military staff reviewed existing force goals and drafted an action plan to address all required capabilities, both short- and long-term.⁵⁷ A number of NATO and Supreme Headquarters Allied Powers Europe (SHAPE) staff members emphasized that near-term counterproliferation efforts would focus on enhancing or creating capabilities for large formations of deployable NATO forces. The latter included a combined (several countries) joint (several services) task force (CJTF)⁵⁸ or the Allied Command Europe (ACE) Rapid Reaction Corps (ARRC),⁵⁹ operating in a WMD environment but not enhancing a current defensive capability.⁶⁰ Although staffers clearly recognized the long-term proliferation

threat, such as ballistic missile developments by proliferant countries, they considered current progress in developing defensive capabilities sufficient.⁶¹

At its meeting in December 1996, the NAC endorsed the new and revised force goals,⁶² but a number of hurdles remained—not the least of which was an unwillingness by many NATO members, for political and economic reasons, to fully accede to the anticipated costs of this ambitious program. The Alliance would need to commit resources in a period of declining military budgets to meet the proliferation challenges. The question is, Will Alliance members be willing to devote necessary resources in a time of shrinking budgets? More than likely, the proposed full program and timetables, though laudable, will not be met.

The Budgetary Dilemma and Other Obstacles

No matter what they're telling ya, they ain't telling the whole truth; and no matter what they're talking about, they're talking about money!

—Western American aphorism

A number of obstacles stand in the way of full implementation of this program. The first is primarily conceptual—that is, what the Alliance thinks about the security implications of proliferation and deterrence. Indeed, one critical factor remains how Alliance political leaders truly perceive the threat—specifically, whether they see NBC and missile proliferation as representing a fundamental change in their individual and collective security environment. Perhaps the DGP's greatest accomplishment has been NATO's acceptance that proliferation has the potential to profoundly affect the Alliance's security and its ability to act in regions beyond its borders.⁶³

On the other hand, the national leadership and the public in several key allied nations do not see WMD proliferation as a significant threat—certainly not to the degree so vividly and dramatically reflected in President Clinton's declaration of a national emergency.⁶⁴

Interestingly, except in the context of NATO antiproliferation efforts, none of the other Alliance members have expressly addressed or claimed that proliferation is a high national priority. When asked, United Kingdom, Ger-

The Alliance would need to commit resources in a period of declining military budgets to meet the proliferation challenges.

man, French, Dutch, Italian, and other allied defense officials admitted that both their publics and their parliaments perceived the threat as small and would not support increasing defense budgets.⁶⁵ Although the DGP did an admirable and thorough job of ranking the types of threats and developing action plans to address shortfalls, it was not tasked to address the question (nor probably should it have been) of where within a hierarchical order of national or Alliance security interests counterproliferation should fall. NATO pronouncements to the contrary, for most parliaments looking to save scarce fiscal resources, the answer lies not very far up on the list.

An arguably insurmountable hurdle is the present fiscally constrained environment that has already resulted in declining military budgets for virtually every Alliance member. Indeed, at the NAC ministerial meeting of June 1996, foreign ministers recognized that significant force reductions and lower readiness levels have occurred as a result, at least partly, of perceptions of an end-of-the-cold-war dividend.⁶⁶

Unfortunately, with its CPI goal of eliminating perceived vulnerabilities, the United States appears to be unilaterally working on all shortfall areas, even though the allies have similar programs. One DOD official even indicated, notwithstanding prior political pronouncements, that the United States is not interested in burden sharing when it comes to addressing proliferation concerns.⁶⁷ Although probably overstated, such a remark does reflect the fact that cooperative efforts, if any,

are more oriented towards sharing information, addressing interoperability concerns, and standardizing equipment and systems, than towards establishing collaborative efforts or supporting a particularly promising national acquisition program over other similar, but less promising, programs.

Further, shrinking or stagnant defense budgets will make it difficult to support new initiatives. Cuts in nonmilitary spending have already spawned a number of protests in Europe, and no government is willing to risk political immolation by sacrificing social programs to meet unspecified future threats. Alternatively, cutting military spending is relatively safe politically because of a perceived absence of threat and a pervasive ambivalence about any separation of European and American defense interests. As one senior French defense official said, "It is true that you have some countries in Europe that are completely relying on American protection and have abandoned any idea of their own defense. They have paper headquarters and paper armies."⁶⁸

NATO-Europe has collectively seen its defense expenditures shrink from 3.6 percent of the gross national product to 2.3 percent. Key allies are slashing their budgets in such a way as to make any new initiatives problematic. The French military procurement budget of 1996 had already been slashed by \$5 billion, and France has been forced to back out of a number of joint procurement projects. For example, in April 1997 France announced its withdrawal from joint development (with the United States, Germany, and Italy) of a medium extended air defense system (MEADS)⁶⁹ and initially refused to provide financial backing for the European Future Large Aircraft (FLA), a long-distance transport plane designed to include NBC protection equipment.⁷⁰ Ironically, one of the biggest supporters of NATO's counterproliferation efforts has already been unable to support two key programs.⁷¹

Germany is also dramatically cutting back its military, and the German public has no interest in spending more on defense.⁷² As one German staff officer noted, "There is no

nationwide interest in spending more on defending against proliferation risks. It is just the opposite."⁷³ The United Kingdom is projecting zero budget growth with modest reductions in personnel and, in terms of the General Defense Plan, an actual slight decrease in defense spending from 3.1 percent to 2.7 percent by 1998-99.⁷⁴ Other Alliance members are suffering from similar or even harsher defense budget cuts.⁷⁵

According to NATO officials, by approving the DGP report, several defense ministers made it clear that they were by no means signing up or agreeing to fund the proposed action plans when the costs are fully assessed. That, of course, will have to await the outcome of the catch-up Force Goals process. Whatever the merits of a counterproliferation program within NATO, one can certainly make the case that NATO enlargement and not proliferation concerns will take center stage politically and demand the most for reprioritizing already scarce budgetary resources.⁷⁶ A recent RAND study estimates that \$20 to \$70 billion would be required of the 16 current members over a 10- to 15-year period for three new members,⁷⁷ with the total cost of NATO expansion projected between \$61 and \$125 billion.⁷⁸

In the face of these competing interests, it is no wonder that Alliance members have been less than enthusiastic. One DOD official argued that the DGP is not assuming any increase in defense budgets but is looking for a reallocation of resources.⁷⁹ Yet, while one might argue that agreeing to amended 1996 Force Goals simply means realigning budget priorities, surely adding new force proposals means increasing budgets, giving up other programs, or making reductions in other areas that Alliance members are not likely to make—at least not without painful trade-offs. Discussions with NATO and SHAPE staff members and national military representatives to NATO headquarters indicated not only that support for DGP action plans would require increased spending but also that agreement to do so would remain unlikely.⁸⁰

Surmounting the Cold Reality of Constrained Resources: Proposals for a Realistic Counterproliferation Program

There are, however, alternatives worth pursuing that would give NATO an enhanced antiproliferation capability without breaking the bank—politically as well as economically. Although the work of the DGP was comprehensive, it is—in the current political and fiscal climate—overly ambitious, too expensive, and therefore unrealistic. Those ongoing programs—already funded and validated for reasons other than the proliferation threat—obviously should proceed. But for the near term (within the next five years), a more achievable (and supportable) program should encompass three core initiatives: (1) collaborative intelligence sharing through the creation of a NATO Proliferation Risk Intelligence and Analysis Center, (2) firm commitment to truly cooperative and collaborative efforts and support of common funding and burden sharing, and (3) reorientation of doctrine and creation of realistic training and exercises for adapting selective forces to operate in out-of-area WMD environments.

Intelligence Sharing

We need to stop WMD attacks before they occur—intelligence is the key.

—CPRC Report

The DGP report recommended the development of a common, centralized database containing comprehensive information on WMD proliferation and proliferators. Although sound and worthwhile, the recommendation does not go far enough. NATO needs a NATO-controlled, centrally located, commonly funded, and politically supported intelligence and analysis center. The goal is to provide NATO policy makers with a fully integrated intelligence center that supports efforts to prevent the acquisition of WMD, roll back existing WMD programs and capabilities,

deter the use of these weapons against NATO security interests, and assist in the adaptation of NATO military forces to respond to the threat.

NATO has no independent intelligence-gathering function or capacity of its own; instead, it collates and disseminates intelligence provided by national authorities.⁸¹ Clearly, this procedure is inadequate. The US Central Intelligence Agency (CIA) has already formed a nonproliferation center to help focus, among other things, US development and acquisition of needed technologies and systems. The United States should take the lead in building a similarly focused and fused NATO Proliferation Risk Intelligence and Analysis Center to support NATO responses to proliferation threats. Such a center would receive largely unfiltered, raw data from numerous, diverse sources for analysis by an analytical support team culled from the very best intelligence analysts from all NATO nations.

The United States has already shared ballistic missile early-warning information with its NATO allies in conjunction with the development of a theater missile defense (TMD).⁸² There is no reason to assume that—with an effort reflective of the same patience, compromise, and ingenuity displayed during the cold war—the United States could not share other intelligence data. One example is the unprecedented way in which intelligence is being shared and new commercially based data-dissemination technologies are being exploited during the peacekeeping operations in Bosnia.

The creation of such a center would have several advantages. First, it would be a NATO instead of a national intelligence product and thus would have more credibility, even if the primary assets used in collecting the information were largely American. Second, more information would be available to clear up any lingering doubts about proliferation risks.⁸³ Third, Alliance members could use the center to collect and analyze all information from all sources (diplomatic, military, economic, and law enforcement) that are currently, for the most part, responding independently to the threat. Law enforcement agencies, for exam-

ple, have already established procedures for sharing information, and that information could be shared with NATO military authorities.

Fourth, data from international organizations such as the International Atomic Energy Agency (IAEA), which tracks and analyzes cases of nuclear smuggling,⁸⁴ could be made available. Information gleaned from meetings on the export control regime—the Australia (chemical and biological) and Nuclear Suppliers Group constitute the two prime examples—would also be funneled into the center. Intelligence products generated by the center could be used by other national agencies (e.g., customs agencies) to help them in their nonproliferation efforts.

There are other advantages as well. A NATO intelligence center with its own assessment capability could relieve political pressure on countries such as France and Germany to field their own independent satellite-collection program. They could cancel the problematic *Helios 2* and *Horus* satellite programs and save billions of dollars.⁸⁵ Imagery from American satellites would be analyzed by French, German, and other imagery specialists, and estimates would be presented as Alliance—not US—work products. Collaborative efforts in developing the center's collection capabilities could lead to transatlantic cooperation on several information systems, including US-European partnering on future satellites. Partnering in the development of such satellites might offer more affordable choices on both sides of the Atlantic. Certainly, any initial costs incurred by creation of the center will be more than offset by these savings.

Cooperative and Collaborative Efforts

The arrangements which the nations of the free world have made for collective defense and mutual help are based on the recognition that the concept of national self-sufficiency is now out of date. The countries of the free world are interdependent and only in genuine partnership, by combining their resources and sharing tasks in many fields, can progress and safety be found.

—US and UK Declaration of Common Purpose, 1957

NATO has created the JCP (which includes the DGP) to establish a framework for defense activities related to proliferation, but true cooperative efforts in the full panoply of needed capabilities is lagging. With the possible exception of ballistic missile defense,⁸⁶ little has been done to create a fully cooperative effort in improving counterproliferation capabilities. As argued here, shrinking defense budgets make it politically unrealistic for Alliance members to independently pursue the necessary capabilities to combat or defend against WMD proliferation. In view of the high cost of full implementation of many of the DGP's action plans, cooperative and collaborative ventures are both inevitable and necessary.

Cooperative programs are not new. One of the original purposes of the DGP was to assimilate or at least coordinate with other groups within NATO that were working on programs related to the counterproliferation effort and redirect the focus of these groups to the approved work plan. A number of groups have a related, complementary role within NATO. These include, but are by no means limited to, the NATO Air Defense Committee (NADC), tasked with assessing the conceptual and operational aspects of extended air defense and ballistic missile defense;⁸⁷ the Conference of National Armaments Directors (CNAD), a defense research group studying command, control, and communications systems; and the NATO Industrial Advisory Study Group (NIAG), which studies various technologies, concepts, and cooperative programs.⁸⁸

NATO clearly needs to create a group whose sole purpose is to oversee collaborative efforts in the full range of counterproliferation technology applications. This "new" organization or group could simply be a reenergized CNAD with more authority and a clear political mandate to push for cooperative programs. It could also be a NATO-minus group, organized only with key nations that have significant armaments industries, having the sole purpose of focusing on NATO military interdependence by providing incentives for successful armaments and collaboration on research and development (R&D).

Another possibility is that the SGP could assume this responsibility. In that regard, a program worth emulating is the Technical Cooperation Program (TCP)—a long-standing program for collaborative efforts among the United States, United Kingdom, Australia, Canada, and New Zealand. The TCP takes as its premise the idea that no nation possesses the total resources and ingenuity necessary to provide for its own defense R&D needs. The object of the program is straightforward; it provides

a means of acquainting the participating nations with each other's defense research and development programs so that each national program may be adjusted and planned in cognizance of the efforts of the other nations. This process . . . avoids unnecessary duplication, promotes concerted action and joint research . . . and provides each nation with the best technical information available for advice to their governments on matters related to defense research and development.⁸⁹

Although the TCP has no funding, it has been successful because of a recognition of mutual defense requirements and the willingness of the subgroups to collaborate in joint research activities through consultation, collective decisions, and formulation of recommendations for operation requirements.

Obviously, NATO members cooperate on a variety of projects and programs. Although cooperative R&D programs do go on within NATO (TMD being the most obvious),⁹⁰ no organized structure similar to the TCP currently exists to oversee and help generate cooperative, collaborative programs. Creating such a TCP-like program would prove a forceful tool in prodding and pushing Alliance members into more productive and economical collaborative efforts. This not only would strengthen the counterproliferation effort as a whole but also would strengthen the political will of the Alliance to work together. Fiscal reality is already forcing Alliance members to cooperate on testing and evaluation of weapons systems.⁹¹ National defense industries are also in the painfully slow but inevitable process of merging to create efficiencies.⁹² A structured program similar to the TCP

would enhance NATO's prospects for developing needed capabilities at affordable costs in an environment of maximum cooperation.

Cooperative efforts should not be restricted to R&D alone, of course. Recently, DOD formed "International Cooperative Opportunity Groups" to identify "programs for international cooperation in the areas of major systems, science and technology and advanced concept technology demonstrations (ACTD's)."⁹³ Yet, support for such programs within DOD is not widespread, and cooperative armaments projects remain the subject of widespread mistrust on both sides of the Atlantic. Nevertheless, the inevitability of coalition warfare, coupled with declining defense acquisition budgets, makes cross-border defense-procurement agreements a political and economic imperative.

Essentially, NATO has three options for funding and fielding any part of the ambitious DGP program. One entails NATO's asking members to procure necessary systems to meet the identified shortfalls. Clearly, some nations will not be able to afford or will be politically unable to purchase expensive systems for reasons described earlier. Another option calls for nations to share in purchasing systems to meet the capability shortfalls identified by the DGP. Not everyone participates, but costs are shared by those who do. One example is MEADS, initially a project undertaken jointly by France, Germany, Italy, and the United States. When France dropped out for budgetary reasons, the other three countries were able to launch the program after restructuring it and slightly increasing the percentage in the sharing of costs, hoping that France would eventually be able to return.⁹⁴

The third option—the one endorsed here—is common funding, which entails members contributing funds for NATO to own a particular system or asset outright. This too is not uncommon. For certain capabilities such as ground surveillance—something needed at all levels within the spectrum of conflict⁹⁵—common ownership is the most attractive, politically and economically. Having each country agree to support pro rata WMD response capabilities will strengthen the com-

mitment of all members to the program and lower the cost for everyone—especially those partners who have committed the most (and who have the most to lose) to respond to the threat.⁹⁶ Common funding and ownership would make the sale more palatable to civilian populations of NATO countries, and experience suggests that it would accelerate standardization and interoperability.⁹⁷

Doctrine and Training

Si vis pacem, para bellum. (If you want peace, prepare for war.)

—Roman lesson of war

Commanders must now begin to prepare for the possibility of having to fight in regional out-of-area operations that will likely involve the use of WMD. Consequently, the NAC should direct that the international military staff, in conjunction with the major NATO commands, begin the development of realistic training situations for individuals and units, down to the lowest levels of training and indoctrination. Doctrine publications should be reviewed and revised (or new ones added) to include material about warfare in WMD environments. All combined exercises should include WMD events. The silence of current standard exercise scenarios on this issue⁹⁸ is not a realistic approach for the area (the Middle East) primarily identified for out-of-area deployments.

The United States should take the lead in initiating combined WMD proliferation exercises within NATO. Recently, the Clinton administration proposed spending up to \$23 million to conduct realistic exercises involving a nuclear terrorist incident.⁹⁹ Such exercises will lead to the development of procedures for responding to proliferation contingencies, such as compatible rules of engagement (ROE), and help build political awareness of the importance of planning, training, and equipping NATO forces to operate in WMD environments. This will require the US military not only to accept the reality of fighting in a WMD environment but also to plan, train, and equip for fighting such a

war. As one expert noted, military planners tend to discount the value that NBC weapons may have to potential proliferators because, after the cold war, they have much less value to the United States.¹⁰⁰

Going hand in hand with developing doctrine and training is the question of what forces would be committed to such situations and at what cost—politically as well as economically. All-member participation in a WMD risk environment is problematic because all countries have not invested in the capability (e.g., BW vaccines, adequate protective clothing, etc.). Rather, Alliance members would choose to participate in NATO counterproliferation efforts à la carte rather than accept the full political and military menu, based both on perceptions of predominantly national versus Alliance interests and a desire to limit their roles and responsibilities in new and costly NATO programs.¹⁰¹

Nations that have not made up-front investments in these capabilities will have preempted themselves from direct participation. The reasons are clear. In any out-of-area mission, all deployed forces are potential WMD targets, whether they are logistical-support or combat forces. Consequently, designating forces for out-of-area missions and funding their training and equipment becomes more fiscally (and politically) supportable. If a member nation chooses not to participate directly, it would still be obligated to provide political and pro rata financial support. The ideal solution, however, calls for a dedicated force already designated and trained for these types of missions. Further, nations that already have such commitments or that have contributed or designated forces to combined NATO commands (e.g., the CJTF or ARRC, discussed above) should focus their efforts on training and equipping only those forces for fighting in WMD environments.

One way to ensure their participation is to have the United States fund the training and necessary equipment for forces designated to the combined-force command. Once the United States has developed and fielded the capability, it would be warehoused for allied use. Doing this would prove cheaper and po-

litically more attractive than either going it alone or providing additional forces to make up for those that could not participate for lack of such training or equipment.

Conclusion: The Way Ahead

Everything in strategy is very simple, but that does not mean that everything is very easy.

—Carl von Clausewitz

NATO has embarked on a program that will fulfill its strategy for defeating the forces of proliferation, but the current program is overly ambitious and therefore unrealistic. As argued here, more realistic options exist in terms of cost and political supportability. Those initiatives focus primarily on intelligence (the first line of defense against proliferation); collaboration and true cooperation; and identifying, training, and equipping quantifiable but limited forces, based on the fiscal realities of funding expensive counterproliferation programs.

The DGP and its efforts represent a significant milestone in achieving political consensus on proliferation risks and a strategy for response. The Alliance, finally matching its political rhetoric, made a good start towards the development of adequate capabilities to respond to potential adversaries. It has given greater impetus to a number of NATO's ongoing initiatives, such as developing an effective airborne ground surveillance and TMD; it has served as a useful vehicle for sensitizing members to the deadly potential of WMD, particularly biological weapons; and it has established a prioritized list by which the Alliance can make allocation or reallocation decisions.¹⁰²

Unfortunately, mustering the fiscal means and sustaining the necessary political will to take the actions proposed are unlikely in the present fiscal and political climate. The DGP program is a good one, and in a world that sees the proliferant threat as a world emergency, it would have greater public support and chances of success. Building a combined approach to the problem, however, will ne-

cessitate more modest programs in which the United States will have to continue its lead role. This will require mustering the required political support, sharing intelligence assets, and undertaking truly cooperative and collaborative R&D efforts.

The initiatives suggested here would serve as the basis for all future cooperative efforts and would provide the solid political foundation necessary for a successful counterproliferation program. First, creation of the proposed Proliferation Risk Intelligence and Analysis Center would serve as a catalyst for achieving the information dominance necessary for successfully meeting this challenge. An integrated intelligence center would provide multisourced information unencumbered by the political baggage associated with single-source information and analysis.

Second, a fully cooperative and collaborative program of R&D and a program for the acquisition of equipment necessary to defend against and respond to proliferation risks must be initiated. The TCP model is a good one. Achieving efficiencies and lowering costs argue strongly for more collaborative efforts, even though other concerns (such as current arguments over the future of national defense industries) would make this contentious.

Finally, because not all Alliance members are or will be able to produce the necessary forces, either now or in the future, forces within NATO must be identified, trained, and equipped for operations in potential WMD environments. Creating and training such a force cannot be limited to reactive measures. Given the potential for irrationality on the part of many of today's potential proliferators, it would be foolish to stand idly by while one's enemy delivers a fatal blow, all the while holding firm to the false belief that overwhelming counterforces are a sufficient deterrent.¹⁰³ NATO must develop the capability to fight with credible, combat-capable, rapidly deployable war-fighting forces that have the wherewithal and confidence to operate in a potential WMD environment. That is the only feasible route towards ending the gaps in our

ability to respond to and counter any future proliferation concerns.¹⁰⁴

Success depends on NATO's preparedness to deal with proliferation threats and recognition of the essential aspect of adapting to the new security environment.¹⁰⁵ Meeting the challenge of proliferation is one of the most vexing security problems the United States and NATO will face for many years to come.

Notes

1. It is not the purpose of this article to delve into the reasons why states may decide it is in their national security interests to seek WMD. For a discussion of the rationale for WMD acquisition, see Mitchell Reiss, *Without the Bomb: The Politics of Nuclear Nonproliferation* (New York: Columbia University Press, 1988); idem and Robert S. Litwak, eds., *Nuclear Proliferation, After the Cold War* (Washington, D.C.: Woodrow Wilson Center Press, 1994); Dean Wilkening and Kenneth Watman, *Nuclear Deterrence in a Regional Context* (Santa Monica, Calif.: RAND, 1995); Munir Ahmad Khan, "Toward a Universal Framework of Nuclear Restraint," in Joseph F. Pilat and Robert E. Pendley, eds., *Beyond 1995: The Future of the NPT Regime* (New York: Plenum Press, 1990), 89; Gregory J. Rattray, *Explaining Weapons Proliferation: Going beyond the Security Dilemma*, Institute for National Security Studies Occasional Paper 1 (Colorado Springs, Colo.: USAF Institute for National Security Studies, USAF Academy, July 1994); and Robert G. Joseph and John F. Reichart, "Deterrence and Defense in a Nuclear, Biological, and Chemical Environment," *Comparative Strategy* 15, no. 1 (1996): 59. For an examination of US efforts to control proliferation, see Zachary S. Davis, *Nonproliferation Regimes: Policies to Control the Spread of Nuclear, Chemical and Biological Weapons and Missiles*, Congressional Research Service Report 93-237 (Washington, D.C.: Library of Congress, 18 February 1993).

2. See Senate, *Testimony of R. James Woolsey, Director of Central Intelligence, before the Senate Select Committee on Intelligence*, 25 January 1994, S. Hrg. 103-630, 18; and *The Weapons Proliferation Threat*, Central Intelligence Agency Non-Proliferation Center Report, March 1995. See also Marc Dean Millot, "Facing the Emerging Reality of Regional Nuclear Adversaries," *Washington Quarterly* 17, no. 3 (Summer 1994): 41-50.

3. See for example, John M. Collins, *Weapons of Mass Destruction: The Impact of Proliferation on U.S. Military Posture*, Congressional Research Service Report 95-673S (Washington, D.C.: Library of Congress, 2 June 1995), fig. 1, page 3.

4. Bill Gertz, "China, Russia Still Producing Biological Weapons, Study Says," *Washington Times*, 8 August 1996, 6.

5. See R. Jeffrey Smith, "Germ, Nuclear Arms Top Pentagon's List of Threats," *Washington Post*, 12 April 1996, 32. See generally, Office of the Secretary of Defense, *Proliferation: Threat and Response* (Washington, D.C.: Government Printing Office, April 1996).

6. See generally, Central Intelligence Agency Nonproliferation Center, *The Chemical and Biological Weapons Threat*, CIA Nonproliferation Center Publication, March 1996.

7. Ruth Wedgwood, "Truth Sleuth in Iraq," *Washington Post*, 19 June 1996, 19; and "Evidence Lacking That Iraq Destroyed Arms, Report Says," *Baltimore Sun*, 12 April 1996, 22. See also, *The Chemical and Biological Weapons Threat*.

8. "Bosnia Producing Chemical Arms, Report Says," *New York Times*, 4 December 1996, 11.

9. Joseph D. Douglass Jr., "Chemical and Biological Warfare Unmasked," *Wall Street Journal*, 2 November 1995, 18; and Gertz,

It will require a truly dedicated effort if it is to succeed. US leadership coupled with effective and timely intelligence, a military capability to respond effectively to proliferation threats, and confidence in the solid political support—and will—of all members of the Alliance will ultimately stand the best chance of eliminating this scourge on mankind. □

10. Carla Anne Robbins, "Russia's Nuclear Stockpile Still Raises Concerns Despite Major Cutbacks and Improved Security," *Wall Street Journal*, 18 April 1996, 1.

11. See Marilyn Greene, "Japan Cult Shopped for Nuclear Weapons," *USA Today*, 1 November 1995, 1; Guy B. Roberts, "Five Minutes Past Midnight: The Clear and Present Danger of Nuclear Weapons Grade Fissile Materials," Institute for National Security Studies Occasional Paper 8 (Colorado Springs, Colo.: USAF Institute for National Security Studies, USAF Academy, February 1996); and Peter Grier, "'Loose Nukes': Threat Growing," *Christian Science Monitor*, 25 August 1995, 1.

12. There is no one best way to assure deterrence through credibility or uncertainty. Certainly, the United States has had enough experience in Vietnam and elsewhere to know that military superiority is not necessarily enough. What deters regional adversaries is complex, and what works in one case may not work in another. See sources cited in note 1; John J. Mearsheimer, *Conventional Deterrence* (Ithaca, N.Y.: Cornell University Press, 1983); and John Arme, "Deterrence Failures: A Second Look," *International Security*, Spring 1987, 96-124.

13. *The Alliance's Strategic Concept* (Brussels: NATO Office of Information and Press, 7-8 December 1991), pars. 12, 50.

14. *Ibid.*, pars. 9, 13.

15. In its broadest sense, the term *counterproliferation* refers to the activities of the Department of Defense (DOD) across the full range of US efforts to combat proliferation. It includes supporting proliferation prevention and intelligence activities, deterring the use of NBC weapons, defending against NBC weapons, protecting against their effects, and maintaining a robust capability to find and destroy NBC weapons-delivery forces and their supporting infrastructure elements with minimum collateral effects, should this become necessary. Counterproliferation Program Review Committee, *Report on Activities and Programs for Countering Proliferation* (Washington, D.C.: Counterproliferation Program Review Committee, May 1995), 2 (hereinafter CPRC Report). The term *counterproliferation* has an interesting history. After a protracted interagency battle over DOD's role in combating proliferation (the author was actively involved as a member of the Joint Staff), in which the State Department objected strenuously to an expansive definition and increased DOD responsibility in the area, Daniel Poneman, senior director for nonproliferation, National Security Council, crafted a "compromise" definition: "the activities of the Department of Defense across the full range of U.S. efforts to combat proliferation, including diplomacy, arms control, export controls, and intelligence collection and analysis, with particular responsibility for assuring U.S. forces and interests can be protected should they confront an adversary armed with weapons of mass destruction or missiles." In other words, anything DOD does is counterproliferation; everything every other agency does is nonproliferation. This definition appeared in *Report on Nonproliferation and Counterproliferation Activities and Programs* (Washington, D.C.: Office of the Deputy Secretary of Defense, May 1994).

16. See Natalie J. Goldring, "Skittish on Counterproliferation," *Bulletin of the Atomic Scientists*, March/April 1994, 12. The author participated in a number of briefings to defense officials in member states that year and in early 1994. The response was uniformly negative.

17. William E. Berry Jr., "North Korea's Nuclear Program: The Clinton Administration's Response," Institute for National Security Studies Occasional Paper 3 (Colorado Springs, Colo.: Institute for National Security Studies, USAF Academy, March 1995); and Stephen Engelberg with Michael Gordon, "Intelligence Study Says North Korea Has Nuclear Bomb," *New York Times*, 26 December 1993, 1.

18. See "North Korean Missile Could Reach US, Intelligence Warns," *Washington Times*, 29 September 1995, 1

19. This disagreement over how best to address WMD ambitions by rogue states continues, as demonstrated by the recent failure of the United States to convince NATO allies to bar arms trade with Libya, Iran, and North Korea. Turkey also signed a \$20 billion gas agreement with Iran despite potential penalties for doing so under the recently enacted Iran and Libya Sanctions Act. Jeff Erlich and Brooks Tigner, "Allies Balk at Rogue Nation Penalties," *Defense News*, 19-26 August 1996, 4.

20. See Harald Muller and Mitchell Reiss, "Counterproliferation: Putting New Wine in Old Bottles," *Washington Quarterly* 18, no. 2 (Spring 1995): 143-54; idem, eds., *International Perspectives on Counterproliferation*, Wilson Center Working Paper (Washington, D.C.: Woodrow Wilson International Center for Scholars, December 1994); Joseph F. Pilat and Walter L. Kirchner, "The Technological Promise of Counterproliferation," *Washington Quarterly* 18, no. 1 (Winter 1995): 153-66; Zachary S. Davis, *U.S. Counterproliferation Doctrine: Issues for Congress*, Congressional Research Service Report 94-734 (Washington, D.C.: Library of Congress, 21 September 1994); and Steven M. Kosiak, *Nonproliferation & Counterproliferation: Investing for a Safer World?* (Washington, D.C.: Defense Budget Project, April 1995).

21. Since 1993 yearly reports on DOD's counterproliferation program have been published. The most recent reports include William J. Perry, *Annual Report to the President and the Congress* (Washington, D.C.: Department of Defense, March 1996), 53-62; *Proliferation: Threat and Response*; and CPRC Report. See also, William J. Clinton, *A National Security Strategy of Engagement and Enlargement* (Washington, D.C.: Government Printing Office, February 1995), 13-15; and *National Military Strategy of the United States of America* (Washington, D.C.: Office of the Chairman of the Joint Chiefs of Staff, 1995), 15.

22. CPRC Report, 10.

23. Because of their relationship to NATO efforts, discussed below, these 15 counterproliferation priorities bear repeating here:

- (1) Detection, Identification, and Characterization of BW/Chemical Warfare (CW) Agents
- (2) Cruise Missile Defense
- (3) Theater Ballistic Missile Defense
- (4) Detection, Characterization, and Defeat of Underground WMD Facilities
- (5) Collection, Analysis, and Dissemination of Actionable Intelligence to the War Fighter
- (6) Robust Passive Defense to Enable Continued Operations on the NBC Battlefield
- (7) BW Vaccine Research, Development, Testing, and Evaluation and Production
- (8) Target Planning for WMD Targets
- (9) BW/CW Agent Defeat
- (10) Detection and Tracking of WMD and WMD-Related Shipments
- (11) Prompt Mobile Target Detection and Defeat
- (12) Support for Special Operations Forces
- (13) Defense against Paramilitary, Covert Delivery, and Terrorist WMD Threats

(14) Support of Export Control Activities of the US Government

(15) Support of Inspection and Monitoring Activities of Verifiable Arms Control Agreements and Regimes. See CPRC Report, ES-2.

24. Pamela Pohling Brown, "Technologies for America's New Course," *International Defense Review* 27, no. 10 (1994): 33-38. Of that amount, \$522.1 million was for counterproliferation and another \$1.9 billion for strongly related programs and activities. See William J. Perry, *Annual Report to the President and the Congress* (Washington, D.C.: Department of Defense, February 1995), 74. Because of the multuse nature of many programs, it is difficult to pin down exactly how much is directly spent on counterproliferation. Arguably, categorization is arbitrary in many cases.

25. CPRC Report, ES-2. For fiscal year 1996, DOD requested \$165.2 million for counterproliferation. These funds are for specific, high-priority acquisition activities to provide required military capabilities. The rest of the funds are for related programs and systems that have multipurpose capabilities in addition to counterproliferation relevance. The US government's fiscal year runs from 1 October to 30 September.

26. *Ibid.*, 33.

27. See Goldring, 12-13. NATO members have leveled criticism at the potential unilateral use of American military force to destroy WMD. See also Dr. Klaus Kinkel, federal minister for foreign affairs, "German 10-Point Initiative on Non-Proliferation Policy," circular note from the Permanent Mission of the Federal Republic of Germany to the Conference on Security and Cooperation in Europe (CSCE) in Vienna, 13 January 1994 (on file with author).

28. These concerns continue. Recent revelations about Iraq's BW and missile program are particularly disturbing. In addition to having an extensive BW program, Iraq also was trying to develop a missile with a range of two thousand kilometers, placing NATO's Southern Flank at risk. See Wedgwood, 19.

29. "Declaration of the Heads of State and Government Participating in the Meeting of the North Atlantic Council," in *NATO Communiqués 1994* (Brussels: NATO Office of Information and Press, 10-11 January 1994), 13.

30. Robert Joseph, "Proliferation, Counter-Proliferation, and NATO," *Survival* 38, no. 1 (Spring 1996): 117. France's views on proliferation should be considered in light of its new and pragmatic relationship with NATO. See Robert P. Grant, "France's New Relationship with NATO," *Survival* 38, no. 1 (Spring 1996): 58-80. See also Gregory L. Schulte, "Responding to Proliferation—NATO's Role," *NATO Review*, July 1995, 15-19; and Joachim Krause, "Proliferation Risks and Their Strategic Relevance: What Role for NATO?" *Survival* 37, no. 2 (Summer 1995): 136.

31. UK Ministry of Defence (MOD) official, interviewed by author, 24 June 1996. See also MOD, *Statement on Defence Estimates 1994* (London: MOD, 1994), 20.

32. NATO officials and NATO member representatives, interviewed by author, 26-28 June 1996. The initial report of the Senior Defense Group on Proliferation consisted of an assessment of WMD risks. That report, adopted by the NAC, recognized that nonproliferation efforts would not be enough and that the risk of WMD was growing, but no conclusions were being made on the immediacy of the threat and the extent to which NATO countries were at risk. Numerous interviews with NATO member representatives produced a range of views on the nature of the threat; a large majority stated that no immediate threat existed.

33. Basic fact sheet, "NATO's Response to Proliferation of Weapons of Mass Destruction" (Brussels: NATO Office of Information and Press, May 1996).

34. *Ibid.*

35. "Alliance Policy Framework on Proliferation of Weapons of Mass Destruction," in *NATO Communiqués 1994* (Brussels: NATO Office of Information and Press, 9 June 1994), 43.

36. *Ibid.*, 46.

37. See Joseph, "Proliferation," 121-25.
38. The report was presented to the NAC in May 1995. See "Ministerial Meeting of the North Atlantic Council, Final Communiqué, 30 May 1995," in *NATO Communiqués 1995* (Brussels: NATO Office of Information and Press, 1995), 16.
39. See, for example, *Proliferation: Threat and Response*, 11-34.
40. "Alliance Policy Framework on Proliferation of Weapons of Mass Destruction," in *NATO Communiqués 1994* (Brussels: NATO Office of Information and Press, 9 June 1994), 43-44.
41. "NATO's Response to Proliferation of Weapons of Mass Destruction," *NATO Press Release 95*, no. 124 (29 November 1995): 3-4.
42. NATO and Supreme Headquarters Allied Powers Europe (SHAPE) officials, interviewed by author, 26-27 June 1996. See also *Arms Control and Disarmament Review*, no. 40 (1 November-29 February 1996): 98; and Perry, 57.
43. See generally, CPRC Report.
44. "NATO's Response to Proliferation of Weapons of Mass Destruction" (1995).
45. "Final Communiqué, Ministerial Meeting of the North Atlantic Council in Berlin, 3 June 1996," Press Communiqué M-NAC-1 (96)63 (Brussels: NATO Press and Media Service, 1996), 7.
46. Article 5 of the North Atlantic Treaty requires that any armed attack against one or more parties to the treaty be considered an attack against all. The treaty contemplates collective action of the members in Europe and North America with adequate armed forces for both deterrence and defense. The treaty does not contemplate member forces, acting as a NATO force, undertaking missions such as peace enforcement out-of-area. Consequently, as NATO evolves and takes on new responsibilities beyond the mandate of the original treaty, we can expect controversy over and resistance to these types of missions.
47. "Final Communiqué, Meeting of the North Atlantic Council in Defense Ministers Session on 13 June, 1996," Press Communiqué, M-NAC(DM)-2(96)89 (Brussels: NATO Press and Media Service, 1996), 5.
48. See generally, executive summary to the CPRC Report.
49. Joseph, "Proliferation."
50. *Ibid.*, 125.
51. DOD official, interviewed by author, 13 June 1996; interview with MOD Officials, 25 June 1996; and interviews with NATO/SHAPE officials, 26-27 June 1996.
52. *Ibid.*
53. NATO officials, interviewed by author, 26 June 1996. "Midterm" was assessed as five to 10 years.
54. "Final Communiqué, Defense Planning Committee and Nuclear Planning Group, 29 November 1995," in *NATO Communiqués 1995* (Brussels: NATO Office of Information and Press, 1995), 2.
55. "Final Communiqué, Defense Planning Committee and Nuclear Planning Group," Press Communiqué M-DPC/NPG-1 (96)88 (Brussels: NATO Press and Media Service, 13 June 1996), 2.
56. Interview with NATO/SHAPE officials, 26-27 June 1996; and Press Communiqué M-DPC/NPG-1 (96)88.
57. Interviews with NATO/SHAPE officials, 26-27 June 1996. The author is indebted to those staff officers at SHAPE who helped explain the anticipated process by which the DGP's 39 action plans might be implemented.
58. At the defense ministerial meeting in Brussels in May 1994 and the NAC ministerial meeting in Istanbul in June 1994, the Alliance endorsed the concept of a CJTF concept to enable the Alliance to more efficiently and more flexibly conduct multinational and multiservice military missions such as peacekeeping with non-NATO partners. It was seen as promoting a cooperative effort with the Western European Union (WEU) and facilitating the involvement of Partnership for Peace (PfP) countries in various missions. The CJTF concept, recently approved by the NAC at the ministerial meeting of June 1996, will

allow NATO to mount contingency operations and promote the "use of separable but not separate military capabilities in operations led by the WEU, and the participation of nations outside the Alliance" in operations such as those in Bosnia. See "Final Communiqué, Ministerial Meeting of the North Atlantic Council in Berlin, 3 June 1996," Press Communiqué M-NAC-1 (96)63 (Brussels: NATO Press and Media Service, 1996), par. 6. Although the concept has been approved, the CJTF remains controversial. It will take two or three years to define practical procedures to make the CJTF a reality. The political-control issue will be the most intractable. See Brooks Tigner, "Will Alliance Embrace or Evade CJTF Issue?" *Defense News*, 3-9 June 1996, 4.

59. ARRC is the land component of the ACE Rapid Reaction Forces (the other two being Reaction Forces Air Staff [RFAS] and the Immediate Reaction Forces-Maritime). Its role is to deploy as necessary to augment or reinforce local forces in a NATO country and to respond rapidly to a wide range of crises, including out-of-area missions. It is designed to have a broad spectrum of capabilities tailored to respond to multifaceted and unpredictable risks, including response to a WMD-equipped adversary. Its peacetime structure includes 10 divisions plus corps troops from 12 NATO countries. Its headquarters is in Rheindahlen, Germany; commanded by a British three-star general, it became operational in 1995. The United States has approximately 33 personnel assigned to Headquarters ARRC and funds approximately 9 percent of its operating expenses. US forces participating in the ARRC include an armored division from US Army Europe. For a more detailed explanation of these forces and NATO command structure, see *NATO Handbook* (Brussels: NATO Office of Information and Press, October 1995), 165-84.

60. Interviews with NATO/SHAPE staff, 26-28 June 1996.
61. Interview with NATO officials, 26 June 1996.
62. "Final Communiqué, Defense Ministers Meeting of the North Atlantic Council in Brussels, 18 December 1996," Press Communiqué M-NAC(DM) 3(96) 172 (Brussels: NATO Press and Media Services, 1996), pars. 23-25.
63. A close second is France's concerns over WMD proliferation, which has led to its active participation, lead within the DGP (an initial cochair of the group), and movement towards full participation in NATO affairs.
64. Executive Order 12938, Proliferation of Weapons of Mass Destruction, 12 November 1994.
65. Interviews with NATO member representatives, 25-28 June 1996.
66. See David R. Francis, "End of Cold War Brings Huge Savings," *Christian Science Monitor*, 26 July 1996, 1.
67. DOD official, interviewed by author, 18 June 1996.
68. Quoted in Rick Atkinson and Bradley Graham, "As Europe Seeks Wider NATO Role, Its Armies Shrink," *Washington Post*, 29 July 1996, 1.
69. "France Quits Anti-Missile Project," *London Financial Times*, 17 April 1996, 3.
70. "FLA Failure Plays into U.S. Hands," *European Defense and Technology*, U.S.-Crest Online, 14 June 1996. Although France now appears to have committed to funding its part of the program, current French funding is insufficient for the program. NBC-capable planes will have to be separately funded once the program is fully launched in early 1998. See Giovanni de Briganti and Michael J. Witt, "U.K. Edges Closer to FLA Program as Partners Pen Needs Agreement," *Defense News*, 2-8 September 1996, 3.
71. See also Peter Lewis, "French Security Policy: The Year of the Disappearing Budget," *Jane's Defence Weekly*, January 1996, 42.
72. Germany's Ministry of Defense is projecting a \$30 million budget reduction for the 1997 budget (approximately \$34 billion). See Jeff Erlich, "Germans Give Top Priority to Overseas Commando Unit," *Defense News*, 23-29 September 1996, 36.
73. German representative to NATO, interviewed by author, 26 June 1996.
74. *Statement on the Defence Estimates, 1996* (London: Directorate of Defence Policy, MOD, 1996), 47-52.

75. Atkinson and Graham, 71.
76. See Javier Solana, "NATO Charts Firm Course," *Defense News*, 17-23 June 1996, 9. (NATO enlargement will provide a "strong and coherent alliance in Europe" and a desire for more equitable defense burden sharing.)
77. Cited in Carla Anne Robbins, "Devil Is in Details of NATO Expansion," *Wall Street Journal*, 9 August 1996, 1.
78. Jonathan S. Landay, "Is Eastern Europe Ready for NATO?" *Christian Science Monitor*, 18 June 1996, 4. US contributions would be in the \$5-19 billion range. See also David D. Newsom, "The Go-Slow Approach to NATO Expansion," *Christian Science Monitor*, 24 July 1996, 19; and Theresa Hitchens, "Voices Rise for Slow NATO Growth," *Defense News*, 22-28 April 1996, 46.
79. DOD official, interviewed by author, 3 June 1996.
80. Interviews with NATO/SHAPE officials, 26-27 June 1996.
81. NATO has also created a NATO Intelligence Board (NIB) that meets once or twice a year. Its members include the heads of national intelligence services, and its work is coordinated by the international military staff. The DGP has requested that the NIB develop plans for a centralized database—an encouraging request but one that doesn't go nearly far enough.
82. See David Martin, "Towards an Alliance Framework for Extended Air Defence/Theatre Missile Defence," *NATO Review* 44, no. 3 (May 1996): 34.
83. Interestingly, during the author's research for this article, a number of NATO officials and staff members expressed skepticism about the extent of the risk, implying that the Americans were simply crying "wolf" in order to enhance American arms exports or garner support for future "preemptive" military operations against proliferators.
84. The IAEA, for example, has established a database to begin tracking and analyzing cases of the trafficking of fissile materials, and it has a number of nuclear-materials forensic laboratories.
85. See Giovanni de Briganti, "Delays Force French to Rethink Satellite Plans," *Defense News*, 12-18 August 1996, 14; and Peter B. de Selding, "Multinational Satellite Plan Stalls; Countries Move on Own Projects," *Defense News*, 16-22 September 1996, 58. The estimated cost of *Helios 2* (*Helios 1A* was launched in 1985) and *Horus* is \$4.5 billion. France and Britain are also working on a four-satellite telecommunications system, to be in place by 2005, that will cost an estimated \$2.6 billion. Italy is developing its own military communications satellite (called *Sicral*) for \$457 million, to be in place by 1999.
86. Martin, 32.
87. *Ibid.*
88. A detailed discussion of these and other NATO group efforts lies beyond the scope of this article. Suffice it to say there exists a bewildering variety of these groups, often operating without coordination. See *NATO Handbook*. No wonder Secretary of Defense William Perry and General Sheehan, commander in chief, Atlantic Forces (and a major NATO commander) has called for streamlining and better coordination. See "Interview," *Jane's Defence Weekly*, 12 June 1996, 48.
89. *The Technical Cooperation Program*, TCP Document on Interim Policies, Organization, and Procedures in Non-Atomic Military Research and Development, Doc-Sec-1-1996, 4.
90. See Martin and accompanying text.
91. Jeff Erlich, "Nations Eye Joint Weapons Test," *Defense News*, 26 February-3 March 1996, 8.
92. Although it will be a struggle—as change always is—national defense industries are slowly awakening to the reality that if they are to have any industry at all in the face of shrinking national defense budgets, they must cooperate and collaborate—and at times be forced to merge. See, for example, "British, French Firms Clear Guided Weapons Venture," *Wall Street Journal*, 19 August 1996, 8; Len Zuga, "Protectionism Defeats Protector," *Defense News*, 12-18 August 1996, 25; Peter B. de Selding, "Europeans OK \$2.6 Billion Satellite Plan," *Defense News*, 9-15 September 1996, 3; Giovanni de Briganti, "Most FTA

Members Accept Single Development Contract," *Defense News*, 9-15 September 1996, 14; and "Building Eurospace Corp.," *Economist*, 7 September 1996, 59.

93. *Transatlantic Armament Cooperation: Into the 21st Century* (Arlington, Va.: U.S.-Crest, 1996), viii.

94. Giovanni de Briganti, "Partners Say MEADS Will Proceed," *Defense News*, 22-28 April 1996, 4.

95. "SHAPE to Stress Need for Surveillance System," *Defense News*, 9-15 September 1996, 2.

96. Some people have even argued that commitment to acquiring the identified capabilities will be demonstrated only when NATO members fund specific programs, such as the joint surveillance, target attack radar system (JSTARS) and a theater high-altitude area defense (THAAD)-type TMD system. See Joseph, "Proliferation," 128. Recently, SHAPE officials told the military committee of an urgent need to acquire an airborne ground system, giving impetus to efforts to acquire JSTARS for NATO. JSTARS will be commonly owned. "SHAPE to Stress Need for Surveillance System," 2.

97. Interviews with NATO/SHAPE staff, 26-28 June 1996.

98. Two recent joint/combined exercises are the latest examples. In April/May 1996, the United Kingdom and the United States participated in Exercise Purple Star on the eastern seaboard of the United States, involving 45,000 US and 12,000 British troops—the largest deployment of American and British forces together since Operation Desert Storm. The scenario involved a CJTF being deployed to provide assistance to a country invaded by a neighboring aggressor. There was no WMD play. In August 1996, at Camp Lejeune, North Carolina, US forces participated with NATO (Canadian, Danish, and Dutch) and PFP (17 Eastern European nations) forces in Exercise Cooperative Osprey. The exercise involved humanitarian peacekeeping scenarios. There was no WMD play.

99. Todd S. Purdum, "Clinton Suggests an Array of Steps to Foil Terrorism," *New York Times*, 10 September 1996, 1.

100. See Millot, 41.

101. NATO national representatives, interviewed by author, 26-28 June 1996.

102. France's active participation has been almost as important, signaling a new and closer relationship with NATO. One French official noted that this is the first time France has taken external analysis into account in its national-defense decision making. Interviewed by author, 3 June 1996.

103. Support from Alliance members was notably absent when the United States vowed to blow up Libya's suspected CW plant at Tarhunah. See "U.S. Will Annihilate Attackers, Perry Vows," *Washington Times*, 19 April 1996, 6. Again, part of the reason for Alliance reluctance to become more involved is the lack of independent intelligence and assessments of the activities of rogue states like Libya. The proposed center could remedy that and ultimately make preemptive actions by a NATO force more palatable politically. See Douglas Wallter, "Target Gaddafi, Again," *Time*, 1 April 1996, 46.

104. Recently, the British MOD publicly advocated a change in NATO's defensive posture and urged the development of a policy on preemptive strikes. The sooner this debate occurs, the easier it will be to deal with the reality of WMD threats in the post-cold-war world. See Charles Miller, "U.K. Military: Take Offense," *Defense News*, 28 October-3 November 1996, 3.

105. Success also depends on whether the United States and the allies do something that is beyond the scope of this article: persuade countries of the world to work together in keeping the peace; extending the rule of law; promoting economic growth, human rights, environmental protection, and cultural dignity; and remaining strong in the face of forces that, feeding on the movements of rage and economic stagnation, would use weapons of mass destruction to impede the development of democratic institutions and global economic growth—forces so vital for humanity's future.



Origins of Airpower

Hap Arnold's
Command Years and
Aviation Technology,
1936-1945*

MAJ DIK DASO, USAF



IN JANUARY 1936, Brig Gen Henry H. Arnold was transferred back to Washington, D.C. Maj Gen Oscar F. Westover had taken over as chief of the Air Corps and had convinced Gen Malin Craig, chief of staff, that he needed Arnold as his assistant. Another candidate for that job was General Headquarters (GHQ) Air Force commander Brig Gen Frank M. Andrews. Andrews and Westover had clashed regarding independence of the air arm. Westover, who had opposed separation from the Army throughout his career, and Arnold, perhaps having learned a lesson about bucking the system at too high a level, agreed that remaining part of the Army held definite advantages for the Air Corps, particularly in the area of logistical support. From that point, Andrews's career took a different path from Arnold's. By 1939, Andrews had moved over to the General Staff under Gen George C. Marshall, and Arnold held command of the Air Corps. Arnold used this position to ensure, among other things, continued scientific and technological advances in his command.¹

Even before assuming command, Arnold chaired a committee formed in 1936 to examine how best to create a "Balanced Air Program." There was nothing unusual in his final report; in fact, it followed very closely the recommendations made previously by the Drum Board (a committee headed by Maj Gen Hugh Drum that was appointed to review and revise the Air Corps's five-year procurement plan). The numbers reflected in each report for personnel and planes were similar. Surprising today but realistic at that time, the forecast for airplanes required was only 1,399 in 1936, increasing to a meager 2,708 in 1941.² Although Arnold's report was primarily an attempt to reckon with depression budgets, no mention was made of scientific research or technological development. Rather, the program's primary concern was to

save dollars in all areas except purchasing airplanes.

In September 1937, Arnold modified the conservative approach which his Balanced Air Program report had taken. While addressing the Western Aviation Planning Conference, Arnold summarized his philosophy for creating a top-notch aeronautical institution in America:

Remember that the seed comes first; if you are to reap a harvest of aeronautical development, you must plant the seed called *experimental research*. Install aeronautical branches in your universities; encourage your young men to take up aeronautical engineering. It is a new field but it is likely to prove a very productive one indeed. Spend all the funds you can possibly make available on experimentation and research. Next, do not visualize aviation merely as a collection of airplanes. It is broad and far reaching. It combines manufacture, schools, transportation, airdrome, building and management, air munitions and armaments, metallurgy, mills and mines, finance and banking, and finally, public security-national defense. (Emphasis in original)³

In this statement, Arnold had issued the broadest description of the evolving technological system of airpower, even if he didn't make a distinction between empirical (based on observation) versus theoretical (based on calculations) research. If the Air Corps had little money for research and development (R&D), then perhaps universities and industry could be persuaded to find some. After all, it had been the Guggenheim Fund for the Promotion of Aeronautics that had funded the fledgling departments in that discipline at several universities almost a decade earlier.⁴ No matter the source, experimental research was the key to future airpower. Arnold had very cleverly linked Air Corps development to civilian prosperity in the aviation industry, hoping that civilian institutions would pick up the fumbled research ball while the Air Corps was struggling just to acquire planes. His ideas reflected the "Millikan philosophy,"

¹This article is the second part of a study of Gen H. H. Arnold and aviation technology, which began in the Winter 1996 issue.



USAF MUSEUM

Capt Homer Boushey in the Ercoupe at March Field.

that of bringing the center of aeronautical science in America to the California Institute of Technology (Caltech), which had shaped that university since the 1920s. This philosophy, coupled with Arnold's realization that airpower was a complex system of logistics, procurement, ground support bases, and operations, guided his vision for future growth.⁵ Arnold's approach to airpower development was actually the first notion of what became the military-industrial-academic complex after World War II.⁶

As was all too frequent an occurrence in these early years of aviation, a tragic aircraft accident took the life of General Westover on 21 September 1938. Arnold was now the top man in the Air Corps. Arnold's experience in Army aviation had prepared him for the tasks which loomed ahead, and now he was in a position to tackle these problems.

When Arnold "shook the stick" and officially took command of the Air Corps on 29 September 1938, many military aviation projects were under consideration both at Wright Field and at the National Advisory Committee for Aeronautics (NACA) facility at Langley: radar, aircraft windshield deicing, jet assisted takeoff (JATO) system (which was actually a rocket), and a host of aircraft and engine design modifications. Many of these projects were related to the brand new B-17, an aviation technology leap in itself.⁷ Arnold wasted no time in calling the "long hairs" to a meeting at the National Academy of Sciences (NAS) under the auspices of the Committee on Air Corps Research, to solve these problems.⁸ It was no surprise that Arnold immediately accelerated Air Corps R&D efforts. In his first message as Air Corps commander, Arnold devoted a separate para-

NACA's William Durand (center) was present for the initial JATO tests. Later he would be sworn to secrecy during development of the first American jet aircraft.



JET PROPULSION LAB

graph to the subject that reflected his public views on airpower. "Until quite recently," he said, "we have had marked superiority in airplanes, engines, and accessories. That superiority is now definitely challenged by recent developments abroad. This means that our experimental development programs must be speeded up."⁹ But his views were already commonly known to most airmen.

Assisting the speeding-up process, the Guggenheim Aeronautical Laboratory at the California Institute of Technology (GALCIT) and the Massachusetts Institute of Technology (MIT) sent representatives to this NAS meeting. Vannevar Bush and Jerome Hunsaker of MIT grabbed the windshield deicing problem for their institution while openly dismissing JATO as a fantasy. Hunsaker called JATO the "Buck Rogers" job. Bush explained to Robert Millikan and Theodore von Kármán that he never understood how "a serious engineer or scientist could play around with rockets."¹⁰ Arnold knew that GALCIT had already demonstrated some success in that area. Bush's condescending attitude did not go over well with General Arnold. From that meeting onward, Arnold thought of Bush as something less than forward-looking, despite his excellent, even pioneering, record in electrical engineering. The case of Vannevar Bush was a classic example of how a talented individual

had been dropped from confidence because of personal perceptions.

On the other hand, Millikan and Kármán, representing GALCIT, eagerly accepted the JATO challenge, an attitude that Arnold no doubt appreciated. JATO represented potential funding for the struggling GALCIT Rocket Research Project, initiated in 1936. This project, also known as GALCIT Project #1, was established by Dr. Kármán and Dr. Frank Malina, and exists today as the Jet Propulsion Laboratory (JPL).¹¹

It was after this NAS meeting that the Arnold/Kármán association officially began. Arnold saw Kármán as a useful tool, a tap for recognizing undeveloped technologies. Kármán saw the Army Air Corps as a worthy recipient of his services. More importantly, however, the funding Arnold made available seemed bottomless and helped Caltech maintain its status as the leading aeronautical university in the country. Kármán was dedicated to helping the Army but was also dedicated to Caltech, the GALCIT, and Robert Millikan. Nonetheless, this alliance, above all others which Arnold held with scientists and engineers, proved one of the most significant and engaging collaborations in the early history of American airpower.

This meeting was just the beginning of Major General Arnold's push to make science and technology an integral part of the Air



JET PROPULSION LAB

Kármán calculates the number of engines for a JATO-only takeoff (above). Twelve canisters were needed, the propeller was removed, and the nose was covered in safety posters (below). "What about tomorrow if I meet with an accident today?"



Corps. He even invited General Marshall to a luncheon with the visiting scientists. Marshall wondered, "What on earth are you doing with people like that?" Arnold replied that he was "using" their brainpower to develop devices "too difficult for the Air Force engineers to develop themselves."¹² The realization that civilian help was the only way to ensure that the Army Air Corps had the best technology available was typical of Arnold. He didn't care where the devices came from; he only cared whether his Air Corps was utilizing them. By including Marshall in this circle of scientists, Arnold began winning support for advanced technology from the highest ranking Army officers.



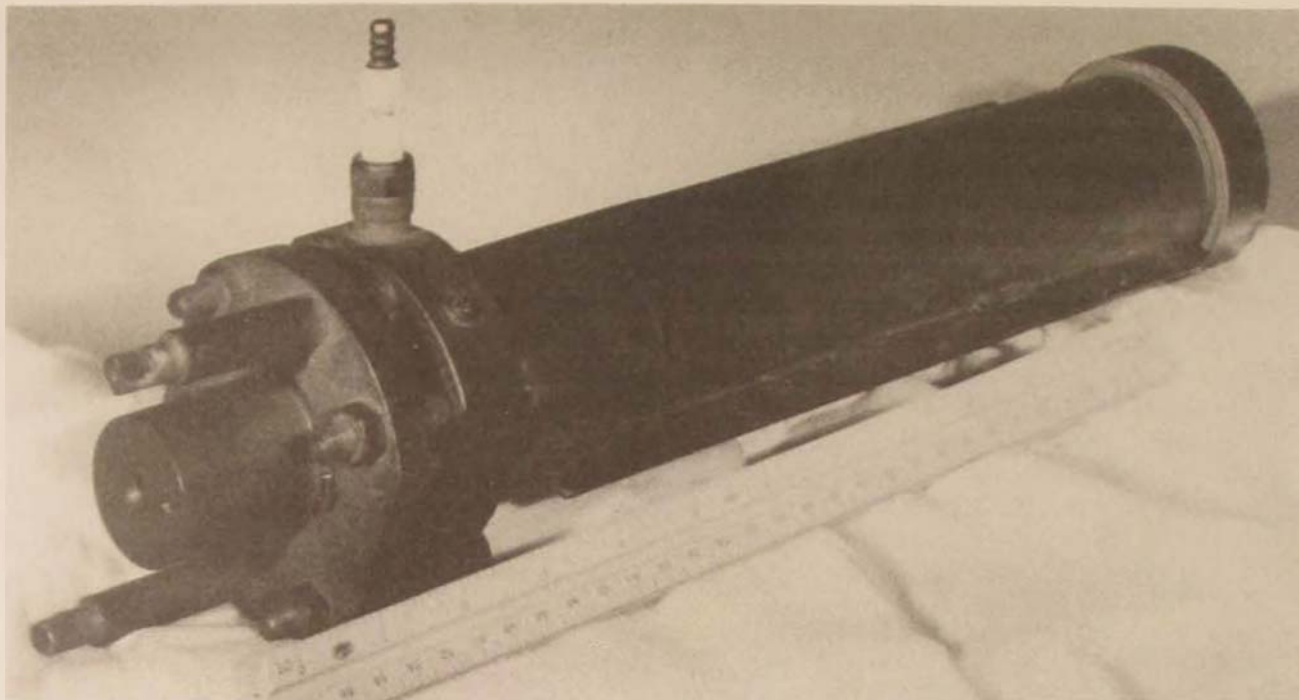
USAF MUSEUM

This view of the test run shows the test aircraft piloted by Clark Millikan.

Not only did Arnold utilize the advice of scientists, he gathered information from civilian aviators as well. One in particular influenced Arnold's commitment to technology. In late 1938, Arnold had exchanged letters with Charles Lindbergh, then touring Europe, which expressed Lindbergh's concern over US lethargy in airplane development. "It seems to me," Lindbergh wrote, "that we should be developing prototypes with a top speed in the vicinity of 500 mph at altitude. . . . The trend over here seems to be toward very high speed."¹³ This revelation worried Arnold. In March 1939, Arnold established a special air board to study the problems that Lindbergh had addressed. By April 1939, Arnold had convinced Lindbergh to accept an active duty commission as a member of the study group. This group, known as the Kilner Board, produced a five-year plan for research and development within the Air Corps. The report was shortsighted in many respects but did represent the immediate needs of the air arm. Jet

propulsion and missiles, for example, were not even considered.¹⁴

Lindbergh's impact was immediate but short-lived. In a written recommendation for the NACA, Lindbergh gained support for an expanded aeronautical research facility to be located at Moffett Field, California. The funding was approved on 15 September 1939. That same morning, Lindbergh spoke out against American participation in the European war on three major national radio networks. President Franklin D. Roosevelt tried to dissuade him from taking his views directly to the nation. After Lindbergh's historic flight, the Guggenheim Fund had invested \$100,000 to subsidize a national tour expressly designed to generate support for aviation. By the late 1920s, Lindbergh had toured over 80 cities and influenced millions of Americans. "Lindy" was a skilled communicator. In many respects, he became the American spokesman for aviation.¹⁵ As such, his words carried an inordinate amount of influence. Fearing a



USAF MUSEUM

A JATO rocket engine, about 18 inches long.



In 1941, Air Chief Marshal Sir Charles Portal and Gen Arnold arranged the transfer of the Whittle technology. The photo was taken just prior to 6 June 1944.

major effect on public opinion, FDR promised Lindbergh a new cabinet post if he remained silent concerning American participation in the European war. Arnold had been caught in the middle of the presidential offer, but there was never any doubt in the general's mind that Lindbergh would turn down such an offer and speak his own mind. Arnold was right. Consequently, Lindbergh "resigned" his commission, but Arnold had already taken his earlier warnings to heart.¹⁶

Arnold's public campaigns reflected Lindbergh's warnings. In January 1939, while speaking to the Society of Automotive Engineers in Detroit, Arnold—now the Air Corps's No. 1 man—reemphasized that America was falling behind in aircraft development. He attributed this failing to an inadequate program of scientific research. He stated:

All of us in the Army Air Corps realize that America owes its present prestige and standing in the air world in large measure to the money, time, and effort expended in aeronautical experimentation and research. We know that our future supremacy in the air depends on the brains and efforts of our engineers. . . .¹⁷

His dedication to continuous research, experimentation, and development was more focused, more defined than it had ever been, and now he carried the message across the country.

Arnold's official correspondence reflected the same commitment to R&D. In a memorandum to the assistant secretary of war dated 2 March 1939, Arnold vigorously defended proposed funding for research and development:

The work of the large number of aeronautical research agencies in this country should be afforded government support and encouragement only through a single coordinating agency which can determine that the individual and collective effort will be to the best interests of the Government. The NACA is the agency designated by law to carry out basic aeronautical research and its own plant and facilities cannot cover all phases of development. Furthermore, there are many public or semi-public institutions whose students or other research personnel are willing and anxious to perform useful investigation that will contribute to a real advancement of the various branches of aeronautical science.¹⁸

As a member of the NACA Main Committee since taking over the Air Corps, Arnold attended the committee meetings regularly and was familiar with the workings of the group. More importantly, he was acquainted with the other Main Committee members who together read like a "Who's Who" in American aviation. Van Bush, Orville Wright, Charles Lindbergh, and Harry Guggenheim were all members of the Main Committee in 1939. Shortly after the 2 March memo was sent, Arnold established an official liaison between the NACA facilities at Langley Field and the Air Corps Materiel Division at Wright Field. Arnold assigned Maj Carl F. Greene to the post in an effort to tighten the relationship between the two organizations.¹⁹ The attempt to consolidate R&D programs was valiant, but time was running short. Conflict in Europe assured that the relationship would never mature.

The expanding war in Europe indicated that a posture of readiness was prudent and



ROBERT ARNOLD

Arnold departs for England in April 1941 on the "Clipper."

necessary for the United States. From the day that Germany invaded Poland in September 1939, Arnold realized that all American production efforts would be needed just to build enough aircraft of existing designs to create a fighting air force. "For us to have expended our effort on future weapons to win a war at hand," he wrote Gen Carl A. Spaatz in 1946, "would be as stupid as trying to win the next war with outmoded weapons and doctrines."²⁰ While the outcome of the war was in question, and even though the United States was not yet directly involved, Arnold emphasized R&D only to improve weapons or aircraft by using technologies that were already on the drawing board. Essentially, from September 1939 until the spring of 1944, the majority of Army aviation R&D efforts were dedicated to short-term improvements in existing technologies.²¹

The total American production effort that followed Arnold's early fears and resignation

shocked everyone, including Arnold. By April 1943, the four-star general wrote to General Andrews, now air commander in the European theater, "By God, Andy, after all these years it was almost too much—I don't imagine any of us, even in our most optimistic moments, dreamed that the Air Corps would ever build up the way it has. I know I . . . never did."²² Airplane production became one of the major reasons for American airpower's evolution into a massive technological system by 1944. Until the early years of World War II in Europe, the American aircraft industry was still in its infancy. The war forced it into early adolescence. Despite the many challenges inherent in the massive buildup of airplanes, Arnold still found time to push for a few untested technologies that showed exceptional promise while also pressing his field commanders to use "science" to advantage whenever possible.²³

The most spectacular of these technologies was the JATO program being pursued at Caltech since the NAS meeting in November 1938. Since it was most desirable to build aircraft that carried heavy bomb loads, the problems of high wing loading on initial takeoff became extremely important. "In many cases the maximum allowable gross weight of an airplane was limited solely by takeoff considerations. One of the many methods . . . proposed for the elimination of this difficulty involved the use of auxiliary rocket jets to augment the available thrust during takeoff and initial climb."²⁴ The net result was an increase in range for a desired payload. Frank Malina, "Homerjoe" Stewart, and the rest of the "suicide club" spent most of 1940 and the first half of 1941, developing the JATO system. By summer, Malina's team was ready to flight-test the device. Capt Homer Boushey flew an Air Corps Ercoupe from Wright to March Field, the selected spot for the test, late in July 1941. After a failed static firing resulted in a spectacular explosion, the rockets were affixed to the underside of the Ercoupe's wings, near the wing roots. Despite the failed test, it was decided to accomplish an anchored test-firing of the rockets attached to the plane. Although this test was more suc-

cessful than the previous one, fragments of burning propellant and a small piece of a nozzle still burned a forearm-sized hole in the underside of the Ercoupe tail. "Well, at least it isn't a big hole," one of the onlookers observed. After the hole was patched, a successful airborne confidence firing test of the rockets was completed on 6 August, but the big test was yet to come.²⁵

On 12 August, filled with newfound confidence, Boushey strapped himself into the Ercoupe, now loaded with six JATOs, three under each wing. William Durand, long-time friend of Kármán, NACA charter member, and chairman of NACA's Special Committee on Jet Propulsion, had been invited to witness the JATO flight test. A test aircraft, a Piper Cub, piloted by Dr. Clark Millikan, idled next to the Ercoupe waiting for the soon-to-be-rocket plane to release brakes. Both aircraft revved their engines and released their brakes. In a matter of only a few seconds, having reached a predetermined speed, Boushey ignited his rockets. In a cloud of smoke, followed shortly by the crack of the rocket ignition, the Ercoupe catapulted into the air and over the 50-foot banner that marked the calculated height to be achieved after rocket ignition. The Piper Cub appeared to climb in slow motion. The JATO launch had been a remarkable success.²⁶

It was so successful that Kármán decided that it would be possible to launch the Ercoupe on rocket power alone, sans propeller. To cover up the fact that the prop had been removed, the Ercoupe nose was plastered with safety posters as if it were undergoing some form of repairs. "Be Alert, Don't Get Hurt!" At least the JATO team had a sense of humor. He calculated that 12 JATO engines would be required to accomplish the first American rocket-powered airplane flight. On 23 August, Boushey strapped in one more time. Kármán had calculated that at least 25 knots ground speed would be needed for the test to work properly, so it was decided to accelerate to that speed and then fire the rockets. But how to accelerate to the required speed without a working prop? A standard pickup truck fitted with a long rope pulled out on the runway in front of the propless Ercoupe. Boushey

grabbed the rope like a rodeo bull rider and held on while the truck accelerated to the calculated 25 knots. Boushey released the rope, fired the rockets, now twice as loud and smoky, and hurtled 10 feet into the air on rocket power alone. He had enough runway left to make a safe landing straight ahead. Additional testing continued in both solid and liquid auxiliary propulsion for the next decade.²⁷ Arnold pushed this program because it demonstrated potential for increasing the combat range of his heavy bombers.

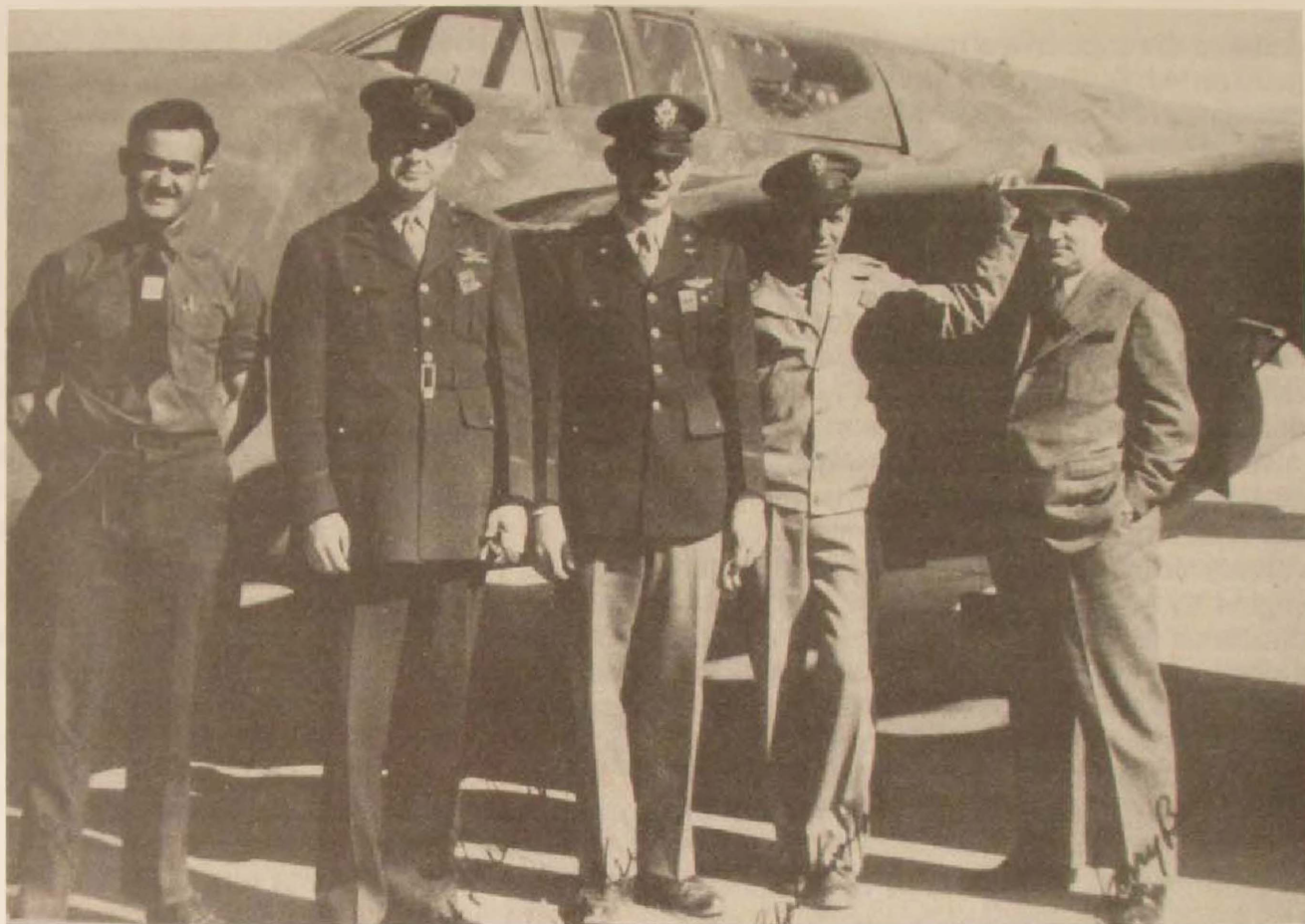
Although not initially the most spectacular of all the Air Corps's scientific and technological research programs, Arnold's direct involvement in bringing the British Whittle jet engine to America beginning in April 1941 illustrated his personal commitment to technology and its application to the American war effort. As in 1913, Arnold did not care where the technology came from. If it benefited the Air Corps, he wanted it. So it was with the Whittle engine and the development of American jet aircraft.²⁸

Throughout 1938, Arnold had received Lindbergh's reports which suggested that some German pursuit planes were capable of speeds exceeding 400 MPH.²⁹ He had also assigned Lindbergh to the Kilner Board in an effort to project R&D requirements for the Air Corps. Whether Lindbergh had been "duped" by the Nazis on preplanned factory tours during his visits to Germany turned out to be irrelevant. Lindbergh had convinced Arnold that the Air Corps should begin research that would lead to a 500 MPH fighter. Arnold's constant quest for better technologies and equipment forced a confrontation with George W. Lewis, director of aeronautical research at NACA. Hap, at that moment not very happy, wanted to know "why . . . we [in the Army Air Corps] haven't got one [a 400-plus MPH fighter]." Lewis replied, "Because you haven't ordered one."³⁰ Arnold was furious. A lengthy dialogue followed during which Arnold discovered that Lewis was well aware that the technology to build faster planes had existed for some time. Lewis had not suggested building one because it was not NACA's function to dictate what the military

should or should not build. To Arnold, NACA was not acting like a true team player. The general might have even considered Lewis's attitude unpatriotic.³¹ This incident overshadowed the many successful programs NACA had undertaken during Arnold's tenure.

Having lost trust in the workings and leadership of NACA, Arnold resorted to other civilian agencies in an effort to capitalize on Whittle's jet engine information made available to him by the combined approval of Lord Beaverbrook, who was in charge of all production; Sir Henry Tizard, scientific expert; Col Moore-Barbazon, minister of aircraft production; and Air Chief Marshal Sir Charles Portal in April 1941. Although NACA took steps toward jet engine development directed by the 1941 Durand Board (formed in March 1941 at Arnold's request), importing the plans and an engine from Britain was the general's personal achievement.³² In September, he took these plans and created a separate, supersecret production team that included Larry Bell of Bell Aircraft and Donald F. "Truly" Warner of General Electric (GE). GE was selected because of previous work done on "turbo-supercharging" (under the guidance of Sanford Moss), a process similar in nature to the turbojet concept.³³ The project military representative was Col Benjamin Chidlaw. This Bell/GE team was so secret that only 15 men at Wright Field knew of its existence. The contracts with GE had been handwritten and transmitted in person by Arnold's personal liaison, Maj Donald J. Keirn. Keirn recalled that the first GE contract was for a turboprop which was being built in Schenectady, New York, while the Whittle engine project was undertaken at West Lynn, Massachusetts. The three Durand Board engine teams—one at Westinghouse, a second sponsored by the NACA, and the first GE project—were unaware that Arnold had directed Chidlaw to get a jet in the air under absolute secrecy.³⁴ "Gen. Arnold," Chidlaw asked bewildered, "How do you keep the Empire State Building a secret?" Sternly, Arnold replied, "You keep it a secret."³⁵

The supersecret engine was assembled at Lynn, Massachusetts, under the project title "Super-charger Type #1." At Larry Bell's fac-



AFMCMO, FROM THE GE COLLECTION

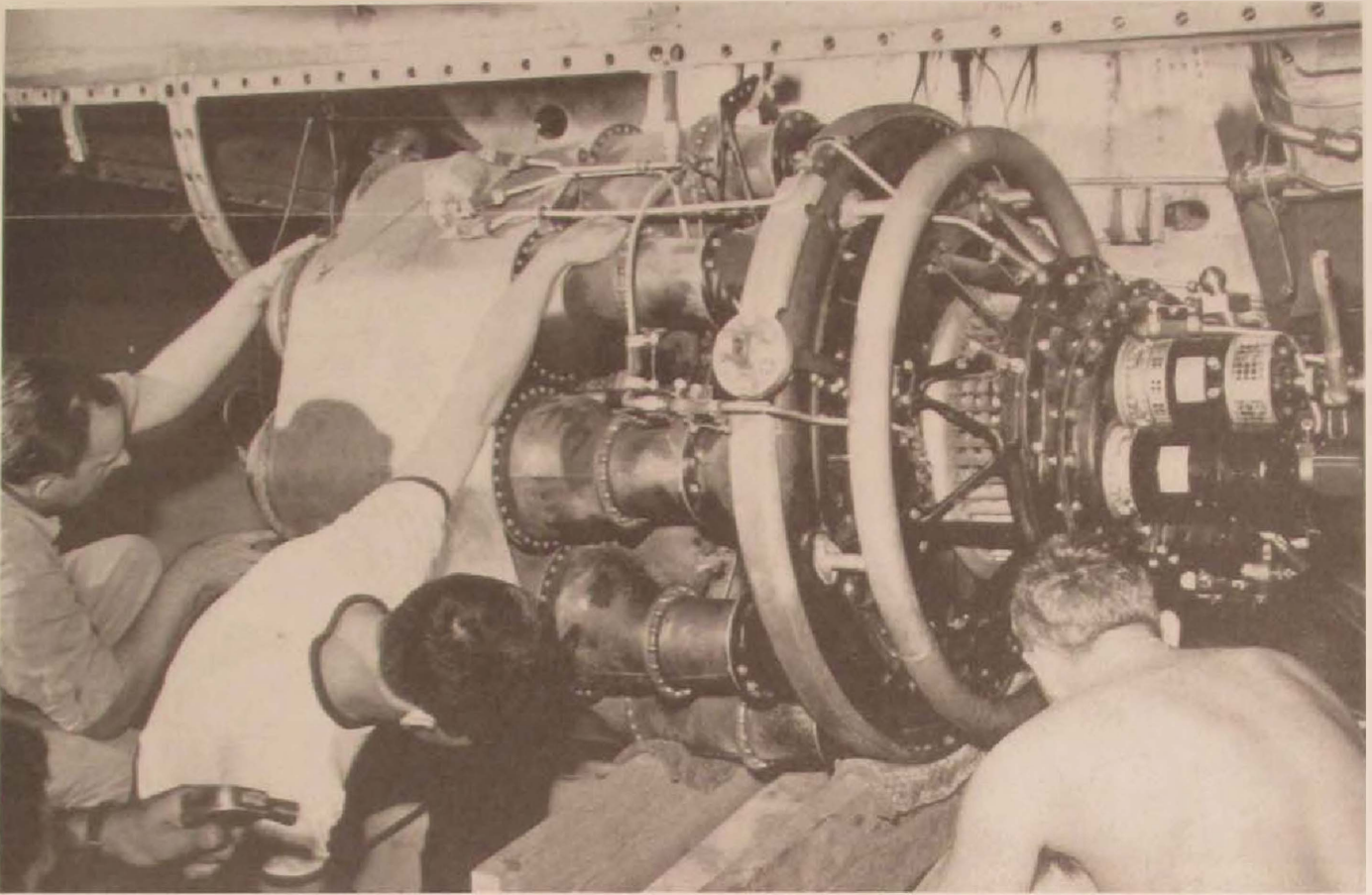
The "Supersecret" XP-59A team: Bob Stanley, Bell test pilot; Col Benjamin Chidlaw, program director; Maj Don Keim and Maj Ralph Swofford, liaison officers; and Larry Bell.

tory, the airframe project received an old program number so as not to arouse any suspicion. The workers themselves were segregated from each other so that even the members of the team were not totally sure what they were building. The Army Air Forces (AAF) officer who was to be the first American military man to fly a jet, Col Laurence "Bill" Craigie, never revealed his mission, even to his wife, who found out about it in January 1944 with the rest of the country. Craigie recalled that "the only project I know of that was more secret was the atomic bomb."³⁶

On 2 October 1942, the Bell XP-59A flew three times. The first two flights were piloted by Bob Stanley, a Bell test pilot and Caltech graduate, and the third was flown by Colonel Craigie. In actuality, the plane had flown for the first time during taxi tests on 30 September and again on 1 October, but Larry Bell

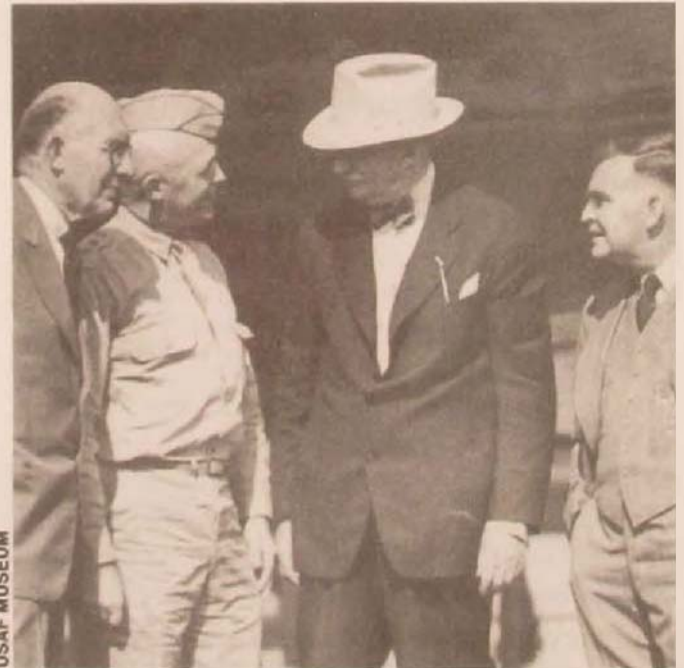
insisted that the first flight was not "official" until the brass hats were present as witnesses.³⁷ The internal "cloak of secrecy" was so effective that the general NACA membership had heard only rumors of the technology. Only William Durand himself had been informed of Arnold's Whittle project but he was sworn to secrecy. The day the XP-59A flew, he was the only member of NACA who knew of the existence of the plane. In fact, he was at Muroc Dry Lake, California, the day of the first "official" flight.³⁸

It was not until 7 January 1944 that the rest of America, including Mrs. Craigie, found out about the flight. The *Washington Post* carried the inaccurate front-page headline "U.S. Making Rocket War Plane," which detailed the events of 15 months earlier.³⁹ The development of the XP-59A can legitimately be called the first Air Force "skunk works" project.

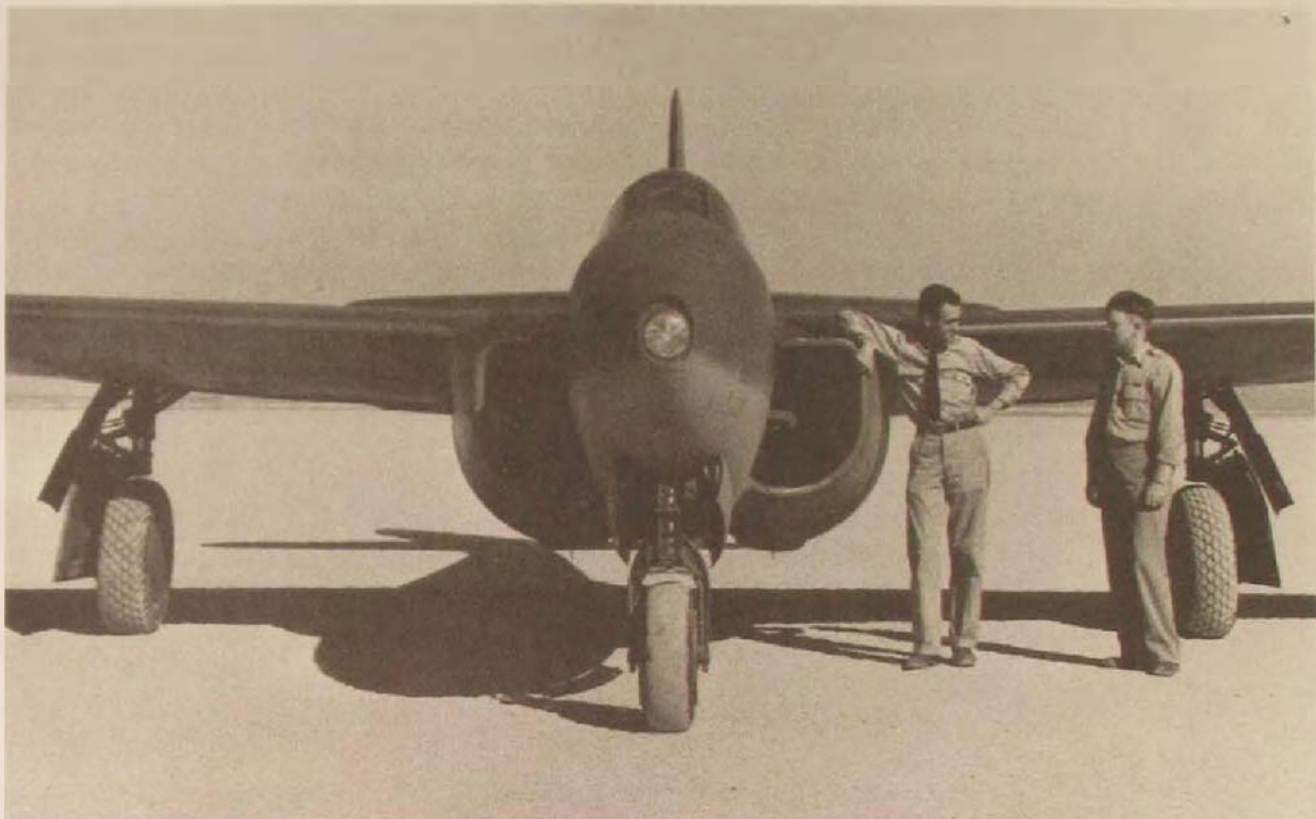


The XP-59A's I-A engine, "Son of Whittle."

America's development of the jet engine was a typical example of how Arnold utilized technological advancement in attempting to improve Army Air Forces capability. Once aware of a particular technology, he decided whether or not it was applicable to AAF airplanes or their combat capability. As late as January 1939, for example, Arnold had stated, "Because of the high efficiency and flexibility of operation of the controllable propeller as it exists today, it will be many years before any means of propulsion, such as rocket or jet propulsion, can be expected on a large scale."⁴⁰ But British engine developments, coupled with the underpinnings of early American turbojet concepts, and the promising work done at GALCIT Project #1 during 1940, convinced him that jets and rockets held significant potential for his air forces. Arnold always wanted the most advanced capabilities for his airplanes. But during the period 1939-1944, he wanted them within two years, no later.⁴¹



Charles "Boss" Kettering (left), Arnold, and William S. Knudsen discuss production plans on 19 August 1940. The massive effort at times surprised even Arnold.



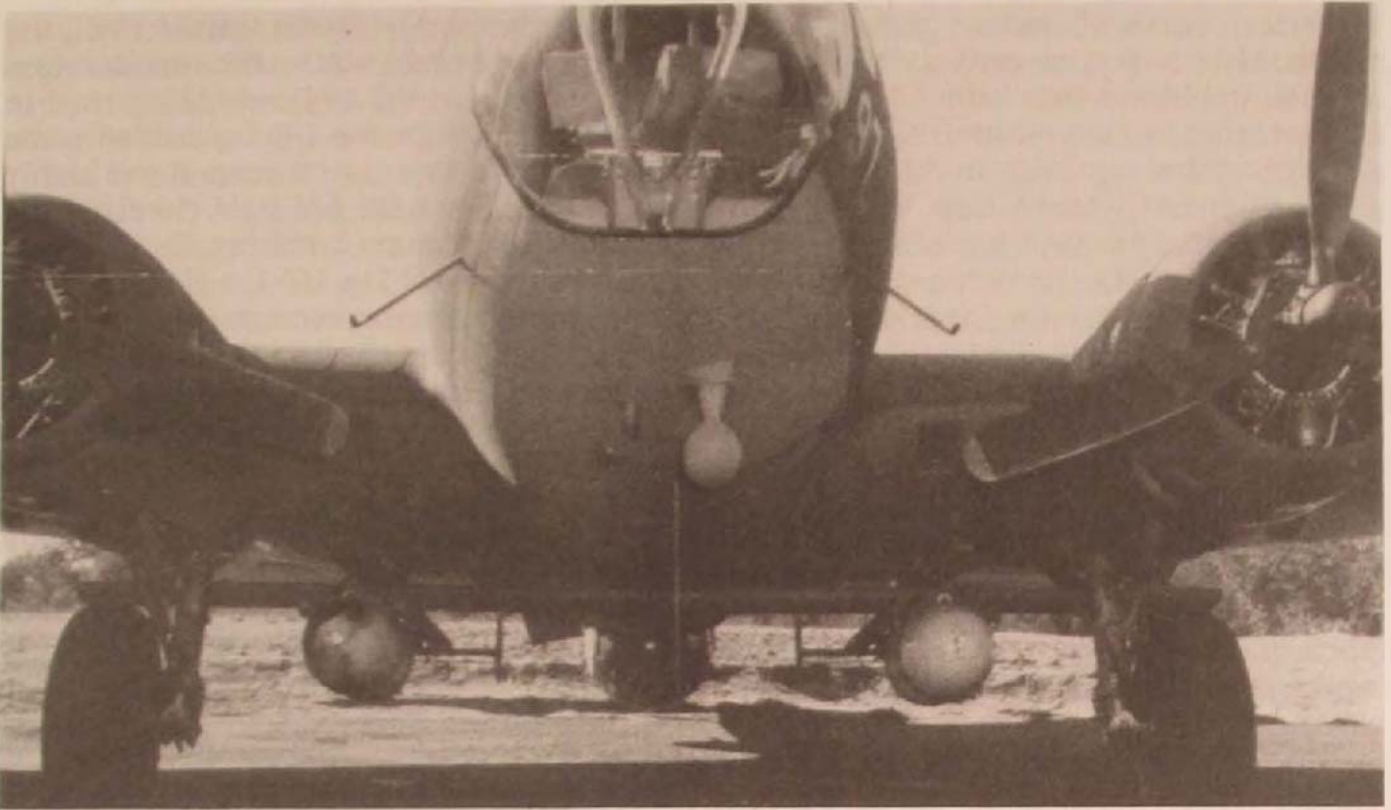
AFM/CHO

Bob Stanley and Col Laurence "Bill" Craigie flew the first three flights of the XP-59A "officially" on 2 October 1942 at Muroc Dry Lake, California.

Once convinced of a program's efficacy, he gathered trusted scientists, engineers, and officers. Then, using the force of his personality, he directed what he wanted done with the technology. His teams were given considerable latitude in accomplishing the task and rarely failed to produce results.⁴² Some who had served on these "Hap-directed" task forces had private reservations about specified tasks. "You never thought the things he asked you to do were possible," one Douglas Aircraft engineer recalled, "but then you went out and did them."⁴³ Colonel Chidlaw's XP-59A team was one glittering example.

The XP-59A was an exceptional program in that it seemed to violate Arnold's general tendency to expend R&D efforts only on current production equipment from late 1939 until mid-1944. But Arnold saw the possibility for unbelievable capability from continuous research concerning jets. He envisioned aircraft capable of speeds exceeding 1,000 MPH and, despite criticism, completely believed in

the future of jets. Arnold, having seen the British Gloster Meteor during its initial ground tests, realized that the first jets would not be the production models. Instead, he felt it more important to get a jet aircraft flying and then work on the modifications necessary to make it combat worthy. Perhaps he remembered the lesson of Billy Mitchell's Barling bomber, which had provided vital data and production techniques even though it was an operational failure. Additionally, Arnold was able to get a substantial jump on the program by promising the British an improved formula for high-speed, high-temperature turbine blades in return for all available British jet experimental data and an engine. As it stood, jet aircraft did not have the necessary range to be of much value to the AAF, who would soon be flying missions from England to Germany. Consequently, until the problem of limited range was solved, the production effort was not pushed as hard as that of combat-proven aircraft. For that reason, American jets did not



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The GB-1 was specifically designed to keep aircraft away from enemy flak belts. Two were loaded on specially modified B-17s, and, although ineffective, were a stepping stone to "smart bombs."

contribute directly to the World War II victory.⁴⁴ Arnold's push for the B-29 Superfortress can be better understood, however, in light of his perception of the importance of combat range to mission success. This was particularly true for operations in the Pacific, although the airplane was not designed specifically for that theater.

Another Hap-directed project was established while the XP-59A was under development. In May 1942, Arnold ordered the formation of the Sea-Search Attack Development Unit (SADU). This unit was composed of scientists from MIT, the National Defense Research Committee (NDRC), and operations personnel from the Navy and the Army Air Forces. Total control of all assets having to do with submarine destruction—research and development, production, even combat execution—fell to this organization. Arnold viewed this specific task with such high priority that he attached the unit directly under his command, eliminating all bureaucratic obstacles to mission accomplishment.⁴⁵ Having seen



USAF MUSEUM

"Weary Willie" (sometimes "Weary Willy") aircraft served a dual purpose: they eliminated useless surplus from the inventory and furthered the development of remotely piloted missiles.

"American-version" radars at Fort Monmouth, New Jersey, as early as May 1937, General Arnold was satisfied with the potential that radar had demonstrated and pushed hard for combat capability in that area.

The multicavity magnetron, which made shortwave radar practical, was a British invention. In April 1942, Dr. Edward L. Bowles, from the MIT Radiation Laboratory (RAD-LAB), was assigned as a special consultant for radar installations. Arnold's commitment and Bowles's expertise helped make SADU an extremely effective unit. Arnold reminded Spaatz of the ultimate impact of SADU and the development of microwave radar in a letter after the war. "The use of microwave search radars during the campaign against the submarine was mainly instrumental in ending the menace of the U-boats. Germany had no comparable radar, or any countermeasures against it. In fact, for a long time the Germans were not even aware of what it was that was revealing the position of their subs so frequently."⁴⁶ As Arnold counted on Caltech for much of his aeronautical advice, he depended on MIT for similar advice concerning electronic advances, particularly radar.

In fact, it was German (and eventually Japanese) treachery in the conduct of the war, particularly with U-boats, that jolted Arnold into an attempt to rekindle an earlier pet project: the "Flying Bug." Although using the World War I surplus Bugs was actively considered during the war, the idea was finally dismissed due to the relatively short range of the weapon (only 200 miles). Other projects, however, did result from this initial rekindling. In the fall of 1939, Arnold wrote his old friend Charles Kettering, now vice president of General Motors, wanting to develop "glide bombs" to be used if war came. Arnold envisioned a device that could be used by the hundreds that might keep his pilots away from enemy flak barrages. He wanted the weapon to glide one mile for each one thousand feet of altitude, carry a sizable amount of high explosives, have a circular error of probability (CEP) less than one-half mile, and cost less than seven hundred dollars each. Kettering was convinced that it could be

done fairly quickly. By December 1942, the GB-1 (glide bomb) was well under development and by spring 1943 was being used in Europe. Although the GB-1 provided some protection to American airmen, it was highly inaccurate. Since the AAF held closely to the doctrine of precision bombing, the GB-1 was quickly shelved.⁴⁷ The GT-1, a glide torpedo, was somewhat more successful and saw some use in the Pacific theater. The development of the glide bomb series of weapons, which later included radio steering and television cameras, demonstrated one thing very clearly: General Arnold was not completely sold on manned, daylight, precision bombing doctrine.

As the air war progressed, B-17 and B-24 bombers literally began to wear out. These surplus bombers occupied valuable ramp space and even more valuable maintenance time. By late 1943, General Arnold had directed Brig Gen Grandison Gardner's Eglin Field engineers to outfit these "Weary Willies" with automatic pilots so that the airplanes, both B-17s and B-24s, could be filled with TNT or liquid petroleum and remotely flown to enemy targets. The idea behind Project Aphrodite was to crash the orphan aircraft into the target, a large city or industrial complex, detonating the explosives. General Spaatz utilized several of these "guided missiles" in the fall of 1944 against targets in Europe. They were largely unsuccessful because they were easy to shoot down before they reached the target area. At Yalta, shortly after the first Willies were used in combat, the British vetoed further Aphrodite missions because of possible German retaliation to the undeniable "terror" nature of the weapon. Weary Willies were grounded after Yalta, much to General Arnold's disappointment.

Interestingly, Project Aphrodite clearly involved the use of a nonprecision weapon system. Yet, Arnold staunchly supported its development well before Germany launched its first V-1 at England in the early morning hours of 13 June 1944. Not only were Willies capable of carrying large amounts of explosives, using them as guided missiles assured that none would remain in American stock-

piles. Arnold remembered the painful Liberty engine lessons from World War I production days. He didn't want B-17s flying a decade after this war was over as the DH-4 had done.⁴⁸

The importance of Aphrodite was not its impact on the outcome of the war. Arnold had no great hopes for the ultimate decisiveness of these "area bombing" weapons. Rather, Aphrodite demonstrated Arnold's willingness to supplement precision-bombing doctrine in an effort to save the lives of American airmen, particularly since he was feeling confident that the war in Europe was essentially under control by late spring 1944. In a staff memo, Arnold explained that he didn't care if the Willies were actually radio controlled or just pointed at the enemy and allowed to run out of gas.⁴⁹ Aphrodite did provide an opportunity to test new automated piloting technology in a combat situation. Additionally, and more importantly, destroying weary bombers made room for new airplanes that the prescient Arnold knew the air forces would need after the war ended.

Although Arnold was determined to rid the inventory of useless machines, in most combat situations he preferred manned bombers to Willies. In November 1944, Arnold reminded Spaatz of the salvage rules for damaged aircraft: "The accelerated activities of our fighting forces in all theaters makes it increasingly important that we utilize our material resources to the maximum, not only for the sake of the economy, but also in order that the greatest possible pressure be brought to bear against the enemy."⁵⁰ The experienced Arnold realized that to win a war one side must "try and kill as many men and destroy as much property as you can. If you can get mechanical machines to do this, then you are saving lives at the outset."⁵¹ At this point, though willing to try nonprecision methods on occasion, Arnold realized that technology had not surpassed the abilities of manned bombers in accuracy or guile for accomplishing that mission.⁵²

Having established and tested his working pattern, General Arnold began actively planning for the future of airpower. NACA methodology under George Lewis left Arnold feel-

ing let down, particularly in the field of advanced aircraft research.⁵³ And although Wright Field had been vital to AAF production research and problem solving, personnel shortages made long-range studies a simple impossibility. Additionally, Arnold said he was irritated with the Materiel Division engineers' no-can-do attitude. Perhaps frustrated was a better description. Arnold once told a gathering of Materiel Division engineers, "I wish some of you would get in and help me row this boat. I can't do it alone."⁵⁴ Finally, any request for formal assistance from Vannevar Bush, now chief of the Office of Scientific Research and Development (OSRD), was not an option for Arnold—even though OSRD and its predecessor, the NDRC, had played a vital role during the war, particularly with radar and the development of the atomic bomb. Bush's attitude toward the JATO project had proved to Arnold that, although an excellent electrical engineer, Bush was no visionary. Bush once told Major Keirn, Whittle project liaison officer, that the AAF "would be further along with the jet engine had the NDRC been brought into the jet engine business," sarcastically adding, "but who am I to argue with Hap Arnold?"⁵⁵ The general and the OSRD chief held widely different views concerning military involvement in R&D that appeared diametrically opposed. Bush believed that the military should be excluded from any type of research other than production R&D. Arnold was adamant in the belief that long-term R&D also required military input lest the civilian world drive the development and implementation of airpower doctrine and policy. Their personal differences likely began to develop in 1938–1939 when Bush held the reins at NACA and Arnold served on its Executive Committee. It appeared that they just did not like each other.

For the most part, the problems discussed here have been related to the immediate needs of the AAF. The Whittle jet engine problem was, perhaps, the only exception. Arnold likely justified the project based on his acquisition of British plans and hardware, which essentially brought the Army Air Forces up to speed with the rest of the world. While deal-



AFMCHO, FROM THE GE COLLECTION

Left to right: Maj Gen Ben Chidlaw, Col Edward Deeds, Orville Wright, and Brig Gen Bill Craigie (the first military jet pilot) watch a P-80 being flown by a young Chuck Yeager at the AAF Fair at Wright Field in 1945. Orville had seen the Wrights' invention evolve into an immense technological system.

ing with these "short-term" research problems, which always involved available technologies, Arnold had formed strong opinions about the major participants in the American scientific and research communities. Lack of faith in NACA, exasperation with Wright Field, and the incompatibility of OSRD/NDRC philosophy with Arnold's convictions convinced him that, if he were to have an effective long-term plan for the AAF, an independent expert panel of free-thinking civilian scientists, given initial direction by the AAF, was the only answer. As he had said in different ways on several occasions, the future of American supremacy in the air depended on the brains and efforts of engineers and scientists. Now that the European war was winding down and the air war was definitely won, Arnold turned his thoughts to the distant future of the Army Air Forces. His call to action came in the form of a memo from an

old friend and supporter of airpower, Gen George C. Marshall. On 26 July 1944, Marshall wrote: "The AAF should now assume responsibility for research, development, and development procurement."⁵⁶ The impatient Arnold saw an immediate opportunity to act. Arnold had already decided that America's leading aeronautical scientist, Theodore von Kármán, whom he had known and trusted since the early 1930s, was the man he needed at the head of the Army Air Force Long Range Development Program.⁵⁷ In November 1944, the Kármán Committee became the AAF Scientific Advisory Group (SAG). In December 1945, SAG published *Toward New Horizons*, a report that served as Arnold's tool for linking technological advancement to the development of the US Air Force.

In summarizing Arnold's stance on technological advancement and R&D within the Air Corps, three distinct time periods are

revealed. Prior to the fall of 1939, Arnold supported long-term research that held promise for the entire aviation community over the coming decades. Immediately after the German invasion of Poland, Arnold shifted the posture of research and development in the Air Corps away from long-term projects toward short-term, quick-impact, operational-oriented R&D.⁵⁸ With few exceptions, Arnold's efforts in production and production R&D through 1944 provided massive fleets of technically advanced aircraft and weapons that were used by Americans and the Allies. The jet airplane—a bending of his “production R&D only” rule during the war years—held so much potential that Arnold felt obligated to take the risk involved in research and development in that area. Arnold himself saw jet aircraft as a “signpost to the future” rather than a tool for the present.⁵⁹

Arnold's personal contacts within the scientific/industrial sector, his World War I experi-

ence, as well as his tour at the Industrial College of the Army, were vital to the eventual success of American industrial mobilization efforts. He believed that it was more important to fight the war with the best weapons at hand, which included technological refinement for those existing systems, than to hang hopes on futuristic weapons that might not make it into the combat zone in time to make an impact on the outcome of the war. Arnold's pragmatism during the war (fall 1939 to late spring 1944) reflected the American tradition of empiricism, nicely explained by Tom Hughes in *American Genesis*. When Arnold felt that the inevitable victory was assured (late spring—early summer 1944), he once again turned his efforts to long-term planning for the Army Air Forces. His decisions—which shifted the basic direction of the Army Air Forces during the war years toward, then away, then back toward long-term R&D—established the scientific and technological foundation of today's modern Air Force. □

Notes

1. H. H. Arnold to Mrs. S. H. Pool (Bee's mother), 22 February 1926, Robert Arnold Collection, Sonoma, California; and Herman S. Wolk, *Planning and Organizing the Postwar Air Force, 1943-1947* (Washington, D.C.: Office of Air Force History, 1984), 20-31.

2. “Report of Special Board Appointed to Make up a Balanced Air Program,” 5 August 1936, US Air Force Historical Research Agency (hereafter USAFHRA), 145.93-96; also see Wolk, 12-20.

3. Address of Brig Gen H. H. Arnold, assistant chief of the Air Corps, at the Western Aviation Planning Conference, 23 September 1937, USAFHRA, 168.3952-119. This belief in research may have been the result of earlier association with Dr. Robert Millikan. In 1934, Millikan had warned military officials through the executive Scientific Advisory Board, established in the summer of 1933, that “research is a peace-time thing and . . . moves too slowly to be done after you get into trouble.” Quoted in Michael S. Sherry, *Planning for the Next War: American Plans for Postwar Defense, 1941-45* (New Haven: Yale University Press, 1977), 123.

4. Richard P. Hallion, *Legacy of Flight: The Guggenheim Contribution to American Aviation* (Seattle: University of Washington Press, 1977). This book summarizes the entire story of the Guggenheim influence on the early years of American aviation.

5. In another speech, “Air Lessons from Current Wars,” before the Bond Club, Philadelphia, Pennsylvania, 25 March 1938, Arnold emphasized the foundations of airpower as not just planes but also “the number of flyers, mechanics, and skilled artisans available . . . and the size and character of the ground establishments we lump under the general name *air bases*.” Ira C. Eaker Papers, Library of Congress (LOC), Washington, D.C., box 58, Arnold speeches (hereafter Eaker Papers).

6. Michael S. Sherry, *The Rise of American Air Power: The Creation of Armageddon* (New Haven: Yale University Press, 1987), 200-201. Also see Stuart L. Leslie, *The Cold War and American Science: The Military-Industrial-Academic Complex at MIT and Stanford* (New York: Columbia University Press, 1993).

7. Arnold to Oscar Westover, 18 May 1937, Murray Green Collection (hereafter MGC), LOC, box 55. JATO is pronounced *jay'toe*; for a list of NACA projects, see the NACA Executive Meeting minutes, National Archives Annex, College Park, Md.

8. Michael H. Gorn, *The Universal Man: Theodore von Kármán's Life in Aeronautics* (Washington, D.C.: Smithsonian Institution Press, 1992), 84; Ira C. Eaker, oral interview, 19 October 1978, USAF Academy Oral Interview series, USAFA. Eaker verified that Arnold and his staff reviewed intelligence reports on the air battles of the Spanish Civil War. One of Arnold's 1938 speeches covered the war in great detail and concentrated on the uses of airpower.

9. Maj Gen Henry H. Arnold, chief of the Air Corps, a message from the chief to the corps, 30 September 1938. National Air and Space Museum Archives, Arnold folder, Washington, D.C. (Hereafter NASM Archives). This message was Arnold's first as chief following Westover's death. Early influences on his quick action came from individuals like Lindbergh, Kármán, and even an informant who met with Arnold in Alaska during the 1934 B-10 flight.

10. Theodore von Kármán and Lee Edson, *The Wind and Beyond* (Boston: Little, Brown and Co., 1967), 243; also Kármán, oral interview by D. Shaughnessy, 27 January 1960, USAFA Special Collections, 2.

11. There are detailed accounts of this meeting in the Robert Millikan Collection, LOC, 9.15, roll 10. In a letter from Mason to

Arnold, 5 January 1939, Mason summed up the results of the NAS meeting of the "long hairs."

12. Henry H. Arnold, *Global Mission* (New York: Harper and Brothers, 1949), 65-166; see Sherry, *The Rise of American Air Power*, 186-88.

13. Charles Lindbergh to Arnold, letter, subject: US Airplane Development, 29 November 1938, USAFHRA, 168.65-40.

14. Wesley Frank Craven and James Lea Cate, eds., *The Army Air Forces in World War II*, vol. 6, *Men and Planes* (1949; new imprint, Washington, D.C.: Office of Air Force History, 1983), 178-80.

15. Leonard S. Reich, "From the Spirit of St. Louis to the SST: Charles Lindbergh, Technology, and Environment," *Technology and Culture* 36 (April 1995): 365-67; also see Robert E. Herstein, *Roosevelt and Hitler: Prelude to War* (New York: Paragon House, 1989), 226-31; and Jeffery S. Underwood, *The Wings of Democracy: The Influence of Air Power on the Roosevelt Administration, 1933-1941* (College Station: Texas A&M Press, 1991), 111.

16. Charles A. Lindbergh, *Autobiography of Values* (New York: Harcourt Brace Jovanovich, Inc., 1976), 190-92.

17. "Performance and Development Trends in Military Aircraft and Accessories," speech given by Maj Gen H. H. Arnold before the Society of Automotive Engineers, Detroit, Michigan, 11 January 1939, 15-16, USAFHRA, 168.3952-119.

18. H.H. Arnold to the assistant secretary of war, memorandum, subject: Funding for Research and Development, 2 March 1939, USAFHRA, 167.8-33.

19. Arnold to Maj Carl F. Greene, letter (under NACA letterhead), subject: Assignment as Liaison Official, 1938, Kármán Collection; and NACA Executive Committee Meeting minutes, National Archives, College Park Annex, College Park, Maryland. Arnold served on the Executive (Main) Committee from October 1938 to April 1946.

20. Arnold to Gen Carl A. Spaatz, letter, subject: American Production Efforts in World War II, 9 November 1946, in Spaatz Papers, box 256. Arnold's detailed comments are in response to a news article critical of Air Force leadership during the war. Arnold feared that the hostile tone might influence funding in the Congress and warned Spaatz to read it carefully.

21. Maj Gen H. H. Arnold and Col Ira C. Eaker, *Winged Warfare* (New York: Harper & Brothers, 1941), 239. Arnold summed up what would become his wartime R&D philosophy: "Sacrifice some quality to get sufficient quantity to supply all fighting units. Never follow the mirage, looking for the perfect airplane, to a point where fighting squadrons are deficient in numbers of fighting planes."

22. Arnold to Lt Gen Frank Andrews, 29 March 1943, Andrews Papers, box 1, Library of Congress.

23. Arnold to Ira C. Eaker, 8 August 1943, Eaker Papers, box 50. "The more I think of our recent interchange of messages regarding German countermeasures against your bomber formations, the more I am convinced that you should have on your staff a free thinking technical man who is not tied down with current logistics, current modifications, and current procedure in any way. This man's main mission in life should be to sit there and weigh the information received . . . then advise you what action should be taken by you to outsmart the Germans. . . . This technician should also have a staff of two or three more scientists who would help him diagnose German moves and the motives behind them. At this writing, I have nobody in mind at all for this long-haired technical job, but if you think well of the plan I will rake up somebody and send him over to you, and I will also send the assistant scientists to sit there and help him." This philosophy carried over into his directions to Kármán's mission in the fall of 1944.

24. C. B. Millikan and H. J. Stewart, "Aerodynamic Analysis of Take-Off and Initial Climb as Affected by Auxiliary Jet Propulsion," 14 January 1941, original report in the custody of Dr. Homer Joe Stewart, Altadena, California.

25. Dr. Homer Joe Stewart, interviewed by author, 21 July 1995, Altadena, California.

26. Dr. Durand had been named chairman of the Jet Propulsion Committee on 24 March 1941. This committee, instigated by Arnold and created by Vannevar Bush, the NACA Main Committee chairman, became known as the Durand Board. See Alex Roland's *Model Research: The National Advisory Committee for Aeronautics, 1915-1958* (Washington, D.C.: National Aeronautics and Space Agency, 1985), 189.

27. Stewart interview. Dr. Stewart confirmed the JATO story told in Kármán's autobiography, except he corrected the fact that Boushey was a captain, not a lieutenant; Kármán and Edson, 249-51; photos from the Jet Propulsion Lab Archives in Pasadena revealed the safety poster sayings.

28. The story of why America did not develop the jet engine earlier may be traced to its tendency toward utilitarian uses for "science." The story, a fascinating study in the evolution of American science, is expertly covered by Edward Constant's *The Origins of the Turbojet Revolution* (Baltimore: Johns Hopkins University Press, 1981).

29. Charles Lindbergh to Arnold, letter, subject: JATO Test, 29 November 1938, USAFHRA, 168.65-40.

30. John F. Victory, oral interview, no. 210A, USAF Academy Oral Interviews, USAFA, Colorado. Victory was the first employee of NACA in 1915 and served as secretary throughout the period of this study.

31. *Ibid.* The story is too long to reproduce, but essentially Lewis sat at his desk in Washington and strictly adhered to the "advisory mission" of NACA. It was rare that NACA offered to expedite research or offer data without being asked by the Army Air Corps first. Arnold certainly saw this attitude as an obstacle to rapidly expanding the size and capability of the air arm; Hugh L. Dryden, Columbia University Oral History Report (CUOHR), 23. Dr. Dryden substantiates the basis of the 500 MPH story.

32. Vannevar Bush to Jerome Hunsaker, letter, subject: Jet Engine Development, 10 March 1941, Bush Papers, box 53, Hunsaker Folder, LOC; and *Global Mission*, 242.

33. Maj Gen Frank Carroll, interview with Murray Green, 1 September 1971, Boulder, Colorado, transcript in MGC, roll 12; also James O. Young, "Riding England's Coattails: The U.S. Army Air Forces and the Turbojet Revolution," manuscript (photocopy), Air Force Flight Test Center (AFFTC) History Office, Edwards Air Force Base, Calif., 1995.

34. Maj Gen Donald J. Keirn, interview with Murray Green, 25 September 1970, Delaplane, Va., transcript in MGC, roll 12. Keirn proves that there were two separate engine projects at GE at the same time; also see Roland, *Model Research*, for Durand Committee discussion.

35. Gen Benjamin Chidlaw, interview with Murray Green, 12 December 1969, Colorado Springs, Colo., transcript in MGC, roll 12. The question of why the United States was so late entering the jet age is expertly examined in Constant, 150-75 in particular. He cites the American tradition of empiricism as the reason that "radical" technologies were not produced ahead of more theoretically oriented countries like Germany and England.

36. Lt Gen Laurence Craigie, interview with Murray Green, 19 August 1970, Burbank, Calif., transcript in MGC, roll 12. Additional information on the Whittle engine can be found in the Arnold Collection, box 47. Walt Bonney, representing Bell Aircraft Corporation, was tasked to answer a flood of calls that resulted after the *Washington Post* story was released on 7 January 1944. In his press release, he emphasized the total secrecy of the project beginning in September 1941. Bonney did write a brief history of jet propulsion to placate the mass inquiries, but the secret nature of jet propulsion was protected. Walt Bonney, Bell Aircraft Corporation, 11 January 1944, NASM Archives, Jet Propulsion folder. Arnold's, "Second Report of the Commanding General of the Army Air Forces to the Secretary of War," 27 February 1945, USAFHRA, 168.03, tells the story from his perspective. "Never has a plane been built in this country under greater secrecy," 76; also Young, "Riding England's Coattails," and Ezra Kotcher, "Our Jet Propelled Fighter," *Air Force* (March 1944), 6-8, 64.

37. Gen Laurence Craigie, USAF, Retired, and Gen Franklin Carroll, USAF, Retired, interviewed by Murray Green, in MGC, roll 12, US Air Force Academy Special Collections. Craven and Cate mistakenly state that Craigie was first to fly the jet; also see Daniel Ford, "Gentlemen, I Give You the Whittle Engine," *Air & Space*, October/November 1992, 88-98.

38. Frank Walter Anderson, *Orders of Magnitude: A History of NACA and NASA, 1915-1976* (Washington, D.C.: National Aeronautics and Space Administration, 1976), 31-48; Roland, 191-92; also Hugh L. Dryden, CUOHR. The original XP-59A has recently been placed in the National Air and Space Museum entryway where it will permanently reside in the company of the Wright Flyer, Apollo 11's command module, and the Bell X-1, to name a few.

39. *Washington Post*, 7 January 1944, 1.

40. Maj Gen H. H. Arnold, "Performance and Development Trends in Military Aircraft and Accessories," address to the Society of Automotive Engineers, Detroit, Michigan, 14, USAFHRA, 3952.119.

41. Young, 12.

42. Laurence S. Kuter, "How Hap Arnold Built the AAF," *Air Force Magazine* (September 1973), 185-89.

43. F. W. Conant, CUOHR, in MGC, roll 12. Conant worked for Donald Douglas during this period—not to be confused with James B. Conant of MIT.

44. Brig Gen Godfrey McHugh, interview with Murray Green, 21 April 1970, Washington, D.C., transcript in MGC, roll 12; Colonel Lyon to Arnold, letter, September 1941, in MGC (Arnold Papers, box 43); Maj Gen Frank Carroll, interview with Murray Green, 1 September 1971, Boulder, Colo., transcript in MGC, roll 12; Arnold interview with T. A. Boyd (range was a major factor in determining which weapons or aircraft to build. The problems for Germany, at least in home defense, did not involve worries about range); and Ford, 88-98.

45. Craven and Cate, vol. 1, *Plans and Early Operations, January 1939 to August 1942*, 550.

46. Arnold to Spaatz, letter, 9 November 1946; excerpt from Stimson Diaries, 1 April 1942, in MGC, roll 12, documents Bowles's assignment as special consultant; Spaatz to Arnold, letter, 1 September 1944; Arnold to Spaatz, letter, 12 September 1944, in MGC, roll 12; Arnold to Oscar F. Westover, letter, 18 May 1937, in MGC.

47. Arnold to Charles Kettering, letter, subject: [GB-1], 3 November 1939, reprinted in MGC 6.38. This letter marked the beginning of controllable missile development, which included powered and nonpowered bombs and missiles of all kinds; Arnold to Spaatz, letter, n.d., in MGC (Spaatz Papers, LOC, box 8, record MM). "Obviously, this is an area weapon," Arnold wrote; Brig Gen Oscar Anderson to George Stratemeyer, memo, 2 April 1943, in MGC (Arnold Papers, box 137); and Craven and Cate, vol. 6, *Men and Planes*, 253-62.

48. Lt Gen Henry Viccellio, interview with Murray Green, 13 May 1970, San Antonio, Tex.; Arnold to George C. Kenney, letter, subject: Surplus B-17s, 25 October 1944; Arnold's War Diary, October 1944-December 1945, LOC. For a summary of Crossbow and Allied countermeasures, see Craven and Cate, vol. 3, *Europe: Argument to V-E Day, January 1944 to May 1945*, 525-46. Jacob Neufeld, in *Ballistic Missiles in the United States Air Force, 1945-1960*, points out that Lt Joseph P. Kennedy Jr., US Navy, was killed while flying a Weary Willie mission (page 10).

49. Lt Gen Fred Dean, interview with Murray Green, 20 February 1973, Hilton Head, S.C., transcript in MGC, roll 12; Arnold to Spaatz, letter, 22 November 1944, reprinted in MGC, roll 12.

50. Arnold staff memo, 2 November 1944, Arnold Papers, box 44; Arnold to Spaatz, letter, 22 November 1944, in MGC, roll 12. The different Willie projects should be clarified at this point. Weary Willie aircraft were flown to the enemy battle lines, then the pilot set the automatic pilot and bailed out in friendly territory. A Willie orphan was totally radio controlled and was remotely launched and guided into enemy territory sometimes from a mother ship that followed it to enemy territory. Aphrodite was also totally radio controlled, normally from the ground.

51. H. H. Arnold, E. L. Bowles, Louis Ridenour, phone transcript, 9 August 1944, in MGC, roll 12.

52. The circular error probable (CEP) for bombs dropped during World War II during American daylight missions was 3,200 feet for a 2,000-pound bomb. During Desert Storm, CEP for the same size bomb using precision guidance was three meters for over 80 percent of the bombs dropped. Dr. Richard P. Hallion, chief Air Force historian, interview with author, 28 August 1995. For an excellent discussion of the meaning of precision, see Stephen L. McFarland, *America's Pursuit of Precision Bombing, 1910-1945* (Washington, D.C.: Smithsonian Institution Press, 1995).

53. Roland, 192. Arnold did not give up on NACA altogether. In 1944 he pressured Donald Marr Nelson to push the construction of the Jet Engine Facility in Cleveland, Ohio. This facility became the test center for the engines that Arnold had kept secret from them in earlier years. Ironically, the facility was named after George Lewis, the research director most directly responsible for Arnold and Kármán's distrust.

54. Grandison Gardner, CUOHR, 11-13, 33. Gardner refers to Arnold's hesitation to use Wright Field engineers for important projects. Tactical research was even taken away from Wright Field and moved to Eglin AFB, Fla., under command of Gardner for this very reason; also see Lt Gen Donald L. Putt, interview by J. C. Hasdorff, 1-3 April 1974, Atherton, Calif., USAFHRA, Oral History K239.0512-724, 24.

55. Maj Gen Donald J. Keirn, interview with Murray Green, 25 September 1970, Delaplane, Va., transcript in MGC, roll 12.

56. Marshall to Arnold and Gen Brehon B. Somervell, 26 July 1944, in MGC, roll 12.

57. Dr. I. A. Getting, interview by author, 9 November 1994. Dr. Getting believed that Arnold had consulted Dr. Edward Bowles before deciding upon Kármán to head the SAG. Arnold respected Bowles's opinion and had been impressed by his work on the SADU. He trusted his views on the direction for science and technology for the Air Force.

58. Arnold and Eaker, *Winged Warfare*, 238-39.

59. H. H. Arnold, "Air Forces in the Atomic Age," in Dexter Masters and Katharine Way, eds., *One World or None* (New York: McGraw-Hill, Co., 1946), 30; and Young. The debate over whether or not Arnold's staff had kept him as well informed concerning jet development in the United States as they could have is a complicated one. His actions in 1940, such as funding the high-speed tunnel at Wright Field, seem to indicate that he was aware of the Kotcher Report of 1939. Remember, too, that these developments would have taken place during what I call Arnold's early "Technology Phase II, September 1939-Spring 1944," when production and production R&D projects took precedence over all other projects. The turbojet engine, in the early days, did not show the potential for completion within the two-year restriction that Arnold imposed on R&D projects. Once the Whittle information became available in April 1941, the American timetable moved dramatically forward, hence Arnold's apparent late push into jet propulsion. Actually, this fit well with his wartime R&D restrictions.



Way Points

Officers of the army are apt in general to write like kitchen maids.

—Lord Palmerston

HERITAGE

Lt Col Karen S. Wilhelm, USAF

OUR HERITAGE WAS written by heroes, both sung and unsung. We honor them with our clichés, but they deserve much more. They deserve to be remembered as they were—with their humanity intact, so we can appreciate their triumphs even more. Their humanity led to mistakes, some of monumental proportions, but they triumphed over all. Briefly then, this is their story.

We trace our heritage to the Wright brothers—Orville and Wilbur—who began this symbiosis of man and machine. Others, such as Octave Chanute and Samuel Langley, were oh-so-close but missed the acclaim. Few people recognized the military potential of this technological wonder. The Army's first permanently assigned pilot was Lt Benjamin Foulois, who learned to fly by correspondence with the Wrights. The mission was reconnaissance, although there were early experiments with machine guns. The fledgling 1st Aero Squadron's initial tactical tasking was to support Gen John "Black Jack" Pershing's expedition to Mexico. Foulois was in command of 10 pilots, 84 enlisted men, and eight planes. Operating in the high winds of the mountain passes of northern Mexico, the squadron's handful of battered JN-1 Jennies never had a chance.

Our first heroes were those daring young men in their flying machines of World War I. The camaraderie of unarmed reconnaissance planes on both sides quickly gave way to pistol shots and handheld bombs. Edward "Eddie" Rickenbacker captured the imagination of the nation, becoming our ace of aces. Raoul Lufbery and Frank Luke, the "Arizona Balloon Buster," also made headlines with their daring exploits. But the public's romance with open cockpits, leather helmets, and silk scarves became the airmen's reality of bitter cold, unreliable engines, and no parachutes. In spite of the hardships, soaring above the earth produced an almost indescribable feeling—captured by a young airman at the beginning of the next war in words yet to be surpassed: "Oh, I have slipped the surly bonds of earth/and danced the skies on laughter-silvered wings. . . ./put out my hand, and touched the face of God."

After the war to end all wars, the country returned to isolationism, and the military returned to the back burner. From the beginning, airmen recognized the need for an independent air arm. After the war, their quest began in earnest. William "Billy" Mitchell was their outspoken advocate, and his vehicle was publicity. Mitchell challenged the Army and Navy on their most cherished doctrines and beat them at their own game. He sank the captured German battleship *Ostfriesland* after the Navy said it couldn't be done. Mitchell's combative nature and refusal to compromise eventually brought matters to a head, and he sacrificed his career in the battle for an independent air arm.

While Mitchell literally assaulted the system, another man worked from within to consolidate what few gains were made. Maj Gen Mason Patrick was appointed chief of the Air Service to bring discipline to the free-spirited flyers. Instead, he quickly earned his wings and adopted their cause. Patrick was a West Point classmate of General Pershing, and his credibility with the Army and Congress was such that they at least had to listen to these new ideas.

Meanwhile, young men such as Frank Andrews, Henry "Hap" Arnold, and Ira Eaker "expanded the envelope" by flying higher, farther, and faster in a never-ending quest for increased capabilities. They experienced both failure (flying the mail) and success (Carl "Tooey" Spaatz setting an endurance record in the *Question Mark*). The theories of Mitchell and other airpower advocates at the Air Corps Tactical School evolved into the dogma of unescorted daylight precision bombing conducted by "battleships of the air," even though we had no such battleships. This concept, espousing as it did an independent mission, dovetailed neatly with the drive for an independent service. By 1934 the concept was reality, as the XB-17 set speed and endurance records, outstripping any pursuit aircraft then possessed by the United States. When the B-17 survived the doctrinal fight with the Army and the funding fight with Congress, most airmen felt that the next war would be won from the air. At the same time, Claire Chennault remained a voice crying in the wilderness for the development of long-range fighter escorts.

War began again, but before we could put theory into practice, production had to catch up. The United States found itself unprepared, as always, and Britain would stand alone for many months before we made a significant contribution.

In 1943 the fledgling Eighth Air Force sent its first B-17s to England and made its first bombing raid just across the English Channel to Rouen, France. The effort grew until it seemed Britain would surely sink under the weight of American men and materiel. In the North African campaign, the Army took one more shot at letting ground commanders control tactical air support. It didn't work—airmen had won. At last, they were independent in fact, if not in name. Unbearable losses at Ploesti, Schweinfurt, and Regensburg drove home the great doctrinal error of unaccompanied

bombers. The British advocated nighttime area bombing, but we waited for long-range escorts to continue the task. At first we had only P-47s with cardboard drop tanks—quickly replaced by metal tanks—but then came the magnificent P-51. Round-the-clock bombing ensued, and raids by a thousand bombers on Cologne and Dresden caused firestorms and tens of thousands of civilian deaths—a portent of things to come.

The Pacific war began on a shoestring, defending the lines of communication between Hawaii and Australia. “Germany first” insured that the European theater got first crack at the B-17s, B-25s, and B-26s coming off the assembly lines in ever-increasing numbers. Japanese Zeros, which could outmaneuver anything the United States had to offer, shot American chauvinism from the skies. James “Jimmy” Doolittle and an intrepid band lifted B-25s from the pitching deck of the carrier *Hornet* and struck Tokyo. The physical damage to the Japanese was negligible, but the psychological damage proved incalculable. The first piece of real estate wrested from the Japanese was Guadalcanal, and the Air Force followed the Marines to the island. Daily missions and nightly bombardments from Japanese ships coming down the “Slot” soon wore our planes, pilots, and ground crews to the bone. The effort expanded, and soon George Kenney’s Fifth Air Force became an integral part of Douglas MacArthur’s island-hopping campaign.

Strategic bombardment played its role in the Pacific as well as in Europe. Twentieth Air Force began inauspiciously, flying missions from China, using B-17s to fly fuel from India to China, and then returning to ferry the bombs over. The investment far outweighed the return. After engineers manufactured bases from jungle coral on Guam and Saipan and B-29s arrived fresh from the factories, the effort began in earnest.

Again we adapted doctrine to reality when high-altitude precision bombing proved ineffective. Gen Curtis LeMay initiated low-level incendiary attacks whose firestorms destroyed the hearts of Japanese cities. Waiting in the wings was the 509th Bombardment Group, Col Paul Tibbets, and a very special weapon—one that caused its creator, Robert Oppenheimer, to murmur a line from the *Bhagavad Gita*: “I am become death, the destroyer of worlds.”

For every famous name—Chennault, LeMay, Richard Bong—there were millions more who were not famous. The courage of the nation was boundless and took many forms: flying a straight-and-level bomb run into the teeth of German flak, scrambling fighters against overwhelming odds over Port Moresby, and nursing unarmed “Gooney Birds” over the “Hump.” The scenes in the movie *Twelve O’Clock High* say it all—ground crews working all night and silently waiting all day to count the Flying Fortresses as they landed. Hap Arnold bought hundreds of B-29s before the test model was ever flown. “Rosie the Riveter” sent her man off to war and then built the planes he flew—and Jacqueline “Jackie” Cochran and the Women’s Airforce Service Pilots flew them where they were needed. Innovation became the hallmark of the day, from scientists on the

Manhattan Project, to developers of the Norden bombsight; from ground crews who put so many guns on a B-26 that it became an A-26, to people who used a railroad rail to repair a broken main spar in a B-17; from aircrews who countered new enemy tactics and capabilities as they arose, to a crew who used salad oil as an engine lubricant to bring a stricken C-47 home.

Inevitably, the weight of numbers issuing from the "arsenal of democracy" overwhelmed the battered enemies, and demobilization couldn't happen fast enough to suit Americans. Millions came home, while thoughtful people, in and out of government, pondered the changes wrought at Hiroshima and Nagasaki. For airmen, fact became reality when the Air Force became an independent service at last. In 1948 people who were our enemies three years earlier became allies, and vice versa, as the Soviets cut off Berlin from the outside world. "LeMay's Coal and Feed Company" supplied the city as Gen William Tunner organized "Operation Vittles"—airlift on an unprecedented scale. C-47s and C-54s took off every three minutes, flying with five hundred feet of vertical separation through some of the worst weather imaginable. A lieutenant named Halverson dropped candy on miniature parachutes to children at the end of the runway. Men died in peacetime, but the blockade was broken—the fledgling Air Force had its first triumph and first lessons learned.

When North Korea invaded South Korea in 1950, we were as unprepared as ever. The United Nations "police action" was a war by any other name, and the United States had the leading role. The Air Force counted as its missions interdiction, close air support, and air superiority. The aerial duel became higher, farther, and faster as jet fighters entered the combat arena. F-86s amassed a 15-to-one kill ratio against Chinese MiG-15s, whose only recourse was flight across the Yalu River.

The hot war ended, but the cold one continued. Strategic Air Command came into its own with B-52s on continuous airborne alert, and KC-97s and the new KC-135s provided global capability. *Sputnik 1* launched the space age, and intercontinental ballistic missiles brought terms like *mutual assured destruction* and *strategic deterrence* into vogue. As crisis followed crisis—the downing of the U-2 piloted by Francis Gary Powers and the discovery of Russian missiles in Cuba—the people of the world built bomb shelters in their backyards. Charles "Chuck" Yeager broke the sound barrier in a stubby little airplane, and seven young Mercury astronauts became instant heroes.

In contrast to our previous wars, Vietnam sucked us in so gradually we hardly knew it. We conducted the air war against an enemy who was everywhere—and nowhere. The leaders in Washington selected the targets, and operations called Rolling Thunder and Bullet Shot achieved next to nothing. Vietnam became a war of cynics. "Puff the Magic Dragon" killed trucks, and "BUFFs" brought "death from above." Hanoi became the most heavily defended real estate in the world. Wild Weasels suppressed

surface-to-air missiles in front of the strike missions. Linebacker I and II flew B-52s in trail at such regular altitudes and intervals that even the most inept shooters could have downed them. Steve Ritchey, Chuck DeBellevue, and Jeffrey Feinstein became aces. Other airmen became prisoners of war—with no inkling of when the end would come. After enduring unspeakable horrors, men like Robinson Risner and Jeremiah Denton came home with honor and dignity. A captain screamed at his tormentors, "My name is Lance Peter Sijan!" and said no more. We gave him a medal and named a building for him—posthumously.

Peace came, finally. Austerity and the all-volunteer force meant doing more with less. As Vietnam slowly faded into history, the military healed itself and its relationship with the nation. Massive rebuilding followed the lean years—the F-15, F-16, B-1, B-2, F-117, and C-17 entered the inventory, while veterans like the B-52, KC-135, and C-141 continued to fly.

We all rejoiced when the Berlin Wall came down—and turned our attention to lesser bullies. Saddam Hussein decided to test our resolve and found himself facing the full fury of the most capable air force on earth. The Air Force team provided a textbook illustration of "Global Reach, Global Power" in action. Air Mobility Command helped move the equivalent of the city of Abilene—people, household goods, and vehicles—to the desert. After plans came together from Col John Warden's Checkmate directorate, as well as from Ninth Air Force and the "Black Hole," Gen Charles "Chuck" Horner and Gen Buster Glosson put them into action. In the end, a hundred-hour ground war followed 40 days of pounding from the air—and the world was astonished at the scope and apparent ease of the victory.

War fighters quickly returned to peacetime duties of unprecedented range, from enforcing no-fly zones, to conducting precision strikes designed to keep the peace, to delivering relief supplies to the far reaches of the globe. We don't know what the future holds, but we'll be there—doing the mission.

What, then, do we say of our heritage? What have Foulois, Mitchell, Eaker, Sijan, and those nameless others given us? An ideal? No—they were not ideal; they were imperfect, as we are. They've given us a history of hope, courage, and innovation. They've given us a heritage to be proud of—to celebrate and live up to. They've given us a realization that even though we exist only through technology, the technology is not enough. It takes us—poor, fallible human beings—to make the force a reality. They've given us this incongruous joining of flight and its awesome, destructive capabilities. They've given us freedom to dream and think—in peace.

Travis AFB, California

CONVENTIONALLY ARMED ICBMs

Maj Robert Gibson, USAF

The means of destruction are approaching perfection with frightful rapidity.

—Henri de Jomini

"A NEW ERA is upon us. The Cold War is over. The dissolution of the Soviet empire has radically transformed the security environment facing the United States and our allies. Yet there remains a complex array of new and old security challenges America must meet as we approach a new century."¹

These timely words should sound familiar since they are part of the cornerstone of the future national security strategy of the United States, which finds itself in a world that has recently undergone staggering political and military upheaval. No longer is the United States faced with a Soviet threat based on a Fulda Gap scenario or a bolt-out-of-the-blue attack. Instead, our challenges will become regional concerns—oftentimes started by daft rulers with hegemonic desires—or smaller clashes involving civil wars and ethnic rivalries. "Little wars," such as the Bosnian conflict, are on the rise, often threatening to spill over borders and endanger the peace and stability of an entire area. The National Defense Council Foundation, the agency tasked with monitoring world confrontations, recorded 71 such conflicts last year—more than double the number in 1989.²

The US military needs a weapon system that can counter such aggression and neatly fill in the gaps between our current posture of overseas presence and power projection. One of the most prominent gaps in our military posture is the ability to put conventional bombs on target, globally, within minutes. Specifically, this discriminatory weapon with global reach, based in the continental United States (CONUS), must counter two areas of concern facing our new national military objectives: proliferation of weapons of mass destruction (WMD) and regional instability. The time has come for a conventionally armed intercontinental ballistic missile (CICBM).

Granted, strategic deterrence remains our nation's highest priority, and today's force structure can provide conventional deterrence in many circumstances. Yet, some scenarios may very well require a capability that currently does not exist. As it stands today, the United States has "virtually no response to the use of WMD," cites one Joint Staff official. "In fact," the officer goes on to say, "it is unclear whether even *nuclear* weapons could provide a deterrent, unless the U.S. was willing to take the difficult moral step of destroying entire cities" (emphasis added).³

As the United States contemplates its future conflicts, it must consider a gamut of factors ranging from ethnic warfare, shifting international power

cores, and state-sponsored terrorism. Previous foes, once thought to be eliminated, continue to press hard against the United States. Iraq may still represent one of the largest menaces to America because current intelligence estimates suggest that eliminating that country's development of nuclear weapons may prove harder than most analysts thought.⁴ Neighboring Iran has continued to pursue a chemical weapons capability and has Scud missiles to deliver them. China, with its army of 3.2 million soldiers, has nuclear warheads aimed at the United States and might be developing biological warfare agents. More than a dozen countries have operational ballistic missiles, and many more have missile development programs.⁵ Intelligence and security professionals from the former Soviet Union are now peddling their wares to terrorist organizations. Islamic extremists have established infrastructures in Latin America and are forging links with prominent drug cartels. The list grows.

The United States should counter such contingencies by fortifying its means of conventional deterrence and now has the opportunity to study the possibilities of the first-ever, unmanned, CONUS-based, standoff weapon system. The US land-based nuclear missile fleet is currently undergoing a 50 percent reduction in size, due to the end of the cold war. The mothballing of 450 Minuteman II (MMII) ICBM boosters has given the United States the necessary hardware to reshape conventional forces by building an impressive standoff system.

Advantages

Several factors argue in favor of acquiring such a system. These include readiness, accuracy, threat, and mobility.

Readiness

Depending upon the operational status of a CICBM, it could hit a target anywhere in the world within minutes—not the hours or days currently needed by such weapon systems as cruise missiles or bombers. From the time a theater commander in chief (CINC) requests target neutralization, a CICBM could put a high-yield reentry vehicle (RV) on target in less than an hour. Because of relatively low costs, a CICBM system—like nuclear ICBMs—could remain on alert daily. However, should rising costs or other factors so dictate, one could attain a reduced level of readiness by powering down the system to a “dormant” stage.

Accuracy

Recent improvements in terminal guidance technology, satellite telemetry applications, and advanced RVs will soon allow strikes within 10 feet of the intended target,⁶ anywhere in the world, from a sortie launched in the CONUS. Depending upon the weapon's yield, current intelligence sources indicate that this may be enough to destroy most hardened targets.

Another important advantage is the high probability of kill, since no defense exists against such a threat. The small radar cross section and the extreme velocities of an incoming RV ensure penetration of any futile attempts at defense. Even with the advent of venerable Russian antiballistic missile (ABM) technology, no plausible capability today—or in the near future—could defeat such a strike.⁷ This compares favorably even to air-breathing Navy Tomahawk land attack missiles (TLAM), which are somewhat precarious due to their relatively slow speed. The cruise missile strike against targets outside Baghdad in January 1993 highlighted the vulnerabilities of cruise missiles to anti-aircraft artillery (AAA) when some missiles missed their targets, and at least one was knocked off course by hostile fire, hitting a high-visibility civilian target.⁸ No AAA battery is going to hit an incoming RV traveling at Mach 15.

Threat

No US soldier, sailor, airman, or marine falls into harm's way during a CICBM attack. No other vehicle can deliver such clout without the least bit of harm to the weapon's operators. Existing concepts of employment for weapon systems require the involvement of practically hundreds of individuals during offensive actions. This is not true with CICBMs. A handful of trained military professionals can deliver a knockout blow safely from within the confines of US borders.

Mobility

Operation Desert Storm stretched our airlift and sea lift capabilities to the limit. The Pentagon expects the aggressor in a typical major regional conflict (MRC) of the future to have up to 750,000 troops, four thousand tanks, and one thousand combat aircraft.⁹ A *single* MRC requires 10 fighter wings, 80 heavy bombers, three aircraft carriers, and 90 percent of current US airlift. A second MRC would require significant shuttling and shifting.¹⁰ Gen Joseph P. Hoar, a recent CINC of US Central Command, said that "airlift in this country is broken right now. I'm not sure it's workable for one major regional contingency, much less two."¹¹ CICBMs would require no mobilization and no deployment; instead, they would be ready and able when called upon. In a recent issue of *Parameters*, Col David Jablonsky sums up the situation neatly by saying, "If U.S. forces require future theater ballistic missile support in Asia, why send small theater missiles when ICBMs with conventional warheads with zero CEP [circular error of probability] can do the job without tying up strategic lift?"¹²

Disadvantages

No weapon is without flaws or a potential downside. The same is true of CICBMs.

Cost

We have procured research and development funds to examine the feasibility of building such a system, and studies are under way to determine the best types of launchers, munitions, and force size. However, in these days of military budget cuts and force drawdowns, a proposed weapon system is usually the first item eliminated when funds dry up.¹³ Clearly, getting full funding for such a system—especially one that's not as "sexy" to the Air Force as a B-2 or an F-117—will be an uphill fight.¹⁴

Collateral Damage

The first two stages of an MMII consist of solid-fuel rocket motors that fall into the ocean after they burn out. Because the third stage carries the RVs to their final destination, it is relatively close to the third target (on a payload consisting of three multiple independently targeted reentry vehicles [MIRV]) programmed in the "bus."¹⁵ Unless modified, this third stage is not likely to fall harmlessly into a body of water but may cause collateral damage—perhaps to a friendly nation. This is exactly what a CICBM should not do. Perhaps the best way of solving this problem would entail building a small self-destruct mechanism on board to destroy the bus after it releases the third RV. The United States needs to be concerned about disposing of the missile's third stage—something it didn't have to worry about in its previous nuclear role. A high-explosive on board might be the solution.

Intelligence

Without superior intelligence, we will waste our effort, costs will rise, and—most likely—the conflict will last longer. As Charles de Gaulle once observed, "A general with an excellent army no matter how carefully deployed, will eventually be defeated if insufficiently informed about his enemy."¹⁶

Conclusion

To do the greatest damage to our enemy with the least exposure to ourselves, is a military axiom lost sight of only by ignorance of the true ends of victory.

—Alfred Thayer Mahan

Undoubtedly, the most important question for any new proposal becomes, "Is it feasible?" In other words, "Will it be suitable and worthwhile, given the means the nation has to do it?" I believe that the answer to those questions is a resounding "yes." The United States, now more than ever, needs to acquire a weapon system that can execute fast,

long-range, limited strikes against heavily defended targets. A CICBM force would fill in that "global-coverage-in-minutes" gap mentioned earlier.

As the United States moves away from the cold war, when our primary foe was the Soviet Union, one thing remains certain: future threats will be less defined—and less understood—than they were in the bipolar arena. Current measures may or may not deter emerging powers. We need new methods to preempt or interdict the use of WMD. Delivering weapons globally with speed and precision will provide the National Command Authorities, war-fighting CINCs, and theater commanders a unique capability to strike targets regardless of location, weather, or defenses—with little risk to US forces.

Therefore, *if it is at all possible*, future systems must provide a resolute show of force, absolute precision, low collateral damage, high probability of kill, and minimum response time, while placing no strain on thinly stretched mobility requirements.

It is possible now—with CICBMs.

Arlington, Virginia

Notes

1. William J. Clinton, *A National Security Strategy of Engagement and Enlargement* (Washington, D.C.: Government Printing Office, 1995), 1.

2. "Conflicts on the Rise across the Globe, Group Says," *Newport [Rhode Island] Daily News*, 3 January 1996.

3. Robert Holzer, "Wargame Increases DoD Focus on Biological Weapons," *Defense News*, 3 September 1995, 18. The article goes on to say, "On the other hand, if the U.S. did launch a nuclear attack no country would use those weapons for the next 100 years" (page 18). However, overriding arguments of an international furor and the ethical dilemma of a nuclear response may well prevent the use of such horrific weapons.

4. Les Aspin, "An Approach to Sizing American Conventional Forces for the Post-Soviet Era," *National Security Decision Making Publication*, 25 February 1992, 563.

5. "Countering Weapons of Mass Destruction," in *Strategic Assessment 1996: Instruments of U.S. Power* (Washington, D.C.: National Defense University, Institute for National Strategic Studies, 1996), 200.

6. Briefing, Christopher Sharp, Peterson AFB, Colo., subject Conventional ICBM Concept of Operations, December 1993.

7. Michael J. Morgan, Franklin R. Fish, and David A. Goller, "Conventionally Armed Strategic Missile," point paper (Peterson AFB, Colo.: Headquarters Air Force Space Command, 1 December 1992), 16. Depending upon the munitions package and final angle of attack, most RVs will enter the target area with speeds in excess of Mach 15.

8. George C. Wilson, "Cruise Missiles Fast Becoming Irresistible Weapon," *Air Force Times*, 8 February 1993, 27.

9. John T. Correll, "The High Risk Military Strategy," *Air Force Magazine* 77, no. 9 (September 1994), 37.

10. *Ibid.*

11. Quoted in *ibid.*

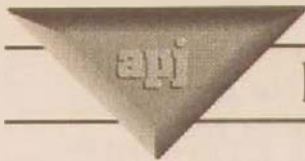
12. Col David Jablonsky, "U.S. Military Doctrine and the Revolution in Military Affairs," *Parameters* 24, no. 3 (Autumn 1994) 27.

13. "The Economic and Budget Outlook: Fiscal Years 1995-1999," in *Report to the Senate and House Committees on the Budget* (Washington, D.C.: Government Printing Office, January 1994), 92. Military planners must understand the nature of the budget dilemma. Discretionary spending, which includes defense spending, is taking up a progressively smaller portion of the federal budget. Such spending has fallen from 70 percent of the budget in 1962 to less than 37 percent in 1994, and it continues to decline.

14. However, unlike these outrageously expensive stealth aircraft, a CICBM doesn't need a plethora of vulnerable personnel to put bombs on target. A B-2 currently lists for nearly \$2 billion a copy, and an F-117 sets the defense budget back just over \$70 million. With existing rocket motors, launchers, and infrastructure, some estimates suggest that a CICBM force on both coasts could be funded for less than the cost of one B-2.

15. The first two stages of an ICBM are usually spent during the first 33 percent of the flight to the target. After being ejected by the second stage, the third stage actually carries the RVs to the target zone by kinetic energy only and maneuvers with very small rocket motors to drop the RVs off one at a time. The location of each RV depends upon the "footprint" of the three targets.

16. Charles de Gaulle, *The Edge of the Sword* (New York: Criterion Books, 1960), 80.



Net Assessment

To be a successful soldier, you must know history.

—Gen George S. Patton Jr.

Last Seen Alive: The Search for Missing POWs from the Korean War by Lawrence Jolidan. Inkslinger Press, Austin, Texas, 1995, 346 pages, \$15.00.

Last Seen Alive is the compelling tale of the investigation into the fate of hundreds of American soldiers, sailors, and airmen who were captured by Communist forces during the Korean War (1950–53) and never returned. These men are believed to have been held by the Communist forces of the Soviet Union, People's Republic of China, and North Korea following the armistice in July 1953, in violation of the terms of the prisoner exchange. In his book, investigative journalist Lawrence Jolidan carefully weaves both the fragments of information made public during the cold war and the torrents of data released after the fall of the Soviet Union, and he makes a compelling case that American servicemen were retained after the war—some in the Soviet Union, some in China, and some in North Korea. He also asserts that the government of the United States has not aggressively and completely investigated this issue but has allowed it to fade quietly from public view in order to advance other foreign-relations objectives.

Over 2.2 million American men and women served in the Korean theater during the war, and thousands were captured by the Communist forces. Most were returned during the prisoner exchanges in 1953, but the American government soon realized that thousands of service members known to be prisoners of war (POW) were not repatriated.

During the 1950s and 1960s, numerous reports stated that not only did Americans remain captive in North Korea but also some Americans had been transferred to China and the Soviet Union—and remained prisoners there.

Jolidan interweaves his own carefully compiled research with the studies conducted by Task Force Russia, a temporary Department of Defense (DOD) organization of specially selected analysts and ex-

perts on foreign intelligence, POWs, and the Soviet military that had responsibility for examining the issue of POWs who may have been under Soviet control. His theme becomes evident early: during the Korean War, the Soviet military sent captured Americans back to the Soviet Union and never acknowledged their existence; those prisoners most likely died in Soviet prison camps; the US government was aware of the Soviet activities at the time but took no action; current (post-Soviet Union) research proves this fact; and the US government is now downplaying the issue rather than spoil its relations with the new Russian Federation.

The most notable story Jolidan tells is about the captured American airmen of the Far East Air Forces (FEAF). The Soviet Union established the 64th Fighter Aviation Corps at Antung Air Base in Manchuria, China, in late 1950. One of its tasks was the management of an overt and covert intelligence-collection mission against the US FEAF. The commander of this unit was Gen Georgi A. Lobov, who, following the dissolution of the Soviet Union in 1991, decided to go public with his information. Other officers of the 64th, such as Col Gavril Korotkov, soon followed with additional data, and the story began to come together.

As American pilots were captured, they were immediately sent to Sinuiju, the North Korean city across the Yalu River from Antung, where they were interrogated by Chinese and Soviet officers. The Soviets admit to processing 262 American fliers through this collection point. Normally, the Soviet officers were not present but wrote out their questions for the Chinese to ask. Later, a Soviet officer of Mongol heritage participated because he looked Chinese. The questions were designed to provide information that might be useful to Soviet pilots flying MiG-15s against the Americans, and all of the prisoners were asked to work for the Soviet government. None accepted the offer, so many were subsequently transferred to prisons in the Soviet Union and were accused of being spies.

American pilots sent to the Soviet Union were first transferred to an interrogation facility in Khabarovsk, just inside the Soviet border, where they were questioned by a team of over one hundred intelligence officers. Apparently hundreds of Americans were sent there, and from that point on they were controlled by the MGB, the forerunner of

the KGB. No Americans who were sent through Khabarovsk ever returned to the United States.

The 64th Fighter Aviation Corps was primarily interested in the F-86 Sabre, the top American aircraft in-theater during the war. Soviet intelligence officers assigned to the unit went to great efforts to acquire and ship to the Soviet Union F-86s which had been downed but remained relatively intact. At least three F-86s were transferred to the Zhukovski Central Aerohydrodynamics Institute and the Sukhoi Design Bureau in Moscow. Soviet officers also searched extensively for downed F-86 pilots. According to the reports, when such pilots were captured, they were almost always retained rather than repatriated. A key factor in this analysis is the higher missing-in-action (MIA) rate for F-86 pilots—55 percent—than for pilots of any other aircraft. Research conducted by Task Force Russia indicates that some 31 of 56 F-86 pilots lost during the war could have been captured and processed through the interrogation centers, never to return.

In August 1993, Task Force Russia published an interim report titled *The Transfer of U.S. Korean War POWs to the Soviet Union*, which stated unequivocally that "U.S. Korean War POWs were transferred to the Soviet Union and never repatriated." This 77-page report detailed the role of the 64th Fighter Aviation Corps and provided both documentary and anecdotal information on its activities in interrogating and processing captured American pilots. However, despite solid evidence, senior DOD officials disavowed the report, and the US government failed to press its case with the Soviet Union. A subsequent two-page report, issued in 1995, states only that "the possibility of transfers of American servicemen from the Korean theater of military operations into the former Soviet Union remains a key working hypothesis [but that] this information to date has not been confirmed." Jolidan asserts that the POW issue has become a pawn in the larger context of US-Russian relations and that the US government is cautious of pushing it for fear of how it could affect internal Russian politics.

Jolidan's book is an exciting and terrifying read, but it does have its flaws. Firstly, written in journalistic style, it is short on documentation—even for many direct quotes from key participants in the events. Most of the endnotes—only 192 for a three-hundred-page book—provide supplemental information rather than sources. As such, it is difficult to judge the validity of much of the information Jolidan used to develop his thesis. Secondly, and in the same vein, the index is very limited and of little value in researching particular topics. It is only seven pages long and lacks such critical topics as Antung, the key Soviet facility in Manchuria during the war, and Task Force Russia, the organization that provided much of the material. Thirdly, because Jolidan was trained as a journalist rather than a historian, his writing style translates into short, punchy paragraphs rather than fully developed concepts and ideas. The book reads like a very long article for a Sunday newspaper. Clearly, he wanted to be the first to publish this exciting material. Fourthly, the material could be better organized. The fact that Jolidan approaches his topics in a variety of ways makes his thought process somewhat difficult to follow. A more analytical and historical methodology would go far in clarifying this material. Finally, the book could have been more carefully edited. Numerous typographical errors seriously detract from the main issues presented in the book.

With *Last Seen Alive*, Lawrence Jolidan has written an important book—one that belongs on the bookshelf of any scholar of the Korean War. In time, it will be replaced by more scholarly histories of this facet of the conflict, but until then, *Last Seen Alive* stands as a testament to the fate of thousands of brave American servicemen who were captured during the Forgotten War and never came home.

Michael J. McCarthy
Washington, D.C.

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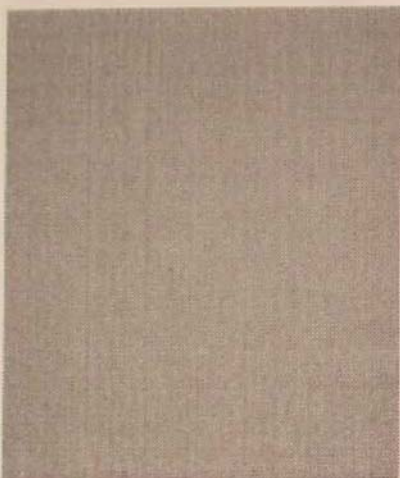
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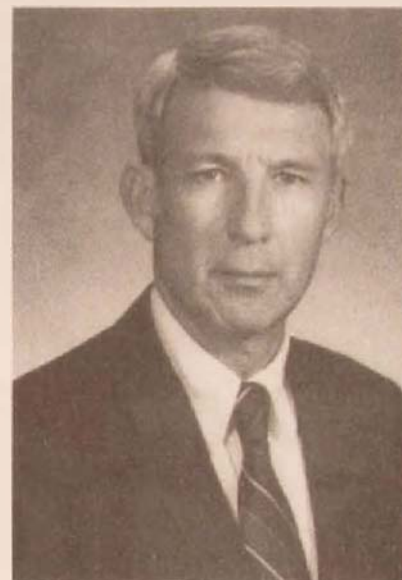


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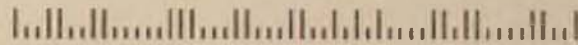


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