# Winter Fireside Readings

- Leadership and High Technology
- Battle of the Bulge: Air Operations
- Professional Military Education

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# AIRPOWER

## JOURNAL

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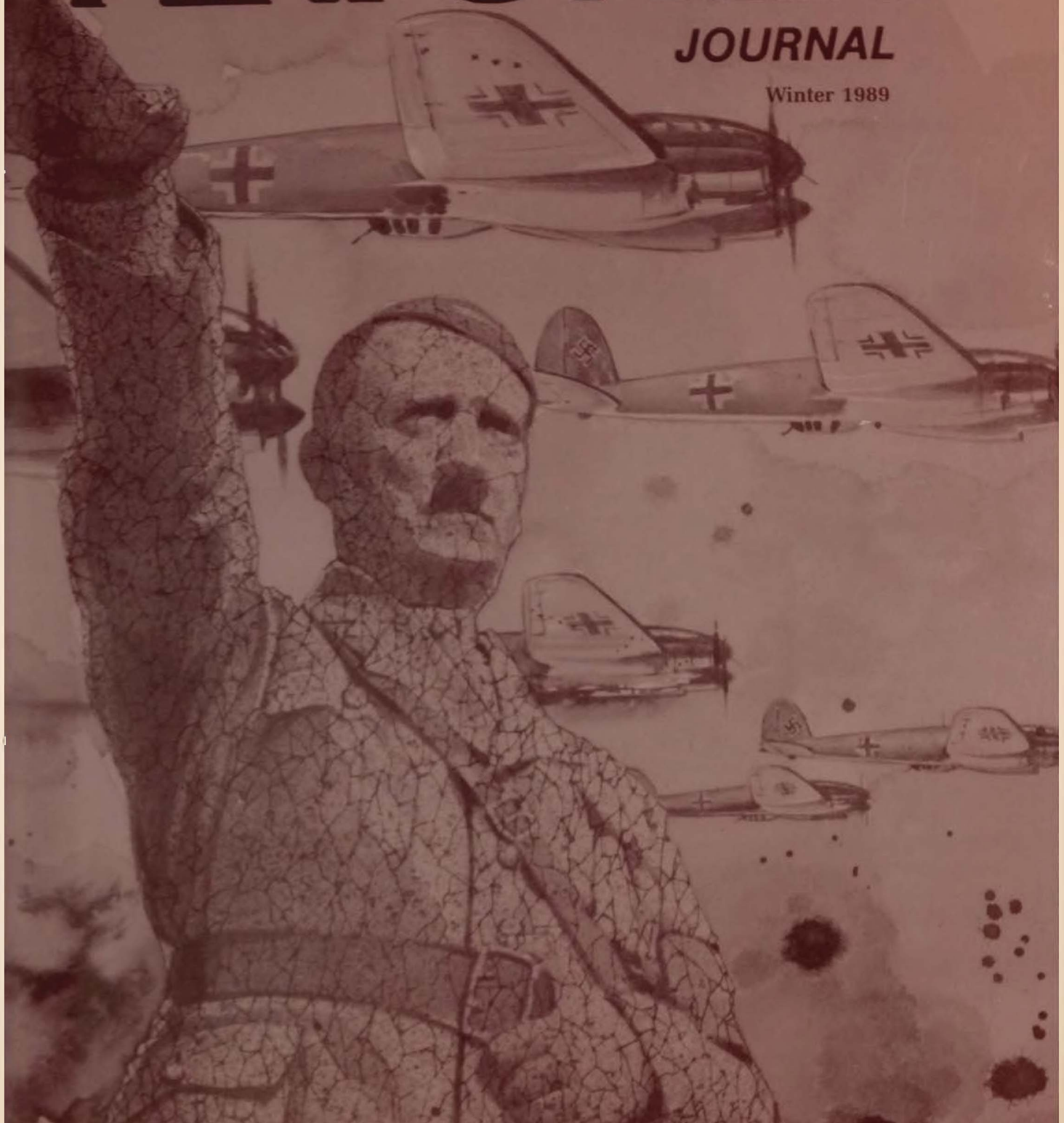

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*Letters to the editor are encouraged. All correspondence should be addressed to the Editor, Airpower Journal, Walker Hall, Maxwell AFB AL 36112-5532. We reserve the right to edit the material for overall length.*

## COURSE CORRECTION FOR SPACE DOCTRINE

*Editor's Note: The following letter is a response by the authors to Maj Thomas C. Blow's letter in the Spring 1988 issue. Major Blow's letter was in response to the article "Real Tenets of Military Space Doctrine," which was published in the Winter 1988 issue.*

"Real Tenets of Military Space Doctrine" provides basic space doctrine in the same sense as basic air doctrine in AFM 1–1, i.e., "the most fundamental and enduring beliefs which describe and guide the proper use of . . . forces in military action" (AFM 1–1, p. v). This contrasts with operational doctrine that would anticipate "changes and influences which may affect military operations, such as technological advances" (AFM 1–1, p. vi). This further contrasts with strategy which must consider future developments when implementing sound doctrinal concepts on how to employ systems in certain environments.

In the context of [Col Dennis] Drew ["Of Trees and Leaves: A New View of Doctrine," *Air University Review*, January-February 1982], environmental doctrine (developed in our article for the space environment) "would seem to have considerable staying power" as opposed to organizational doctrine which "concerns the use of particular forces in a particular environment at a particular time—today" (p. 45). We therefore submit that our tenets for basic and environmental space doctrine do not rest solely "upon the current state of affairs," as characterized by Major Blow, but offer also a "framework for future application" in the sense of Drew (p. 42). Once our basic concepts of space doctrine are understood, they may be applied in strategy and operational doctrine as the threat and future technology evolve.

To clarify the specific points raised by Major Blow, we point out that "Real Tenets of Military Space Doctrine" does not deny that satellites may become more flexible in the future. Certainly, technology can enhance the future survivability, endurance, and maneuverability of each of our space systems. This is a purely relative notion. The point is that "flexibility" is not one of the key attributes of satellites which distinguish them as effective military assets. As an example, airplanes can be reroled for different missions; strategic bombers can be employed for high-altitude conventional or low-altitude nuclear penetration missions; a pilot can land at a base of his choice and quickly alter his flight plan. Satellites do not do these types of things well. Once a space mission is designed and deployed, it is difficult, if not impossible, to alter due to natural and system constraints.

Space control and space surveillance were developed in the article as vital concepts for employment of space forces. As pointed out by Major Blow, warning times will decrease with future threats, but we believe this only reemphasizes the point that surveillance and warning will continue as key elements for successful employment of space forces. A strong space intelligence, surveillance, and warning network could provide early threat assessment so that space systems would have time to react and avoid threatening situations, regardless of the time frame considered.

Finally, a robust launch capability is just one of the elements needed to sustain access to space, as discussed in the article. However, this is also only one part of the doctrine; another key part is space control. Without an effective space control system, the potential SDI-type threat posed by Major Blow could very well "shut down US launches." The point remains that the doctrine must be viewed as a whole, and without access to space (or a robust launch capability), it would be incomplete and ineffective.

We believe our article "Real Tenets of Military Space Doctrine" does account for developing threats and does accommodate the future. What remains to be done, as our space capabilities evolve, is to place these basic doctrinal concepts in a time and technology perspective with the

development of operational space doctrine and an integrated military strategy. If these concepts are ignored or subdued within existing official doctrine, we concede to a correct conclusion by Major Blow that "the US will have no option other than to react after the fact . . . to potential adversaries–a condition we would surely wish to avoid."

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**Lt Col John G. Tockston, USAF**
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## MORE ON CLAUSEWITZ

*Editor's Note: The following is a response by the author to a letter concerning his article "Clausewitz and the Indirect Approach: Misreading the Master," Winter 1988. Mr Forbes's letter appeared in the Summer 1989 issue.*

I have read Joseph Forbes's critiques of other authors on other topics in other journals but was surprised he should choose my article on Liddell Hart's misunderstanding of Clausewitz as his latest target. His two main criticisms were echoes of Liddell Hart's own misunderstandings, which I shall endeavor to illustrate even more clearly than in my article.

First, Clausewitz quite clearly did *not* advocate direct frontal attacks in preference to flank attacks. Although Liddell Hart, Forbes, and others drew this conclusion, a thorough reading of *On War* reveals this to be erroneous. Even disregarding the thrust of this entire work (which does not support such a simplistic idea), one notes that Clausewitz very clearly stated in book seven, chapter seven ("The Offensive Battle") that "the main feature of an offensive battle is the *outflanking* or *by-passing of the defender* [emphasis added]." He further stated that since "doubt about the enemy's position" characterizes most offensive battles, it becomes even more imperative to "outflank rather than envelop the enemy."

Second, Forbes apparently didn't understand Clausewitz's discussion of the "center of gravity" in book eight, chapter four of *On War* ("Closer Definition of the Military Objective: The Defeat of the Enemy"). I devoted nearly an entire page of my article (p. 50) to that concept, comparing it to Liddell Hart's "indirect approach." Obviously, Liddell Hart did not use "indirect" to mean attacking completely irrelevant points, but meant avoiding "direct" attack on the enemy where he is strong by concentrating forces "indirectly" against his *decisive vulnerability*. Clausewitz also said to direct "all our energies" against "the hub of all power and movement on which everything [in the enemy's war effort] depends." And though Clausewitz noted that the enemy's military forces "will be a very significant feature" (which is quite obvious in wartime), he also specifically wrote that the center of gravity is often *not* the enemy army but an ally, an area (the capital), or a leader. Forbes incorrectly asserts that Clausewitz advocated "attacking where the enemy's power of resistance is greatest"; Clausewitz, on the contrary, emphasized that only "by constantly seeking out the *center of his power* [his center of gravity, *not* his greatest strength] . . . will one really defeat the enemy."

Mr Forbes also quotes J. F. C. Fuller to support his contention that Clausewitz misunderstood Napoleonic warfare and, since Clausewitz was "influenced" by his experiences of such warfare, that his conclusions on warfare must be unreliable. This argument is a logical fallacy. Furthermore, without delving into a discussion of Major General Fuller's assessment (which I feel is mistaken, based almost exclusively on a too-rigid interpretation of Clausewitz's concept of "concentration"), I believe that the major lesson Clausewitz derived from Napoleon's campaigns was that warfare is a great sociopolitical activity. This conclusion forms one of the overarching themes of *On War*. He also drew lessons regarding the strength of defense over offense from personal experience in two great defensive operations—the Russian retreat towards Moscow and the battle of Waterloo. The validity of both these assessments is hardly debatable.

Finally, Mr Forbes read into my article things that were simply not there. He felt that my article was meant to adulate Clausewitz as the "inerrant authority on military affairs," that I claimed Clausewitz was the "ultimate, unchallengeable fount of military wisdom," and other such nonsense. My intentions were much more modest: I merely wanted to illuminate the shortcomings in Liddell Hart's understanding of *On War* as he presented it in *Strategy: The Indirect Approach*. That Mr Forbes read my article very superficially was obvious from that misunderstanding, as well as his continual misspelling of

*Continued on page 85*

# LEADERSHIP AND HIGH TECHNOLOGY

BRIG GEN STUART R. BOYD, USAF

IN AUGUST of 1940, just a few months after the German army had swept through France and introduced the world to the power of a mechanized advance, the US Army began large-scale training maneuvers in Louisiana. In the face of the success of the German blitzkrieg, you might have expected to see our forces searching out new ways to counter the threat of the tank and technology. Such was not the case. As these troops gathered for

instruction, a serious logistics problem soon developed: there were not enough horses to go around. As we approached the dawn of the Second World War, we still clung to the thrill of the cavalry charge. Technology was not yet an integral part of our military force. Gen George S. Patton, a staunch advocate of the horse cavalry, wrote in 1926 that "it is the cold glitter in the attacker's eye, not the point of the questing bayonet, that breaks the line. It is the fierce determination of the drive to close with the enemy, not the mechanical perfection of the tank, that conquers the trench. It is the cataclysmic ecstasy of conflict in the flier, not the perfection of his machine gun, that drops the enemy in flaming ruin."[1]

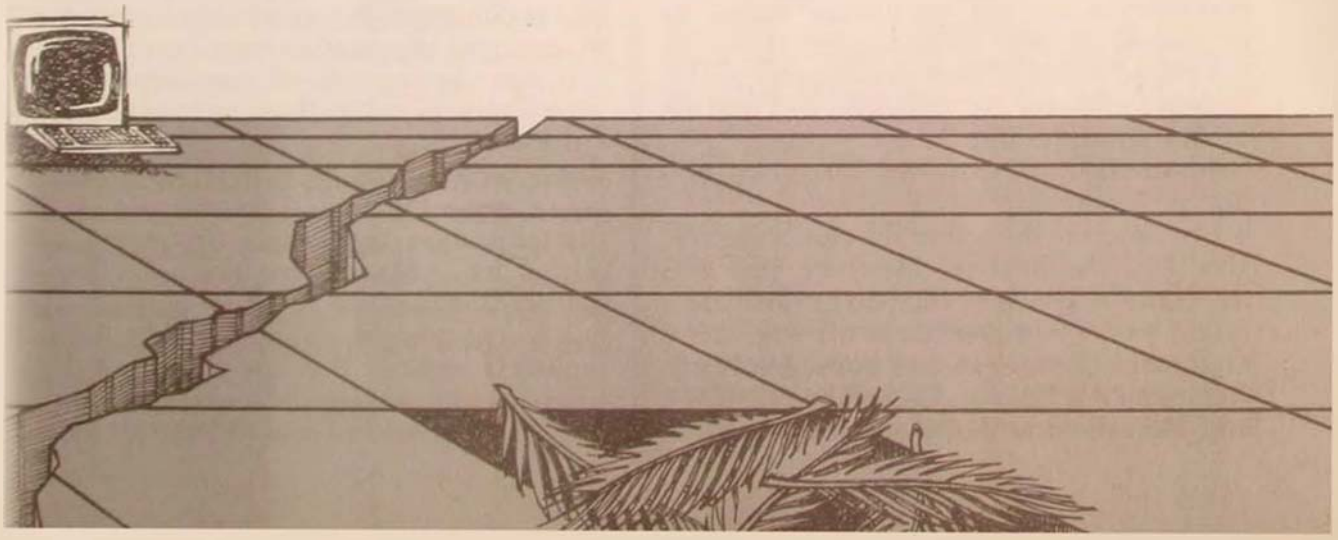
History is full of examples of reluctance to adjust to change, especially changes associated with the introduction of new technologies. The French at the Battle of Crécy spent the flower of their knighthood against the power of the English longbow. Millions fell before the machine gun in World War I. Even Henry Ford, father of the Model T, was reluctant to introduce colors other than black or to change to the six-cylinder engine. Change is a key factor in effective leadership. New technology, however, has a greater impact than does the process of change that occurs inside an organization.

The importance of high tech to today's decisionmaker has never been greater. Significant portions of our defense dollar are spent on research and development, although some people argue that such expenditures remain inadequate to meet the challenges our country faces. Weapon systems grow more complicated and expensive at an ever-accelerating rate. Today's F-16C has more than 10 times the computer capacity of the lunar landing module that carried man to the surface of the moon only a short 20 years ago. As new technologies evolve, we need to decide how we, as military leaders, are to interact with this technical explosion. That is the purpose of this paper—to explore some ideas concerning the relationship between leadership and technology. Let's start with a definition of technology.

In the broadest sense, *technology* refers to any enhancement of human ability: to move faster, shout louder, hit harder, see sharper, calculate faster, and so on. Technology and weaponry have always been intimately connected. I believe it was George Bernard Shaw who pointed out that man's genius is best observed, not in his housing or clothing, but in his weapons. We have always needed weapons to ensure our security and, in some cases, our survival.

**Editor's Note:**

*This essay is drawn, with thanks, from the Ira C. Eaker Center for Professional Development's forthcoming text* Concepts for Air Force Leadership *edited by Dr Richard R. Lester.*



Maintenance of external security is a responsibility that is assigned to the military in the United States—thus, military leaders will always have to deal with the technology that is embodied in the new weapons provided to them.

The essential elements of military leadership do not change. There are many definitions of leadership, but one by E. M. Flanagan, Jr., seems to capture most of the critical components: "Leadership in the Army, simply stated, is the ability to get a unit to accomplish a given mission efficiently (of time, resources, casualties) and willingly or at least cooperatively."[2] Although the essence of military leadership may never change, technology—an essential instrument of mission success—is in constant flux. The challenge for the military leader is to recognize and use whatever technology is available and to dominate that technology—not to be dominated by it.

The problem is not technology per se; it is the process of leaders adapting themselves to technology that is the issue. We have had to adapt to the longbow, the tank, the airplane, and now to the challenges and opportunities of outer space. Your role as a military leader is to integrate the technologies of today into the accomplishment of your mission—during peace or war. At the same time, you must be ready to work with the rapidly evolving technologies of the future.

Let us now focus on some of the characteristics of high technology. We frequently concentrate on the wonderful things to be gained by new technologies. However, the introduction of new developments also causes problems. Accordingly, this portion of the article could be aptly titled, "Potholes on the Road to the Successful Integration of Leadership and Technology."

*Just load the data, and the computer will give you the answer.* Many of you will recall the movie *War Games*. In this film a bright young teenager hacks his way into a mythical computer system housed at North American Air Defense Command (NORAD) and almost starts World War III. The final scenes are shot in the command post where a number of senior officers are staring at the electronically generated battle, helpless to deal with the runaway computer that is bent on "winning the game." Though the situation itself is absurd, the idea of an electronic system isolated from any human intervention is real. When people deal with high technology, they have a tendency to become isolated from reality. I recently saw an advertisement for a computer designed to assist ground planners in the North Atlantic Treaty Organization (NATO) environment. The advertisement emphasized the idea that the maximum use of symbols was a strong selling point since it allowed the decisionmaker to "avoid the need for person-to-person communication in a difficult multilingual environment." High tech can be impersonal.

*With a computer you get all the information you want—immediately.* Speed was often a critical factor in the classic military battles. The fastest horse decided many engagements. Now we have systems that instantly provide the logistic planner the location and status of every part on the F-16 or B-1. Technology can provide real-time information—regardless of the accuracy of the data loaded. Traditional methods of staffing, though sometimes bureaucratic and frustrating, provided time to check data before they went to the decisionmaker. With the introduction of applications of expert systems using artificial intelligence, however, we will see an increased reliance on the computer. It can provide a great deal of incorrect information very rapidly.

*It must be correct; it's computed to the 10th decimal place.* High technology provides an impression of precision. Who can argue with reams of computer printouts being generated by a high-speed laser printer from a mainframe computer supported by banks of tape drives? When I attended Squadron Officer School, we had to complete a staff study. The format included sections that identified assumptions as well as data sources. This information clarified the logic of the decision

*"It is the cold glitter in the attacker's eye, not the point of the questing bayonet, that breaks the line."*

process for the reader. Such an approach, however, is not available from many of our current technologies. We now rely on software developed by someone else, for which we couldn't read the program code even if it were available. How many people, even if they are comfortable with computers, spend time "studying" the documentation? The precision of a computer answer may lure you into a false sense of security. I can recall struggling with a french curve,* trying to find a "fit" for some very scattered data points. Since the rules said the raw data had to be plotted, the world would know how I arrived at my conclusions. In today's world, though, the computer does all of that for you and draws a nice, smooth, multicolored graph—all at the speed of light.

*I really don't understand these new technologies and techniques, but I don't want to look stupid.* High tech can be intimidating. Because it is complex and mysterious, the senior decisionmaker is faced with a new set of problems. As previously mentioned, the computational process can be difficult to understand. The people who do understand it are probably not on the senior staff, since the education needed to work with these new technologies is more readily available to junior personnel. How will you integrate tools such as marginal analyses, effectiveness ratios, or a weighted decision matrix into your decision process? Can you integrate these tools if you do not really understand them? Considering the history of the Eastern Front in World War II, no computer programmer in the world would have given the German army more than three months to survive. The German forces were outnumbered, outgunned, and undersupplied. However, despite their eventual defeat, they conducted a brilliant series of campaigns lasting almost three years. Training and discipline held out for a long period of time against overwhelming odds.

*Since technology continues to improve, if you can wait until tomorrow I can promise you a "better" answer.* A significant portion of my career has been involved in research and development. One thing I have seen time and again is the engineer who can always make it (an aircraft, radar system, etc.) just a little better. In peacetime, it is this allure of making "it" more combat effective, even with tight schedules and limited funding, that has been the downfall of many programs. In wartime, the appeal resides in the "promise" of turning around an impossible tactical situation with "this new miracle weapon to be delivered tomorrow." Tomorrow's leaders must understand the risks associated with

*A curved piece of flat, often plastic, material used as a guide in drawing curves

searching for the optimum solution instead of an effective solution.

*If you want more information, the computer can turn out products as long as you want to ask for them.* Future leaders will have at their fingertips everything they could possibly want to know about the status of their units. This information will not be reserved solely for the unit commander. Every level of command can look into what is happening at a particular location or in a particular situation. Every dollar expended, every takeoff aborted—everything can be reviewed and questioned. George Orwell's book *1984* introduced Big Brother, who can look into every aspect of our lives. The technology is now available to make *1984* a reality. A military commander no longer has to leave the office to determine how things are going in the tire shop or whether bombing scores are getting better or worse. As a commander, what will you do when you call up a computer screen that shows nobody ate liver at the dining hall last evening? How are the leaders of tomorrow going to use the vast amount of information they will have at their disposal? How do you, as a leader, operate in an environment of "total information"?

In wartime the problems can become even more complex. Numerous sensors feeding back to a central data bank can provide a myriad of details to the commander. Even the pilot can become saturated with dozens of inputs requiring rapid decisions. The wartime implications of total information are even more challenging than those of peacetime.

*Instant communication is here today.* During several recent military operations, technology allowed direct communication with forces actually engaged in combat. Was this capability more effective than the earlier methods of indirect, delayed communications? One of the reasons for the German defeat at Stalingrad is attributed to attempts by Hitler to direct the battle from his bunker in Berlin. The role of future communications is critical. The capability to direct an F-16 squadron located halfway around the world is real. Modern communications systems allow us to make a decision immediately. Sometimes an instant decision may not be wise—the situation may change, or the weather may worsen. Rapid communications can pressure a leader into furnishing an answer even if the answer could and should wait.

*Technology is a tool, but it cannot consider everything—especially such intangibles as discipline, motivation, and so forth.* This last pothole can be the most dangerous of the lot. Some of the best military decisions have been based on what a leader "felt" was the best course of action. For all the controversy surrounding General MacArthur, the Inchon landing was a masterpiece of military strategy. Almost everyone said that circumstances did not favor the operation: the bay was too shallow, the tides too high. Everyone, including the Joint Chiefs of Staff (JCS), reasoned that it would fail. In the past, leadership was developed in field exercises where the smell of dust and sweat was part of the learning experience. Leaders learned how to "feel" the right way to go and how to best motivate their troops, depending on the situation. Today, we are moving more to the world of computer wargaming. After you make your "decision," the computer will make the calculations and tell you whether you are an effective leader or not. In such computerized training, how does tomorrow's leader learn to develop the "gut sense" that has led to many of the great decisions of the past?

At this point, you may be wondering how you can get down the road at all since it is so full of potholes. Let me offer a few suggestions to avoid some of the deeper ones.

*Develop a concept of "inner tennis."* One of the current sports fads is to focus on a key element of an activity in a "mind-over-matter" mode. You picture yourself as a great skier or a par golfer. In tennis, you discipline yourself to always keep your eye on the ball. You can use the same technique

as you try to function effectively in the world of high technology. Keep your eye on the objective. Don't drive off the road because of the potholes. No matter how seductive the technology, don't lose sight of your organizational goals. Practice inner tennis.

*Use a "technology telescope."* A telescope allows you to search ahead and better define where you are going. It makes things clearer. Today's technology can provide tools not available five years ago. Find out what tools can be used, and integrate them into your organization. One set of tools will not work for everyone, however, because some organizations are unique.

*Understand what technology can and can't do for you.* Because technology changes rapidly, you are not going to be able to keep up unless you make an effort. Therefore, the importance of education to both you and your unit will continue to grow. Without periodic updates, you cannot expect to be capable of making prudent decisions. Technology comes loaded with all sorts of seductive charms. If you don't take the time to understand the underlying principles, you just might fall in love with the slick allure of all those high-tech bells and whistles.

*Technology is a micromanager's dream—don't get caught in the trap.* These new technologies provide an opportunity to drive a staff crazy with dozens of questions, all developed by paging through computer screens, and all delivered by electronic mail. Centralized management and information saturation can result in organizational self-destruction. Tomorrow's leaders must discipline themselves to stay out of this mode. They must also establish an environment that does not force their staffs to operate in this mode.

*High tech–high touch.* Technology will tend to drive you away from your people. Don't forget the basic adage: the effective leader spends at least 25 percent of his or her time "out with the troops." The need to discipline yourself to be in the organization is more difficult in an information-rich, rapid-communications world. The military histories of tomorrow are not going to focus on who wrote the most vivid electronic message. Your most critical resource is people. You must gain their confidence, stimulate their productivity, and reward their accomplishments. The only way you can do these things is by getting out from behind your computer terminal.

Where, then, do you fit into this environment of technology? More important, what are you going to do to better adapt your leadership strengths and weaknesses to the changes ahead? As a leader, you will be expected to understand and shape the technologies you are using to meet mission requirements. No matter what kind of organization you are with—from fighter squadron to system-program office—there are technological tools that can improve productivity and develop a happier, harder working unit.

This article has discussed a number of potential problem areas associated with high tech. A complete list would be quite long. You and your staff could spend some valuable time exploring this area and deciding how you will avoid some of the potholes. I have also shared a few ideas that will make your adaptation to new technologies easier and more effective. Keep in mind that we are currently experiencing major funding reductions. The old days of "doing more with less" are gone. The new days of "working smarter" are here. I challenge you to get on board; high tech can save you—or sink you. □

**Notes**

1. Martin Blumenson, *The Patton Papers, 1885–1940*, vol. 1 (Boston: Houghton Mifflin Company, 1972), 797.

2. E. M. Flanagan, Jr., "Before the Battle," *Army* 38, no. 4 (April 1988): 83.

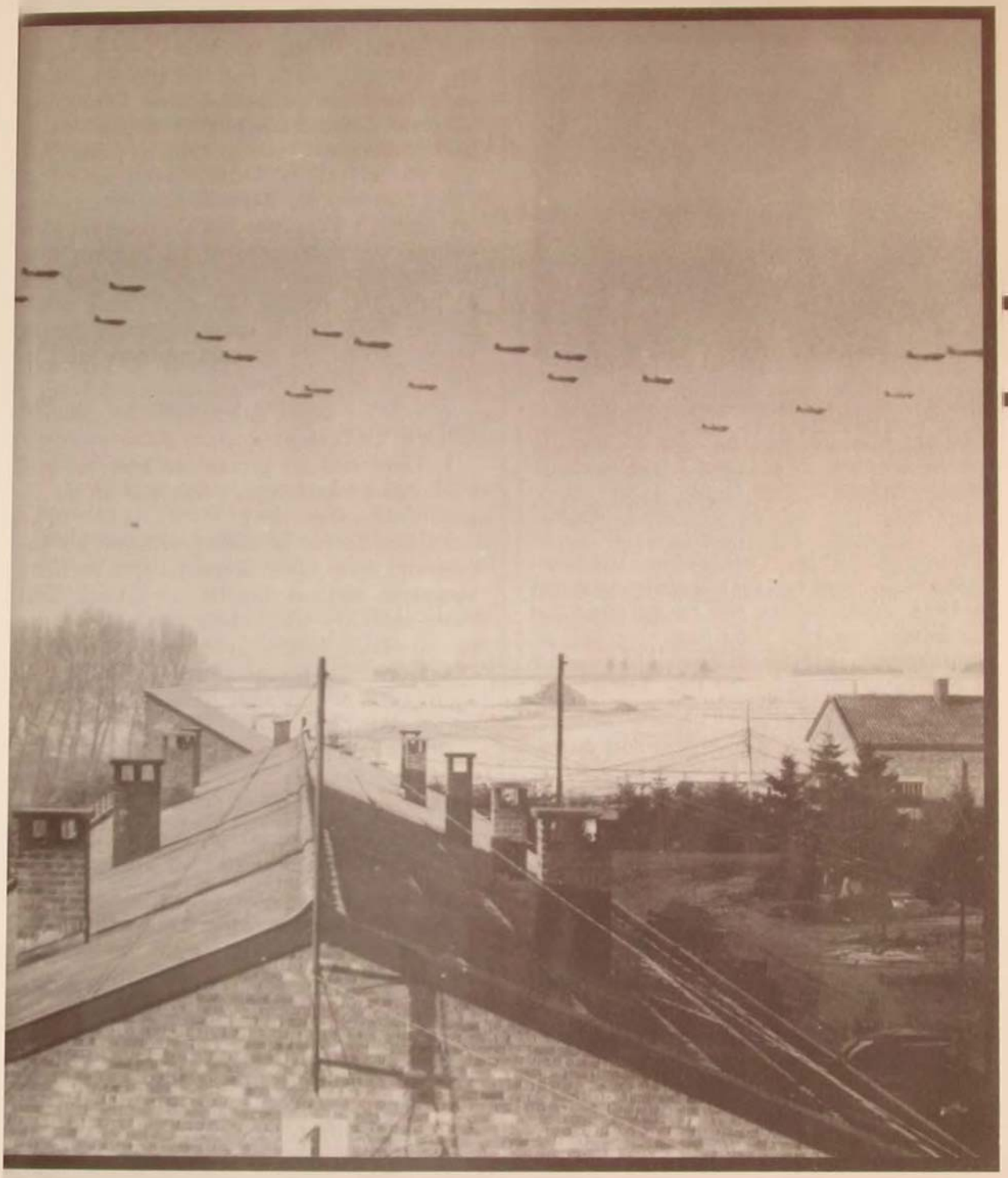
# AIR POWER IN THE BATTLE OF THE BULGE

## *A Theater Campaign Perspective*

COL WILLIAM R. CARTER, USAF

*The sixteenth of December 1989 is the 45th anniversary of the Battle of the Bulge. This battle placed tough demands upon our soldiers and airmen, and they met the challenge with competence and courage. To date much has been written concerning the ground operations. For it was on the ground that the ultimate outcome was measured. In contrast, the contributions of air power to the success of the battle have been largely presented in either shallow descriptions or individual flying unit tactical analyses. Missing has been an examination of air power as it was applied to achieve the goals of the theater strategy.*

POPULAR lore of the Battle of the Bulge evokes images of surprised Allied commanders, Gen George S. Patton's wheeling Third Army, gallantry at Bastogne, and answered prayer for good weather that brought the wrath of Allied air power on German forces.[1] How did air power support theater objectives and contribute effectively to the defeat of Hitler's 1944 Ardennes offensive? To gain an appreciation of the air commander's



*Maj Gen Elwood R. "Pete" Quesada (left), commander of IX TAC during the Battle of the Bulge. Above, C-47s resupply Bastogne after the weather improved. The layered air defense of the bulge enabled unarmed C-47s to deliver supplies directly into combat areas with the loss of only 19 cargo aircraft.*

*General Quesada was instrumental in the success of the air battle for the bulge. Flexible use of air doctrine and a close working relationship with Army ground commanders made a significant contribution to the defeat of the German offensive.*

perspective, we must understand the principles of air power as they were understood in 1944. After setting the background for the battle, we can then see how Allied commanders applied air power in support of a theater campaign to first blunt then smash Hitler's last gamble.

## The Principles of Air Power

The United States entered World War II as a "third-rate air power" at best.[2] As far as our knowledge went with regards to supporting ground operations with air power, we entered North Africa in late 1942 with an "abundance of ignorance."[3] However, American airmen learned quickly from the British experience in North Africa. Under the wing of Air Marshal Sir Arthur W. Tedder and Air Vice Marshal Sir Arthur "Maori" Coningham, Generals Carl "Tooey" Spaatz, Elwood R. "Pete" Quesada, Laurence Kuter, and others were seasoned.[4]

On 31 January 1943, President Franklin D. Roosevelt met with Prime Minister Winston Churchill at Casablanca, Morocco. At this conference the Anglo-American leaders and their staffs defined the alliance's grand strategy, established the Combined Chiefs of Staff, and agreed on both a strategic bombing and tactical support policy.[5] It was the successful, battle-honed model of Field Marshal Sir Bernard Law Montgomery and Air Vice Marshal Coningham that defined the principles of air support that became US Army Air Corps doctrine on 21 July 1943 in FM 100–20.[6] These intellectual tools forged early in North Africa served the Allied air commanders well in the Battle of the Bulge.

The key concepts incorporated in FM 100–20 were

1. Land and air power are coequal and interdependent forces; neither is an auxiliary of the other.
2. Land forces operating without air superiority must take such extensive security measures against hostile air attack that their mobility and ability to defeat the enemy land forces are greatly reduced. Therefore, air forces must be employed against the enemy's air forces until air superiority is obtained.
3. The inherent mobility of modern land and air forces must be exploited to the fullest.

The missions of air power employment as spelled out in FM 100–20 were

1. *First priority*. To gain the necessary degree of air superiority. This will be accomplished by attacks against aircraft in the air and on the ground and against those installations that the enemy requires for the application of air power.
2. *Second priority*. To prevent the movement of hostile troops and supplies into the theater of operations or within the theater (air interdiction).
3. *Third priority*. To participate in a combined effort of the air and ground forces, in the battle area, to gain objectives on the immediate front of the ground forces (close cooperation).

The basic doctrine of employment in FM 100–20 called for the following:

1. Air power operations should almost invariably precede the contact of surface forces. The purpose of this action is to disrupt the orderly mobilization and strategic concentration of the enemy's field forces.
2. Air operations are conducted in a joint Army and Navy operational plan focused on the strategic and tactical objectives.
3. Only total destruction of the enemy's aviation can gain and maintain complete control of the air. Since this is seldom practical, counterair operations and air defenses in the theater must be carried on continuously to provide security from hostile air operations.
4. Centralized command of air forces enables air power to be constituted in mass and enables it to be switched quickly from one objective to another in a theater of operations.
5. Facilities are required for tactical control and planning, administration, maintenance, repair, supply, and rest. Air bases, suitably located and secure, are essential for the sustained operation of military aviation. Aviation engineers are essential.
6. Adequate communications for the control and direction of air operations and for liaison are required.[7]

## The Setting

> When the disproportion of Power is so great that no limitation of our own object can ensure us safety from catastrophe . . . forces will, or should, be concentrated in one desperate blow. . . .
>
> Carl von Clausewitz
> *On War*

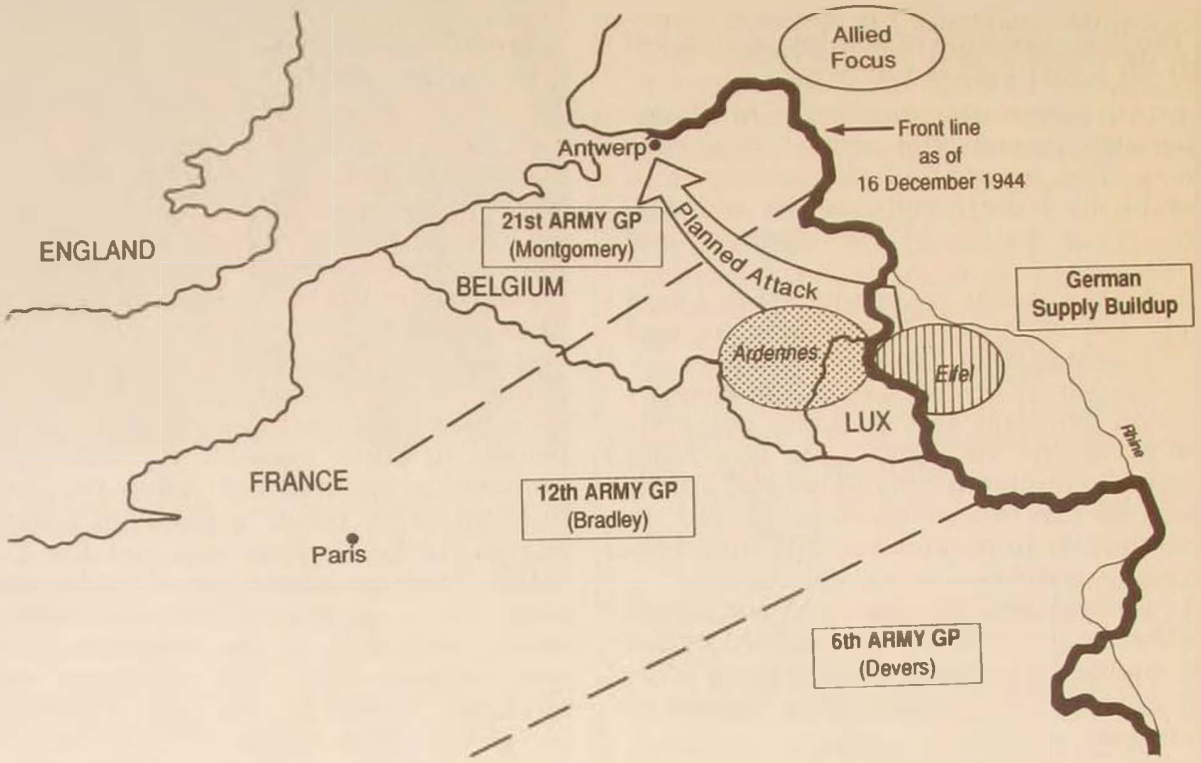
Hitler alone conceived the Battle of the Bulge. His purpose was to knock the Western Allies out of the war with a great victory that would "bring down the artificial coalition with a crash."[8] With this objective accomplished, he would turn to the east and "effectively" concentrate against the Soviets. However, the Germans had not launched an offensive outside the Soviet Union in nearly three years, and it was the first time an offensive had been attempted in the face of an opponent who had achieved air superiority. On the other side, this was the first time American air power had been assigned a large-scale battle mission *not planned in advance* as part of an offensive.[9]

In the fall of 1944, two Allied army groups faced Germany's "West Wall"; a third was in Alsace-Lorraine. The Allies paused to allow logistics to catch up in preparation for their next offensive phase, their attention being focused on planned attacks in the Aachen area and the Ruhr valley. They gave little regard to the possibility of a significant German counterattack, especially in the Ardennes Forest area, where four US divisions were stretched along an 80-mile front. Gen Dwight D. Eisenhower had thinned his strength in this region to provide the "mass" required to the north (map 1).

On 16 December 1944 Hitler struck this "quiet sector" with 24 divisions and 2,400 tactical aircraft, creating a 60-mile-wide break in the Allied line.[10] The number of aircraft dedicated to this operation was more than the Luftwaffe had used in 1940 to conquer France or successfully defend, though at great cost, the skies over Kursk in 1943.[11] Within a week these forces would be engaged by elements of two Allied army groups supported by 6,000 tactical aircraft and heavy bombers. Though the Allies had both numerical and qualitative superiority in the air in 1944, the threat of 2,400 enemy aircraft in one operation could not be dismissed.

The German operational objective was to drive quickly through Gen Omar Bradley's 12th Army Group to collapse the right flank of Field Marshal Montgomery's 21st Army Group. The ultimate goal was to capture Antwerp and "trap" 35 Allied divisions and possibly create another Dunkirk.

Hitler believed that a successful offensive through the American sector would trap




*Map 1. The position of the Allied lines on 16 December 1944, the day the Battle of the Bulge began. The focus of the Allies was in the north, while the German buildup was in the center. Hitler's plan was to use the German Heeresgruppe B (Army Group B) to drive through Gen Omar Bradley's 12th Army Group to collapse the right flank of Field Marshal Bernard Montgomery's 21st Army Group. The Sixth Panzer Army was to conduct the primary attack.*

Montgomery's forces and drive a political wedge between the British and the Americans. He hoped that it would create enough tension between London and Washington to make possible a negotiated armistice on the Western front. Thus, Hitler's blow was aimed at the *will* of the Allied high command.[12] He reasoned that Churchill and Roosevelt would have to consult to counter his attack, and that this delay would in turn give the Wehrmacht the time needed to seal the fate of the Allied front. Hitler did not believe that Eisenhower had the authority to act on his own.

Hitler began laying the groundwork for an offensive in the Ardennes in late July 1944.[13] This was at a time when the Allies were breaking out of Normandy at Saint Lô. In August, as the Allies raced toward Paris, Hitler began stockpiling equipment and materiel for the attack in the Eifel region and along the Rhine.[14] Hitler was setting his "trap" well ahead of Allied thinkers, and he was positioning his scarce resources to ensure adequate support. The Germans did not intend to depend on captured Allied supplies for success in this operation.[15]

In his all-out attack, Hitler guaranteed his ground commanders that they would have strong fighter support. Since air forces took time to build, he conceived the ruse of a massive defensive air campaign against Allied strategic bombers to build up his air power. An attack on the planes that were blasting German cities daily would most certainly motivate even the most reluctant Luftwaffe officers into full and enthusiastic

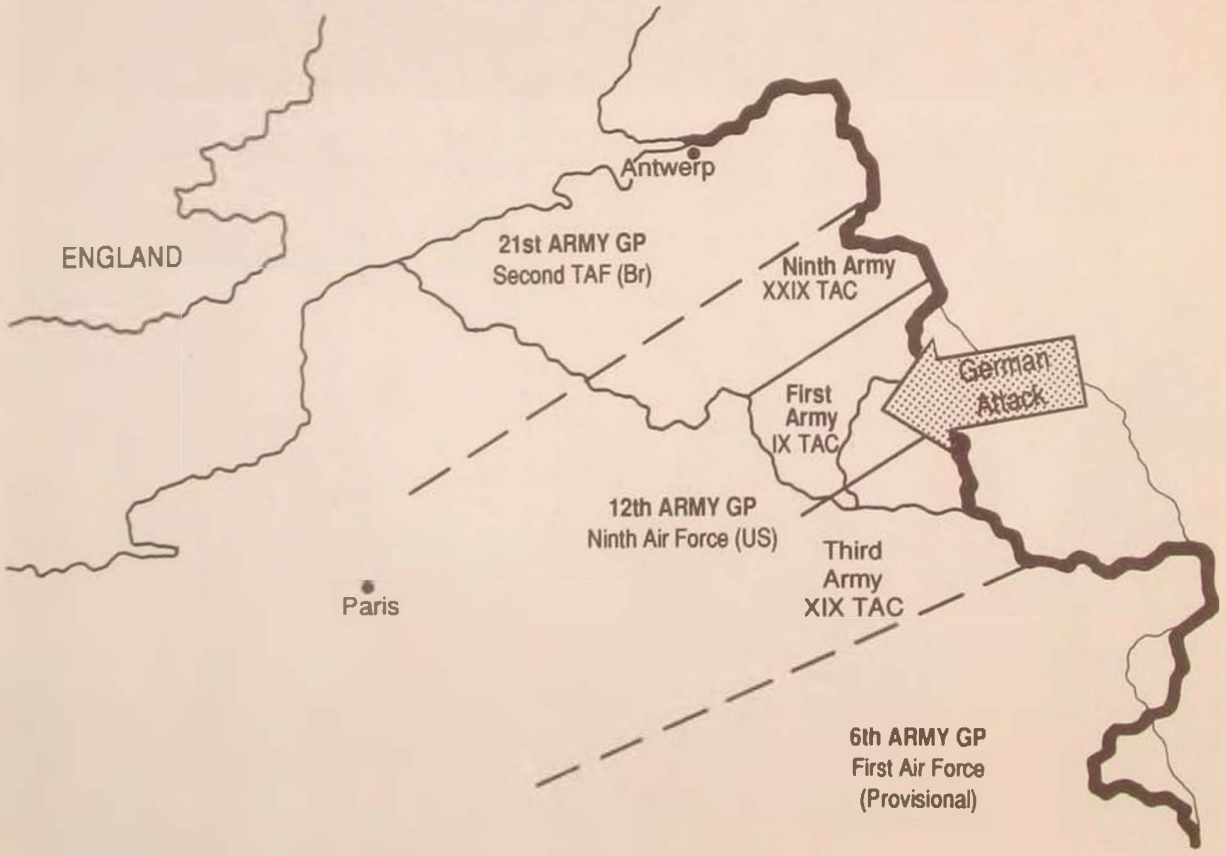
support. Only later would Hitler tell them of their true purpose.[16]

Behind this facade of deception, German air commanders prepared for a large defensive counterair operation, *der Grosse Schlag* (the Great Blow). Their plan was to engage in overwhelming strength the bombers of the Eighth Air Force. These airmen ardently designed a force of 18 fighter wings consisting of 3,700 aircraft, a "fighting force such as the Luftwaffe had never possessed before."[17] Planning, training, equipping, and basing all proceeded with the single focus on air defense. Although Hitler understood, very well, how to elicit his soldiers' devotion, he did not understand air power and distrusted the Luftwaffe leadership.

Hitler did not realize that a fighter force prepared solely for the mission of air-to-air combat was not very effective when directed to support combat on the ground. With this fault at the base of Hitler's planning, his air commanders built the wrong force structure. Deceived by Hitler, they constructed their air forces in isolation from the ground units that they would be required to support. Precious gasoline was used to train for air-to-air combat, not for air-to-ground attack. Tactics were developed for bomber intercept, not for ground support tasks. Munitions were procured for aerial combat, not for ground attack. Air bases were located east of the Rhine River for security and were consolidated to facilitate centralized control and timely massing. Forward deployed and dispersed fields needed to support ground operations were not prepared. Everything was designed for "the special task of defense of the Reich."[18]

On the ground the operational plan was simple though overextended. The Sixth Panzer Army (mostly SS divisions) was to

*Map 2. The German attack on 16 December 1944, which split Gen Omar Bradley's 12th Army Group.*



*Bastogne was resupplied by air from 23 December until 26 December 1944. During that time, IX Troop Carrier Command flew 962 sorties and dropped 850 tons of supplies to the surrounded town.*

*Fighter aircraft of IX TAC were stationed in Belgium, close to the front. This gave them a significant advantage over the Luftwaffe forces, which had a short combat radius and were stationed some distance from the fighting.*

conduct the primary attack with strong support on its left flank by the Fifth Panzer Army, comprised of regular Wehrmacht troops. The Fifteenth Army was to pin Allied troops in the Aachen area on the penetration's northern shoulder, and the Seventh Army was to block Patton on the southern flank.[19]

In the air the operational planning was as flawed as the force structure. The operational order for the attack of *Heeresgruppe B* (German Army Group B) toward Antwerp stated that the first priority of the Luftwaffe was "ground support for Panzer spearheads." Air was "to attack the roads along the axis of advance and the preparation areas." Only key points were to be supported due to limited air assets. Second priority was to "attack against the airfields of the enemy tactical units close to the front."[20] Planning for this second objective began in late November, but because of the extensive "veil of secrecy" surrounding the land attack, command indecision, and poor weather, it was not exercised until 1 January 1945.[21]

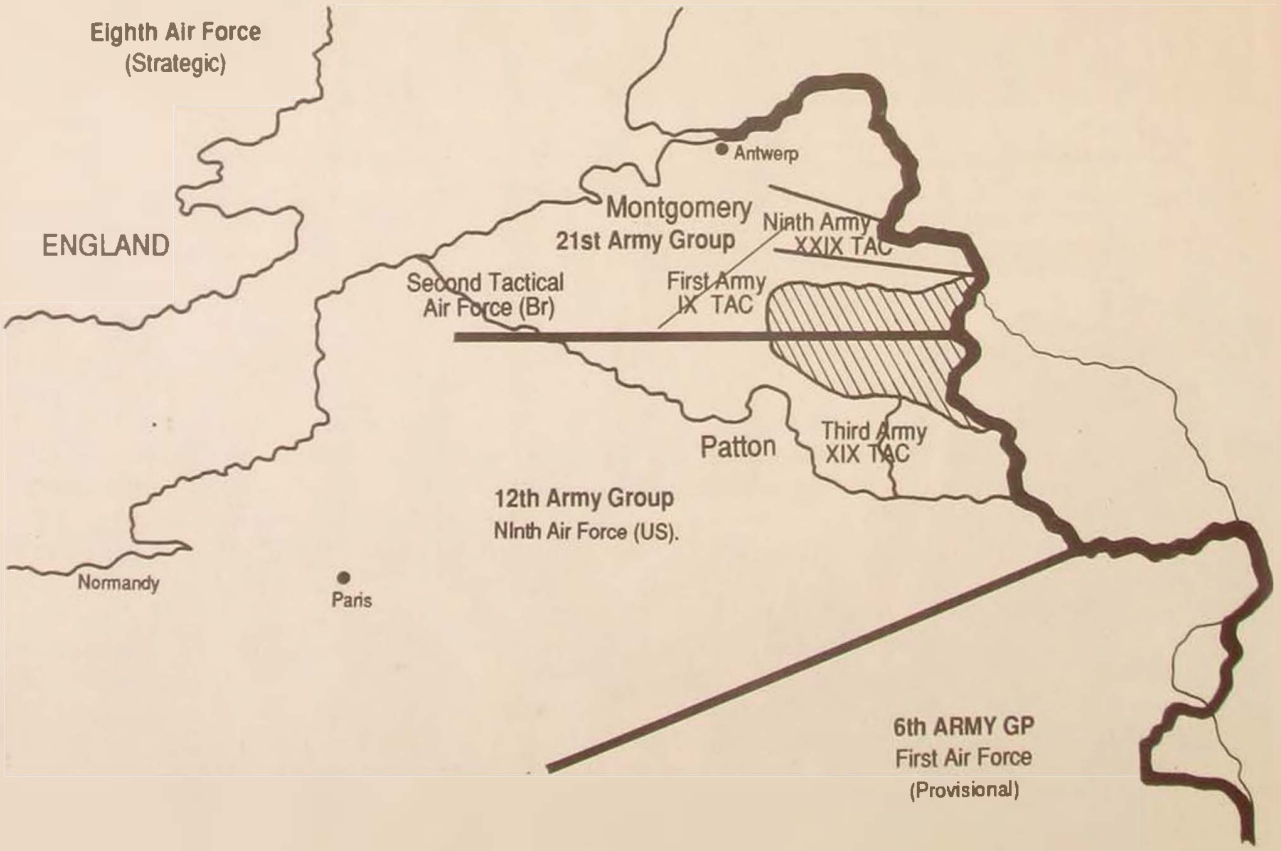
No consolidated Luftwaffe-German army command structure, planning staff, or operations staff existed. All integration of air activity went through a liaison headquarters of *Luftwaffen-Kommando West* attached to *Heeresgruppe B*. This liaison group communicated by radio or land line to appropriate Luftwaffe headquarters. All air attack requirements were passed to this

*While the bad weather hindered Allied air support in the early days of the battle, it ensured the availability of a rested and ready combat air force once the weather cleared.*

liaison office through army headquarters. Coordination between German air defense flak units and Luftwaffe fighters was extremely poor. Besides the recognition lights on Luftwaffe fighters, the only attempt to reduce fratricide was the use of *Goldregen* rocket signals. Luftwaffe ground liaison personnel fired these signals to alert nearby German ground forces and *Flakkorps* that low-flying Luftwaffe aircraft would be approaching from the rear. Returning flights were on their own.[22]

The Ardennes attack obtained its intended surprise. The Germans had produced an effective veil of secrecy and prepared for the offensive in almost total radio silence.[23] Even Ultra revealed no mention of the buildup.[24] In addition, heavy cloud cover and dense foliage in the buildup area as well as German deception activities contributed to the concealment. The plan intentionally took advantage of the poor seasonal weather and the long winter nights. A bogus headquarters, *Gruppe von Manteuffel*, was created to shroud the command structure. Even the code name *Wacht am Rhein* (Watch on the Rhine) was structured to convey a "defensive" nature, while all movements and preparations had to be justified by another code name *Abwehrschlacht im Westen* (Defensive Battle in the West).[25] To feed Allied misperceptions about these "defensive" preparations, the first paragraph of every movement order contained the words "in preparation for the anticipated enemy offensive. . . ."[26] Moreover, the degree of surprise achieved was compounded by Allied overconfidence, preoccupation with

*Map 3. The disposition of the US armies and air commands on 20 December, after Field Marshal Montgomery took command of the north side of the bulge and Patton the south.*



their own offensive plans, poor aerial reconnaissance, and the relative lack of combat contact by the US First Army. Allied intelligence failed completely to detect the offensive.[27] The Allies "had looked in a mirror for the enemy and seen there only a reflection of their own intentions."[28]

The Germans had attained surprise, and their *tempo of advance* became the center of gravity for Hitler's offensive. While consuming supplies at a very high rate,[29] they had to quickly seize key roads, communications hubs, and bridges. Hitler's forces required hard, frozen ground to support their off-road armor tactics, to support supply movements around obstructions, and to bypass Allied strong points. They also needed low clouds and fog to ground Allied air forces. Unhindered movement was essential.

It was not to be. Constricted and ever-lengthening transportation routes compounded the German logistics problem.[30] This was a condition magnified by malpositioned war materiel and gasoline. Nearly half of the German supplies were located east of the Rhine—more than 60 miles from the attack's starting point. Hitler had directed this positioning as a security measure, so as not to draw unnecessary attention to the Eifel buildup area prior to the attack. It became a serious flaw in the face of Allied air interdiction. Additionally, above-freezing temperatures combined with the wet weather to make off-road traffic a muddy impossibility through the first critical week of the offensive. The poor weather channeled the German attack to the already limited number of east-west roads in the Ardennes—a situation that left their army even more vulnerable to disruption by air attack.[31]

During the first three days of the offensive, the Allied air forces and the Luftwaffe met in the skies over the cloud-covered battlefield as the Luftwaffe attempted to get under the low ceilings to support *Wacht am Rhein*. The fighters of the Ninth Air Force engaged them, claiming 136 kills.[32] On 23 December the Luftwaffe changed its objective. Instead of pressing the ground-attack mission "in mass," it divided its effort equally between ground attack and bomber intercept. With this split purpose, the Luftwaffe did neither well.[33] Moreover, hitting the heavy bombers focused Allied attention on the potential problem that such a large number of enemy planes could pose.

## Allied Counterstrategy

By 20 December General Eisenhower had formed a counterstrategy and modified his command structure to meet the threat. Eisenhower had focused his responding battle strategy on the German vulnerabilities of *tempo* and *logistics*—to restrict German resupply by confining the penetration to as narrow a one as possible.[34] To accomplish this, he built strong defensive shoulders at the base of the salient, established "impenetrable" flanks to contain the penetration's width, and defended key communications centers along the axis of the German advance (fig. 1). Holding the crossroads at Saint Vith and Bastogne was the key element of the strategy designed to increase German logistics requirements and slow the German advance. Next, Eisenhower established a blocking position to limit the depth of the penetration, relying primarily on Montgomery's 21st Army Group. Once the Germans were contained, he would counterattack.[35]

General Eisenhower's air commanders placed first priority on air supremacy to prevent the Luftwaffe from giving direct support to the advancing German ground troops. Allied ground forces required complete freedom of maneuver to withdraw, reinforce, and counterattack. Due to the immediate threat of enemy armored spearheads, the second priority became close cooperation with ground forces to "destroy the weapons committed by the enemy to the attack."[36] Targets to be attacked were "German tanks, aircraft, motor transport, and guns." The third priority was an in-

terdiction effort designed to "knock out the facilities necessary to replenish the enemy's supplies—the rail roads, bridges, marshaling yards, and communications centers, as well as the supplies themselves."[37]

The Allies quickly adjusted their command structure to execute General Eisenhower's strategy. General Quesada, then commander of the IX Tactical Air Command (TAC),[38] described these adjustments:

> The Germans in their Bulge effort had definitely put a dividing line within Bradley's army group area. Bradley would have had one part of his army group north of the Bulge and another part of his army group south of the Bulge. And Eisenhower felt that it would be better to have the north side of the Bulge be under one army group, which in this case would be Montgomery. Because Montgomery was contributing British units to this force, Eisenhower thought it would be better for Montgomery to have command of the U.S. Ninth and First Armies.[39] (See maps 2 and 3.)

*Innovative uses of radar and other command and control systems (at left, a "Pundit Light") enabled the Allies to gain and maintain air superiority. Despite heavy snow (below), runways were kept clear to keep aircraft flying.*

## The Air Operation

Along with the Ninth and First US Armies went their respective tactical air commands—XXIX TAC with the Ninth Army, and IX TAC under General Quesada supporting the First Army. These commands were changed from the operational control of the Ninth Air Force to the control of the Second Tactical Air Force of the Royal Air Force (RAF). At that time, Air Marshal Coningham appointed General Quesada responsible for controlling all Allied air efforts on the north side of the bulge.[40]

Throughout the entire continental campaign from the Normandy beachhead to the fall of the Reich, there was neither a theater air component nor ground component commander (an exception to the specific letter of FM 100–20). General Eisenhower, with Air Chief Marshal Tedder as his deputy, assumed the positions of both, as well as that of exercising overall theater command. The tasks of determining the amount of resources that should be placed against which individual target group and allocating resources among the operational com-

mands were accomplished by a balance of Allied air force components working closely together. The need was apparent, and the mission was clear. Organizational structure did not stand in the way of centralized direction and unity of the air campaign.[41]

The Ninth Air Force coordinated all support activities and assigned fighter and bomber groups to appropriate tasking and controlling authorities—in most cases either the IX or XIX Tactical Air Commands.[42] The TACs then executed the air battle and coordinated closely with their respective armies to maintain cohesion with the land battle. The Eighth Air Force coordinated its ground support attacks through the Ninth Air Force, and the TACs coordinated their operations along army boundary lines with each other.

"Inoperable" flying weather closed in on the entire battle area from 19 until 23 December.[43] During this period, the German penetration expanded to a 50-mile bulge—its maximum depth. Saint Vith was evacuated; but Bastogne, although surrounded, still held. On 23 December the skies cleared. Allied air and ground power were ready to strike.[44] Allied ground movements had secured the flanks of the penetration and blunted its expansion westward. Rested and ready, Allied air forces attacked.[45] In the next five days, they flew more than 16,000 sorties.[46]

The Allied effort maintained air supremacy to the point that the Luftwaffe did not significantly hinder a single Allied ground movement or operation during the battle. The Allied air forces constructed a layered defense that Luftwaffe pilots had to negotiate just to get into the "battle area." First, in response to heavy Luftwaffe attacks on bombers on 23 December, Eighth Air Force heavy bombers carpet-bombed the German forward bases around Frankfurt on 24 December.[47] The Eighth's fighters engaged the Luftwaffe's airborne fighters and strafed their airfields daily.[48]

The next barrier was the RAF's Second Tactical Air Force and the XXIX TAC roaming over the Eifel region. Finally, to the west, the German fighters faced the IX and XIX TACs directly over the bulge itself. To get home the German pilots had to negotiate these same barriers while contemplating the prospect that Allied aircraft might be waiting to jump them when they returned to their airfields. Aided by ground-based radar and "Y-Service"[49] radio intercepts, Allied fighter groups timed their airfield attacks to coincide with returning Luftwaffe aircraft that were low on fuel and ammunition. This tactic worked especially well against jet aircraft, which were also restricted to concrete runway operations. Forced to engage Allied fighters while attempting to land, many Luftwaffe pilots ran out of fuel and crashed.[50]

Despite losses, the Luftwaffe managed to fly as many as 1,200 sorties on some days. However, the effort was one of "despair."[51] Shifting operational priorities, the lack of coordinated air and ground planning, no clear doctrine of air power employment, and poor leadership at the top crippled the Luftwaffe's effective use. Other major contributing factors to the ineffectiveness of the Luftwaffe were (1) the inexperience of most of the German pilots compared to their American and British opponents, (2) fuel shortages, (3) the short operational range of their aircraft, and (4) the distance of their air bases from the area of the offensive.[52]

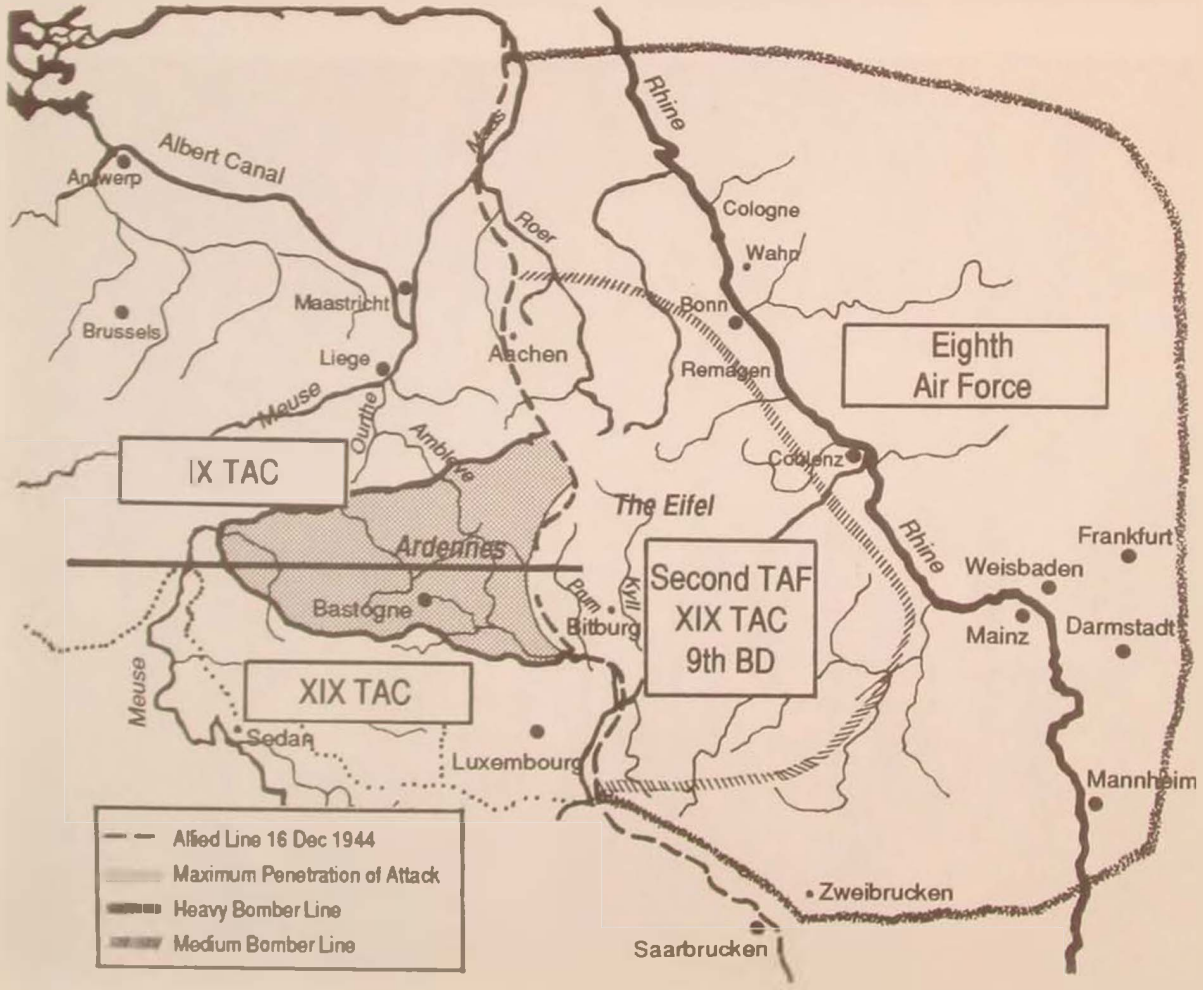
The clear weather of 23 December unleashed the full power of the Allied air forces, and the Luftwaffe faced another dilemma. Allied interdiction was having a serious impact on German logistics.[53] Yet, Luftwaffe orders were to support the German army with ground attack sorties. They had to choose whether to comply with the air operations plan issued by Army Group B at the beginning of the offensive or to engage Allied air power. Once again the decision was split and reactionary. Pilot prisoners captured between 23 and 31 December stated that they had been ordered to attack ground targets but that these attacks had "not been pressed with skill or deter-

mination."[54] It had become too deadly to challenge the Allied air forces' layered defense protecting the bulge. Meanwhile, other aircraft were sent to attack the heavily escorted medium and heavy bombers. The Luftwaffe achieved mass on neither objective.

With air superiority achieved, Allied air forces executed their air-to-ground operations to obtain four specific objectives. First, fighter-bombers were assigned to attack armored spearheads.[55] The IX TAC directed air action against the Germans' primary attack axis, which was the north side of the bulge. The XIX TAC ran operations in relief of Bastogne and along the southern side.[56] The second objective was to "isolate the Ardennes-Eifel area from rail traffic." Responsibility for this "classic interdiction" went to the light and medium bombers of the Ninth Air Force's 9th Bombardment Division, the XXIX TAC, and the RAF's Second Tactical Air Force.[57] (See map 4.) In addition to ground attack, the Ninth's fighters supported the 9th Bombardment Division in the Eifel region with air escort, flak suppression, and follow-up attacks after bomber raids.

The third objective of the ground attack plan called for delaying, harassing, and obstructing road traffic. The medium and

*Map 4. The maximum extension of the bulge. Also shown are the mission assignments of the air assets.*



heavy bombers of the Ninth and Eighth Air Forces accomplished this objective both in the Eifel region and within the bulge itself.[58] To streamline the responsiveness of strategic bombardment assets, the Eighth Air Force passed direct tasking authority of its 2d Air Division to the Ninth Air Force.[59] The final objective was to isolate the battle area by the "destruction of storage, rail heads, and supplies around the perimeter of the isolated area." This was the primary task of the Eighth Air Force, which attacked river bridges, rail yards, and marshaling areas along the Rhine. Eighth Air Force fighters, after completing bomber-escort duties, strafed rail and road traffic east of the Rhine.[60]

Also with the clear skies came the opportunity to resupply Bastogne, which by 23 December had run critically low on ammunition and supplies.[61] Between 0930 hours on 23 December and the afternoon of 26 December, the day the US 4th Armored Division broke the siege, the IX Troop Carrier Command flew 962 sorties and dropped 850 tons of supplies to the defenders. Heavily protected from air attack and ground fire by the fighter-bombers of the XIX TAC, the entire operation resulted in the loss of only 19 C-47s.[62]

The Luftwaffe's attempted aerial resupply to the overextended *Kampfgruppe Peiper* of the Sixth Panzer Army's 1st SS Panzer Division and the paradrop of Col

*A German half-track (below) and a Mark IV tank (opposite page) destroyed in Houffalize, Belgium. This area was repeatedly struck by Ninth Air Force bombers.*

Friedrich von der Heydte's commandos were complete failures.[63] However, the Luftwaffe's night bombings of Bastogne on Christmas Eve and again in January had their effect. Conducted under flare illumination from Luftwaffe pathfinder aircraft, the attacks exposed a weak point in the Allied air defense—night fighters. General Bradley said, "Enemy air was able again and again to get through to attack the defended city with serious results. [Allied] night fighter activity was inadequate."[64]

As the bulge was compressed, the Luftwaffe attempted one last effort to reduce the effectiveness of Allied fighter-bombers. In a dawn raid on 1 January 1945, 900 Luftwaffe aircraft attacked Allied airfields in Belgium, Holland, and France—operation *Bodenplatte* (Base Plate).[65] The Luftwaffe and the German command had once again achieved surprise. However, poor tactical execution and planning cost the Luftwaffe more than 300 of their attacking aircraft.[66] More important, they lost 232 pilots—of which 18 were unit commanders and 59 were leaders; this was the life's blood of the Luftwaffe. As a pitiful epitaph, German flak gunners shot down as many as 100 of their own returning Luftwaffe aircraft.[67] In contrast, the Allies replaced the 127 aircraft lost on the ground in less than a day, and the skies of 1 January 1945 saw the second largest Allied sortie rate of the battle.[68] The Luftwaffe was rarely seen again in any appreciable strength.[69] *Bodenplatte* was more than a total defeat. "The *Luftwaffe* [had] received its death blow."[70]

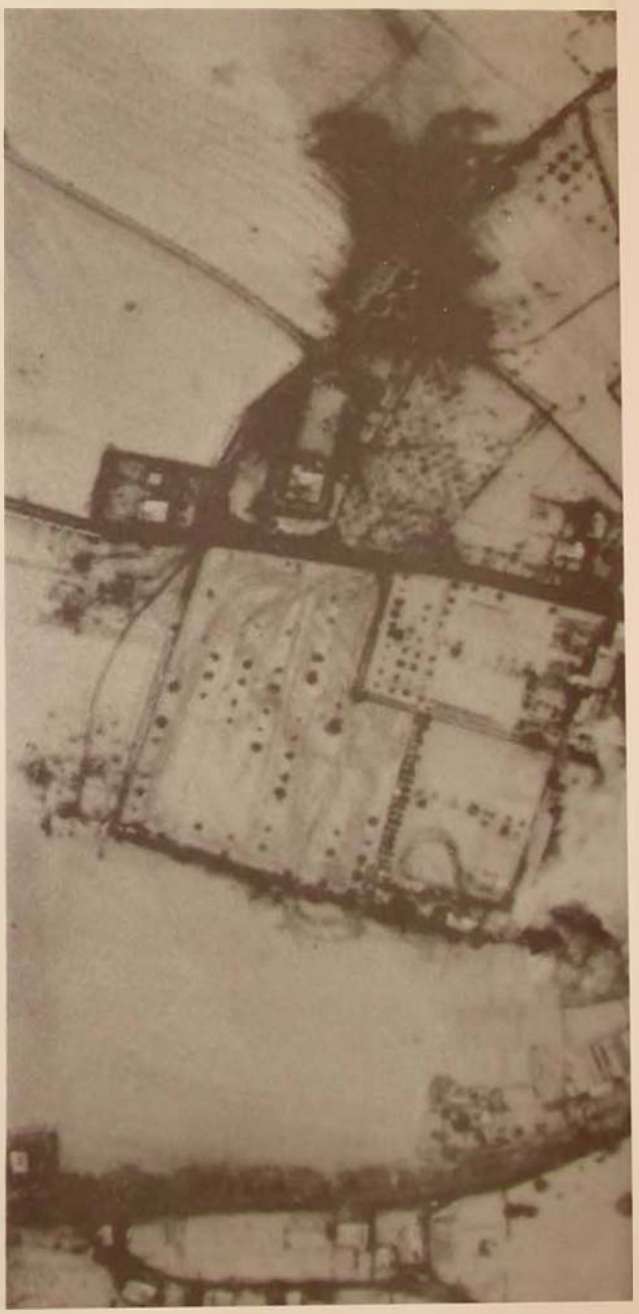
During the Battle of the Bulge, Allied air power doctrine and its conceptual underpinnings had reached full maturity in the

European theater of operations. Commanders of ground and air forces worked alongside each other every day, participating together in the planning process from concept to execution.[71] Forward air controllers worked with army maneuver elements to ensure effective tactical coordination. The Army used distinctive panels to mark its vehicles and fired artillery routinely to suppress enemy antiaircraft fire. It also fired smoke rounds to help fighter pilots identify targets. Even Army balloon companies helped by identifying friendly positions and assisting in fighter target area navigation.[72]

A key element of Allied air control was ground-based radar—a capability that the Luftwaffe ignored. Luftwaffe leaders realized neither its importance nor its vulnerabilities. Although they understood the technical capabilities of radar, they never put it to use in the manner employed by the Allies. They saw its use only through the "lens" of their own application—as a facilitating tool for *air defense* operations.[73]

In contrast, General Quesada innovated. He used the microwave early warning (MEW) radar and the SCR-584 antiaircraft radar in several new and unplanned ways, building an entire command and control network centered around this new technology. He put radio intercept operators (Y-Service) with MEW and radio controllers to help win the air battle.[74] To assist ground-attack missions, MEW operators coordinated with SCR-584 operators to provide navigation and precise control to fighter-bombers.[75] The wide-band MEW was used for long-range and area control, while the SCR-584, with its narrow beam, was used for close-range, precision work.[76]

Throughout the battle, the thick, low clouds, the snow-covered land, and the fluid ground situation made navigation and ground target identification difficult to impossible.[77] General Quesada's operation solved the problem.[78] Radar operators helped fighters get under and through the weather both in the target areas and at recovery bases and validated targets by correlating ground locations with tracked fighter positions. Furthermore, IX TAC used the SCR-584 to "blind bomb" through overcast skies such area targets as Saint Vith and to direct night aerial reconnaissance flights.[79] As a result, the fighter-



*St. Vith, the vital communications center and choke point captured by the Germans after fierce fighting, is seen under aerial attack on Christmas Day, 1944. This operation was part of the systematic effort to isolate the Germans from their much-needed supplies.*

bombers controlled by the IX TAC effectively supported Allied ground forces, even in times of poor weather and confusing ground tactical situations.[80]

Had it not been for radar, the coordination of effective air-to-ground operations would have been "incredibly difficult and impossible under the weather conditions" that prevailed.[81] The effective use of radar in attacking ground targets was devastating on the enemy, while Allied fratricide was minimal.[82] The use of radar, though in its infancy, "permeated every phase of air warfare." It provided for the control and direction of "virtually every day or night sortie flown by the TACs."[83] The IX TAC's radar-centered command and control system became a decisive factor in the battle outcome.[84]

## Analysis

Allied air power's success and Hitler's defeat during the Battle of the Bulge vindi-

cated the principles of FM 100–20.[85] The Allies kept the Luftwaffe out of the ground battle and by January had knocked it out of the war. German ground forces suffered severe delays and heavy losses to their armored spearheads, which were denied the tactical mobility of daylight maneuver. And Allied air interdiction crushed the German logistics effort. In contrast, force structure, doctrine, and leadership problems doomed the Luftwaffe.

The Allied command had withstood the test, and the Allied air commanders had met the challenge. Exceptions were made to the "letter" of the doctrine to fit the need of the battle. Command lines were tailored to fit General Eisenhower's organization. *Centralized control* was accomplished by relying on the battle-honed, close-working relationships of the air force commanders. *Mission priorities* were adjusted to address the threat. *The mission of close cooperation with ground forces*, as prioritized by FM 100–20, was moved ahead of *interdiction* as a necessity of battle. In addition, the close working relationships of the air and land commanders developed by their *collocated headquarters* proved to be an essential element of the combat synergism of combined air and land power. The doctrine of FM 100–20 proved to be as flexible and responsive as air power itself.

Allied air forces maintained *air supremacy* over the battle area, which in turn facilitated unhindered Allied ground movement. They had constructed a layered fighter defense supported by ground controllers and radio intercept operators. Meanwhile, they attacked Luftwaffe airfields with both fighters and bombers, and the Allies timed their attacks to hit when the Luftwaffe was most vulnerable—during landing operations.[86]

With air supremacy achieved, the Allies successfully executed both the *close cooperation* and *interdiction* phases of their plan. Innovations in radar used became a key factor in successful air-to-ground attack as well as combat in the air. With the MEW and the SCR-584, General Quesada's IX TAC directed *close cooperation* through poor weather and confusing ground battle situations—achieving a degree of effectiveness that would have been impossible otherwise. The TACs' command and control system adjusted to and met the challenge of a massive, unplanned operation. Field Marshal Gerd von Rundstedt, the nominal commander of the Ardennes offensive, said that Allied air power "made impossible the reshuffling of troops and robbed us of all mobility."[87] In the words of another German general, it was like playing chess where your opponent took three moves to your one.[88]

Though third in priority, *air interdiction* crushed the German army's logistical effort. The German army had not been underprovisioned; rather, the Ardennes attack had provided ideal circumstances for interdiction. The *tempo* of the German Ardennes offensive required supplies in large quantities, which in turn had to be transported over restricted and ever-lengthening routes to meet critical timetables. Furthermore, the "malpositioning" of large stockpiles behind a major river barrier, the Rhine, created a significant vulnerability and a lucrative target. When executed against the direct Allied ground and air counterstrategies, *Wacht am Rhein* failed.

The Allies had prepared *complementary* air and ground strategies against the German logistics vulnerability. On the ground, obstacles like Bastogne frustrated German supply and created targets vulnerable to air attack. In the air, the firepower and mobility of Allied air forces slowed resupply to a nighttime-only trickle. The Allied attack on the German logistics system from the Rhine, across the Eifel region, and throughout the bulge crippled the tempo, timing, and sustainability of the offensive.

German supplies were disrupted during the critical high-usage-rate periods of the offensive. The German 2d Panzer Division of the Fifth Panzer Army ran out of gas just as the US 2d Armored Division attacked it on 24 and 25 December at the westernmost tip of the bulge salient.[89] In other German

divisions, tank and motorized crews abandoned hundreds of vehicles with empty gas tanks.[90] Finally, German morale was deflated—and Allied morale boosted—by the constant swarming of Allied aircraft over the battlefield. German ground forces had felt the full impact of successful *air interdiction*.[91]

Despite Hitler's success in maintaining secrecy and executing deception, his air operations were flawed from the start by his naive view of air warfare and his distrust of the Luftwaffe leadership. He had deceived his own airmen into posturing the wrong force for the task. The Luftwaffe, knowing it had prepared its force structure and basing to fight a totally different conflict, began the Battle of the Bulge demoralized and disillusioned. The domination of the Luftwaffe's air support system by senior ground commanders further fragmented its efforts and diluted any concentration that could have been achieved with its scarce resources. Thus, with poor leadership at the very top, the wrong force structure, and the lack of unity in the command structure, the Luftwaffe misapplied the basic principles of air power.

When examining the Luftwaffe operations in detail, one finds poor execution as well as planning. The senior Luftwaffe commanders diluted the potential effectiveness of their air assets by shifting operational priorities on an almost daily basis. This "flexibility," which allowed the Luftwaffe to move from one mission to another, contributed to the lack of adequate air power on any one objective. Furthermore, the Luftwaffe lost the potential to mass its forces and brought destruction on its own airfields when half of its forces were shifted away from *Wacht am Rhein* to attack the strategic bombers early in the battle. Later, when the Luftwaffe tried to execute the *Bodenplatte* portion of its prepared air operation, tactical errors and fratricide cost them the heart of their air force.[92]

Moreover, the Luftwaffe leadership and the German high command did not comprehend the changes that had taken place in air power during the five years of war. Technology, doctrine, and leadership had flourished in air forces other than in the Third Reich. The Luftwaffe command had so segregated itself that it became crippled by the lack of creative thought. Thus, it failed to realize either the potential weaknesses of the enemy (i.e., the Allies' limited number of radar sets) or the strengths of the Allied doctrine, organization, or command and control system. Hitler's commanders had relied solely on their own perceptions and understood neither their enemy nor air power.

## Epilogue

In mid-January 1945, the Soviets launched their final offensive against the Reich—an attack that by May took them to Berlin. To counter it, Hitler ordered all available forces to the east. On 22 January near Dasburg, Allied aircraft caught German divisions moving in broad daylight to the Eastern Front. Troops and equipment were spread along columns 10 miles long. Allied air exploited the situation. The IX TAC alone destroyed more than 2,800 vehicles, tanks, and wagons and killed large numbers of troops.[93]

The Allied air campaign—air superiority, close cooperation, and interdiction—had succeeded in full. In a document captured after the war, German Field Marshal Walther Model, commander of Army Group B during the Battle of the Bulge, wrote the following statement concerning the effectiveness of air power during the battle: "Enemy number one is the hostile air force, which because of its absolute superiority tries to destroy our spearheads of attack and our artillery through fighter-bomber attacks and bomb carpets and to render movements in the rear areas impossible."[94] Shortly thereafter, he put a pistol to his head and committed suicide.

## Conclusion

> History is the only laboratory that we have in peacetime to develop and try theories of war. . . .
>
> John A. Warden III
> *The Air Campaign*

The air operations during the Battle of the Bulge reveal the effect of air power's missions in the context of a theater-level conflict. The contrasting strategies, doctrine, and organizations of the Allies and the Luftwaffe continue to give us insight into the force structure and decision process of air power employment—both right and wrong. General Quesada's skillful leadership provides a rich case study of the vision, flexibility, and innovation required of a great air commander. Furthermore, the battle demonstrated the effect of technology, with increased capabilities, which could not only improve the tactical effectiveness of forces but directly influence the war-fighting concepts and overall force employment. The cohesion of the Allied air and land forces, working in concert with each other, continues to relate how air power is synthesized "jointly" in a theater campaign. The "Air Battle of the Bulge" validates the foundation of current air power doctrine. □

**Notes**

1. Patton summoned Army Chaplain James H. O'Neill to "get God on our side for a change" and to pray for good weather. The chaplain complied. On 23 December the skies cleared; Chaplain O'Neill earned a medal. Danny S. Parker, "Battle for the Ardennes, May 1940 and December 1944," *Strategy and Tactics* 71 (November–December 1978): 38.

2. Lt Gen Lewis H. Brereton, USA, *The Brereton Diaries: The War in the Air in the Pacific, Middle East and Europe, 3 October 1941-8 May 1945* (New York: William Morrow and Company, 1946), 7.

3. Michael L. Wolfert, "From Acts to Cobra: Evolution of Close Air Support Doctrine in World War Two," Report 88-2800 (Maxwell AFB, Ala.: Air Command and Staff College, 1988), 21.

4. General Spaatz commanded the Northwest African Air Forces, one of the three major subordinate commands under the Mediterranean Air Command headed by Air Marshal Tedder. Air Vice Marshal Coningham ran the Northwestern African Tactical Air Force under which both Generals Quesada and Kuter served. Frank Craven and James L. Cate, eds., *The Army Air Forces in World War II*, vol. 2, *Europe: Torch to Point Blank, August 1942 to December 1943* (Chicago: University of Chicago Press, 1948), 162–64.

5. Richard H. Kohn and Joseph P. Harahan, eds., *Air Superiority in World War II and Korea* (Washington, D.C.: Office of Air Force History, 1983), 30.

6. "U.S. Tactical Air Power in Europe," *Impact* 3, no. 5 (May 1945): 4; see also Wolfert, 49.

7. War Department Field Manual (FM) 100-20, *Command and Employment of Air Power*, 21 July 1943, 1–11.

8. Charles B. MacDonald, *A Time for Trumpets* (New York: William Morrow and Company, Inc., 1985), 47.

9. "U.S. Tactical Air Power in Europe," 45.

10. The German air order of battle on 16 December 1944 consisted of the following:

| | |
|---|---|
| Jet Aircraft | 40 |
| Level Bombers | 55 |
| Ground Attack Aircraft | 390 |
| Single-engine Fighters | 1,770 |
| Twin-engine Fighters | 140 |
| Reconnaissance Aircraft | 65 |
| TOTAL | 2,460 |

See Parker, 35. Postwar records show that of this number only 1,376 were ever operational at any one time, and the Luftwaffe averaged less than 50 percent operationally ready on any given day. Craven and Cate, vol. 3, *Europe: Argument to V-E Day, January 1944 to May 1945*, 673.

11. MacDonald, 45. At Kursk the Luftwaffe possessed approximately 1,850 aircraft against more than 3,000 Soviet planes. John F. Kreis, *Air Warfare and Air Base Defense* (Washington, D.C.: Office of Air Force History, 1988), 199.

12. General of the Army Dwight D. Eisenhower, *Report by the Supreme Commander to the Combined Chiefs of Staff on the Operations in Europe of the Allied Expeditionary Force, 6 June 1944 to 8 May 1945* (Washington, D.C.: US Government Printing Office, 1946), 75.

13. "The intention to go over to the offensive in the west already existed at the end of July." Adolf Galland, *The First and the Last: The Rise and Fall of the German Fighter Forces, 1938–1945* (New York: Holt, 1954), 242.

14. "Strategic Air Wins in Europe," *Impact* 3, no. 7 (July 1945): 67. The bulk of the gasoline was stored east of the Rhine. *Operational History of the Ninth Air Force*, bk. I, *Battle of the Ardennes: 1 December 1944-31 January 1945*, sec. II, 4.

15. Joseph A. Wyant, "Material in Response to Telephone Request of 28 September 1945 Concerning Allied Air Effort during the Battle of the Bulge," an undated reply to Brig Gen R. C. Candee by the Office of Ninth Air Force History on file at the Air Force Historical Research Center, Maxwell AFB, Ala. Stringent rationing, drawing from existing stockpiles, and importing oil from Hungary had resulted in a 5-million-gallon petrol stockpile for the attack in the Ardennes. Any captured Allied gas would be a bonus. MacDonald, 46.

16. Galland, 241–42.

17. Ibid., 241.

18. Ibid.

19. Vincent J. Esposito, ed., *West Point Atlas of American Wars* (New York: Praeger, 1959), 60.

20. Jean Pallud, *Battle of the Bulge: Then and Now* (London: Battle of Britain Prints International, Limited, 1986), 33.

21. Michael J. F. Bowyer, *2 Group R.A.F.: A Complete History, 1936–1945* (London: Faber, 1974), 403–4; see also Galland, 241.

22. Pallud, *Battle of the Bulge*, 33.

23. MacDonald, 61.

24. "Ultra" refers to the German high command encoded messages that had been intercepted and decoded by the Allies. This information only went to the commanders of Allied field armies, tactical air commands, and above. The lack of any Ultra information about the impending German attack contributed to a dismissal of what little tactical information was becoming available. Lt Gen Elwood R. Quesada, USAF, Retired, interview with author, 9–11 April 1988 (hereafter referred to as Quesada, 1988 interview); see also MacDonald, 60–61.

25. MacDonald, 40.

26. Ibid.

27. Parker, 38. On 15 December some 18 hours before the Germans launched their attack, Eisenhower's G-3, in briefing the air commanders on the ground situation, dismissed the Ardennes with a simple "nothing to report." See also Craven and Cate 3:682; and MacDonald, 56–67.

28. MacDonald, 79.

29. An estimation of the tons of supplies per day for a division in contact can be made by examining the logistics requirements for sustaining an equivalent Allied division, adjusted for size and motorized composition. Using this "yardstick," German logistics requirements in the Ardennes should have been between 400 and 550 tons per day per division in contact and about two-thirds that number while in movement. To meet this need, a minimum of 2,000 truckloads of materiel had to reach the front each day just to sustain the German army group.

30. Wyant, 23.

31. Ibid., 23–26.

32. Ibid., 16–18.

33. *Operational History of the Ninth Air Force*, bk. I, sec. III, 58.

34. Craven and Cate 3:685.

35. "Another Tactical Air Triumph," *Impact* 3, no. 2 (February 1945): 8.

36. Note that "close cooperation with ground forces" moved to the second priority task from its stated priority in FM 100-20. This action at the command level demonstrated that pragmatic Allied decisionmakers had learned to take advantage of the *flexibility of air power*.

37. *Operational History of the Ninth Air Force*, bk. I, sec. II, 5.

38. The IX, XIX, and XXIX Tactical Air Commands (TACs), along with the 9th Bombardment Division were the major subordinate combat commands under the Ninth Air Force. Each TAC was assigned to work with a US field army, while the Ninth Air Force worked with the Allied 12th Army Group. The 9th Bombardment Division, comprised of heavy and light bombers, worked directly for the Ninth Air Force.

39. Quesada, 1988 interview; see also MacDonald, 419–24; and *Operational History of the Ninth Air Force*, bk. I, sec. II, 26, 29–30.

40. Eisenhower, 76.

41. Quesada, 1988 interview.

42. *Operational History of the Ninth Air Force*, bk. I, sec. I, 2.

43. Ibid., 26–27.

44. Of the 800 German fighter sorties flown that day, over half were defensive and directed against strategic bombers. This activity reflected the confusion that existed within the Luftwaffe as to what its real mission was supposed to be—to support the Ardennes offensive or to attack bombers. Craven and Cate 3: 689.

45. Quesada, 1988 interview.

46. Approximately 8,500 sorties were flown by the Ninth Air Force between 23 and 27 December 1944. *Operational History of the Ninth Air Force*, bk. I, sec. III, 62. The British Second Tactical Air Force, the Eighth Air Force, and RAF Bomber Command accounted for the remainder of the 16,000 sorties. For Allied sortie totals correlated against weather conditions, see "Another Tactical Air Triumph," 5.

47. Because of the poor weather over the bulge area in the early days of the offensive (16–23 December 1944), the Luftwaffe leadership decided that aircraft dedicated to the Ardennes offensive would be "reroled" to attack Allied bombers that were striking targets deep in Germany. These attacks were unrelated to the Ardennes campaign. Though this use of aircraft could have been interpreted as using flexibility of air power—or a use-it-or-lose-it philosophy—it resulted in an undesirable Eighth Air Force reaction for the Germans. The Eighth "carpet bombed" their airfields. This activity reduced the Luftwaffe's support of their primary objective, the Ardennes attack. The German air commanders had violated the first principle of war, *objective*. In addition, the Luftwaffe had tipped its hand by "telegraphing" to the Allies the increased numbers of aircraft that were brought into the theater before they could be decisively used. This action squandered scarce resources. The decision to go against the strategic bombers was probably influenced by the Luftwaffe's intensive planning, positioning, and training for the "cover story" of the "Great Blow." Galland, 242.

48. Eisenhower, 77.

49. The Y-Service was a radio intercept operation, first devised by the British, to monitor and intrude on Luftwaffe ground-to-air communications. General Quesada refined the system by collocating this capability with his MEW radar units. By doing so, the IX TAC gained the information it needed to time its airfield attacks to the most vulnerable periods of air operations—landings and takeoffs. Quesada, 1988 interview.

50. Ibid.

51. *Operational History of the Ninth Air Force*, bk. I, sec. IV, 39.

52. General Quesada said that of all the Luftwaffe's shortcomings, "stupid leadership" was its primary deficiency. Generalleutenant Josef Schmid, *Kommando West*, ran all Luftwaffe support for the Ardennes offensive. The German commander of *Jagdkorps* II, the Luftwaffe's fighter forces supporting the offensive, was Generalmajor Dietrich Peltz. Quesada, 1988 interview. See also Pallud, *Battle of the Bulge*, 655.

53. *Operational History of the Ninth Air Force*, bk. I, sec. III, 59.

54. Ibid.

55. Ibid., sec. IV, 6.

56. Ibid., sec. III, 13.

57. *Ninth Air Force in the European Theater of Operations*, vol. IV, Headquarters Ninth Air Force, 1945, 72.

58. Eisenhower, 77.

59. This change of operational command lines was accomplished in a single day. The use of the Eighth's heavy bombers had not been so easily obtained for General Eisenhower's D-day support. However, the bulge support by the Eighth demonstrated common vision of mission that existed among the air commanders during this phase of the war. It also highlighted the flexibility of bomber aviation in its ability to contribute to the *close cooperation* and *interdiction* battles. Craven and Cate 3:686. See also *Operational History of the Ninth Air Force*, bk. I, sec. III, 12.

60. *History of the Eighth Air Force: Invasion and Victory*, Headquarters Eighth Air Force, 1945, 144.

61. MacDonald, 511.

62. Ibid., 522.

63. Pallud, *Battle of the Bulge*, 86-89; and MacDonald, 458.

64. *Operational History of the Ninth Air Force*, bk. I, sec. III, 7.

65. Lt Gen John K. Cannon, "The Contribution of Air Power

to the Defeat of Germany," a report prepared by the assistant chief of staff, A2, Headquarters United States Air Forces in Europe, on file at the Air Force Historical Research Center, Maxwell AFB, Ala., vol. 4, 8 May 1945, 7C(2)(e). See also Werner Girbig, *Six Months to Oblivion: The Eclipse of the Luftwaffe Fighter Force* (New York: Hippocrene Books, Inc., 1975), 112; *Operational History of the Ninth Air Force*, bk. I, sec. IV, 15–16, 39–41; and Pallud, *Battle of the Bulge*, 433–36.

66. Allied antiaircraft artillery (AAA) fire shot down between 80 and 150 aircraft. One of the reasons that Allied antiaircraft fire was so effective and "not one Allied plane was lost" can be attributed to the high state of readiness of the AAA positions during aircraft takeoff and recovery cycles. All sites were manned to alert status, and fighter pilots stood duty as aircraft identification officers with every gun crew during these periods of vulnerability. This was a standing procedure directed by the commander of the IX TAC, General Quesada. After all, these were the very times that Allied air commanders attempted to attack German airfields. It only seemed reasonable that the Luftwaffe might try to imitate the successful tactic. Quesada, 1988 interview. See also John L. Frisbee, ed., *Makers of the United States Air Force* (Washington, D.C.: Office of Air Force History, 1987), 197.

67. Adolf Galland, *The First and the Last: The Rise and Fall of the German Fighter Forces 1938–1945* (New York: Ballantine Books, 1954), 243; see also *Operational History of the Ninth Air Force*, bk. I, sec. IV, 40; and Girbig, 112.

68. *Operational History of the Ninth Air Force*, bk. I, sec. IV, 40, and sec. V, 12.

69. *Ninth Air Force in the European Theater of Operations*, 73; see also "Another Tactical Triumph," 5.

70. Galland, 242.

71. Gen James Ferguson, USAF, Retired, interview, 14 June 1988 at Air University television studio, on file at AU/TV, Maxwell AFB, Alabama.

72. Quesada, 1988 interview.

73. Only six radar sets formed the nucleus of the Allied air control system. Had these sets been knocked out of action, Allied air power would have been severely affected. This could have been an "Achilles' heel" to the entire air support battle. Ibid.

74. In December 1944, MEW-assisted intercepts were credited with 161 Luftwaffe aircraft destroyed and 72 damaged. Blair E. Garland, "Radar in ETO Air-Ground Operations," *Signals* 3, no. 4 (March–April 1949): 11.

75. Lt Gen Elwood R. Quesada, USAF, Retired, telephone interview with author, 14 January 1989 (hereafter referred to as Quesada, 1989 interview).

76. General Quesada had modified three SCR-584 antiaircraft radars with Norden bombsights, which were placed upside down and backwards. Mounted on the radar's X-Y axis plotting table that projected a light beam of the tracked aircraft through a 1:1,000,000-scale ground map, the bombsight-radar innovation provided navigation accuracy to within 300 yards of a ground target over 30 miles away. Quesada, 1988 interview. See also Garland, 10; and "U.S. Tactical Air Power in Europe," 38.

77. At this time there was no distinct forward edge of the battle area (FEBA) line, and the situation tasked the Allies with fighting a significant *rear* battle for the first time since D-day. Coordinating air power around the pockets of Allied resistance and in concert with the retreating and reinforcing ground movements stressed the existing command and control elements of the TACs' to their limits. The manpower-intensive nature of command and control was one of the major shortfalls of the pre-D-day force structure planning. To correct this deficiency, General Quesada "broke-up" the fighter wing organizations (roughly equivalent to today's air divisions) and reallocated their manpower to the tactical air control system under the TACs. Quesada, 1988 interview.

78. Frisbee, 197.

79. Garland, 10.

80. Quesada, 1988 interview.

81. "U.S. Tactical Air Power in Europe," 34.

82. Two Allied air strikes on Malmédy (both by the 9th Bombardment Division), one on the Arlon marshaling yards in Belgium and one on Verviers, were the most significant events of fratricide by Allied aircraft. Maj Gen Blair E. Garland, USAF, Retired, 8 February 1989, telephone interview with the author at Maxwell AFB, Alabama. Although both civilian and military casualties occurred at these locations, none had a significant impact on Allied operations. Quesada, 1989 interview. Fighter group leaders were very reluctant to attack targets on the ground, not knowing whether they were friendly or enemy. The SCR-584 procedures resolved this problem. Fighter group leaders would be tracked and vectored by the SCR-584 in the battle area. As they flew over vehicles on the ground they would notify the radar controller. The controller, knowing the position of the aircraft and the location of friendly positions that were plotted on his X-Y table, could validate whether the target was friendly or enemy. This was a routine, "day in and day out process" throughout the entire Battle of the Bulge. United States Joint Board on Scientific Information Policy, *Radar, A Report on Science at War* (Washington, D.C.: Office of Scientific Research and Development, 1945), 39. See also MacDonald, 464–65; and Quesada, 1988 interview. For more information on Allied fratricide, see Craven and Cate 3:692; Pallud, 388; and Jean Paul Pallud, *Ardennes 1944: Peiper and Skorzeny* (London: Osprey Publishing, 1987), 13.

83. "U.S. Tactical Air Power in Europe," 34.

84. One early example of radar's impact on the battle occurred near Stavelot, Belgium. On 18 December German *Kampfgruppe Peiper* approached the bridge over the Linne at Hamiemont, Belgium. This was the last bridge before open ground leading to the Meuse River. General Quesada ordered a spotter plane reconnaissance airborne, despite the dangers of fog and cloud ceilings below 100 feet. Capt Richard H. Cassidy and 2Lt Abram Jaffe volunteered to fly the mission. Using guidance information from a MEW radar, then an SCR-584 radar, the pilots were guided to the vicinity of *Kampfgruppe Peiper*'s breakthrough. Breaking a 200-foot ceiling in the target area, they quickly discovered the enemy column and called for fighter-bomber support. The 365th Fighter Group, under the command of Col Ray Stecker, along with a squadron each from the 366th and 404th Fighter Groups were launched through the weather, again under radar control. The fighter group descended through the clouds and to a rendezvous with the spotter plane. The attack on *Kampfgruppe Peiper* destroyed only a few vehicles. More important though, it resulted in a two-hour delay in the column's movement—just enough time for Army engineers to destroy the bridge, literally in the face of Peiper's troops. The Battle of the Bulge was the only time during the war in which radar was so heavily depended on. Reasons for this were improving weather, less fluid lines of advance, and shortness of the war after the Battle of the Bulge. Quesada, 1988 interview. See also *Operational History of the Ninth Air Force*, bk. I, sec. II, 81; Craven and Cate 3:687; and MacDonald, 241–44.

85. *Ninth Air Force in the European Theater of Operations*, 45–46; see also "U.S. Tactical Air Power in Europe," 48.

86. *Operational History of the Ninth Air Force*, bk. I, sec. III, 44.

87. "Strategic Air Wins in Europe," 63.

88. The "chess" analogy was a popular way of describing the effects of tactical air power on ground maneuver. General Frido von Senger und Etterlin, commander of the XIV Panzer Corps in Italy, is given credit for first use of the phrase. F. M.

Salagar, *Operation "Strangle" (Italy, Spring 1944): A Case Study of Tactical Air Interdiction* (Santa Monica, Calif.: Rand Corporation, 1972), 62; see also Frido von Senger und Etterlin, *Neither Fear Nor Hope* (New York: E. D. Dutton, 1964), 224.

89. *Operational History of the Ninth Air Force*, bk. I, sec. III, 4.

90. Ibid., 53.

91. Ultra intercepts during the Battle of the Bulge described the immensely destructive effect of air interdiction. Reinforcements and supplies were cut from the impetus of the offensive. The destruction of rail lines in the Eifel area made rerouting impossible. Telephone facilities hardly existed. Supplies had to be hand-loaded and unloaded along the Rhine, a condition that seriously delayed them from reaching the units in need. Ralph F. Bennett, *Ultra in the West: The Normandy Campaign* (New York: Scribner, 1980), 217.

92. As stated in FM 100–20, "Counter air force operations and air defenses in the theater must be carried on continuously to provide security from hostile air operations." As executed on 1 January 1945, Operation *Bodenplatte* was designed as a "single blow" of decisive strength. It was a woeful underestimation, and it only served to exemplify that the Luftwaffe's leadership had very little understanding of how to execute a counterair operation.

93. "Smashing Windup to the Ardennes Bulge Battle Was a Costly Experience for the Germans," *Impact* 3, no. 3 (March 1945): 2

94. *Operational History of the Ninth Air Force*, bk. I, sec IV, 5.

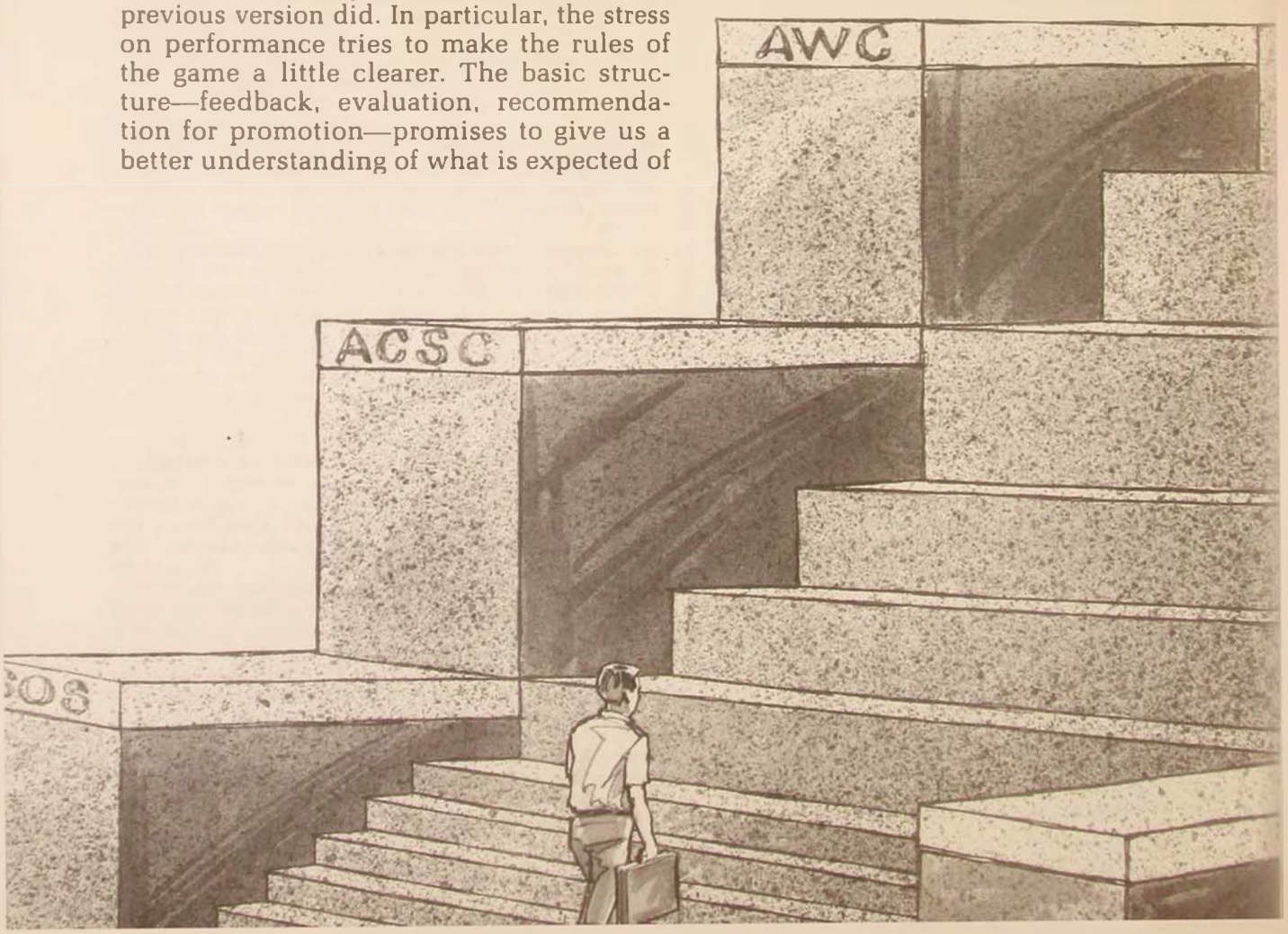
# THE CASE FOR OFFICER PROFESSIONAL MILITARY EDUCATION

## *A View from the Trenches*

Lt Col Richard L. Davis, USAF

SINCE August 1988 the Air Force has been using its new officer evaluation system (OES) to measure officer performance. Although no system is perfect, this one attempts to provide a more realistic and balanced assessment of our utility to the service than the previous version did. In particular, the stress on performance tries to make the rules of the game a little clearer. The basic structure—feedback, evaluation, recommendation for promotion—promises to give us a better understanding of what is expected of us and of how well we fulfill our professional obligations along the way.

At least one important question remains unanswered, however. What will the emphasis on performance do to our percep-



tions about the role of professional military education (PME) for officers? No one actually says there is no role for PME. Senior Air Force leaders, for example, clearly stress its importance and have defended its value before Congress.[1] At the same time, though, a great deal has been said about reducing the distractions caused by PME by making it more job-related or deemphasizing its reputation as a necessary square-filler for promotion. Although these suggestions have some merit, the purpose of PME can be confusing to the rank and file.

The question really involves what we think PME should do for us. If PME has *no* value, we should dismantle Air University and shift its 1 percent of the Air Force budget to more productive uses. However, PME *does* have value, and our reasons for needing it are implicit in that value. Writing in the *Air University Review*, Col Thomas A. Fabyanic asked, "What is the purpose of an AWC [Air War College] education? Do we seek to graduate senior staff officers or senior combat commanders? Do we educate colonels or future generals?"[2] I want to broaden these questions considerably. What do we think the purpose of PME is for *any* officer? How does PME fit into the professional development of officers? What should PME teach us? And what should we look for in a sound PME program?

## The Problem of Perception

Since 1946 the Air Force system of PME has been consolidated at Air University and has consisted of three isolated educational episodes at the junior, intermediate, and senior stages of an officer's career. Air Force leaders in the 1940s wanted PME to encourage "forward thinking" with courses taught by "great teacher types."[3] These leaders expected Air University to produce graduates with broad views and a deep, thorough understanding of their profession. Although a good technical education was important, a good general education was even more necessary to ensure sound judgment and high-quality decisions by Air Force officers.[4] Early Air Force leaders knew that winning a war was a complex task, requiring mutual support among the services and broad-thinking leadership. They placed high value on PME as a key vehicle for preparing officers of all grades:

> It is quite clear that our national security becomes ever more dependent on the minds of men rather than their brute strength. Particularly is this evident in the United States Air Force which is faced with periodic crises and realignments of power politics as well as tremendous technological advances that constantly modify its mission, its capabilities, and its operations. . . . It is essential that every effort be made to maintain and enhance academic vitality for it is one of the keys to the enormous advantages of gaining the future first.[5]

However, the average officer today may not hold this view. Perceptions of nonresident PME for officers, for example, are telling. In the past, large numbers of officers enrolled in nonresident courses, but the emphasis was on *completing* PME rather than learning from it. The surge of course completions prior to promotion boards indicated that these officers considered PME important for advancement but not particularly relevant to their jobs. Of course, our new officer-development policy now restricts nonresident enrollment until after appropriate promotion boards occur.[6] But officers still think that PME courses are a necessary part of the competition for higher rank.

Meanwhile, officers persist in their perception that selection for intermediate and senior service schools in residence is good, but that actual attendance confers no real benefit aside from encouraging collegiality among select peers. Attendance in residence is a necessary evil, largely incidental to the concerns of the real world. Taken together with the utilitarian view of nonresident programs, we can perhaps conclude that Air Force officers view PME only as a

*Air University, citadel of Air Force PME. Is it producing knowledgeable professionals or simply providing a square that officers seeking higher rank must fill?*

step toward promotion. Rarely do they acknowledge its intended function—a means of enhancing professional competence.

A comparison may suggest what is wrong with this perception of PME. In the Soviet Union, officer PME is available through about 20 military "academies" roughly equivalent to the US military staff and war colleges. As in the United States, graduation from a Soviet academy is generally considered a prerequisite for advancement to senior military positions. There the similarity ends, however. The faculty of Soviet PME schools, unlike that in our system, is directly involved in the development of military doctrine and strategic planning. Soviet officers, including flag ranks, must pass a competitive entrance examination to qualify for selection and, depending on the school, attend for two to five years—much longer than our usual 10 months. In order to graduate, they must defend a thesis on a military subject.[7]

The Soviets stress "the ability to think broadly, deeply and quickly, to see the relationship between the part and the whole, to accept high goals and to find effective means of achieving them."[8] We say we value the same qualities, but the Soviets provide their officers with an obvious "graduate school" environment for PME. This difference in approach has an interesting effect:

> The most rigorous critics of Soviet military weaknesses thrive within their own uniformed defense establishment. . . . Self-criticism plays an institutional role in the Soviet military system. . . . In contrast, with few exceptions, American military officers are relatively minor players in the world of strategic ideas. Institutions of higher learning in the West pay little heed to military matters as art or science.[9]

Contrary to our popular image of the Soviet system, it directly challenges and expects officers to think in depth about their profession. Uniformed critics and skeptics—at least on military issues—appear to be lauded rather than discouraged. The Soviet military also urges its officers to publish their views about doctrine and strategy. Can we say the same about the intellectual environment of the Air Force?

Despite the ambitions of our founding Air Force leaders, somewhere along the way we have lost sight of the real usefulness of PME. The advent of the Project Warrior program—a type of professional education—reflects a partial recognition of this loss. And the need for a better understanding of what PME should be doing for us is underscored by the fact that formal Air Force PME programs have faced a good deal of serious criticism over the years, ranging from poorly qualified faculty and superficial instruction to the failure of graduates to understand the doctrine and basic aspects of their profession.[10] But, as the founders of Air University well knew, PME should not be a square-filler. It should play a key, if not vital, role in the professional development of officers. Why?

## PME and the Professional Development of Officers

One answer lies in the words of Maj Gen Donald Wilson, who provided direction to the 1945 Army Air Forces (AAF) board responsible for outlining a postwar PME system for airmen. To General Wilson, a young officer should

> begin with a specialty. Personnel shall, in general, continue with that specialty until elimination from the service or selection for greater responsibilities which will be assigned to those persons who demonstrate the fundamental characteristics of good judgement, initiative, common sense, and the overall ability to evaluate a problem and effect the best solution.[11]

These are good thoughts, and a portion of this philosophy—born of the lessons of World War II—has been resurrected in Air Force OES policy, which states in part that

> the right focus at the lieutenant and captain level is in their career area. The primary concern of all officers should be doing the very best possible job in their primary duties.[12]

But General Wilson also spoke of officers having "good judgement," the "ability to evaluate," and the ability to find "the best solution." Developing sound professional judgment and the ability to think flexibly should be the highest aspiration of the professional development of officers. The measure of PME's value, in turn, should be the degree to which it enhances our ability to develop *as professionals* throughout our careers. Yet, the Air Force's stated objectives for PME—at least on paper—fall somewhat short of the mark.

According to AFR 53–8, *USAF Officer PME System*, the purpose of PME is to help us become "experts in aerospace power." The subsequent objectives in pursuit of expertise involve broadening our perspective and knowledge about aerospace power, preparing us for higher command and staff duties, increasing our understanding of war and military forces, and developing creative thinking and "a systematic approach to solving military problems."[13] These words sound good, but broadened perspective and knowledge can fall short of full comprehension. Preparation for command or staff duty is not necessarily the same as preparation for real leadership in war. And increased understanding can fall short of the ability to analyze and evaluate, just as creative thinking and systematic problem solving may not constitute true profes-


*Col Viktor Kozlov, Soviet deputy air attaché. The Soviet professional military schools have a much more thorough curriculum than do American schools and expect their students to perform at the graduate level. Could we be doing more to enhance the professional knowledge of our senior officers?*

sional judgment. In other words, someone who meets the regulation's criteria for an expert in aerospace power may not necessarily be able to use that power to best advantage, especially in war. Judging from the regulations alone, we do not challenge ourselves enough as we learn the profession of war.

The solution is not to change the words but to improve our attitudes toward PME.

**Far from de-emphasizing PME, our new stress on professional performance should reinvigorate PME.**

The broad philosophy behind OES is a step in the right direction. Far from de-emphasizing PME, our new stress on professional performance should reinvigorate PME. A careful reading of guidance on officer evaluations, for example, shows that—although training, experience, and PME are each important—PME holds a special place.[14] Training and experience augment our immediate performance, helping us do well in our daily jobs, but PME programs are oriented toward an officer's future. For good or ill, they will define the tenor of officer professional development.

One respected practitioner of the art of war, German Field Marshal Erwin Rommel, understood the importance of proper professional development. He felt that battles (and wars) were won by "flexibility of mind, eager acceptance of responsibility, a fitting mixture of caution and audacity, and the greater control [compared to the oppo-

nent] over the fighting troops."[15] Rommel identified five elements important in developing the mental agility required of the professional officer (fig. 1). In his view, these elements combined synergistically to enable the officer to confront and master the challenges of war.[16] Underlying that synergy is education—PME.

In the Air Force our training gives us knowledge of our specialty, and our assignments give us experience in what we are trained to do. But if we confine ourselves to the narrow areas of training or experience—whether as rated or nonrated officers—we become merely technical specialists. Once we attain positions of senior leadership, we will not have the foundation necessary to successfully prosecute the operational art of war or develop the strategies that require much broader thinking. Thus, PME's role is to stretch our thinking well beyond our current assignment or next promotion and to convert the highly trained crewmember, engineer, or technician into a professional officer. What, then, should we study and know?

## The First Principle of War: Pay Attention

Given the importance of our profession, PME should teach us to pay closer attention, not only to procedures for using our individual weapon systems, but also to the ideas and techniques that help us accomplish the mission quickly, effectively, and at the lowest possible cost in terms of lives and resources. In short, PME teaches us the operational art. Yet, effective PME is one of those strange, paradoxical commodities whose real value becomes apparent only as we begin to benefit from it. Therefore, we have to begin PME-type studies with a certain amount of faith in the outcome. But

### Rommel's Five Elements for Officer Professional Development

- Comprehensive instruction in technical and organizational matters, with the specific object of cultivating independence of mind and the ability to think critically. Rommel wrote that "respect for the opinion of this or that great soldier must never be allowed to go so far that nobody dares to discuss it."
- Encouraging the ability of a creative intellect to use energy and initiative in employing forces.
- A complete understanding of the psychology of the troops, acquired in part by personal contact with them. Rommel felt that leadership by example was vital.
- An understanding from military history that battles have rarely gone as planned, since opponents inevitably have plans of their own and the resulting clash of wills creates a multitude of unpredictable results. Strategies that proceeded according to plan were successful because the victor had absolute qualitative or quantitative superiority or "the loser [was] utterly incompetent."
- The greatest efforts must be made to teach officers to avoid both interservice and intraservice rivalries, which hurt unity of purpose and the will to pull together toward a common goal: "[Interservice] struggling for power is rather like sawing off the branch on which one is sitting."

*Figure 1*

there are several important, broad elements that can serve as guides to what is significant, including the complex environment of war, the dynamics of the human element, the value of military history, and the role played by individual intuition.

### *Knowing the Environment*

Probably the most important lesson to gain is an insight into the environment in which war operates—that amorphous mix of economics and politics, constraints and ambitions, human reason and human emotion. If we do not understand this environment, we will not operate successfully in it. To stretch the point, the environment for flying includes weather and air currents. If we do not understand how this environment functions, the airplanes we design may not work—at least while in flight. To cope in this environment, pilots study aircraft systems to enhance their understanding and "hanger-fly" emergency procedures to anticipate solutions to potential problems.

By comparison, war is infinitely more intangible and complex. How much more important is it, then, that we officers try to understand the environment of war? Like the pilot, we should try to foresee the types of problems we may face in war, asking "what-if" questions about the operational art: How do our opponents think? Why do they think that way? What motivates their political leadership and their troops in the field? What are their most likely decisions? Their least likely decisions? How much are they willing to fight for their cause? *Why* are they fighting in the first place? But the pilot has an advantage: an aircraft engine failure is a tangible problem with a relatively fixed set of solutions. Not so in war. Success in war requires lengthy and careful study of possible conflict scenarios, opera-

*Air Force PME has always been treated as three isolated episodes in an officer's career. Indeed, many officers will never seriously study their profession again after Squadron Officer School.*

tional requirements, strategies, and the issues that motivate people to war. Such is the stuff of real PME.

### *Chess Games*

As we begin to understand the environment of war, it very quickly becomes clear that moral factors—morale, courage, dedication, and the will to fight—have an incredible effect on the outcome of a war, let alone a battle. These elements are important because the dynamics of war primarily involve competition between the minds of the participants. Someone once said that the true victory in a game of chess is not to achieve the mate but to compel the opponent to resign. As Sir Basil Henry Liddell Hart put it, the goal is to convince our opponents that they cannot win—not necessarily to mercilessly crush them.[17] Conversely, it is possible to crush opponents but fail to defeat them; they will be back as soon as they are able.

The significance of the psychology of war underlies our efforts toward "defeating the enemy will." To force our opponents "to resign," we must understand and evaluate their psychology and military thinking as well as our own. Success directly depends upon how well we evaluate our opponents, ourselves, and our potential responses in a given situation. If we are successful in this endeavor, we have mastered the art of war. And it is through PME that these aspects of war become apparent.

This line of reasoning leads to another point, which to the tactically oriented will sound like heresy. Since war is a competition between minds, the conduct of war—the operational art—has very little to do with weapon systems or technology, per se. Weapons and technology are important only as tools. The *conduct* of war uses a given set of weapons to accomplish some end.[18] Technology does not answer questions such as when, where, or why we should fight; how much we should spend; how far we should go; or how often we should strike. Technology simply enables us to pursue the solution once a decision has been made. Without the competing wills of men prosecuting the conflict, the most sophisticated weapon system we have is useless—it cannot will itself to fight. Even with a highly computerized, robotic system, some person has to turn it on and point it in the desired direction.[19]

War is not an exercise of the will directed against a detached, inanimate object. In war, our will opposes that of living opponents who think and react as they choose.[20] Rommel alludes to this situation in his fourth element. Our weapons—whether tanks, ships, airplanes, or cavalry sabers—are only inanimate extensions of ourselves. Focusing on things like technology, paper wars, or quantities of weapon systems—although these factors certainly should be considered—lowers our thinking below the level of operational art and makes war something it is not.

### *The Value of Military History*

A third element that should emerge from PME is a sound appreciation for military history. Even a cursory review of the record will show that almost every great military leader recognized that, in prosecuting war, one must accept the fact that there are few quick and easy answers to very complex dilemmas. We must be prepared for the unexpected by studying how other military professionals handled the confusion and complexities of combat. Knowing military history, in other words, directly benefits the professional soldier. Napoléon was blunt: "Read and meditate upon the wars of the great captains. This is the only means of rightly learning the science of war."[21] We can also learn from mistakes; history is replete with examples of the results of military leaders failing to fully understand the complexities of their profession.

It is important to realize that the purpose here is not to quantify knowledge by enumerating battles, wars, dates, names, and places—though these details may provide a framework for comparison. The purpose is to develop flexibility in our thinking.

Rather than concentrating on facts or content, we should learn our lessons by examining how men have tried to dominate each other in war. Understanding history thus prevents us from viewing war in a vacuum, alerts us to its unquantifiable aspects, and helps provide the degree of mental agility essential to any comprehensive critical assessment. As professional Air Force officers, we are not limited to the 78 years that delimit the history of air power. We share with the Army and Navy the same age-old warrior heritage. Truly learning the lessons of this history requires career-long reflection and is based on the insights or broad impressions gained from continuing study.

Our experience in Vietnam provides just one example of what might be learned. While we were in the proverbial alligator-infested swamp in Vietnam, our approach favored the tacticians—the alligator eaters. As the attention of senior military leaders focused on the tactical level, we gradually lost sight of the real reason for the fight. Counting alligators became the standard of success, rather than ensuring that operations successfully proceeded toward the larger policy objective of draining the swamp. Eventually, the pursuit of combat became an end in itself. Our collective failure to acknowledge ineffective leadership, inefficient tactics, or the limitations of air power led to defeat.[22] Analyzing situations like this one does not equip us with formulas for solving problems, but it can help us understand relationships, reevaluate priorities, and exercise our intuitive skills when we deal with the inevitable fog of war.

### *Clausewitz on PME*

Carl von Clausewitz clearly saw the value of a regimen of professional study. In particular, he drew his lessons on the art of war directly from military history, which provided the basis for his most pertinent and eloquent prose. This writing dealt not with facts and figures but with the attitudes and *thinking* behind war and its parent—politics.[23] We may argue with specific points that Clausewitz makes, but we must understand military history and the rationale behind his ideas in order to argue intelligently about those ideas.[24]

One of his more compelling conclusions is that commanders must rely on their "imaginative intellect" to succeed. This intellect, a sort of internal guide or insight to action, must be developed by a careful and reasoned study of history and military theory—subjects that should be included in PME.[25] However, the mental requirements differ according to the various stages of an officer's career. For the young, energetic officer—such as a fighter pilot—boldness, audacity, and quick reactions are prerequisites for success. But a theater commander dealing with operational problems needs a different degree of mental agility, insight, and intellect. The boldness of the aggressive young pilot *must*, in the general officer, be tempered by insight, intelligent assessment, and broader professional judgment.[26]

Due to the danger, chaos, and fog of war, the moment of combat—like the moment of engine failure in an aircraft—is the wrong time for a lengthy contemplation of alternatives. Therefore, in order to assure at least some measure of success, we must develop professional insight by thinking about factors affecting a possible war when we are still at peace. Our opponents have their own perception of conflict, based on the conditioning of their culture, social values, military heritage, and history. They are "animate objects" who will respond to our actions just as we will respond to theirs, based on the limits of our conditioning, perceptions, and intuition. Success in war depends on retaining some element of initiative over our opponents, keeping them off balance, and manipulating deployment and employment of forces to our advantage. Understanding how we and our opponents think serves this end directly.

By the time we assume responsibilities as senior officers, we must be used to thinking, reading, and writing about broad military concepts and have expanded our

thoughts well beyond the tactical level.[27] Likewise, it should be apparent to us that war offers no simple keys to success. Clausewitz's chief principle of war was that there are no abiding principles of war.[28] Everything is circumstantial. Successful fighting cannot depend solely upon lists of maxims, as though war could be run with checklists and neat procedures. Checklists, of course, have their advantages—they are relatively easy to write, and they do not require much thinking to implement. But good checklists have a lot behind them. Those for flying, for example, are based on extensive flight manuals. To learn to fly, we study the flight manuals—not the checklists. Similarly, relying solely on lists of "principles of war" ignores the need to understand the history and experience that inform these principles.

## Can We Do Better?

As the previous discussion suggests, military professionals need a sound education that requires considerable reading and study so that they can learn the proper concepts and ask the right questions. Currently, the Air Force provides reading material, including books and key periodicals, to all general officers and encourages company- and field-grade officers to participate in Project Warrior. Further, an Air University suggested guide to professional reading lists 33 good titles.[29] However, unlike other professionals—such as lawyers or physicians—we do not have formal reading requirements beyond commissioning, and officers are not seriously challenged to reflect upon some of the basic assumptions of their profession of arms.

One of the more common responses to this last observation is that there is no time to do much professional reading. It is difficult to be a professional, however, if one does not think about the elements of the profession. Inevitably, we reserve our best thinking for our favorite interest or specialty.[30] To be successful, for example, the professional football player eats, breathes, and thinks his sport. Professional soldiers should be just as eager to understand and absorb the art of war. Yet, war is not as clear cut as a game of football: there exists no neat line of scrimmage. One has to anticipate things like the equivalent of enemy Spetsnaz linebackers standing next to the quarterback. It takes time to understand war, an intelligent approach to study the right things, and reflective thought to prepare for war's uncertainties.

Since our minds are formed by the knowledge and ideas we receive over time, it is very important that we design a long-term PME program that properly develops our professional thinking. If ideas taught through PME are limited to accepted dogma, established models, or mastery of rote procedures, or if the goal of a PME program is to provide only a superficial familiarity with a wide range of topics, then we will be poorly prepared for the unexpected or for situations that do not fit the patterns we have learned. A good PME program, therefore, should help provide us with the ability to see the combat situation in a comprehensive fashion and to exercise the mental freedom necessary to dominate events and not be dominated by them.[31] A good PME program should help us learn to question the basic assumptions we make about the issues affecting our profession. If our assumptions are sound, they will be vindicated by such questioning. If not, we need to discover their shortcomings before we fight the next war.

Although officers do the learning, the Air Force as a corporate body has a clear responsibility to ensure that its PME program truly serves the profession by presenting a curriculum that is cohesive and effective in challenging officers to think. It is not enough just to "have a program." The programs we select must be susceptible and responsive to recurring critical assessment. The historian Daniel Boorstin once wrote that the greater obstacles to discovery and progress are not ignorance but "the illusions of knowledge."[32] This defect is

not exclusively the fault of academics, as shown by similar criticism closer to home:

> The [military services' PME] schools permit their charges to range over vast expanses of subject matter but keep the herd moving so fast that there is scant time for intellectual grazing. The danger of this approach is that it creates an unjustified sensation of expertise.[33]

This statement is similar to the often-heard complaint that the Air Force's PME curriculum is "a mile wide and an inch deep." Yet it is clear that our requirement for intelligent military thinkers and first-rate leadership is becoming more important, not less. Is our current approach sufficient for future needs? Actually, we probably do not need a PME program in order to fly and fight; our specialized training programs serve us quite well in that respect. But I suggest that we must have a good PME program if we expect to fight and win. We officers must recognize and accept the real value of PME and be willing to pursue lifelong professional study.

This last point is of paramount importance. As professionals, we should want to pursue PME for its own sake, to improve our ability to question and analyze, to remain receptive to alternatives, and to understand as well as we can the context within which we employ aerospace power. Each of us should want to be perpetually challenged in this way. After all, it is our own capacities—or incapacities—for judgment that will be tested in time of war.

Thus, PME is critical to the quality of leadership we provide as Air Force officers. And its success depends on our perceptions of its value. We benefit most from PME by treating professional education as a way of life that involves a desire to continuously study and reflect upon the various aspects of our profession. As Rear Adm Ronald J. Kurth put it, the intent is not to create ivory-tower intellectuals, but to develop within ourselves an ability to exercise sound professional judgment and enlarge our focus over time from narrow tactical thinking to broad strategic thinking.[34] It is a necessary professional step. If we do not take the lead in such thinking about the uses of aerospace power, we will end up following a lead determined by others. □

**Notes**

1. For example, Gen John T. Chain, Jr., commander in chief of Strategic Air Command, recently presented to a House Armed Services Committee panel excellent statements about the importance and purpose of PME. See AFRP 190-1, *Air Force Policy Letter for Commanders*, October 1988.

2. Col Thomas A. Fabyanic, USAF, Retired, "War, Doctrine, and the Air War College: Some Relationships and Implications for the U.S. Air Force," *Air University Review*, January–February 1986, 4. I recommend that all officers carefully reread this article.

3. These terms were used by Maj Gen David M. Schlatter, first deputy commanding general of education at Air University, in *First Report of the Board of Visitors* (BOV) (Maxwell Field, Ala.: Air University, Spring 1946), 11, 20, 22–23; and *Third Report of the BOV* (Maxwell Field, Ala.: Air University, 1947), 33–34.

4. *Second Report of the BOV* (Maxwell Field, Ala.: Air University, Fall 1946), 4–6.

5. *Thirteenth Report of the BOV* (Maxwell Field, Ala.: Air University, 1957), 3.

6. AFR 53-8, *USAF Officer Professional Military Education System*, 24 October 1986; change 1, 16 November 1987, 11, 14, 16–17.

7. Col Richard G. Head, "Military Affairs Abroad: Soviet Military Education," *Air University Review*, November–December 1978, 45–57; and Lt Col Michael P. Murray, Jr., "The Education and Training of Soviet Air Force Officers," *Strategic Review*, Spring 1977, 86–87.

8. Gen-Maj A. S. Milovidov and Col V. G. Kozlov, eds., *The Philosophical Heritage of V. I. Lenin and Problems of Contemporary War (A Soviet View)*, translated and published under the auspices of the US Air Force, Soviet Military Thought Series, vol. 5 (Washington, D.C.: Government Printing Office, 1975), 183.

9. Lt Col G. Murphy Donovan, "Military Vulnerabilities: Why We Ignore Them," *Strategic Review*, Summer 1988, 41. The Soviet approach contrasts markedly with that of the US armed forces, who basically abdicate strategic thinking to civilian think tanks and "beltway bandits." See also Harriet Fast Scott and William F. Scott, *Soviet Military Doctrine: Continuity, Formulation, and Dissemination* (London: Westview Press, 1988), 218–20.

10. Lt Col Harvey J. Crawford et al., "CADRE Officer Professional Military Education Study" (Maxwell AFB, Ala.: Airpower Research Institute, Center for Aerospace Doctrine, Research, and Education, June 1988), 4–6 to 4–14, 5–9 to 5–30. The latest criticism, which echoed many concerns from earlier studies, came from the report of a committee chaired by Rep Ike Skelton (Democrat, Missouri): House Committee on Armed Services, *Report of the Panel on Military Education of the One Hundredth Congress*, 101st Cong., 1st sess., 21 April 1989.

11. Memorandum by Maj Gen Donald Wilson to the president, Army Air Forces Board, subject: Army Air Forces Postwar School System, 9 August 1945.

12. AFP 36-30, *OES: Officer Evaluation System*, 4 April 1988, 2.

13. AFR 53-8, *USAF Officer PME System*, October 1986, 8.

14. AFP 36-30, 2. See also AFM 1-1, *Basic Aerospace Doctrine of the United States Air Force*, 16 March 1984, 2-4: "There is no simple formula to learn warfighting. Gaining that knowledge is a continuous process that is the product of institutionalized education and training, experience, and personal effort."

15. B. H. Liddell Hart, *The Rommel Papers* (New York: Harcourt, Brace and Company, 1953), 517. Rommel also complained of the tendency to be trapped by tradition, even in matters of science and technology. Following World War I, for example,

> many of the European General Staffs became rigidly doctrinaire in their outlook. While unquestioningly accepting the views of great men in matters of principle, they themselves became lost in the detail, tangled it all up into a dreadful complexity, turned warfare into an exchange of memoranda and stuck to their ideas through thick and thin. Soon they were unable to see even the simplest possibilities of a situation, and they never failed to find in their followers and fellow-thinkers a sounding-board for their theories (516).

16. Ibid., 518-19.

17. B. H. Liddell Hart, *Strategy* (New York: Praeger Publishers, Inc., 1974), 352.

18. Carl von Clausewitz, *On War*, ed. and trans. Michael Howard and Peter Paret (Princeton, N.J.: Princeton University Press, 1984), 144-45, 148.

19. Steven M. Shaker and Alan R. Wise, *War Without Men: Robots on the Future Battlefield* (Washington, D.C.: Pergamon-Brassey's International Defense Publishers, Inc., 1988), 10. Autonomous robotic systems are possible, but even these would be directed "like pieces on a chessboard," and constrained by the limits of their programming (ibid., 48, 63-65, 173-76). Perhaps a more interesting conclusion is reached by the Soviets:

> We cannot place any limits beyond which control automation is impossible. [However,] the deciding word in expanding capabilities of automation goes to man, who was and remains the main element in a control system, although his functions constantly change (Milovidov and Kozlov, 182).

20. Clausewitz, 149.

21. Quoted in David G. Chandler, *The Campaigns of Napoleon* (New York: Macmillan Publishing Co., Inc., 1966), 138. "Science of war" has also been translated "art of war." See Robert Cowley, "A Note to the Reader," *The Quarterly Journal of Military History*, Autumn 1988, 2. Clausewitz echoes the same sentiment as Napoléon in *On War*, 185.

22. For the sake of argument, this statement of the problem ignores the question of whether the objective was well defined in the first place. See Lawrence E. Grinter and Peter M. Dunn, eds., *The American War in Vietnam: Lessons, Legacies, and Implications for Future Conflicts* (New York: Greenwood Press, 1987), 69-81.

23. Clausewitz, 75-123, 603-10.

24. See, for example, Charles C. Petersen, "Soviet Strategy in the Arctic," *Wings of Gold*, Fall 1988, 31.

25. Clausewitz, 140-41.

26. Ibid., 190-91.

27. Gen Charles L. Donnelly, "A Theater-level View of Air Power," *Air Clues*, October 1988, 378.

28. Clausewitz, 140.

29. The *Air University Suggested Professional Reading Guide* was last printed in 1989. OPR: AU DCS/Plans and Programs, Maxwell AFB, Alabama.

30. See, for example, Allan Bloom, *The Closing of the American Mind* (New York: Simon & Schuster, Inc., 1987), 16.

31. Clausewitz, 578.

32. Daniel J. Boorstin, *The Discoverers: A History of Man's Search to Know His World and Himself* (New York: Vintage Books, 1983), xv. See also Fabyanic, 13.

33. Maureen Mylander, "Graduate School for the Generals," *Washington Monthly*, October 1974, 46-47. An interesting counterpoint was made earlier by Maj Gen David Schlatter, first deputy commanding general of education at Air University:

> Our success is not going to be measured by the quantity or number of students we put out. It is going to be measured by the quality of those students and on the correctness of our doctrines and concepts (*First Report of the BOV*, 20).

34. Rear Adm Ronald J. Kurth, "President's Notes," *Naval War College Review*, Summer 1988, 4-5. Admiral Kurth is president of the Naval War College.

# ANTISATELLITES AND STRATEGIC STABILITY

MARC J. BERKOWITZ

OUTER space is popularly perceived as the "final frontier." People see it as a pristine environment untouched by the political enmities and military rivalries that burden mankind on earth. As Thomas Schelling observed some 25 years ago, there is "an aesthetic prejudice against contaminating the heavens with military objects and activities . . . a sense of awe and mystery, [and] general uneasiness at letting the arms race spill into space just because space is there waiting to be occupied."[1] This continues to be a deeply held sentiment for many people today. Although space has been "militarized" for over 20 years, the prospect of the United States and the Soviet Union "weaponizing" space and potentially ending its status as a sanctuary from conflict elicits strong criticism.

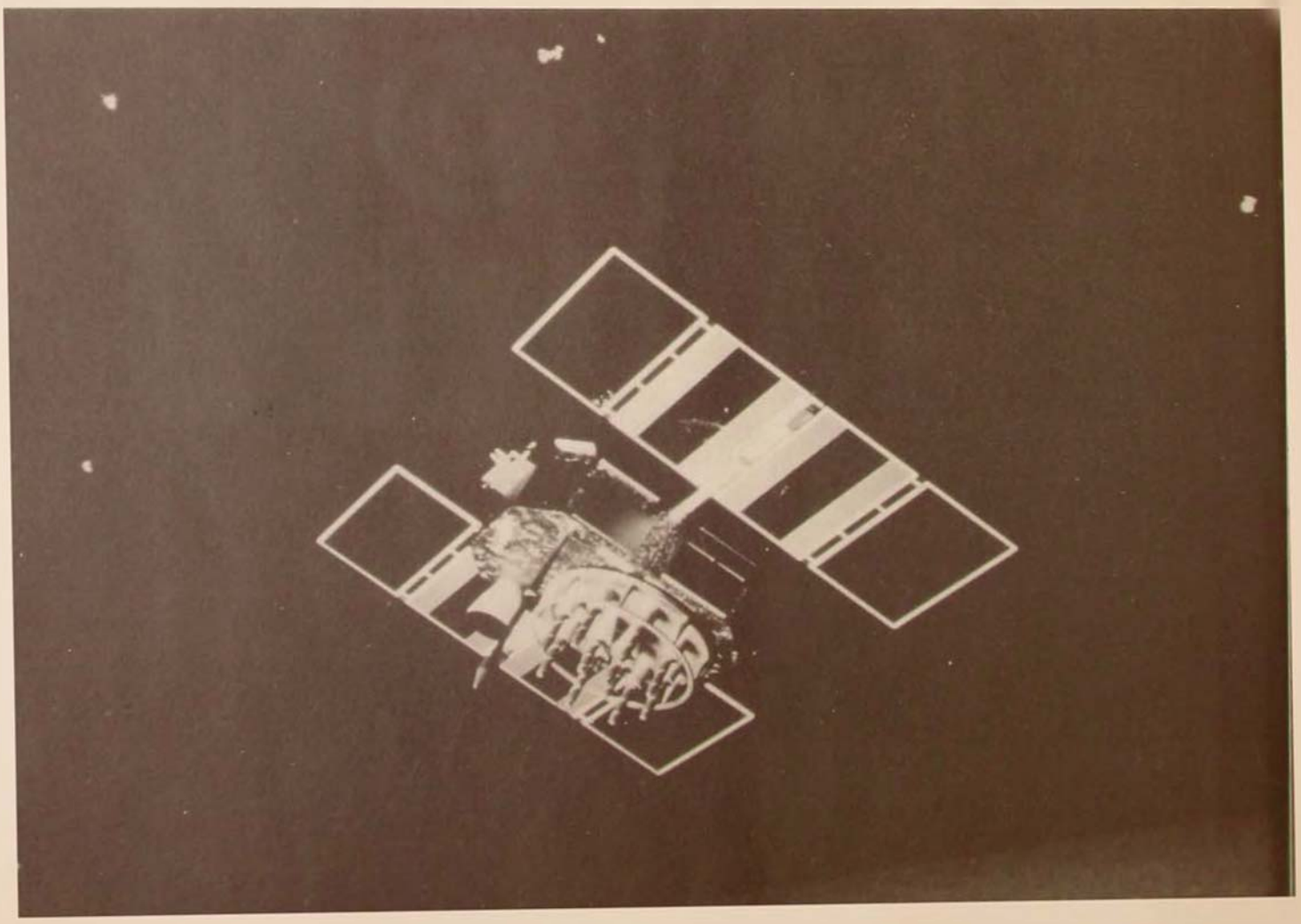
The proposal for a major new antisatellite (ASAT) program contained in the US defense budget request for fiscal years 1990 and 1991 has aroused antipathy in Congress and the arms control community. The budget seeks funding for a mix of ground-based kinetic and directed-energy ASAT

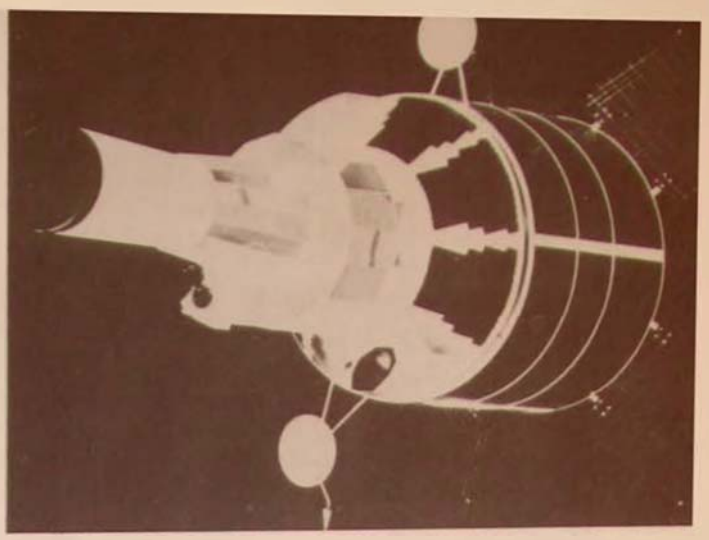
capabilities as well as for upgrades to the existing space surveillance network. Objections to ASAT weapons go beyond a mere visceral preference for preventing the further militarization of space. A central argument against the acquisition of dedicated ASAT weapon systems is that they would undermine strategic stability and increase the probability of war.

Critics argue that ASATs could spark a competition in space weaponry in which the superpowers would be racing to achieve dangerous unilateral advantages and could be the proximate cause of war in an acute political crisis. In their view, rather than acquiring dedicated ASAT weapons, the United States should be attempting to arrest the development, testing, and deployment of space weaponry either through formal negotiation with the Soviet Union or unilateral restraint. The congressional moratoria on testing the F-15-launched miniature homing vehicle ASAT against an object in space, which ultimately led to cancellation of the system last year, was an effort to legislate such restraint.

Debate over the new program can be expected to focus on whether a US ASAT capability would be "destabilizing." This article examines critically the argument that ASATs would undermine strategic stability. It discusses the concerns of people who oppose US acquisition of dedicated ASAT capabilities and assesses the validity of premises underlying the argument that ASATs would promote strategic instability.

*The NAVSTAR global positioning system (GPS) is designed to provide precise positioning for weapons platforms on earth. It is part of the ever-increasing US reliance on space-based systems. Although the US considers the GPS nonlethal, the Soviet Union may in fact perceive the system as a direct military threat.*





*A defense satellite program (DSP) satellite. Critics of ASAT technology argue that because of US reliance on such satellites, we have more to lose by developing ASAT technology than we have to gain.*

## ASATs and Strategic Instability

The centerpiece of the case against ASAT acquisition is that it would have profoundly malign consequences for strategic stability. Critics assert that certain satellites, such as reconnaissance satellites for monitoring arms control compliance and early warning satellites for detecting ballistic missile attack, perform nonthreatening military support functions that contribute to stability and peace. They claim that acquisition of a US ASAT weapon would increase the vulnerability of such military space systems and thereby erode arms race and crisis stability.

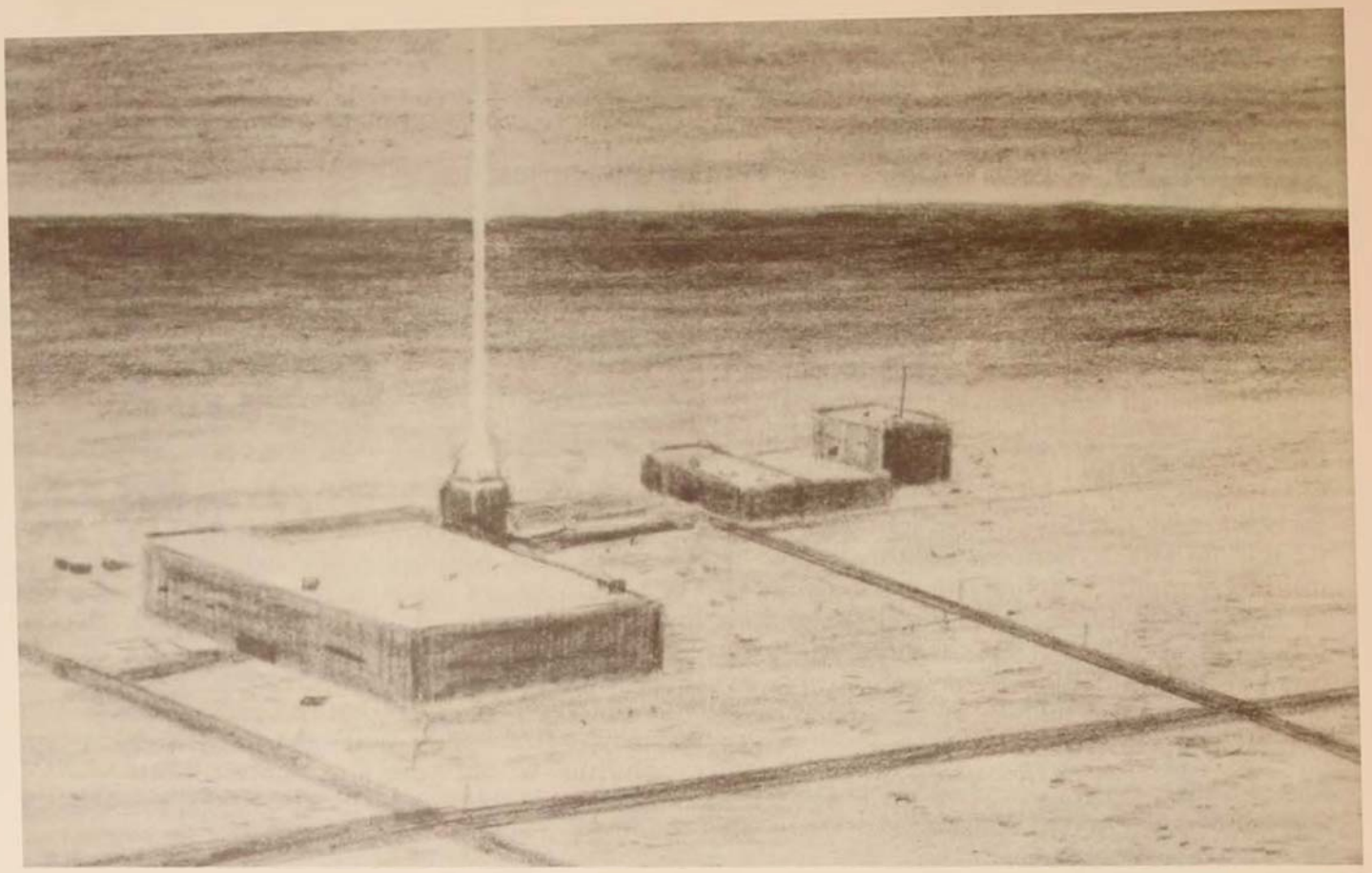
### *Arms Race Instability*

The first part of the instability case is that ASATs promote arms race instability. Critics argue that neither the United States nor the Soviet Union presently has an operational system that could be considered a very significant threat to the other's satellites. The superpowers thus have been able to conduct their space activities in a relatively benign environment for nearly three decades. The contention, however, is that this situation will change if the United States acquires ASAT weapons. In short, critics allege that the United States will stimulate a new and expensive round of the arms race by moving forward with an ASAT program.[2]

A key assertion is that the Soviet Union's dedicated co-orbital (or coplanar) ASAT system, which must be launched into the same orbital plane as its target satellite, is a crude and ineffective weapon system.[3] The contention is that the satellite interceptor is the product of 1960s-vintage technology and that Soviet confidence in the system has been diminished by the unilateral testing moratorium announced by then Gen Secretary Yuri Andropov in August 1983. US satellites in geosynchronous orbit, moreover, remain invulnerable to attack since the co-orbital ASAT can threaten only those satellites in low earth orbits.

In effect, critics claim that the technological sophistication of potential US ASAT capabilities would pose a far more serious threat to vital Soviet satellites.[4] Indeed, the United States could field an ASAT weapon that could negate Soviet satellites in high orbits. US acquisition of ASAT capabilities, they argue, thus will promote arms race instability because the Soviet Union will be forced to respond by developing and deploying a new and more sophisticated ASAT weapon capable of placing critical US satellites at greater risk.[5]

A general refrain of this argument is that the United States has more to lose in an unrestrained ASAT competition than the Soviet Union because it is more dependent on military space systems.[6] The argument asserts that the United States, as the leader of a global maritime alliance, is reliant on satellites to maintain command, control, and communications with its overseas bases and forces. The Soviet Union, however, is able to rely primarily on interior lines of communications because it is a continental (Eurasian) land power that has fewer military forces deployed beyond its borders. An ASAT competition, therefore, would place the United States ultimately at a disadvantage.



*The directed-energy research facility at Sary Shagan, USSR, used to test ground-based lasers. The Soviets are developing a variety of new technologies for space defense, regardless of US activities.*

Critics often cite US deployment of multiple independently targetable reentry vehicles (MIRVs) as a relevant historical analogy.[7] They argue that the "destabilizing" nature of MIRVs was recognized at the time of the Strategic Arms Limitation Talks (SALT) I negotiations and that a bilateral United States-Soviet agreement to prohibit their deployment could easily have been reached. Instead, the United States declined to explore arms control seriously and chose to deploy MIRVs in order to gain a temporary military advantage. The unexpected consequence of that decision was that the United States contributed to the vulnerability of its own land-based intercontinental ballistic missile (ICBM) force. The lesson to be learned, of course, is that the United States will pay a similar price in reduced security if ASATs are not constrained either by arms control or unilateral restraint.

### *Crisis Instability*

The second part of the instability case against ASATs is that they promote crisis instability. Critics argue that prevention of armed conflict erupting out of a deep United States-Soviet political crisis could depend to a considerable extent on the use of satellites as instruments for monitoring and assessing the adversary's actions as well as for maintaining reliable communications.[8] In an acute crisis where both superpowers possessed sophisticated ASAT weapons, according to this reasoning, knowledge that the opponent had an effective capability to neutralize or destroy vital satellites could undermine crisis-management efforts and contribute to crisis escalation.[9] Indeed, awareness that critical satellites were at risk could undermine confidence in deter-

rence. Critics argue that fear of a surprise ASAT attack in conjunction with a first strike might become self-fulfilling since it could produce overwhelming preemptive incentives.[10]

Furthermore, they argue that ASAT weapons could significantly increase the difficulty of limiting or controlling a conflict once it was under way.[11] If hostilities broke out during a crisis, whatever chance of averting escalation to nuclear use could depend on the continuous flow of satellite communications. ASAT employment would disrupt the stream of such information and would greatly complicate the subsequent command and control of nuclear forces. Hence, the loss of satellites utilized for strategic command and control would make it difficult to restrain nuclear employment and would add to the problem of conflict limitation.[12]

A related contention is that ASAT weapons could exacerbate instabilities inherent in US and Soviet command and control systems.[13] According to this argument, it is necessary to diffuse launch authority within the military command structure as a precaution against nuclear "decapitation" when the alert level of strategic forces is raised. The heightened alert status, however, most likely would be recognized quickly by the other superpower and would prompt a similar precautionary response. This action could weaken centralized command and result in inadvertent or unauthorized launches, precipitating escalation. Thus, it is asserted that ASATs could contribute to fear of "decapitation" and, at heightened alert levels, aggravate command instability.[14]

In addition, critics argue that ASATs could reduce the likelihood of early conflict termination.[15] Widespread destruction of communications satellites would impede transmission of any cease-fire order and constrain the ability of the superpowers to conduct negotiations or bargaining. Similarly, loss of surveillance satellites would greatly increase the difficulty of monitoring the adversary's behavior both during war-termination negotiations and after an armistice since neither side would be able to gauge the extent of the other's compliance with the terms of an agreement.[16]

## Flaws in the Instability Argument

The argument that US acquisition of ASAT capabilities would undermine strategic stability and increase the probability of war is based on several underlying premises. Basic assumptions framing the strategic instability case concern (1) the cause of the United States-Soviet arms competition; (2) the threat posed by Soviet ASAT capabilities; (3) Soviet acceptance of (Western-defined) crisis-stability criteria; and (4) the importance of satellites for conflict limitation, control, and termination.

***"The Soviet Union and the United States mutually influence one another's strategic plans. Whatever be their intentions, whatever be our intentions, actions . . . on either side . . . necessarily trigger reactions on the other side. It is precisely this action-reaction phenomenon which fuels the arms race."***

**Secretary of Defense Robert S. McNamara**

***Causes of the United States-Soviet Arms Competition***

The concept of arms race stability propounded by people who oppose the acquisition of a US ASAT capability holds that the engine of the United States-Soviet arms competition is the first-strike fears produced by weapons programs designed to threaten an opponent's deterrent. They argue that the Soviet Union would build a new and more sophisticated ASAT weapon in response to the threat posed by US ASAT capabilities and that this would initiate a new "spiral" of the arms race wherein both superpowers would be seeking to gain a unilateral military advantage in space weaponry. The problem with this concept of arms race stability, however, is that it is based on a theory of arms race dynamics that historical evidence suggests strongly to be false.

Critics of a US ASAT capability are essentially repeating the hypothesis that US and Soviet force-acquisition programs are locked in an "action-reaction" cycle. This hypothesis, as elaborated by former Secretary of Defense Robert S. McNamara, holds that "the Soviet Union and the United States mutually influence one another's strategic plans. Whatever be their intentions, whatever be our intentions, actions . . . on either side . . . necessarily trigger reactions on the other side. It is precisely this action-reaction phenomenon which fuels the arms race."[17]

The history of the last two decades should have discredited this simplistic theory as an adequate explanation for the United States-Soviet arms competition. In the 1960s, for example, critics of the US Safeguard/Sentinel antiballistic missile (ABM) program argued on the basis of the action-reaction model that deployment of a ballistic missile defense would prompt reactive Soviet offensive deployments.[18] The corollary to their argument was that arms control could intervene in this cycle of force procurements. The 1972 ABM Treaty, of course, was based in part on such logic. It was presented to the American public and Congress as the means for constraining strategic offensive forces (i.e., "stabilizing" the arms race).

The subsequent record of Soviet force acquisitions, however, did not validate

the action-reaction hypothesis. While the United States leveled off ICBM procurement and virtually ceased strategic defense efforts, the Soviet Union proceeded with a military buildup. As former Secretary of Defense Harold Brown observed, "Clearly over the past 20 years they have kept growing at a steady rate. When we did more, they kept building at a steady rate. When we cut back, they kept building at a steady rate."[19]

In short, the action-reaction model is not a satisfactory explanation for Soviet arms behavior. Despite the lack of empirical evidence, critics of a US ASAT capability confidently predict that it would promote arms race instability on the basis of a specious theory of arms race dynamics. They fail to consider seriously the possibility that Soviet weapons programs are driven primarily by their own internal logic and objectives. Thus, they overlook the evidence that doctrinal requirements are the principal driving forces behind the Soviet Union's military space posture.[20]

Fear of the effect of reactive Soviet ASAT deployments on arms race stability should not lead people to oppose a US ASAT program. Opposing this program in the belief that responsive Soviet ASAT deployments would degrade stability is predicated on the assumption that the Soviet Union will not pursue additional ASAT capabilities unless motivated by US actions. Yet, acquisition of a US ASAT capability would not lead to reactive Soviet ASAT deployments. As discussed below, the Soviet Union has been actively developing ASAT capabilities for years in accordance with military doctrinal requirements for attaining and maintaining military space superiority in order to deny the United States and its allies the use of space.

### *Soviet ASAT Capabilities*

The assertion that the Soviet co-orbital ASAT interceptor does not pose a very significant threat to US satellites misrepresents the threat posed by Soviet ASAT capabilities. It is incorrect to portray the co-orbital satellite interceptor as a crude and ineffective weapon. The Soviets continued to test, refine, and incorporate new components into the system after completing its initial design. As the Defense Department has stated, "Given the complexity of launch, target tracking, and radar-guided intercept, the Soviet ASAT is far from primitive. Soviet ASAT tests have been largely successful, indicating an operational system fully capable of performing its mission."[21] Between October 1968 and June 1982, the system was successful in nine out of 14 tests (64 percent) in a radar-guided configuration.

In addition, it is specious to claim that Soviet confidence in the ability of the co-orbital ASAT to perform its mission has been undermined as a result of the unilateral testing moratorium. Testing of the system was interrupted twice previously (December 1971–February 1976 and May 1978–April 1980) without any deleterious effect on its performance. During these stand-down periods, improvements were likely incorporated into the system's design.[22] The co-orbital ASAT, moreover, probably does not require integrated testing in order to maintain confidence in the system. Components could be tested on the ground or exercised in the numerous launches, rendezvous, and dockings in space that the Soviet Union conducts each year. The rendezvous and dockings, of course, are essentially the resolution of intercept problems. Soviet confidence in the reliability of the system is also reinforced by the fact that the SL-11 booster used to launch the satellite interceptor continues to be successfully employed five or six times per year.

People who oppose US acquisition of a dedicated ASAT also misrepresent the threat posed by Soviet ASAT capabilities by focusing almost solely on the co-orbital interceptor to the exclusion of other capabilities that could interfere purposefully with the timely functioning of a "space system." The ASAT mission can be per-

formed by any weapon capable of disrupting or destroying any one of a space system's three (orbital, link, and terrestrial) segments. These critics generally overlook the fact that the Soviet Union presently has several other weapons available for use in an ASAT role and is vigorously developing additional ASAT weapons technologies. In addition to the co-orbital satellite interceptor armed with a nonnuclear warhead and capable of negating satellites at low altitudes, Soviet ASAT capabilities include Galosh exoatmospheric ABM interceptors inherently capable of being employed as direct-ascent ASATs; ground-based, high-energy lasers that could irradiate satellites; and ground-based, electronic-warfare systems that could interfere with satellites at all altitudes.[23]

Moreover, the Soviet Union is working on ground- and space-based particle beam, radio-frequency (high-power microwave), and kinetic-energy weapons technologies as part of its strategic defense program, which could provide additional ASAT capabilities.[24] These exotic-technology weapons programs may come to fruition in the future. Indeed, Rear Adm Thomas Brooks, the director of naval intelligence, recently disclosed that the introduction of a more powerful, compact nuclear-power module may be a critical step toward Soviet deployment of a space-based ASAT by the mid-1990s.[25]

*The current, operational Soviet ASAT system can attack only low-orbit satellites. Critics argue that the system is not a significant threat, but continuous technology updates have made it a viable weapon.*

Thus, it is incorrect to assert that Soviet ASAT capabilities represent an insignificant threat to US space systems. It is a fallacy, moreover, to believe that moving forward with a US ASAT program will promote arms race instability when the Soviet Union has been investing substantial resources in a range of ASAT capabilities for years. Critics of a US ASAT capability should take into account the potential implications of ceding to the Soviet Union a unilateral ability for asserting space control and exploiting it to enhance the combat effectiveness of its terrestrial forces.

### *The Soviets Accept (Western-Defined) Crisis Stability Criteria*

The crisis stability theory propounded by people opposed to US acquisition of ASAT capabilities holds that the character of the superpowers' military force postures should never be the proximate cause of war. Force postures should be designed to dampen, rather than create, incentives to initiate the use of military force in an acute crisis. Stable deterrence in a crisis, according to this theory, depends on the mutual vulnerability of the superpowers' homelands and the mutual invulnerability of their retaliatory forces and associated command and control systems. Proponents of this theory argue that the existence of ASATs during a severe crisis could undermine crisis management and contribute to crisis escalation. In particular, the concern is that awareness of the vulnerability of strategic command and control satellites could lead to fear of a surprise ASAT attack in conjunction with a first strike and that this apprehension could produce overwhelming preemptive incentives.

The basic problem with such theorizing about crisis stability is that it presumes that the Soviet Union is interested in stability as it is defined by Western arms control theory and has structured its force posture according to a comparable paradigm of deterrence. The USSR, however, has not given any indication that it accepts the concept of deterrence based on consensual vulnerability. Soviet military theoreticians have long derided this notion as "incorrect bourgeois thinking."[26] They believe that it would not be prudent to place their security in the hands of their adversary.

The Soviet Union has designed its force posture without regard for Western considerations of crisis stability. The USSR has attempted to make its homeland, strategic forces, and associated command and control systems invulnerable to nuclear attack. It has also consistently sought to make the United States homeland and deterrent vulnerable. Indeed, the Soviet Union continues to pursue an effective, damage-limiting, strategic force posture. In addition to the fifth generation of ICBMs being added to the inventory of hard-target counterforce weapons, the USSR is maintaining robust strategic air defense and leadership hardening/relocation programs. Moreover, as President Reagan reported to Congress in December 1987 and reaffirmed before leaving office, "The aggregate of the Soviet Union's ABM and ABM-related actions (e.g., radar construction, concurrent testing, SAM [surface-to-air missile] upgrade, ABM rapid reload, ABM mobility and deployment of ABM components to Gomel) suggests that the USSR may be preparing an ABM defense of its national territory" in violation of the ABM Treaty.[27] The Soviet Union prefers to seek stability through a unilateral ability for crisis control rather than rely on the reciprocal restraint of an adversary.

Furthermore, Soviet military theoreticians do not accept the notion that military technology in itself might cause a crisis to erupt into war. This position is in direct contrast to the assertion that the mere presence of ASATs and the corresponding vulnerability of vital satellites could in itself be the source of conflict. Soviet military theoreticians reject such reasoning out of hand as being overly mechanistic and divorced from strategic political considerations. According to Soviet military theory, war is an issue of politics and not a func-

tion of technology. A basic premise of Soviet military thought is Clausewitz's dictum, modified by Lenin, that "war is a continuation of politics by other (namely violent) means."[28] From the Soviet perspective, stability does not rest on specific technical characteristics of the military balance. Rather, political factors are the main determinants of crisis stability. Indeed, Marshal Sergei F. Akhromeyev, former chief of the Soviet General Staff and advisor to General Secretary Gorbachev, has emphasized that Soviet national security policy is "based on the fact that, in the nuclear space age, maintenance of security appears more and more to be a political problem. It cannot be guaranteed just through military-technical means or through the creation of even the most powerful offensive or defensive forces."[29]

Perhaps an even greater indictment of the crisis instability charge is that it is unfounded even with respect to the critics' own stability criteria. The principal criterion for the stability of deterrence in a crisis, as noted above, is mutual societal vulnerability to strategic retaliation. According to Western arms control theory, neither the United States nor the Soviet Union would be likely to calculate that the potential political or military benefits of resorting to force in an acute crisis outweigh the costs of a conflict so long as both countries are vulnerable to nuclear attack. Thus, unless one side had an ASAT capability that could effectively deny the other the ability to use—or order use of—its strategic offensive force, it is difficult to see how the presence of ASATs during a superpower crisis could precipitate nuclear escalation. Since neither the United States nor the Soviet Union completely relies on satellites for strategic command and control to the degree that space could be considered either side's Achilles' heel, fear of an ASAT attack in conjunction with a first strike should not, by itself, produce overwhelming incentives to preempt in an acute crisis.

What the critics leveling the crisis instability charge against ASAT should consider, given the contrasting Soviet view of stability, is that the ability to hold Soviet force-enhancement satellites at prompt risk could be extremely important for maintaining deterrence in a crisis. Indeed, since the Soviet Union evidently believes that the quality of deterrence rests on the relative war-fighting prowess of its armed forces, deterrence stability should be strengthened by confronting Soviet defense planners with the prospect of being denied surveillance, targeting, navigation, and communications information from space to support their terrestrial forces.

### *Conflict Control, Limitation, Termination, and Satellites*

Critics of a US ASAT program also argue that such weapons would exacerbate the problems of controlling, limiting, and terminating a superpower conflict. They are concerned that ASAT employment would greatly complicate strategic command and control, wartime negotiation or bargaining, and the ability to monitor compliance with an armistice. These concerns, however, are the result of an overestimation of the importance of satellites for long-distance communications and surveillance. It is true that both the United States and the Soviet Union are continuing to increase their peacetime use of space for such activities. But neither country is now, or is ever likely to become, *entirely* dependent on satellites for long-distance communications in wartime or postattack surveillance–at least to the point where the other side was *100 percent confident* that a successful ASAT campaign would effect a paralysis in command.

Both the United States and the Soviet Union have devoted substantial resources to the development of redundant and survivable means of strategic communications. Indeed, strategic command, control, and communications have had the highest priority in the US strategic modernization program. The superpowers utilize almost all communications technologies and frequencies for strategic communications. But

satellites generally have become a favored means for long-haul communications because they permit the reliable transmission of large amounts of information. Consequently, both superpowers have improved passive survivability measures for satellites.

Satellites are not the only means of strategic communications utilized by the United States and the Soviet Union. Landlines and (non-space-dependent) radio relays are also used to connect command authorities with strategic forces. Both superpowers have constructed fixed, hardened command centers as well as airborne, ground-, and sea-mobile command posts. They have connected these command centers to their strategic forces with redundant communication links comprised of above- and below-ground cables and radio-relay systems in addition to communications satellites. Thus, given the availability of alternative means of strategic communications, it is unlikely that ASAT employment against satellites used for strategic command and control would in itself lead to uncontrolled or inadvertent escalation.

Similarly, it is unlikely that ASAT employment against communications satellites could significantly impede the transmission of a cease-fire order and thus reduce the likelihood of early conflict termination. This is not to underestimate the difficulty of maintaining strategic command and control in a nuclear wartime environment. But it is to suggest that satellites may not be such crucial communication links that their disablement or destruction effectively would result in decapitation and spasm retaliation. In addition, redundant communication links between the superpowers are available for wartime negotiations. The 1963 Hot-Line Agreement established a duplex telegraph circuit linked by cable between Moscow and Washington and a high-frequency radio backup. When the hot line was upgraded in 1971 with the addition of satellite circuits, the cable link became the backup, and the radio link was eliminated.

Concern about the implications of ASATs for monitoring an adversary's behavior during a war and after an armistice is also misplaced. Both the United States and the Soviet Union are aware that satellites in near-earth orbits would be vulnerable to direct attack. Thus, it is unlikely that either country would plan to rely exclusively on satellites for such missions in wartime. Aircraft and/or drones, for example, could be used as interim means for gathering information or monitoring compliance with an armistice.

## Conclusion

The deterrence and arms race instability case against the US ASAT program is flawed. Critics charge that US acquisition of dedicated ASAT capabilities would be destabilizing and could increase the probability of war. They argue that moving forward with an ASAT program will ignite a dangerous space arms race. In addition, they argue that ASATs could be the proximate cause of war in an acute political crisis. As the foregoing analysis has shown, however, the premises underlying these charges are not valid.

First, Soviet force-acquisition behavior has not conformed to the action-reaction model of the arms race. The presumption that US acquisition of ASAT capabilities would lead to reactive Soviet ASAT deployments is based on a specious theory of arms race dynamics. Rather than being a reaction to prospective US ASAT deployments, the Soviet Union's development of space weaponry is more likely the product of doctrinal requirements for achieving military space superiority to deny the United States and its allies the use of space and enhance the combat effectiveness of its own terrestrial forces.

Second, the Soviet Union's ASAT capabilities pose a significant threat to US space systems. The co-orbital ASAT is operational, and Soviet confidence in the system most likely has been maintained despite the unilateral test moratorium. Moreover,

focusing almost entirely on the Soviet coorbital satellite interceptor overlooks the range of other military capabilities that the Soviet Union either has already deployed or is developing for the ASAT mission.

Third, the Soviet Union neither accepts Western-defined criteria for crisis stability nor structures its force posture in accordance with Western considerations of stability. It has rejected as a policy consideration the Western concept of deterrence based on mutual vulnerability to strategic retaliation. Instead, the Soviet Union has pursued a comprehensive damage-limiting posture. Even if the USSR accepted the Western notion of stable deterrence, however, it is difficult to see how the presence of ASATs in an acute crisis could precipitate nuclear escalation unless one side had an ASAT capability that could deny the other the ability to use, or order use of, its retaliatory force.

Fourth, since neither the United States nor the Soviet Union is entirely dependent on satellites for long-haul communications or surveillance, ASAT employment would not necessarily preclude conflict control, limitation, or termination. Both superpowers utilize (non-space-dependent) radio relays and landlines as redundant communication links to connect command authorities with strategic forces. Thus, ASAT employment against satellite links should not in itself lead to uncontrolled or inadvertent escalation. Redundant communication links between the United States and the Soviet Union also exist for wartime negotiations. Similarly, means other than satellites (aircraft and/or drones) could be available for monitoring compliance with an armistice.

The faulty assumptions that underpin the argument that ASATs are destabilizing should not influence the debate over the proposal for a new US ASAT program. The United States should not deny itself a dedicated ASAT capability on the grounds that it would promote arms race and crisis instability. Moving forward with an ASAT program can hardly spark a space arms race when the Soviet Union has been investing substantial resources in a range of ASAT capabilities with the aim of controlling space for the enhancement of its own military forces. Rather than promoting instability in an acute superpower crisis, it may well be essential for the stability of deterrence—and the prevention of war—that the United States acquire and maintain capabilities to hold Soviet force-enhancement satellites at prompt risk. □

Notes

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4. See, for example, Aspen Strategy Group, *Anti-Satellite Weapons and U.S. Military Space Policy* (Lanham, Md.: University Press of America, 1986), 9–13.

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7. See, for example, Harkin, 3.

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11. Ibid.

12. Ibid.

13. See, for example, Kurt Gottfried and Richard Ned Lebow, "Anti-Satellite Weapons: Weighing the Risks," *Daedalus* 114, no. 2 (Spring 1985): 147–69.

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15. See, for example, Stares, "Nuclear Operations," 697.

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20. See, for example, Department of Defense, *The Soviet Space Challenge* (Washington, D.C.: Government Printing Office 1987), iii; and Defense Intelligence Agency, *Soviet Military Space Doctrine*, DDB-1400-16-84 (Washington, D.C.: Government Printing Office, 1984), 32.

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26. See, for example, V. Kulakov et al., *Marxism Leninism on War and Army*, translated and published under the auspices of the US Air Force (Washington, D.C.: Government Printing Office, 1974), 28.

27. *The President's Unclassified Report on Soviet Noncompliance with Arms Control Agreements* (Washington, D.C.: The White House, 2 December 1987), 10; and *The President's Unclassified Report on Soviet Noncompliance with Arms Control Agreements* (Washington, D.C.: The White House, 2 December 1988), 18.

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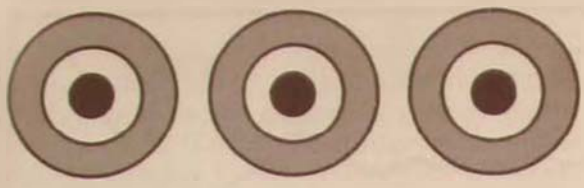
# THE BEKAA VALLEY AIR BATTLE, JUNE 1982: LESSONS MISLEARNED?

C1C Matthew M. Hurley, USAFA

MILITARY analysts are always eager to derive "lessons" from recent military conflicts, but our perceptions of such lessons are often clouded by national biases; interservice rivalries; incomplete information; and differing needs, desires, and viewpoints. For example, the Bekaa Valley (Lebanon) air battle of June 1982 is widely regarded as a significant development in modern warfare. The Israeli Air Force (IAF) achieved a remarkable military victory, and certainly there are lessons to be learned from it. Unfortunately, most literature on the battle suffers from distortions resulting from the above factors. The problem lies in determining which lessons are applicable to the US military and which merely draw attention away from what is truly significant. Many of the lessons from the Bekaa were rather short-lived in their usefulness, and others—while of great interest to military historians—simply do not apply to the American military situation.

It is, of course, essential to first summarize the events preceding and during the battle, as well as the factors contributing to the Israeli victory. The circumstances that determined the outcome of the Bekaa Valley battle can easily be traced back to 1967, when the Israelis launched a devastating surprise air attack on Egyptian airfields to begin the Six Day War. The Arab states, particularly Egypt, responded by establishing a system of surface-to-air missiles (SAMs) to deal with any future Israeli incursions into their airspace.[1] During the War of Attrition from 1967–70 the IAF



admitted losing at least 22 aircraft to the new Arab missile defenses, though Egypt claimed 21 in July 1970 alone.[2] Even so, it was not until the three-week-long October War in 1973 that SAM warfare came of age in the Middle East. Egyptian SAMs (SA-2s, SA-3s, and SA-6s) along with 23-mm ZSU-23-4 antiaircraft cannons destroyed some 40 Israeli aircraft in the first 48 hours of the war, or 14 percent of the frontline strength of the IAF.[3] In contrast, only five Israeli aircraft were destroyed in air-to-air combat during the entire conflict.[4] Coupled with the high number of aircraft lost to ground-based air defenses in Vietnam, the results of the October War prompted some analysts to ask whether tactical aircraft had outlived their usefulness on the modern battlefield.[5]

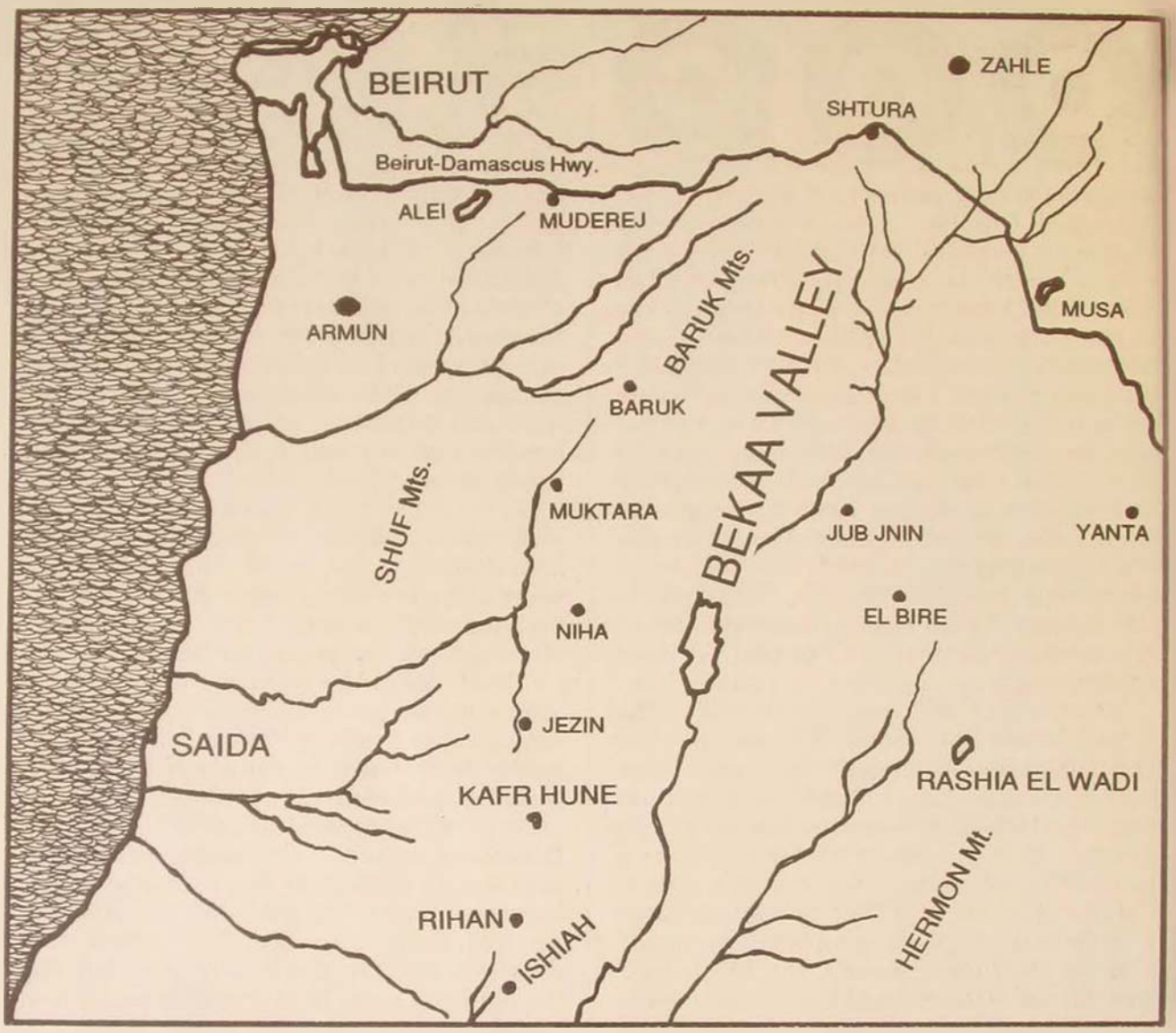
In retrospect, it appears obvious that the Israelis were not prepared to counter the "missile umbrella" Egypt had erected before and during the 1973 war. Instead, their doctrine reflected the experiences of the Six Day War, in which SAMs were not a factor. But after sustaining heavy losses in the October War, the Israelis adjusted with a coherent SAM-suppression doctrine.[6] Should hostilities resume, the IAF would now be prepared for SAM suppression and could adapt as necessary to meet new contingencies.

During the spring of 1981, the Israelis came close to putting their new doctrine and capability to the test. On 28 April the IAF shot down two Syrian helicopters while providing air cover for Christian militiamen in Zahle, Lebanon. Damascus reacted by deploying three SA-6 batteries to Lebanon's Bekaa Valley the next day.[7] The Israelis regarded the newly emplaced SAMs as a violation of a tacit Syrian-Israeli agreement regarding the Syrian presence in Lebanon and as a threat to vital air reconnaissance. Although the Israelis threatened to remove the missile batteries by force, the crisis was defused by diplomatic means; Syrian missiles and troops, however, remained in Lebanon.[8]

For the next year the IAF conducted extensive air reconnaissance over the Bekaa and trained in the Negev Desert against mock SAM sites identical to those in Lebanon.[9] Meanwhile, Defense Minister Ariel Sharon and Lt Gen Rafael Eitan, chief of staff of Israeli Defense Forces (IDF), developed the plans for an invasion to rid northern Israel of Palestine Liberation Organization (PLO) raids and shelling from southern Lebanon, which had killed 25 Israelis and wounded 250 more between July 1981 and June 1982.[10]

On 3 June 1982 Palestinian terrorists made an assassination attempt against the Israeli ambassador in London. After three years of frenzied shelling and countershelling, the IDF launched the long-planned, often-delayed invasion Operation Peace for Galilee.[11] Its goal was to destroy the infrastructure and bases of the PLO in southern Lebanon and remove the artillery threat to northern Israel.[12] Although Israel proclaimed a desire to avoid any unpleasantries with Syrian forces in Lebanon, Damascus decided to reinforce its Lebanon contingent, including the 19 Syrian SAM batteries now deployed in the Bekaa.[13] Though Syria intended this action as a deterrent gesture, the Israelis decided that the batteries must be destroyed, for by now hostilities had erupted between Syrian and Israeli forces.[14]

Reports of what happened next vary. It is generally accepted that in the course of the first attack against the Bekaa on 9 June 1982, the IAF destroyed 17 of the 19 Syrian SAM batteries and their radar sites, as well as 29 Syrian Air Force (SAF) fighters, without loss.[15] The following day, the IAF destroyed the remaining two missile batteries. The SAF once more challenged the Israelis and lost approximately 35 more aircraft, again without downing an Israeli aircraft. By the end of July, Syria had lost at least 87 aircraft, while Israeli losses amounted to a




*The Bekaa Valley, Lebanon. The Israelis' familiarity with this area, resulting from repeated overflights for an extended period of time, gave them an advantage not normally available to attacking forces.*

few helicopters, one RF-4E, and an A-4 Skyhawk downed by a PLO SA-7.[16]

Naturally, Arab claims differed from Western and Israeli accounts. The Syrian news agency SANA claimed that 19 Israeli and 14 Syrian planes had been downed on 9 June. The next day, the Syrians maintained that six Israeli and seven Syrian aircraft had been destroyed, while no mention was made on either day of any damage to their SAMs.[17] The Soviets went even further in extolling the SAF's combat virtues: the military newspaper *Red Star* announced triumphantly that "sixty-seven Israeli aircraft, including modern US-made F-15 and F-16 fighters, were downed" in the fighting.[18] Further Soviet reports included an account in *Red Star* about a meeting with a Syrian airman who eagerly recounted an engagement in which he shot down an Israeli F-15: "The victory had not been easy; the enemy had been subtle."[19]

These claims met with great skepticism, even within Soviet ranks. After the Bekaa Valley debacle, for example, a story circulated around the Soviet military about how the Syrian Air Force maintained a departure control but no approach control.[20] Even the Syrians themselves privately admitted defeat. After the Bekaa turkey shoot, Gen Mustafa Tlas, the defense minister, told President Hafez Assad and other government leaders that "the Syrian Air Force was outclassed, the ground-to-air missiles useless, and that without air cover, the army could not fight on."[21] Indeed, it seems a bit odd that the Soviets would celebrate a great Syrian victory by sending the first deputy commander of the Soviet air defense forces to find out what went wrong. It seems even stranger that they would conclude that a new SAM system of SA-8s, SA-9s, and long-range SA-5s was necessary, manned by some 1,000 to 1,500 Soviet "advisers."[22]

The lopsided results of the battle stem from a number of factors. The most visible in any air engagement are the quality and capabilities of the weapon systems employed, especially aircraft and air-to-air armament. The IAF had a definite qualitative advantage in both. The primary Syrian fighter during the Lebanon War was the relatively obsolescent MiG-21, with considerable numbers of export model MiG-23s and Su-20s also deployed.[23] The Israelis, on the other hand, were flying new-generation McDonnell Douglas F-15s and General Dynamics F-16s, as well as older but still effective McDonnell Douglas F-4s and Israeli Aircraft Industries Kfirs.[24]

The F-15 and the F-16, which were specifically designed for air superiority,[25] both have a thrust-to-weight ratio greater than one (i.e., the thrust provided by their engines exceeds their loaded takeoff weight, thus allowing the aircraft to accelerate even while maneuvering or climbing).[26] In addition to better acceleration and maneuverability at combat speeds, the F-15 and F-16 have superior radars and cockpit visibility that often resulted in early detection of the enemy and the delivery of undetected shots.[27]

These shots were quite lethal because of the high reliability of US-made AIM-7F Sparrow radar-guided missiles, AIM-9L Sidewinder infrared-guided missiles, and computer-aimed 20-mm cannons. The AIM-9L, which accounted for the majority of the kills, was particularly effective with its "all-aspect capability."[28] Simply put, the missile could be launched at an opposing aircraft from any angle, including head-on, thus eliminating the need to maneuver behind the enemy to shoot.[29] The AIM-9L had been used earlier during the Falklands campaign, where British Harriers scored 25 kills for 27 launches against faster aircraft in marginal weather. The resulting 93 percent success rate was quite an improvement over the 10–19 percent kill rate for earlier models of the AIM-9 in Vietnam.[30] The Syrians had no comparable ordnance, relying instead on the 1960s vintage AA-2 "Atoll."[31]

The Israelis also demonstrated considerable technical prowess in command, control, and communications ($C^3$). The Bekaa Valley battle was the first combat involving the use of modern airborne warning and control system (AWACS) aircraft, specifically, the US-made Grumman E-2C Hawkeye. The AWACS is an airborne radar platform responsible for vectoring fighters to their targets and managing the overall air battle situation.[32] The E-2C has an APS-125 radar mounted in a "dish" above the fuselage, with which it can scan 3 million cubic miles of airspace. It can monitor over 200 aircraft simultaneously and control up to 130 separate air-to-air engagements at ranges up to 250 miles.[33] In addition, the E-2C includes an ALR-59 passive detection system that can pick up radar signals 500 miles away, effectively doubling the Hawkeye's early detection range.[34] This capability enabled the IAF to detect Syrian aircraft as they took off, allowing it to determine how many hostile aircraft were inbound and from what direction.[35] The Israelis also used F-15s in the rear as "mini-AWACS" to

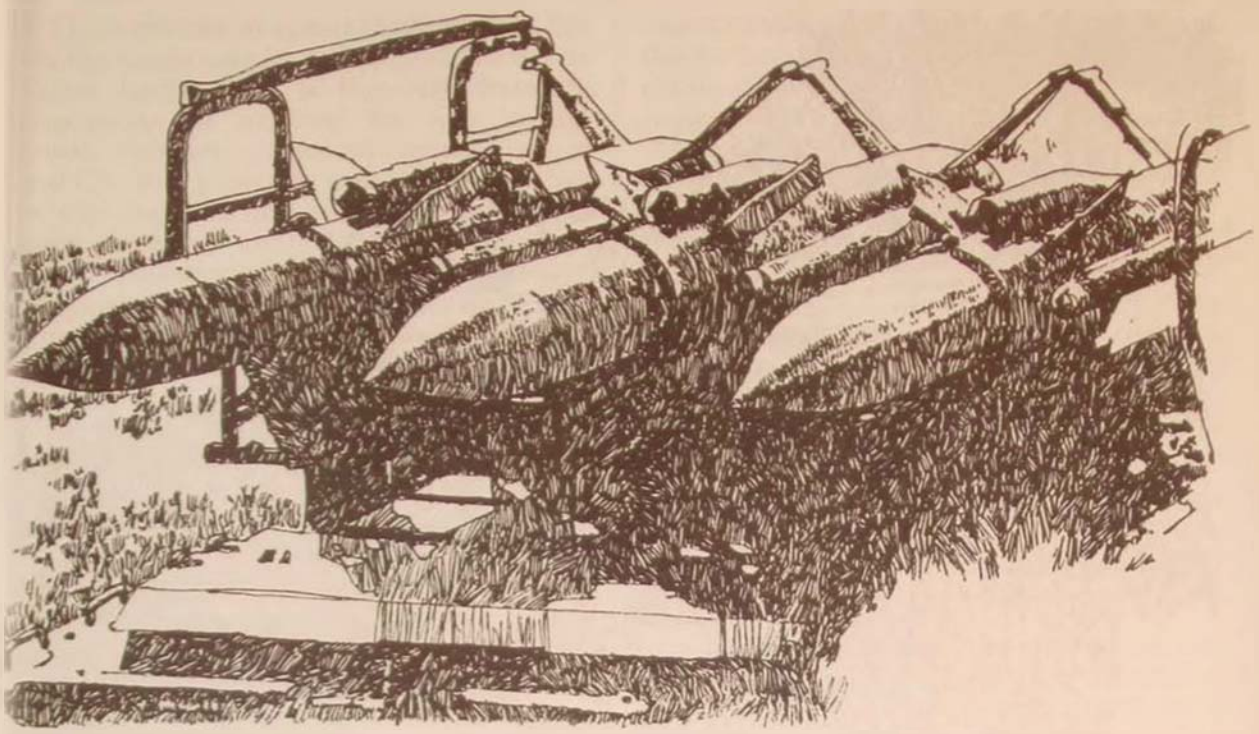
help manage air-to-air engagements.[36] This overall Israeli AWACS capability allowed the IAF to vector its fighters into "blind-side" attacks on the Syrian MiGs, which had only nose- and tail-threat warning receivers to warn the pilot of a missile attack. SAF pilots were thus denied any advance warning of an attack by the IAF's all-aspect AIM-9Ls or AIM-7Fs: the latter could be fired well beyond visual range.[37] Israeli aircraft could thus fire shots at their Syrian opponents—often undetected from launch until impact—and deny the Syrians any opportunity to evade or return fire.

The IAF worked to obstruct Syrian $C^3$ while enhancing its own, making especially effective use of modified Boeing 707s. These aircraft were equipped with standoff jammers capable of disrupting several enemy frequencies at once with very little out-of-phase disturbance, thereby minimizing self-jamming of frequencies used by the IDF.[38] Effective jamming of Syrian communications and radar systems cut off SAF MiGs from ground control, leaving them isolated and vulnerable to AWACS-directed attacks from F-15s and F-16s.[39] The result was chaos within the Syrian formations. According to one Western military observer, "I watched a group of Syrian fighter planes fly figure-eights. They just flew around and around and obviously had no idea what to do next."[40]

The Israelis were also intent on preserving the integrity of their own $C^3$ against Syrian electronic countermeasures (ECM). Israeli fighter aircraft were equipped with ECM pods, including the indigenously produced EL/L-8200 series, which provided protection against ground-based and airborne radar threats.[41] To protect their digital and voice communications from Syrian interference, the IDF developed a very high frequency (VHF) FM radio system that changed radio frequencies across a 30 to 88 megahertz (MHz) band. Before the Syrians could identify and jam a utilized frequency, the radio would switch to a different frequency and continue to do so according to a complex mathematical formula that gave the appearance of random switching.[42] Given the superior Israeli jamming capability, such an innovative radio system would have been useful to the Syrians; however, they had no such equipment.

Another technological innovation that contributed to the Israeli victory was the remotely piloted vehicle (RPV). The IAF used this drone aircraft in the months preceding the invasion to "fingerprint" surface-to-air radar, providing information vital to Israeli countermeasures.[43] When the battle actually began, RPVs were used as "decoys" to simulate electronically the radar signature of full-size strike aircraft and trick the Syrians into activating their SAM target acquisition and tracking radars.[44] This ruse provided ample targets for the AGM-78 Standard antiradiation missile (ARM) and AGM-45 Shrike air-launched ARMs that followed.[45] Other RPVs served as cheap and survivable intelligence platforms because they were constructed out of aluminum and composite materials for a minimal radar and infrared signature.[46] Once launched, they were employed most often as photographic platforms or "real-time" video intelligence systems whose fields of view, zoom ratios, and flight plans could be preprogrammed or changed at the discretion of the commander.[47] Once the tactical reconnaissance and deception functions were completed and strike aircraft were directed to the SAM sites, air-launched laser-guided ordnance was guided to the target by laser designators mounted on the RPVs.[48]

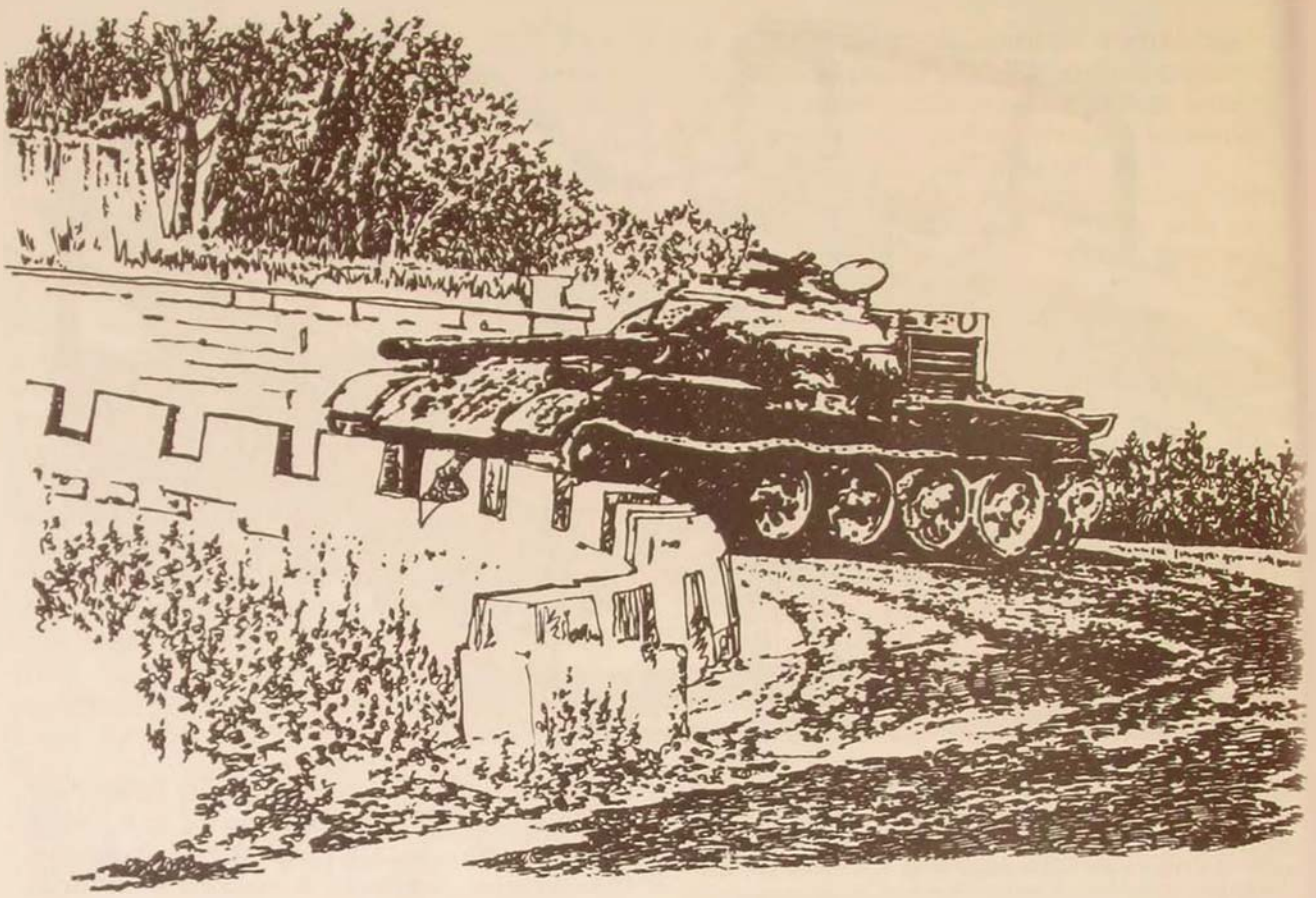
Despite their technological advantages, the Israelis placed considerable priority on the human element, maintaining that high technology is useless without the ability to employ it successfully. According to General Eitan, "Training is of greater importance and significance than the means of warfare, the weaponry systems, and the technology."[49] It was precisely this philosophy that allowed the IAF to exploit fully the capabilities of their equipment during the Bekaa Valley battle.[50] Pilots and ground crews were so well trained that the aircraft



*The Israelis destroyed numerous Soviet-made SA-6 surface-to-air batteries during the June 1982 fighting. But they were aided in this destruction by the enemy's poor doctrine—an advantage that NATO forces will probably not have in potential future engagements with Soviet or Warsaw Pact forces.*

turnaround rate (the time it took to refuel, reload, and service an aircraft before the next mission) was in some cases reduced to less than 10 minutes.[51] Furthermore, Israeli pilots were for years exposed to the most realistic training of all—combat. Besides conducting simulated strikes against mock SAM sites in the Negev Desert, the IAF had fought three major wars against their Arab opponents since 1967, including considerable combat experience between the wars. The IAF had also been flying virtually unopposed over Lebanon and the Bekaa Valley for years,[52] affording it a familiarity with the target area and deployment of enemy forces unprecedented in modern warfare.

Qualitative advantages in equipment and manpower, however impressive, are relative; therefore, Syrian deficiencies—and there were plenty—were equally important in determining the outcome of the Bekaa Valley battle. In air combat, for example, the Syrians displayed a marked inferiority to the Israelis in tactics and training. The fact that they were largely dependent on ground control not only limited pilot initiative and independence but also encouraged the Israelis to continually jam their communication links.[53] The constraints thus imposed on the Syrian pilots degraded their already inferior technological capabilities. An anonymous senior IAF officer concluded, "They could have flown the best fighter in the world, but if they flew it the way they were flying, we would have shot them down in exactly the same way. It wasn't the equipment at fault, but their tactics."[54] General Eitan echoed this attitude, complaining that although the IAF encountered the MiG-25 during the Lebanon War, it was difficult to assess the aircraft's capabilities because "the Syrians don't know how to fly or operate the MiG-25. If we could have been sitting in a MiG-25, nobody could have touched us."[55]



*Even the Syrian defense minister had to admit that the Syrian air force could not compete with Israel's and that without air cover, the army could not successfully engage the enemy. The Israelis' air superiority allowed them to destroy enemy forces such as this Soviet-made tank virtually at will.*

Syrian SAM operators also invited disaster upon themselves. Their Soviet equipment was generally regarded as quite good; Syrian handling of it was appalling. As noted by Lt Gen Leonard Perroots, director of the US Defense Intelligence Agency, "'The Syrians used mobile missiles in a fixed configuration; they put the radars in the valley instead of the hills because they didn't want to dig latrines—seriously.'"[56] The Syrian practice of stationing mobile missiles in one place for several months allowed Israeli reconnaissance to determine the exact location of the missiles and their radars, giving the IAF a definite tactical advantage on the eve of battle.[57] Even so, the Syrians might have been able to avoid the complete destruction of their SAM complex had they effectively camouflaged their sites; instead, they used smoke to "hide" them, which actually made them easier to spot from the air.[58] It is ironic that the Syrians, who have been criticized for their strict adherence to Soviet doctrine, chose to ignore the viable doctrine that emphasizes the utility of maneuver and camouflage. According to a 1981 article in *Soviet Military Review*, alternate firing positions, defensive ambushes, regular repositioning of mobile SAMs to confuse enemy intelligence, and the emplacement of dummy SAM sites are fundamental considerations for the effective deployment and survivability of ground-based air defenses.[59]

Three lessons of special relevance to the United States may be drawn from the Bekaa Valley battle. First is the overwhelming importance of winning the war in the fourth dimension (i.e., electronic warfare and C3). It is generally accepted today that to win the land and sea battle, a fighting force must first control the air. This concept—revolutionary in its genesis—was demonstrated numerous times in World War II and subsequent conflicts. Now, in order to win the air battle, one must first conquer the electromagnetic spectrum. What used to be "a minor side show to the real battles that raged on the land, on the sea, or in the air" is now a prerequisite for modern warfighting.[60] The Bekaa Valley has shown that an effective electronic warfighting capability is no longer a luxury, but a necessity.

That point was emphasized in the Anglo-Argentine conflict over the Falklands only a few months earlier. HMS *Sheffield*, for example, was destroyed by a single Exocet antiship missile fired by an Argentine Super Étendard, with substantial loss of life. Had the Royal Navy had an E-2C at its disposal, it would have been able to destroy the Argentine aircraft before it was within firing range.[61] As Soviet missile and aircraft capabilities continue to grow, it becomes evident that without adequate electronic preparation the US Air Force may also suffer unacceptable losses in the event of war. Certainly, the Syrians were outthought and outflown over the Bekaa Valley, but it must be noted that they were also outperformed in the electronic arena.[62] For more evenly matched forces, that advantage (or the lack thereof) will make a considerable, if not decisive, difference.

The Bekaa Valley air battle also demonstrated the need for effective doctrine and organization. The Israelis had suffered in this respect between 1967 and 1973, but by 1982 had reorganized themselves into the effective fighting force that dominated the Bekaa Valley battle. Interservice cooperation has become the standard for the IDF; indeed, the Israeli Air Force and navy are incorporated into the ground forces staff at the national level.[63] This integrated command structure allows a strict division of responsibility and gives the IAF an easily defined mission—control of the air, both to support the ground forces and to protect Israel from air attack. Therefore, the IAF controls all the helicopters and since 1971 has controlled all the air defense forces as well, including air defense artillery.[64] In short, the IAF controls *all* assets used in gaining and maintaining control of the air and in projecting power from the air. Perhaps this total control is due to the limited and specifically defined roles of the separate Israeli services, but the United States could nonetheless learn some valuable lessons from the Israeli example. Warren A. Trest has noted that in the US armed forces,

> military air power, perhaps irrevocably, has been severed four ways. This fragmenting has led to overlap in all roles and mission areas, even to the conceptual extreme of extending rotary-wing operations into the realm of interdiction. Each service has developed its own air doctrine, oftentimes with disregard for the total air situation.[65]

Recent American military history reflects the results of this fragmentation. Names such as *Rolling Thunder*, *Desert One*, and *Grenada* recall misapplications of air power caused by insufficient interservice coordination—a coordination that should have already existed. The US raid on Libya in 1986 provides an even more recent example of the complexities and problems that result when different services each want a "piece of the action." The US naval force in that operation included 14 A-6s, six A-7s, six F-18s, several F-14s and EA-6Bs, and four E-2Cs from two carriers that based 155 aircraft.[66] The 24 US Air Force F-111s in the operation required the support of over 30 more aircraft, including five EF-111 electronic warfare aircraft and some 28 KC-135 and KC-10 tankers; even so, nine of the F-111s did not complete the mission.[67] The Air Force aircraft were further handicapped by the length of their

mission—a round-trip of 5,600 miles lasting 14 hours and 34 minutes.[68] It might have been easier, given the Navy assets described, simply to use carrier-based aircraft, which had the advantages of proximity and relative immunity from such political prerequisites as overflight rights.

But perhaps the most important lesson from the Bekaa Valley is not to try to infer too many lessons. There are many factors that make the Lebanon War in general and the Bekaa Valley battle in particular of limited relevance to the US military.

The US Air Force may take comfort from the fact that its premier fighters and other equipment performed so well. However, these aircraft had been greatly modified by the relatively small but competent Israeli aircraft and electronics industry. The Israeli F-4, for example, had undergone 600 modifications, and the E-2C AWACS was specially modified by Elta—the electronics division of Israel Aircraft Industries—to fit the unique requirements for Middle Eastern air warfare.[69] Perhaps even more significantly, the Soviet-supplied Syrian aircraft were stripped-down export models. One cannot predict from the IAF's overwhelming victory against Syrian MiG-23s and MiG-21s in Lebanon that NATO would achieve a similar tally against Warsaw Pact air forces in central Europe. NATO pilots will face the latest models of older Soviet fighters, as well as increasing numbers of their next-generation fighters: the MiG-29, MiG-31, and Su-27. Of course, that is not saying that the technological advantage the West has traditionally enjoyed is no longer present, but a quality differential of the magnitude demonstrated over Lebanon will most likely not be repeated in a European warfighting environment.

Similarly, although Syrian pilots showed severe shortcomings in tactics and initiative in battle, it is dangerous to assume that their Soviet sponsor's performance in future air-to-air combat will be as poor. In fact, the past few years have seen a revolution in Soviet tactics. While Soviet training may be more rigid, more dependent upon ground control, and less realistic than American training, recent trends in the Soviet military press indicate a change toward more realistic training and tactics designed to enhance and encourage pilot initiative and independence.[70] Moreover, every third pilot in a Soviet fighter regiment is designated as an "aerial sniper," with experience, flight time, and some skills comparable to those of Western fighter pilots.[71] In short, the Soviet pilot of 1982—though far superior to his Syrian counterpart—is himself overshadowed by his 1989 successor.

Other factors make the Bekaa Valley battle unique in the history of air power and limit its relevance. In addition to their qualitative advantage, the Israelis enjoyed numerical preponderance over the Bekaa Valley, outnumbering the Syrian Air Force by a ratio of about three aircraft to two.[72] NATO air forces cannot count on this numerical advantage against the Warsaw Pact. The IAF also enjoyed the advantage of superior combat experience, having fought the Syrians in 1967, 1973, and in other engagements before the 1982 affair; US Air Force pilots have not fought any likely enemy so often or so recently.

Furthermore, the IAF had been flying unopposed over the Bekaa Valley for years, familiarizing itself with the terrain and the location of Syrian SAM emplacements.[73] The Israelis also trained a full year for one specific mission, fought a well-known and less-than-capable foe in a relatively small area, and had the opportunity to employ strategic initiative and surprise. These considerations simplified the Israeli SAM-suppression situation immensely, but, again, the US Air Force can seldom hope for such advantages. No US Air Force pilots have routinely flown reconnaissance over Czechoslovakia or East Germany. Despite considerable experience in West German airspace, US pilots would certainly benefit from familiarity with enemy airspace in preparing themselves for deep strikes, rear-area interdiction, and SAM-suppression operations beyond the Fulda

Gap (West Germany). In addition, the SA-10, SA-11, SA-12A, and SA-13 systems now deployed with Warsaw Pact forces are considered to be marked improvements over their predecessors deployed in the Bekaa. They are far more mobile, more accurate, harder to jam, and are in the hands of competent personnel who know how to use them.[74] NATO pilots can thus expect a greater concentration of superior missiles than those faced by the Israelis. Additionally, the potential area of SAM suppression and counterair operations in Europe is likely to be somewhat larger than the Bekaa Valley and its surroundings, which roughly equate to the size of Luxembourg.[75]

There are obviously many possible interpretations of any military event, hence many different "lessons." The problem, again, lies in determining which lessons apply to a given nation or armed service. To make this vital distinction, the US Air Force needs to abandon any tendency toward self-aggrandizement and realize that the Israelis had a much easier task than US Air Force pilots can ever hope to expect against their chief potential adversaries. Instead of merely praising the performance of its equipment and allies, the US armed forces must focus on those lessons that truly do apply to the future possibilities of air war, rather than on self-serving "lessons" that merely highlight the dangers of living in the past. If the US Air Force focuses on the latter, it may find itself burdened with outdated doctrine and weapons. In that case, rather than following the Israeli example of victory, the US Air Force might find itself conforming to the Syrian model of humiliation and defeat. □

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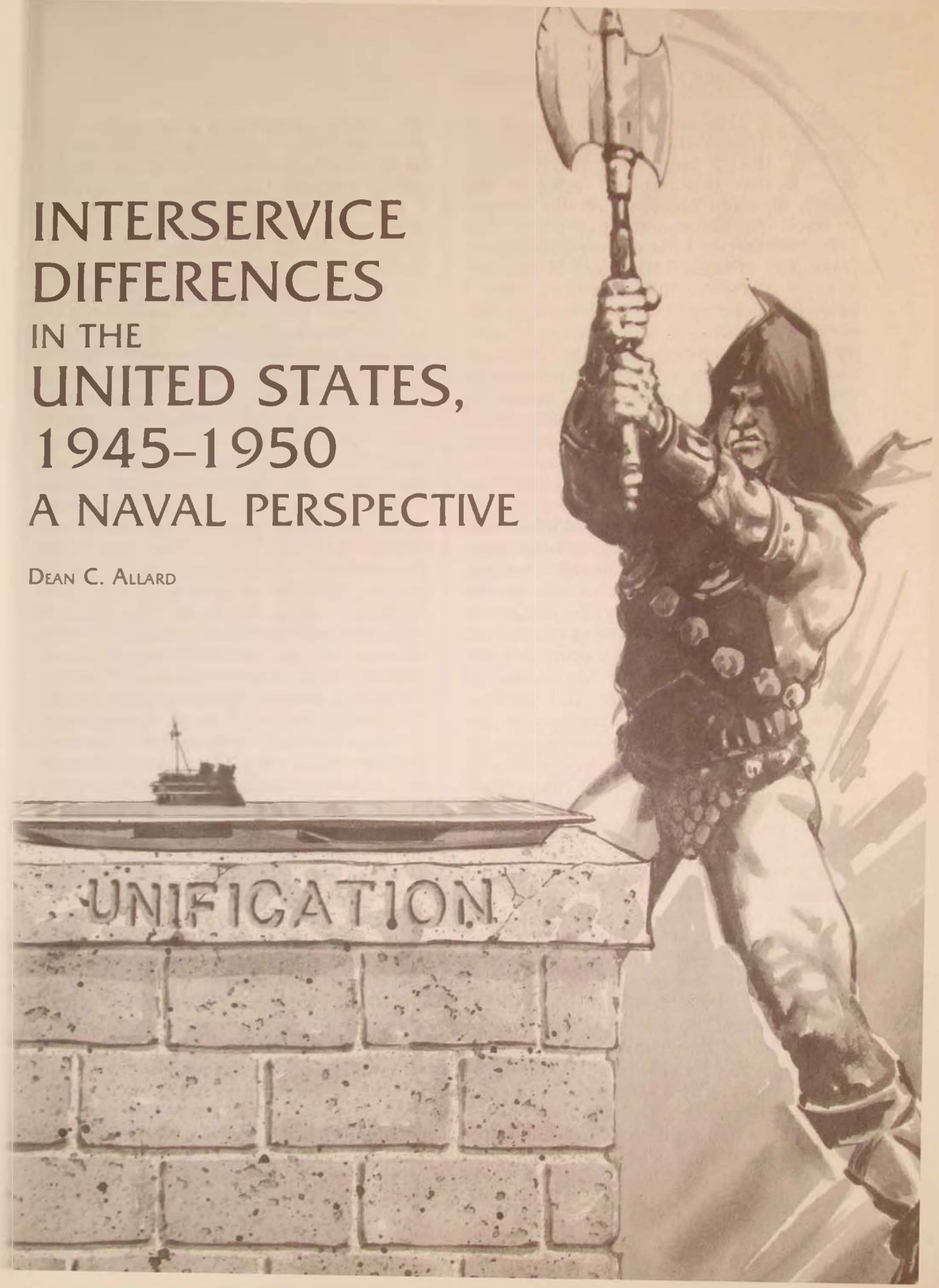
# INTERSERVICE DIFFERENCES IN THE UNITED STATES, 1945–1950

## A NAVAL PERSPECTIVE

DEAN C. ALLARD



AT THE end of World War II, an intense rivalry erupted between the US Army, Navy, and Air Force that continues to echo in the minds of many observers of the nation's defense. This bureaucratic conflict resulted from interservice differences regarding the principles of organization and of national strategy. It also was influenced by a level of defense spending that increasingly fell short of matching America's security obligations. The resulting acrimony often was sharp and sometimes highly emotional. In the last analysis, however, this article argues that the defense debate of 1945–50 led to a better understanding between America's armed forces.

A logical starting point for this story is a plan advanced in November 1943 by Gen George C. Marshall, the Army chief of staff, and elaborated upon in congressional hearings during the spring of 1944. Marshall and his Army colleagues called for the elimination of the existing Department of the Navy and the Department of War, which then contained the nation's army and the largely autonomous Army Air Forces. In lieu of civilian secretaries and military chiefs for each of these services—and the addition of comparable officials for an Air Force that was expected to become entirely separate at the end of the war—these men proposed creating one Department of the Armed Forces, headed by a secretary of defense. The Marshall proposal also called for a single chief of staff commanding a unified service divided into ground, air, and naval elements and a common supply department. Typical of the Army's organizational philosophy, the plan provided a tight system of centralized control. This was the way in which the Army organized its own forces. The plan also reflected the dependence of the Army upon naval and air support and its view that this could be guaranteed only by a single chain of command for all of the armed services.[1]

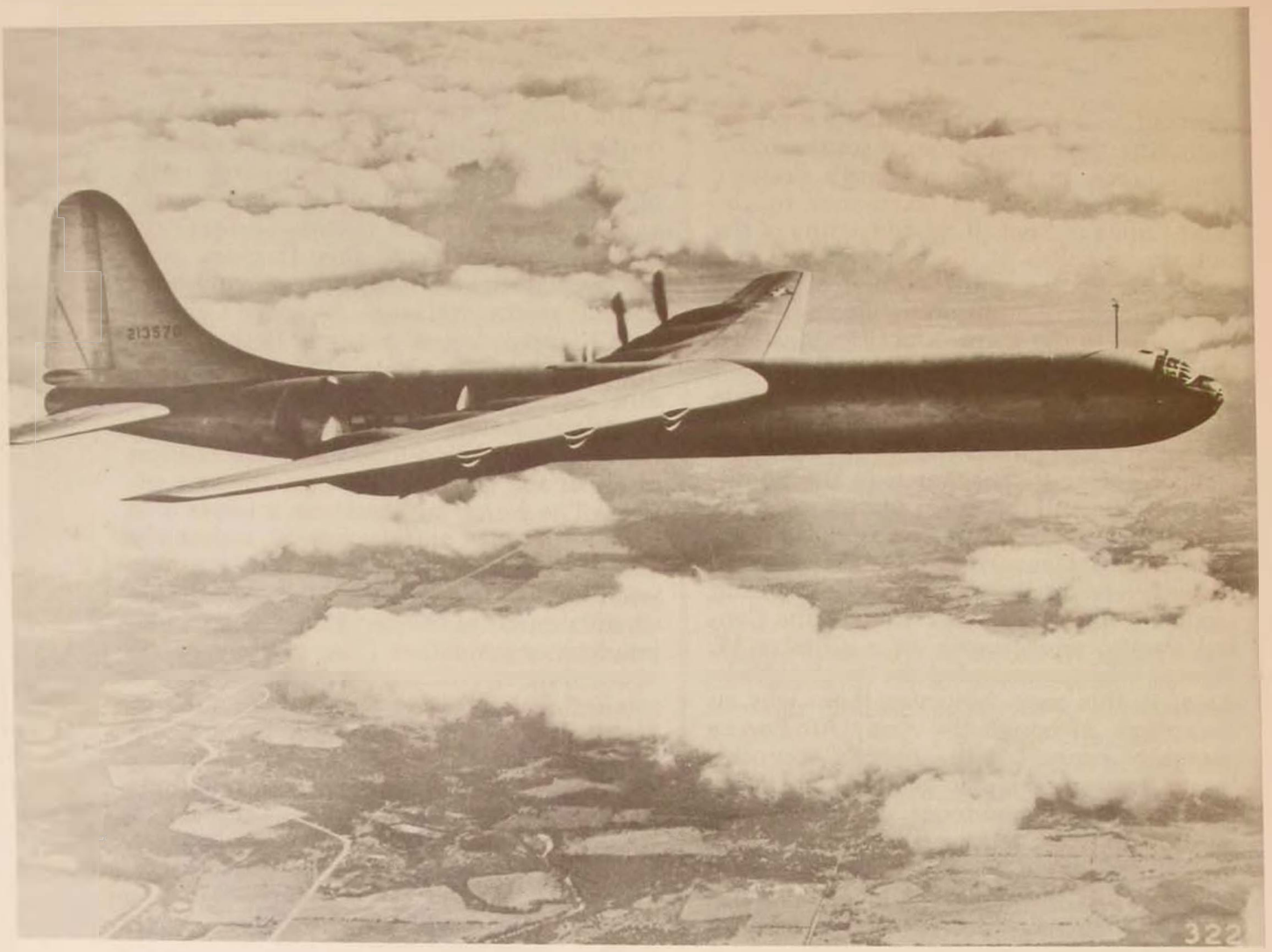
The Navy had a different administrative tradition. In the era of sailing ships, when forces were deployed throughout the world and rapid, long-range communications were unknown, detailed orders could not be given to naval forces. To be sure, broad policy guidance was issued in periodic letters of instruction, but implementation of these goals had to be left to the decision of the operational commander. This decentralized management style, based upon respect for the independence and initiative of subordinate commanders, was shared by many of the world's navies. In the United States, as elsewhere, it carried over into the era of rapid electronic communications and helps to explain why the Navy opposed the US Army's proposal of 1943–44. An additional factor was the fear of being dominated in a unified organization by Army and Army Air Forces officers who represented a larger and, in the Navy's opinion, a more politically powerful service. Those leaders were not expected to understand the nature of naval power, including the superior mobility of navies in comparison to ground forces. Nor were they likely to appreciate the Navy's success in integrating its own sea, air, and marine ground elements into a single organization.[2] In fact, the Navy's aviators had long suspected that the leaders of the Army Air Forces sought to take over their organization, as Great Britain's Royal Air Force (RAF) had absorbed the Royal Navy's Fleet Air Arm after World War I, in order to achieve unification. At the same time, the US Marine Corps knew that at least some Army leaders saw their service as another competitor that needed to be merged with the larger ground force, or at least reduced in size to the point that it would become a minor force incapable of undertaking its mission of amphibious warfare.[3]

The Navy supported the need for cooperation with the other services, including unity of command for joint operations, and felt that this approach—as opposed to a merger of the armed forces—could continue to be effective. Naval officers could point out that their service worked with the Army for almost four decades after 1903 on the Joint Army-Navy Board, which for-

mulated broad policies for both services, including the preparation of joint contingency plans. In 1942 that board's strategic planning function was taken over by the Joint Chiefs of Staff (JCS), consisting of the uniformed chiefs of the Army, Navy, and Army Air Forces, and the chief of staff to the president. In addition to offering strategic advice to the nation's political leaders, the JCS established and controlled joint operational commands. The commanders of those organizations normally controlled all service components assigned to them. Hence, during World War II in the Southwest Pacific and the European theaters, US naval units reported to Gen Douglas MacArthur and Gen Dwight D. Eisenhower, respectively. In the same way, Army and tactical Army Air Forces units in the Central Pacific were under Adm Chester W. Nimitz, who commanded the Pacific Ocean Area. In this case, however, there was an exception. Although the Army Air Forces generally supported the Army's approach to unification, bomber generals normally demanded independence from outside control in conducting strategic bombing campaigns. Army Air Forces officers, who doubted that the other services could understand the requirements of this special type of warfare, sought recognition that strategic bombardment campaigns required a separate theater of operations under its own commander in chief. For that reason, in 1945 the Twentieth Air Force and its bombing campaign that launched against Japan from bases in the Marianas were removed from Nimitz's control, except under emergency situations.[4]

A major development in the organizational debate between the Army and the Navy was Secretary of the Navy James Forrestal's recognition that the Navy could not oppose all change to the national defense structure. Instead, with the assistance of his longtime associate Ferdinand Eberstadt, Forrestal developed his own reform plan and unveiled it in October 1945. The Forrestal-Eberstadt proposal was typically naval in stressing coordination as opposed to line control. And the arena in which this cooperation would take place was enlarged beyond the Army's relatively narrow military definition to include the diplomatic and economic aspects of national security. A key institution for this purpose was the presidential advisory board, eventually known as the National Security Council (NSC), consisting of representatives from the armed forces, State Department, and other civilian agencies designated by the president. A Central Intelligence Agency (CIA) was proposed to assure coordination of all of the government's intelligence offices. The Forrestal-Eberstadt scheme also called for the continuation of separately administered military services, which now would grow from two to three with the establishment of the Air Force as an independent organization. The civilian secretaries of these military departments were to retain their seats in the president's cabinet. Finally, the Navy's plan called for interservice boards and committees, including the Joint Chiefs of Staff, to coordinate the armed forces.[5]

As might be expected, Army leaders opposed the Navy's demarche. Their basic outlook was shared by President Harry S Truman, a US Army veteran of World War I and a former member of the Army's oversight committee in the US Senate. Hence, the forces were arrayed for the first phase of this dispute, lasting from the fall of 1945 until the passage by Congress of the National Security Act of July 1947. Despite the stiff opposition it faced, the Navy displayed considerable political skill for an organization that was not always noted for this



*The B-36 intercontinental bomber. Navy concern over the portion of the defense budget that this aircraft absorbed was a major point of interservice conflict during the late 1940s.*

ability. The National Security Act included every basic element advanced in the Navy's original plan. Although the authority and identity of the individual services were preserved and no single chief of staff was established, the Navy did not entirely have its way. It was forced to agree to a new level of authority between the president and the services, known as the National Military Establishment, headed by a secretary of defense. This organization can be seen as a step toward the single Department of Defense that was the cornerstone of the Army's unification plan. Nevertheless, the Navy succeeded in diluting the power of the secretary of defense by limiting his role to policy coordination and other controls of a very broad nature, and by restricting the size of his staff. In addition, the Navy seemed to achieve another important goal by inserting specific language in the National Security Act guaranteeing the retention of its carrier- and land-based naval aviation forces and protecting the Marine Corps, including that organization's special responsibility for amphibious warfare. A final indication of the Navy's apparent success was President Truman's eventual choice for the first secretary of defense, who was none other than James Forrestal.[6]

Even though the Navy largely won this campaign, it had not won the war. The Army continued after 1947 to seek a cen-

tralized defense apparatus that was consistent with its style of administration. If anything, the Army was more persistent in advancing its views now that the Air Force had won its complete independence, a development that raised obvious questions regarding the degree to which American ground troops could expect to receive tactical air support. There also would be disputes between the services regarding the execution of other tasks. Yet, as one former Department of Defense historian noted, a separate Air Force—combined with the loose coordinating authority of the new National Military Establishment—indicated that "triplification" rather than unification had taken place.[7] In the absence of strong central authority and the continuation of interservice differences, the National Security Act of 1947—far from ending the defense dispute—actually marked the opening of its second stage.

The principal debate after 1947 involved the allocation of roles and missions between the individual services. The National Security Act and an executive order issued by President Truman when that law was passed, attempted to settle this issue by giving the Army, Navy, and Air Force primary responsibility for operations on the land, at sea, and in the air, respectively. But, as General Eisenhower later stated, "Modern weapons and methods of war have scrambled traditional service functions." Separate ground, sea, and air warfare was "gone forever."[8] An excellent illustration of this complexity was the new ability of navies to project power ashore, far beyond the range of ship guns, by employing carrier air strikes or sea-based bombardment missiles. The Air Force may have accepted the validity of naval carrier- and land-based air units' controlling the air over maritime areas. But the Navy knew that its ability to strike inland targets far from the ocean's edge and its claim to use nuclear as well as conventional weapons for this purpose were considered by the Air Force to be threats, since those capabilities implied that resources would be diverted from the new service.[9] Marine Corps leaders were equally concerned by the Army's attitude toward their service. They believed that the Army General Staff hoped to limit Marine effectiveness by preventing the formation of units larger than regiments and by achieving sharp cuts in the 100,000-man strength authorized for the corps in 1947. In addition, the Marines charged that the Army aimed to transfer to itself primary responsibility for amphibious warfare.[10]

James Forrestal, as the first secretary of defense, needed to resolve these differences, especially in order to allow preparation of the nation's strategic plans for a possible war with the Soviet Union—the


*The conflict in Korea brought the military services closer together as they fought a real enemy on the battlefield, but at home the budget and organizational battles between the services continued.*


*Secretary of Defense Louis A. Johnson is greeted by (then) Lt Gen Nathan F. Twining. The Navy thought that Secretary Johnson was prejudiced in favor of Air Force programs and that this bias was at least partially responsible for canceling construction of the supercarrier* United States.

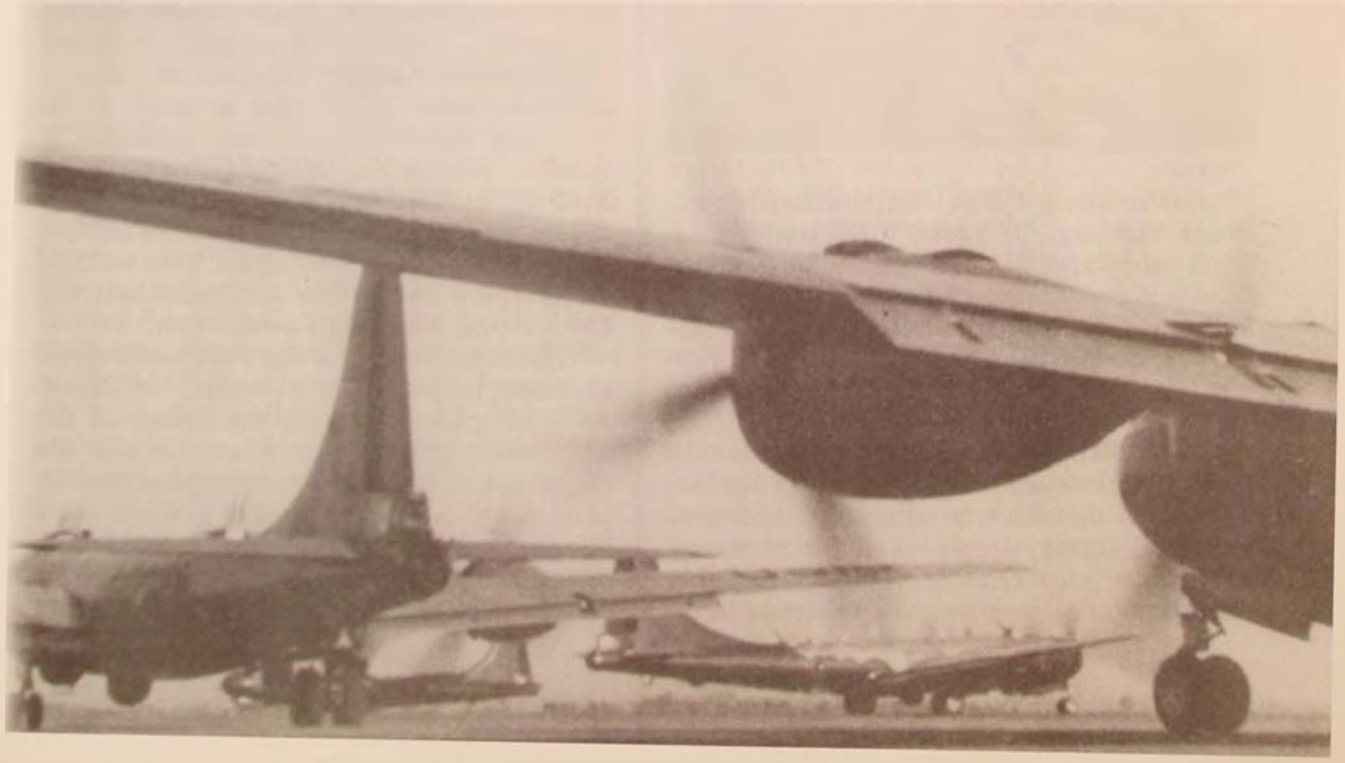
only major potential enemy that the United States faced in the postwar years. His initial approach to resolving interservice conflict was consistent with the nonauthoritarian principles on which the National Military Establishment was based and his own style of leadership. Convinced that the most effective way to carry out a program was to assure that all members of the management team felt that they were participants in making key decisions, he sought to achieve a group consensus instead of issuing arbitrary orders. But Forrestal soon discovered that in some respects the services were intransigent in defending their individual interests. Hence, reasoned negotiations did not always work. One of the ironies associated with James Forrestal is that by 1948 this man—who had worked so hard throughout 1945–47 to defend the prerogatives of the military services—called for amendments to the National Security Act that would give the secretary of defense much greater authority.[11]

The disagreement between the Navy and Air Force on the role of carrier aviation was one of the disputes that was extremely difficult to reconcile. The symbol of the Navy's ambitions was its first postwar carrier, the 65,000-ton *United States*. After several years of planning, this ship was laid down in April 1949. As part of its campaign to secure support for this vessel, the Navy emphasized that the *United States*—unlike

its predecessors—could operate the large aircraft required to carry nuclear weapons, each of which then weighed some 10,000 pounds. The Navy was well aware that atomic bombs were the glamor weapons of the day and that a capability to deliver these devices could further its claims for large appropriations. But the Air Force viewed the Navy's nuclear aspirations as an attempt to create a second strategic air force. This competition seemed especially threatening to a service that was still relatively new and insecure. Further, in this period the inability to produce large quantities of fissionable material severely limited the number of nuclear weapons. Hence, Air Force leaders saw the use of these precious devices by an untried naval strategic air arm as a foolhardy gamble. After all, they argued, only their long-range bombers actually had demonstrated—in their World War II missions over Hiroshima and Nagasaki—that they had the ability to wage nuclear war.[12]

Recent historical studies demonstrate that by 1949 the mainstream of the Navy's leadership viewed the *United States* as much more than a platform for atomic bombing.[13] In addition to that function, they foresaw a vessel that provided tactical air support for air and amphibious forces, that had the ability to achieve sea control, and that allowed such additional missions as oceanic mining. Further, insofar as nuclear warfare was concerned, the Navy sought to supplement—not supersede—the Air Force. For the admirals, the integration of nuclear weapons into the fleet was not intended to undercut the Air Force; it was only another effort to develop the most modern and effective weapon systems. As one scholar has noted, this attempt was consistent with the Navy's belief that "the critical new component of the military capability of states would be the technological *quality* of their arms." Unfortunately, as the Navy reached this position and undertook an internal debate on the issues involved, some of its officers gave contrary signals—a situation that explains why the

*B-29s preparing for takeoff. The Air Force believed that only its long-range bombers had proven their effectiveness in waging nuclear war. But the Navy felt that tight budgets placed too much emphasis on strategic air power. Thus, Europe would be abandoned in favor of a "fortress America" defended by long-range air power instead of forward-based naval forces.*



Air Force could conclude that the *United States* was primarily a platform for long-range nuclear bombardment.[14]

In a more general sense, the Navy's development of the carrier *United States* supported the claim that it could play an effective role in waging war against the Soviet Union, despite the absence of a major Soviet surface fleet. The maritime strategy developed for countering this great continental power was based on the forward deployment of naval forces off the shores of northern and southern Europe. Here, naval aircraft could attack opposing Soviet submarines and other naval units at their home bases, rather than wait for them to deploy into the broad seas. Naval forces would also meet the Soviet air threat by striking those aircraft at their home bases. At the same time, naval planners foresaw cooperation with the Air Force in providing tactical air support to the Army as it repelled a Soviet invasion of Western Europe. In addition, the landing of amphibious forces to counter the enemy was an integral aspect of this strategy.[15]

In retrospect, it is evident that neither the Navy nor the Air Force fully understood each other's position. If misperceptions can lead to wars between nations, they also may promote conflicts between bureaucracies. This situation may explain why Forrestal's attempts to achieve Navy-Air Force harmony came to naught. To be sure, the so-called Key West agreement, resulting from a conference of senior military leaders in Florida that Secretary Forrestal convened in March 1948, produced some degree of understanding. The Navy recognized that the Air Force had primary responsibility for strategic air warfare, and the Air Force agreed that the Navy could continue to operate carriers. The Air Force also recognized that the Navy might contribute to its strategic bombing mission and support naval and ground campaigns by attacking other shore targets. Naval leaders understood that in both of these functions nuclear weapons were available. The Navy also assumed that through its chief of naval operations, who was a member of the Joint Chiefs of Staff, it shared in the control of atomic weapons, including the selection of their intended targets. As it developed, however, the Air Force, which continued to be very sensitive to outside interference in its conduct of air warfare, agreed with neither of these assumptions. Several months after the Key West conference, Air Force Secretary Stuart Symington demanded that his service have exclusive control of nuclear weapons, especially because of the great scarcity of these devices and the promise that land-based aircraft could employ them more effectively.[16]

In an attempt once again to reach interservice accord, Forrestal chaired a second conference of the nation's military leaders in August 1948 at Newport, Rhode Island. Here the Air Force agreed not to block the Navy's access to nuclear arms, while the Navy reaffirmed that it had only secondary or collateral interest in strategic bombing. Since the relative effectiveness of aviation weapons now was a central issue in the Navy-Air Force dispute, the conferees at Newport also agreed to establish a Weapons Systems Evaluation Group that could provide independent assessments. But neither this accord nor the other agreements reached at Newport ended the acrimony between the Navy and the Air Force.

While the Navy and Air Force attempted to come to terms on aviation, the Navy-Army dispute regarding the future of the Marine Corps also continued. Despite the corps' suspicions that the Navy might bargain away its rights in order to maintain a strong maritime aviation arm, naval leaders supported Marine interests at the Key West conference. In the accords emerging from

that meeting, the Army stated plainly that it had no intention of eliminating the Marines, while the Marines acknowledged that they did not aspire to create a second land army. More specifically, the Army recognized that the Marines could have division-sized formations, while Marine leaders agreed that for "planning purposes" their corps had a maximum size of four divisions. At the same time, the Army continued to recognize that the Marines had primary responsibility for amphibious operations and that the Army's own efforts in that field of warfare were of secondary importance.[17] In the aftermath of the Key West conference, major public disputation on this matter subsided for almost a year. But, as was true for the aviation controversy, it soon became evident that this issue was not permanently resolved.

The Navy's position on its aviation and Marine arms implied a balanced defense posture for the nation. This stance was consistent with the Navy's view that flexibility was an essential attribute of military force, since it was impossible to foretell the exact nature of future armed conflicts. James Forrestal agreed fully with this outlook, as can be seen in the rather elaborate system developed at Key West and Newport by which the services were assigned a broad array of primary and secondary functions.[18] The Navy and Secretary Forrestal also assumed that adequate funding would be available to implement these functions. By the fall of 1948, however, the American defense budget was starting to shrink, despite the expanding security obligations the United States faced in Western Europe and elsewhere. This austerity reflected President Truman's deep conviction that excessive spending threatened the strength of the United States. Perceiving the economic well being of the nation to be, in itself, one of the pillars of national strength, Truman established a budgetary limit of $14.4 billion for defense in the fiscal year beginning in July 1949. That restraint had a profound strategic consequence, for it meant—as Defense Department officials noted—that the only offensive the United States could undertake in the event of a war with the Soviet Union was a strategic bombing campaign launched by B-29 aircraft based in the British Isles.[19]

It was obvious that the faith James Forrestal and the Navy had in maintaining a broad range of defense capabilities was being eroded by the harsh discipline of national finance, which increasingly tended to leave aerial bombardment by land-based aircraft as the only viable option in the nation's arsenal. This development also promised to stimulate even more interservice acrimony as the services vied with each other for their share of a shrinking defense dollar. Under these circumstances, Truman's increasingly conservative stance on the budget after the fall of 1948 laid the basis for the third and final chapter in this history.

In March 1949 James Forrestal was replaced with a new secretary of defense, Louis A. Johnson. Tragically, shortly after Forrestal's resignation, the accumulated pressures of his long service to the nation led to mental breakdown and eventual suicide. For the Navy, Johnson's appointment dramatized the new bureaucratic perils it faced. Johnson believed as firmly as Truman that defense budgets needed to be reduced in order to promote the nation's overall strength. He also was perceived by the Navy as a special partisan for the Air Force. And Johnson took office at a time when amendments to the National Security Act of 1947 were pending in Congress. These changes would give the secretary of defense much greater power and a larger staff in an organization that would be renamed the Department of Defense. In what was interpreted by the Navy as a partial step toward the establishment of a single chief of staff, the amendments added a chairman to the Joint Chiefs of Staff. At the same time, the civilian secretaries lost membership in the president's cabinet, a move that revealed the declining power of the individual services. These provisions, which had the endorsement of a frustrated

James Forrestal, as well as of President Truman, seemed certain to be enacted, as in fact they were in August 1949. But, even before that event, Louis Johnson demonstrated decisive if perhaps arbitrary leadership by announcing in April that he was halting construction of the carrier *United States*. Johnson was supported by an advisory poll of the Joint Chiefs of Staff in which the Army and Air Force voted for the ship's cancellation, leaving the naval member in the minority. The enormous importance of this action for the Navy was dramatized when Secretary of the Navy John L. Sullivan, who had not been consulted on Johnson's decision, announced his immediate resignation. Sullivan charged that Johnson's action was the "first attempt ever made in this country to prevent the development of a powerful weapon system." He added, "The conviction that this will result in a renewed effort to abolish the Marine Corps and to transfer all naval and marine aviation elsewhere adds to my anxiety."[20]

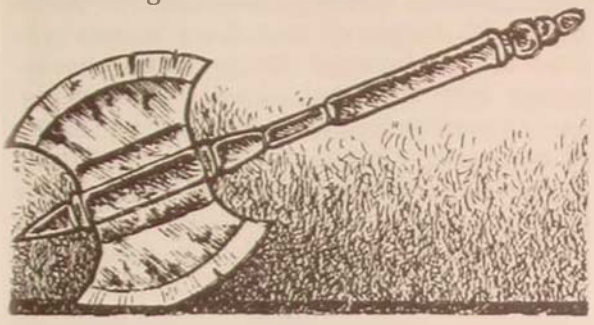
Sullivan's protest appeared to have little effect, for more bad news for the Navy was to come. In July 1949 Johnson placed a new ceiling of $13 billion on the defense budget, starting one year hence. In the next month, he began to plan further economies, including major cuts in the Navy and Marine aviation arms. Specifically, he proposed reducing the number of attack carriers from eight to four and eliminating 11 of the 23 Marine aviation squadrons. Yet, while the Navy suffered from Truman's program of austerity, it noted that the Air Force received funds for 75 B-36 bombers in addition to the 100 airplanes then on order.[21]

Although the B-36 was not operational at that time and was destined to be superseded in the 1950s by the much more capable B-52 aircraft, it served as the symbol of the Air Force's strategy, much as the *United States* epitomized the Navy's strategic outlook. Originally conceived in 1941 when German victories threatened to deny European bases to the United States, this extremely long-range aircraft was intended by 1949 to deliver nuclear strikes against the Soviet Union from bases in North America. This plan was in contrast to the forward strategy of the Navy, based around forces operating in European waters to lend support to the defense of Western Europe, or to the Army's policy of developing ground defenses within the developing NATO alliance. Instead, the B-36 implied a Fortress America concept. It suggested that the United States might ignore its allies and assure American security interests by using the almost magical technology represented by the atomic bomb and the B-36 in attacking the Soviet homeland. A few air power extremists suggested that no other means of military power was needed to deter the Soviets from going to war or, if deterrence failed, to assure the enemy's destruction.[22]

All of these developments aroused profound naval concern that the distinctive capabilities of maritime forces and the advantages of a forward strategy were being sacrificed on the altar of the new system known as unification. The reactions of the Navy included some steps that cannot be justified. One of these was an anonymous document prepared by Cedric Worth, a civilian aide to the under secretary of the Navy, which included the charge that Louis Johnson and Secretary of the Air Force Stuart Symington stood to gain personally from the purchase of the additional B-36 aircraft. This memorandum was circulated in Washington during the spring of 1949 and led Congressman Carl Vinson, the influential chairman of the House Armed Services Committee, to schedule investigative hearings in August. Vinson's hearings demonstrated that Worth's charges were entirely false, and his immediate dismissal was recommended by the committee. The Navy obviously was embarrassed, even though it was evident that Worth acted entirely on his own rather than in collusion with naval authorities.[23]

But the cause célèbre created by Worth and other naval partisans also led Vinson to schedule a second set of hearings that were of much greater significance. These were

held in October 1949 and featured testimony from almost the entire high command of the Navy, including such notable World War II leaders as Ernest J. King and Chester W. Nimitz. These highly publicized proceedings soon became known as the "Revolt of the Admirals." That catchy title, however, conceals the valid purpose served by these hearings in allowing a public discussion of key issues in defense organization and national strategy that previously were the subject of internal debates within the Pentagon.[24]



Some of the most sensational naval testimony consisted of attacks upon the effectiveness of the B-36 bomber and the overall concept of strategic bombing. In the process, the Navy addressed a number of issues that had been or were being assessed in highly classified Defense Department studies. Specifically, naval officers suggested that it was unlikely the B-36 could penetrate Soviet air defenses. Even if a few aircraft should do so, they claimed that these airplanes were incapable of precision bombing from the high altitudes at which they operated. As a result, a B-36 campaign could accomplish little more than area bombing. Aside from the immorality of this style of warfare, due to the heavy civilian casualties involved, the Navy felt that this effort could not prevent a Soviet invasion of Western Europe, a prime objective of the nation's strategy. Nor could it act as a deterrent to Soviet adventurism. One spokesman, Rear Adm Ralph A. Ofstie, suggested that the Air Force's belief in the potency of strategic bombing rested on the doctrines of the Italian air theorist Giulio Douhet, which had been proven false in World War II. Another admiral, Arthur Radford, charged that the American people were being misled by the Air Force and its friends to believe that the B-36 and the "atomic blitz" theory of warfare it symbolized could promise a cheap and easy victory.[25]

In lieu of that approach, the Navy advanced its own strategy. As noted previously, that plan involved the use of carrier and amphibious forces working closely with ground forces and land-based tactical aviation elements to frustrate a Soviet offensive against NATO. As noted by Adm Louis E. Denfeld, chief of naval operations, this strategy was consistent with the Navy's primary missions—after it had won control of the sea—of exerting "steady, unrelenting pressure" against the enemy ashore. The political significance of this approach was recognized by another key naval leader, Vice Adm Forrest Sherman. Although he did not appear before Vinson's committee, testimony prepared by Sherman—in the event he was called—pointed out that Americans were committed to aiding their allies. The admiral obviously had Western Europe in mind when he stated, "We can not in good faith . . . base our military preparations on abandoning these peoples, and relying on exchanging destructive air attacks."[26] Yet, naval witnesses pointed out the apparently concerted efforts by the Army, Air Force, and secretary of defense to eliminate or gravely weaken the Navy's air and amphibious arms, which provided the Navy with the capability to contribute to ground campaigns. The cuts imposed in those areas were disproportionate to the reductions in the overall defense budget. As was reflected in the cancellation of the *United States*, the cuts also were very specific, leading to a situation in which the Navy—which best knew its warfare specialty—was being told by the other services how it should achieve its mission. Because of the failure by other defense officials to heed the advice of naval professionals, the Navy charged that it was being treated as an unequal member of the unified defense

team. One result was the failure to develop the nation's maritime capabilities in the most effective way. Another was the imposition of a faulty national strategy dependent almost solely upon land-based strategic bombing.

Marine leaders gave full support to this position. One major witness, Gen Clifton B. Cates, commandant of the corps, charged that "the power of the budget, the power of coordination, and the power of strategic direction of the armed forces have been used as devices to destroy the operating forces" of the Marine Corps. He noted that his organization was especially vulnerable since it lacked direct representation on the Joint Chiefs of Staff. Behind the deep cuts suffered by his ground and air arms, Cates asserted, was the continuing animosity of the Army General Staff, which was determined to circumvent the provisions of the National Security Act protecting the corps and its amphibious warfare mission. This enmity also reflected the inability of Army and Air Force leaders to recognize the value of sea power in a global war, including "the necessity for land action incident to a naval campaign."[27]

It is not surprising that the testimony presented to the Vinson committee by Louis Johnson and Army and Air Force officers rebutted the Navy's basic assumptions and its motives. There were outright denials that the Army sought to sabotage the Marine Corps or to undermine its primary responsibility for developing amphibious warfare. Air Force officers and Secretary Johnson stated that they did not oppose naval aircraft carriers, as such. Their position on the *United States* resulted from the understanding that the supercarrier was primarily a platform for strategic bombing. In an era of declining defense budgets and acute scarcity in the number of nuclear weapons, it made no sense to duplicate a mission that the Air Force performed with greater efficiency. In any event, they noted, the austerity faced by the Navy was shared by the other services and reflected tightened levels of funding throughout the Defense Department, rather than an attempt to diminish maritime strength. Several Army and Air Force witnesses suggested that the admirals' objections, aside from being mistaken, resulted from personal pique. For example, Gen Omar Bradley, the new chairman of the Joint Chiefs of Staff, stated that the Navy's witnesses could be compared to the "fancy dans" on a football team who refused to play unless they alone could be the stars.[28]

In March 1950, five months after these hearings were concluded, Representative Vinson submitted the committee's final report. It sided entirely with none of the services. Thus, Vinson and his associates rejected the Navy's suggestion that the B-36 was a defective weapon system. Pending completion of a study by the independent Weapons Systems Evaluation Group, the committee used one of the Navy's own arguments by observing that credence should be given to the views of the uniformed experts in the field, who in this case happened to be Air Force officers.[29]

On the other hand, the Navy could take comfort from other points made in the report. Any suggestion that Navy and Marine aviation might be integrated into the Air Force or that strategic bombing was the only valid aerial mission was denied when the committee stated that the "Air Force is not synonymous with the Nation's military air power." Instead, US air strength "consists of Air Force, Navy, and Marine Corps air power, and of this, strategic bombing is but one phase." The committee deplored the manner in which the carrier *United States* was canceled. In criticizing Secretary Johnson's decision, the report once

again stated that "sound policy" called for the Department of Defense to "follow the advice" of the appropriate professional leaders. So far as carriers were concerned, those experts wore naval uniforms. The committee also seemed to bear in mind Navy and Marine Corps testimony when it concluded that the structure of the Joint Chiefs of Staff failed to ensure "adequate consideration for the views of all services." Vinson's committee stated that it planned to sponsor legislation requiring that the JCS chair be rotated among the services every two years. It also called for adding the commandant of the Marine Corps as a member of that body. Finally, the Armed Services Committee observed that it had asked the Navy to provide witnesses to testify on the "fundamental disagreements" on defense policy. The report denied that these witnesses "were performing in any manner unbecoming their positions in the government," an apparent attempt to put to rest the charges that the Navy's admirals were revolting against civilian authority. More particularly, this statement can be seen as a defense of Admiral Denfeld, chief of naval operations, who was dismissed peremptorily by Secretary of Defense Johnson soon after his testimony to Vinson's committee.[30]

Although not specifically addressed in the final report, the hearings included testimony from all of the services that demonstrated the obvious inadequacy of President Truman's budgets to meet the nation's security needs. This concern was echoed by Representative Vinson, who observed at one point in the proceedings that arbitrary budget levels, rather than strategic factors, were determining the American defense effort.[31] Despite these statements, the financial policy and hence the strategy of the Truman administration remained essentially unchanged in the aftermath of the B-36 hearings. Not even the famed National Security Council policy statement of April 1950—NSC 68, which called for an immediate expansion of the conventional and nuclear warfare capabilities of the United States to match growing Soviet strength—prompted a change of course. The programs outlined in NSC 68 would have required annual expenditures of $35 to $40 billion per year, approximately three times the level authorized by the president in the first half of 1950.[32]

The era of dramatic change came only with the outbreak of the Korean War in June 1950. Despite the fascination of many Air Force and Navy officers with nuclear warfare, this limited conflict required the employment of conventional forces, including large armies, land-based tactical aviation, naval carrier and surface forces, and Marine amphibious elements. Further, since the Korean War was evaluated as a Soviet-inspired feint to divert attention from the critical European zone, the United States undertook a massive buildup in conventional and nuclear arms designed to assure the defense of Western Europe.

The requirement to defend South Korea, combined with rearmament in Europe, led to an almost fourfold expansion in American defense expenditures after 1950. These increased funds allowed the nation to achieve the balanced defense posture that the Navy long had sought, including a major expansion in conventional ground, sea, and air forces. For the Navy, that program featured the large *Forrestal*-class carriers built after 1952. The Marine Corps was greatly expanded and after 1952 had its own representative on the Joint Chiefs of Staff. In the strategic warfare area, a key development was the dramatic increase in the supply of raw material for nuclear bombs, which ended the scarcity of these weapons. At the same time, other technical advances led to the development of compact nuclear weapons that could be delivered by relatively lightweight tactical aircraft. As a result, both the Navy and the Air Force developed formidable capabilities to deliver nuclear weapons against the Soviet Union. Ironically, it is now evident that despite the heated Navy-Air Force debate discussed in this article, the United States had an extremely rudimentary abil-

ity to undertake atomic warfare before the Korean War.[33]

The new age of generous defense budgets and technical breakthroughs meant that the Army, Navy, Air Force, and Marine Corps could implement the roles and missions assigned to them after World War II. As a result, interservice acrimony became less pronounced. This new comity resulted, in part, from the fact that the services now had several years of experience in working with one another in the new, unified defense structure. But the process of adjustment was aided by the intense debate in the years leading up to the Korean War. At times, as the admirals and generals argued their respective cases with such emotion, it seemed that the contestants were not listening to one another. Despite the divergent outlooks and interests that were revealed, this process promoted recognition that it was essential for military leaders to work together to achieve their common goals of maintaining an effective national defense.[34] This positive effect is one of the most encouraging lessons that can be drawn from the bureaucratic conflict that was so intense in the years between 1945 and 1950. □

**Notes**

1. For general accounts of the 1944–1947 period that include insights into the Army's outlook, see Steven L. Rearden, *History of the Office of the Secretary of Defense*, vol. 1, *The Formative Years, 1947–1950* (Washington, D.C.: Office of the Secretary of Defense, 1984); Lawrence Legere, Jr., "Unification of the Armed Forces" (PhD diss., Harvard University, 1950); and John C. Ries, *The Management of Defense* (Baltimore, Md.: Johns Hopkins University Press, 1964). The basic documents on this subject appear in Alice C. Cole et al., eds., *The Department of Defense: Documents on Establishment and Organization, 1944–1978* (Washington, D.C.: Office of the Secretary of Defense, 1978).

2. For carrier aviation developments, see Clark G. Reynolds, *The Fast Carriers: The Forging of an Air Navy* (New York: McGraw Hill, 1968); and Norman Friedman, *Carrier Air Power* (Annapolis, Md.: Naval Institute Press, 1981). The basic account of amphibious developments is Jeter A. Isely and Philip A. Crowl, *The U.S. Marines and Amphibious War* (Princeton, N.J.: Princeton University Press, 1951).

3. See Edwin B. Hooper, *The Navy Department: Evolution and Fragmentation* (Washington, D.C.: Naval Historical Foundation, 1978); and Gordon W. Keiser, *The U.S. Marine Corps and Defense Unification, 1944–1947* (Washington, D.C.: National Defense University Press, 1982).

4. E. B. Potter, *Nimitz* (Annapolis, Md.: Naval Institute Press, 1976), 356.

5. Hooper, 23–24. A basic source on Forrestal is *The Forrestal Diaries*, ed. Walter Millis (New York: Viking Press, 1951).

6. See the sources cited in footnote 2.

7. Rudolph A. Winnacker as quoted in Rearden, 27.

8. Dwight D. Eisenhower, *The White House Years: Waging Peace* (Garden City, N.Y.: Doubleday, 1965), 246, 250.

9. General assessments of the Navy's views are in David A. Rosenberg and Floyd D. Kennedy, Jr., *U.S. Aircraft Carriers in the Strategic Role* (Washington, D.C.: Lulejian Associates, 1975); David A. Rosenberg, "American Postwar Air Doctrine and Organization: The Navy Experience," in *Air Power and Warfare*, ed. Alfred F. Hurley and Robert C. Ehrhart (Washington, D.C.: Office of Air Force History, 1979), 245–90; Paola E. Coletta, *The United States Navy and Defense Unification* (Newark, Del.: University of Delaware Press, 1981); and Paola E. Coletta, "The Defense Unification Battle, 1947–1950: The Navy," *Prologue* 7 (Spring 1975): 6–17.

10. See testimony of Gen Clifton B. Cates in House Armed Services Committee, *The National Defense Program–Unification and Strategy: Hearings*, 81st Cong., 1st sess., 1949, 367 (hereafter cited as *The National Defense Program*).

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12. For the nuclear capabilities of the carrier, see Rosenberg, "American Postwar Air Doctrine," 252. Air Force views are discussed in Robert Frank Futrell, *Ideas, Concepts, Doctrine: A History of Basic Thinking in the United States Air Force, 1907–1964* (Maxwell AFB, Ala.: Aerospace Studies Institute, 1971), 169–241; John T. Greenwood, "The Emergence of the Postwar Strategic Air Force, 1945–1953," in Hurley and Ehrhart, 215–44; and Herman S. Wolk, "The Defense Unification Battle, 1944–1950: The Air Force," *Prologue* 7 (Spring 1975): 18–26.

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14. The technology quotation is from Vincent Davis, *Postwar Defense Policy and the U.S. Navy, 1943–1946* (Chapel Hill, N.C.: University of North Carolina Press, 1962), 258. For the internal naval debate, see Palmer, 33–52; and Rosenberg, "American Postwar Air Doctrine," 252–54.

15. See Palmer, passim; Kenneth W. Condit, *The Joint Chiefs of Staff and National Policy: 1947–1949* (Washington, D.C.: Joint Chiefs of Staff, 1978), 333–37; Norman Friedman, *The Postwar Naval Revolution* (Annapolis, Md.: Naval Institute Press, 1986), 17–19, 23–25; and Paul R. Schratz, "The Admirals' Revolt," *U.S. Naval Institute Proceedings* 112 (February 1986): 70.

16. See Condit, 173–81; and Rearden, 393–402.

17. Rearden, 395–96.

18. Ibid., 37, 403; Coletta, "The Defense Unification Battle," 9. Palmer argues that some, but not all, naval leaders supported a balanced defense posture (50–52).

19. Rearden, 341–45; Futrell, 222–23.

20. In addition to the general works cited above, see the following accounts of this period: Paul Y. Hammond, "Super Carriers and B-36 Bombers: Appropriations, Strategy and Politics," in *American Civil-Military Decisions: A Book of Case Studies*, ed. Harold Stein (University, Ala.: University of Alabama Press, 1963), 465–564; Jeffrey G. Barlow, "The

Revolt of the Admirals' Reconsidered" (Paper delivered at the US Naval Academy, September 1987); James C. Freund, "The 'Revolt of the Admirals.'" *The Airpower Historian* 10 (January and April 1963): 1–10, 37–42; Arthur W. Radford, *From Pearl Harbor to Vietnam: The Memoirs of Admiral Arthur W. Radford*, ed. Stephen Jurika, Jr. (Stanford, Calif.: Hoover Institution Press, 1980); Arleigh A. Burke, "A Study of OP-23 and Its Role in the Unification Debates of 1949," oral history series manuscript, US Naval Institute; James A. Field, Jr., *History of United States Naval Operations: Korea* (Washington, D.C.: Naval Historical Center, 1962), 21–34; and Keith D. McFarland, "The 1949 Revolt of the Admirals," *Parameters* 11 (June 1981): 53–63. The Sullivan quotation is from Coletta, "The Defense Unification Battle," 12.

21. Condit, 263–71, 323–24. See also Rearden, 378–79 (table 6).

22. See, for example, Futrell, 220–21. But Futrell observes that this view was not shared by all senior Air Force officials (236–37). Radford notes that Gen Curtis E. LeMay denied that strategic bombing alone could win wars (167).

23. House Armed Services Committee, *Investigation of the B-36 Bomber Program: Hearings*, 81st Cong., 1st sess., 1949.

24. This point is made, for example, in Barlow, 1.

25. An excellent summary of the Navy's case appears in Radford, 175–208. The Radford and Ofstie testimony appears in *The National Defense Program*, 39–52, 183–89.

26. The Denfeld quote is from *The National Defense Program*, 353. Sherman's comments appear in "Statement of Forrest P. Sherman . . . Before the Armed Services Committee," Records of Op-23 (File E-1), Operational Archives, Naval Historical Center, undated. I am indebted to Dr Michael A. Palmer, who drew this document to my attention.

27. *The National Defense Program*, 365–73.

28. Ibid., 536 and passim.

29. House Armed Services Committee, *Unification and Strategy: A Report of Investigation of the Committee on Armed Services*, 81st Cong., 2d sess., 1950, 56.

30. Ibid., 9, 53–56.

31. *The National Defense Program*, 474.

32. Rearden, 527–36.

33. For the impact of Korea and the post-1950 buildup, see Rosenberg, "American Postwar Air Doctrine," 262–69, and Dean C. Allard, "An Era of Transition, 1945–1953," in *In Peace and War: Interpretations of American Naval History, 1775–1984*, ed. Kenneth J. Hagan (Westport, Conn.: Greenwood Press, 1984), 299–302. The extremely limited atomic capability prior to 1950 is discussed in Harry R. Borowski, *A Hollow Threat: Strategic Air Power and Containment Before Korea* (Westport, Conn.: Greenwood Press, 1982); and Davis, 252–56.

34. This need for cooperation is suggested by the scientific leader Vannevar Bush, who was a relatively neutral observer of interservice conflict, in his *Pieces of the Action* (New York: William Morrow and Co., 1970), 67–68.

## Ricochets

*continued from page 3*

my name in his letter (it's "Davison," not "Davidson").

Liddell Hart himself later admitted that he had misunderstood Clausewitz. I, too, must admit that one correction should be made to my article: Peter Paret assures me that Clausewitz wrote very clear and concrete German. Since I read Professor Paret's translation (as most of us do), I withdraw my offhand remark that Clausewitz wrote in a confusing, cumbersome style and in my ignorance bow to an expert opinion.

**Capt Kenneth L. Davison, Jr., USAF**
*Colorado Springs, Colorado*

It seems that every time I pick up a journal of military history or theory it contains an article dealing with the writings of Carl von Clausewitz. Invariably, these articles are highly respectful of the late Prussian and score instead those lesser mortals who have foolishly "misinterpreted" him over the past 165 or so years. Now comes the latest *Airpower Journal* and yet another missive on the "Master" (the use of this sobriquet is becoming so widespread that the uninitiated might think it is actually Clausewitz's first name) that yet again seeks to clarify his thought for the average officer ("Clausewitz for Beginners," Summer 1989). Interestingly, however, in the "Ricochets" section of the same issue there is a letter from an irate individual who complains of a recent *APJ* article regarding Clausewitz ("Clausewitz and the Indirect Approach: Misreading the Master," Winter 1988) that had thrown rocks at Basil H. Liddell Hart and his apparent inability to understand Clausewitz. Mr Forbes's complaint had a kernel of validity but falls short of the mark. In rejecting the investiture of Clausewitz as Master, he substitutes one of his own—J. F. C. Fuller. Why this inordinate need of late to build and destroy icons?

An even more interesting example of this tendency is a recent book edited by Michael Handel of the Army War College. In the introduction to *Clausewitz and Modern Strategy*, Handel argues that Clausewitz is one of the true geniuses of history and *On War* one of the greatest books ever written. Unfortunately, according to Handel, the Master has been repeatedly misread and misinterpreted by unimaginative dullards and incompetents. Included in the list of unworthies are Henri de Jomini, Helmuth von Moltke (the elder), Alfred von Schlieffen, Ferdinand Foch, Erich Friedrich Wilhelm Ludendorff, Ludwig Beck, Hans von Seeckt, Fuller,

and Liddell Hart—to name a few. Well, what is one to make of this? Are we to presume that men with lifetimes of military experience—who commanded great armies in battle (Clausewitz never did command, by the way), who fought in great wars and small wars (those with total goals and those with limited ones), who were men of intelligence and culture—all "misinterpreted" Clausewitz and did so in such remarkably diverse ways? Is this not an incredible presumption? Is it really possible they were all so puerile and thick that not one of them read the Master correctly? Is it not even more presumptuous to believe that we have succeeded today where so many before have failed? Those who worship at the shrine of the Prussian argue that they now have a new translation (by Peter Paret and Michael Howard) that makes things clearer. But one wonders how an American and an Englishman can take the pedantic and complex German prose of a man dead for 175 years and retranslate it to make it more readable. Bear in mind also that what Clausewitz left behind was a manuscript of 126 chapters—125 of which were in draft. Now, I know how miserable my drafts are; why do we suppose Clausewitz's were any better? Moreover, how do we know that in making him "more understandable" than the earlier translation by J. J. Graham, Paret and Howard have not induced their own brand of distortions?

Where does all this lead? In my opinion, it is foolhardy to rely upon the literal translation of a 175-year-old draft and to assume that Carl von Clausewitz is the standard by which all other military theorists should be measured. It is simply not logical to believe that dozens of noted and successful commanders and politicians have "misinterpreted" his writings over the decades. If so many people have misunderstood his words, then perhaps they are not capable of understanding. Like the Bible, *On War* can be many things to many people, so contradictory and so obtuse that anyone can pick out "relevant" quotes and ideas. (I have seen colonels teaching classes on military history and theory to other colonels with a copy of *On War* lying on their desks, quoting passages to "prove" points, in much the same way that television preachers abuse the Bible.) If a book is full of truisms, then it contains little truth.

Am I therefore advocating that we not study Clausewitz? No, that is not my point. He is an intelligent and thoughtful writer; more importantly, he is *provocative*, in the sense that he provokes the mind to think and challenge. But he is only one of many military thinkers deserving of study. It is fruitless, indeed it is worse, to seek answers in Clausewitz or to compare others, always unfavorably, to him and his ideas. Clausewitz should be seen as an intellectual exercise, one who can be read to generate thought and discussion and who trains the mind. But it must be remembered that Clausewitz is not the answer; he is the question.

In sum, let us all please refrain from getting into literary punch-ups over what Clausewitz said about this or that and what he probably meant by it. What is truly important about him, indeed fascinating, is what so many *think* he said and how they then acted upon those beliefs. There is a classic book waiting—needing—to be written on "The Effect of Clausewitz's Ideas on Military Commanders." The emphasis would be on how Foch, for example, devised the strategy of World War I based on his readings of Clausewitz–never mind if his readings were "correct" or not. The *result* is the key.

**Lt Col Phillip S. Meilinger, USAF**
*Washington, D.C.*

## AN EVEN GREATER PARADOX

Air base operability ("Paradox of the Headless Horseman," Spring 1989) remains in a "quick fix" mode, with a "rush" to get on the books without the insight of consolidated manning. EOD manning has a different baseline than NBC. [Other problems include] depth of involvement, paper taskings, and a decided lack of coordination [between] deployed sites and deployable assets, especially in the areas of fragmented taskings rather than full unit taskings. Beddown plans are usually not provided to the fragmented tasked mobility positions, and they must beg for direction. A good article, but it only scratched the surface.

**Turney D. Williams**
*Tyndall AFB, Florida*

## SUPPORTING BARRAGE BALLOONS

Major Hillson ("Barrage Balloons for Low-Level Air Defense," Summer 1989) promotes a potentially effective "fix" for low-level air attacks against USAF airfields. Of course, the principal advantage of fixed balloon emplacements is their low cost. For the price of a single Rapier

system literally dozens of balloons can be arranged to deny an attacker free choice of attack altitudes.

I wish to make another point regarding this kind of static defense: balloons will serve to route attacking forces into certain low-level corridors. An attacking force will of necessity direct its efforts to ingress as low as possible, and will, for the reasons stated by Major Hillson, avoid balloon concentrations.

Thus balloons will serve as a means of enhancing the efficacy of point defense SAM and AAA weapons by allowing them to concentrate on those areas where balloons are not deployed. Should the attacking force elect to overfly balloon emplacements, its presence will be noted by radar and the ground weapons can be reaimed as required (if far enough away), or the attacking force will have its attack geometry scrambled from its last-minute adjustments to altitude.

There is one other aspect to the balloon/cable defense strategy. During World War II the British used a variant of the balloon/cable defense system to protect ships that came under attack at sea. These vessels did not or could not deploy balloons and were instead outfitted with rocket-propelled cables with a small parachute attached at the rocket end. As the attacking plane made its target run, several rockets were fired, each carrying a cable. At some predetermined height, usually 1,000 feet, the cable would pull free from the rocket and a small parachute would deploy, the weight of the cable causing the parachute to inflate. The cable would remain aloft for up to 30 seconds. The other end of the cable was moored to the ship itself. The rocket cable system gave ships an "instant," albeit temporary, cable air defense system and was responsible for aborting a number of low-level attacks on British vessels. As with balloons, such a system could provide a cheap, reliable, and effective means of airfield defense in future conflicts.

There are several distinct advantages to this system: the temporary nature of the defense allows the target defenders to literally fill the airspace above with cables as the attackers appear within range, yet not advertise the presence of a high-value target; the rockets will add to the confusion of the attacking force because they are likely to be taken for SAMs, with resulting evasive actions; and the rockets are less of a threat to friendly aircraft since they are fired only when attacking aircraft are in the immediate vicinity. Added to this is the intangible value of creating one more concern for the attacking pilot—the sudden appearance of a rocket cable in front of his aircraft.

I applaud Major Hillson for raising (excuse the pun) the idea of balloon defense. The concept is certainly valid and in the era of doing more with less, a valuable lesson from history. A rocket/cable defense system to augment balloons offers another potentially useful lesson from our immediate past.

**Maj John J. Michels, Jr., USAF**
*Maxwell AFB, Alabama*

FALL 1989

# IRA C. EAKER AWARD WINNER

## Major Charles M. Westenhoff, USAF

for his article

"Aggressive Vision"

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**Congratulations to Maj Charles M. Westenhoff on his selection as the Ira C. Eaker Award winner for the best eligible article from the Fall 1989 issue of the *Airpower Journal*. Major Westenhoff receives a $500 cash award for his contribution to the Air Force's professional dialogue. The award honors Gen Ira C. Eaker and is made possible through the support of the Arthur G. B. Metcalf Foundation of Winchester, Massachusetts.**

**If you would like to compete for the Ira C. Eaker Award, submit an article of feature length to the *Airpower Journal*, Walker Hall, Maxwell AFB, AL 36112-5532. The award is for the best eligible article in each issue and is open to all US military personnel below the rank of colonel or equivalent and all US government civilian employees below GS-15 or equivalent.**

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### *Air University Review* Index

The Air University Press is in the process of publishing a complete index of the *Air University Review* (1947–1987). This two-volume index will contain an author index, a title index, and a cross-referenced subject index. Any Air Force or other government organization, college or university library, or similar organization with a need for this index can be placed on distribution. Requests for distribution and other inquiries should be addressed to Maj M. A. Kirtland, CADRE/RI, Walker Hall, Maxwell AFB AL 36112-5532. Major Kirtland can also be contacted at AUTOVON 875-6629 or (205) 293-6629.

### Psychology in DOD Symposium

The Department of Behavioral Sciences and Leadership at the US Air Force Academy will host the Twelfth Biennial Psychology in the Department of Defense Symposium on 18–20 April 1990 at the Air Force Academy. Inquiries concerning attendance or submission of papers should be addressed to Lt Col Dave Porter or Maj Lee Lever, USAFA/DFBL, US Air Force Academy CO 80840-5701. Telephone inquiries to AUTOVON 259-3860 or (719) 472-3860.

### Space Logistics Symposium

The Third Space Logistics Symposium will be held from 30 April to 2 May 1990 in Colorado Springs, Colorado. The topic of the conference is "Space Logistics in Transition—The Shift from R&D and Experimental to Operational Systems." Inquiries concerning the conference should be sent to Mr David P. Martin, Science Applications International Corporation, 2860 S. Circle Drive, Suite 2400, Colorado Springs CO 80906.

### World War II Encyclopedia

The publishers of a compact encyclopedia on World War II in Europe are seeking contributors for articles ranging from 100 to 4,000 words. Inquiries should be sent to Mr David T. Zabecki, Am Alten Turnplatz 9, D6652 Bexbach, West Germany.

### Korean War Encyclopedia

The publishers of a compact encyclopedia on the Korean War are seeking contributors for articles ranging from 50 to 5,000 words. Inquiries should be sent to Dr Stanley Sandler, 507 S. 5th Street, Spring Lake NC 28390.

### School of Advanced Airpower Studies: Military Faculty Openings and Student Information

Openings are available now for qualified Air Force officers on the faculty of the School of Advanced Airpower Studies (SAAS), Maxwell AFB, Alabama. Reporting will be in August 1990. One year later, 25 officers from the graduating classes of the intermediate service schools will begin their studies at the SAAS. The objective of the school is to educate Air Force officers to develop and implement sound air strategy. The curriculum will include an intensive study of military history and theory, with an emphasis on air power. High-quality, relevant faculty research will be essential in maintaining the quality of the curriculum. The Air University intends to pursue accreditation of the program and the authority to award a master's degree. Applicants for military faculty positions must be in the rank of lieutenant colonel. A doctorate degree or equivalent in the areas of history, political science, systems analysis, operations research, technology, public policy, or similar fields is required. Experience in flying or missile operations, intelligence, logistics, space, weapons testing, or munitions is desirable. Faculty and students must be able to qualify for a top secret clearance and compartmented access. Students will be nominated by their parent command and selected by a central board, based on their performance and academic qualifications. For more information, contact Col George Tiller or Lt Col Jerry Crawford, AUTOVON 875-5421 or (205) 293-5421.

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***The Editor***

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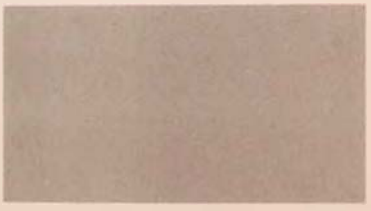

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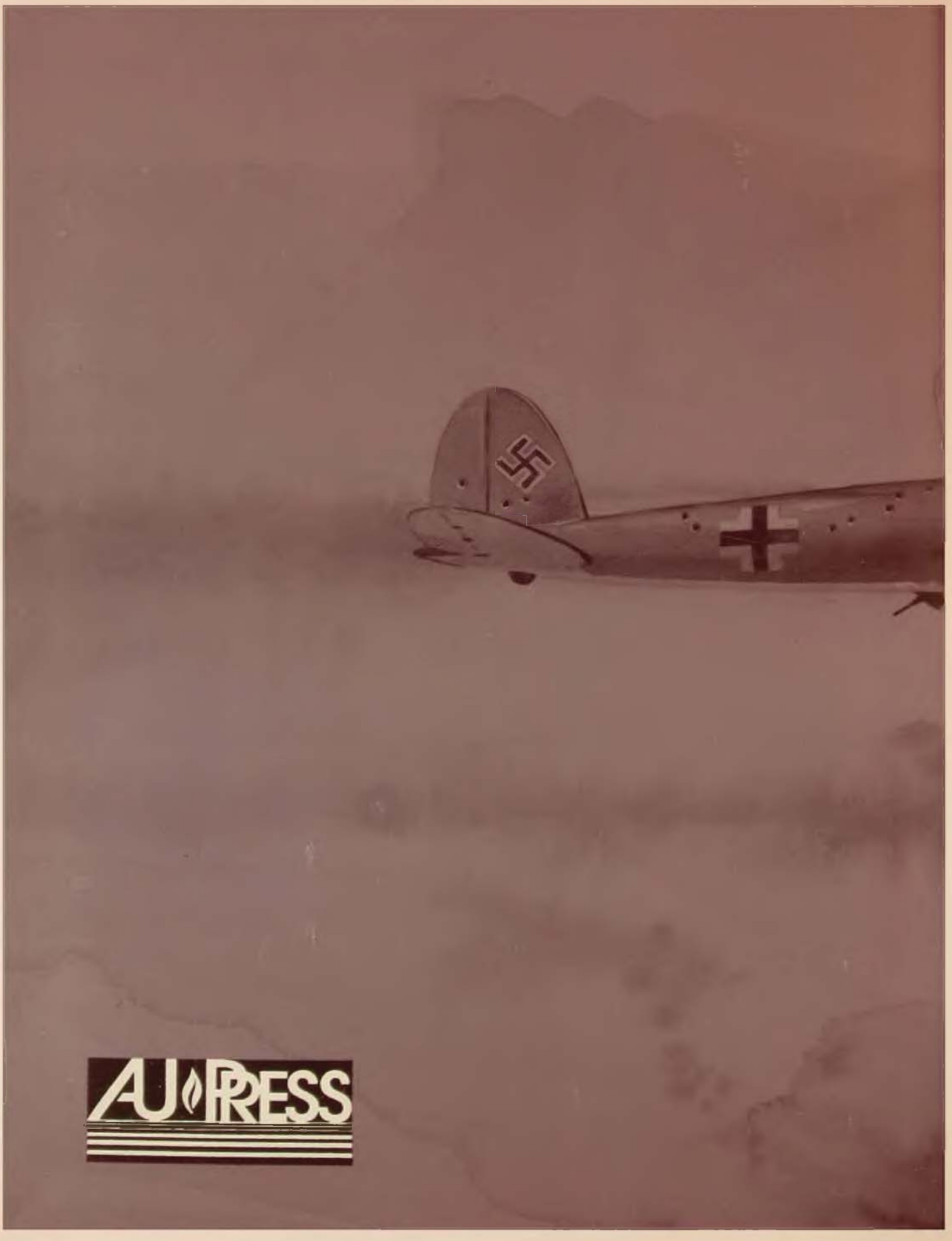
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