

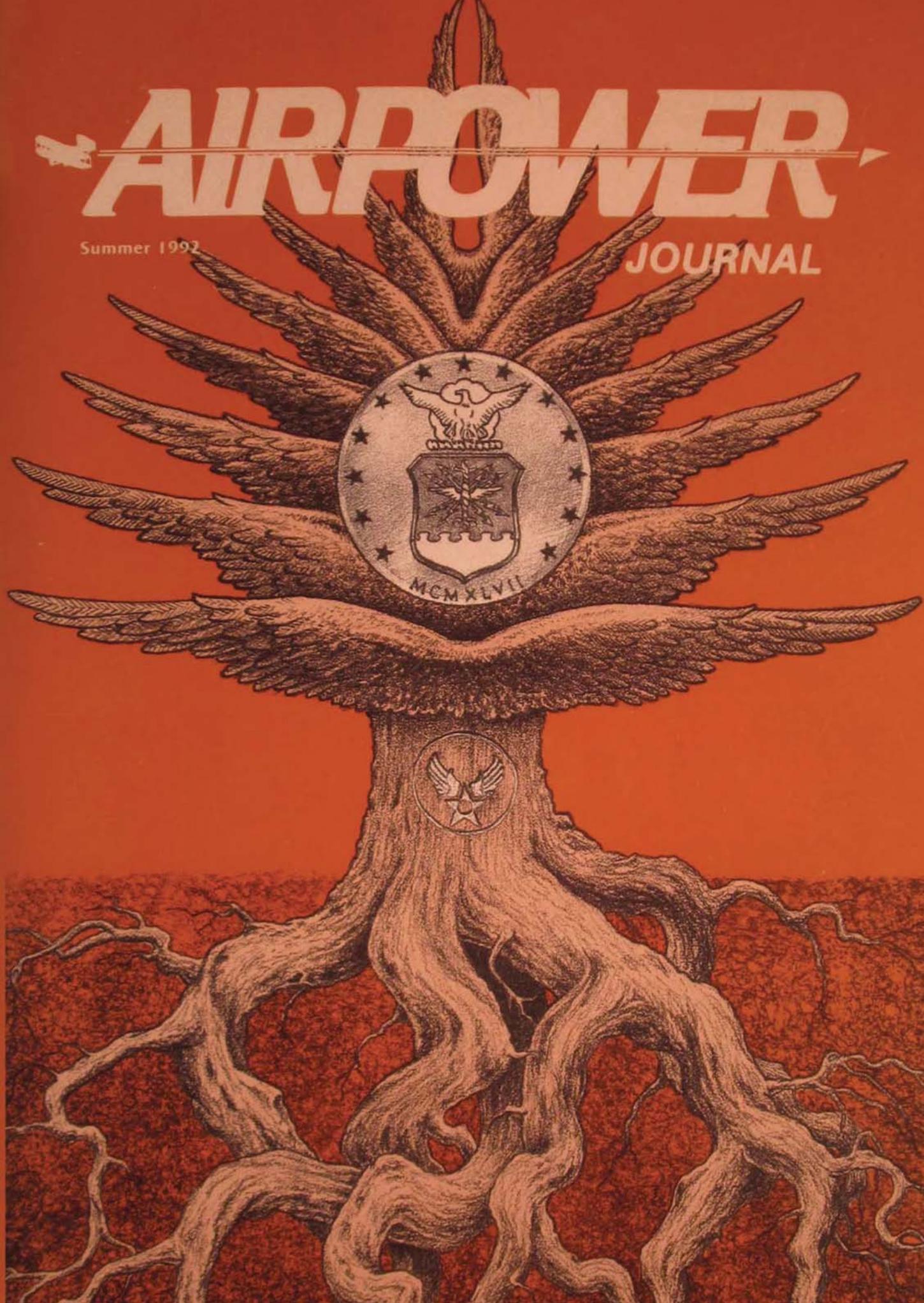
Summer Readings

- Planning Air Operations
- Assured Access to Space

AIRPOWER

Summer 1992

JOURNAL



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JOURNAL

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EDITORIAL

A Terrible Choice

OVER THE PAST couple of months, thousands of us bluesuiters have had to make what for many amounts to a terrible choice. We must either accept an attractive separation bonus and leave the Air Force for good, or stay in, leave the separation decision to a possible reduction in force (RIF) board, and—if RIFed—accept a smaller severance payment.

From a business standpoint, it may make sense to accept the separation bonus and leave the service. Think rationally about it, and ask yourself some important questions. How good are my records (not me, but my records)? How valuable is my AFSC to the Air Force? How many years do I have invested? Perhaps most importantly, How many of my peers have taken the separation package? and, How do the numbers look?

Only after all the facts are in, after you've talked with your supervisor, coworkers, and family, and the options are clearly before you, do you go to the personnel office and ask for the paperwork. Yes, you can rationalize the decision from a business standpoint. After all, the numbers just ain't there. Ninety-five percent of your year group may get whacked by a RIF board. The choice is clear.

We make business decisions with our heads; logic, thought, and pros and cons are involved in the process. But there are other, less tangible factors involved. What makes this decision so difficult for many of us is not the loss of benefits such as the Big BX or the 20-year retirement package. That's not why we joined and stayed all of these years. Culturally, the Air Force has been just too damn neat for some of us to want to voluntarily jump from what seems to be a perfectly good airplane. Many of us will prefer to wait it out and hope that a KC-135 appears before the gas runs out.

As of this writing, there is still time for us to ponder the choice between leaving now or taking a pretty big (expensive) chance on the results of a RIF board. For those of you who, like me, are extremely vulnerable to forced separation and happen to enjoy the Air Force, D day approaches. In mid-March, I'm reminded of the words of a gruff colonel who, after listening to an exasperated lieutenant describe his hectic schedule, replied, "Good! Helps build character!" I've had my dose of character the past couple of months.

By the time this is printed, the choices will have been made and the die cast. The larger issue, then, is the excruciating decisions that must be made by both the individual and the institution as we draw down for the first time in the truly all-volunteer force. Perhaps these decisions are just the first pains in the process of birthing an Air Force for the new world we live in. JJD

HOW ARE WE DOING?

We need to know how you feel about the *Airpower Journal*. We are genuinely interested in providing you, the reader, as well as the Air Force, the best possible professional journal. It is, after all, your journal. In that spirit, we have provided a tear-out readership survey just inside the back cover. Please take a few minutes to complete it and return it to us. (We'll pay the postage.) It will help us further define the focus and scope of the *Journal*, and it will help us determine how well we are reaching our target audience.

Thanks for your help.

The Editor

Letters to the editor are encouraged. All correspondence should be addressed to the Editor, Airpower Journal, Walker Hall, Bldg. 1400, Maxwell AFB AL 36112-5532. We reserve the right to edit the material for overall length.

AIR POWER VINDICATED

The article by Lt Gen Charles G. Boyd and Lt Col Charles M. Westenhoff ("Air Power Thinking: 'Request Unrestricted Climb' ") in your Fall 1991 issue was excellent. High-tech air power was certainly vindicated in the Gulf war, as were the many hard battles in the Pentagon and on the Hill to get the equipment and the weapons the Air Force needed to fulfill its promise.

The authors quote Alfred the Great on good fortune, but he also noted that success breeds arrogance; we learn by our failures. In our present euphoria, we should remember that many of the key systems which vindicated themselves in the Gulf overcame hard times—from Congress, the administration, and the operators themselves—before they could be fielded. I refer to the E-3, A-10, F-16, and joint surveillance target attack radar system (JSTARS) inter alia. Among weapons, the Paveway series is a great example. Paveway I was unwelcome in Vietnam until it showed its prowess. Paveway III was cancelled by Secretary of the Air Force Verne Orr in the eighties. Now it's back in production. Fortunately, even though we have been late and overpriced, we seem to be the best in the world anyway.

Maj Gen J. C. Toomay, USAF, Retired
Carlsbad, California

LEADERSHIP AND DOCTRINE

I want to thank Lt Gen Charles G. Boyd and Lt Col Charles M. Westenhoff for bringing our attention back to basics in their Fall 1991 article, "Air Power Thinking: 'Request Unrestricted Climb'." At the same time, I would like to offer some observations about the draft of the first of the two volumes scheduled to replace the 1984 version of AFM 1-1, *Basic Aerospace Doctrine of the United States Air Force*.

It was my privilege to serve on a special study group looking at our doctrine while I was a student at Air War College (AWC). Interestingly enough, the team I was on concluded that our "old" doctrine was actually pretty good. Indeed, the now-famous air campaign of Operation Desert Storm appeared to follow the tenets of chapter 2 very well! Specifically, paragraph 2-7's "Broad Plan of Employment" explains how to conduct simultaneous strategic and tactical actions after gaining air superiority. Under "Attack an Enemy's Warfighting Potential," we find, inter alia, explanations of the "how" and "why" of relentlessly attacking an enemy in depth, planning/coordinating interdiction with surface forces, and constantly assessing the battlefield situation (pages 2-13 through 2-15). There is also a now-obvious reminder that "close support can create opportunities, protect maneuver, and defend land forces." Additionally, the "old 1-1" emphasizes seizing the initiative with a flexibly structured force to compel the enemy to react. That is just what we did in Iraq.

While not meaning to offend the rated force—and General Boyd in particular—I hope the first volume of the draft AFM 1-1 is not, as he characterized it, a "summation of Air Force thinking" (page 4). It certainly is "bare bones" and the format is definitely easy to read, but it neglects any significant mention of the role of leadership. In fairness, chapters 3 and 4 do talk about several important things commanders do. However, the 1984 version at least explains that "command is the exercise of leadership and power of decision" (page 1-4), while mentioning leadership another 15 times in the text and two more times in annex A. The draft, on the other hand, uses the term only four times, and three of those deal with the enemy! Nonetheless, both the old and new versions lack the punch of AFM 1-10, *Combat Support Doctrine*, when defining and explaining leadership.

Our curriculum at AWC provided the opportunity to read AFM 1-10. In my opinion, that short document contains some of the best official comments on leadership that I have encountered in over 21 years. Unfortunately, many of my rated classmates admitted they

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ROOTS AND WINGS

A PERSPECTIVE ON REORGANIZATION

GEN RUSSELL E. DOUGHERTY, USAF, RETIRED

Adapted from remarks to the Tactical Air Command Commanders Conference, 8 October 1991.

AIR FORCE people are standing on the threshold of another great period of readjustment that will better serve the nation and make this one of the most exciting times to serve. Readjustment, retrenchment, and reorganization are the order of the day, and Air Force people are in on the beginning of the development of new ways to put together the capabilities of the Air Force to make them even more effective.

I am an advocate of the Air Force, but I'm not a blind advocate of any particular organization within the Air Force. I do not think internal Air Force organizations are institutions in their own right. Organizations must be designed to serve a purpose



or address a need. The Air Force is the overarching institution; how it is organized internally depends on the circumstances and objectives of our nation. It depends on what we have to do and the framework in which we must do it. It has always been that way.

The restructure of Strategic Air Command (SAC), Tactical Air Command (TAC), and Military Airlift Command (MAC) is an example of reorganization to serve the requirements of the time. I served in SAC many years. Its passing is intensely nostalgic. It was a truly great organization of people, spirit, and mission. I am proud of every day I spent there and of the people of the command. Adm Thomas H. Moorer, former chairman of the Joint Chiefs of Staff (JCS), was right when he told an international military audience in 1971, "SAC enjoys worldwide the reputation of being the ultimate in professionalism and in readiness, and it has set the standard for all the military organizations of the world."¹

But I am not going to wail and wring my hands because of SAC's disestablishment. SAC has served us well; it did something that had to be done. We conducted a cold war for 40 years and won it. It is necessary now to reorganize to take advantage of victory and handle the future objectives of the nation. So SAC, TAC, and MAC are being phased into a more relevant command structure.

Since this is a time of great change for our nation's military, it is useful to reflect on why organizations must adapt to chang-

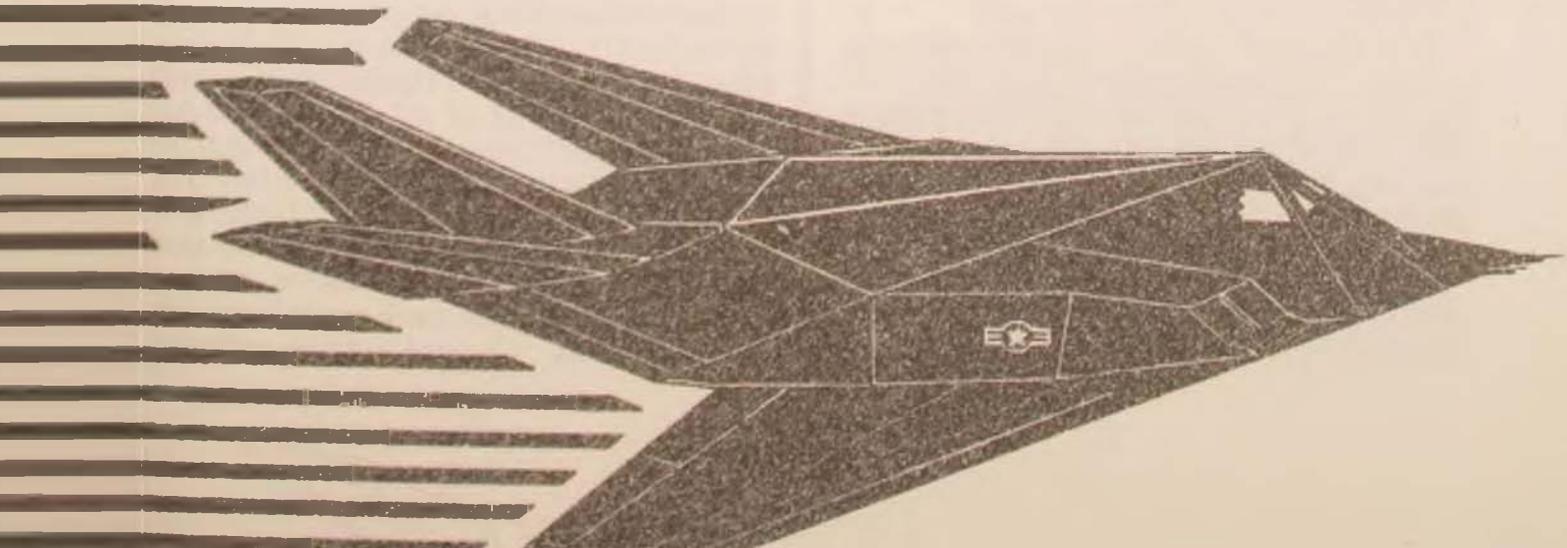
ing circumstances, why it is important to not resist provisions of command structure and internal organization, and what historical events led to the shape of today's Air Force.

The Air Force is a creation of this century. By and large, aviation technology is only 75 or 80 years old, with the modern Air Force less than 50 years old. Some of those early years in the Air Force were taken up with learning to fly, trying to keep alive, and discovering the possibilities of military aviation.

The service is still so young we can see our traditions aborning. We can reach out and touch our roots. I and my contemporaries know Gen James H. Doolittle and Gen Elwood R. ("Pete") Quesada. We knew generals like H. H. ("Hap") Arnold, Curtis E. LeMay, Lauris Norstad, Ira C. Eaker, Haywood S. ("Possum") Hansell, and many others who formed the roots of the Air Force. Unlike the other services, we could reach out and touch our "roots," have first-person, face-to-face experiences with them, know what they did, and how they thought.

From my conversations with him, I can still hear General Eaker say,

Beware of permitting the "corps concept" to get into the Air Force. Don't let that happen to us—resist it at every turn! The "corps" begins to develop its own *raison d'être*. It builds resistance to change. It exists to protect and preserve "the corps." Yet the corps is only an organization, not an institution. It should be flexible.²



I think General Eaker was adamantly opposed to our losing flexibility and becoming committed to any particular organization.

To me, the "roots" we have are Air Force roots—not organizational roots. The important heritage of our short Air Force existence is the ability to change and to adapt to circumstances. We have adaptability with our equipment, with our training, and with our tactics and our organizations. Our service should not permit its internal organizational structure to become so institutionalized that these organizations take on inviolable lives of their own. We must not let those who would resist change cause us to abdicate the Air Force traditions of adaptability and flexibility.

The chief of staff and the secretary of the Air Force have set the stage for our internal Air Force reorganization. Secretary of the Air Force Donald B. Rice has noted that the Air Force is a service born of change, and he is exactly right. We were born of change, of controversy, of endless vigilance by prescient forefathers to prevent our new technology—the technology of aerospace—from becoming subsumed in the existing "institutions" of other times and other technologies.

The National Security Act of 1947 brought a major change in the structure of our nation's military. The Air Force was created because brave people recognized the need for change; they recognized the tremendous potential of our new technology. That recognition, that milieu, that controversy, is worth considering since stewardship in the future can hinge on how well we understand the past.

We were spawned by dramatic political change. Our nation was coming out of an isolationist period. We had reluctantly gone into Europe for the second time in two decades. Only after a sneak attack did we reluctantly focus on the necessity to destroy Japan's military elite.

Technological change was coming along so fast we had to organize to handle and channel it. We were beginning to have

some global instincts, though not yet global capabilities. Global power projection was emerging, but we could not yet get there except through leapfrogging.

Our nation's political perceptions were beginning to change. We had expanding national horizons. We had begun to see that our security and future prosperity were going to lie in international involvement.

Threat changes were paralleled by changes in our industrial base for production of the instruments of the aerospace age. We had come from being a stop-making-plows-and-start-making-tanks country to one with a defense industry. We could no longer get by with industries that stopped making firecrackers and baking powder to start making gun powder and explosives. We were developing an aerospace industry. Finally, and of great significance, was an awakening of the conceptual changes that air power had made in the ability of a nation to attack, to project power, to deter attack, and to make obsolete many of the early forms of defense. That was the environment in which our fledgling air forces were born. And it was in my lifetime and that of many others alive today!

When Lew Allen was leaving as chief of staff, I was running the Air Force Association staff and I asked him, "Chief, do you have any parting advice for your Air Force Association?" He said, "Make sure our people understand the unique aspect of air power."

I said, "Yes, sir, Chief, you can bet that's what we'll do." On the way back to the office I asked myself, scratching my head, "What in the hell is the unique aspect of air power?" I felt just like George Brown when he went over to the Senate for confirmation as the chief of staff for the Air Force. On that occasion, we worked for three or four days giving George all sorts of "skull sessions" and all sorts of data collections. He had books all tabbed and filled with figures and facts. Lo and behold, the first question he got from the committee was, "General, why do we need



an Air Force?" George said to us later, "I was completely unprepared to answer that question!"

What is the unique aspect of aerospace power? My answer: "Access." Aerospace power provides unlimited access to this world and, to an increasing degree, access out of this world. Access for whatever purpose—for offense or defense, for information and intelligence, for political purposes, for psychological purposes, for exploration, for whatever is in our nation's interests. Access.

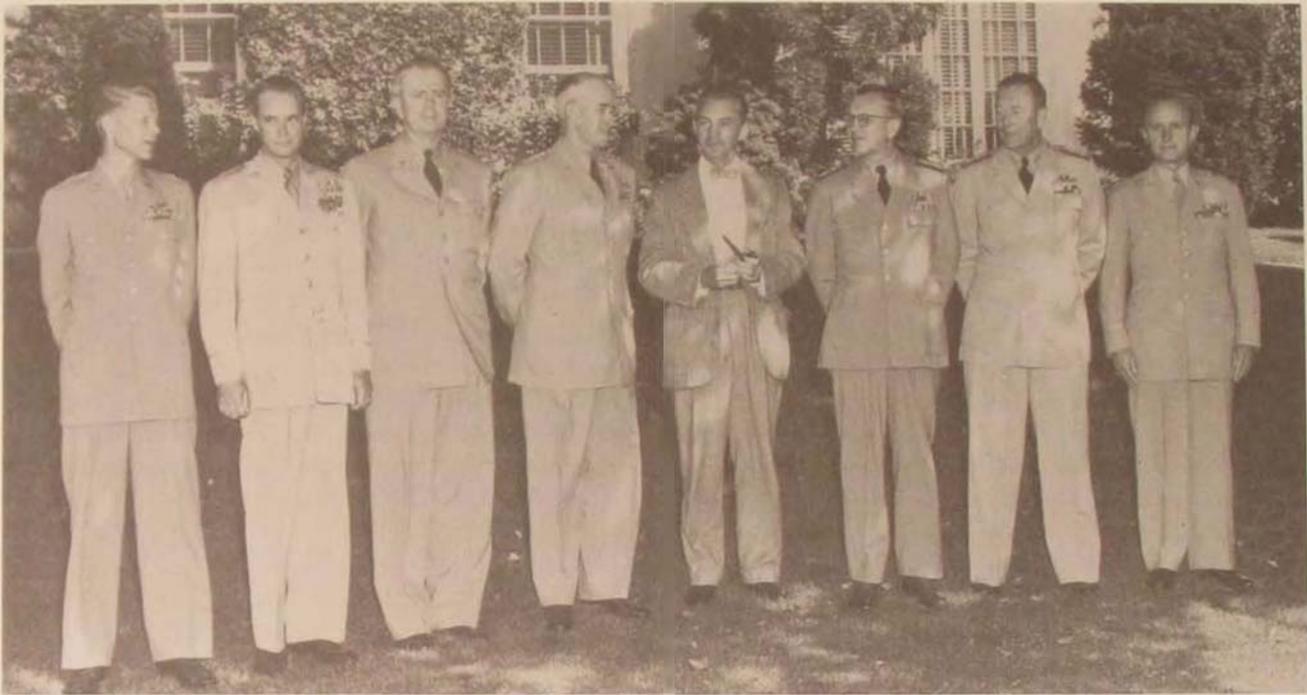
What we can offer the president, the National Security Council, or our combatant commanders is the ability to "access." We can demonstrate how those commanders can best use that access and what it can accomplish: Global Reach and Global Power—the strategic vision established for the Air Force by Secretary Don Rice.

As for the question, Why do we need an Air Force? go back to the environment of change in which this Air Force was born. Just as the recent focus has been on organization, so the Congress was focused on military reorganization at the end of World War II.

As stated by the author, the Air Force's relative youth has allowed many of today's flag officers to "reach out and touch their roots" by interacting with the likes of generals Hansell, Quesada, and LeMay. Here, General LeMay talks to students during a break at the Joint Flag Officer Warfighting Course at Maxwell AFB, Alabama, in 1988. A regular guest of the course, his final visit occurred the week before his passing in October 1990.

In 1945 President Harry S Truman sent a message to Congress outlining his ideas about the post-World War II military. He suggested a separate air force and advised Congress to start now legislating for a combined War and Navy Department, with unified direction of land, sea, and air forces; a "comparatively small regular Army, Navy and Marine Corps—a cadre-type regular service," with a separate air force. Then he wanted to have a greatly strengthened and enlarged National Guard and organized Reserve. He recommended the creation of a large general reserve of trained men who have completed a course in universal military training (UMT).³

UMT was a hot potato that sent Congress into a real spin. It became a rallying cry for everybody who wanted to defuse any initiatives to create an air force. In effect, they advocated focusing on UMT and forgoing



Secretary of Defense James Forrestal hosted the Newport Conference, where the services formulated a compromise to the contentious Key West Agreement on roles and missions. Participants included, left to right, Lt Gen Lauris Norstad, USAF; Gen Hoyt S. Vandenberg, USAF; Lt Gen Albert C. Wedemeyer, USA; Gen Omar N. Bradley, USA; Forrestal, Adm Louis E. Denfield, USN; Vice Adm Arthur W. Radford, USN; and Maj Gen Alfred M. Gruenther, USA.

the military reorganization to create an air force. But the proponents of a separate air force prevailed, so Congress delayed action on the proposed UMT and reserve forces, supporting the ground swell for broader reorganization, fanned and fueled by the champions of a separate air force.

The military history of this period, as recorded in the history of the Office of the Secretary of Defense, helps us know how we got here:

Although many factors militated in favor of post-war Service reorganization, none captured the public imagination quite so strongly as the coming of age of airpower. From the beginning of the war, the aircraft carrier replaced the battleship as the Navy's primary offensive weapon while the enormously expanded Army Air Forces became a near autonomous service overshadowing both the Army ground forces and the Army service forces. And with the advent of the

atomic bomb, many felt that airpower was destined to become the decisive weapon of the future. Since 1919 most Army airmen had championed the cause of a totally separate air department, co-equal with the Army/Navy, as the best means for exploiting the full potential.⁴

Noteworthy is the fact that Congress had considered over 50 bills between 1919 and 1945, all designed to reorganize the military and most to provide the Air Force some breathing room.⁵

About this time, the Army came out with a philosophical position paper on how it would develop the defense establishment into one department, a single civilian secretary, a single military commander (or chief of staff), a single military high command, and unified service branches for air, sea, and ground warfare. The Navy took exception to this. Finding the plan to be a challenge to its existence, the Navy created an immediate buffer. The buffer recommended working defense matters through agencies and cooperative ventures. The services and military departments would remain separate, but would "cooperate" with each other on a range of tasks.

This significant "exchange of service

views" started the battle that culminated with the National Security Act of 1947, popularly called the Unification Act, that created the United States Air Force. The act was signed on 26 July 1947, and the Air Force's birthday came on 18 September 1947, when the act became effective. But things did not end there.

Other things were happening that would affect the Air Force's future. The principal service-level controversy was the one over the roles and missions of the service chiefs and service forces. The decisions on roles and missions gave metes and bounds to the new Air Force and serious heartburn to the other services, particularly the Navy. Seeing this confrontation coming, two very important men took on the job of sorting out the thorns and stickers: Maj Gen Lauris Norstad of the Air Force and Vice Adm Arthur W. Radford of the Navy. They tried to work out an arrangement that could be agreed to, but without success.

President Truman himself then took a hand in the matter, and lit right into one of the big arguments: whether the Navy could possess land-based air for naval reconnaissance, antisubmarine warfare, and protection of shipping. In a letter to Secretary of the Navy James Forrestal and Secretary of War John Patterson, the president said that such planes "should be manned by Air Force personnel!"⁶ That presidential position sent the Navy through the overhead.

After the president sent this letter, he sent a similar letter to the Senate and House committees on Military and Naval Affairs. This letter reiterated his version of the roles and missions of the services, including his view that land-based planes for naval reconnaissance, antisubmarine warfare, and protection of shipping "can and should be manned by Air Force personnel."⁷

After the unification legislation was passed, Forrestal was made the first secretary of defense. As a footnote, Forrestal was the president's second choice for secretary of defense. His first choice was Patterson, then secretary of war, a jurist with the Silver Star with oak leaf cluster, and a thoroughly respected man. Patterson

refused the job, and the president turned to Secretary of the Navy Forrestal, who was confirmed that day by voice vote in the Senate.⁸

Forrestal very rapidly changed his Navy-oriented views and, to a great degree, began to support the actions needed for unification. He had no luck with his Navy. Norstad was again brought back in and teamed this time with Adm Forrest Sherman. Again these great men tackled roles and missions. At the time, the president's disputed executive order (EO 9877) on roles and missions was still on the books, with the Navy openly irritated and adamantly opposed to the Air Force role in certain naval aviation matters.⁹

The debate got so heated that President Truman rescinded Executive Order 9877 and told Secretary Forrestal to issue the "Functions" directive himself.¹⁰ Secretary Forrestal took all the joint chiefs down to Key West, Florida, for a four-day retreat. This produced the famous Key West agreement on roles and missions. But, in fact, out of the Key West agreement came another heated debate. So a second retreat was set up in Newport, Rhode Island, where a shaky compromise was worked out.

While all this legislative maneuvering was under way, the Air Force groundwork being laid, and the roles and missions fight placed on the table, several commands had been established in 1946 as internal organizations of the Army Air Forces: Strategic Air Command, Tactical Air Command, Air Defense Command (ADC), and Air Transport Command (ATC).

Importantly, when the Air Force was created, the chief of staff of the Air Force was designated by law as the commander of all Air Force forces. In a couple of years, specific language in legislation, using command names, placed SAC, TAC, ATC, and the other major operational organizations of the Air Force under his overall command, with other Air Force organizations under his "supervision." The chief of staff was the commander of all Air Force combatant forces; he was the Air Force's operational force commander.

On 18 November 1952, Secretary of Defense Robert A. Lovett wrote the president a letter. His key thoughts were as follows:

The organizations of the Army, the Navy, and the Air Force are all different. The responsibilities and authorities of the Chiefs of Staff of the three services differ. Their present organizations follow a preunification pattern and some parts are fixed by law while others are not.¹¹

He concluded that this was an unsatisfactory and unworkable situation. Lovett recommended a thorough functional and organizational study of the Department of Defense.

President Dwight D. Eisenhower, who well knew how things were, echoed Secretary Lovett's dissatisfaction and, with his impeccable credentials in the defense area, dealt a personal hand. He convened the Rockefeller Commission and in early 1958 sent Congress a most important message. In part, he said,

We must organize our fighting forces into operational commands that are truly unified, each assigned a mission in full accord with our overall military objectives of the United States....

I intend that, subject only to exceptions personally approved by the Commander in Chief, all of our operational forces be organized into truly unified commands. Such commands will be established at my direction....

Each unified commander must have unquestioned authority over all units of his command. Forces must be assigned to the command and removed only by central direction—by the Secretary of Defense or the Commander in Chief—and not by orders of individual military departments.

Commands of this kind we do not have today. To the extent that we are unable to organize them under present law, to that extent we cannot fully marshal our armed strength.

We must recognize that by law our military organization still reflects the traditional concepts of separate forces for land, sea, and air

operations.... This separation is clearly incompatible with unified commands whose missions and weapon systems go far beyond the concepts and traditions of individual Services....

I recommend, therefore, that present law, including certain restrictions relating to combatant functions, be so amended as to remove any possible obstacles to the full unity of our Commands and the full command over them by unified commanders.¹²

President Eisenhower then forwarded a draft bill to do what he recommended. It was no surprise that once the Congress took the command relationship bit in its teeth, the fire and fury raged. Only the role and stature of Eisenhower as commander in chief and president kept the debate limited to a few months. Most of his recommendations became law in the Defense Reorganization Act of 1958.

This legislation modified and repealed the overall command authorities of the chiefs of the services over their combatant forces. The chief of staff of the Air Force no longer had command of Air Force operational forces. His new role was extensive and vital, but generally one of supervision over the preparation and equipping of Air Force forces to conduct their missions under the various combatant commanders in chief (CINC).

The Defense Reorganization Act of 1958 said the Air Force shall be divided into such organizations as the secretary may prescribe to carry out his responsibilities, including aviation forces, both combat and service. The command of all the operational forces, however, was to be assigned to the CINCs. This was to be done annually through the JCS Force Assignments Paper, which was to be approved by the secretary of defense. But things were not as "clean" as they sounded.

DOD Directive 5100.1, *Functions of the Department of Defense and Its Major Components*, of 31 December 1958 was the "mother" of all DOD reorganization plans. It revised and articulated the functions, roles, and missions of the services and the department. It is in this significant direc-

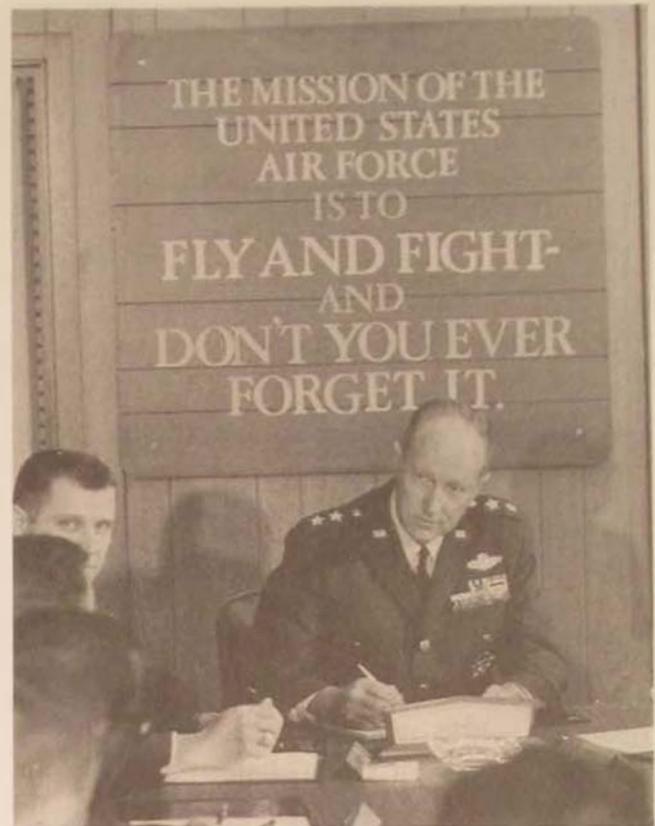
tive that the service tasks to "organize, train, and equip" are found. So here we were, in the never-never land of 1959, where the chief had many of the residual trappings of command and almost all the real sinews of command but was no longer the force commander of the operational Air Force forces. We had a rudimentary unified and specified command structure, but nobody paid much attention to it in practice. The service chiefs still ran their forces through the service component commands without much, if any, CINC involvement.

It was my observation that, by and large, we lived with some fragments of this arrangement for the next 17-plus years, until 1986. A lot of things that we did did not work very well, in part because the law said, "This is the way it's supposed to be," and we were just not doing it that way. At times some practices had to ignore the legal command arrangements. It just did not work well.

I recall that one day Air Force Chief of Staff Gen John P. McConnell, who had just returned from Southeast Asia, tacked a sign up on the door of his office. I think he picked up the sign from one of the squadrons in Thailand—the 388th or "Triple Nickel," or some such. It said, "The mission of this outfit is to fly and fight—and don't you forget it!" Over the sign the chief wrote, "The mission of the Air Force is to fly and fight—and don't you forget it!"

I said one day, in a not very discreet environment I suppose, "I don't think that is the primary mission of the Air Force. I think it used to be the mission of the Air Force, but it was changed in 1958, and we haven't yet recognized that it has changed."

The "fly and fight" imperative was the mission of that combat squadron and all its people. Also, I think "fly and fight" was included in the combatant mission of Pacific Command (PACOM) and Pacific Air Forces (PACAF), but it was not our service mission in the Air Force. The Air Force mission was to organize, procure, train, equip, motivate, and support those forces to go out there in the combatant



Many in the service were slow to fully appreciate or understand the changes in command relationships dictated by the Defense Reorganization Act of 1958. While catchy, the legendary "fly and fight" slogan misrepresented the real mission of the Air force, which, per DOD Directive 5100.1, was to organize, train, and equip the air forces assigned to the CINCs.

units of the CINCs and fly and fight and do it better than anyone else.

You can imagine that this irreverent observation of mine started a big brouhaha, but it also caused some people to think about what had changed. The command role of the chief of staff had changed dramatically. The Defense Reorganization Act of 1958 had made major differences in the command lines of combatant forces. Shortly thereafter we changed the name of the place in the basement of the Pentagon from the Air Force "Command Post" to the Air Force "Operations Center." We were beginning to see the light.

There's a lot more light now. In fact, a brilliant congressional spotlight was

turned on this command relationship by the Department of Defense Reorganization Act of 1986, or the Goldwater-Nichols Act. To a great degree, this legislation put those legislated command relationships in context and demanded we get with it. In this act, Congress beefed up the responsibilities and authority of the chairman of the JCS and the CINCs to a degree they never had before. The CINCs were given authority to fire and hire, and even to require their component commanders to report "through" them if they chose. They could even require info copies of all the correspondence between the services and the components, if they chose. The CINCs were given the ability and authority to direct and influence some unit training, inspection, disposition, and equipping of the service forces under their operational command. Goldwater-Nichols goes far toward combining combatant command authority with mission responsibility, but the understanding of our law is still incomplete and unenthusiastic.

We must do better. These legislative dictates are a fact of life. If we don't live with them, we are going to be out of tune with Congress and at odds with the way Congress has directed the forces of the United States to be deployed and commanded in combat.

We must organize as we are going to fight. We need to develop first-rate, responsible Air Force organizations that work with and support the combatant commanders of the United States with the best we can give them. And we must start now to train our top people to function well as the CINCs and senior staff officers of such commands.

Though we still cannot see the entire construct that is emerging, the president's most recent national military strategy (1991) is divided conceptually into four force packages:

- Forward presence in the Atlantic areas, including a European forward presence, not as heavy as it is now but with staying power.

- Forward presence in the Pacific areas, with primarily maritime and mobile forces deployed over vast areas.

- Contingency forces for crisis response, formed from service forces postured and equipped in the continental United States, and from reconstituted forces, to support the area commands, or to conduct contingency operations in their own right, at any time and place required, with whatever forces are required to prevail.

- Strategic forces, consolidated under the operational command and control of the new CINC, US Strategic Command, with assigned Navy and Air Force nuclear-capable forces.¹³

To a great degree, we are at the point that Napoléon's maxims would advise, "He who hazards nothing, gains nothing," or as some of our pilots say, "No guts, no glory." We have an opportunity to get out in front and organize the Air Force so that we fit into the forthcoming unified command organizations. If I could offer some advice from over the years, it would be to "make sure we get all of our operational forces tucked in under the proper unified or specified command structure and train together as we plan to fight together." I hope the commander of Air Combat Command can become a CINC in the unified command structure—possibly of a unified US Combat Command, or the CINC of the air component of a unified US Combat Command.

Joint force employment is a hallmark of our times. It is a dictate of our Congress, it makes sense, and it is the right thing to do. This nation is not an island; it lives in the world. Our services cannot survive alone, and certainly they cannot fight alone in all the circumstances we may face. We must do a better job of putting them together. By the same token, our nation cannot fight alone in all the circumstances we must envision. International involvement is a *sine qua non* of our times, and this will continue.

Joint military employment is an absolute requirement of successful military opera-

tions. Be good at it. If we are to be best qualified for the key responsibilities in joint operations, our best people need to be trained and prepared in our own equipment. They need to move through the experience wickets and qualify for the jobs with international military organizations, for the top joint jobs, for the CINCs' jobs. That way we make sure air power is effectively employed. Show me some joint commanders or senior joint staff officers who don't understand well their own service equipment and employment doctrine, and I'll show you some "losers."

The *Air Force Times* had an editorial in the Fall 1991 issue concerning Air Force reorganization. The editorial postulated, What would LeMay think about all this? Well, we don't know—he's not with us—but I worked for the revered "old man" long enough to venture a guess as to what General LeMay might say about the recent reorganization. He'd say, What took you so long?

He'd say, We've been down a road like this before; don't hesitate to get started and don't be grit in the chief's machinery. I think he would be sure to say, Minimize the number of higher headquarters, because I hate all higher headquarters. That disdain for paper-pushing headquarters was a principle he often shared.

He would say, Organize to ensure unity of command in peace and in war, under whatever command structure makes sense. Make sure you have unity of command, and make sure you practice it. Finally, General LeMay would say, Train like you're gonna fight.

We have been down this road before. For instance, at Langley Field, Virginia, in the mid-1930s, there was a "General Headquarters Air Force," which was, in effect, an Air Force combat command. At one time, it was under Gen Frank M. Andrews, with headquarters at Langley, and it was the centrally controlled combat command of the Army Air Forces during that time. Incidentally, Curtis LeMay, as a first lieutenant, was the lead navigator/bombardier of this command! I suggest the book *A Few*



As part of SAC's stand-down from alert, a weapons load team chief downloads air-launched cruise missiles from a B-52 at Fairchild AFB's 92d Bombardment Wing.

Great Captains for more on what was happening in our formative years; and *The Warlords: Military Commanders of the Twentieth Century* for insights into an essential aspect of World War II air power—flexibility to adapt.¹⁴

All of us are products of our own times and our own experiences. Too often we accept as truth only those wisdoms that our experience validates as being true. I would encourage Air Force people, as they put together different people and things in new organizational structures, to recognize that they will not have had an opportunity to experience all the things their colleagues have. They will not be able to validate by their own experience all of the truths others have validated by theirs, so listen and share.

These new colleagues must learn to work together, to respect each other's truths. They'll have to grow in the ability to plan, to conceive tactics, to apply air power, to ensure unity of air power, and to make sure air power is not fractured or misunderstood. Let's trust each other—let's don't have a rivalry within the Air Force like the one between Auburn and

Alabama. It's too important to be torn apart by schisms. If we can interact in good spirit, with honest motives, Air Combat Command and Air Mobility Command will be vital forces for ensuring the proper use of air power under every situation, with rapid application. We already have the very best, balanced, and experienced people that the world has ever seen. Let's make them better.

As we become smaller (and we must), let's make sure those left are the best—and that they are the best-equipped, best-motivated, and best-led warriors in the world.

A light note of personal counsel—and a wonderful memory—in closing. When my son Bryant was promoted to lieutenant colonel, I went to the 1st Tactical Fighter Wing for the pinning. When it came time for Bryant to talk, he looked over at me and said,

Dad called me last night and said, "Son, you're going to be promoted tomorrow to lieutenant colonel. I've got some advice for you." I asked him, "What is it, Dad?" and Dad said, "Son, it's time for you to become more modest."

Bryant continued,

I thought about that advice all night. But you know Dad, you were a bomber and tanker pilot all your life ... so you've got an awful lot to be modest about!

Then he added,

But, Dad, sitting here where I am, surrounded by all of these gurus of the profession, at the top rung of the fighter pilot ladder ... Hat in the Ring ... 27th Fighter, oldest squadron in the Air Force ... Langley ... gad, Dad, it's hard to be modest when you're at the top of the world!

Share your expertise, your good will, and capability with all your new colleagues—but be modest in the doing. The guy down at Seymour Johnson who runs those KC-10s, that bomb squadron commander at Grand Forks, or that Security Police commander at Loring is damn proud of his or her outfit, too. And those missile crews are proud of their skills and their mission—justifiably proud—and so it goes all the way through our Air Force.

In fact, none of us are going anywhere if the airmen assigned to pull our chocks don't do their job! Be proud of the entire Air Force; treat it with loving respect as you go about putting it together in a new package—and have fun doing it! □

Notes

1. Closing remarks by Adm Thomas H. Moorer at the Air Force Association/SAC Symposium, Orlando, Florida, 16 December 1971.

2. Gen Ira C. Eaker, USAF, Retired, personal conversation with author, c. 1976.

3. Alice C. Cole et al., *The Department of Defense: Documents on Establishment and Organization, 1944–1978* (Washington, D. C.: Office of the Secretary of Defense History Office, 1978), 7; 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 History Office, 1984), 14.

4. Rearden, 18.

5. *Ibid.*, 17.

6. Cole, 26–28.

7. *Ibid.*, 30.

8. Rearden, 29–30.

9. Executive Order 9877, Functions of the Armed Services, 26 July 1947, was signed by President Truman on the same date, and at the same time he signed the National Security Act of 1947.

10. Richard I. Wolf, *The United States Air Force: Basic Documents on Roles and Missions* (Washington, D.C.: Office of Air Force History, 1987), 154.

11. Cole, 124.

12. *Ibid.*, 179–80.

13. President George Bush, *National Security Strategy of the United States* (Washington, D.C.: The White House, August 1991).

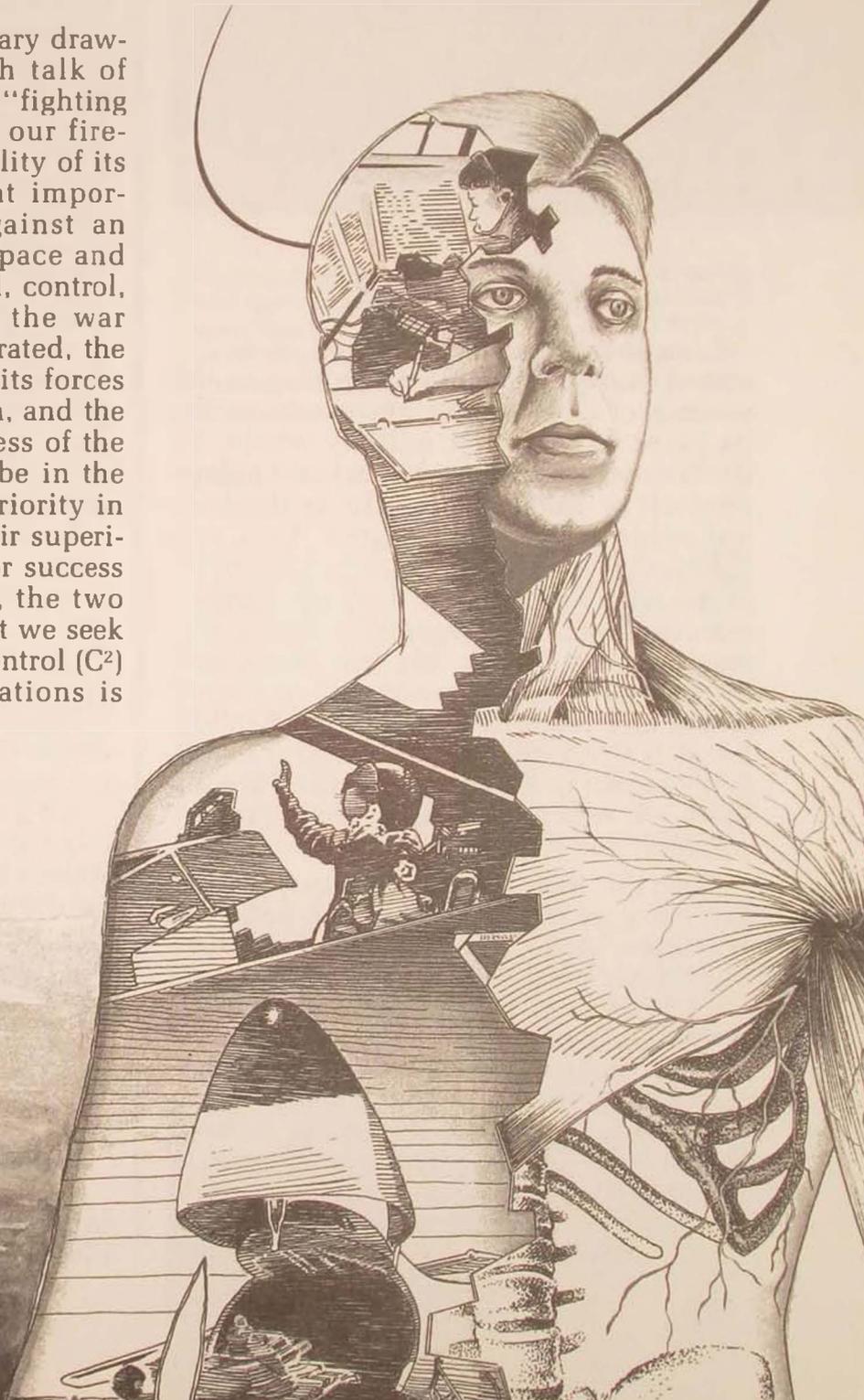
14. Dewitt S. Copp, *A Few Great Captains: The Men and Events That Shaped the Development of U.S. Air Power* (Garden City, N. Y.: Doubleday, 1980); Field Marshal Sir Michael Carver, ed., *The War Lords: Military Commanders of the Twentieth Century* (Boston: Little, Brown, 1976).

IN THE LOOP

SUPERIORITY IN COMMAND AND CONTROL

1ST LT GARY A. VINCENT, USAF

IN THE coming years of military draw-downs, there will be much talk of "doing more with less" and "fighting smarter." If the quantity of our firepower is to shrink, then the quality of its application assumes paramount importance. Applying firepower against an enemy in the proper place in space and time is the function of command, control, and communications (C³). As the war against Iraq graphically demonstrated, the side that cannot properly wield its forces will succumb to the side that can, and the results will be the same regardless of the numbers involved. It may well be in the future that we speak of C³ superiority in the same way we now speak of air superiority, as something mandatory for success in other areas. As we shall see, the two concepts are closely related. What we seek is an outline for command and control (C²) superiority because communications is



simply the technical means for command and control. Basically, the C² structure "provides commanders with the status and capabilities of both friendly and enemy forces and allows a commander to direct an air effort knowledgeably and efficiently."¹ We look for a program of assailing enemy C² from all sides while protecting our own, a doctrine that combines the ideas of electronic combat, camouflage, deception, stealth, and mobility. We shall examine in better detail how C² fits into the overall scheme of military operations and then move on to examine C² and its components. By studying the pieces and how they best fit, we can integrate them in a way to best ensure success over an opponent.

Where It Fits

Like most things, this goal is easier stated than achieved, and getting to the essence of C² is easier done if we can see its place in the larger military whole. To do this, we will use a biological analogy implicit in much of our military thinking but seldom explicitly stated. Carl von Clausewitz tells us that "war is no activity of the will, which exerts itself upon inanimate matter ... but against a living and reacting force."² Let's take this idea a step further; let's say the enemy is not simply living and reacting but his armed forces are also structured like a biological organism. Combat units, logistics, and C² are the labels we will use instead of muscular, circulatory, and nervous systems.

With this biological analogy in mind, we can compare the two traditional models of warfare—attrition and maneuver—to attacks on separate systems of the organism. Attrition is an attack on the muscular system, a battering of enemy flesh. Its effects can be the most lasting because it entails the physical destruction of the opponent, but its success is the slowest and most difficult to produce. Maneuver traditionally was a method to concentrate force against particular units of an army and later to attack and sever both the cir-

culcation and the nerves of an army. In the days of "classical" C² (before telegraphs or radios), the two systems were one and the same, hence the virtually synonymous use of the terms *line of supply* and *line of communication*.³ Success against these lines was quicker although somewhat reversible. Modern technology, however, has placed an interesting limitation on maneuver. When the radio replaced the telegraph, it became possible for units to be logistically cut off but still able to communicate with the main body. Until those units ran out of supplies, they could still be effectively controlled by the overall commander. The lines of communication now ran through the radio waves instead of along the ground with supplies. Thus, classic maneuver became an attack mainly upon logistics.

If the enemy nervous system can no longer be attacked through maneuver, then it can be attacked separately and directly by two newer weapons—the aircraft and electronic combat (EC). An attack directly upon the C² system produces the quickest and most short-lived effect—paralysis. It is important to note that the effect is *transitory*. If an attack is not sustained, the enemy will soon regain control of his forces, be a little wiser for his troubles, and be harder to knock off balance later. Therefore, if we have temporarily paralyzed our enemy, we have three choices: (1) continue to attack his C², (2) shift our efforts to attack combat units, or (3) attack his logistics. Often, all three are combined.

Air Force doctrine separates attacks on combat units (close air support) from attacks on targets in the rear (air interdiction). However, targets in the rear are not separated into those supporting logistics and those supporting C². According to Air Force Manual (AFM) 1-1,

Air interdiction attacks are usually executed against enemy surface forces, movement networks (including lines of communication), command, control, and communications networks, and combat supplies.⁴

In this sense, the doctrine does not recognize the divergence of the logistics (cir-

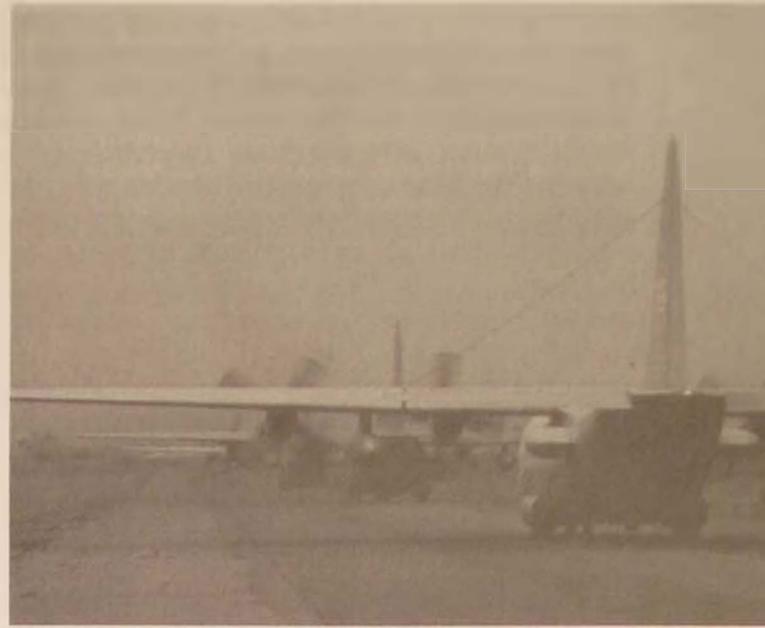
culatory) and C² (nervous) systems. The danger here is that we will attack half of one and half of the other while destroying neither. Normally, initial attacks should concentrate on command and control as the doorway to the other systems.

In the air campaign against Iraq, all types of targets were attacked early on, but there was a shift from an emphasis on C² (headquarters units, radar units) to logistics (bridges, trucks, supply dumps) to combat units (tanks and troops).⁵ The greatest contribution by EC was in the opening attacks, where it "shut down the Iraqi air defense completely in the first 24 hr. of the air war."⁶ Compass Call EC-130s jammed radio communications, "severing Baghdad's ability to communicate with its radars, missiles and artillery batteries."⁷ EF-111As and EA-6Bs provided radar-jamming escort for strike packages, and F-4G Wild Weasels and other aircraft attacked radar sites directly. As a result, "allied aircraft achieved tactical surprise and delivered a paralyzing blow that Iraq never recovered from. Air strikes crippled Iraq's highly centralized air defense system and devastated its command and control network."⁸ Air Force Chief of Staff Gen Merrill A. McPeak observed, "In essence, the issue was decided in the first few hours of the engagement."⁹ The initial attack on C² opened the way for follow-on attacks, and while the enemy was in temporary disarray, our initial success was parlayed into a lasting one.

As we will see, air power and EC are the tools best suited for destroying the enemy's C², and thereby unhinging his ability to counter other attacks on his forces. We can examine C² in detail, dissect it for its various parts, and see how air power and EC, woven together, can be used to attack each part.

The Model

Perhaps the best model of command and control is that offered by John R. Boyd in



The greatest contribution by electronic combat during Desert Storm was offered in the opening attacks, when it crippled Iraqi air defense systems. Compass Call EC-130s (above) played a key role in jamming Iraqi radio communications while EF-111 Ravens (below) provided radar-jamming escort for strike packages.

A Discourse on Winning and Losing. Boyd asserts that

in order to win, we should operate at a faster tempo or rhythm than our adversaries—or better yet, get inside (the) adversary's Observation—Orientation—Decision—Action time cycle or loop.¹⁰

This cycle or loop, abbreviated by Boyd as the O-O-D-A cycle, suggests warfare is a constant process of evaluation and action, and the side that passes through each cycle faster will be in better consonance



with reality. (AFM 1-1 has a similar loop diagram, although the specific components are somewhat different.)¹¹ The goal, contends Boyd, is to "collapse [the] adversary's system into *confusion* and *disorder* by causing him to over and under react to activity that appears simultaneously menacing as well as *ambiguous*, *chaotic*, or *misleading*."¹² The idea of fast-tempo operations aimed at creating confusion and disorder has found its latest expression in the concept of "hyperwar." As the name implies, this concept hinges on "high tempo round-the-clock operations."¹³ Upon reflection, we can see that this is nothing more than maximum rate O-O-D-A cycle attack.

Of course, none of these ideas are entirely new. Sun Tzu, a heavy influence on Boyd, counseled that

all warfare is based on deception. Therefore, when capable, feign incapacity; when active, inactivity. When near, make it appear that you are far away; when far away, that you are near ... anger his general and confuse him.¹⁴

Even Clausewitz, with his emphasis on direct battle, concedes that surprise "lies more or less at the foundation of all undertakings, for without it the preponderance at the decisive point is not properly conceivable."¹⁵

Achieving surprise and operating at a faster tempo than the enemy are the results of several interactions. The main factors are the natural tempos of each opponent's C² system—how quickly a system can operate without interference, its inherent "friction" as Clausewitz would say—and how much it can interfere with the systems of others.

Inherent friction is determined by the structure of the C² system, and as such is a topic that demands a lot more space than we have here. Furthermore, we have no control over the natural tempo of the enemy. We must analyze how to create friction in an opponent's O-O-D-A cycle and how to prevent its creation in ours. We will elaborate on this by considering each part of the O-O-D-A cycle in turn.

Observation

When we speak of observation, we define it as the sum of possible information sources available to a commander. Previously, those sources were limited mostly to what could be optically observed. Technology has produced a whole gamut of sensors exploiting many, if not all, bands of the electromagnetic spectrum (and in the case of sonar, the sonic spectrum).

Here is where EC first enters the picture. By definition, "electronic combat involves actions to protect friendly electromagnetic capabilities and actions to neutralize or destroy the enemy's electromagnetic capabilities."¹⁶ EC is unique in the military arsenal on two counts. First, no other type of combat uses so many "soft-kill" (nondestructive) methods. Jammers, for example, presently produce no lasting damage to their victim (although this may change in the future).¹⁷ Second, EC is the only weapon targeted almost exclusively at command and control. A laser-guided bomb destroys a radar site or a supply truck equally well, but a radar jammer has only one potential victim.

Traditionally, observation is an area ripe for creating friction in an opponent's O-O-D-A cycle. Jamming, stealth, camouflage, decoys, and other deceptions are all efforts to deny good observation to the enemy. Stealth, lately the most celebrated of these techniques, is important because it can deceive the enemy as to the *level* of activity as well as its direction. An increase in jamming will clue the enemy that *something* is happening even if he does not know what. Stealth can let you "when near, make it appear that you are far away." Of course, stealth is only one of many techniques. As many as possible should be used, since often a combination of methods will work where any single one fails.

Other means are available to deny information to the enemy. Less flamboyant, but just as important, are security measures such as emissions control (EMCON) and communications security (COMSEC).

These and other mundane measures help to ensure the success of active deceptions.

Highly mobile forces, and the use of them in an unpredictable manner, are also important. Commanders piece together "snapshots" of the combat situation as information comes to them through the loop. The more dynamic the battle is, the more their picture will be out of sync with reality as time goes on. Herein lies the inherent advantage of maneuver over attrition. Since attrition battles are often static slugging matches, a given picture remains accurate for a longer time. Even if the picture is old, simple extrapolation can be used to figure out the course of battle. Using mobility, we make it difficult for an enemy to keep up with reality by rapidly reshaping reality itself. Maneuver also exacerbates the inherent tendency for erroneous information to enter the enemy's system in an environment characterized by fear, fatigue, and uncertainty.

In addition to deception and mobility, we can use physical attack against enemy observation. Here air power, with its inherent mobility and concentrated firepower, is often the weapon of choice. Communication nodes and certain sensors like airborne and ground surveillance radars are particularly vulnerable to destruction. Other sensors, like battlefield radars and night vision devices, have proliferated so greatly that it is not practical to attack them all. In this case, soft kill is the preferred route.

The flip side of all this is how to prevent an intelligent adversary from doing the same things to us. A guiding principle of EC should be frequency diversity. In essence, diversity is a form of electromagnetic mobility. If an opponent wants to deny our use of the spectrum, he should have to chase us across many bands to prevent it. The more bands used, the more jammers must dissipate their energy to cover them. Furthermore, deceptions aimed at one part of the spectrum seldom work against other parts. (An obvious example is the need of aircraft to carry chaff and flares in order to defeat missiles

using the separate radar and infrared bands.) Diversity lets us cross-reference information from different sources to develop a truer picture of the battlefield. The principle remains the same whether in reference to sensors or communications.

Diversity can be achieved in one of two ways. One way is to build separate systems operating in different frequency bands. In this case, physical diversity is also achieved, creating more targets for an adversary to attack. Unfortunately, this method can grow prohibitively expensive. An alternate method is to produce a single piece of equipment capable of operating at different frequencies, otherwise known as frequency agility. This allows frequency diversity, though not physical diversity. Also, most of these systems confine themselves to relatively few frequency bands. However, the development of ultra-wideband (UWB) radars may herald sensors using many frequency bands at once.¹⁸

Of course, guarding against electromagnetic attack is only part of the equation. The more traditional worry has been attack from the air. The need for air superiority is well argued and well documented.¹⁹ It protects our forces, including our C², from aerial attack. It allows us cover for freedom of mobility and deception. Conversely, it denies all these things to the enemy. As with many things, it is easier to desire than to achieve it, but the attainment of air superiority and the attainment of C² superiority are inextricably woven together.

Just as achieving air superiority requires much more than the best aircraft and the best pilots, all the elements of stealth, deception, EC, unified C², and aircrews and aircraft must be combined to achieve C² superiority. Arguably, the quality of Iraqi pilots or the MiG-29 was largely irrelevant to the success of the coalition air campaign. If the Iraqis had possessed Top Gun graduates and the F-22, the results of the air war would have varied only slightly. To paraphrase an old saying, "Fighters can patrol some of the air all of the time, or all of the air some of the time,

but not all of the air all of the time." They must know when to sortie and what parts of the sky to search for the enemy. No one system can do it alone. With no proper command and control, any aircraft would simply have ended up as a bomb magnet.

Orientation

Orientation is the part of the O-O-D-A cycle where information gathered during observation is filtered and organized. It is where we decide what is important and attempt to answer the question, What does it all mean? Boyd considers it the most important part of the cycle. Says Boyd, "It shapes the way we interact with the environment—hence orientation shapes

The airplane and radio, the latter classically represented here by an infantry radioman, have taken movement and C² to a new dimension—the aircraft into the sky and the radio into the electromagnetic spectrum.

the way we observe, the way we decide, the way we act."²⁰

In orientation, experience—and indeed prejudice—shapes how we or the enemy decides what is important. It takes place in the minds of all those who observe or assimilate information. As such, there is no physical attack against orientation; the attack against orientation is psychological.

We can program our deceptions and actions to take advantage of the inherent prejudices of our enemy. This, of course, can be difficult as it requires an extensive knowledge of our enemy, his culture, and his training. On the other hand, if we do have this knowledge, we can see a large return for not a lot of effort. The deceptions can range from the tactical to the grand strategic. The German preoccupation with Lt Gen George S. Patton was played for effect in the days before the Normandy invasion. His phantom army, made of wooden tanks and jeeps, pinned



down numerous German divisions across the Pas de Calais, despite the fact that the Germans were 90 percent convinced the attack would fall in the Normandy area. False radio networks and numerous air raids in the area reinforced the deception.²¹

As a protection against being manipulated ourselves, we should be aware of our own prejudices. As members of the military, as Americans, and as Westerners, we possess tendencies and biases we may be only partially aware of, if at all. The North Vietnamese were skillfully able to play upon the American public's impatience and aversion to civilian casualties to their own advantage. Compare this to Saddam Hussein's total misunderstanding of Westerners, and how he only managed to increase American resolve with his ploys (e.g., his televised interviews with hostages). The difference in the results was partly because of the skills of the practitioner but also because of the American military's renewed understanding of the importance of public opinion. All this lies at the heart of Sun Tzu's admonition to "know the enemy and know yourself."²²

Decision and Action

Decision is one aspect of the O-O-D-A cycle that we really cannot influence except by influencing the steps previous to it. Physical destruction is possible but difficult since top leaders are often hunkered down in deep bunkers or constantly moving.²³ However, we can try to prevent the commander's orders from reaching the units that are to carry them out. Jamming and physical destruction of his communication system are again the tools used here.

The last place we may attack the enemy cycle is to preemptively attack the units that are to execute the orders. This is less than optimum since it may be difficult to divine just which units are to act. Even if we know this, such an attack is really nothing more than informed attrition. We should attempt to attack the enemy cycle in its early stages as opposed to its later

ones. Sun Tzu said that "what is of supreme importance in war is to attack the enemy's strategy ... next best is to disrupt his alliances ... the next best is to attack his army.... The worst policy is to attack cities."²⁴ Attacking cities in those days meant siege warfare, the most predictable form of attrition. We should not be meeting strength with strength. Perhaps it is better to let the enemy strive for and achieve invalid objectives than to forestall his achieving valid ones.

In these last stages, protecting our ability to act is a function of many of the steps in previous stages. Proper electronic diversity ensures we will be able to communicate our orders to tasked units. Air superiority safeguards our freedom to act, and mobility means our forces will be on the way to accomplishing their objectives before the enemy can stop them. With the cover of air power, Operation Desert Storm ground units were able to safely and secretly mass to the west prior to their encirclement maneuver. Once the ground phase began, these highly mobile units were able to close the trap even after their objective became apparent. Lacking air cover and proper mobility, Iraqi units simply could not move out fast enough to escape.

Assessments

Having examined the individual parts of the O-O-D-A loop model, we can now reassemble them to examine their interaction and to see what cycle times are common and possible. Remember, we seek to outpace the enemy; we need not measure our speed against some absolute reference.

First, we should understand that O-O-D-A loops are found at every level of a military structure. Observations and actions made by commanders at the tactical level feed into those of the operational commander and then the strategic commander. Loops feed into and overlap each other. Unnecessarily complex C² creates too many feeders and overlaps, creating inherent friction.



Attacking the enemy's nervous system at the onset of hostilities by neutralizing his radar and command structure is likened to throwing dirt in your opponent's eyes prior to a fistfight. Above, remains of an Iraqi radar system, and opposite, a destroyed Iraqi headquarters building in Kuwait.

Even though there is no absolute standard, let us examine what have been the natural cycle times through the years. In the times of classical command and control, message speed was essentially the same as transportation speed. A single messenger was faster than a body of troops, but only a little faster. A messenger on a ship moved no faster than a body of troops on a ship. Cycle times on a strategic level could therefore approach many weeks or even months. On a tactical level, flags, bugles, and drums limited communication to a series of simple messages. As the locomotive changed the speed of movement, the telegraph changed the

speed of message and made possible wide-ranging campaigns like the American Civil War.

The airplane and the radio have taken movement and C² into literally new dimensions—the aircraft into the sky and the radio into the electromagnetic spectrum. The combination of the two allows cycle times on a faster level than ever before. As a rough guide, we can assume that cycle times are the amount of time it takes for new targets to be selected and then attacked—the amount of time it takes to assess the situation and then react to it.

During the Korean War, bomb targets were selected about twice a week. Counting the time to observe new targets and the time to attack them, the cycle times were probably on the order of one to two weeks. In the early years of Vietnam, targets were actually selected only once a week, at a Tuesday White House luncheon.²⁵ Adding observation and attack times, the cycle probably lasted two weeks—no better than Korea. These times could be even longer if bad weather delayed the observation or the attack.

In the Gulf war, the air tasking order (the document that specifies all sorties and their objectives) was published on a daily basis. However, according to *Aviation Week & Space Technology*, "It took days, not hours, to develop the daily tasking orders that went out to individual allied air units, although last-minute changes could be made."²⁶ So at least we have now progressed to the point where the process of evaluation and reaction takes a couple of days. What is the theoretical minimum O-O-D-A loop time, and how much faster than our current cycle time can we expect to operate?

The theoretical minimum would be instantly—a "reflex" action—and even though this is of course unattainable, it is possible that cycle times *could* approach hours instead of days. Aircraft could be tasked on a broad mission-oriented basis, with real-time intelligence providing target selection. The search for Scud launchers in the Gulf war resulted in F-15Es being placed under the direction of joint sur-

veillance target attack radar system (J-STARS) aircraft. After a suspect vehicle was found, the J-STARS would vector the Eagles to the target just as the airborne warning and control system (AWACS) vectors their air-to-air counterparts.²⁷ Here we see a case where aircrews used real-time intelligence to fulfill a broad mission-oriented objective instead of simply flying to a point on a map and dropping bombs there.

It is more difficult to judge what the loop times of our potential enemies might be. The very successful paralysis of the Iraqis makes it difficult to judge how they would have fared if they had been better prepared or had attacked first. If, however, the Iran-Iraq war is any indication, the answer is not too well.

Thankfully, few potential adversaries are able to act and react as quickly as our forces. With the proliferation of high-technology weapons, this may continue to be our only advantage. Luckily for us, many nations are unable to resist the temptation to purchase prestige weapons (jet fighters, main battle tanks) at the expense of the command and control equipment and training needed to use them properly. Of course, this is not to say that we are immune to this disease ourselves.

Another way to look at the issue is to ask, How well would our C² system cope if it sustained the same sort of initial attack we inflicted on the Iraqis? In other words, we can dish it out, but can we take it? Undoubtedly, our air defense system is very formidable when fully up and operating. But what if we were surprised on a strategic level? What of a high-tech Pearl Harbor? Whether our C² system could easily and quickly reconstitute itself is another matter.

Before its recent demise, the Soviet Union (or one of its former client states) was our greatest threat in most scenarios. It is interesting to note that in some respects Soviet doctrine on EC had become more advanced than ours. The Soviet counterpart to EC was *radioelektronnaya bor'ba* (REB), which translates as radio-

electronic struggle. According to one analyst,

The Soviet development of REB marked a great leap forward over the traditional Western idea of electronic warfare because the Soviets combined the tactics of electronic warfare, surprise, deception and firepower to create a unique doctrine.... The author continues, REB includes actions to disrupt enemy use of the spectrum and actions to protect friendly use of the spectrum. It incorporates *razvedka* (reconnaissance and intelligence) and *maskirovka*, a term without any satisfactory English translation, but one that combines concealment and deception.²⁸

The comprehensiveness and aggressiveness in REB is, however, contrasted by a limited and somewhat defensive view of air superiority. The Soviets saw command of the air as difficult if not impossible to achieve and sought instead only local, temporary supremacy.²⁹ Their division of forces reflected this view. There was the Aviation of Air Defense (APVO), an entire



"command" devoted to protecting Soviet airspace. Long-Range Aviation's mission was analogous to the bomber component of the Strategic Air Command (SAC). Of greatest interest was Frontal Aviation. Speaking of this component at the zenith of Soviet strength, one expert on the Soviet military said that

frontal aviation has matured into the largest branch of the Soviet Air Force. It is an operational-tactical asset with a multi-role mission of providing air support, air defense, and tactical airlift for the ground forces. Ground support has become the principal role.³⁰

Another expert concluded, "Thus Soviet air supremacy is largely tactical, and directly related to combined-arms activities even when described as 'independent air operation'."³¹ Nowhere was there an independent force whose mission was to wrest control of the skies from the enemy. With no true doctrine in air superiority doctrine, it seems unlikely that the Soviets would have had the opportunity to carry out their REB doctrine.

More important, the Soviet C² system was highly vulnerable to the aerial/electronic warfare we have been discussing. At this writing, it is impossible to predict what form of government will replace the Soviet Union or what will become of its military. It is likely, however, that the military forces will remain a highly centralized, top-down structure.

Of course, we should not be so arrogant to assume no one will ever pose a threat to our C². Our C² system is still basically hierarchical, even if it is less centralized than others.

Conclusion

If we view warfare as a match between two single combatants, we see the relationship of each of their biological systems to their overall effort. Their muscles will provide the striking power, their circula-

tory system will ensure the muscles have the nourishment they need, and their nervous system will give the orders directing their muscles to act.

If we accept this basic analogy, we can choose to employ military force in one of several ways. We can go the brawling route and simply trade blows with our opponent. If we are sufficiently strong, we will eventually prevail, but we should remember that in war every blow struck can cost countless lives.

We can go the smarter route and strike at pressure points while attempting to dodge the blows. Or we can go the smartest route and throw dirt in their eyes before we strike the first blow, then circle around and strike without warning from any direction. Of course, in a bar fight this would be considered dirty fighting, but when lives and national interests are at stake, we might excuse a certain lack of chivalry.

In any case, attacking the enemy's nervous system through employment of aerospace power is the key to success. After we have stunned the enemy, we can more easily attack those systems that further our objectives. No two armed forces are the same, and particular systems that may be robust in one army or air force may be weak in another. In small, low-tech armies with small supply needs, combat units may be the best target. For opponents with midsized, medium-tech forces, logistics may afford the best route to success. As observed before, these nations have probably bought the weapons before buying the support and supplies to operate them. A large, high-tech army poses the greatest threat, of course, but in this case the priority should not change. A shifting attack that at first emphasizes C², then logistics, and finally combat units offers the best chance of success. Of course, this will never be popular with the platoon leader at the front, who would rather have an F-16 attacking the enemy in front of him than a headquarters unit many miles back. Also, in this last case we must hope our C² system is resilient enough to withstand whatever blows the enemy can inflict.

A few final words. The coming years will produce a smaller expeditionary force geared toward meeting varied threats. If this force is to succeed, it must be able to adapt, cope, and reorganize faster than its potential foes. This can only be achieved by flexible, mobile, and survivable com-

mand and control. If, as we have done here, we liken armed forces to living biological organisms, then we must understand that whenever they meet, there will be a form of military Darwinism at work.³² The best C², effectively used, ensures survival and prosperity. □

Notes

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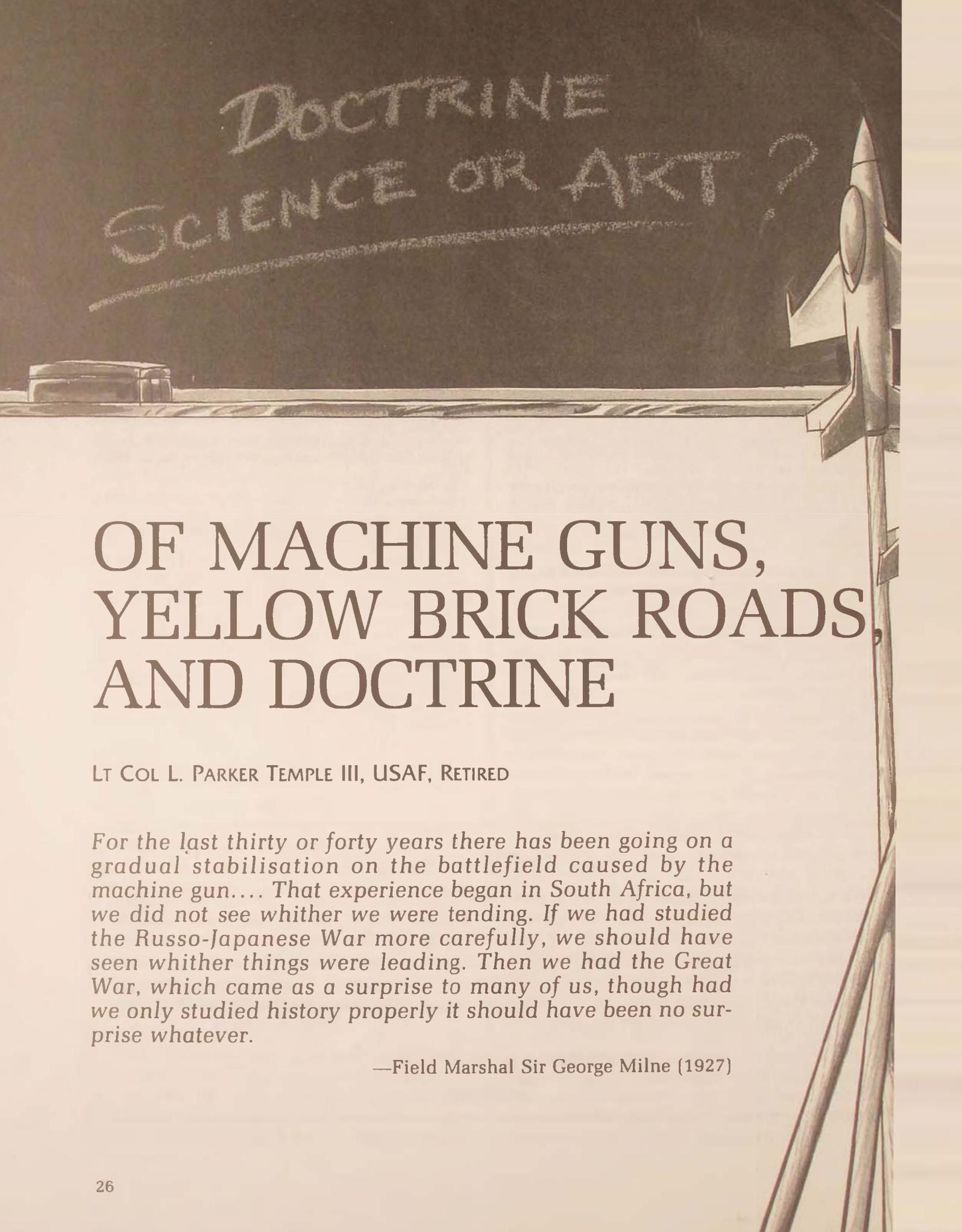
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How Are We Doing?

We need to know how you feel about the *Airpower Journal*. We are genuinely interested in providing you, the reader, as well as the Air Force, the best possible professional journal. It is, after all, your journal. In that spirit, we have provided a tear-out readership survey just inside the back cover. Please take a few minutes to complete it and return it to us. (We'll pay the postage.) It will help us further define the focus and scope of the *Journal*, and it will help us determine how well we are reaching our target audience.

Thanks for your help,

The Editor



DOCTRINE
SCIENCE OR ART?

OF MACHINE GUNS, YELLOW BRICK ROADS, AND DOCTRINE

LT COL L. PARKER TEMPLE III, USAF, RETIRED

For the last thirty or forty years there has been going on a gradual stabilisation on the battlefield caused by the machine gun.... That experience began in South Africa, but we did not see whither we were tending. If we had studied the Russo-Japanese War more carefully, we should have seen whither things were leading. Then we had the Great War, which came as a surprise to many of us, though had we only studied history properly it should have been no surprise whatever.

—Field Marshal Sir George Milne (1927)



AT THE beginning of World War I, the British army had 24 machine guns per division and two per battalion—the same ratio as in 1899. By the end of the war in 1918, there were 500 per division. British observers of the Russo-Japanese War had reported the great effect of machine guns in 1905, but their reports went unheeded.¹ Field Marshal Milne later disputed some historians who believed that changes brought about by the machine gun could not have been understood beforehand. Clearly he was correct. He went further to say that the changes in warfare should have been obvious before they occurred. The use of history as described by Milne is known as doctrine.

The Air Force is facing the most dramatic changes since the end of World War I caused many to declare the military as an expensive and unnecessary luxury in the brave new world of peace. The Air Force is struggling to allocate required cuts, but it has no viable means of judging how to retain the flexibility it will need to meet the unknown challenges of the future. We must use history to derive doctrine that tells both how warfare is changing and how to prepare for and succeed in the next war. More than at any time in the past, the

Air Force needs adequate doctrine. Why don't we have a doctrine that serves us?

Amongst the Munchkins

Doctrine should not be considered as strictly precise rules but as "officially approved prescriptions of the best way to do a job. Doctrine is, or should be, the product of experience. Doctrine is what experience has shown usually works best."² Doctrine plays an essential role in the selection and acquisition of weapon systems.³ It depends on learning history's lessons and generalizing from accumulated experience to form guides to future action.⁴ As Carl von Clausewitz demonstrated, doctrine should use historical vignettes illustrating normative and value-laden conclusions.⁵ Based on the idea that we learn from individual experience, we ought to benefit from the experience of others.

Something seems wrong here. If this summary of the definition and utility of doctrine is accurate, why don't we think of AFM 1-1, *Basic Aerospace Doctrine of the United States Air Force*, as performing these functions for us? When was the last time anyone referred to AFM 1-1 in preparing a budget, justifying a new aircraft, or planning the next flight? This description of doctrine is definitely not Kansas, Toto.

Air Force doctrine has been notably unsuccessful in influencing behavior and weapon system acquisition. It has been the critical target of authors who exhort us to get serious about doctrine, tell us what doctrine should contain, and describe what doctrine would do for us if only we had one.

Basic Aerospace Doctrine of the United States Air Force is not really doctrine as described above. Robert F. Futrell lamented that doctrine has languished since the 1950s.⁶ Our leadership's lack of a stronger push for doctrine is not surprising. No active duty personnel have ever served in an Air Force where fundamental doctrine had a vital role or demonstrated

its ability to achieve its potential. Consequently, there is a predominating opinion that we have done just fine without it.

Dr I. B. Holley, professor emeritus at Duke University and a retired Air Force Reserve major general, has explained the "what" and "why" of doctrine, described a bit of the general content and method, and suggested the model for who should do it.⁷ We won't go into these concepts here. The missing brick in the yellow brick road to an adequate doctrine is the methodology—the "how to do it" of doctrine. To produce a useful, viable doctrine, we must have a philosophically valid methodology. In the past, great minds have focused on how to get "there" but were frustrated in convincing the leadership that "there" was worth getting to.

Doctrine is a form of social inquiry, for which there are two contending methodological schools. The scientific method versus other methods, which we summarize as "art," has been debated for most of this century.⁸ This article is really about why the scientific method does not work for developing doctrine, and it describes a more productive method. To understand the proposal for doctrine development, we need a brief background of the opposing camps.

Newton, Einstein, and Doctrine

The scientific method, which has been so highly successful in discovering the universe, is the jewel of Western logical thought that overshadows other logical methods. It comprises five main ideas:⁹

1. The scientific method is a self-correcting enterprise generating consensus within the community of inquirers over the long run.

2. Any form of inquiry must be self-correcting and must generate a consensus if it is to form a genuine body of scientific knowledge.

3. The scientific method is the only method that makes gaining knowledge self-correcting and consensus-generating.

4. Social inquiry must adopt the features of the scientific method that make it self-correcting and consensus-generating to have genuine knowledge about society.

5. Three features make the scientific method self-correcting and consensus-generating:

a. The scientific method compels all hypotheses to confront data not liable to conflicting interpretations or subject to dispute.

b. The scientific method ensures that confrontation with the data will make indisputable the confirmation or disconfirmation of hypotheses by the data.

c. The scientific method systematically and impartially seeks out indisputable data with which to test claims to knowledge.

The scientific method does have its limitations, however, in developing an adequate doctrine. Science can reveal the wonders of the atom but not the meaning of atomic behavior. Science does not judge the objects it studies. Physicists criticize the standard atomic model or the laws of gravitation on the basis of how accurately they reflect the truth of the real world, not whether they are pretty, pleasing, good, or bad. For scientists, nature is what it is and not subject to criticism.

The scientific method derives universal laws that describe the way nature works but does not establish norms for nature to follow. Isaac Newton did not establish norms with $F = ma$ any more than Albert Einstein did with $E = mc^2$. Doctrine, on the other hand, is concerned with establishing norms and making judgments.

Sadly, there are no scientifically derived rules which, if followed, will inevitably lead to success in war.¹⁰ The principles of war are abstractions distilled to their essence.¹¹ Their fallacy stems from the superficial similarity of wars across time. Such similarities do not mean that inviolable principles exist. A biological analogy is that birds, bats, and bees all have wings and fly but have little else in common. Their similarity of form hides fundamen-

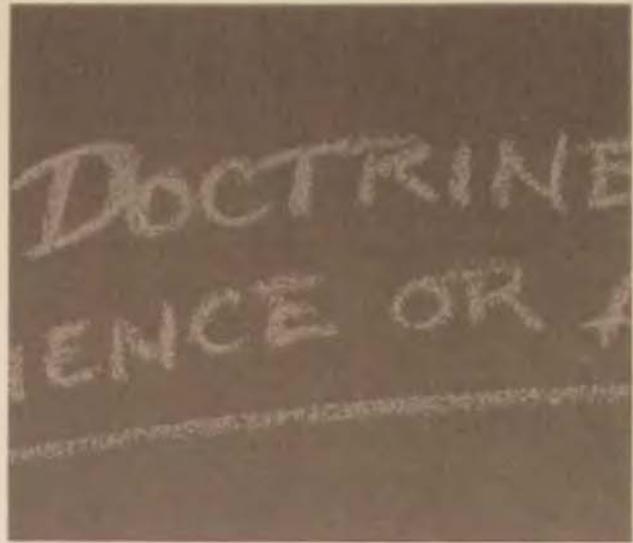
tally different structures. Similarity of wars overlooks incompatible underlying structures; every war is different. Not that there is no commonality. The misleading part is that some common elements cause the naive to think that the same is true of other elements.

The scientific method loses its usefulness in developing doctrine because war has no natural laws reducible to fixed equations. If it did, the winner would always be the one who complies best with those equations. If both sides follow the principles of war in precisely the same manner, the winner will be the lucky one. While I would rather be lucky than skillful any day when luck is involved, the situation defies use of rote principles. The principles of war are interesting intellectual constructs that have outlived their usefulness except for informing and educating.

Clausewitz thought he would eventually be able to use rational thought to distill war to its essential elements. He was notably more successful than anyone before him in providing a logical structure to his work. Serious students of warfare cannot consider themselves complete until they have read and understood Clausewitz. But something about warfare has changed, and only portions of Clausewitz have specific use in modern war. Few readers of Clausewitz find much use in his "Attack on Cordons," for example, because modern warfare is no longer like Napoleonic conflict. Furthermore, as we saw in Operation Desert Storm, the information available on today's battlefield is far more voluminous, accurate, and timely than Clausewitz could have conceived. An aviator who understands Clausewitz will not be totally prepared to meet the challenges of modern warfare.

Pyrrhus, Leonardo, and Doctrine

History as the source of doctrine and useful information has been a subject of philosophical debate for over 200 years. Its



usefulness is determined by its method and its validity. History's contextual set of dates, places, and events has no more meaning than the functioning of atoms. To have meaning, these facts must be interpreted, which is a function of social inquiry.

The scientific method describes without giving meaning. To be useful, doctrine needs meaning that science cannot provide. Valid alternatives to the scientific method must be rigorously applied to find meaning.

Doctrine extracts guides for action by interpreting relevant and meaningful experience, a procedure that involves value judgments and standards. Determining whether a battle was won or lost can be a value judgment. For example, at the Battle of Asculum in 279 B.C., the victorious Macedonian commander, Pyrrhus of Epirus, took heavy losses without removing the opposing Roman armies from the field. After the battle, he gave us the term *Pyrrhic victory* when he exclaimed, "One more victory like that over the Romans will destroy us completely!"¹²

Clausewitz sought an essential core of principles but stopped short of establishing a set of them for rote application. He sensed that science could be used to help his analysis but that war remained an art.¹³ Clausewitz used the term *coup d'oeil* to

mean "quick recognition of a truth that the mind would ordinarily miss or would perceive only after long study and reflection."¹⁴ Doctrine helps prepare the mind to recognize when conditions have changed and to improve the chances of success when this occurs.¹⁵ Providing the study and reflection to aid later battlefield decisions is the task and art of doctrine.

The essence of art is precisely why the scientific method fails: art has meaning relative to the observer, thus defying scientific method. This does not mean art cannot be learned but that the Mitchells, Spaatzes, and Arnolds excelled at their craft just as artists do. There have been no duplicates of any of these great air power pioneers, and to assume anyone could learn to be one of them degrades their genius. Studying Pablo Picasso or Leonardo da Vinci does not make one Picasso or Leonardo. Likewise, studying doctrine cannot by itself make military people martial geniuses. However, Clausewitz's *coup d'oeil* implies that whatever native ability exists can be improved upon.

Developing doctrine through the scientific method is the wrong path. If that logical thinking method is wrong, then what about the methods used in the social sciences, which we have referred to as art? These approaches (objectivism, relativism, historicism, and many others) are too numerous to discuss here. While we can coherently discuss the scientific method (considered by many to be the best way to approach learning), no such coherence ties together the methods of sociology, economics, history, and the other social sciences. Whereas the scientific method is a relatively well-defined way to digest facts and gain knowledge, the art we refer to as the alternative is an amalgamation of numerous disparate approaches. None of these different art approaches, used to try to understand the meaning of historical events, have produced an adequate doctrine. None have achieved the same degree of meaningful explanation of human activity as the scientific method has had in describing the workings of physics, for example.

If none of these methods are individually suited to social inquiry, then what about some sort of synthesis of the various approaches to inquiry? There may be a valid methodology following the thoughts of Brazilian philosopher Roberto Unger.¹⁶

The Yellow Brick Factory

A way to think of Unger's method is through a coarse analogy to the classic dichotomy in flight training methods, such as teaching a cloverleaf maneuver to a T-37 student pilot. Some instructors teach by describing the number of degrees to be turned, the airspeed at various points in the maneuver, and so on. Others teach "feeling" the aircraft to gain the proper performance. The two valid approaches have individual merit and produce similar maneuvers with differing precision and understanding of what is happening. Synthesizing the two classic methods might allow a pilot to perform a maneuver with both precise structure (through facts about its parameters) and meaningful understanding of the range of handling through different attitudes and airspeeds (through subjective "feel").

Instead of using the classic battle lines of choosing between the scientific method or art as the better approach, Unger recognized that key features of both sides of the argument have merit. He proposed the synthesized concept of frameworks describing both the boundaries and the internal structure of social entities.

For military doctrine, frameworks would be used to describe conditions of importance both on the boundaries and internally to the war being examined. Boundary conditions are such things as the technology available (not necessarily applied), geography, politics, economics, morality (such as decisions about employing weapons of mass destruction), and other factors that determine the latitude of the actions of either member in a conflict. Within these boundaries, there are internal factors—tactics; training; command, con-

trol, and communications; intelligence; the technology actually in the field; and similar factors—that govern how much of the maximum latitude any given actor uses. Discerning which boundary and internal elements determine the meaning of the events described is part of the art of writing doctrine.

Sir George Milne asserted that the Russo-Japanese War should have provided evidence of the importance of machine guns. But the First World War was fought in a different framework; the degree of armament on both sides was different, the political and economic boundary conditions were different, the weapons overall were different (despite the commonality of the machine gun). For these same reasons, Clausewitz is not totally applicable to all wars; some things are the same, others are different, and the differences become significant. Judging which differences are significant is another part of the art of doctrine.

The scientific method contributes the idea that when humans settle down within the confines of some framework, there will be laws which are valid within that framework. Art, as the opposition to scientific method, contributes the idea that humans create their own social world, which is neither governed nor limited by universal laws. Both are key to understanding history, deriving its lessons, and being able to fashion a doctrine with future applicability. It should be clear that such a doctrine cannot be static and that it requires continual examination in light of new situations, technologies, and other factors which change the face of war. The key attributes of frameworks are¹⁷

1. People create all social interaction; there is nothing inbred and unchangeable about society.
2. Societies have frameworks of rules that set the basic tenor of interactions.
3. Frameworks arise when people stop arguing over terms of social life and agree to form some regular patterns.
4. Frameworks have some internal structure involving hierarchies of some sort;

some hierarchical frameworks are more open and flexible than others.

5. Once established, frameworks resist change but all can be changed or destroyed.

6. No framework can fully encompass the individuals that live in it in two senses:

a. Humans are context-dependent beings needing stable and settled frameworks to find satisfaction in life.

b. Humans can go beyond context. Frameworks are never fully satisfying, and there is always some ability to transcend a present framework and create new ones.

Next we will examine the important implications of these to developing a doctrine meaningful to the Air Force.

“Though This Be Madness, Yet There Is Method In’t.”*

The behavior we call war is wholly a creation of humans complying with the first attribute of frameworks. Discussions about the savagery of human nature aside, decisions about going to war, the means of conducting it, and the nature of that war are determined by humans. There is nothing especially profound in this other than the conclusion that war is not some instinctive behavior over which we are powerless.

The second attribute means that any war represents some basic agreement by the combatants over the rules to be used. Whenever war is engaged, the societies on each side have some set of rules that they deem acceptable or unacceptable for the conduct of that war. Although they don't formally decide on rules beforehand, this is not far from the mark. The rules are bound by treaties, weaponry, technology availability, habits, and practices rooted in assumptions about what is feasible and what is rational, and even implied rules about what is or is not allowed. Hitler could have used gas and chemical

**Hamlet*, act 2, sc. 2.



weapons in World War II but did not. The United States could have used tactical nuclear weapons in Vietnam but did not. For the distinctions drawn here, it is not so important to understand these rules as being driven by policy, treaty, law, or moral beliefs. What matters is that each war has rules that are not violated. These rules, however, defy generalization across all wars and history.

The rules are formed well ahead of time and reflect the third key attribute, since they evolve as people settle down and agree that they have enough common interests for them to consider their futures mutually intertwined. They have more in common than they have to disagree about, and these common items form the core of the framework's rules for that society.

The fourth attribute reflects the formation of the society's ability to deal with the common issues of security and defense. Just as every society will be different, so will their rules regarding warfare. The issues are resolved with some sense of the relative priority, prestige, and control of the organization that will provide these services. The Department of Defense (DOD) provides security and defense for our society within a hierarchy of other frameworks alongside the departments of

State, Justice, and others; within the DOD, the Air Force's contributory framework is different from those of the Army and Navy; within the Air Force, the Strategic Air Command's framework differs to some degree from that of the Tactical Air Command. The societal hierarchy and its resolution of the common issues reflect the differences in the ability of the society to cope with the rest of the world. This, in turn, is reflected in the conduct of war and is an essential element of the differences between wars.

The fifth key attribute means that once a society agrees to a basic set of common interests and the hierarchical institutions necessary for that society's functioning, the society resists further change. Because frameworks are created entities, we have the power to alter and even tear down part or all of any framework we establish. Although the military is reputed to be resistant to change, this is probably unjustified in recent frameworks. This century has seen tremendous changes in the nature and conduct of war, largely as a reflection of the more flexible frameworks of the military institutions evolved in the latter part of the century. Some military institutions have been veritably dynamic in changing and adapting. The advance of military-related technology has not allowed stability since development of the machine gun. This century's warfare testifies to society's ability to change frameworks despite resistance to change. Dynamic military frameworks preclude development of doctrine that remains stable for years. Doctrine must be as vital and dynamic as the framework it describes.

The sixth key attribute covers the dynamics of framework evolution and the changing nature of the people within the military. People depend on context to derive meaning, understanding, and comfort within their framework. Even with uncertainty, danger, deprivation, and vagaries in military life, context plays an important role for every military member in coping. The frameworks for military organizations allow a certain number of people to do more than simply cope; they

actually excel and thrive. Such people learn to exist and exploit to the fullest the opportunities available within the framework. Such people eventually become the leadership.

Not all people are satisfied with the existing framework. Some are dissatisfied with the framework and merely cope with it, while a small number may play a role in changing and evolving the framework. Gen William ("Billy") Mitchell can be considered in the latter group, since he continually battled with his Army superiors over the role of air power. Of those who excel within the framework, there are some who can go beyond their present context. Gen H. H. ("Hap") Arnold exemplifies those who created the new framework of the Air Force.

When applied to the military, each of these attributes explains something about the military and contributes to the general inability to derive consistent and general rules about all warfare. The six attributes of frameworks all affect the nature and conduct of war, some so severely that the actual concept of universal laws (or scientific investigation) becomes ludicrous.

The Yellow Brick Road

Doctrine does not imply universality and must be developed only after relevant experience allows us to extract lessons learned. Lessons learned within a framework may or may not be valid across the boundary to subsequent frameworks. If a new framework is initiated, past experience may be irrelevant and dangerously misleading. Determining when a framework has changed and judging which are the proper lessons to be learned from history's experience is part of the art of doctrine.

Unger's frameworks allow locally applicable laws within stable frameworks. Doctrine comprises locally applicable laws—not universal principles of war. So long as the framework remains relatively stable and experience within it grows, doctrine can be usefully and productively pursued.

The more flexible a framework is, the harder it will be for doctrine to remain valuable over time. A framework that evolves easily and adapts to changing conditions may undermine the pertinent experience base from which doctrine is derived. Thus some doctrinal thoughts about aerial combat in the Korean conflict may not apply to the advanced tactical fighter, while others may. Again, judgment is required. An unquestioning acceptance of experience as relevant to the present would lead to trouble.

Luckily, frameworks resist change. This argues for the ability to extract usable lessons learned from experience (judgment) and the relative longevity of such doctrine. In this sense, doctrine is critical for helping people cope within the military. The embodiment of experience in doctrine is an ideal way to explain the framework to people entering into the military without prior background. Doctrine would be an important aspect of helping assure survival in the military in times of war when the regular force is augmented. Furthermore, people who not only cope within the military framework but who thrive in it may be the best sources of understanding what it takes to succeed (an essential element of writing doctrine).

No two wars are the same at the level of detail where doctrine is derived. Since doctrine is based on history, this seems a prescription to fight each war as the previous one. Indeed it is if we assume that the individuals within any framework are only subject to it, unaware of its evolution, and incapable of changing it. Thucydides wrote his history of the Peloponnesian War because he believed that circumstances keep recurring, and people who are prepared can prevent the errors of the past (by applying what we call doctrine).¹⁸

Oz on the Horizon

We now have the end objective in sight. The incorporation of frameworks as described here will both help us write bet-

ter doctrine and, just as importantly, help us interpret whatever history we read to determine its usefulness for ourselves. Unfortunately, we do not now have a doctrine that is developed according to the framework approach. The current draft of AFM 1-1 has taken a giant step forward by incorporating historical examples and vignettes, as many of us have encouraged in the past.¹⁹

Frameworks offer the only valid method for doctrine development. Each new war does not necessarily improve our ability to wage war successfully. Korea and Vietnam were not improvements on our success in World War II. Whether they could have been is moot; they were not because doctrine had not adequately accounted for the increased political dimension of the latter wars. Lessons learned in wars do not move inexorably toward perfect understanding. Methodologies that cause us to believe we will eventually achieve perfect principles of war are dangerous. Each war has elements from previous wars but in an essentially new framework. Unless doctrine is dynamic enough to recognize changes in frameworks, it will not enhance our chances of success.

Writing successful doctrine requires recognizing, judging, and describing how the Air Force operates in such a way that we can observe and assess the changes as frameworks evolve and come into contact with other frameworks. The Air Force's frameworks were modified by the development and fielding of stealth technology in both Tactical Air Command (TAC) and Strategic Air Command (SAC); it also necessitated modification of the framework of anyone who might be an enemy, since he would have to try to counter stealth. In this case, we are forcing the rest of the world to react to a revolutionary new technology.

As we force others to adapt to our new framework, we cannot wait and adapt to their changing frameworks. We must stay intensely aware of the status of the frameworks of potential enemies as an important aspect of professional military education. Without this, there would be

little hope for recognizing the areas where doctrine would help exploit weaknesses in the adversary and where the adversary might exploit our own weaknesses.

Doctrine must be at once historical and futuristic. It must be historical to understand how the framework came to be what it is. Once we understand why it has become what it is, we will be able to understand what elements of the framework will need to be changed in order for us to meet the future, to stay ahead of technology, or to change aspects of the present framework that we do not like.

Suppose we object to the size and weight of present military satellites and believe we should spend resources to develop lightsats instead. Before rushing ahead, we should be able to find in an adequate space doctrine just how we came to have such large satellites—and we should do this in terms clear enough to understand what is required to reduce their size and what is lost in downsizing without adversely affecting other aspects of the Air Force's space business. An adequate doctrine would also allow us to judge if smaller satellites are even a good idea once we understand the subject.

Operation Desert Storm provides an excellent example for doctrinal framework evaluation. The doctrinal frameworks we might compare it to are the Vietnam War and the North African campaign in World War II. Both have common elements to carry forward into the framework for Desert Storm. Some of the same problems faced Field Marshals Erwin Rommel and Bernard Montgomery (heat, water shortages, and sand). But I submit that what we actually saw was the crossing of a significant framework boundary. Although it will take more serious thinking, judgment indicates the new framework must be built on the basis of the three key elements of precision guided munitions, the vast flow of information (public, private, and military), and the tight integration of all US and allied forces.

Precision guided munitions were not new to Desert Storm; however, never before had they been used in such num-

bers (many times the total number used in the entire Vietnam War), with such intensity (a few months versus years for the Vietnam War), and with such devastating effects. Precision guided munitions hold the potential to be Sir George Milne's machine guns of the latter half of the twentieth century in terms of doctrinal impact.

No war in history ever had so much information flowing. It will take some time to comprehend the impact of the vast amount of information from mass media, from command, control, communications, and intelligence (C³I) systems in the military, and from other sources and to fold them into doctrine. However, the information revolution of Desert Storm is just as important doctrinally as the precision guided munitions within the new framework.

The integration of forces was also a key to success. It was truly a showpiece for aerial warfare, but it took the synergism of land, sea, air, and space forces to prosecute the war with such overwhelming effect on the enemy.

The use of frameworks would also cause us to examine other aspects of the war. Before we claim the decisiveness of air power, we ought to realize that the symmetry of numbers was not evident in the tactics, resources used, technology, training, and in virtually every metric we could apply. The coalition fought a lopsided war because it took advantage of the three key elements enumerated and because the Iraqis could not. The use of precision guided munitions and the information to employ them being readily available were a major asymmetry in Desert Storm. Judgment indicates that before we derive a doctrine that asserts the ascendancy of air power (as Billy Mitchell and Giulio Douhet would have had us do 60 years ago), we must understand Desert Storm in terms of its framework.

Frameworks will allow us to build doctrine that helps us anticipate the changes in war before they occur by interpreting our enemy's altering frameworks rather than waiting and adapting afterwards. In a time of decreasing budgets, we need a doc-

trine incorporating lessons learned from Desert Storm to select where to take cuts and perhaps to justify budget increases to meet the challenges of peace. As Unger's approach makes clear, we need both science and art together, as provided by the concept of frameworks.

The Balloon Home

There are some straightforward steps to develop the doctrine which we need to meet the dynamics of the changes we see every day.

First, we must recognize that AFM 1-1 must be changed. If we remain tied to its 1984 structure, we will have a doctrine manual but no doctrine with which to meet the challenges ahead. Second, we must pick a starting point in a dynamic world (today would be good), describing the framework of the Air Force as it has come to be. This includes the operation of the Air Force's frameworks, the underlying structures of these frameworks, and why the Air Force is structured the way it is for the various political, military, and economic reasons that actually underlie its present form. Simply describing the four-star commands is inadequate. We must tie the evolution of the Air Force to its history and judge what is good or bad about that legacy. Explicit historical reference couples meaning to doctrine and understanding when changes occur. Third, we must give insight into the role of weapon systems as they apply either within the existing framework or as they change the existing framework. Stealth or the Strategic Defense Initiative is an instance in which the existing framework will cease to apply, and frameworks explain why this is so.

Largely because of the strength and vision of its leaders, the Air Force has not drifted aimlessly since its inception. But we cannot always count on being so lucky. We must be able to bring people on board quickly in the case of a national emergency. The lessons of World War I's

"Peace for All Time" aftermath must not be forgotten. Nor can we continue to fool ourselves that our people understand the Air Force's frameworks well enough to avoid unwise or frivolous resource expenditures. Now is the time to devote our best

and most experienced minds to the development of an adequate doctrine before we make mistakes more devastating than the British in regard to the machine gun in 1914. □

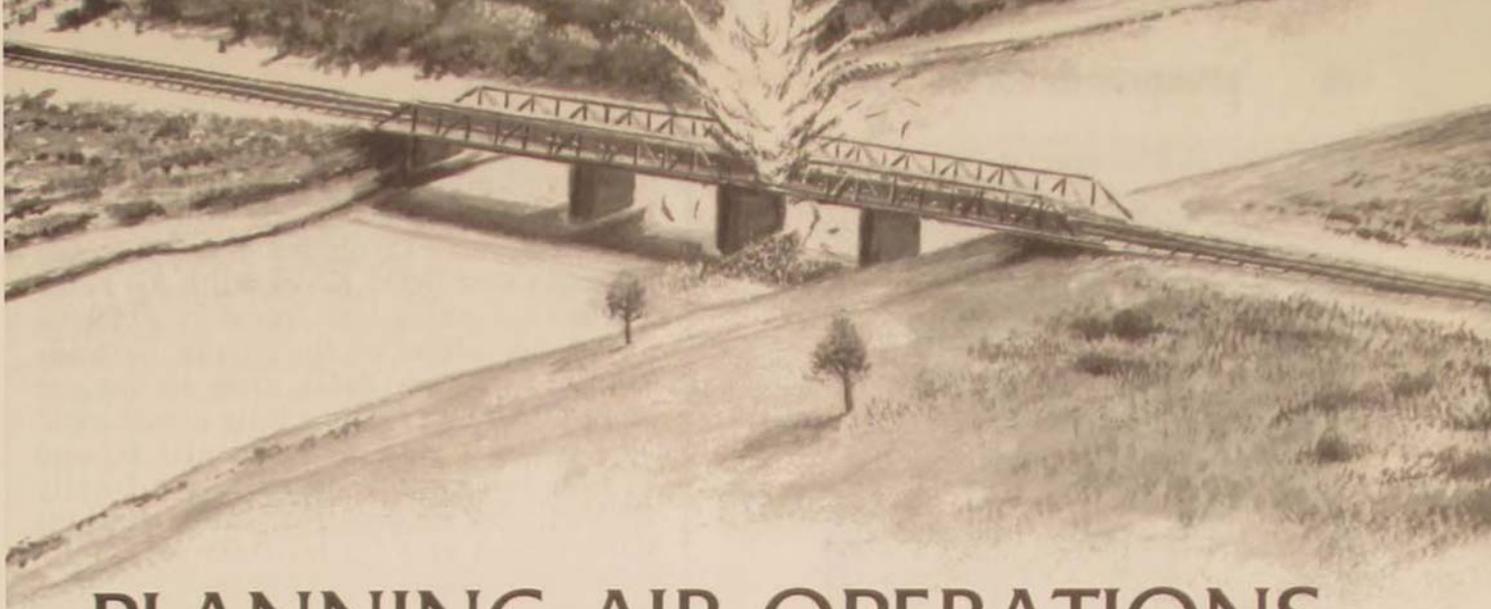
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5. Carl von Clausewitz, *On War*, trans. Peter Paret and Michael Howard (Princeton, N.J.: Princeton University Press, 1976). Clausewitz describes the idea of value-laden moral issues on page 137 of this translation. The need for (and cautions about the use of) historical vignettes is covered in two places, pages 156–65 and 170–74.
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7. Holley, *Ideas and Weapons*, 19; idem, "The Doctrinal Process: Some Suggested Steps," *Military Review* 59 (April 1979): 2–13; and Clausewitz, 156–57. Clausewitz outlines here the same sort of critical process as described by Professor Holley. Holley, "An Enduring Challenge: The Problem of Air Force Doctrine," in *The Harmon Memorial Lectures in Military History*, no. 16 (Colorado Springs, Colo.: US Air Force Academy, 1974), 10–11.
8. The debate is actually between two schools of philosophy: the "positivist," which believes that the methods of natural science are the only way to understand reality; and the "antipositivist," which has failed to arrive at any consensus about method other than to agree that the methods of natural science are inappropriate for understanding human activity. For the sake of simplicity in this paper, we use the term scientific method to describe the positivist method and the term art to cover the antipositivist method.
9. This section owes much to class lecture and interpreta-

- tion of the positivist philosophical school of social inquiry, in a course entitled *The Philosophy of Social Science*, presented by Dr Andrew Altman at George Washington University, Fall 1990, and used here with his kind permission.
10. L. Parker Temple III, "The Principles of War" (Unpublished paper, Naval War College, Newport, R.I., April 1978).
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12. Plutarch, *The Age of Alexander*, trans. Ian Scott-Kilvert (New York: Penguin Books, 1979), 409. An alternative translation was, "If we are victorious in one more such battle with the Romans we shall be utterly ruined."
13. Clausewitz, 127–32 and 148–50.
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16. Roberto M. Unger, *Social Theory: Its Structure and Its Task* (New York: Cambridge University Press, 1987), 165–70.
17. The interpretation of Unger's supertheory approach to social inquiry again owes much to the interpretive lectures of Professor Altman, cited earlier.
18. Thucydides, *The Complete Writings of Thucydides: The Peloponnesian War*, trans. John H. Finley, Jr. (New York: Modern Library, 1954), 14. In the best ancient description of doctrine, he wrote that if his work "be judged useful by those inquirers who desire an exact knowledge of the past as an aid to the interpretation of the future, which in the course of human things must resemble if it does not reflect it, I shall be content."
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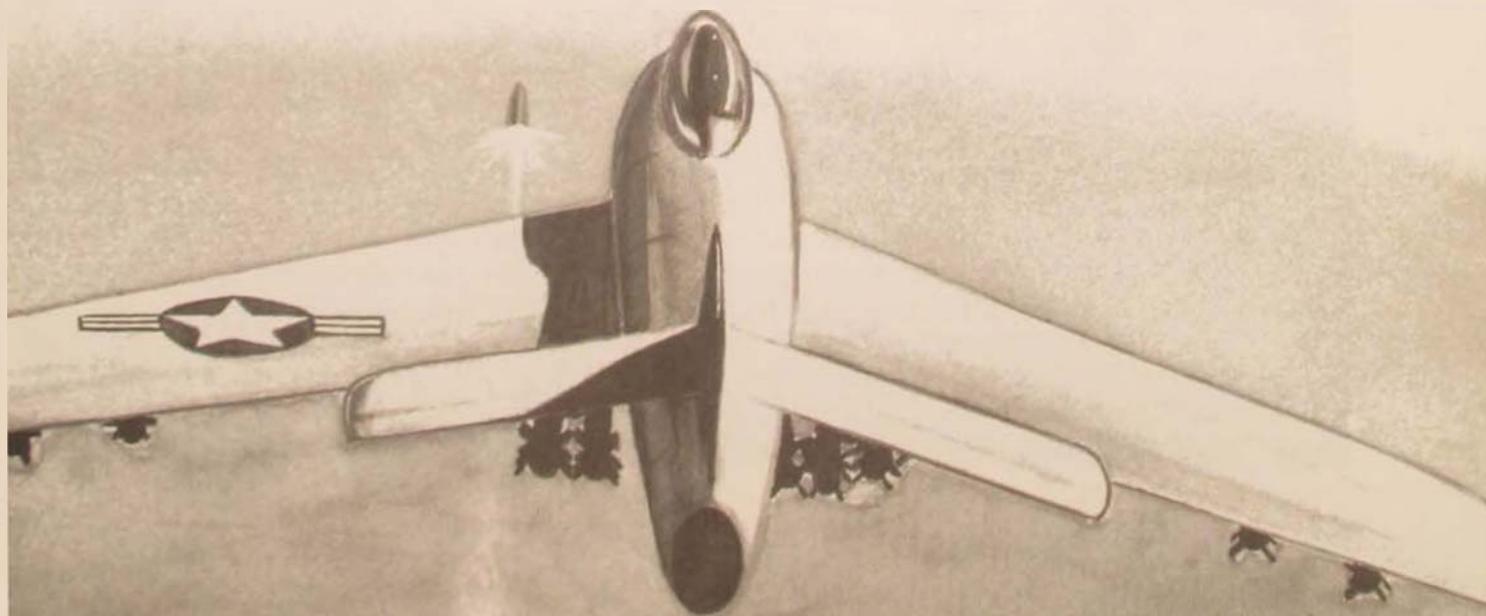
PLANNING AIR OPERATIONS LESSONS FROM OPERATION STRANGLE IN THE KOREAN WAR

LT COL MICHAEL A. KIRTLAND, USAF

OFTEN THE lessons we learn best from combat come not from our victories but from our failures. Such a case is the Rail Interdiction Program, better known as Operation Strangle, conducted in Korea from the summer of 1951 to early 1952. Enthusiasm for air power and the desire to show that air power was enough to win a war were not enough to make up for deficiencies in planning, command structure, or resources that plagued this operation. The lessons those airmen learned so painfully, and at such a cost, 40 years ago are

still relevant today. Effective air operations come from understanding one's doctrine, knowing one's limitations, and most of all, from thoroughly planning the campaign from beginning to end.

The Korean War began with a surprise North Korean attack against the South on 25 June 1950. The woefully unprepared and battered South Korean army rapidly retreated. US military forces were introduced almost immediately from Japan. Unfortunately, they had served since the end of World War II as an army of occupation in Japan and were not ready for the





Gen Otto P. Weyland, commander of the Far East Air Forces (FEAF), was charged with implementing Operation Strangle.

difficult combat they faced in Korea. By late summer of 1950, the 100,000-man Republic of Korea (ROK) army had lost over half its strength. US forces brought over piecemeal from Japan were sent directly into the fight and did not fare much better. North Korean forces had reduced the ROK/US control over the Korean Peninsula to a small area around the port of Pusan—the now famous Pusan perimeter.¹

American air power, in the form of Far East Air Forces (FEAF) and Fifth Air Force stationed in Korea, was not much better prepared for war. FEAF planning for Korea consisted of assistance in the evacuation of Americans in the event of war.² But air power recovered much more quickly than did the land forces, scoring its first aerial victories just two days after the opening of

hostilities.³ Air Force action quickly destroyed much of the North Korean air force, reestablishing air superiority. FEAF's Bomber Command began bombing missions over North Korea. Fifth Air Force fighters supported land forces by attacking enemy formations on the ground. Between Bomber Command raids, close air support by Fifth Air Force, and a truly heroic stand by US Marines and Army units around Pusan, the enemy assault was finally slowed long enough for United Nations (UN) forces and US military reinforcements to arrive.

Relief from the pressure on Pusan came in September when Gen Douglas MacArthur launched a daring invasion at Inchon. Within a week, US forces had broken the enemy lines around Pusan and linked up with units of X Corps that had landed at Inchon. It was now the North Koreans' turn to head into full retreat. By late October, UN forces had driven the enemy back into North Korea, decimated his air and ground forces, and occupied the North Korean capital at Pyongyang. By mid-November UN forces were approaching the Chinese border along the Yalu River.⁴

UN forces were again surprised on 26 November when 300,000 Communist Chinese forces entered the war. UN forces began a continuous withdrawal and retreat that lasted for the rest of 1950, finally halting some 70 miles south of Seoul.⁵ Once again it was American air power that slowed the advance of Communist forces. The enemy attack bogged down under the constant assault by air interdiction missions as well as close air support by Fifth Air Force, Navy, and Marine forces. UN forces went on the offensive in late winter and early spring of 1951, recapturing Seoul and advancing northward.⁶ Finally, in the summer of 1951, armistice negotiations began.

With the coming of the truce negotiations, UN forces, under US Army general Matthew B. Ridgway, wanted to keep pressure on the Communists in order to encourage the negotiations process. However, the American Joint Chiefs of Staff

(JCS) wanted no operations that would either appear to be offensive in nature or result in high casualties. This attitude was reflected in a JCS message sent to Ridgway on 11 August 1951 that said, "If Armistice discussions fail, it is of greatest importance that clear responsibility for failure rest upon the Communists."⁷

Air Force leaders, still wanting to show just what air power could achieve in war, were quick to offer interdiction as the solution. Brig Gen Edward J. Timberlake,

Fifth Air Force vice-commander and later acting commander, suggested a road/truck interdiction effort, which was supported by FEAF headquarters with a goal of paralyzing the Communist transportation system between the 39th parallel and the front lines.⁸ The official objective of Operation Strangle, according to FEAF, was to "interfere with and disrupt the enemy's lines of communications to such an extent that he will be unable to contain a determined offensive by friendly forces or be

THE NAME GAME

OVERLORD, Saturate, Linebacker, Just Cause, Desert Storm—sometimes it seems the choosing of a name for military operations is as critical a part of the operation as the military planning itself. Operation Strangle has become perhaps the classic example of how not to choose a name for a military campaign. To understand how and why the name *Strangle* was chosen, we need to know something about Air Force history. To understand why the name became a thorn in the side of its planners, we need to understand bureaucratic politics.

Since the inception of air power, air advocates have sought to prove that air power was the equal of land and naval power and that it could be decisive in warfare. Airmen were stung at the end of World War II by criticism that air power still had not truly proved itself. When the opportunity came during the Korean War to conduct an interdiction campaign, Air Force leaders were eager to seize the opportunity to show what air power could do.

Gen Otto P. Weyland, FEAF commander during the Korean War, claims that the source of the name *Strangle* is unknown. But the official history of Fifth Air Force attributes the origination of the name to Brig Gen Edward J. Timberlake, who was Fifth Air Force vice-commander at that time. The history goes on to say that the name was chosen "in order to avoid the use of the term 'interdiction' to describe an aerial campaign." Air power advocates were seeking a strong name that would capture the imagination. Unfortunately, they probably captured too much imagination.

The name *Strangle* was to apply to the road and truck interdiction effort during the summer of 1951. As that program faded in favor of the rail interdiction effort, which began on 18 August, the

name simply followed it. No effort was made to name this rail interdiction effort. Both FEAF and Fifth Air Force press releases continued to refer to Operation Strangle. The capstone to attaching Strangle to rail interdiction operations came in a 21 November press conference in Washington in which Gen Hoyt S. Vandenberg, Air Force chief of staff, referred to the effort as Operation Strangle.

As it became more evident that the interdiction effort could not achieve the objective of pressuring the enemy to conclude truce negotiations, critics, especially in the other services, began to attack Operation Strangle for its ineffectiveness in "strangling" the enemy. The dynamic name began to haunt the less than dynamic results. By 12 December, the Fifth Air Force commander, in an article in the *Pacific Stars and Stripes*, said the correct name was not *Strangle* but simply the *Rail Interdiction Program*. By this time, no one was admitting who came up with the name *Strangle* or why the Rail Interdiction Program was "erroneously" being referred to as Operation Strangle. Nonetheless, some Fifth Air Force Public Information Office releases continued to refer to it by that name.

Strong criticism of the "failure" of Operation Strangle from the other services caused Air Force leaders to come to the defense of Operation Strangle/Rail Interdiction Program by recounting the damage it had done to the enemy and by carefully defining and redefining its purpose. The Air Force maintained throughout the war and afterward that Operation Strangle was a success. Others remained unconvinced. Naming an operation carries with it an importance far out of proportion to whether or not the operation is successful.

unable to mount a sustained major offensive himself."⁹ According to noted air power historian Robert F. Futrell, both the Air Force chief of staff, Gen Hoyt S. Vandenberg, and FEAF commander, Gen Otto P. Weyland, had misgivings about the operation under the conditions imposed by the JCS and the truce negotiations.¹⁰ However, there is no indication that they expressed those doubts at the time.

General Weyland said the goal was to isolate the enemy, making him unable to sustain his frontline forces, but then he waffled in this by adding that a parallel objective was to "punish the enemy to the maximum extent possible."¹¹ Choosing the name *Strangle* for the initial road/truck interdiction operation further confused the issue of just what the objective was intended to be. Air Force leaders were looking for a strong name for the operation and wanted to avoid using the term *interdiction* in favor of terms that clearly indicated that this was an air campaign.¹² Ground commanders seem to have chosen to interpret the term *Strangle* to indicate that air interdiction would "strangle" the enemy by choking off his supplies and preventing him from maintaining an army in the field. The choice of the name *Strangle* itself has become a classic lesson in the dangers of picking names for military operations (see sidebar). The ultimate result was an unclear objective, loosely interpreted to suit the goals and needs of various organizations, with no common understanding of what it was supposed to achieve. The principle of the objective was clearly violated. Because of this violation, only mixed results came from the effort. The road/truck interdiction program was short-lived and not very successful; it killed trucks without really achieving any strategic objectives.¹³ Because of the problems with the road/truck interdiction effort, Eighth Army and Fifth Air Force began a joint survey in July 1951 to consider potential weaknesses in the enemy logistical system. This survey was to be the basis of planning for the Rail Interdiction Program, also known as Operation *Strangle*, even though the survey was not

completed until more than a month after the program began. Unfortunately, another important lesson flowed from failure. The development of a joint survey was the correct action to take in planning an air campaign to support Operation *Strangle's* perceived objectives. But surveys should be completed and the right questions asked before the campaign begins. The joint study focused on the logistics needs of the Communist field armies and determined that the enemy required 2,400 tons of supplies daily to support his combat forces. Further analysis indicated that while it would take approximately 6,000 trucks to support this effort, 120 railcars could carry the same load, making rail transport a more reasonable target for UN air forces to attack. Three alternative solutions were postulated as potential methods for attacking the rail transport system. Bridges could be destroyed, rolling stock could be attacked, or the rail lines themselves could be destroyed. Headquarters FEAF and Fifth Air Force decided by process of elimination to attack the rail lines as the primary target, reinforced by secondary attacks on the bridges, as well as preplanned and target-of-opportunity attacks on rolling stock.¹⁴ Here again, failure to follow through with proper analysis diluted the effective planning that had previously been done.

The major effort to analyze the enemy logistical system was a textbook example of how to determine a center of gravity for enemy activity. Rail transport was indeed essential to the enemy effort in the field. In fact, Lt Gen Nam Il, the chief Communist delegate to the peace negotiations, speaking of the overall air effort during the Korean War, attributed the success of the UN forces to their bombing campaigns.¹⁵ But at the same time, the analysis failed to consider just how successful interdiction could be in defeating the North Korean rail supply effort. Little consideration was given to the notion that interdiction is most effective when combined with a ground campaign which causes the enemy to exhaust his supplies at a rate that cannot be sustained.

The most successful period for Operation Strangle was the first three months of the campaign, when Eighth Army was still conducting ground operations to consolidate and secure its positions. By the autumn of 1951, when ground activity decreased, so did the effectiveness of the interdiction effort. While the study had determined the level of supply effort needed by the enemy when engaged in battle, little consideration had been given to what level of supply was required to sustain the enemy in static defensive positions when neither side was conducting offensive operations. Still less effort was given to considering if the rail interdiction efforts of Operation Strangle could reduce the enemy supplies reaching the front to a level below that needed to sustain a static defense. Air planners and air commanders had simply assumed through their beliefs in air power that they could interdict the enemy supply levels to the point where the enemy would be forced to negotiate a settlement rapidly and in good faith.

In its official pre-Rail Interdiction Program estimate of 14 August 1951, Fifth Air Force stated that it, FEAFF Bomber Command, and naval Task Force 77 together

A Fifth Air Force B-26 light bomber returns to its base in southern Japan after an early Operation Strangle mission over Korea in June 1951. The effectiveness of the interdiction effort would decline in relation to a decrease in US Eighth Army operations.

“have the capacity of destroying the enemy’s rail system in North Korea and of hindering his highway transportation system to such an extent that he will not be capable of opposing the US Eighth Army effectively.”¹⁶ In November, when General Vandenberg received an update briefing at Fifth Air Force headquarters, the assumption that rail traffic could be reduced to near zero was still held: “Our plan is to reduce the lines to such a state of unserviceability that we can keep them blocked with a minimum of effort.”¹⁷ This estimate was given despite the fact that at the time a maximum effort was not achieving the same objective.

The difficulty of cutting rail traffic was not fully considered. Planners simply asserted that air attacks could make sufficient cuts in rail lines to stem the flow of supplies. This assumption ignored the recent experiences of IX Tactical Air Command (TAC) rail interdiction efforts in World War II, which showed that cutting rail lines was extremely difficult and that, until a new munition was developed, this was not a particularly effective technique when compared with the effort involved in achieving those cuts.¹⁸ The failure to follow through with the analysis process to determine if effective means of interdicting the rail supply effort below acceptable levels for the enemy was a major defect in the planning effort. Planners asked the right questions when they determined rail





A B-26 strike cripples a supply depot near a rail line (lower right) in North Korea. Despite a sustained effort by UN air forces, interdiction alone could not meet the objective of Operation Strangle.

transport as a center of gravity. But they neglected to ask the logical follow-up questions to determine if the center of gravity could successfully be defeated with the means at hand. During its most successful period, Operation Strangle decreased enemy rail transport to between 4 or 5 percent of its prewar levels. However, that 4 or 5 percent, combined with other methods of transport, was sufficient to support the needs of the Communist forces in a static defensive position.¹⁹

In fact, making cuts in rail lines was extremely difficult. Only one out of every four sorties flown actually produced a rail cut. With a typical sortie carrying two 500-pound bombs, the statistical results showed only 12.9 percent of the ordnance dropped had any effect on the rail system.²⁰ As Operation Strangle entered the Korean winter, the results were even worse. Bombs often simply skipped off the frozen ground and exploded harmlessly, littering the countryside with shrapnel but

not cutting the rail lines. In addition, by this time Communist forces had begun to react to UN air attacks, decreasing the effect of successful bombing missions and increasing the danger to UN flyers.

Not accounting for enemy reaction to Operation Strangle was another key lapse in the planning process. Initially, the interdiction effort had been successful, destroying enemy supplies faster than they could be replaced. Combined with Eighth Army ground activity, the rail interdiction effort was hurting the enemy. There were even reports of food shortages in some areas. Realizing the need to maintain their supply lines, the Communists cannibalized existing double-track rail lines in order to assure that at least a single-track rail line would remain open. In many cases, trains were shuttled the short distances between rail cuts and the cargo unloaded and transferred to another existing rail line in order to complete the journey to the front. By October 1951, it seemed as if the rail interdiction effort would prove successful. But the enemy was beginning to overcome the difficulties created by the interdiction effort, and FEAF proved slow to react to enemy tacti-

cal changes, signaling the eventual downfall of Operation Strangle.

The first enemy reaction was to increase the air defense pressure on FEAF Bomber Command attacks on the bridge system. The slow-moving B-29s were extremely vulnerable to MiG activity, and with only a limited number of B-29s available, high loss rates could not be tolerated. Communist air attacks against Bomber Command formations intensified until restrictions were placed on how far north they could operate.

The enemy proved extremely capable as well in the area of deception techniques, creating the impression of destroyed bridges and rail lines when, in fact, the bridges or rail sections were in good working order. Bypass bridges were rapidly constructed, in some cases even before the original bridge was destroyed. In addition, some bridges had removable sections so that they appeared to be destroyed by day but were fully functional for nightly rail traffic.²¹ A poor understanding of deception techniques was a serious weakness in FEAF intelligence and photo analysis efforts. It resulted in a failure to strike numerous targets that should have been hit and allowed the enemy to successfully move his supplies while the UN forces believed they had stemmed that movement.

The enemy proved to be willing to commit a vast amount of human resources to the effort of keeping rail lines open. Manpower, in the form of enforced Korean and Chinese labor, was a virtually unlimited resource that could be stationed at close intervals along the rail lines. When rail cuts were made, they could be repaired in very short periods of time, often in no more than six to eight hours and sometimes less.²² The tools and supplies required were simple, plentiful, and inexpensive. The end result was that, typically, a rail line that was cut by air attacks was back in operation by the next day and had to be continually re-struck to keep it shut down. The cost to the UN forces in material resources was far greater than to the

enemy. This same lack of understanding of what reliance on human labor and simple tools could accomplish would haunt US forces again during the Vietnam War. Being technologically oriented, the US military—and perhaps especially the Air Force—gave short shrift to nontechnical solutions to military problems.

Another way Communist forces used their vast manpower resources to good advantage was the simple expedient of human transportation. An April 1952 study of enemy reactions to the Rail Interdiction Program showed, for example, that 100 men transporting mortar shells on their backs could meet the enemy's daily requirement for mortar shells for an indefinite length of time. By combining those supplies reaching the front by rail, truck, and foot, Communist forces were not only meeting their needs, they were actually able to stockpile some supplies for future use.²³ In spite of a maximum, sustained effort by air forces, interdiction alone could not meet the objectives set for Operation Strangle. Lack of analysis combined with enemy ingenuity and perseverance to stifle the air interdiction effort. The enemy understood his logistical problems far better than UN analysts did. By using the blinders of Western thinking to view possible solutions to the problems of logistical support while under air attack, UN forces ignored the possibility of simple, but labor-intensive, alternatives.

The most critical enemy reaction to the interdiction effort was the movement of antiaircraft assets to protect the rail network. FEAF viewed this as proof that the Communists needed the rail system and that the air attacks were hurting them. In this assessment they may have been correct. But the enemy's ability to sustain attacks was significantly greater than FEAF's ability to sustain the increasingly greater losses of aircraft and personnel in making those attacks. Fifth Air Force units were assigned specific sections of rail lines to attack. Because the same sections of railway were attacked day after day, often in the same sequence of sections and at the

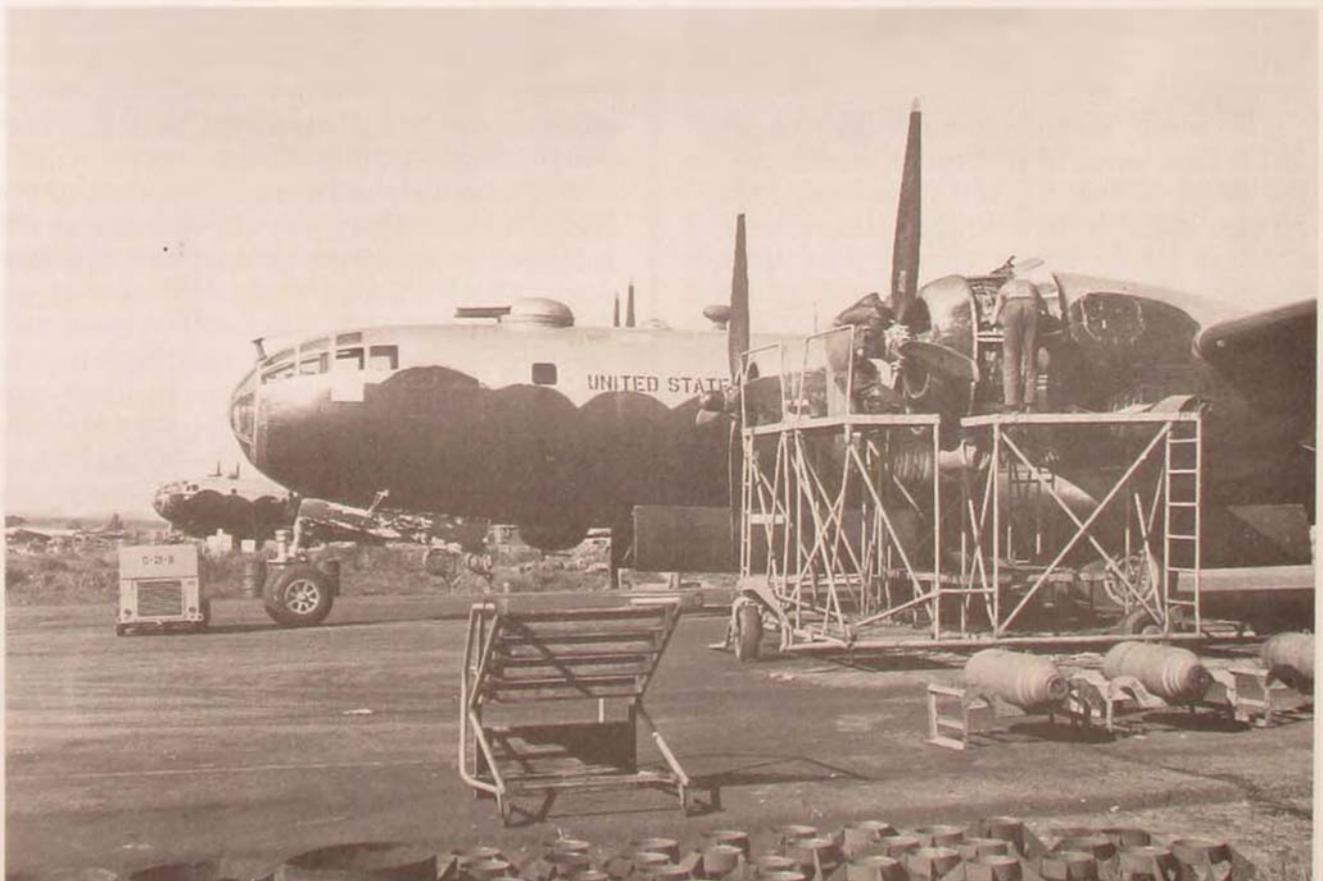
same time of day, the Communists could concentrate automatic weapons fire and antiaircraft artillery (AAA) along the rail line to provide the best air defense.²⁴ Because of the concentrated AAA fire, bombs had to be dropped from higher altitudes, decreasing their accuracy. In addition, a larger percentage of the sorties had to be devoted to suppression of enemy air defenses, further decreasing the effectiveness of attempts to cut the rail network.

In the end, the cost became prohibitive for UN air resources. In the seven-month period from the start of the Rail Interdiction Program until mid-March 1952, 243 aircraft were lost on interdiction missions, and another 290 suffered major damage. The cost in human terms was 245 airmen killed or missing and 34 wounded. The loss rate was double the replacement rate for aircraft, four times the rate when seriously damaged aircraft are included.²⁵

FCAF Bomber Command B-29s undergo routine maintenance prior to a mission over Korea. The Superfort's vulnerability to North Korean MiGs eventually compelled FCAF to place restrictions on how far north they could operate.

Obviously, this kind of negative exchange rate could not be sustained. The cost was simply too great, especially when compared to the damage being inflicted on the enemy.

Failure to account for enemy reaction to air attacks and failure to adequately adjust tactics to deal with enemy reactions proved to be another costly error for Operation Strangle. Originally designed to last 45 days, the campaign was continuously extended as it struggled to meet its ill-defined objectives. UN military planners saw no obvious alternative course of action to achieve the objectives either of "strangling" enemy logistics or of pressuring the enemy to negotiate in good faith. So the Rail Interdiction Program was simply extended. Continuing the campaign long beyond its intended length without careful consideration of the costs only further separated Operation Strangle from its originally envisioned objectives, no matter which definition of the objectives was used. By December 1951, Fifth Air Force had concluded that Operation Strangle was not working, but General Ridgway insisted it should be continued.²⁶



That General Ridgway should insist on continuing an air operation that his air component considered futile further points out a problem in the air campaign planning process used in Korea. General Ridgway inherited the Korean command structure from General MacArthur, albeit with some modifications. It remained throughout the war an Army command structure masquerading as a unified command system. But it was never a truly unified command structure with equivalent-level component commanders representing and controlling their own area of expertise. This was especially true for air activity. Even within the Air Force, no single commander or staff organization had control over all air assets. Fifth Air Force controlled fighter-bomber and light bomber assets, and FEAF Bomber Command controlled B-29 attacks. Meanwhile, naval Task Force 77 controlled naval air assets, and the 1st Marine Air Wing worked independently as well. Eventually a geographical area of responsibility agreement was worked out giving Marine, Navy, and Air Force units separate areas of operations.²⁷ The beginnings of the route pack system used in Vietnam can be seen in these service-oriented geographical arrangements. There was no air component commander and little or no coordination between the services, significantly diminishing the overall effectiveness of air operations.

In the end, interdiction failed to achieve the results its early planners had envisioned, and it became a matter of putting the best face on an unsuccessful operation. General Ridgway told the JCS that air interdiction had seriously affected enemy

supply operations, diverted thousands of troops, and destroyed thousands of trucks and rail cars.²⁸ The Air Force proudly cited the statistics showing the destruction it had wrought. But the FEAF staff study that would end the Rail Interdiction Program concluded that interdiction of rail lines was not worth the effort and that—given the restrictions placed upon them in terms of unclear objectives, lack of effective munitions, and geographical restrictions along the northern border of Korea—air power could not be decisive in Korea.²⁹

Failure to clearly state objectives after considering accepted doctrine and to thoroughly analyze enemy centers of gravity and the available means of attacking those centers had doomed Operation Strangle before the first sortie ever left the ground. Lack of thorough planning and lack of a unified command structure with control over all air assets had further weakened the efforts of Operation Strangle. Attempting to simply extend a short-term operation into a full aerial campaign would not suffice in achieving the objectives. Slow reaction to enemy efforts to defeat Operation Strangle depleted resources until it was finally admitted that the effort was insufficient.

Air interdiction had been successful in limited roles earlier in the Korean War. But it must be remembered that those efforts were for a period of limited duration and in coordinated effort with ground operations to achieve maximum pressure on enemy resources. Planners of military operations, especially air planners, should consider the legacy of Operation Strangle before planning future air campaigns. □

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16. "The Story of 'Operation Strangle,'" *Air Intelligence Digest*, January 1952, 7.
17. *Ibid.*, 10.
18. RSI study, 138.
19. Futrell, *USAF in Korea*, 436.
20. *Ibid.*, 409.
21. Maj Felix Kozaczka, "Enemy Bridging Techniques in Korea," *Air University Quarterly Review* 5, no. 4 (Winter 1952–1953): 59.
22. RSI study, 150.
23. Randolph and Mayo, 5.
24. Futrell, *USAF in Korea*, 408.
25. Randolph and Mayo, 3.
26. Futrell, *Air Operations in Korea*, 26.
27. Futrell, *USAF in Korea*, 296.
28. RSI study, 152.
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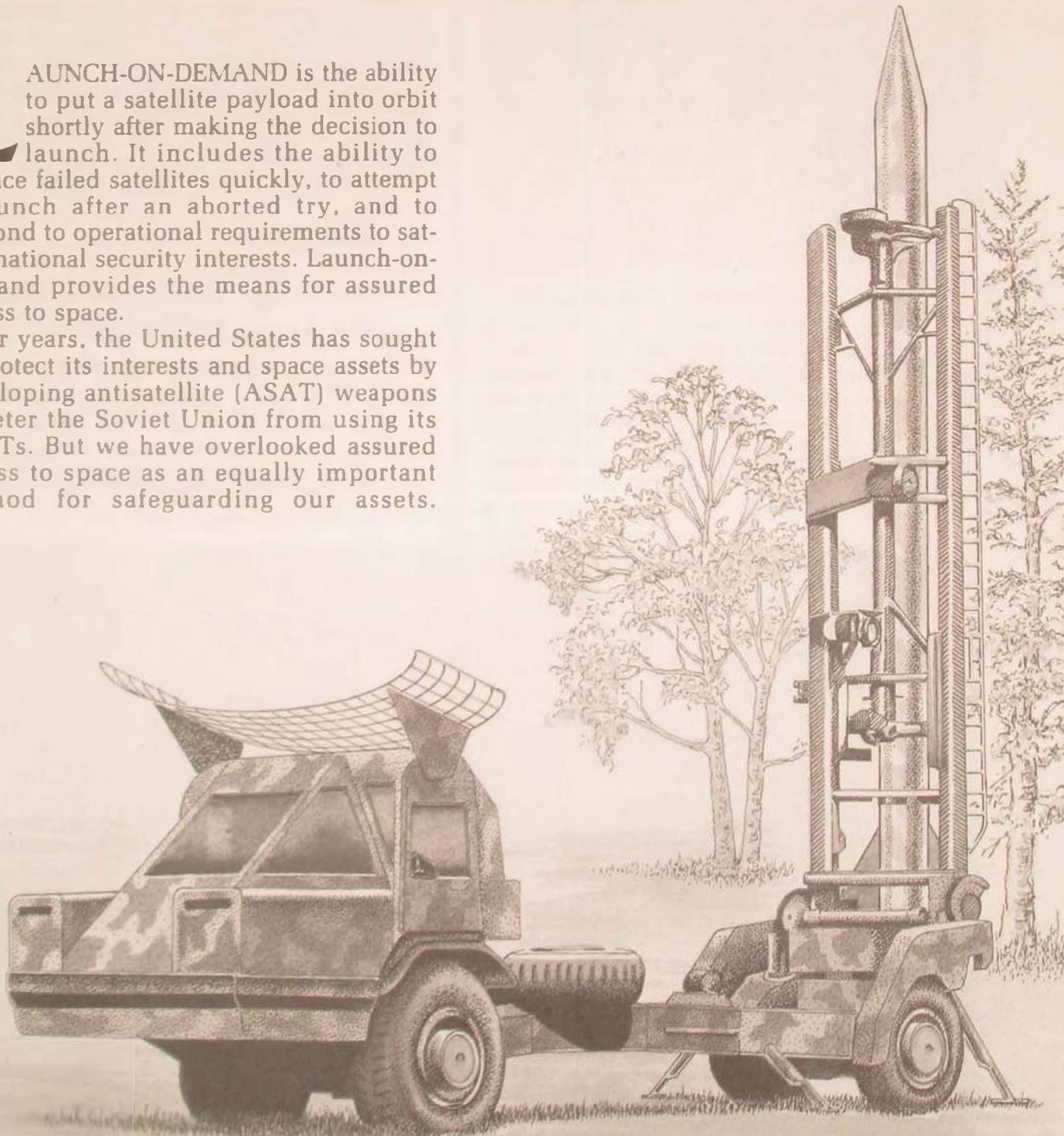
ASSURED ACCESS TO SPACE

THE DILEMMA OF RECONSTITUTION AND LAUNCH-ON-DEMAND

CAPT LAWRENCE A. COOPER, USAF

LAUNCH-ON-DEMAND is the ability to put a satellite payload into orbit shortly after making the decision to launch. It includes the ability to replace failed satellites quickly, to attempt a launch after an aborted try, and to respond to operational requirements to satisfy national security interests. Launch-on-demand provides the means for assured access to space.

For years, the United States has sought to protect its interests and space assets by developing antisatellite (ASAT) weapons to deter the Soviet Union from using its ASATs. But we have overlooked assured access to space as an equally important method for safeguarding our assets.



Although this aspect of space control has been discussed in the recent past, its benefits and pitfalls remain relatively obscure.¹ Before the US implements assured-access programs, it must recognize that these programs will need the support of specific plans and policies. These include the development of launch systems and sites capable of fulfilling launch-on-demand needs, new satellite designs, and a force structure to perform a launch-on-demand mission.

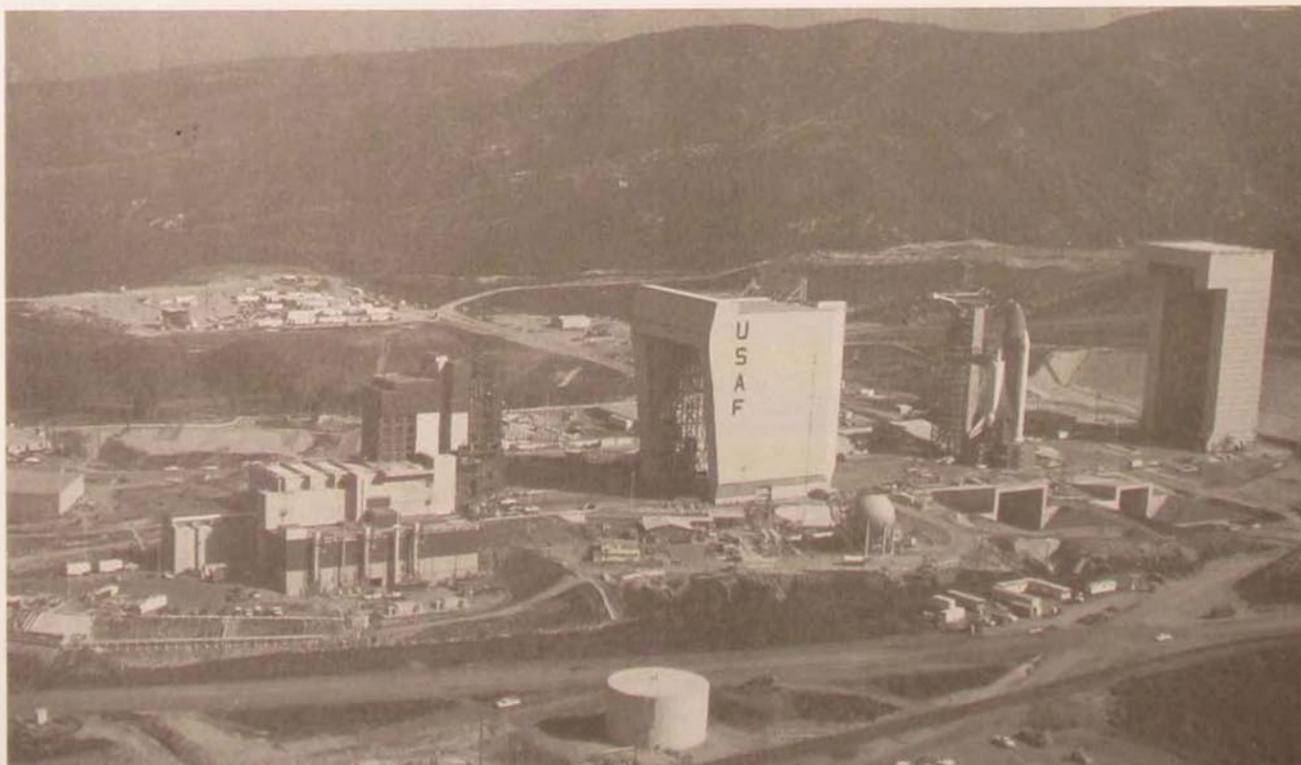
The US should be able to replace or launch new space assets on short notice. A launchpad mishap could incapacitate the launch site, or a postlaunch abort could diminish mission capability. Further, terrorist or preemptive strikes against our launch assets could disrupt the deployment of strategic and tactical satellite (TACSAT) assets. One of the best counters to such accidents or threats is the ability to replace satellites quickly and efficiently. Unfortunately, this is currently beyond our means.

The US operates major launch sites at Cape Canaveral, Florida, and Vandenberg AFB, California (pictured). Shutting down these sites due to accident or hostile action would be less disruptive if the services had mobile launch systems and "small" satellites that would continue to assure access to space.

Launch-on-demand would also support the services' desire to develop small satellites as tactical aids. Although the Air Force, Army, and Navy have talked about launch-on-demand in one form or another for years, one does not simply deploy into the wilderness or steam onto the high seas and launch a satellite. We currently have no procedures for creating satellite designs and establishing operational methods to launch satellites during a battlefield situation and then quickly bring them on-line to support a tactical commander's needs. When the military services call for TACSATs to provide communications and reconnaissance for commanders in battle, they are really calling for launch-on-demand. When critics chastised the US for almost crippling its space program after the *Challenger* disaster, they too were really calling for launch-on-demand.

Air Force Doctrinal Basis for Launch-On-Demand

The principles of war discussed by Clausewitz and adapted for Air Force Manual (AFM) 1-1, *Basic Aerospace Doctrine of the United States Air Force*, support the concept of launch-on-demand and



reconstitution. Specifically, the principles of security and logistics as defined by AFM 1-1 apply directly to justifying such a need:

Security protects friendly military operations from enemy activities which could hamper or defeat aerospace forces.... Security in aerospace operations is achieved through a combination of factors such as ... the defense and hardening of forces.²

Security derives not only from denying an enemy knowledge of one's forces and operations, but also from increasing the survivability of these forces. The latter secures the forces against attacks and thus insures their use in offensive and defensive operations. Reconstitution can be an integral part of survivable space systems and can assure the performance of critical space missions immediately prior to, during, and after hostilities.³ For example, the launching of spares augments degraded or interdicted space systems and provides for their continued use in strategic and tactical missions.

AFM 1-1 also notes that

logistics is the principle of sustaining both man and machine in combat by obtaining, moving, and maintaining warfighting potential. . . .

Effective logistics also requires a flexible system that can function in all combat environments and that can respond to abrupt and sudden change.⁴

In his book on space power doctrine, Lt Col David Lupton recognizes the importance of logistics to space systems. Of primary importance is his observation that a nation's ability to access space determines its pecking order among the space powers.⁵ Indeed, the Soviet Union's inability to put cosmonauts on the moon and the apparent impotency of the US immediately following the *Challenger* accident diminished the image of these nations as space powers. The Soviet Union shifted its space program's focus to near-earth operations, while the US shifted emphasis from the space shuttle to the use of expendable launch vehicles.

Control of Space

As an operational medium, space has been compared to the sea in terms of allowing maneuverability and freedom of passage.⁶ Adm Alfred Thayer Mahan recognized the importance of the sea as a highway, of oceanic trade routes for ease of travel and access, and of securing ports and protecting ships at sea.⁷ He also emphasized the utility of choke points, which enable a nation to control access to the sea and its trade routes. Many of Mahan's observations are relevant to the control of space. For instance, nations prefer certain locations from which to launch their spacecraft and take pains to protect these sites. This enables them to put spacecraft into orbit when they so desire. Additional technical and logistical issues (e.g., weather patterns, access to the site, proximity to population centers, waste disposal, etc.) influence the selection of launch sites but are beyond the scope of this article.

Sun Tzu also touched on an underlying principle of space control when he stressed the importance of focal ground, observing that "he who gets control of it will gain the support of surrounding states."⁸ Thus, Sun Tzu correctly recognized over 2,400 years ago that the occupation or control of certain areas will provide a nation security against potential enemies. Whether called choke points or focal ground, launch sites and ranges will play a significant role in space control because all satellites are launched and controlled from these areas.

Two facts illustrate the value of good locations for launch sites. First, the closer the site to the equator, the easier it is to launch a spacecraft into geosynchronous orbit (i.e., one in which the satellite travels above the equator at the same speed as the earth rotates so that the satellite appears stationary).⁹ The math of orbital mechanics does not allow the launching of vehicles directly into an orbit inclination lower than the site's latitude. Furthermore, the closer the site to the equator, the smaller the booster needed to put a

payload into a geosynchronous orbit (or the larger the payload put into orbit). Second, if a fixed site is easily accessible, has proper facilities, and abuts uninhabited areas or is on the ocean, it assures logistical support and safe operations.

The manpower, materiel, and money required to build launch complexes would normally restrict the number of sites a nation can afford. Most countries have one major launch site. The US has two: Kennedy Space Center, Florida (used to launch satellites into equatorial and inclined orbits—fig. 1), and Vandenberg AFB, California (used to launch satellites into polar orbits—fig. 2). The Soviets have three (fig. 3). These sites and the ranges through which launch vehicles travel to orbit constitute choke points which must be protected if the nation is to access space. The launch site's facilities and personnel are vulnerable to attack, and the

launch vehicle is vulnerable while on the pad and while accelerating downrange and into orbit. Just as bombs can destroy launch facilities, so can hand-held ground-to-air missiles destroy rocket boosters.

Although a launch vehicle's delicate systems, flammable fuels, and slow speed at low altitudes render it vulnerable to attack, it does not enjoy even a modicum of the security that is provided to mission-control facilities and communications nodes. Generally, mission-control facilities are protected by security forces on military installations, where most mission-control facilities are located. Because communications nodes—satellite-control facilities, communications dishes, radio-frequency links, and so forth—are already recognized as linchpins or choke points for communications systems, we have taken extensive measures to secure them from jamming and harden them against the effects of

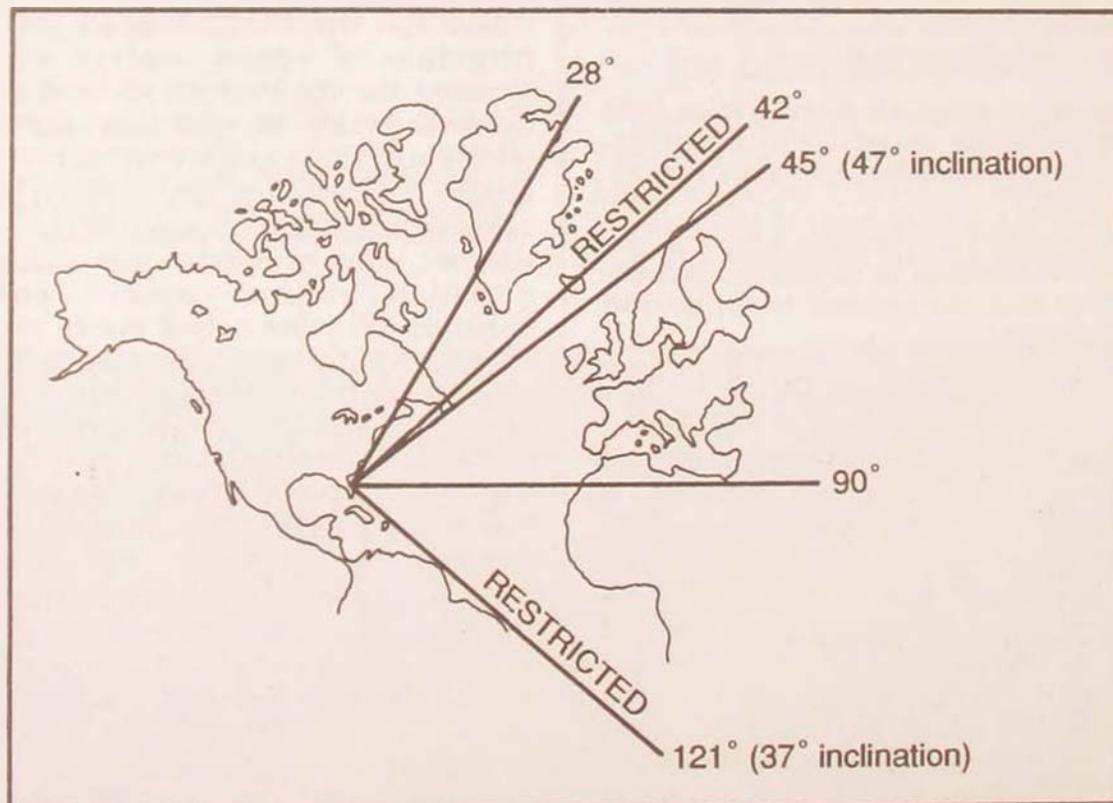


Figure 1. Launch azimuths from Kennedy Space Center are constrained due to geographical, safety, environmental, and political considerations. (From class notes in Operations Research 592, Air Force Institute of Technology, Winter 1991.)

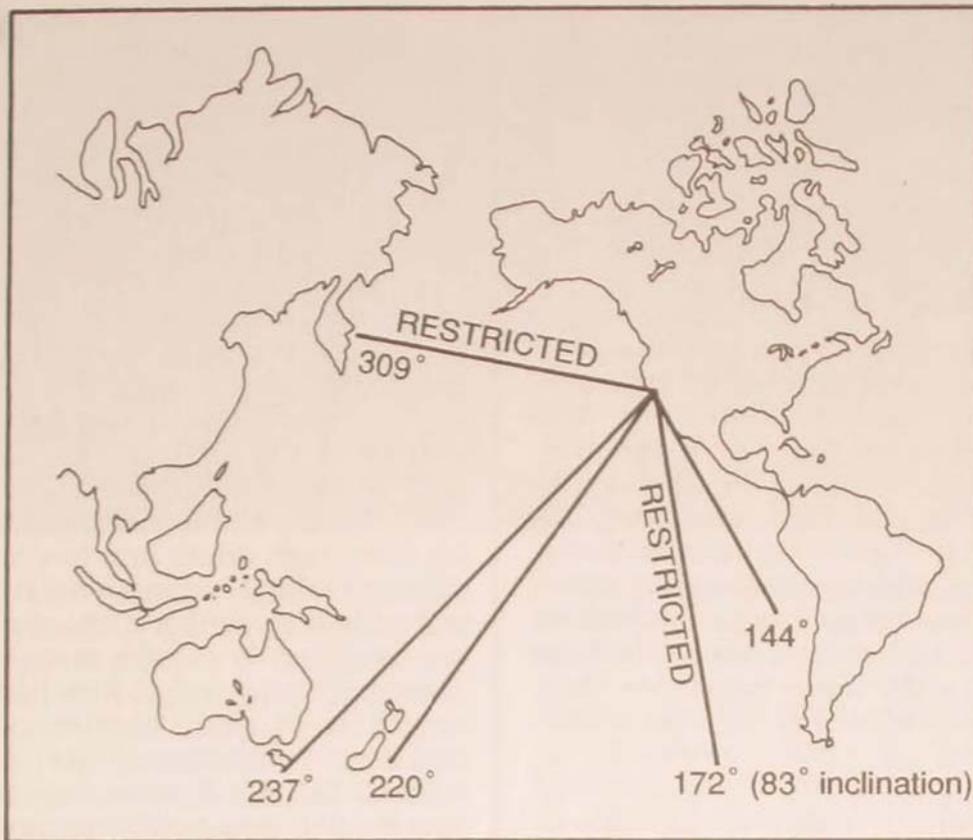
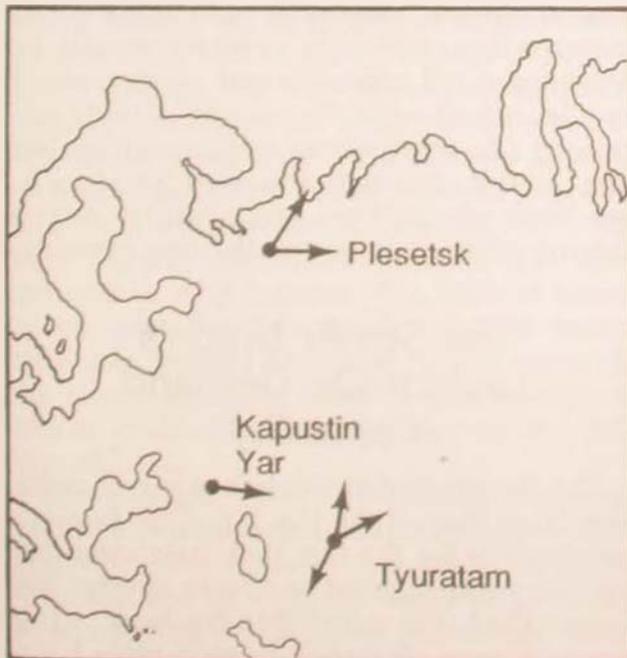


Figure 2. Available launch azimuths from Vandenberg AFB are also constrained due to geographical, safety, environmental, and political considerations. (From class notes in Operations Research 592, Air Force Institute of Technology, Winter 1991.)



nuclear attack.¹⁰ Otherwise, an enemy could easily cripple a nation's ability to use its satellites.

Even though we are capable of establishing alternate locations from which to control satellites, the fact that there are so few of these sites makes them high-value targets. Well-timed attacks on the few mission- and satellite-control facilities in this country could conceivably cripple the ability of the US to command and control its satellites for a brief time. Nevertheless, control facilities are infinitely more sur-

Figure 3. Soviet Union launch sites and ranges. The northeast arrows for Plesetsk and Tyuratam delineate a range of azimuths. (Adapted from Nicholas L. Johnson, *The Soviet Year in Space, 1990* [Colorado Springs, Colo.: Teledyne Brown Engineering, 1991], 8.)

vivable than launch sites and vehicles simply because we have taken at least some steps to protect them. But control facilities are useless if there are no satellites to control.

On-Orbit Spares

The ability of the US to launch space assets and to support national security policy was considerably degraded after the *Challenger* disaster and the abortive launches of three other vehicles carrying communications and reconnaissance satellites.¹¹ The Air Force's communications, early-warning, and reconnaissance satellites worked overtime due to the lack of replacements and spares; constellations had to work with fewer satellites than were actually needed; and payload schedules were backed up for years. As an interim solution, the Air Force procured expendable launch vehicles (e.g., Delta II, Titan IV, and Atlas II launchers) to place military and national security assets into orbit. Thus, the US became reliant on a mixture of different launchers to complement and supplement the launch capabilities of the space shuttle.

But this policy addresses only long-term access to space. A so-called short-notice launch would take over three months to check out, package, and prepare the satellite.¹² If, by some accident, a vital satellite were lost on orbit, or if a global crisis required a special reconnaissance satellite, or if a nation with ballistic missiles destroyed one of our satellites, the US could not quickly launch a replacement.

An alternative to launching replacement satellites into space is the use of on-orbit spares. This concept involves placing satellites in high storage orbits, where they are left for long periods of time. When it is needed, a spare is activated and moved into position to take over the duties of a failed satellite. We have used on-orbit spares in the past and are considering them for much more extensive use in future constellations.¹³

Although the use of spares greatly reduces the time required to replace satellites, it does not eliminate the need for launch-on-demand. For instance, no spares are available for constellations initially placed into orbit. Further, TACSATs—which will augment reconnaissance and communications satellites and provide battlefield commanders enhanced wartime capabilities—are short-lived assets placed in special orbits. In this case, the use of spares is impractical because we cannot anticipate when we will need TACSATs. Although satellite spares may at first glance seem to solve our problem, we must remember that moving from high orbits into low ones (and at different orbital inclinations) requires considerable fuel; furthermore, such a maneuver could easily require more time than a short-notice launch. More likely, spares would be of much greater use to high-orbiting communications satellites—witness the Air Force's repositioning of communications satellites during Operation Desert Storm.

Since the repositioning of spares is an expensive operation, only a small number of them (if any) are normally orbited. Spares are more feasible as replacements for anticipated losses (e.g., if several satellites in one or more constellations failed due to natural causes or through human intervention, valuable systems would be degraded until replacements were readied and launched—clearly an undesirable situation). On-orbit spares are appealing, but they do not eliminate the need for launch-on-demand; rather, we should strive toward a balanced use of the two systems.

The Soviet Union's Launch-On-Demand Capability

The Soviet Union launches many more satellites than does the US. The Soviets compensate for the fact that their satellites are less sophisticated and have shorter life spans than US satellites by launching more of them. But their launch rates have



Flight controllers in the mission control center at the Johnson Space Center in Houston, Texas, monitor the chores of a space shuttle crew.

decreased in recent years because improved technology has extended the life span of their satellites.¹⁴ Despite this decrease, the USSR remains able to launch within a day or two of making such a decision. Indeed, the Soviets have launched one satellite every 48 hours for several weeks at a time in support of military exercises and space operations. During the Falklands War, they launched 29 boosters over 69 days.¹⁵ Thus, the people who prepare the satellites and launchers and those who operate the mission-control centers gain valuable experience.

The Soviet Union not only launches many rockets on short notice to showcase its prowess and to carry out its military space strategy, but also to support national security interests on a day-to-day basis. When the need arises, the Soviets launch reconnaissance or other special-purpose satellites, as they did to monitor the 1973 Yom Kippur War, the Falklands War, and the war in Afghanistan.¹⁶ In each of these cases, the Soviets made one or more launches within 48 hours of the onset of the crisis, enabling them to closely follow events without having to divert their existing orbiters.

The Soviets' assembly-line approach to satellite production does not imply a less capable space force. Although their satellites are not as sophisticated or as long-lived as ours, by keeping about the same number in orbit as we do, the Soviets can

closely approximate US capabilities. In peacetime, the Soviets have to expend more resources to match the performance of US satellites, but in a crisis or time of war, their quick-launch capability gives them more flexibility. If in some crisis the Soviets lose part or all of their space assets, they have enough stockpiled boosters and satellites to quickly replace those assets. The US, however, would need weeks or months to reconstitute its space forces.

The loss of one or more of the Soviet Union's three launch sites could easily cripple its launch capability, forcing the country to rely on short-lived assets already in orbit. Of course, the Soviet Union's increasing use of long-lived satellites will reduce this vulnerability.¹⁷ Despite these facts, the Soviets' launch sites and boosters are less vulnerable than their American counterparts for two main reasons: access to the sites is limited, and they are well within the boundaries of the Soviet Union.

High Payoff for Launch-On-Demand

Many benefits await the US if it develops launch-on-demand. We could

dedicate special satellites for monitoring and providing communications to our forces in remote locations (e.g., the Persian Gulf) and could replace satellites lost to accidents or interference. If, for example, a country such as Iraq or Libya, having developed long-range missiles or space-launch vehicles, used them to deliver a warhead on a high-priority US satellite, we might respond in several ways. We could protest and impose sanctions. Or—if we had our own ASATs—we could respond in kind, assuming that verification and assignation of blame were possible. As an alternative or complementary measure, the US could replace that asset in less than a week. Thus, we would gain prestige and demonstrate our leadership through our ability to respond to adversity, showing that the loss does not affect our ability to continue operations.

In time of war or heightened tensions, an Army commander might need special reconnaissance capabilities for supporting troops, keeping track of enemy troop movements, and providing other intelligence. A fleet commander might want to launch a special reconnaissance satellite to watch enemy fleets over the horizon, track hostile forces, or perform surveillance of an area to aid in battle planning. Since satellites already in orbit might not be available to support the mission, we could launch special TACSATs on a moment's notice and quickly maneuver them into position.

Missing Link for Effective Launch-On-Demand

The Pegasus air-launched booster is currently being tested. Taurus—its ground-launched, mobile derivative which can deliver bigger payloads—is also under development.¹⁸ The Air Force, Army, and Navy are all developing small, inexpensive satellites for a variety of missions.¹⁹ The Air Force is also developing new satellite technology to make modular satellites with common buses and standard interfaces to facilitate the connection to launch

vehicles.²⁰ Although we have emphasized the development of technology that will give the US assured access to space and launch-on-demand, we have not taken pains to establish the procedures that would make launch-on-demand feasible. One cannot simply drive a mobile launcher to a location and shoot a satellite into orbit. Quick launches from fixed sites will not differ greatly from normal operations, but the same cannot be said of operations from a mobile launcher.

Many questions and problems present themselves. For quick launches in support of battlefield and fleet commanders, who will have launch authority? Where will the launchers be located? Dust, rain, mud, and salt water do not mix readily with the technology of today's—or even tomorrow's—launchers and payloads. It would probably be best to establish vast, special launch areas in the continental United States and on the high seas where mobile launch complexes would operate. Crews could quickly and secretly move payloads to a remote location within these areas and quietly launch them into space.

Additionally, dedicated and secure mission-control complexes and teams must coordinate with the organization that requests and performs the launch. We must also establish procedures for quick checkout and transition to operational status. Currently, it takes several days or weeks to check out a satellite, stabilize it, and move it into its proper orbit, thus assuring a smooth, efficient operation. Last, we need new satellite designs and operational procedures if those satellites are to perform their missions immediately after launch.

Implications for US Space Forces

The US learned its lesson in the aftermath of the *Challenger* disaster and has developed expendable launch vehicles and other technologies to assure access to space. But these technologies give the US

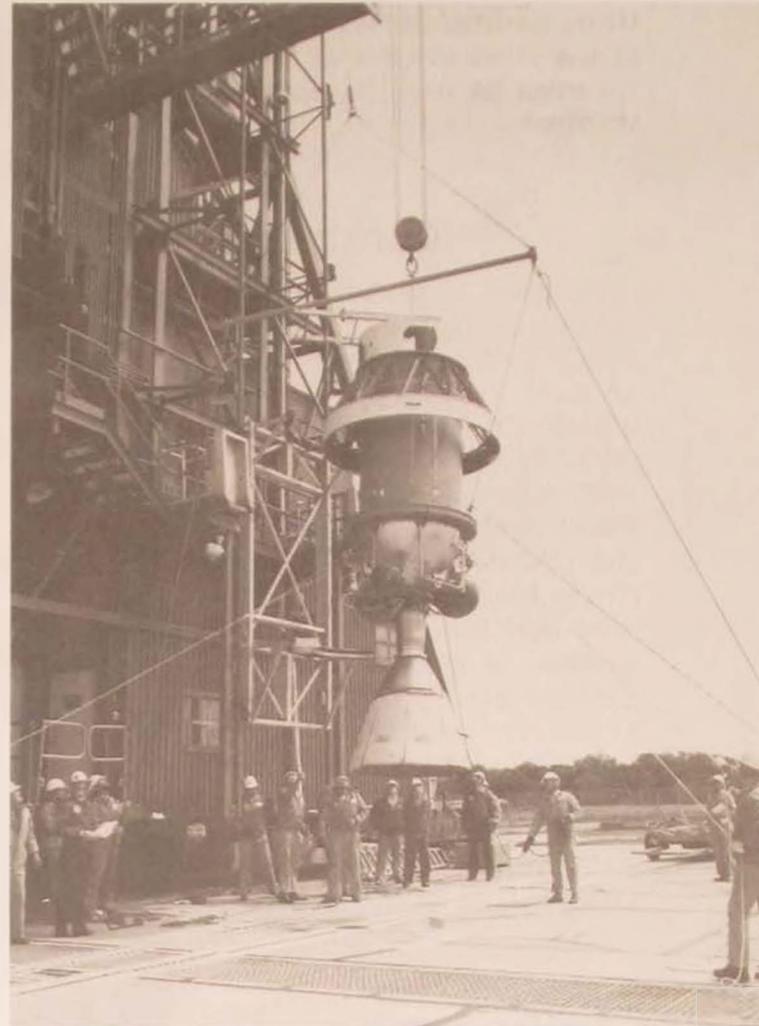
access to space only at intervals of several months. If we continue to develop small satellites and small, versatile launchers, we must be able to launch these satellites into orbit days after the need arises, not months. The US has the means to do this but not the method.

The US must fill the gap between possibility and capability by developing operational procedures and policies to decide to replace or launch a satellite on day one; pull the satellite from inventory, check it out, and mate it to a booster on day two; and launch the satellite and put it to work in space on day three. This capability relieves the pressure of losing a satellite and sends a message to the world that the US is in space to stay and that nothing can stop it from conducting operations in support of its national policies.

This position of strength is particularly important in light of Operation Desert Storm. The performance of US surveillance, reconnaissance, meteorological, and navigation satellites in the war with Iraq demonstrated the contribution of space forces to national security.²¹ Had Iraq possessed a credible ASAT capability, though, it could have eliminated or crippled our ability to gather valuable intelligence that contributed to victory.

Because of the protracted buildup of forces in the Persian Gulf, US communications were sorely taxed. Despite the fact that the US had more than five months to prepare for hostilities, however, no supplemental communications satellites were forthcoming. Regardless of whether this need was unforeseen or whether no satellites were available, the situation reveals a glaring weakness in our space capabilities.

Even in these days of force reductions and cutbacks in the military budget, we cannot neglect the cost of implementing launch-on-demand. It costs money to develop launch vehicles and train launch crews. Pegasus and Taurus are under development and will allow short-notice launching of small payloads. Further, the technology that underlies weapons such as the small intercontinental ballistic missile (SICBM) can be adapted to provide alternate platforms for small launchers. The



The second stage of a Delta rocket is hoisted up the gantry for attachment to the rocket's first stage in preparation for a future satellite launch. Even short-notice launches require over three months of preparation time.

cost of such adapted technology indicates that a great deal of money has already been spent on the development of launch-on-demand. Plans and programs designed to implement the technology and fit it into the military's force structure have not received the same attention, however.

Such planning, programming, and training of launch crews will compete with other military programs for scarce funds. Deciding how much money to allocate to launch-on-demand depends on the answer to the question. In a crisis, what is it worth to retain space systems as a force multiplier? Desert Storm revealed to the world some of the benefits of space-based naviga-

tion, communications, and reconnaissance. If we are to rely on this technology, we must be sure that it is available during wartime.

Conclusion

In order to make launch-on-demand a reality, US Space Command and Air Force Space Command (AFSPACECOM) need to address a number of matters, several of which are currently under development. AFSPACECOM, which has already taken over normal launch operations from Air Force Systems Command, must develop the procedures and technology to routinely launch satellites in much the same way that the Air Force generates aircraft sorties. At present, the Air Force custom designs each satellite and booster. However, the service is developing an assembly-line approach featuring standardized boosters for easy mating of payloads, as well as common buses and components to facilitate the switching of components to change satellite function.

Notes

1. Capt John W. Power, "Space Control in the Post-Cold War Era," *Airpower Journal* 4, no. 4 (Winter 1990): 30.
2. AFM 1-1, *Basic Aerospace Doctrine of the United States Air Force*, 16 March 1984, 2-6 through 2-7.
3. Col Robert B. Giffen, *US Space System Survivability: Strategic Alternatives for the 1990s* (Washington, D.C.: National Defense University Press, 1982), 42.
4. AFM 1-1, 2-9.
5. Lt Col David E. Lupton, *On Space Warfare: A Space Power Doctrine* (Maxwell AFB, Ala.: Air University Press, June 1988), 127. Colonel Lupton emphasizes five pillars of a space-control doctrine (logistics, humans, space surveillance, weapons, and organization). Placing logistics first seems to imply its preeminence, but placing systems and weapons first seems more logical. Otherwise, the tail is wagging the dog. Logistics supports the systems which perform space control.
6. Power, 26.
7. A. T. Mahan, *The Influence of Sea Power upon History, 1660-1783* (Boston: Little, Brown and Co., 1945), 25.
8. Gen Tao Hanzhang, *Sun Tzu's Art of War*, trans. Yuan Shihing (New York: Sterling Publishing Co., Inc., 1987), 67.
9. Giffen, 12. In order for a launch vehicle to boost directly into orbit, at some time the launch site must be directly under the orbital path. Boosters launched from latitudes above the inclination of a particular orbit require a plane

Small, single-purpose light satellites (LIGHTSAT) and TACSATs are under development. New types of launchers, such as Pegasus and Taurus, will provide the Air Force much greater flexibility in putting payloads into orbit. Although orbital inclinations are restricted by the latitude of launch, Pegasus could conceivably launch all of its payloads from the equator, thus maximizing the available orbit inclinations. The mobile Taurus could be dispersed in times of heightened tensions to provide reconstitution or local launch services to a tactical unit. An unusual option might include equipping ships or submarines with a Taurus derivative to launch small satellites into orbit.

When these technologies become operational, technicians will have to begin practicing many short-notice launches per year to establish their proficiency. Furthermore, we will need to integrate launch-on-demand into joint operations for US and NATO troops and practice it during military exercises. This way, the US will have the technology and the ability to adapt its space forces to meet any crisis. □

- change or dogleg maneuver to reach that orbit. This requires more fuel (thus, a larger booster) or a smaller payload.
10. *Ibid.*, 35-37.
11. James W. Canan, "Coming Back in Space," *Air Force Magazine* 70, no. 2 (February 1987): 45.
12. Gen John L. Piotrowski, "Military Space Launch: The Path to a More Responsive System (Part I)," *Aerospace & Defense Science* 9, no. 7 (July 1990): 43.
13. *Ibid.*
14. Craig Covault, "Soviet Military Space Operations Developing Longer Life Satellites," *Aviation Week & Space Technology* 132, no. 15 (9 April 1990): 44.
15. Piotrowski, 46.
16. Nicholas L. Johnson, *Soviet Military Strategy in Space* (London: Jane's Publishing Co., Ltd., 1987), 93.
17. Nicholas L. Johnson, *The Soviet Year in Space, 1990* (Colorado Springs, Colo.: Teledyne Brown Engineering, 1991), 45.
18. Craig Covault, "Desert Storm Reinforces Military Space Directions," *Aviation Week & Space Technology* 134, no. 14 (8 April 1991): 45.
19. Vincent Kiernan, "Military Services Moving to Wider Role for Lightsats," *Space News* 1, no. 30 (6-12 August 1990): 9.
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21. "The Advantage of Space Power," *Space News* 2, no. 2 (21 January-3 February 1991): 22.



Spring 1992

IRA C. EAKER AWARD WINNER



LT COL PHILLIP S. MEILINGER, USAF

for his article

The Problem with Our Air Power Doctrine

Congratulations to Lt Col Phillip S. Meilinger on his selection as the Ira C. Eaker Award winner for the best eligible article from the Spring 1992 issue of the *Airpower Journal*. Colonel Meilinger 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.

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JOINTNESS

THE FUNDAMENTAL PROBLEM

A REVIEW OF JOINT PUB 1

COL DENNIS M. DREW, USAF

THE PROBLEM is straightforward. Airmen, soldiers, sailors, and marines look at the world through their own lenses. Their respective missions, operating environments, experiences, and training all lead to very different perspectives. These divergent perspectives fuel service parochialism and foster interservice rivalries.

Some degree of service parochialism and interservice rivalry is inevitable and, within limits, can be healthy. We should be suspicious of any service that is not extremely proud of its mission, capabilities, and accomplishments. In the same light, friendly rivalries can keep institutional capabilities razor-sharp and reduce complacency. Unfortunately, both parochialism and rivalry have demonstrated a propensity to get out of hand, much to the detriment of US national security.

Fed up with perceived service parochialism, worried by the failures in Vietnam and at Desert One, concerned with problems in Operation Urgent Fury (Grenada), and spurred on by the military reform group, Congress enacted legislation in 1986 (known by the shorthand name, "Goldwater-Nichols"). Designed to strengthen a sense of "jointness" within the entire US military establishment, the

legislation has complex and far-reaching provisions. Among other attributes, it strengthens the role of the chairman of the Joint Chiefs of Staff, modifies both the requirements and prospects for officers serving in joint billets, and mandates the production of joint doctrine—for example, Joint Pub[lication] 1, *Joint Warfare of the US Armed Forces* (11 November 1991), the subject of this review.

Whether or not in the long run the legislation will have its intended effects without debilitating side effects remains to be seen. Many people argue that the stunning success of Operation Desert Storm demonstrated that Goldwater-Nichols achieved positive results. One must be cautious in making this judgment, however, because there may or may not be a direct cause-and-effect relationship between the legislation and success in the Gulf war. The jury is still out.

The Root of the Problem

Parochialism and rivalry among the services are certainly not new phenomena. Their foundation lies in the nature of the services themselves, whose very different worldviews are based on different operat-



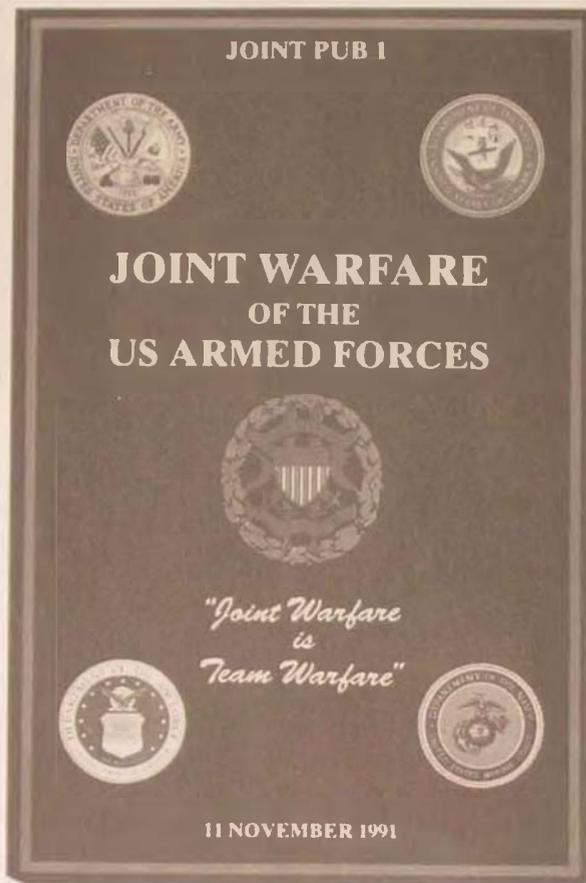
ing environments.¹ Ground forces, for example, have a relatively narrow worldview, which is a natural outgrowth of the ways in which ground forces fight. To ground forces, every hill, river, forest, and so forth, is an obstacle which they must overcome and a serious hindrance to maneuverability. Further, their "problem" is immediate—it is the "bad guys" right in front of them who are shooting at them. The result is a constricted worldview and a heavy emphasis on shorter-term problems.² Both of these tendencies have traditionally been reflected in Army doctrine although the most recent versions have displayed an expanded perspective.³

The traditional naval viewpoint (to include the Marine Corps) is much different. The naval worldview conforms to the nature of its operating environment—global in scope, constrained only by the shorelines of the world's oceans. Even these limitations have been loosened by the advent of naval air power, which can project power far inland. The broad naval viewpoint also has a long-range perspective for at least three reasons. First, the primary combat problem is often not immediate. The fact that contending navies are often widely separated has traditionally made the hunt for the enemy fleet a principal problem. Second, the

creation of naval forces from the keel up requires an extremely long lead time. Third, naval assets tend to stay in service much longer than air and land force assets. The recent decommissioning of the aircraft carrier USS *Lexington*, which was launched midway through World War II, is just one recent example.

Airmen have the least constrained worldview, which is totally in consonance with their operating environment. The all-enveloping aerospace environment puts no bounds on the operations of airmen except those imposed by technology or human endurance. The advance of aeronautical technology during the twentieth century has made it possible for airmen to mass great power quickly over any spot on the globe. The airman's worldview is also influenced by the speed at which one can operate in the aerospace environment. Closing speeds measured in thousands of miles per hour provide a sense of immediacy to a global worldview.⁴

These differing worldviews have led to differing operational concerns. At the risk of oversimplifying, one may say that ground forces place great emphasis on the immediate problem—winning the battle—and less emphasis on campaigns and the total war effort. At the other end of the scale, airmen place relatively greater



emphasis on actions that can “win” the entire war, less emphasis on campaigns, and the least emphasis of all on individual battles. Naval forces fall someplace in between, a situation muddled somewhat because American naval forces have their own “army” (the Marine Corps) and their own “air force.”

The upshot of all this is that airmen, soldiers, sailors, and marines have very different views about how wars should be fought and how the nation’s armed forces should be structured and equipped. This, in turn, has led over the years to bitter struggles over the military budget during peacetime and struggles over military strategy during times of strife. In the latter instance, all the services fear that their forces will be misused by the “unwashed” from another service, who do not understand how their forces should be used and do not appreciate the contribution their particular kind of military force can make to the larger struggle.

The Fears of Airmen

For airmen, the fears have a significant basis in fact. Most airmen are well aware of the bitter struggles between the Army and the Army Air Corps (later, the Army Air Forces) during the 1920s and 1930s. They also know about the stiff resistance of the Navy during much of that same period to the expansion of land-based air power in defense of the American coastline.⁵ After World War II, the so-called revolt of the admirals—a controversy over the B-36 bomber and a new supercarrier—demonstrated to airmen just how far another service would go to protect its “turf.”⁶

Acrimony spilled onto the battlefield in Korea when, for a time, coordinating naval and Air Force air power became all but impossible.⁷ In Vietnam, service jealousies and bickering resulted in about six different air wars being waged simultaneously, for the most part without centralized control.⁸

Soldiers, sailors, and marines can recite instances which, from their perspectives, give rise to their own fears. For example, airmen tend to forget the enormous emphasis on air power during the 1950s when so-called atomic air power became the centerpiece of US national defense policy at the direct expense of the Army, Navy, and Marine Corps. The situation became so lopsided and intolerable that Gen Maxwell Taylor of the US Army was driven to produce a book openly critical of US defense policy, warning that all future wars could not be settled by nuclear weapons.⁹ A few short years later, our deep involvement in Southeast Asia provided the proof of that pudding.

The point of all this is that soldiers, sailors, airmen, and marines have had—and probably do have—misgivings about one another. The problem is real and of long standing.

Enter Goldwater-Nichols

Into this simmering stew of worldviews, parochialism, rivalry, and misgivings came

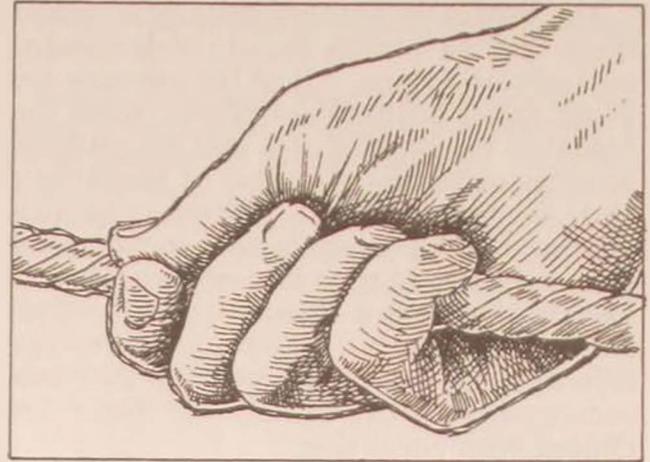
the Goldwater-Nichols legislation, which mandated jointness from the top down. It would be nice if things were so simple and the problem could be so easily solved. As pointed out above, however, the problems are real, they are long-standing, and they are based on fundamentally different worldviews. The situation cannot be changed by a simple wave of the congressional pen.

One of the most interesting and controversial portions of Goldwater-Nichols is the requirement to produce joint doctrine. This requirement has spawned a vast effort that has yielded some significant results. It has also revealed some of the intractable problems caused by differing worldviews and theories of victory. The production of joint doctrine—which truly melds the war-fighting viewpoints of land, sea, and air forces into a coherent war-fighting package—is still far from a total success and will require much more effort and soul-searching.

The Unveiling of Joint Pub 1

Into the middle of this joint doctrine muddle comes Joint Pub 1, intended to be a capstone document which “guides the joint action of the Armed Forces of the United States, presenting concepts molding those Armed Forces into the most effective joint fighting force” (page iii). Considering what has been said above, one requires little imagination to realize the difficulty of fulfilling the publication’s intended purpose.

The document is a slick, colorful booklet laced with appropriate pictures. Included are vignettes of people who have been awarded the Medal of Honor in joint operations, as well as portraits of famous commanders of joint and combined forces (Gen Douglas MacArthur, Gen Alexander Vandegrift, and Gen Dwight Eisenhower). Although informative and illustrative, these vignettes and portraits tend to disrupt the flow of the text throughout the publication.



The meat of the text attempts to discuss the nature of modern warfare, the personal values required for successful joint warfare, the fundamentals of joint warfare, and the nature of joint campaigns. There is little to argue with here. It is “middle-of-the-road” or mainstream military thought. This reviewer also found that throughout the text one could change the word *joint* to (take your pick) *land*, *sea*, or *air* and still have an accurate and coherent document. But, perhaps that is the point. Warfare in the modern world is joint warfare—not something distinct and apart from that with which we are familiar. This is a lesson well worth relearning from time to time.

One can quibble with the text here and there. For example, the preface states that “joint force commanders choose the capabilities they need from the air, land, sea, space, and *special operations forces* at their disposal” (page iii, emphasis added). Aside from the arbitrary division of aerospace into air and space, the inclusion of special operations forces seems somewhat akin to mixing apples and oranges, in that it mixes operating environments with capabilities. The fact that this odd mixture is repeated again (see pages 38–39) indicates that it is no accident. Another quibble comes in chapter 4, “The Joint Campaign.” Section B of that chapter (“Supporting Capabilities”) defies any observable logic in its construction, mixing capabilities and operations in a careless fashion.

The author or authors have gone out of their way to ensure that this document will offend no one. All of the services are given equal billing throughout. Even the Medal of Honor awardees and the pictures accompanying the vignettes of MacArthur and Eisenhower have been carefully chosen and balanced. Here is a picture of Eisenhower talking to two airmen. Here is Eisenhower aboard ship talking to several admirals. Finally comes a photo of Ike talking to several soldiers. The pictures accompanying the MacArthur story are chosen with equal care.

In this reviewer's opinion, Joint Pub 1 is not intended for the "military intellectual" community. It is a "cheerleading" document most appropriate for wide public consumption and for use in precommissioning education programs. It emphasizes the need for jointness and the reality of three-dimensional warfare in the modern world. It provides positive examples of success in joint operations. At the same time, it ignores the peacetime and wartime problems in achieving jointness discussed earlier and provides little that is new or challenging to people who have studied warfare. On the positive side, as a document intended for wide public consumption, Joint Pub 1 serves an effective and

useful purpose and does so with considerable style.

The downside is that the fundamentally different worldviews of soldiers, sailors, airmen, and marines cannot be papered over. They will not just disappear. Nor should these divergent worldviews and theories of victory be sacrificed on the altar of jointness. Rather, we must find a way to meld them. We must find a way to channel parochial interests and interservice rivalries and harness them to create more effective war-fighting capabilities across the spectrum of conflict. Joint Pub 1 does not do this nor, in my opinion, was it intended to accomplish such a feat. If anything, Joint Pub 1 is an opening salvo in what will be a long-term battle to meld the diverse views and capabilities of the services in a synergistic fashion.

Unquestionably, the effort to create joint synergies will be both long and difficult. It will be made even more difficult because of the downsizing of the US military. If history is any guide, parochialism and interservice rivalry reach their zenith when the budget gets tight and service institutions and capabilities are threatened. A formidable task faces the chairman and the joint chiefs. In fact, a formidable task faces us all. □

Notes

1. For a more complete exposition of this concept, see my article "Joint Operations: The World Looks Different from 10,000 Feet," *Airpower Journal* 2, no. 3 (Fall 1988): 4-16.

2. See Russell Weigley's discussion of this tendency as it related to the invasion of Northwest Europe in 1944 in *Eisenhower's Lieutenants* (Bloomington, Ind.: Indiana University Press, 1981), 35.

3. For example, the US Army's Field Manual (FM) 100-5, Operations, 1 July 1976, had for its overriding theme the notion of "winning the first battle." The version of FM 100-5 written in the 1980s featured the "AirLand Battle" concept, which incorporates a refreshingly broader perspective.

4. This worldview and the conceptual capabilities of air power were the basis for the strategic bombing doctrine that dominated Army Air Corps, Army Air Forces, and Air Force thinking from the 1920s well into the 1960s. The most authoritative treatment of this subject is found in Robert Frank Futrell's massive study *Ideas, Concepts, Doctrine: Basic Thinking in the United States Air Force*, vol. 1, 1907-

1960, and vol. 2, 1961-1984 (Maxwell AFB, Ala.: Air University Press, 1989).

5. Again, the best reference is volume 1 of Futrell's *Ideas, Concepts, Doctrine*.

6. An excellent recent article on this incident is Lt Col Phillip S. Meilinger's "The Admirals' Revolt of 1949: Lessons for Today," *Parameters*, September 1989, 81-96.

7. See Robert F. Futrell, *The United States Air Force in Korea, 1950-1953*, rev. ed. (Washington, D.C.: Office of Air Force History, 1983), 48-55.

8. Two of the best and most authoritative recent books on the air wars in Southeast Asia are Mark Clodfelter's *The Limits of Airpower: The American Bombing of North Vietnam* (New York: Free Press, 1989); and Earl H. Tilford, Jr.'s *Setup: What the Air Force Did in Vietnam and Why* (Maxwell AFB, Ala.: Air University Press, 1991).

9. Gen Maxwell D. Taylor, *The Uncertain Trumpet* (New York: Harper and Brothers, 1960).

Ricochets

continued from page 3

didn't bother to read it because of the title. They felt it didn't apply to them! Funny, I still feel that the following observation transcends all specialties:

The maturation of people is an ongoing process [that is] meant to instill the will—the warfighting spirit—and the skills of a warrior as people are trained, educated, and indoctrinated to perform at the unit, theater, and global levels.... Therefore, self-preparation, coupled with a formal and professional education, is needed to compensate for a lack of combat experience. (page 2-3)

General Boyd and Colonel Westenhoff admitted in their article that "airmen have not been famous for reading history" (page 4). Based on many so-called lessons learned from Desert Shield/Storm, it is pretty clear that more attention should be given to such things as Project Warrior, exercise after-action reports, input from the unit level (shades of Total Quality Management!), and leadership. I hope that the confidence of General Boyd and Colonel Westenhoff is rewarded and that "most Air Force professionals not only will read our new doctrine with care, but will devote themselves to making it better in the future" (page 5). Unfortunately, my experience at AWC leaves me skeptical.

Nonetheless, I am confident that most professionals agree with the following words found in AFM 1-10:

You [emphasis added] are the single most important factor in achieving military victory.... Peacetime organizations can only remain dynamic and viable through personal leadership; groups are less capable of managing organizational change because group action demands consensus and avoids risk-taking. Thus, the imagination and creativity of the individual leader can bring vision to an organization and motivate people to accomplish extraordinary deeds.

Leaders are recognized and judged by their actions, not by their grade or position. Leaders are people who first choose to do "the right thing" and then ensure "things are done right." They are loyal [and] accept the responsibility for all their decisions, especially when they go wrong, without offering any excuse for their mistakes. They have ... courage, integrity, and candor.... They encourage initiative and innovation.... They demand realistic combat training from and for their subordinates.... They appreciate the relationship between morale, health, physical fitness, cohesion, and combat effectiveness.... They know how to reward and discipline the troops and when "to keep them out of the noon-day sun." Finally, leaders are relentless

in their commitment to make the Air Force more combat capable. (page 3-2)

Happily, the new draft AFM 1-1 captures many of these ideas in chapter 4 when talking about training our forces. Perhaps I am being petty, but we seem to have substituted liberal references to "commanders" for any substantive description of leadership responsibilities. Have we really become such an egalitarian outfit that it is unfashionable even to talk about leadership? Even Total Quality Management acknowledges the importance of "vision" and active, quality-oriented leaders.

At a minimum, I recommend that these ideas from AFM 1-10 be rolled into the new AFM 1-1 to ensure that everyone understands the difference leadership can have on mission results. If our present and future leaders do not gain a healthy appreciation for the impact of leaders at all levels and do not actively strive to "push" the doctrinal envelope, then they will indeed be overlooking an "indispensable ingredient in understanding warfare" ("new" AFM 1-1, 1:4-2). So please justify the confidence voiced by General Boyd and Colonel Westenhoff, and get yourself, your peers, and your subordinates involved now!

LT Col C. J. Bohn III, USAF
Goodfellow AFB, Texas

General Boyd's Response:

Colonel Bohn's letter raises important issues about basic aerospace doctrine and how it is written. A good way to approach these issues is, I believe, to first address some broader considerations: What is USAF doctrine? What does it do? Why is it important?

Our basic doctrine is a summation of Air Force thinking in the broadest, most comprehensive sense. It defines what aerospace power is, and it states our belief on how best to exploit this unique facet of military power. In the words of the new AFM 1-1, "Doctrine is what we have learned about aerospace power and its application since the dawn of powered flight. [It is] what we hold true about aerospace power and the best way to do the job in the Air Force." It is thus the sine qua non for formulating strategy at any of war's levels—strategic, operational, or tactical. A solid, comprehensive grasp of USAF doctrine—of what aerospace power is and how it can be fully exploited—is therefore essential to fulfilling our responsibilities to the country and to maintaining national security. This is why we have an AFM

1-1; this is why every officer (commissioned and noncommissioned) must know what is in it.

That said, let me address more directly the issues raised by Colonel Bohn. First, why did we revise AFM 1-1's 1984 version—particularly when it served us well in Operation Desert Shield/Desert Storm? Why mess with a good thing?

As Colonel Bohn points out, we did well in the Gulf war. We planned and executed an excellent air campaign—not a perfect one. With a little better doctrine and a little better understanding of it, we would have been a little better. As the introduction to the new 1-1 says, "Doctrine should be alive—growing, evolving, and maturing." We should continually improve and refine 1-1 as we learn more. Hence, the real question is not, Why did we revise AFM 1-1? but, What took us so long to begin doing so? Even more, Shouldn't we have a doctrinal review process which solicits and incorporates the insights of USAF personnel like Colonel Bohn earlier on? (I will address this particular issue below.) Doctrine, if not subject to thoughtful, constant revision, atrophies and becomes dogma. And dogma won't hack it in today's geostrategic environment.

Other, more specific, considerations prompted this latest revision. We especially needed to buttress AFM 1-1's assertions with solid, documented evidence. Hence, we complemented the revised *what we think* volume 1 with a *why we think it* volume 2. We also wanted to identify the specific tenets of aerospace power. Moreover, unlike the 1984 manual, the new version explains that war is planned and executed at three dynamically interrelated levels—strategic, operational, and tactical. Commanders' responsibilities at the operational level get fuller, more comprehensive treatment than they did in the 1984 version.

Second, Colonel Bohn raises the issue of how the new manual handles leadership. He correctly notes that the current AFM 1-1 does not use this term as often as the previous version (at least in volume 1). In large part, this is because aerospace power is AFM 1-1's principal focus. Certainly, leadership is an essential ingredient in that endeavor, as discussed in chapter 4 of the new 1-1. AFM 1-10 does a good job of reinforcing these concepts and giving punch to leadership's critical role. As one charged with responsibility for USAF-wide education, I would much rather have everyone read AFM 1-10 (as well as AFM 1-1 and other

key doctrinal manuals) than try to incorporate everything everyone needs to know into one manual.

Military leadership undergoes its greatest test in war. The new AFM 1-1 emphasizes the chaotic nature of the wartime environment and the decisiveness of the human factor in it. For example, volume 1, chapter 1, thus stresses that "war is a human enterprise" characterized by "fog, friction, and change," while chapter 4 emphasizes that "people are the decisive element in war." Volume 2 contains an entire essay on human factors in war, and the glossary contains three definitions of leadership. In contrast, the 1984 manual never mentions the danger, exertion, and chance that make wartime leadership so demanding. In short, the current 1-1 treats leadership in a more realistic and comprehensive manner than did earlier doctrinal manuals.

Third, let me address the notion of doctrinal education which Colonel Bohn raised. This issue highlights a distinctive USAF cultural trait and a leadership challenge of the first order. Throughout our history, we have often appeared more comfortable in dealing with machines and technology than with ideas and concepts. We pride ourselves on our pragmatic, "hands-on" worldview. How do we foster an appreciation of doctrine within this context? How do we convince our airmen that ideas are of utmost importance in preparing for and waging war?

The answer to these questions lies in communicating an understanding of doctrine's definition and function. *Without a solid, comprehensive grasp of USAF doctrine—of what aerospace power is and how to exploit it fully—we will have no strategy. We won't be able to outfight future opponents. We won't be capable of fulfilling our responsibilities to the nation.* Commanders at all levels need to work smarter and harder at getting this message across.

Finally, I would like to see our USAF people actively involved—not just in reading doctrine but in *shaping* it. We need an up-front way of incorporating the type of input Colonel Bohn offers.

Right now, the formal process for doctrinal review solicits inputs only at the MAJCOM level and above. We are considering how best to retool this process. We especially want early feedback from personnel at the wing level and below—the "shop floor," if you will—so we can produce a living document of which every airman is an integral part.

I'm grateful that Colonel Bohn took the time to write. He is taking Air Force doctrine seriously and raising important points. He has joined the dialogue on professional issues and has used the *Airpower Journal* as a forum for exchanging ideas. I hope that others follow his example. Our ability to serve our nation well depends on real leaders, like Colonel Bohn, engaging themselves and their personnel in these topics.

Lt Gen Charles G. Boyd, USAF
Maxwell AFB, Alabama

STRATEGIC BOMBING STATIC

I read with interest Maj Mark Clodfelter's first crack at the Gulf air war ("Of Demons, Storms, and Thunder: A Preliminary Look at Vietnam's Impact on the Persian Gulf Air Campaign," Winter 1991) because I found his book *The Limits of Airpower: The American Bombing of North Vietnam* a good critique of "strategic" bombing. His article, however, has one nagging flaw. It insists on conferring a psychological effect of the strategic bombing campaign on the Iraqi civilian population. Much more empirical work will need to be done if a clear link is to be established between the performance of air forces against Iraq and the supposed useful military effect of strategic bombing.

No one disputes that air power was the "decisive instrument" in the war against Iraq. Questions arise, though, in determining what aspect of the air campaign was responsible for ejecting the Iraqi army from Kuwait. If, as Major Clodfelter asserts, the "nature of our announced aims" was so clear-cut, then the strategic air campaign should be measured against the singular military mission of defeating the Iraqi field army. In this regard, strategic bombing doesn't necessarily stand up very well. Tactical bombing of Iraqi field forces was more directly responsible for disrupting, demoralizing, and eventually killing Saddam's fragile conscript force. The strategic campaign destroyed many things with great efficiency, and some aspects of the bombing—destruction of command, control, communications, and intelligence targets—had a direct impact on the army. But much of the bombing effort outside of the Kuwaiti theater of operations (KTO) was directed against a target base that didn't have much "direct military advantage," as international law and Air Force regulations relating to the laws of war put it. The war was just too short and the Iraqi army too overrated and

incompetent for the bombing of systems like electricity to matter.

If the strategic campaign is evaluated against the broader, more truthful set of missions for the war—destroying nuclear, biological, and chemical capabilities; destroying the Scud missile threat; attriting the Iraqi military; restoring peace and stability in the region; toppling Saddam Hussein—the strategic campaign looks even less successful. The bombing of Iraq's military and civilian infrastructure—the 800 fixed targets hit by the end of the war—didn't achieve the other five missions. Only after the war did we learn the degree to which the nuclear and chemical infrastructure survived. The Scud missile mission was incrementally more successful—but at a cost of 1,500 sorties—and was hardly a classical strategic bombing effort. As for the attrition of the Iraqi military, 20 divisions located outside the KTO were mostly untargeted by air attacks. Gen Colin Powell, chairman of the Joint Chiefs of Staff, stated on television's "Good Morning America" on 15 January 1992 that Saddam "still had quite a bit of force available to him that was not in the Kuwaiti theater of operations.... He had a number of divisions that were nowhere near that theater." Large segments of military industry survived, and the man, the Baath party, and the government infrastructure are still there.

Here is where the theory of strategic bombing becomes a nearsighted ideology. Without any supporting evidence, Major Clodfelter states a number of times that the bombing influenced the Iraqi populace and their "will to resist." He quotes Gen Charles Horner and Col John Warden III as saying that the bombing effort in Baghdad and other cities was specifically intended—through target selection or night bombing—to remind the Iraqi civilian population "that Saddam was incapable of containing" the fighting and that they should "put some pressure on their leadership to stop the war." Where is the evidence to support the claims? Precision-guided weapons and overwhelming force proved that discreet targets could be hit with some assurance in a bombing campaign, but it is utterly unclear what effect this had on the Iraqi civilian population.

Writing from Baghdad on 18 January, Marie Colvin of the *Sunday Times* (London) captured the essence of a persistent confusion on the part of air power advocates as to the effect of the bombing campaign:

An Iraqi businessman explained to me why people were so calm. Listening for weeks to the propa-

ganda from Washington, they had expected Armageddon. Now that the bombing had come at last and they had survived, he said: "Well, if that's it, we can take it."

Having conducted a bomb damage assessment in Iraq in August–September 1991 and having interviewed hundreds of Iraqis, from ministers and governors to normal soldiers, doctors, and civilian victims of collateral damage, I conclude that this was the attitude of most Iraqis. Strategic bombing had little or no impact on the population's turning against Saddam Hussein.

If anything, the technology and lethality of warfare had taken such a leap forward that the low immediate collateral damage of the air attacks may have increased the will to exist. Iraqis believed that much worse would happen in the war, and when it didn't, they were baffled. In their minds, they lost their electricity and civilian life-support systems, and Saddam was thoroughly outgunned—but to no avail for them. Which is to say that I met no one who thought that the Iraqis would win; the question was just how badly they would lose. This is not a population that can "put some pressure on their leadership to stop the war." This is a population that learns how to live with an oppressive system that provides them with a decent life. Somehow I get the impression that air power theorists thought we were communicating a "message" to this population, but the nature of the bombing effort and the mode of communication just weren't that clear. I believe we were largely talking to ourselves.

Air power advocates continue to harbor theories about the effect of strategic bombing on enemy "will," but those theories remain unproven. We need better analysis of what the civilian side of the strategic bombing effort—the attacks on electricity, oil, transportation, telecommunications, and industry—achieved. The precision with which these targets were destroyed changed the pattern of modern warfare casualties. It is now clear that some 2,500-3,000 civilians died when rubble fell on them, while another 70,000-90,000 died after the bombing stopped because life-support systems were taken away.

Major Clodfelter doesn't go into civilian casualties—the long-distance cost for our "communication." Those deaths are attributable to the efficiency of the attacks on the civil system. They are one measure of the "success" of the strategic bombing effort. For many Iraqis, particularly the majority of the population living in the center of the country, the bombing thus seemed to victimize the civilian population,

indicative of a campaign to humiliate and subjugate Arab society. They never had any "will" to resist in the first place; they were merely swept up in events far outside their control. The strategic bombing campaign, as good as it may look to us on paper, didn't change their outlook at all.

William M. Arkin
Washington, D.C.

Major Clodfelter's Response:

I appreciate Mr Arkin's willingness to address some of the points I raised in my article, and I confess that I find some of his notions provocative. Yet, I do not agree with his overall conclusion that strategic bombing had a meager impact on the outcome of the Persian Gulf war. Mr Arkin argues that strategic air power failed because—in his opinion—it did not independently achieve "the singular military mission of defeating the Iraqi field army," nor did it achieve what he determines to be the campaign's "broader, more truthful set of missions." He also contends that strategic bombing failed because it did not break the will of the Iraqi populace, and he equates breaking that will to fomenting a popular revolt and toppling Saddam Hussein.

Unfortunately, Mr Arkin's determination of broader, more truthful missions omits much. Besides being charged with impairing Iraq's capacity for offensive warfare and removing the Iraqi army from Kuwait, American military chiefs also had to wage a war that would reach a rapid conclusion and that would do so without a tremendous cost in American lives. Moreover, they had to do their utmost to prevent the war from expanding to include Israel, which would threaten the fabric of the coalition. Against this set of criteria, the Phase 1 air attacks against Iraq achieved significant results.

The loss of electric power degraded Iraq's air defense network—particularly its computer interface—and thus facilitated the achievement of coalition air superiority. Command of the Iraqi skies was vital to prevent the Iraqi air force from attacking coalition ground and sea forces—a threat that Gen Norman Schwarzkopf feared throughout the conflict and one that portended disastrous consequences. The destruction of electric power facilities also deprived nuclear, chemical, and biological warfare plants the means to continue operations, regardless of whether all those plants were identified and attacked. In addition, the attacks

on Iraq helped to ensure that the coalition ground offensive would be a rapid one. By the third week of the air campaign, raids against command and control centers had severed the Iraqi army in Kuwait from its ties to Saddam Hussein, and unrelenting attacks on Iraqi road and rail transport leading to that army prevented it from receiving the sustenance it had to have to survive. Captured Iraqi officers have stated that the inability to communicate with higher headquarters and to feed shell-shocked soldiers contributed directly to the Iraqi exodus from Kuwait. Mr Arkin acknowledges that the air offensive against command, control, communications, and intelligence "had a direct impact" on Iraqi troops. That impact is difficult to overestimate, because it prevented Saddam Hussein from orchestrating a coordinated defense against the coalition's ground assault. The attacks on Scud missile sites, which Mr Arkin dubs "hardly a classical strategic bombing effort," were nonetheless vital to keeping the coalition intact. Without them, the Israelis would likely have entered the conflict, an eventuality that would have contributed little towards "restoring peace and stability in the region." The strategic attacks against Iraq's war-making capability were never intended to achieve a "singular" military objective, and the multifaceted results achieved by them—against targets that indeed provided the enemy with "direct military advantage"—were essential to the success of the coalition war effort.

Mr Arkin goes on to say that the strategic air campaign was a failure because it did not destroy the will of the Iraqi populace to resist; furthermore, he contends that much of the destruction that it did cause was inhumane. Volumes have been written about the efficacy of strategic bombing against civilian morale, and the debate will likely continue—with inconclusive findings—far into the future. Mr Arkin is certainly correct that strategic bombing did not produce a revolution or coup that ousted the Iraqi dictator. But the impact of the strategic attacks may well have caused Saddam Hussein to perceive that he was in danger of losing power and thus contributed to his decision to end the fighting. The precise impact of strategic bombing on Saddam Hussein will probably never be known, much like the specific impact of Linebacker II on the North Vietnamese Politburo's decision to sign the 1973 Paris Accords remains uncertain. Just as I contend that Hanoi's decision was the result of many variables, of which strategic bombing was only one, I would also maintain that

numerous factors—including the devastating effects of tactical air power—caused Saddam Hussein to throw in the towel.

Mr Arkin's claim that strategic bombing was inhumane rests on the assertion that air power ultimately caused the deaths of 70,000–90,000 civilians. That those numbers are based on interviews conducted with 90,000 Iraqi families by a team of Jordanian doctors and nurses makes the accuracy of the statistics questionable at best. More importantly, Mr Arkin dismisses Saddam Hussein's postwar allocation of resources to Ba'ath party officials and the rebuilding of Baghdad at the expense of the bulk of the Iraqi populace. He further ignores the effects of Saddam's savage reprisals against the Shi'ites and Kurds, as well as Saddam's refusal to comply with the terms of the United Nations resolutions that would permit the UN to sell Iraqi oil in exchange for medical supplies and food.

Finally, Mr Arkin contends that the "theory of strategic bombing" has become "nearsighted ideology." I disagree. The successful application of air power is the result of carefully gauging the nature of the enemy and his method of fighting, and then blending "strategic" and "tactical" air attacks in synergistic fashion against the enemy's centers of gravity. The Desert Storm air campaign did precisely that, and strategic bombing was a key aspect of that endeavor.

Maj Mark Clodfelter, USAF
Maxwell AFB, Alabama

DOCTRINAL DEBATE

While I found Lt Col Price T. Bingham's article "Air Power in Desert Storm and the Need for Doctrinal Change" (Winter 1991) interesting and enlightening, his limited understanding and research on both Navy doctrine and carrier air power in Operation Desert Storm is unforgivable. His errors of analysis on naval warfare severely detract from an otherwise excellent article.

Colonel Bingham asserts that the Navy does not have a published doctrine similar to AFM 1-1, *Basic Aerospace Doctrine of the United States Air Force*, or the Army's FM 100-5, *Operations*. This is simply not true. The US Navy's basic doctrine is published in NWP-1A, *Strategic Concepts for the US Navy*. This document covers Navy missions, roles, and functions in a manner very similar to that of AFM 1-1. He compounds his error by looking for

Navy doctrine in the outdated and nonapplicable maritime strategy. By comparing old Navy strategy against other services' doctrines, he compares apples and oranges. The lieutenant colonel is correct in observing that the Navy must update maritime strategy. This issue was recently addressed by the chief of naval operations in US Naval Institute *Proceedings*. In the future, Navy strategy will shift to one of "stability" instead of "containment." While the weakening of the Soviet navy lends itself to a different maritime strategy, the essential US Navy functions of sea control, deterrence, and power projection will not change. The next conflict may not provide 12 friendly, suitable airfields to support full-scale tactical air requirements next to the battle zone. Carrier battle groups might again be first on the scene.

In his analysis of "problems associated with carrier operations," he uses sortie rates and his own definition of strike aircraft to support his views on Navy doctrine. To begin with, Colonel Bingham states that the only attack aircraft on a carrier are the A-6s. In actuality, a carrier air wing includes not only A-6s, but two squadrons of F/A-18s and one squadron of S-3s (maritime strike). Thus, out of an air wing of 80 fixed-wing aircraft, 50 of them are strike aircraft—not 20 as cited by the lieutenant colonel. If Colonel Bingham's criteria for "deep-strike" attack aircraft are applied to the Air Force, both the F-16 and the F-117 would seem to fail his test.

In looking at sortie counts from the war, Colonel Bingham makes his most notable error. He baldly states that carrier air flew only 12 percent of combat sorties flown during the first two weeks of Operation Desert Storm. According to official statistics from US Central Command, carrier air flew 4,754 of the 28,540 sorties flown by US aircraft during the period 17-30 January 1991. That equates to more than 17 percent of total sorties flown for the period—quite a difference from the figure stated and, considering that three aircraft carriers were operating long-range from the Red Sea at the time, quite significant. If Marine air sorties are included, the total jumps to over 25 percent. In both cases, the percentage of sorties flown equates nearly exactly to the percentage of aircraft in theater. For the entire conflict, carrier air flew 25 percent of the total sorties while Marine air added another 10 percent. Colonel Bingham's endnotes reveal that the sortie figures he used for his piece were an estimate from an article in the *Air Force Times*.

The author's final assertion is that carriers

operate too far from critical targets to be effective. It's interesting to note that, in conflicts in Korea, Vietnam, and Libya, carrier strike aircraft were much closer to the action than their Air Force counterparts. The bottom line is that, because every power projection requirement is different, it seems fairly pointless to argue range of carrier-based air versus land-based air.

Desert Storm was a prime example of what land- and sea-based air power can accomplish when used in concert. In the aftermath of the conflict, several observers have used various yardsticks to assess which service "won" the war. The use and misuse of statistics and questionable logic only adds to the "rock throwing" between the Navy and Air Force. It's time to put down the rocks and realize that truly joint air campaigns use the strengths of *all* available assets for power projection. The goal is not to see who flies more sorties; it is to inflict the maximum amount of damage with minimal aircrew losses. Services that work together under joint guidelines can accomplish that and much more.

Lt Comdr Terry B. Kraft, USN
Maxwell AFB, Alabama

Colonel Bingham's Response:

I strongly agree with Commander Kraft that truly joint air campaigns should use the strengths of all available assets for power projection. At the same time, I believe that to conduct more effective joint air campaigns in the future, we need better service and joint doctrine. Developing better doctrine is not easy, in part, because it requires making an honest effort to identify current problems and limitations. This was the point of my article. However, since Commander Kraft clearly thinks that I did not make an honest, professional effort but merely engaged in "rock throwing," I feel obligated to note that naval officers who have studied Navy doctrine and carrier operations have come to conclusions similar to mine.

On the subject of Navy doctrine, Comdr William E. Short, Jr., USN, wrote a 1991 Naval War College paper titled "The Concept of Doctrine: Of Critical Importance But Frequently Misunderstood." His paper should be read by anyone interested in Navy doctrine. After examining the doctrines of the other services, Commander Short did not find that NWP-1A was very similar to AFM 1-1. Instead, he wrote that "traditionally, U.S. Navy doctrine has focused upon the tactical level of war." To

solve this problem, Commander Short recommended that "the Navy should acknowledge the need for sound current U.S. Naval doctrine beyond the tactical level of war." In his opinion, a rewrite of NWP-1A or a revision to the maritime strategy would not do. Instead, he wanted "a basic Navy doctrinal publication [that] would parallel the Army's FM 100-1 and 100-5, the Air Force's AFM 1-1 and the Marine Corps' FMFM 1 and 1-1."

A report by Capt Steven U. Ramsdell, USN, concerning his visit to carriers involved in Operation Desert Storm provides a further critique of Navy doctrine. Captain Ramsdell noted that

the Navy did not bring to Desert Storm any system for planning and directing air campaigns because the Navy does not possess such a system. The Navy does not possess a system to plan the integrated employment of aircraft from more than a single carrier, let alone plan and execute an air campaign involving several carriers.

He further reported that

the concept of conducting campaigns and the process of implementing an approach to war in which tactical decisions are driven primarily by strategic objectives have not been within the field of view of our leaders in the fleet.

Instead, he said the Navy had confined itself to the "technical and logistical issues of fleet operations at the tactical level."

On the subject of command arrangements, Captain Ramsdell reported that several senior officers "expressed reservations about the Navy's involvement in an air campaign centrally directed" by a joint force air component commander using the air tasking order (ATO). According to him, these officers were concerned that "independent Navy operations were threatened" by their participation. Yet, as Captain Ramsdell observed, "The Navy has no alternative to the ATO system. Without it, the campaign would have been planned and directed manually. Sortie rates would have been far lower and strike deconfliction much less certain."

Captain Ramsdell also found that many senior naval officers expressed concern about problems presented by carrier operations in Desert Storm that were similar to those I expressed in my article. He said that in the opinion of these senior officers—an opinion he found widely held in the fleet—Desert Storm was not well suited to carrier operations. In the view of these officers, "CVs [aircraft carriers] are suited to one-time raids similar to the

Libyan action of 1986, but not to sustained campaigning." However, as Captain Ramsdell pointed out, this view

ignores the use of carriers in both Korea and Vietnam and the fact that our huge investment in carriers cannot be justified by such limited usefulness. In fact, the implication of this attitude is that carriers are little more than political instruments, not real warfighters.

Commander Kraft is also mistaken when he asserts that I stated the A-6 is the only attack aircraft on the carrier or that carriers operate too far from critical targets to be effective. Instead, I wrote that the A-6 is the only aircraft which can deliver "a fairly significant payload against targets located far from where a carrier can safely operate." This does not mean that carriers would not be effective when critical targets are near a body of water where carriers can safely operate.

Moreover, when Rear Adm Riley D. Mixson, USN, analyzed Desert Storm in a recent issue of *US Naval Institute Proceedings*, he did not appear to see the range of carrier-based air power as a "pointless" issue. Instead, he noted that "the Navy is becoming hostage to Air Force land-based tanking for sustained power-projection warfare beyond 200 nautical miles from the battle force." As a result, he said there is a pressing need "to develop a true 700-nautical-mile standoff capability." He also noted that until the midpoint in the war, 50 percent of the sorties from carriers in the Persian Gulf were devoted to force defense. When the threat permitted placing the carriers within 150 nautical miles of the targets, "the Navy's sortie count over the beach increased dramatically."

Lt Col Price T. Bingham, USAF
Maxwell AFB, Alabama

Colonel Bingham's article in the Winter 1991 issue made an excellent case for abolishing the superior/subordinate relationship that has existed between ground and air operations in the past. But I question the validity of his belief that air power—embodied in a strategic air and deep interdiction campaign—now dominates modern warfare. Rather, it seems that surface and air operations are as inextricably entwined as ever and must still be closely coordinated.

Operations during Desert Storm were no exception. For over a month, coalition air forces were directed against an essentially inert enemy, had complete control of the air, and

were relatively unhindered by targeting restrictions. Nevertheless, by the end of this period, air power by itself had not achieved any US war aim. The strategic air campaign had not broken the enemy's will (has it ever?), had not prevented Scuds from being fired at Israel, had attrited—but not eliminated—Saddam's weapons of mass destruction, and had not starved the Iraqi army out of Kuwait. Deep air interdiction may have been partially effective, but the Iraqis had already amassed large stockpiles of supplies in Kuwait and in the southern Euphrates Valley. In the end, it took ground units to reassert control over Kuwait, and it took United Nations teams on the ground to discover that the coalition had not, after all, had the perfect intelligence necessary to destroy Iraq's nuclear, biological, and chemical capabilities.

Instead, what air power did was impair the Iraqi military's ability to fight as a coherent whole, which was a contribution of inestimable value. But much of this disruption took place in the Kuwaiti theater itself. Coordinated ground and air operations in Kuwait and southern Iraq, which Colonel Bingham implies were a waste of effort because they were not directed at the Iraqi leadership and war industries, appear to have played a more direct role in achieving the top US war aim (i.e., the liberation of Kuwait) than did independent, strategic air operations. Not that the latter were unimportant—far from it. The strategic strikes paralyzed Iraq's air force, suppressed its air defenses, disrupted its command and control, and reduced the offensive threat posed by Iraqi aircraft and missiles. In addition, the damage to Iraq's war industries, in conjunction with the continuing blockade and UN inspections, will impair Iraq's ability to rapidly rearm and again threaten its neighbors. But these actions were important only inasmuch as they contributed to overall war aims, and the latter were not achieved without an integrated air and ground campaign within the Kuwaiti theater itself.

Beyond Desert Storm, it would be a mistake to assign dominance to either surface or air power based on the last data point of warfare. In another article in the Winter 1991 issue, Maj Mark Clodfelter correctly points out that the war with Iraq was unique and that the conditions under which it was fought are unlikely to be repeated. In the late twentieth century, war is increasingly becoming as much an intrastate as an interstate affair. In this environment, the application of any type of military force will have to be carefully considered. It will not be

sufficient to develop simplistic dogmas (or doctrines) that immediately mandate a strategic bombing campaign (or naval blockades, or armored offensives, etc.) in response to every set of hostilities. After the Gulf war, even Gen Charles Horner pointed out (during testimony before the Senate Armed Services Committee) that air power should not be oversold or held up as the solution to every crisis. Unfortunately, that would be the effect of the doctrinal changes that Colonel Bingham proposes.

Lt Edward H. Feege, Jr., USNR
Upper Marlboro, Maryland

Colonel Bingham's Response:

Lieutenant Feege apparently has misunderstood my position regarding coordinated air and ground operations. I certainly did not intend to imply that such operations are a waste of effort. In fact, I wrote that "Desert Storm revealed how essential ground and amphibious forces can be to air power's effectiveness" (page 40).

Perhaps Lieutenant Feege's confusion results from the word *dominate*. When I say air power can dominate the conduct of modern conventional war, I mean that our air forces (of the Air Force, Navy, and Marine Corps)—employed under the control of the joint force air component commander (JFACC)—can (and often should) play the central role in the campaign. Due to technologies that have enhanced air power's capabilities, we must recognize that while surface forces are still very important, they should not dictate how air forces are employed. Instead, our campaigns should be planned and executed so surface operations complement and reinforce air operations. Exploiting our technological advantages and recognizing the value we place on friendly lives, we should use air power as our primary means of fighting the enemy and, where necessary, neutralizing his armed forces. This does not mean that surface forces will not be necessary to perform the coup de grace, as they did in Desert Storm.

The differences I see between the roles that air forces and surface forces should play in a campaign are similar to the differences between the roles that tanks and infantry played in the German and British armies of 1940. The British tended to employ tanks in the same role they had in 1918—as a supporting arm of their infantry. In contrast, the Germans recognized that due to advances in technology, the tank

should play the dominant role in a combined-arms panzer division, in which infantry was used to complement and reinforce the tank. Today, many people see air forces in the same way the British saw their tanks—as an arm whose primary role is supporting the surface force's scheme of maneuver. This perspective fails to recognize air power's dominance. Instead, we should treat our air forces as the central element (similar to the role that tanks played in the German panzer division) in a joint air-surface campaign. This means that the JFACC should have a major—and often a deciding—role in determining surface schemes of maneuver.

Moreover, while recognizing that all wars are unique, military professionals still must look to the past for guidance on how to conduct war in the future and, therefore, how they should organize, train, and equip. As they look to the past, military professionals can see that the history of warfare is filled with people who seem surprisingly slow to recognize how new developments were changing the conduct of war. A major reason for this is that change is difficult and that there are powerful bureaucratic incen-

tives for military institutions to resist change. Yet, when change is successfully resisted, these bureaucratic victories often contribute to future military defeats. Therefore, before rationalizing that more data points need to be collected regarding air power's effectiveness, all of us should remember that after ignoring the data point on Allied air power that Field Marshal Erwin Rommel had collected in North Africa, Field Marshal Gerd von Rundstedt got his next data point in Normandy.

Lt Col Price T. Bingham, USAF
Maxwell AFB, Alabama

PROFESSIONAL DEVELOPMENT

I just wanted to let you know that I am using a reproduction of CMSgt Robert D. Lewallen's article on "Sex, Power, and Ethics: The Challenge to the Military Professional" from the Fall 1991 *Airpower Journal* for teaching the senior ROTC class at this detachment. It was excellently written and is a valuable resource for incoming lieutenants.

Capt Janet M. Modl, USAF
Rochester, New York

net assessment

Setup: What the Air Force Did in Vietnam and Why by Earl H. Tilford, Jr. Maxwell AFB, Alabama 36112-5532: Air University Press, June 1991, 308 pages, \$12.00.

Setup is a scholarly, detailed, critical history of the USAF air war in Indochina from late 1961 through early 1973. Tilford's criticism is lucid and straightforward, if arguable in some areas. He states that senior Air Force generals failed to develop a winning air strategy to match the political limitations imposed by President Lyndon B. Johnson and Secretary of Defense Robert S. McNamara. He attributes this in large part to a "bomber mentality" characterized by blind adherence to the doctrine of strategic air offensive developed during the 1930s and put into practice during World War II. He notes that the development of nuclear weapons served to complete the doctrine and, consequently, to reduce USAF interest in other aspects of air power. He points out that Tactical

Air Command had so joined the rush to deliver nuclear bombs that its techniques for the delivery of conventional ordnance had been sadly neglected.

Setup is well worth reading for anyone seriously interested in air power, particularly for Air Force officers whose interests in air power go beyond the mechanics of its applications. The fact that some 8 million tons of bombs were dropped by US air forces in Indochina (4 million tons in South Vietnam, 3 million tons in Laos, and 1 million tons in North Vietnam) should interest readers and spark their curiosity about the lack of favorable results.

Jane's Defence Weekly of 29 June 1991 reported on a conference held at the Joint Studies Center in Minot, North Dakota, which dealt with the air campaign during the Gulf war. Col Dennis M. Drew is quoted as saying the Gulf war was "clear evidence to all the doubters of airpower in warfare [that] airpower now domi-

nates land warfare." There is more than a hint there of an attempt to lay a ghost to rest. Yes, air power did dominate in Iraq and Kuwait, but what about Afghanistan and Vietnam? The US established air superiority over Iraq and Kuwait and used it to defeat the Iraqis in a crushing fashion reminiscent of the German blitzkrieg of 1940. But we also had air superiority in Vietnam—most of the time over North Vietnam and always over South Vietnam—yet we were ultimately unsuccessful. Why? For that matter, why were the Soviets unsuccessful in Afghanistan, where they had air supremacy?

Tilford goes deeply into the air campaign that was directed against the flow of men and materiel down the Ho Chi Minh trail. He notes that Vietcong forces required only about 100 tons of logistic resupply per day (about 50 truckloads) and that it was not possible (by air action) to prevent this amount from getting through, given the jungle terrain and the enormous effort the government and people of North Vietnam were willing to expend. That particular air campaign, therefore, was unsuccessful despite the number of sorties flown and trucks destroyed. A serious question is whether any conceivable air campaign was capable of interdicting North Vietnamese resupply of the Vietcong to a level that would cease to provide them adequate support for the kind of war they chose to wage.

On the plus side for air power, Tilford notes that it clearly dominated the Khe Sanh battlefield in January 1968 and prevented Gen Vo Nguyen Giap from repeating his 1954 Dien Bien Phu triumph over the French. Similarly, he points out that air power was a key factor in breaking the back of the North Vietnamese offensive in the spring of 1972, which unleashed 14 regular divisions against South Vietnam in conventional assaults. He also discusses Linebacker I, an operation in which precision guided munitions were used for the first time to attack strategic targets, helping bring the North Vietnamese to the bargaining table.

As Tilford's book shows, there were both air power successes and failures in Vietnam. Frankly, it is not clear to this reviewer that it was possible for the Air Force generals to develop an air strategy which could have defeated the North Vietnamese within the political and operational limitations that the president and secretary of defense imposed. Many of Tilford's criticisms are warranted, but it would be interesting to see what strategies he might suggest in place of the failed ones.

For example, Tilford states that "part of the setup leading to air power's defeat in Southeast

Asia was the Air Force's fascination with technology" (page 209). However, the Air Force's "fascination with technology" seems to have borne very good fruit in the Gulf war. I must disagree, therefore, with Tilford's analysis. The political constraints set by President Johnson, the preindustrial nature of North Vietnamese society, the jungle terrain, and the North Vietnamese commitment to victory made it highly unlikely that any air power strategy short of total annihilation could have "won the war." I agree that the USAF's historic interest in technology increased as its leaders sought a technological solution to an essentially political problem. But I don't believe that it was a primary cause of the failure to develop a winning air strategy—because none was possible, given all the circumstances!

It remains for someone to articulate a theory of air power which will take into account all the significant variables—including terrain and the nature of the society under air attack—and to develop a comprehensive theory that explains a Gulf victory and a Vietnam (and, for that matter, an Afghanistan) failure. Tilford has not done that, but his volume is well worth reading. His challenge to the Air Force reader is to avoid defending air power as dogma and to better understand why it works, how it works, and under what conditions.

Capt John F. O'Connell, USN, Retired
Alexandria, Virginia

Saying the United States lost the war in Vietnam because "the military had their hands tied" is a cliché that can be true or false, depending on one's viewpoint of the constraints placed upon the use of America's military might during the entire Indochina experience. Dr Tilford's premise in *Setup* seems to be that the constraints on the use of US air power were self-imposed doctrinal restrictions that did not permit air power to be adapted to the war at hand, which was a limited-objective, limited-geographic conflict defined by political considerations rather than military objectives.

According to Dr Tilford, the USAF—since its inception—had developed a strategic bombing doctrine to the near exclusion of other forms of aerial warfare. If a war could be won by striking enemy centers of gravity, shapers of Air Force doctrine and dogma were well prepared for a full-scale strategic nuclear exchange. However, the limited conventional conflict that developed in Southeast Asia (SEA) did not fit this mold.

When the USAF first sent people and planes to SEA, neither was prepared. Pilots, having so long concentrated on things nuclear, were not skilled in conventional bombing, rocketry, or strafing. Weapons for conventional warfare were obsolete leftovers from Korea and World War II, and airplanes were borrowed from the Air National Guard (B-26s) and the Navy (A-1s). The all-jet, supersonic, nuclear-capable Air Force did not have the equipment, training, or doctrine to engage in limited combat.

While the Air Force struggled to adapt its force to the war, any changes in force or tactics were generally reactive to the initiatives of the enemy. The use of forward air controllers to locate the movement of war-sustaining supplies along the Ho Chi Minh trail resulted from the inability to interdict these supplies at the source. Missions to suppress active enemy defenses resulted from our restrictions on bombing the sites while they were under construction. Air-to-air engagements resulted, in large measure, from the fact that airfields themselves could not be attacked, thus allowing North Vietnamese aircraft to fly at will.

The political decision not to blockade North Vietnam and Cambodia and not mine the harbors meant that all imported war materiel had to be located and destroyed after disbursement into a convoluted and diverse distribution system. Could air power alone have strangled the resupply of Vietcong and North Vietnamese units in South Vietnam had all targeting constraints been lifted? Most people agree that it could not. Air power is not designed, even under optimum circumstances, to do so.

Setup identified the biggest constraint on the use of US air power in Vietnam as the fear of widening the war and thus involving the Chinese or Soviets. This overriding concern was one of the primary reasons that we did not bring the full force of air power against the North Vietnamese. There was a belief at the highest levels of government that by gradually increasing the bombing intensity against the North, we could reach a pressure point that would cause North Vietnam to stop supporting the insurgency in South Vietnam but would not cause the Chinese or Soviets to intervene. We never reached this pressure point, although some people would say that Linebacker II came close. According to *Setup*, the use of American air power in SEA slowed, but did not stop, the ultimate North Vietnamese victory.

In order for *Setup* to be an accurate assessment of Air Force doctrine, it needs an epilogue that analyzes the differences between air power employment in SEA and in Operation Desert

Storm. Air power is a powerful, flexible tool of military might. Used with the proper doctrine, equipment, training, and leadership, it can influence the outcome of any conflict. Without these elements, it is a waste of valuable national treasure.

Col James S. Mosbey, USAF
Moody AFB, Georgia

Saddam Hussein and the Crisis in the Gulf by Judith Miller and Laurie Mylroie. New York 10022: Random House, 1990. 268 pages, \$5.95 (softcover).

Saddam Hussein: A Political Biography by Efraim Karsh and Inari Rautsi. New York 10022: Free Press, 1991, 309 pages, \$22.95.

Instant Empire: Saddam Hussein's Ambitions for Iraq by Simon Henderson. San Francisco 94133: Mercury House, 1991, 240 pages, \$21.95.

And other books on Iraq.

Any major news event, especially if it endures for more than a few weeks, is certain to produce a rush of books. A swarm of instant books by putative experts who do "in-depth" analyses of yesterday's Big Story is an inevitable by-product of commercial publishing, where topicality guarantees quick sales. Thus, even before Operation Desert Storm had concluded, the confrontation in the Gulf had already about doubled the number of books in print on Iraq. These works divide into two groups: those concerned primarily with the diplomatic and military aspects of the crisis and those dealing more broadly with Saddam Hussein, the Baath party, and their place in Iraqi history.

The three principal books under review fall into the latter category. All of the authors have at least passable credentials that qualify them as experts on the Middle East. Two of the three books are the products of two-person teams, and the professional background of the authors divides evenly between journalism and academia. To place both Saddam Hussein and the invasion in context, all three works try to strike a balance among biographical treatment of Saddam's life, discussion of the dictator's motives in invading Kuwait, and an overview of post-World War I Iraqi history.

The first of the three to appear in print was *Saddam Hussein and the Crisis in the Gulf*, the collaborative fruit of a journalist and an academic. Its authors are Judith Miller, who has

covered the Middle East extensively for the *New York Times*, and Laurie Mylroie, currently a fellow at Harvard's Center for Middle Eastern Studies. Using interviews, press reports, and general scuttlebutt, Judith Miller weaves fact and rumor to produce an exciting, colorful portrait of the Iraqi leader. We learn that Saddam's favorite movie is *The Godfather* and that his activities and those of his entourage are pointedly compared to the goings-on of a Mafia crime family. Saddam's alleged acts of personal violence and the institutionalized violence that has characterized his reign are recounted in chilling detail.

Coauthor Laurie Mylroie provides background on the history of Iraq. Unfortunately, her efforts are less than successful. Mylroie's encyclopedic tone is out of place alongside Miller's style, which has a penchant for anecdotes. The social structure of Iraq is largely the product of the last 70 years, and much of the turbulence of those years stems from the precipitous decline of traditional elites and customary practices. Yet, Mylroie captures little of the complex forces at work behind the political events she describes. The attempt of the Hashemite monarchy, established by the British after World War I, to move the country toward a stable—perhaps moderately authoritarian—parliamentary regime is covered summarily. The ordinary reader is more likely to remember the garish demise of the royal family in the bloody revolution of 1958.

Saddam Hussein: A Political Biography is likewise the result of a collaboration. The authors are Efraim Karsh, a well-known authority on the Iran-Iraq War and a lecturer in the Department of War Studies at King's College, London, and Inari Rautsi, a research fellow in international relations at Helsinki University, specializing in the politics and history of the Middle East. In fluent, economical prose, their book recounts the life of Saddam Hussein from his humble birth and unhappy childhood, through his rapid and violent rise into the hierarchy of the Baath party, up to his current apotheosis as a tyrant wielding as near to absolute power as any man has come since Joseph Stalin. The story of the Iraqi dictator's ascent to power, however, covers less than half the book. The remaining pages are devoted to the dynamics of the Saddam/Baathist regime and a detailed recounting of the Gulf crisis through the conclusion of Desert Storm, with the focus on Saddam Hussein's perceptions and motives.

Karsh and Rautsi see a fanatical determination to stay in power as Saddam's central

motivating goal. Probably rooted in unhappy childhood experiences as the unwanted adopted son of his mother's second husband, Saddam's will to mastery has eliminated whatever moral instincts he may once have had. The result is a shrewd but ruthless tactician who espouses causes and principles only so long as they serve his purposes. The Karsh and Rautsi biography documents the many—and always self-serving—reversals of course that have marked his career. The head of a party committed to secularism and Arab unity, Saddam has not hesitated to preach holy war and has gradually replaced Pan-Arabism with an increasingly xenophobic Iraqi nationalism. He has publicly denounced Israel's and Egypt's accommodationism, while secretly seeking favors from both.

This reading of Saddam Hussein as a driven man, willing to stop at nothing to survive in power, is plausible enough. The Iraqi dictator shows few signs of harboring any selfless impulses. Moreover, Karsh and Rautsi's reduction of Saddam's character to a towering will to power gives their treatment of the available materials a classical and aesthetically pleasing unity of theme, but it runs the risk of turning genuine evil into melodramatic villainy. True evil is always a socially complex product. The sources of Hitler's hold over the German people have proven an inexhaustible subject for historians, political scientists, psychologists, and theologians. No doubt Saddam's place in history will be smaller than Hitler's, yet the relationship between him and the Iraqi people is surely an interesting and important case of social pathology. It is one, however, that the authors neglect. Karsh and Rautsi include the obligatory background material on Iraqi history and geography yet make no serious effort to decipher the bond linking Saddam Hussein to the nation he rules. Of course, the limitations of the sources available for a life of Saddam—a self-glorifying autobiography, an equally propagandistic official biography, and interviews and press reports that are an uncertain mixture of fact and gossip—render so ambitious an endeavor difficult to achieve. At this stage, it would probably be doomed to failure. If a biography is to be attempted at all, the larger assessments required to understand the Iraqi leader and his place in the recent history of the Middle East might as well also be undertaken.

Simon Henderson's *Instant Empire: Saddam Hussein's Ambitions for Iraq* also mixes biography and reportage with chapters devoted to sociohistorical background. However, Henderson's emphases differ. As did the authors

already mentioned, he retells the same facts about Iraq's violent political tradition and oil-imbalanced economy but devotes less space to these subjects. The life of Saddam is likewise recounted somewhat hurriedly, as if Henderson were eager to get on to other matters. Very much the working journalist with his eye on the Big Story, the author saves space for the "scoops" he has collected on Iraq's efforts to develop superweapons (e.g., an artillery gun with the range of a ballistic missile), the companies and countries that have supplied Iraq with arms, and such sensational events as the arrest and execution of an Iranian reporter/spy.

Henderson's investigative-journalist approach, with its focus on the high-profile news aspects of the Gulf crisis, makes his book perhaps the most exciting of the three to read, although there is a nervous edge to his revelations that at times spills over into melodrama. His stories are spiced with fax messages surreptitiously obtained, anonymous informants, and attendance lists from meetings whose attendees clearly wished their presence to remain a secret. Surely, this is front-page stuff, but opportunities for serious analysis are too often sacrificed to headline splashiness.

Still, garishness aside, Henderson's detective work in the demimonde of international politics does manage to clarify at least one important and much controverted issue. Seeking to prevent Iraq's defeat by Iran and to curry favor with the Saddam regime, the United States—it has been said (and Miller and Mylroie repeat the allegation)—supplied Iraq with arms subsequently used against Kuwait and the coalition forces. Contrary to this claim, Henderson's research establishes that direct US military aid to Iraq was almost nonexistent, that high-ranking American officials remained deeply suspicious of Saddam even during the apparent thaw in US/Iraqi relations which occurred in 1988–90, and that these officials saw the survival of the Iraqi strongman as at best a sorry *pis aller* to an Iranian victory. Until the very eve of the Kuwaiti invasion, Iraq's principal arms supplier remained the Soviet Union (and that by a large margin). France came second, with China and a handful of West European and Eastern Bloc countries bringing up the rear.

While each of these three books has its merits, all of them in some measure sacrifice depth to topicality. None, therefore, is a suitable introduction to Iraq for the reader who wishes to place recent events in the Gulf in perspective. Where, then, should a reader with an intellectual curiosity about Iraq turn?

A fusion of at least three quite distinct

regions, Iraq did not really come into existence until roughly 1917, when the British shaped the once-Ottoman provinces of Mosul, Baghdad, and Basra into a League of Nations mandate. Scholars divide the subsequent history of Iraq into four periods: the era of direct British rule, 1918–33; a quarter century of nominal independence under Britain's watchful eye; a decade of political turmoil beginning with the fall of the Hashemite monarchy in the revolution of 1958; and the current era of increasingly totalitarian and militaristic Baath rule, which commenced when the second Baath government assumed power in 1969. Specialized studies exist for each of these periods, but a student without much previous knowledge of Iraq will probably want to start with a general survey of the subject rather than with a narrow monograph.

For this purpose, Christine Helms's *Iraq: Eastern Flank of the Arab World* (Washington, D.C.: Brookings Institution, 1984) probably ought to be avoided. The book's opening chapters provide a good overview of Iraq, describing its geography, economy, and principal ethnic and religious groups. Helms, however, is excessively sympathetic to the Baath party, and many of her statements—possibly pardonable misperceptions seven years ago when the book was published—sound ludicrous in the light of what is now known about the Iraqi regime. The Baath party may once have been a relatively small band of elitist intellectuals as Helms contends, but its expansion over the last 10 to 15 years to include, by some estimates, as many as 1.5 million members has certainly by now transformed the party into a mass organization. As for the collective decision-making processes at the higher levels of government described by Helms, everything we know of the Revolutionary Council and the Baath National Command indicates that they have for some time been totally subject to the will of Saddam Hussein.

Phebe Marr's *Modern History of Iraq* (Boulder, Colorado: Westview Press, 1985) is thorough and well documented. The author concentrates primarily on political events but includes chapters dealing with Iraq's social and political evolution. The chief flaw of Marr's book may indeed be its evenhanded treatment of its subject. Well acquainted with all phases of modern Iraqi history, Marr remains unwedded to any dominant interpretation. As a result, she adopts an impersonal, value-neutral, encyclopedic tone that makes her writing dull to read.

If Marr's study lacks overriding ideas to give it an analytical edge, two other works on Iraq

verge on the tendentious. *Saddam's Iraq: Revolution or Reaction* (London: Zed Books, Ltd., 1989), a collection of historical and sociological essays produced by the Committee against Repression and for Democratic Rights in Iraq (CARDRI), and Peter Sluglett and Marion Farouk-Sluglett's *Iraq since 1958* (London: Kegan Paul, 1988) interpret the Baath regime as the morbid outgrowth of a distorted economy in an underdeveloped country. To these authors, Baathist Iraq—for all its socialist pretensions—is an instance of state capitalism. Awash in oil revenues but with little domestic industrial capability, Iraq—it is alleged—has generated a weak middle class of army officers, bureaucrats, and government contractors who depend upon an authoritarian state for favors and protection. Both books handle this admittedly neo-Marxist thesis adeptly, skillfully applying it to Iraqi conditions. This lends their analysis a force and clarity that is lacking in most other works on Iraq.

Equally interpretive but very different in style and temperament is Samir al-Khallil's *Republic of Fear: The Politics of Modern Iraq* (Los Angeles and Berkeley: University of California Press, 1989). The best single work on the Saddam dictatorship, Samir al-Khallil's book is a major contribution to the study of totalitarianism, and many of its insights are no less relevant to Hitler's Germany, Stalin's USSR, or Khomeini's Iran than they are to contemporary Iraq. Samir's complex analyses are difficult to summarize briefly. In essence, however, he argues that Saddam's hold over the Iraqi people is based on a combination of fear and guilt. The fear is instilled through the regime's all-pervasive police and security apparatus and by the well-known ruthlessness and cruelty with which these organs destroy their victims. The guilt stems from a sense of complicity in the crimes of the regime, which leaves Iraqis with a feeling—perhaps only semiconscious—that the punishment which might someday be visited upon them is deserved. The Baath party has cultivated this sense of complicity through wide networks of informers, secret denunciations, show trials, and public executions. Samir's comments on the party's systematic corruption of language (e.g., the substitution of paranoic analysis for the popular subversion of storytelling) reveal the degree to which the regime has left individuals defenseless before it and bear comparison with George Orwell's explorations of totalitarian language in 1984. Yet, for all its brilliance, *Republic of Fear* is not the best place for the neophyte student of Iraq to begin. Although

Samir provides historical and sociological background, his close reasoning is often hard to follow, and it would probably be better for general readers to first familiarize themselves with Iraq via a general survey before undertaking a book as demanding as the *Republic of Fear*.

Now that Iraq, whether for good or bad, has established a firm grip on the attention of the Western world, more books on its history, politics, and social structure will doubtless appear. Several dealing specifically with the diplomatic aspects of the Gulf crisis or offering provisional military assessments of Desert Shield/Desert Storm have already been published. Hopefully, new research will repair the many gaps in our knowledge of the region. At present, the only monograph-length treatment of the Iraqi army is Mohammed A. Tarbush's *The Role of the Military in Politics: A Case Study of Iraq to 1941* (London: Kegan Paul, 1982). The CARDRI volume contains a section that brings the story forward into the present, but there exists little hard information on how the Baath party managed to subdue an officer corps which all previous regimes had found difficult to control, what effect Baath tutelage has had on the army's professionalism and esprit de corps, or what capability or ambition the Iraqi military may yet harbor for playing an independent part politically. John Devlin's *The Ba'ath Party: A History from Its Origins to 1966* (Stanford, California: Hoover Institution Press, 1976) and Kamel S. Abu Jaber's *The Arab Ba'ath Socialist Party: History, Ideology and Organization* (Syracuse, New York: Syracuse University Press, 1966) likewise need updating to reflect the transformations in party structure, leadership, and ideology that have occurred in the last quarter century.

For the nonspecialist, however, these deficiencies are unlikely to present great problems. The books by Marr and the Slugletts, as well as the CARDRI collection, are more than sufficient to provide the general reader with the most essential available information on the Middle East's troubled eastern fringe. They supply the critical wherewithal for assessing the more topical—if not sensationalist—books on the subject that have already begun to appear on our bookshelves and whose numbers will surely multiply in the months and years ahead.

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To Fly and Fight: Memoirs of a Triple Ace by
Col Clarence E. ("Bud") Anderson with

Joseph Hamelin. New York 10010: Saint Martin's Press, 1990, 302 pages, \$19.95.

The cover photo and title of *To Fly and Fight* might suggest that this book is just another in an endless series of memoirs produced by retired pilots. Nothing could be farther from the truth. The book is oral history at its best—a participant's view of history and his impressions of it. *To Fly and Fight* not only tells the story of Col Bud Anderson, it helps capture the essence of the period from World War II to Vietnam.

The title would lead one to believe that being a fighter pilot and triple ace was Colonel Anderson's greatest achievement. Although he goes into detail about this aspect of his life, much of the book deals with his exploits as a test pilot after World War II, as well as with other events in his career. Anderson and Hamelin do a masterful job of balancing the various parts of an amazing career. They cover the war years in a matter-of-fact way, avoiding any glamorization of war and aerial combat. The events flow as easily as in a well-told war story, and—like all good tales—it is told thoroughly, warts and all. The tone of the book is reminiscent of casual conversation—the kind of talk that comes naturally and easily, without bravado or varnish. There is no attempt to impress the reader with feats of derring-do. Colonel Anderson relates the truth, and it is far more interesting than any fiction.

To Fly and Fight contains no startling revelations. It has no profound thesis. Although it declines to indict US policy or military operations, it is not blindly patriotic. The author is straightforward when he reveals that he and "the system" often did not see eye to eye, but he has no rancor. Like a good soldier, Anderson chooses not to voice any opposition he may have had to US policies at the time. Indeed, he was no policymaker or planner, but an operator. As such, he orients his memoirs accordingly. One gets the impression that because he has few illusions about himself and the Air Force, he is able to excel at his job and enjoy life.

Put simply, *To Fly and Fight* is a great book. Anderson's account is vivid and rich in detail, painting an unforgettable picture of life as a fighter pilot from World War II to Vietnam and beyond. Not just one man's story, *To Fly and Fight* is a piece of history that can serve as both an inspiration and challenge to all of us.

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Military Effectiveness, vol. 1, *The First World War*; vol. 2, *The Interwar Period*; vol. 3, *The Second World War* edited by Allan R. Millett and Williamson Murray. Winchester, Massachusetts 01890: Unwin Hyman, 1988, \$50.00 each (\$24.95 paper).

"The battle is the payoff!" Versions of this axiom have served since time immemorial to underscore the simple but important truth that military organizations exist to fight and win wars and that, traditionally, success in battle has been the path to overall victory. Yet, in modern warfare, success on the battlefield has become only one component (if the Second World War is used as a guide, perhaps not even the most important component) of military effectiveness. The very definition that Allan Millett and Williamson Murray craft to define modern military effectiveness in their three-volume study of this phenomenon—"the process by which armed forces convert resources into fighting power" (1:2)—illustrates how modern war has broadened and extended our ideas about this subject. As this definition emphasizes, military effectiveness has increasingly become concerned with far more than simply applying combat power successfully; now military forces must be concerned with the complex processes that produce combat power. How well they accomplish this transformation, with all the interplay between competing civilian and military agencies, is a new and vital aspect of "military effectiveness."

Why this concept of military effectiveness has been extended is intricately intertwined in the history of modern warfare. Napoleon imbued several generations of commanders with the idea that decisive battle was the preferred means of terminating war. Unfortunately, the post-Napoleonic, industrially revolutionized, nationalized state proved far less vulnerable to battlefield collapse. This was true in large part because this new kind of state produced an army whose firepower prevented its quick destruction, and whose lack of mobility prevented it from performing Napoleonic arabesques of maneuver against an opponent with equally lethal defensive combat power. Attrition, not annihilation, became the route to victory. As Paul Kennedy notes in assessing military effectiveness as a whole during World War I, attritional warfare by its very nature moves the focus of military effectiveness away from the operational and toward the strategic and political levels of war (1:338). Attritional

warfare required the piling up of men, and especially of equipment, in great quantity and of every kind. Thus, the modern military found itself forced to ask for more and more of the state's resources in order to produce the requisite combat power. But in competing for men and materiel, the armed forces extended their area of operations from the battlefield to the councils of state. Thus, the political level of war and the military's facility in this arena became an increasingly important aspect of overall military effectiveness.

Millett and Murray insist that the definition of military effectiveness continued to broaden, even in the realm of "purely" military affairs. As wars grew in size and the individual battle generally took on less and less importance, militaries had to be increasingly concerned with their effectiveness at the operational level, in conducting campaigns, and often in applying power nearly simultaneously throughout the breadth and depth of a theater of operations. At the same time, the strategic level of war—the critical nexus where operational concerns and political realities collide—emerged as a crucial platform in war fighting, primarily because of the new-found strength of civilian political leaders, all of whom had seemingly taken to heart Georges Clemenceau's dictum that "war was too important to be left to the generals."

Thus, according to Millett and Murray, modern military effectiveness must be measured and studied at four levels: political, strategic, operational, and tactical. As the term *level* implies, there is a hierarchy of values here, and failure at the higher level can seldom be compensated for by superior performance at the lower. The Wehrmacht, for example, excelled in the tactical phases of combat, but even sustained brilliance in battle could not make up for the army leadership's—quite apart from the albatross that was Hitler and the Nazi Party—gross operational miscalculations, abysmal strategic ignorance, and willingness to submit to political thralldom under Hitler (2:180–220).

Military Effectiveness surveys the American, British, French, Soviet, Italian, German, and Japanese war machines from 1914 to 1945 at the above-mentioned four levels of war. Editors Millett and Murray have assembled 23 of the world's leading military historians, each an expert for one of the countries during the Great War, the interwar years, or the Second World War. Each essayist was provided with a list of questions to consider in evaluating the armed forces' effectiveness at all four levels of war. The resulting 21 essays—plus six additional

overview and summary pieces—will serve as the starting point for any serious study of twentieth-century military performance by the scholar or the military professional.

The work's seminal qualities are well illustrated in the very first volume. Though some might see an extended discussion of military effectiveness in the First World War as an oxymoron, the essays do a commendable job in bringing to the study of this period a sense of its complexity and—most importantly—of the context in which so many of the conflict's most controversial actions were taken. Perhaps the most interesting piece from a very strong volume is David R. Jones's "Imperial Russia's Forces at War" (1:249–329). Jones challenges conventional views that Russia was somehow unique in its unpreparedness in 1914 and in the incompetence of its leadership. He asserts that the Russian army was in fact better equipped in 1917 than it was at the beginning of the war, and that the key to Russia's collapse lay in the same kinds of problems that afflicted all the other combatants—and in the unique character of the country's economic and social unrest. Certain to provoke interest and debate is Holger Herwig's dissection of German military ineffectiveness in the Great War, due in large part to her initial adherence to Gen Alfred von Schlieffen's "encirclement panacea" and Adm Alfred von Tirpitz's "maritime annihilation obsession" (1:105).

Volume 2 is perhaps the most compelling of the series. Certainly, the situation that confronted the armed forces of the period is identical to that of most modern soldiers: spending long years in peacetime thinking and preparing for the next war. Because the outcome of these years of preparation (1919–39) is so well known, the essays in *The Interwar Period* are particularly instructive. They illustrate once again the fundamental difficulty in taking "lessons" from the past, as the French army had done so diligently and so well by 1939, and applying them to the present.

Inevitably, readers are drawn to certain key interpretations that buttress or challenge their own understanding of the period. Was France really much better prepared in 1914, as Robert Doughty asserts, than she was in 1940? (2:66) And was her undeniably superior military effectiveness during the Great War attributable to the army's preparation or to the explosion of national will that served to carry France through to victory? Manfred Messerschmidt rather cautiously indicts the German military for accepting unrealistic goals that the nation's

resources could not support. This may disappoint people who see a more fundamental problem in the unholy alliance between the military, criminals, and psychopaths that inhabited the Nazi pantheon.

World War II indubitably was the "payoff" for so many efforts discussed in the second volume. MacGregor Knox's assessment of Italian ineptness in World War II (in vol. 3) abundantly justifies Brian Sullivan's assertion that Italian military leaders, in failing to prepare seriously for war and in lying to Mussolini about their efforts, clearly betrayed their country (2:205). Jurgen Forster's emphasis on Hitler's creation of a militarized national "community spirit" (*Volksgemeinschaft*) that stripped away class and sectional differences shows how Nazi ideology cannot somehow be strained off the heady brew of German tactical brilliance. Apologists for the German army must keep in mind Forster's contention that "Auschwitz was defended at Stalingrad too" (3:181). Perhaps most importantly, John Jessup, in assessing the Soviet armed forces in their "Great Patriotic War," reminds all of us that even modern military enterprise often defies the conviction that "there must be some way of quantifying the factors involved" (3:274).

Is there a "bottom line," a way to encapsulate the 30 years of intense military activity assessed in these volumes? Clearly, one result of this searing experience was the absolute dominance that civilians asserted over the military establishment, beginning in the Second World War. Rightly or wrongly, World War I was commonly perceived as an episode in which civilian governments lost control of their armed forces. Churchill, Roosevelt, Hitler, and Stalin were all determined to prevent this from happening again; each developed his own unique method of maintaining control.

A second conclusion relates to the utility of "lessons" from history and the military's ability to react to such lessons. Certainly, no war was more studied than World War I. Military intellectuals in virtually every country attempted to find a doctrine or strategy that could avoid a repetition of the hecatombs of France and Flanders. Yet, despite the tank and the airplane, despite strategic bombing and the blitzkrieg, World War II was fundamentally a war of attrition on an even larger, bloodier scale than its predecessor. Perhaps the post-Great War military intellectuals—J. F. C. Fuller, B. H. Liddell Hart, Giulio Douhet, Erwin Rommel, Mikhail Tukhachevsky—learned the "wrong" lessons from their experiences. More impor-

tantly, they forgot that a key characteristic of successful evolution is adaptation. As Michael Howard has so cogently pointed out, while military men have an obligation to study and prepare for the next war—and to be as right as possible in their assessments of the nature of future conflict—the key to victory is not predicting the future, but adapting quickly to new conditions once that future becomes present reality.

In so massive a work, the reviewer can always find errors or perceived omissions for which he may mount his hobbyhorse. One might wish, for example, that the Soviet articles had taken greater notice of the scholarship of David Glantz, who has contributed so much to our understanding of Soviet operational technique. Inevitably, the essays with their repetitive formats are at times difficult; some are, frankly, heavy going. Yet, such criticisms must not detract from the overall assessment of the three volumes: they are of very high quality and will serve the academic or the professional soldier long and well. Scholars will find in *Military Effectiveness* much with which they may wish to argue, but also a ready starting point for discussing the military operations of the powers during this critical 30-year period. While soldiers will not find lessons from the past in these volumes readily applicable to their own situations, they will find examples, questions, and provocative conclusions that will enhance their own understanding of how modern military systems function.

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Other Losses: The Shocking Truth behind the Mass Deaths of Disarmed German Soldiers and Civilians under General Eisenhower's Command by James Bacque. New York 10010: Prima Publishing, 1991, 296 pages, \$22.95.

Canadian journalist James Bacque has written a fairly simple and concise book about a very complex and diffuse subject. He, along with his colleague Ernest F. Fisher, Jr., a retired historian at the US Army Center of Military History and author of the book's foreword, is concerned with German prisoners of war (POW) during World War II, in particular with their treatment as that conflict reached its conclusion. Thus, they set out to do what no other military historian has done to date. Unfortunately, their study is driven more by their conclusions than their research.

The thesis of *Other Losses* is simple. The lengthy subtitle screams it out in bold red letters from the dust cover. Such sensationalism no doubt led to the book's being a best-seller in Canada and several European countries and the subject of a Canadian Broadcasting Corporation television documentary prior to its publication in the United States.

Relying on documents discovered at the National Archives, Bacque and Fisher claim that the status of German military prisoners in 1945 was changed from POWs to disarmed enemy forces (DEF). Their captors, the US Army of the Supreme Headquarters Allied Expeditionary Forces (SHAEF), then deliberately deprived them of minimum rations. Consequently, untold thousands—"800,000, almost certainly over 900,000 and quite likely over a million"—died in Allied POW camps. Because General Eisenhower was SHAEF commander at the time, he was aware of these losses. Indeed, according to Bacque and Fisher, he personally made the decision to withhold rations.

The crucial evidence for their conclusion is a document that Bacque and Fisher found in the National Archives (and reproduced in the book), which notes a 30-percent death rate in one particular POW camp. With this information in hand, Bacque tracked down and interviewed Col Philip S. Lauben, SHAEF officer in charge of German prisoner transfers and repatriation in 1945, who allegedly confirmed Eisenhower's decision as well as the number of deaths. Additional interviews with selected US Army POW camp guards, mostly of lower rank, document extreme food shortages and poor medical treatment at various POW camps, as well as individual acts of brutality against German prisoners.

Other Losses was initially published in Canada and Great Britain because US publishers were apparently concerned about the authenticity of its conclusions. Responsible World War II scholars led by Stephen Ambrose, the author of the definitive wartime biography of Eisenhower and director of the Eisenhower Center for Leadership Studies, convened a special conference in December 1990 to consider Bacque and Fisher's findings. (Bacque and Fisher were invited to attend but refused.) Historians from both German and American official military history offices and academic specialists examined the charges in light of the historical evidence.

Ambrose and his colleagues acknowledged that by bringing attention to the lack of historical studies on the treatment of enemy POWs during World War II, Bacque had contributed to

the historiography of the war. However, they judged *Other Losses* to be "worse than worthless." Among major discrepancies, they noted that there was a food shortage throughout Europe in 1945 that led to SHAEF's decision not to provide more food for German POWs but to feed them the same amount that German civilians consumed. Indeed, the Allies had anticipated a famine in 1945, and Eisenhower had personally ordered attempts to stockpile foodstuffs prior to the end of the war.

With regard to the document that cited a 30-percent loss of POWs in one camp, historians pointed out that this figure was an obvious typographical error made by a clerk and should have been 3 percent. As to the testimony of Colonel Lauben, the group of scholars noted that he was 90 years old and legally blind when Bacque and Fisher interviewed him. Furthermore, he later repudiated his statements to television documentary officials. The conference also asked, Where are the bodies? If over 1 million prisoners died in this period, how were they disposed of? Ambrose thought that the maximum German POW losses were probably about 56,000. Lastly, they correctly noted that while Eisenhower, as the World War II commander in chief in Europe, was responsible for everything that occurred in his theater, to make him personally accountable for all high-level policy decisions as well as for individual acts of brutality misses the point totally. Though Ike detested the Nazi ideology and the soldiers who fought to perpetuate it, his own sense of military professionalism and personal decency simply would not have allowed a policy of deliberate starvation.

In short, *Other Losses* is bad history. Given the Air Force's interest in the treatment of POWs, readers of *Airpower Journal* would profit from reading a scholarly account of German POWs during World War II. In that regard, they would be disappointed with *Other Losses*.

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A German Odyssey: The Journal of a German Prisoner of War by Helmut Hörner. Translated and edited by Allan Kent Powell. Golden, Colorado 80401: Fulcrum Publishing, 1991, 428 pages, \$23.95.

The publication in 1991 of James Bacque's revisionist work *Other Losses* drew attention to the issue of Allied treatment of former soldiers of the Third Reich. Bacque alleged that, as a result of a deliberate policy enacted by Gen

Dwight D. Eisenhower, nearly 1 million German army prisoners of war (POW) died in American and French captivity from 1945 to 1946. Although Bacque's thesis and methodology have been thoroughly discredited, interest in the fate of German POWs remains high. Aside from Arnold Krammer's excellent *Nazi Prisoners of War in America*, augmented by a few regional studies and "escape" accounts, the German POW experience until recently has been little studied. This gap in the literature is particularly glaring when contrasted with the vast and diverse body of writing dealing with Royal Air Force officer POWs in Germany.

For this reason, the appearance of *A German Odyssey*, an expanded diary/memoir of a German noncommissioned officer captured in Normandy in August 1944, is especially welcome. Hörner's experiences at POW camps in France, his transatlantic crossing, and his internment at POW camps across the United States typify the condition of the average German soldier captured in the debacle in France in the summer of 1944. In effect, this book gives a voice to the long, grey columns of German POWs seen in grainy newsreels.

The core of the manuscript is a typewritten account which Hörner wrote in the late 1940s, itself based upon a rough diary kept between July 1944 and June 1946. With the assistance of his editor/translator, Hörner wrote a new prologue and epilogue, wisely allowing the central narrative to remain untouched. While some of his reminiscences no doubt reflect postwar reorientation and denazification, many of the observations have the ring of authenticity about them. Witness Hörner's recollection of his reaction to news of the 20 July 1944 bomb plot against Hitler: "A feeling of distress lies on my heart and the picture flashes before my eyes of Hagen as he stabbed Siegfried in the back with his spear" (page 37). His descriptions of small-unit action in Normandy and of German infantry battling against near-total Allied superiority in air power and artillery also provide valuable insights.

Yet, this book's primary value lies in its depiction of the POW experience. Many of the holding camps for German prisoners—particularly those in France in the final months of the war—were poorly organized, maintained, and supplied. Prisoners often had to fall back on their own resourcefulness and guile in order to avert starvation (e.g., some made "gold" rings out of scraps of copper and traded them to gullible American guards in exchange for food). Maltreatment in the camps appeared to be dependent upon the attitudes and tempera-

ments of the individual American officers and men. Although Hörner and his fellow prisoners understandably held many anxious discussions about international agreements and conventions, the lot of the average enlisted POW was strictly a day-to-day affair. Likewise, discussions of politics, grand strategy, or war aims were limited to their impact on the POWs' immediate situations or on those of family members back home in the Reich.

A German Odyssey will disappoint readers who are looking for dramatic evidence of Nazi indoctrination among the German army regulars captured in Normandy. Although Hörner and his comrades looked with disdain upon fellow prisoners who collaborated with their captors, there is little evidence of the National Socialist zeal demonstrated by the POWs captured in Tunisia in 1943 (before hopes of a Nazi victory had completely receded). Additionally, Hörner's account seems to bear out the points made by Bacque's detractors: that the poor conditions suffered by many German POWs in Allied hands were the product of local conditions and individual acts of spite or negligence. The conditions of Hörner's captivity gradually improved, and German POWs in the United States certainly wanted for little in the months following Germany's collapse.

A German Odyssey fulfills the hopes held by its editor/translator when he embarked upon the project. While making no claim to objectivity or analysis, the account provides an interesting and worthwhile counterpoint to the more well-known POW memoirs.

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Panama: The Whole Story by Kevin Buckley.
New York 10020: Simon and Schuster, 1991,
304 pages, \$21.95.

Much work is in evidence in *Panama: The Whole Story*, most of it meticulously researched. Kevin Buckley, a seasoned journalist, tends to stay within a historical narrative format in this absolutely riveting book. A slight bias emerges occasionally, but that can't be humanly avoided.

Throughout my reading of this study, I attempted to identify the single strongest message. There were too many: that Panama's and Washington's politics were interlinked; that Miami is the shadow capital of Panama; that Panama's entire population served the personal interests and was the victim of one man, Man-

uel Noriega: that Noriega emerges not so much as a buffoon as an outright goon; and that the ongoing struggle between numerous US government agencies rivalled the struggle between the US and Noriega. The silliest expectation was that once Noriega was removed from power, Panama would enjoy democracy. Any society from which such utter lunacy emerges is not about to respect the parliamentary process. Many people appear to have enjoyed Noriega's antics—until they became his victims.

Buckley presents a good, intensive history of the events leading up to America's invasion of Noriega's stronghold in December 1989. Noriega had often worked with US intelligence and other government agencies, making a point to rub elbows with everyone who surrounded President Ronald Reagan—including then-Vice President George Bush. Noriega was useful but a pest—an apt observation which we shared with the Medellin cartel. The banks were Noriega's private piggy banks; the army was his personal bodyguard and goon squad; public facilities were his personal property; government workers were his personal cheering squad; and the people were his buffer against enemies, internal and external. How the US government ever became so deeply involved with him emerges as the biggest perplexing question, although Buckley does not delve into this sufficiently. He tells us *what* happened, rarely *why*.

Buckley's story is frightening because no clear, single motive for Washington's obsession with removing Noriega emerges. Was it his substantial role in peddling drugs? His threats to the functioning of the Panama Canal? Or was it all an ego showdown between Noriega and Bush, who inherited the mess from the previous administration? Noriega played with Washington. He gave just enough to keep 'em coming back for more—but always on his terms. At one time, Buckley has Noriega toying with Ollie North, who maneuvered to use Noriega in the perennial search for some shred of evidence that Nicaragua was indeed aiding the rebels in El Salvador. Noriega ultimately stabbed Ollie in the back to prove Ollie's naiveté and the power of his own agenda.

The ongoing relationship between Noriega and the [CIA director William] Casey-North axis was indicative of the ball game they were playing—except that North used a softball and Noriega his usual hardball. "To Noriega and his entourage," writes Buckley, "North was a figure of fun." "To Noriega, North had always seemed untrustworthy and gullible." To Noriega, North

was a flunky, yet "to North, Noriega was a spymaster, an operator, a man who made things happen. He worshipped him like a schoolboy." People did their best to use everyone else for their private purposes. The problem was that in Panama we had only a few alternatives because power was concentrated in only a few hands. But Noriega could pick us apart in Washington, where people were tripping over each other, which made Noriega's task all the easier.

Although Buckley stays close to the history, many questions are raised, all of which are well known to students of foreign relations. One question concerns the concerted effort by US agencies to put the squeeze on Panama's economy in order to pressure Noriega to relent. Of course, he never felt the effects, but the people—the victims—did. Was this another case of destroying a village in order save it? Another problem surfaces. If, to get one man, we spent millions of dollars, lost 23 of our military men, exposed many others to dangers, killed hundreds of Panamanians, and reduced that country's economy to a shambles, is it not high time to implement strategies that permit us to make war on only one man and not (in effect) on virtually everyone else except him? This needs serious rethinking. Secretary of Defense Dick Cheney had promised all along that no Americans would be lost, but in the end too many were—not to mention hundreds of Panamanians. Was Noriega worth it?

Finally, the book is not without its faults. It is intensively written and uses frequent flashbacks, a technique that often makes the author's train of thought hard to follow if one's reading is interrupted. Buckley appears to be afraid of leaving out the least detail; consequently, too many players are involved. Yet, the treatment of the final war itself is too brief. There is also a "Woodwardesque" element in the book. Buckley writes, "In private, Noriega did not believe any of his own words." Or, after Noriega was safely ensconced in the nunciature in Panama City, Buckley offers, "His room was austere but far more comfortable than he imagined a U.S. prison cell would be." How does Buckley know what was in Noriega's mind? Buckley also does the unpardonable when he suggests that Noriega could stay at the nunciature for years. He could become, says Buckley, "a tropical Mindszenty [Joseph, Cardinal, granted asylum by the US government in its legation in Budapest during the Hungarian revolt of 1956]." Mark that one down for the worst analogy of the year! However, such exercises in journalistic license do not appreciably discredit the work.

Panama: The Whole Story is a fabulous book. I learned a lot from it. We were able to make short shrift of Saddam, but I'll wonder forever how we ever came to be manipulated by Noriega and how we became so intimate with him in the first place. A movie will have to be made of this piece of history. But it will have to be toned down considerably—to make it more believable!

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JG 26: Top Guns of the Luftwaffe by Donald L. Caldwell. New York 10022: Orion Books, 1991. 427 pages, \$25.00.

In this detailed documentary, Donald L. Caldwell takes us on a day-to-day, up-close look at one of World War II's most famous German fighter wings, *Jagdgeschwader 26* (JG 26). If one could cast aside the ideology and fanaticism of the Third Reich and look at a single World War II German fighter wing from the perspective of the employment of air power and the makeup of the individual pilots, the similarities—not the differences—between an American wing and JG 26 would be most striking. JG 26, known to both Royal Air Force and American pilots as "the Abbeville Kids," was one of the most respected and best German wings for the most part of the war, having the responsibility of defending the Continent, essentially from the banks of the English Channel all the way back to the fatherland. In order to present a complete history, the author has interviewed over 50 former members of JG 26, from their commander to the ground support troops, and has carefully researched the war records in the US, Great Britain, and Germany. His technique of juxtaposing—in time and geography—the records of aerial combat encounters from both sides has shown many combat engagements for the first time according to the true course of events. As one would suspect in combat reports, enemy losses were exaggerated by both sides (although friendly loss records appear to have been accurately kept). This book will possibly give many of the participants, both German and Allied, of Europe's air battles their first look at the actual outcome of their individual fights.

Another interesting facet of the book is what may be best described as "reverse mirror-imaging" of the Allied and German fighter wings. At the beginning of the war, the German units were equipped with the best aircraft,

which were flown by the most experienced pilots with the highest morale, and greatly outnumbered the Allied forces in the air. The loss ratios were heavily in the Germans' favor. As the war progressed, however, all these factors changed to favor the Allies. By 1945, German aircraft were being flown by pilots with as little as 10–15 hours in type; the experienced combat leaders had been lost; and the Allies owned the skies—even over German airdromes, where they often outnumbered the Germans 10:1. The fact that pilots of JG 26 continued to fly at all in the face of these odds, according to the author, was certainly not a result of a fanatical devotion to Nazism, but of their individual professionalism and the remaining pride they had in their fighter groups.

JG 26 is a carefully researched book valuable to any serious student of World War II. Although it is likely to have some factual errors, as Adolf Galland says in his foreword, "The Luftwaffe destroyed most of its records at war's end, and men's memories of events fifty years ago must be considered fallible. Nevertheless, I feel this book, with its unique perspective on the air war, is a suitable memorial to the fallen men of *Jagdgeschwader 26*."

Col James S. Mosbey, USAF
Moody AFB, Georgia

In Enemy Hands: A Prisoner in North Korea by Larry Zellers. Lexington, Kentucky 40508: University Press of Kentucky, 1991, 224 pages, \$24.95.

The military spends large amounts of money each year to train its people on survival techniques for life as a prisoner of war (POW). The various programs all use the expertise of former POWs to ensure the training is as realistic as possible. Nonetheless, training effectiveness has inherent limitations because we cannot subject the trainees to the kinds of physical and mental abuse they would find in a real POW camp, nor can we leave them there for indefinite periods of time without any idea of when, or whether, they will get out. As a result, capturing the experiences of former prisoners and passing that experience to others is especially important to the POW training system.

Larry Zellers brings his Korean War POW experiences to us from a unique perspective. While he had been enlisted in the Army Air Forces during World War II, he was in Korea as a civilian when the war broke out. He was a missionary teacher who found himself thrust

into the unreal world of North Korea as a civilian prisoner of war. Entering this world basically unprepared for what he was to face makes Zellers's experience especially valuable to us because it lets us see how individuals react when the norms and references they have known and accepted in their lives are suddenly removed. It lets us view how an individual reacts to overcome adversity and how human frailties affect our reactions. From this we can learn possible methods to prepare others for a similar experience. At the very least, we can better understand the experience of others.

Zellers spent three years as a prisoner of North Korea. *In Enemy Hands* describes the harsh mental, and sometimes physical, interaction between himself and his interrogators. His analysis of those sessions is perhaps the most useful part of the book for aiding others in understanding the POW experience. Understanding what is happening to you and why can be extremely important in being able to survive continuous interrogation and to successfully react to it. The same can be said of Zellers's chilling description of his time in the death cells, when he could have been executed at any moment. From there he narrates his horrific experiences along with those of his civilian comrades during the forced death march across North Korea in increasingly worse weather and under universally bad treatment.

On a different level, Zellers relates the interaction with other prisoners and the effect their individual personalities had on how, for better or worse, they handled life as prisoners and how they contributed to the entire POW community. His group included a mixed bag of missionaries, diplomats, and ordinary civilians from various nations. Most interesting to note is that a number of his companions were prisoners of a brutal regime for a second time, having been held by the Germans or the Japanese during World War II. The special insight they brought to the other POWs is especially worth reading and reemphasizes to us the importance of capturing and passing on that insight to others who may suffer the same fate in the future.

In Enemy Hands is a well-written memoir, devoid of the self-serving pulp that often fills memoirs. It reads clearly and is well paced. It is worth reading as a history of a little-known portion of the Korean War, as a training aid for POWs, and as a help in understanding the human experience of war.

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The Heart of a Man: A Naval Pilot's Vietnam Diary by Frank C. Elkins. Edited by Marilyn R. Elkins. Annapolis, Maryland 21402: Naval Institute Press, 1991, 133 pages, \$17.95.

If you are searching for insight into the mind and heart of a Vietnam-era pilot, this book is for you. It is candid, moving, and—at the same time—challenging. Its message is all the more trenchant since the author's hope that "everything will be perfect if I can just get through the next three months alive" was ultimately unfulfilled.

In reading the brief accounts of the numerous missions described in this book, one gets the strong impression that this is not simply the story of one man, but a revelation of the shared experiences of many Vietnam warriors. *The Heart of a Man* unveils a spirit common to many military members once they find themselves in combat. Now that we have a new generation of pilots whose mettle has been tested in war, it would be intriguing to compare their experiences and emotions to those of Vietnam veterans. Although the wars were quite different, many of the pilots' reactions could be similar.

The text is edited by Elkins's widow and was originally published in 1973, seven years after his aircraft was shot down. Elkins had been maintaining an extensive diary of his actions and emotions, since "he planned to write a novel after he returned and felt that a record of his own immediate reactions to the war would serve as valuable source material." Marilyn Elkins was fortunate to receive her husband's "unexpurgated" diary to read. A pilot was appointed to censor the material before it was sent home, but he took a risk, stating, "I will not be responsible for changing one word of his diary." Only a week later, this aviator himself died in the tragic fire aboard the USS *Oriskany*. Marilyn Elkins relates that his death "freed me to publish the diary."

The Heart of a Man records a dramatic transformation. We begin with an enthusiastic aviator, eager to make his mark in combat. He is concerned about his career progression and recognizes the key role that his combat experience will play in future assignments. He displays farsighted plans:

I've noticed that as officers grow more senior, they forget (honestly forget, not just disregard) the things that really bugged them as junior officers.... So I am writing down every really notable thing that I honestly feel should be done in cases where something else was done.

On the cruise toward Southeast Asia, he tempers his enthusiasm by recognizing that "having never been shot at, I may be premature in asking for a lot before I taste a little." Even after tasting the bittersweet flavor of combat, he has mixed feelings about the prospects of transferring early to a special-duty assignment before the completion of his tour. Finally, toward the end of the tour, he relates his sleeplessness due to his fear over an impending "night hop":

I couldn't go to sleep.... The very idea of a whole career in the Navy was so remote to me that I decided that I wanted out of all this, decided that the thing for me to do was go through three years of shore duty and then go back to North Carolina and do something: law, teach, anything.... I could think of all that, knowing that if I turned in my wings, that I'd have to live all my life in that same feeling of shame, having the medals but secretly knowing that I had given up because I didn't think I had the stuff to keep going when it got rough.

Even from the beginning, he saw the dilemma of war ("I deeply believe in what's happening here.... Still war is legal murder"). In this book we witness the gradual transformation of a man who is trained to fight and kill into a person truly struggling with deep moral dilemmas.

Bob and I found some trucks.... We turned one over and left four burning and exploding, but you only think about the trucks and supplies and not people. It's cruel, but it's almost necessary to keep yourself sane if you have any humanitarian sensitivities.

Early on in his combat flying, he had sensed that "I guess I need to hate a little.... I'm just not vindictive enough. I hope it doesn't take the loss of one of us to get me on the proper plane."

Elkins was lost during a particularly difficult period of the war. We hear his initial optimism dissipate to the point that 50 days before his life ended, he lamented the fact that he had "too much to live for." He regarded this as an ill omen which took the keen edge off his combat abilities and made him "afraid I'll lose something that's really necessary to get me through all this."

One thing that's really difficult about being married to her is that my attitude is now not as good as it was when I felt I had nothing really to lose. I enjoy living more than some, and if I'm killed, surely there are plenty who will say, "Too bad," and mean it. But I've never felt that the world would be greatly altered. I've lost that attitude, though it's the best possible frame of mind to be in when you know there's a good chance you won't make it

back. It's those who have too much to live for; they're always the ones who get it. And me, I've got too much to live for now.

One of the most appealing aspects of this book is its uncompromising honesty. After recounting an onboard party featuring "some 200 proof stuff mixed with Hawaiian Punch," he states, "When I woke up the next day I felt like pure hell!" At the conclusion of the account, he confesses, "I'm really ashamed of all this, but I don't want to color it in the account, since I'll later like to remember it as it was, good or bad." This candid spirit makes the book valuable not only to aviators, but to all students of the human psyche in combat. One critical example follows:

I don't like to admit this, and if I get killed and Barry reads this as I have given him permission to do, I think it may make him cringe as it would me if I were reading the same thing in his journal. However, the truth is, I downed an aircraft on deck for a bad gyro, and it just wasn't the truth.

As enlightening as the book is, it does possess one distinct drawback—its price. Admittedly, book prices continue to rise, but to charge this much for so brief a volume (printed, for that matter, with widely spaced text) is unfortunate. Perhaps the diary should have been released in paperback so it would be more affordable. Nevertheless, the account certainly merits reading, and we can be grateful that it has been republished.

Due to both its engaging content and its brevity, this is a book easily read in a single sitting. Yet, it raises significant issues which can be pondered for long hours. While his widow acknowledges that "finding any justifiable reason for Frank's death remains problematic," she takes some comfort in the hope that his diary may "serve as a permanent example of the personal cost of wars in American life." This, most certainly, is something none of us can afford to forget. Two days before his death, Lt Frank C. Elkins reflected a genuine, battle-won courage that had dispelled the bravado of short months earlier, when he wrote,

I hate night hops.... Every time I walk up on that deck knowing what's coming up, it's like facing death. Hell, more than that, it is facing death; but I think I face it sometimes more heavy-hearted than other folks. I think I'm sometimes more cowardly about it than others, more hesitant. But dammit, I do it.

Chaplain Capt Robert C. Stroud
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Command Performance: The Neglected Dimension of European Security by Paul B. Stares. Washington, D.C. 20036: Brookings Institution, 1991, 240 pages, \$29.95.

With the fall of the Berlin Wall and the decline of the Warsaw Pact, some strategists might conclude that the need for NATO no longer exists. Not so, argues Paul Stares. Instead, the alliance's command and control (C²) system assumes new importance because of the instability in Eastern Europe. In this compact and well-written study, Stares makes two significant arguments. First, he maintains that the NATO command system has been neglected because most battlefield analysis focuses on weapons and doctrine. This resulted in less emphasis on the command structure, which—in the author's view—could have led to inadvertent war. Stares then uses this main argument as a springboard to suggest that an improved C² system in NATO can make the alliance a factor for stability in a rapidly changing European context.

Stares breaks new ground. The literature dealing with C² systems does not deal with NATO to the same degree that the author does. *Managing Nuclear Operations*, edited by Ashton B. Carter, John D. Steinbruner, and Charles A. Zraket, and Bruce G. Blair's *Strategic Command and Control: Redefining the Nuclear Threat*, both published by the Brookings Institution, discuss C² systems as they relate to nuclear operations in a war between the Soviet Union and the United States. NATO C² systems receive a general overview. Stares, on the other hand, reviews command performance in three battles; discusses in great detail the NATO command structure; illustrates the problems inherent in the system at the theater, operational, and tactical levels if NATO were attacked; and concludes with his recommendations for the future.

The author begins by explaining why C² systems have been neglected. Stares faults historians for assessing past wars and neglecting any discussion of C². He thinks this is because of the prevailing perception that command systems are not really part of weapons systems. In his view, the nature of command systems cuts across lines of technology, organization, and human behavior. The author finds another reason for such neglect in the political systems of the European alliance members. The necessity for NATO's too consultative body to report to individual member governments could, in the author's view, hamstring decision making in

crises. Furthermore, Stares finds that NATO's forward defense and the development by both NATO and the Warsaw Pact of a quick, deep-strike doctrine only compounds the problem of command performance should a conventional war escalate quickly to nuclear exchange.

Stares examines command performance and military effectiveness in three key battles of World War II. He finds that intelligence collections and processing, command decision making, and communications played pivotal roles. During the battle of France in 1940, the Allies failed to act on important intelligence that Germany was massing for attack. Such intelligence conflicted with the view held by Allied leaders of what they thought Germany would do. Furthermore, the Allied chain of command was highly centralized and cumbersome, allowing—for instance—the British to appeal command decisions directly to Great Britain. On the other hand, the German chain of command was decentralized, paralleling the Germans' speed of attack. In another case study, the author cites the advantages of an integrated air defense system that afforded British Fighter Command the capability to scramble aircraft on warning, thereby avoiding the necessity of having to patrol British airspace. By contrast, Germany's Second and Third Air Fleets each planned and communicated separately to the German High Command, confusing Germany's air effort against Britain. The author also cites US code-breaking efforts and the flexible US chain of command as important factors contributing to victory at Midway.

Stares gives NATO's C² systems low marks. He finds NATO's system vulnerable to conventional attack and its key posts, surveillance systems, and intelligence centers incapable of withstanding a high-intensity attack. He decries wholly unrealistic exercises which fail to approximate real war conditions and the failure to standardize communications equipment throughout the alliance. Stares recommends that NATO's mission be changed to that of crisis management and conflict prevention. In order to accomplish this new reorientation, NATO would need its own intelligence and warning satellite system, more realistic exercises, standardized communications and technical support, a rapid-reaction force to respond to any emergency, and greater flexibility in its contingency plans to respond to a variety of situations with the goal of stabilizing crises.

Command Performance is well written and interesting. The author makes extensive use of

personal interviews and secondary sources. Still, the question remains as to who will pay for such extensive retooling of NATO's C² system in this period of fiscal restraint.

Maj William S. Borgiasz, USAF
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A Time for War by Robert Smith Thompson.
New York 10023: Prentice Hall Press, 1991,
449 pages, \$24.95.

Robert Smith Thompson's *A Time for War* is an unoriginal and historically inaccurate New Left critique of America's entry into World War II. In the tradition of Charles Beard's *President Roosevelt and the Coming of the Pacific War, 1941* (1948), the present volume is a polemical screed against Franklin D. Roosevelt's (FDR) imperial presidency and his duplicitous determination to embroil the United States in war. Unfortunately, the muckraking author commits so many historiographical sins that *A Time for War* becomes yet another example of how pundits use and abuse history to confirm a predetermined point.

Thompson's goal is to repudiate traditional explanations of America's entry into World War II, even though scholars have significantly modified them over the last 20 years. According to Thompson, postwar historians were actually mythographers. They promulgated the myth that prior to 1941 the United States was an inward-looking and neutral nation and that it initially failed to recognize incipient German and Japanese aggression. With recognition came appeasement, which unnecessarily delayed American rearmament and left the nation vulnerable to attack. Consequently, it was Japan's cowardly and unprovoked attack on Pearl Harbor that drove the United States to war.

In contrast to the above interpretation, which the American people readily accepted, the author argues that the United States did not enter the fray because of Pearl Harbor. By late 1941, America was already in a naval "war" with Germany and an economic "war" with Japan. Further, FDR "possibly" ("probably" in the author's lexicon) had advanced warning of the Pearl Harbor attack and allowed it to happen. Despite congressional neutrality laws and public unease, Roosevelt did so because he was less interested in containing Germany and Japan than in provoking a fight. According to the author, FDR wanted to precipitate "an incident" that would extend American involve-

ment beyond controlling the Atlantic Ocean and providing material and financial aid to China, Great Britain, and the Soviet Union. As a result, "provocative" actions such as the Lend-Lease Act were "indistinguishable from incitements to war" (page 401). (That lend-lease was not a slavish concession to a de facto ally goes unsaid in *A Time for War*, since it does not fit the author's conspiratorial portrait of FDR. In fact, the goods received did not out-value payments for two years.) To Thompson the real question is not whether Roosevelt provoked a fight but rather why he did so. He did not enter the fray, according to the author, to save democracy or because there was a clear and present danger to the security of the United States. Instead, the United States declared war because Roosevelt-inspired interventionists saw themselves, and the nation, "engaged in a titanic struggle for the right to make the rules for the world" (page 402). Specifically, the Roosevelt administration wanted to reestablish the "golden yesterday" of the nineteenth century, with its political stability and unparalleled prosperity but with the United States as the preeminent power rather than Great Britain. (Since it would upset the author's ahistorical portrait of the United States as a reactionary power, *A Time for War* ignores the possibility that any American would remember the late nineteenth century as an era that included the depressions of 1873-78 and 1893-97.)

The limitations of *A Time for War* have their roots in the Wisconsin school of historiography, which began with William Appleman Williams's *The Tragedy of American Diplomacy* (1959). The latter's emphasis on economics, the impact of business elites on government policies, and the role of self-interest in US foreign policy was new and important. Williams's New Left disciples subsequently (and rightfully) challenged the mixture of fact and fiction that plagued traditional American studies, but their works sometimes degenerated into "blame-America-first" jeremiads. This occurred because Wisconsin school historians also saw themselves as social activists. To buttress their revisionist agendas, they used and abused history in dubious ways.

A Time for War, a volume that restates familiar New Left themes, stems from the above tradition, and thus commits many of the historiographical sins found in other Wisconsin School-inspired studies. For example, by deliberately focusing on a short period of time (1938-41), Thompson can establish bogus cause-and-effect relationships, accept the moral

equivalency of Japanese and American behavior, and neglect the role of 75 years of Japanese colonialism as an impetus to war. The author further depends on secondary rather than primary sources, and the authorities he does cite are overwhelmingly Western. As a result, *A Time for War* completely ignores recent Japanese analyses of the Pacific war that acknowledge Japan's war guilt. Thompson does cite a limited number of primary sources, but he ultimately depends on experts rather than documents to support his themes. (Tellingly, the most frequently cited "document" is the *New York Times*.)

The above strategies thus allow the author to demonize President Roosevelt. Since New Left historiography has its philosophic roots in the Enlightenment, it typically assumes that history is rational. Human events are not driven by chance, nor do they stagger from one crisis to another. If the cause of an event is not apparent, it exists nevertheless. Unfortunately, such an assumption can support conspiracy-based interpretations of history, and one of the great conspiracy theories of American historiography centers on Franklin D. Roosevelt. As suggested earlier, Thompson is not the first to characterize FDR as an omniscient and Mephistophelian figure who single-handedly manipulated America and Japan into war. Nor is he the first to push this single theme far beyond its capacity to explain the actions and reactions of different nations, governments, and military establishments. As a result, the author empties people and events of their true complexity. He minimizes FDR's genuine idealism, as embodied by the Four Freedoms, his frequent indecisiveness, and his anticolonialism, which strained US relations with Great Britain; he focuses on the Japanese-American endgame and ignores how the diplomacy (or its absence) of eight different nations contributed to the Pacific war; and he suggests, since the Japanese were "mired down" in China and the Germans were "bogging down" in Russia, that the inviolable United States could have accepted a stalemate with the Axis powers in 1941. (Thompson seemingly draws the latter conclusion from Bruce Russett's ahistorical *No Clear and Present Danger* (1972), a text delimited by Professor Russett's pacifism and the specter of the Vietnam War.) To say that in 1941 America and its interests were not in danger and that World War II was more or less over is historically irresponsible. Considering that tens of millions were yet to fall, Sheldon Cohen is right to observe that "there are positions that can be

defended only by those who confuse studying history with suffering it."

Ultimately, and because it is an example of history by omission, misplaced emphasis, and innuendo, *A Time for War* is an untrustworthy guide to America's path to war. Instead, interested readers should consult Waldo Heinrichs's *Threshold of War* (1988) and the works of William Langer and S. Everett Gleason.

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The March of Conquest: The German Victories in Western Europe, 1940 by Telford Taylor. Baltimore 21201: Nautical and Aviation Publishing Company, 1991, 374 pages.

Only a few books that were written in the 1950s about the German army are important enough to be kept in print. Walter Goerlitz's *History of the German General Staff*, Gordon Craig's *The Politics of the Prussian Army, 1640-1945*, and Harold Gordon's *The Reichswehr and the German Republic* all come to mind as works still essential for a student of the German army. Telford Taylor's *The March of Conquest*, originally published in 1958, belongs with the above list. Fortunately for the serious military history reader, the Nautical and Aviation Publishing Company has just reprinted Taylor's study.

The March of Conquest examines the German campaigns of 1940 from the Scandinavian invasions through the battle for France to the aborted Operation Sea Lion. Taylor concentrates his research and narrative on the strategy and plans of the Wehrmacht High Command and the senior German commanders. He writes as one of a very few historians who has a realistic grasp of the problems of friction in war and the effect of circumstance and personality upon grand strategy. Taylor also belongs to a minority of historians who possess an in-depth familiarity with the German army system and the personalities of the senior commanders. Taylor had the advantage of serving as an Army intelligence officer in World War II and as chief counsel for the prosecution at the Nuremberg trials. Needless to say, Taylor has a knowledge of German General Staff documents that few historians have been able to equal.

Taylor's familiarity with both the German military and the original documents shows to its best advantage when he outlines and

explains the planning for the 1940 campaign. He corrects several serious misconceptions popularized in the works of B. H. Liddell Hart, Walter Goerlitz, and Alan Bullock due to an overreliance on postwar memoirs, recollections, and a superficial approach to original documents. For example, Taylor effectively sinks the myth that the original plan for the 1940 German advance into the Low Countries was no more than an unimaginative copy of the Schlieffen Plan. Since developing campaign plans is a complex process, Taylor skillfully takes the reader through the several stages of the evolution of the plan that shattered the Allied armies in 1940. While acknowledging that the concept of the armored thrust through the Ardennes came from Gen Erich von Manstein, he details the work of Gen Gerd von Rundstedt and others in developing the plan and getting it adopted by the High Command.

Another myth popularized by Liddell Hart and others that Taylor demolishes is the story that von Manstein was demoted and pushed aside in January 1940 by a reactionary General Staff that resented his brilliant planning. Taylor points out that von Manstein's transfer from his post as army group chief of staff to command of an infantry corps was by no means a demotion. The transfer was in accordance with normal personnel policy, and—after several years on the staff—Manstein was due for a field command. He was not offered a mechanized corps as a slight but simply because such commands were given to generals of higher or equal rank, such as Hermann Hoth, Heinz Guderian, Erich Hoepfner, and George-Hans Reinhardt, who already had field experience in leading armored forces—something Manstein lacked at the time.

Taylor's study of the General Staff also sheds light on important questions, such as the cause for the German delay in cutting off the Allied retreat at Dunkirk. With a common-sense approach, he points out that the Germans, disorganized after their swift advance to the English Channel, took their time in destroying the Dunkirk pocket because the continental-minded General Staff had no idea that naval power could intervene so effectively and evacuate the majority of the trapped Allied troops.

The primary drawback to *The March of Conquest*, which Taylor acknowledges, was that books and articles detailing the Allied side of the story were scarce when the study was written in 1958. Since then, numerous good books from the Allied perspective have appeared, such as Alistair Horne's *To Lose a Battle*;

France 1940 (published 1969), and several of Taylor's mistakes concerning Allied numbers and equipment have been corrected.

In summary, Taylor's *The March of Conquest* is a good book for the well-stocked military history library. It contains a thorough examination of the strengths and weaknesses of German strategy. Further, it is extremely well researched and well written, and displays a high quality of historical and military understanding.

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From Sumer to Rome: The Military Capabilities of Ancient Armies by Richard A. Gabriel and Karen S. Metz. Westport, Connecticut 06881: Greenwood Press, 1991, 182 pages. \$45.00.

This fascinating study appears in the Greenwood series of Contributions in Military Studies, which includes explorations that are refreshingly novel such as Carl Van Dyke's *Russian Imperial Military Doctrine and Education, 1832–1914*, and Joseph Leggold's *Declining Hegemon: The United States and European Defense, 1960–1990*. In keeping with the nature of this scouting operation, the work under review looks at the military history of antiquity from a standpoint unusual among military historians and analysts, namely that of military sociology and military medicine. Furthermore, the book is distinctive inasmuch as it resorts to contemporary field trials that reproduce and approximate the effects of various weapons of antiquity. This is a commendable initiative; details of the procedures used in these simulations are set forth in the introduction.

The first third of the book provides the foundation and framework in describing the historical sociology of war and organized military forces from about 4000 B.C. (Sumer [part of ancient Babylonia]) to about A.D. 100 (imperial Rome at its height). Another way to describe this span of centuries is to say that it begins after the Stone Age ends—namely with the Bronze Age—and that it continues with the Iron Age, most famously symbolized by the gladius, the sword of the Roman legionnaire. The Iron Age, which the authors date from about 1500 B.C., “saw the practice of war firmly rooted in man's societies and experience and, perhaps more importantly, in his psychology.... At this time armies produced the pro-

totype of every weapon that was developed for the next 3,000 years" (page 19).

This historical sociology is not, contrary to appearances, a venture into military history by some metallurgist. The authors make it clear more than once that their thesis is not one of technological determinism (e.g., page 48). The sociology is essentially political and, though it recognizes the importance of irrigation in ancient Egypt and Mesopotamia, makes no use of the concept of hydraulic society or any reference to Karl August Wittfogel's *Oriental Despotism: A Comparative Study of Total Power*.

The historical aspect of the thesis is summed up in a curve of twin peaks separated by millennial decline. Rising from Sumer to imperial Rome, the curve drawn by the authors sums up a very impressive and fairly cumulative achievement. After Rome (the New Rome of Byzantium is excluded without acknowledgement or explanation), all is decline and darkness until Napoléon and after. The validity of this grand curve depends in part on the definition of the term *military*. The curve will presumably find a friendlier audience among historians of ground forces than among naval historians. The early modern breakthroughs in cartography, celestial navigation, and the determination of longitude by the surprising method of chronometry—all of which is the standard story of modern naval power—might make one doubt the long valley between the peaks.

Quite independently of that issue, however, this book makes a substantial and distinctive contribution in its several chapters on military medicine. This is a field in which most military historians—and presumably most military commanders—are traditionally inexpert in the extreme. The simplest way, perhaps, to highlight the importance of military medicine to the nonmedic—military or civilian—is to define the entire variable of preventive and therapeutic military medicine as a major part of what Clausewitz called friction: that is to say, the difference between military capability on paper and military capability as exercised in the real world. There are still too many people who consider war a matter of arrows on maps; for them, especially, this book should be an eye-opener. It is clear, in any case, that the authors are aware of contemporary concerns in the US Army, ranging from the ever-shrinking tooth-to-tail ratio (most recently at about 1:11) and current issues in military medicine such as "quantum healing" (page 160, note 3).

The book is chock-full of vivid and surpris-

ing detail about the accomplishments of the ancients, especially Sumerians and Romans, in matters military. Further, the footnotes and a substantial bibliography guide the reader to specialist literature in the English language.

John Tashjean
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Fall of Eben Emael by Col James E. Mrazek, Jr.
Novato, California 94949: Presidio Press,
1991, 192 pages, \$19.95.

Father Time has scythed away two full decades since this tale by an old Army colonel first appeared in print. However, the passing of a generation has failed to diminish the eloquence, acuity, or drama with which this singular military escapade is told. Further, the intervening score of years has not lessened the relevance of Colonel Mrazek's central message. His book documents by example the inevitable result of ignoring technological progress and of adhering to antiquated dogma in the face of the surprise application of new weapons. It also documents, for the military thinker interested in defending against future Hitlers, a creative military plan carefully laid out by Adolf Hitler himself.

Hitler knew that Fort Eben Emael was the key to the defense of Belgium. Its capture meant that mobile armed forces and the logistics trail necessary for a successful blitzkrieg could be funneled through the border at that point. The result, in fact, led the Allied armies to the brink of destruction. They were saved only by their miraculous evacuation to England from Dunkirk. By contrast, if Eben Emael had withstood the attack for just a few days, the German assault might have been delayed enough to allow the Belgians, British, and French to take significant countermeasures.

In 15 chapters, Colonel Mrazek describes every aspect of this mission (code-named Granite). He outlines the military significance with maps. He takes the reader deep into the "impregnable" fortress, down dark, concrete tunnels, through heavily riveted steel doors, into the command center, into the ammunition chambers, and into the gun-turret casemates. His descriptions throughout the book are vividly interlaced with quotations from survivors. He outlines the German glider program: the promotion of sport gliding, the secret research into military models, the specialized training of the glidermen assault forces. He tells of the invention of "hollow-charge" explosives and

the fact that secrecy forbade even the glidermen from learning, in exercises, of their tremendous power against fortifications.

The actual assault was replete with surprises. For example, the lieutenant leading the 77-man assault force had the misfortune to be in a glider prematurely thrown off its towplane, due to a near midair collision on the way to the target. The clarity of the writing allows readers to put themselves in the place of the characters. Imagine having to recross the Rhine (as did the lieutenant), land in a field, and attempt to scare up a quick tow to continue the mission!

Fall of Eben Emael is thorough, well documented, well organized, and clearly written. Even for those readers outside the military ranks, it makes exciting reading.

Maj Thomas C. Blow II, USAF
Scott AFB, Illinois

Barons of the Sky: From Early Flight to Strategic Warfare; The Story of the American Aerospace Industry by Wayne Biddle. New York 10020: Simon & Schuster, 1991, 365 pages, \$22.95.

Readers expecting a lively and gossipy account of the birth and growth of the American aviation industry will be both pleased and perplexed by this book. On one level, their expectations will be well rewarded. Wayne Biddle, a respected aviation writer for the *New York Times* and *Smithsonian Air & Space*, has used the personal papers of Glenn Martin and Robert Gross as a starting point for an anecdote-filled reminiscence of the early years of not only Martin Marietta and Lockheed, but most of the other early pioneers in the new and highly speculative airplane business. Instead of emphasizing advances in technology, he approaches aerospace development as a human history, moral pitfalls and all. In complete rapport with his subject, Biddle gives us numerous matchless and entertaining insights into the personalities of Prof Samuel Langley, Donald Douglas, Jack Northrop, the Loughhead brothers, and many others whose names are com-

monplace in aviation lore today. Readers who romanticized the aviation pioneers during their formative years will enjoy such stories as Glenn Martin's barnstorming campaigns against rival Glenn Curtis, Donald Douglas's combined airplane and potato enterprise, and the Wright brothers' sullen and tragic descent into endless litigation.

Barons of the Sky, however, is far more than a book of chatty reminiscences, and on another readership level it appeals to the social critics who cast a jaundiced eye on the end products of the aviation pioneers—the supercharged aerospace corporations which now bear their names, if not their élan. Those rakish individuals, after all, had to contend with a hostile business base and a wildly unsettled economy, as well as infant technologies and unfamiliar laws of physics. These problems were less easily conquered than the air itself, and the survivors were those entrepreneurs who were able to fabricate and sell their products in the face of a wary general public and a decidedly flabby civil aviation market. Biddle finds that their salvation lay in the federal government, particularly in its growing demand for warplanes, and proceeds to paint the entire industry in darker tones of greed and international amorality. The economic rescue represented by the military market was certainly true and obvious enough, but the path from innovative aeronaut to soulless weapons industry was neither slippery nor inevitable, and the author frequently becomes too glib in his assertions to the contrary.

The practical constraints of length make this study disappointing in some ways; it would be nearly impossible in one book to decently satisfy Biddle's ambitious topic. The World War II and postwar eras are only lightly touched upon, and the wartime expansion of the aviation companies alone begs for a substantial book of its own. Lawrence Bell's story is neglected, Roy Grumman never appears, and one wishes for a more satisfying discussion of the demise of Jack Northrop's cherished flying wings. Even so, the book is worthwhile in that it is usefully detailed for the newcomer to the subject and entertaining for the old hand.

Dr Raymond L. Puffer
Norton AFB, California

Basis of Issue

AFRP 50-2, **Airpower Journal**, is the professional journal of the Air Force. Requirements for distribution will be based on the following:

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USAFA Instructor Opportunities

The Military Studies Division at the United States Air Force Academy is seeking highly qualified captains for instructor duty. This duty involves motivating and teaching cadets in university-level courses that stress air power, the art of war, military theory, doctrine, and force employment. Since its inception in 1980, the curriculum in professional military studies has evolved into one of the most interesting and demanding areas of study at the academy. A master's degree is required of all applicants. Preferred degrees for military studies instructors are in history, military history, political science, and international relations, or in area studies of the former Soviet Union, Eastern Europe, or the Middle East. Experience in tactical or strategic operations or in operationally related specialties is highly desirable. The division can sponsor a few highly qualified applicants with the appropriate background for a master's degree through the Air Force Institute of Technology (AFIT), with a follow-on assignment to the Military Studies Division. Applicants should have three to seven years of commissioned service, an outstanding military record, and impeccable military bearing and appearance. Interested individuals should consult chapter 8 of AFR 36-20, *Officer Assignments*, for application procedures or write Capt Jeff Cohen, Headquarters USAFA/CWIS, USAF Academy CO 80840-5421 or call DSN 259-3255/3258.

New Publications from Air University Press

Air University Press announces the release of *Setup: What the Air Force Did in Vietnam and Why* by Dr Earl H. Tilford, Jr. Dr Tilford, a

retired USAF intelligence officer, takes a critical look at how the Air Force flew and fought in Southeast Asia. He argues that although the Air Force effectively applied air power at particular places (e.g., Khe Sanh, An Loc) and times, it was unable to devise a strategy and doctrine appropriate for the conflict in Southeast Asia. Tilford surmises that the Air Force's institutional experience and the mind-set of its leadership doomed it from the beginning to expect much but achieve little with air power. He points out that the 94-targets list devised by the Air Staff was deeply rooted in the mind-set of the strategic bombing offensive that emerged in AWPD-1 during World War II. The Air Force leadership firmly believed in the efficacy of that strategy. Air Force doctrine, rooted as it was in the World War II experience, prevented the generals from realizing that Vietnam was a far different war and that North Vietnam did not have a clearly defined center of gravity (i.e., a modern industrial and transportation infrastructure that supported the war machine of North Vietnam).

Other recent books and monographs:

ANZUS in Revision: Changing Defense Features of Australia and New Zealand in the Mid-1980s by Lt Col Frank P. Donnini, USAF, 1991 (book).

Responding to Low-Intensity Conflict Challenges by Dr Stephen Blank et al., 1991 (book).

Space Control and the Role of Antisatellite Weapons by Maj Steven R. Petersen, USAF, 1991 (monograph).

Military Airlift: Turbulence, Evolution, and Promise for the Future by Lt Col Thomas E. Eichhorst, USAF, 1991 (monograph).

To order the above publications, contact the Air University Press, Publication Support

Branch, Maxwell AFB AL 36112-5532 or call (205) 953-6452 or DSN 493-6452.

Conference Announcement

The United States Air Force Academy will hold the Fifteenth Military History Symposium, "A Revolutionary War: Korea and the Transformation of the Post-War World," 14-16 October 1992. For further information, contact Capt T. N. Castle, Headquarters USAFA/DFH, USAF Academy CO 80840-5701 or phone (719) 472-3230.

1992 Military Review Writing Contest

The commandant of the US Army Command and General Staff College is pleased to announce the 1992 *Military Review* writing contest. Entries on the topic "The US Army in Joint, Combined, and Coalition Warfare" will be accepted through 1 July 1992. The winning author will receive a \$500 cash award, and the manuscript will be published in *Military Review* in the fall of this year. Second- and third-place winners will receive \$200 and \$100, respectively, and all entries will be considered for publication in *Military Review*. Appropriate subjects include, but are not limited to, current and future roles and missions; doctrine; historical perspectives; service relationships; recent operational lessons; and education and training. The principal consideration should be joint, combined, and coalition war-fighting capabilities of the present and future. Entries will be judged for relevance to current Army needs, research, and scholarship. Manuscripts must be original and not previously offered elsewhere for publication. They should be between 2,000 and 2,500 words, typed, and double-spaced. Entrants must indicate clearly that the manuscript is a contest entry. A writer's guide is available upon request. Send entries to *Military Review*, US Army Command and General Staff College, Funston Hall, Fort Leavenworth KS 66027-6910.

Air Force Historical Foundation Award

Lt Col Brian W. ("Bingo") McLean, presently assigned to Headquarters USEUCOM/ECJ5-T (long-range plans), is the winner of the James Cannell Memorial Award for 1991. From 1990-91, Colonel McLean was a PACAF command-sponsored research fellow at the Airpower Research Institute (ARI) of the Center for Aerospace Doctrine, Research, and Education, located at Maxwell AFB, Alabama. His monograph, entitled *Joint Training for Night Air Warfare*, was one of nine considered for the Cannell Award. The award is named in honor of the late, long-time executive director of the Air Force Historical Foundation and is presented annually to the author of the best command-sponsored research project completed at ARI. Projects are evaluated on depth and breadth of research; quality of writing and organization; and interest and importance to the Air Force. Colonel McLean receives a \$500 US savings bond, has his name engraved on the Air Force Historical Foundation plaque that is maintained at ARI, and will have his study published as a book by Air University Press.

AFM 1-1 Published

The new AFM 1-1, *Basic Aerospace Doctrine of the United States Air Force*, has been released. Gen Merrill A. McPeak, Air Force chief of staff, says this edition has special significance to all Air Force members, both in the field and at headquarters levels. In the foreword to the manual, he stresses the importance of every commissioned and noncommissioned officer's studying and understanding this basic doctrine, which is the foundation of the profession of arms for airmen. The two-volume manual not only sets out the doctrinal concepts which guide the employment, organization, and training of aerospace power, but also provides historical examples and experiences which have shaped Air Force beliefs. Every active duty officer and chief master sergeant in the Air Force will receive a copy so that they can easily make it the centerpiece of their professional knowledge.

contributors



Gen Russell E. Dougherty, USAF, Retired (AB, Western Kentucky University; JD, University of Louisville) was commander in chief of the Strategic Air Command and director of Strategic Target Planning (Joint Strategic Target Planning Staff) from 1974 until his retirement in 1977. He served as commander, Second Air Force, and as deputy chief of staff, plans and operations at Headquarters USAF. He was chief of staff at Supreme Headquarters Allied Powers Europe from 1972 to 1974. He was a command pilot and served in operations, maintenance, judge advocate, political/military, and command duties during active service in the Air Force. General Dougherty also had four assignments in joint and international duties. During World War II, he was an instructor pilot in the Air Training Command and Third Air Force. Since retiring he has been executive director of the Air Force Association and is now an attorney with a Virginia law firm. General Dougherty is a graduate of National War College.



1st Lt Gary A. Vincent (BS, Rensselaer Polytechnic Institute) is assigned to the 727th Air Control Squadron (Test), Hurlburt Field, Florida, as an air weapons director for the modular control equipment (MCE) system.



Lt Col L. Parker Temple III, USAF, Retired (USFA: MBA, University of Northern Colorado; MS, West Coast University), is a private consultant on space policy and programs. During his 20 years in the Air Force, he flew the F-4 and T-37 and was assigned to Air Force Systems Command, Tactical Air Command, and Air Training Command. At the time of his retirement, Colonel Temple was chief, Database Development,

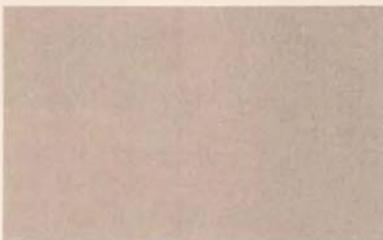
Office of Space Systems, Office of the Secretary of the Air Force. He has published articles on air and space issues, has been a previous contributor to the *Airpower Journal*, and helped write Department of Defense and Air Force space policies. Colonel Temple is a graduate of Squadron Officer School, Air Command and Staff College, and Naval War College.



Lt Col Michael A. Kirtland (BA, Coe College; MPA, University of Colorado) is a military doctrine analyst at the Airpower Research Institute, Center for Aerospace Doctrine, Research, and Education, Maxwell AFB, Alabama. He was a member of the initial cadre in the development and deployment of ground launch cruise missiles, serving at the training squadron and as chief of training at Florennes, Belgium. He served as a military studies instructor at the US Air Force Academy and as a Titan II missile launch officer. He was the first associate editor of the *Airpower Journal* and has published in numerous military publications. He compiled and edited the *Air University Review Index* and is currently completing the editing of the five-year index of *Airpower Journal*. Colonel Kirtland is a graduate of Squadron Officer School, Air Command and Staff College, Air War College, and the National Security Management Program.



Capt Lawrence A. Cooper (USAFA; MBA, Webster University; MS, AFIT) is a satellite operations officer, Air Force Space Command, Falcon AFB, Colorado. In a previous assignment at the Air Force Weapons Laboratory, he was a space systems physicist and a mission planner on the Relay Mirror Experiment. Captain Cooper was recently a student in the Graduate Space Operations Program at the Air Force Institute of Technology. He has published several articles on space systems and space systems survivability.



Col Dennis M. Drew (BA, Willamette University; MS, University of Wyoming; MA, University of Alabama) is dean of the School of Advanced Airpower Studies, Air Command and Staff College (ACSC), Maxwell AFB, Alabama. He has served as chief of the Strategy and Doctrine Branch and chief of the Warfare Studies Division, both at ACSC, and as a missile combat crew commander, missile operations staff officer, and staff division chief at Headquarters SAC. Prior to assuming his current position, he was director of the Airpower Research Institute, Air University Center for Aerospace Doctrine, Research, and Education at Maxwell. Colonel Drew is a distinguished graduate of Air Command and Staff College and a graduate of Squadron Officer School and Air War College.

How Are We Doing?

We need to know how you feel about the *Airpower Journal*. We are genuinely interested in providing you, the reader, as well as the Air Force, the best possible professional journal. It is, after all, your journal. In that spirit, we have provided a tear-out readership survey just inside the back cover. Please take a few minutes to complete it and return it to us. (We'll pay the postage.) It will help us further define the focus and scope of the *Journal*, and it will help us determine how well we are reaching our target audience.

Thanks for your help,

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To help us do our job better, we need to know more about you, the reader. Please take a few moments to complete the following survey. After you have responded, remove the survey, fold it as indicated, tape or staple closed, and place it in the mail. Thank you.

The Editor

PRIVACY ACT

IAW AFR 12-35, para 30, the following information is required by the Privacy Act of 1974. Authority: (1) 5 USC 301, Departmental Regulations; and/or (2) 10 USC 600 Secretary of the Air Force, Powers, Duties, Delegation by Compensation. Principal Purpose: To sample Air Force members' attitudes and opinions concerning the *Airpower Journal*. Routine Use: To provide data for evaluation purposes only. Participation in this questionnaire is strictly voluntary and respondents will not be identified. Adverse action of any kind may be taken against any individual who elects not to participate in any or all parts of this questionnaire.

1. What is your total years of military service?

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| 1. <input type="checkbox"/> 1-4 | 5. <input type="checkbox"/> 17-20 |
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| 4. <input type="checkbox"/> 13-16 | |

2. What is your current rank?

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| 2. <input type="checkbox"/> O-5 | 6. <input type="checkbox"/> E-7 - E-9 |
| 3. <input type="checkbox"/> O-4 | 7. <input type="checkbox"/> E-1 - E-6 |
| 4. <input type="checkbox"/> O-3 | 8. <input type="checkbox"/> Other _____ |

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1. Joint Staff
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3. MAJCOM HQ or equivalent
4. NAF HQ
5. Wing/Squadron/Detachment
6. Other _____

5. Are copies of the *Airpower Journal* available to you in your squadron/office/duty section?

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|---------------------------------|--------------------------------|

6. How often have you read the *Airpower Journal*?

- | | |
|---|----------------------------------|
| 1. <input type="checkbox"/> Routinely | 3. <input type="checkbox"/> Once |
| 2. <input type="checkbox"/> A few times | |

7. How much of the *Airpower Journal* do you normally read?

1. Most or all of it
2. Two or more articles
3. At least one article
4. Only the letters to the editor
5. Only the book review section
6. Look at; but seldom read it

8. How do you normally obtain a copy of the *Airpower Journal*?

1. Paid subscription through the Gov't Printing Office
2. Direct mail
3. Official distribution to my unit
4. Official distribution to another unit
5. Library
6. From a friend or associate

9. In your opinion, is the number of copies distributed through official channels to your squadron/duty section/office:

1. Adequate
2. Inadequate
3. Too many
4. N/A - The *Airpower Journal* is not available in my office
5. Don't know

10. After reading the *Airpower Journal*, what do you do with it?

1. Keep it as a personal copy
2. Place it back in the rack
3. Pass it on to my associates
4. Discard it

11. During a routine day (at work and at home), list the order in which you would most likely read the following periodicals. Ex: A ranking of 1 would mean that you read that periodical first.

- | |
|--|
| _____ Daily Newspaper |
| _____ News Magazine |
| _____ Sports or Special Interest Magazine |
| _____ <i>Air Force, Army, or Navy Times</i> |
| _____ <i>Air Force Magazine</i> |
| _____ <i>Airman Magazine</i> |
| _____ <i>Airpower Journal</i> |
| _____ MAJCOM Publications (e.g., <i>TAC Attack</i> , <i>MA Forum</i> , <i>Combat Crew</i> , etc.) |
| _____ <i>Military Review</i> , <i>Naval War College Review</i> , <i>Parameters</i> or <i>Proceedings</i> |

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| 3. <input type="checkbox"/> Book review section | 6. <input type="checkbox"/> No preference |

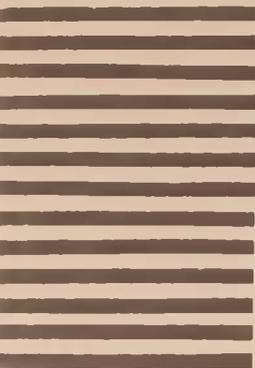
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- | | |
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| 3. <input type="checkbox"/> Book review section | 6. <input type="checkbox"/> No preference |

14. After reading an *Airpower Journal* article, have you ever discussed the merits of the article with a superior subordinate or associate?

- | | |
|--|-----------------------------------|
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| 2. <input type="checkbox"/> A few times | 4. <input type="checkbox"/> Never |

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1. Do you feel the *Airpower Journal* is written at the appropriate level and focus for you?

- 1. About right
- 2. Too high
- 3. Too low

2. What would you like to see the *Airpower Journal* publish more articles about?

- 1. Campaign planning
- 2. Weapon system development/procurement
- 3. Leadership
- 4. National security affairs/policy
- 5. International affairs
- 6. Other _____

3. The *Airpower Journal's* goal is to be an open forum primarily Air Force officers to discuss issues at the operational level of war. How well do you feel the *Journal* meets this objective?

- 1. Extremely well
- 2. Very well
- 3. Satisfactorily
- 4. Not very well
- 5. Poorly

18. Do you feel the operational level of war is the proper focus for the Air Force's professional military journal?

- 1. Yes
- 2. No. It should be at the tactical level
- 3. No. It should be at the national strategy/policy level
- 4. Not sure what the operational level of war is
- 5. Other _____

19. Would you be more or less likely to locate and read the *Airpower Journal* if it were aimed at the national strategy and policy level?

- 1. More likely
- 2. Less likely

20. Other military services have more than one professional journal (e.g., Army: *Military Review & Parameters*). Do you think the Air Force should have a second professional journal focused at the national strategy/policy level?

- 1. Yes
- 2. No
- 3. Not sure

21. If you had one improvement to suggest for the *Airpower Journal*, what would it be?

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Fall Readings

- CAS in Nonlinear Warfare
- Desert Storm's Meaning

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