

Summer Readings

- **A Tour of Space Doctrine**
- **Planning for the Unknown**

AIRPOWER

Summer 1991

JOURNAL



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EDITORIAL

Have You Hugged Your IP Lately?

IN JULY 1990 I attended the wedding of my brother-in-law, a lieutenant stationed at Bitburg Air Base, Germany. This occasion allowed me to become reacquainted with several of his buddies who just over one year before had graduated from the same undergraduate pilot training (UPT) class at Columbus Air Force Base, Mississippi. I can recall their faces and airplanes better than I can their names. The A-10, OV-10, T-38, F-15, B-52, KC-135, C-141, and, of course, C-130 were each represented by their enthusiastic new custodians.

While thousands of miles away Saddam Hussein's army massed at the border between Iraq and Kuwait, talk at the wedding was about squadron qualification (earning "mission ready" status) and flying. The near future would be a time for training, exercises, building up hours in the aircraft, and eventually becoming less of a "new guy" and more of an "old hand" in the unit. The Iraqi threat to Kuwait seemed a routine disturbance in an already troubled part of the world. The real dimensions of what may possibly (hopefully?) have been the major conflict of their generation had yet to take full form.

The events of early August 1990 changed everything. In the weeks and months that followed Saddam's invasion of his neighbor, a sizeable number of graduates from this particular UPT class were deployed in support of what would become Operation Desert Storm. Considering the size of the operation, the fact that so many were called is no real surprise. What amazes, though, is the speed with which these pilots put their recent training to use

in actual combat—in some cases only a few months after the final textbook was closed and the last check ride was passed in their respective aircraft.

The technical competence displayed and the success enjoyed by these flyers—in what was one of the most impressive exhibitions of air power in history—are tributes to the men and women of the Air Training Command (ATC) who first introduced them to and then taught them to master jet aircraft. The various major command programs that are geared to training new pilots in specific weapons systems are built on an already solid foundation, courtesy of some anonymous ATC instructor pilot (IP).

Like all trainers during wartime, these IPs watched the war develop from afar—not up close as did their recent students. Such is the lot of an IP.

As attention turns to welcoming home and honoring the veterans of Operation Desert Storm, consider for a moment the small, two-place aircraft with their attendant high-pitched wails. Will their student pilots be in the middle of a war shortly after graduation? Who knows? The only thing certain is that their instructors will, in a sense, be with them every time they climb into a cockpit, whether it be in the skies of Mississippi or in the midst of anti-aircraft fire over Iraq. Consequently, if war does arrive, those "new" pilots will be ready—as were the lieutenants in the wedding party—and in that context, one need only look to the nearest UPT base to discover a significant factor in the success of Operation Desert Storm. JJD

ricochets

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.

COMPOSITE WINGS

Gen Merrill A. McPeak's article recommending composite wings (Fall 1990) offers us much to consider for the future of the Air Force. As an opportunity for creativity and innovation, I believe that composite wings are an excellent concept. Building teamwork, cooperation, and esprit could well be done through such a wing structure. However, as a solution to tactical command and control (C²) problems, I believe that the composite wing will less than adequately meet our needs.

While I find the idea of mission orders for a composite wing commander to be an exciting concept, I do not believe that composite wings would reduce in any way our need for effective C² systems to orchestrate air campaigns. We all recognize that most of our efforts in future regional conflicts will involve operations that will not fit any single composite wing. Detailed planning and synchronization of air assets, including joint operations, beyond any single composite wing most certainly will be required. In these instances, modern command, control, communications, and intelligence capabilities are essential, speeding the planning and insuring the synchronization. Some of the problems which General McPeak highlights to support the need for composite wings are due, in part, to the Air Force's piecing together "Band-Aids" to our tactical C² systems over the years. Perhaps we should address a comprehensive "cure" to our C² requirements, for the composite wing alone will not solve the problems our chief raises.

Furthermore, I wonder what the true impact of "mission type" orders are to our doctrine of centralized control and decentralized execution. As wing commanders attempt to coordinate the details and meet their mission needs, might "penny packets" of air power be used? By this I mean that the wing commanders become essentially force-level determiners, based upon their own detailed planning, as opposed

to the theater component commander. To have adequate "control by denial"—as the Navy does—of detailed plans in a timely fashion, the overall commander will need an effective C² system.

General McPeak has given us much to work and to resolve with the composite wing concept. As with any change, we must work to understand all its aspects and resolve the issues to improve our application of air power for continued national defense.

Lt Col Timothy H. Courington, USAF
Maxwell AFB, Alabama

You might want to know that your magazine is actually being used by the cadets at the Air Force Academy. After the third sophomore in my squadron came in to interview me about General McPeak's article on the composite wing, it dawned on me to ask what class was studying this. I was happy to hear it was a management class. I figured that our courses in professional military studies, military history, and military strategy would use the *Airpower Journal*, but I had no idea that our Management Department did too. Apparently, they do this every month. I remember studying how to better run a factory when I was a management major here in the seventies and would like to thank you for helping inspire this change.

The cadets and I came to a couple of conclusions in our discussions that I would also like to pass along. First, we might want to think of composite wings as just a stepping-stone to composite forces that integrate conventional aircraft, helicopters, ground-combat units, and naval and space assets into fighting units. Special operations and rapid-deployment forces seem to have begun to go in this direction. Also, Operation Desert Storm may have validated the composite wing/force idea: we were lucky to have had time to build our forces together and do some practicing and planning for six months before the fighting began. This luxury of time will probably not be available in most future conflicts. Finally, as a tanker pilot, I saw the value of composite wings—albeit on a small scale—firsthand. When we flew large for-

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TRENDS IN THE DEVELOPMENT OF THE SOVIET AIR DEFENSE FORCES

GREGORY T. HOOKER

LIKE many institutions in Soviet society, the Soviet Air Defense Forces (*Voiska Protivovozdushnoi Oborony*—VPVO) are undergoing change. The principles of *perestroika* (restructuring) and *glasnost* (openness) have altered many of the factors which directly and indirectly affect the Soviet air defense mission. The continuation of present trends may greatly complicate the ability—or the desire—of the Soviet Union to defend its aerial borders.

Changes in the Soviet military seem to be making it much less threatening than it



was in the recent past. The exact nature and scope of these changes are not clearly understood. What is the evidence of changes in the Soviet military? How is the new defensive doctrine reshaping the Soviet military services? What are the mechanisms and forces contributing to the changes? What will be the ultimate result? This article considers these questions as they pertain to the Soviet Air Defense Forces by briefly reviewing the history of those forces, addressing the major players in the USSR who affect Soviet defense policy, and examining the major issues facing VPVO.

Soviet Air Defense Forces

The Soviet air defense function can be traced back as far as 1917, although it did not attain the status of a military service until much later. During World War II, radar was in its early stages of development, and the principal air defense weapons were fighter aircraft and ground-based anti-aircraft guns. After the war, the United States began developing long-range bombers to deliver nuclear weapons, thus spurring continued Soviet support of a large system of nationwide air defense. VPVO officially became a separate service in 1948, and in 1954 its top officer was elevated to commander in chief (CINC)—equal to the heads of the other services. VPVO originally had the strategic mission of being responsible for the defense of So-



viet territory, including large industrial centers and installations. Tactical air defense of troops on the battlefield was not the responsibility of VPVO. In the 1950s and 1960s, air defense assumed considerable depth, and mass production of surface-to-air missiles (SAM) began. When the US shifted to ballistic missiles as its principal means of nuclear delivery, VPVO kept pace by deploying antiballistic missiles (ABM) during the early 1960s.¹

Prior to 1980 VPVO had been a unified command in both war and peace, without subordination to a geographic command such as a front or military district (MD).² In the early eighties, however, VPVO was reorganized, and many of its assets were subordinated to the MDs; the mission of tactical air defense was also transferred to VPVO.³ The result was a serious dilution of VPVO's mission. This trend was reversed in 1986 when the subordinated strategic assets were returned to VPVO and tactical air defense was returned to the Ground Forces.⁴

Competing Views of the Future

The formulation of Soviet military policy and doctrine has changed drastically in the past several years, but the new system is not yet completely understood. Many more groups and organizations are involved now, and each has the ability—to lesser and greater extents—to affect the future shape of VPVO. These groups, organizations, and individuals fall into three categories—civilian, military, and political—although these groupings are somewhat arbitrary. Categorizing the wide variety of opinion expressed in the present debate over military policy is difficult.⁵

Civilian

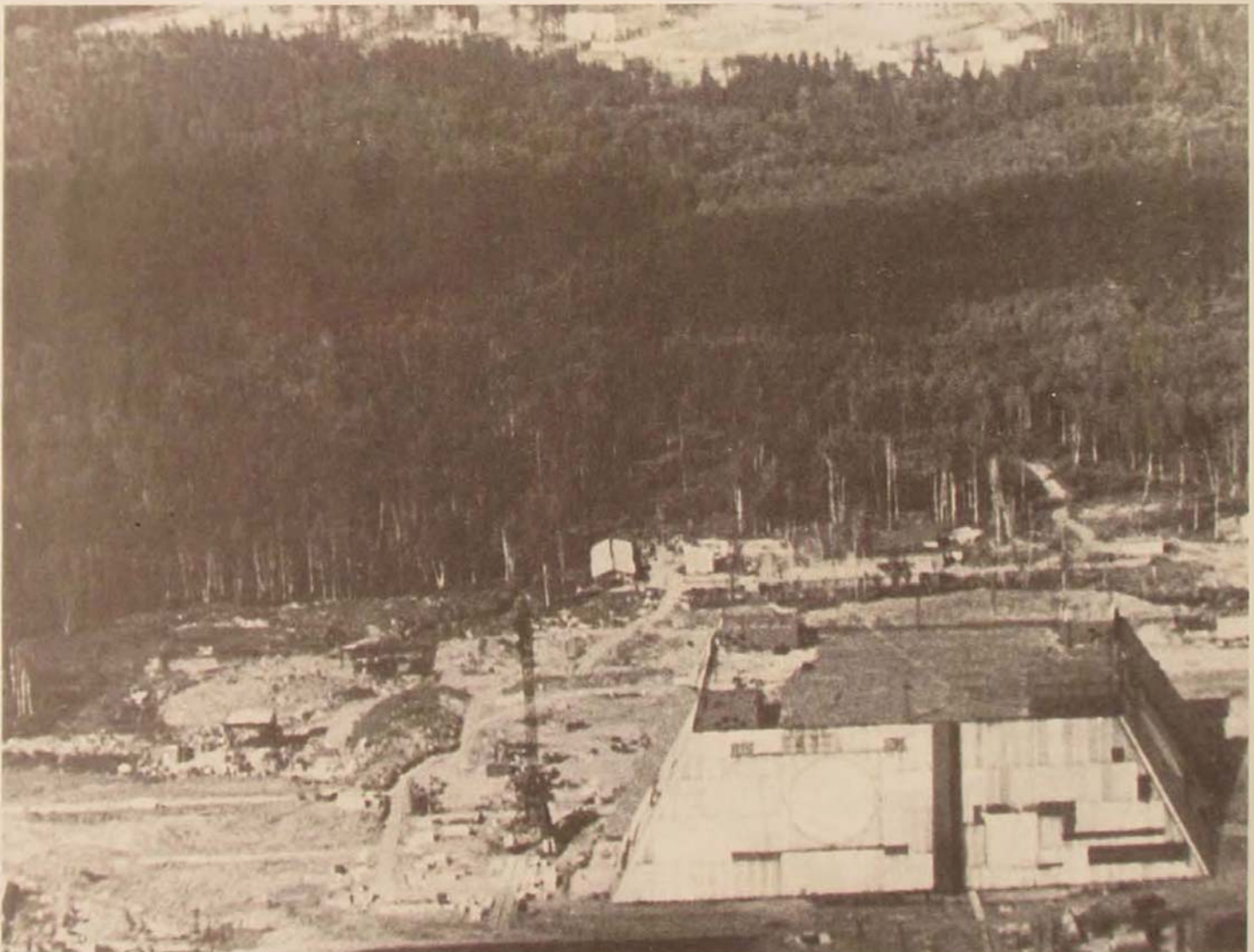
Glasnost and *perestroika* have created a new and vocal group of nonofficial military commentators and analysts in the Soviet Union: the *institutchiki*.⁶ Found in

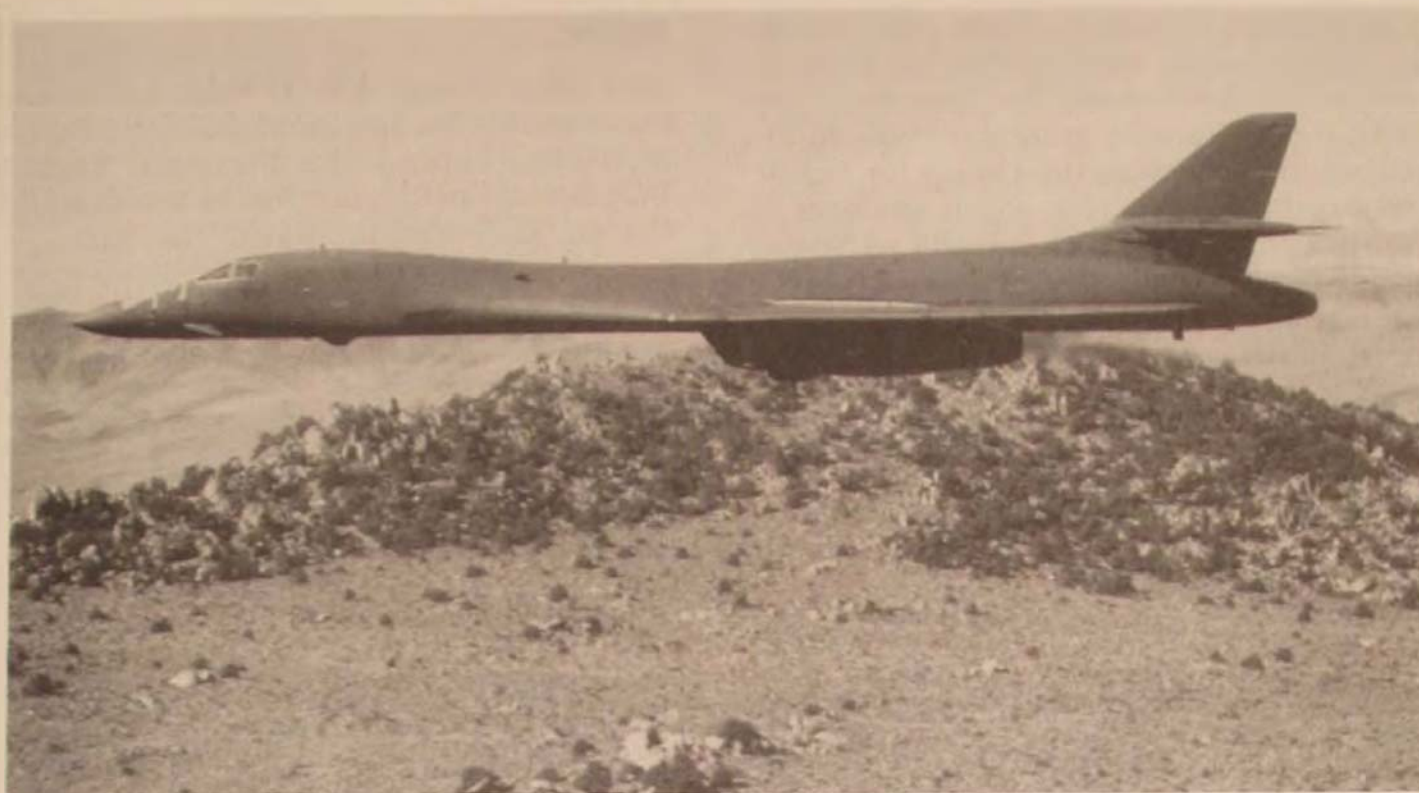
the academic spheres of Soviet life, they are civilians who have begun to comment on military subjects, much like civilians employed by Western think tanks and universities. Working at Soviet universities and institutes, they publish their views in journals which have been freed by *glasnost*. Although the Soviet military officially accepts the new emphasis on defense, the *institutchiki* have explored the concept of defensive sufficiency and suggested interpretations that the military finds alarming.

One civilian has suggested major modifications to the Air Defense Forces. Alexi Arbatov, a scholar at the Institute of the USA and Canada, questions the structure, organization, and emphasis of the Soviet military—including VPVO. Arbatov argues that the national system of air defense is a

waste of money and should be largely abolished. This view is not necessarily incompatible with his advocacy of defensive sufficiency. Arbatov voices three criticisms with regard to maintaining a large system of air defense against strategic nuclear weapons. First, air defense would not make a meaningful difference against a massed strike by strategic bombers and cruise missiles. Arbatov describes this task as countering “many thousands of ‘Rusts,’” a reference to VPVO’s failure in 1987 to stop amateur pilot Mathias Rust

The Soviet Pill Box phased-array radar (below) is part of the Moscow antiballistic missile (ABM) system. Arms-control agreements have placed new restrictions on the Soviet Air Defense Forces (VPVO) and have led to the dismantling of a similar ABM site at Krasnoyarsk.





Critics argue that the VPVO is an unnecessary drain on the Soviet economy. Furthermore, the inability of the VPVO to detect a single light aircraft in the 1987 Rust incident has fostered doubt that it could counter a strike from a strategic bomber such as the USAF's B-1 (above).

from flying a Cessna to Moscow. Second, the radars, SAM sites, and fighter airfields of VPVO are vulnerable to strikes by ballistic missiles. In the event of nuclear war, they would probably not survive the initial exchange of nuclear ballistic missiles. Third, US bombers are not nearly as threatening as ballistic missiles, yet defending against bombers significantly drains Soviet resources. Arbatov does not wish to totally dismantle VPVO. He believes that a smaller force could still fulfill a mission of providing "early warning of attack, controlling air space in peacetime and safeguarding the country against possible terrorists." He also advocates retaining tactical air defense for the purpose of protecting troops.⁷ This reduction in mission might suggest that the Soviet Union no longer needs a separate service for air defense, although Arbatov does not suggest that VPVO be eliminated. Obviously,

though, if the defense against strategic nuclear threats were largely abandoned, the primary mission of VPVO would disappear.

The ultimate role of the *institutchiki* in shaping the Soviet military is unknown. The military takes a dim view of civilian analysis, publishing sharp rebuttals and criticisms of their articles and questioning their competence to comment on military matters.⁸ The political leadership, however, may be more sympathetic to the *institutchiki*. But the strength of any connection between the actions of policymakers and the opinions of civilian analysts remains unclear.⁹

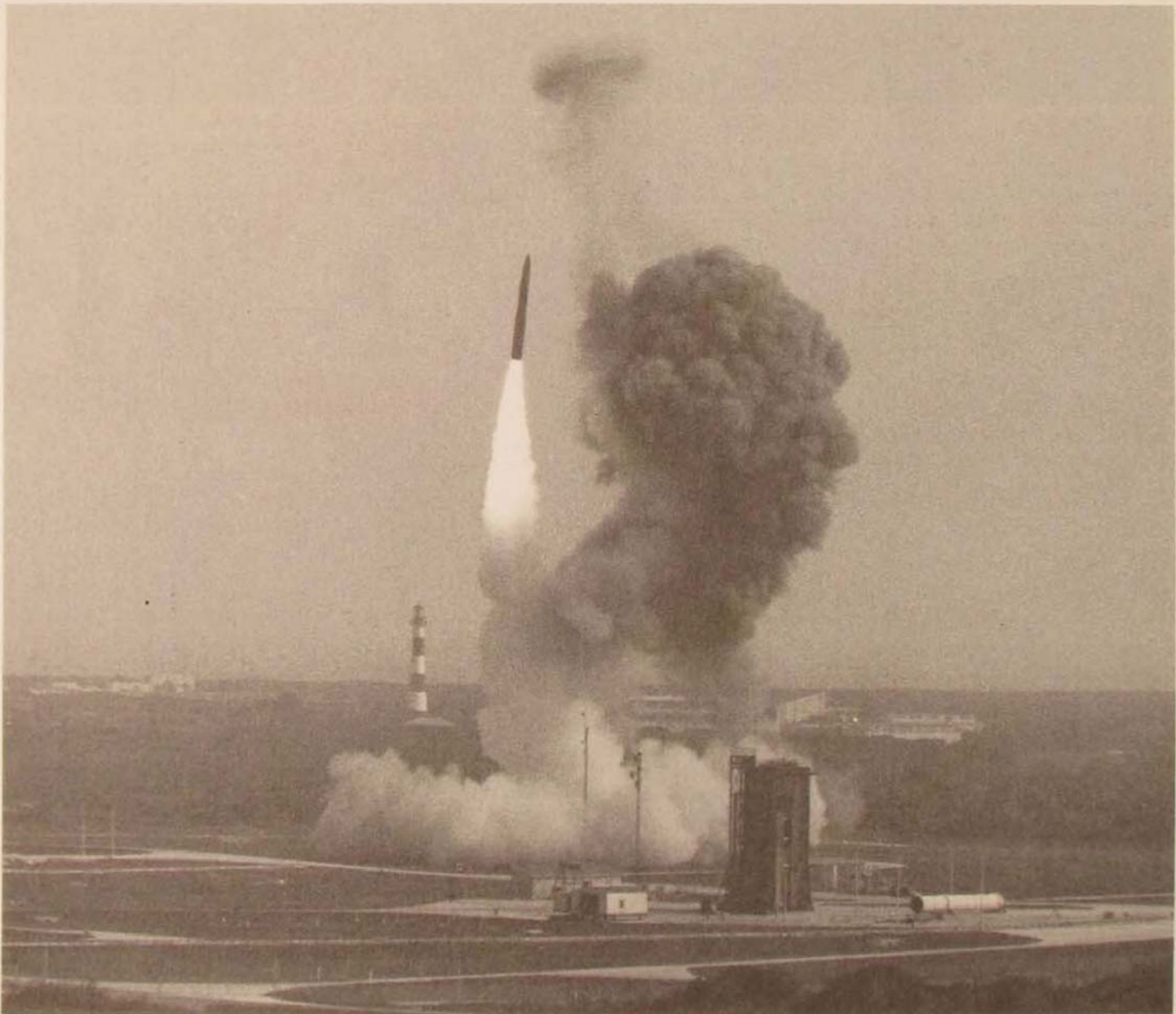
The growing democratization in the USSR has yielded a large number of popularly elected officials, many of whom are very critical of the government. An informed, independent analysis of military affairs could allow them to raise issues, set agendas for reform, and force reevaluation of matters which previously were only under the purview of the military. The availability of analysis to Soviet legislators may make the *institutchiki* much more important in the future.

In addition to writing, these intellectuals are beginning to take practical actions in support of their views. In April 1989 the *institutchiki* formed a nongovernment organization known as the Group for Public Monitoring (GON). This group attempts to monitor unilateral withdrawals of Soviet troops from East Europe and Mongolia, as well as reductions of troops and equipment within the USSR. Although GON must rely largely on information from the Soviet General Staff, it could represent the beginnings of nongovernmental watchdog groups for defense policy.¹⁰

Military

The Soviets rank VPVO third in importance among the five services in the Soviet military—behind the Strategic Rocket Forces and the Ground Forces but ahead of the air force and the navy. This arrange-

The Soviet ICBM launch-detection satellite network is supposed to provide warning of an incoming missile 30 minutes before impact. Analysts note that Soviet air defense forces might not have the ability to survive an initial exchange of ICBMs. Below, a US Minuteman missile emerges from an underground silo.



ment differs from that of most Western countries, whereby the strategic and tactical air defense mission is divided among the air force, army, and navy. The Soviet division of labor was altered somewhat during 1980–86, when some VPVO assets were transferred to the air force.¹¹

The Soviets reversed this policy, but the fate of VPVO may presently be under discussion in the USSR. Several months after the publication of Arbatov's attack on VPVO, Marshal Sergei Akhromeyev commented on possible changes in the structure of the armed forces, citing reasons to justify the existence of VPVO as a separate military service.¹² The military is probably very much in favor of keeping the Air Defense Forces alive and independent.

The military may view defensive sufficiency as a justification for increased emphasis and expenditure on air defense. The Soviet general in charge of weapons procurement has stated that the application of defensive doctrine will result in increased spending on air defense, intelligence gathering, and treaty-verification measures.¹³ Gen I. M. Tret'yak, VPVO CINC, has also pointed out a connection between defensive doctrine and support of the Air Defense Forces: "The necessity of constantly strengthening air defense stems logically from the military doctrine . . . which by its nature is defensive."¹⁴ Gen Mikhail Moiseyev, chief of the General Staff, has indicated that Ground Forces' tactical "air defense means will increase by a factor of 1.5 to 2."¹⁵

Although the military wants to retain an independent VPVO and possibly augment it, the reverse process may be under way. The new emphasis on defense apparently has not insulated VPVO from reductions. Comments from the VPVO CINC and battalion commanders alike indicate that unilateral reductions have affected the Air Defense Forces.¹⁶ General Tret'yak claims to have lost 50,000 troops and suggests that he may lose more.¹⁷ If correct, this figure would represent approximately 8 percent of VPVO manpower.¹⁸ To date, Soviet Ministry of Defense statements indicate that four VPVO divisions have been dis-

banded and that a total of 60 air defense units will be either demobilized or reduced.¹⁹

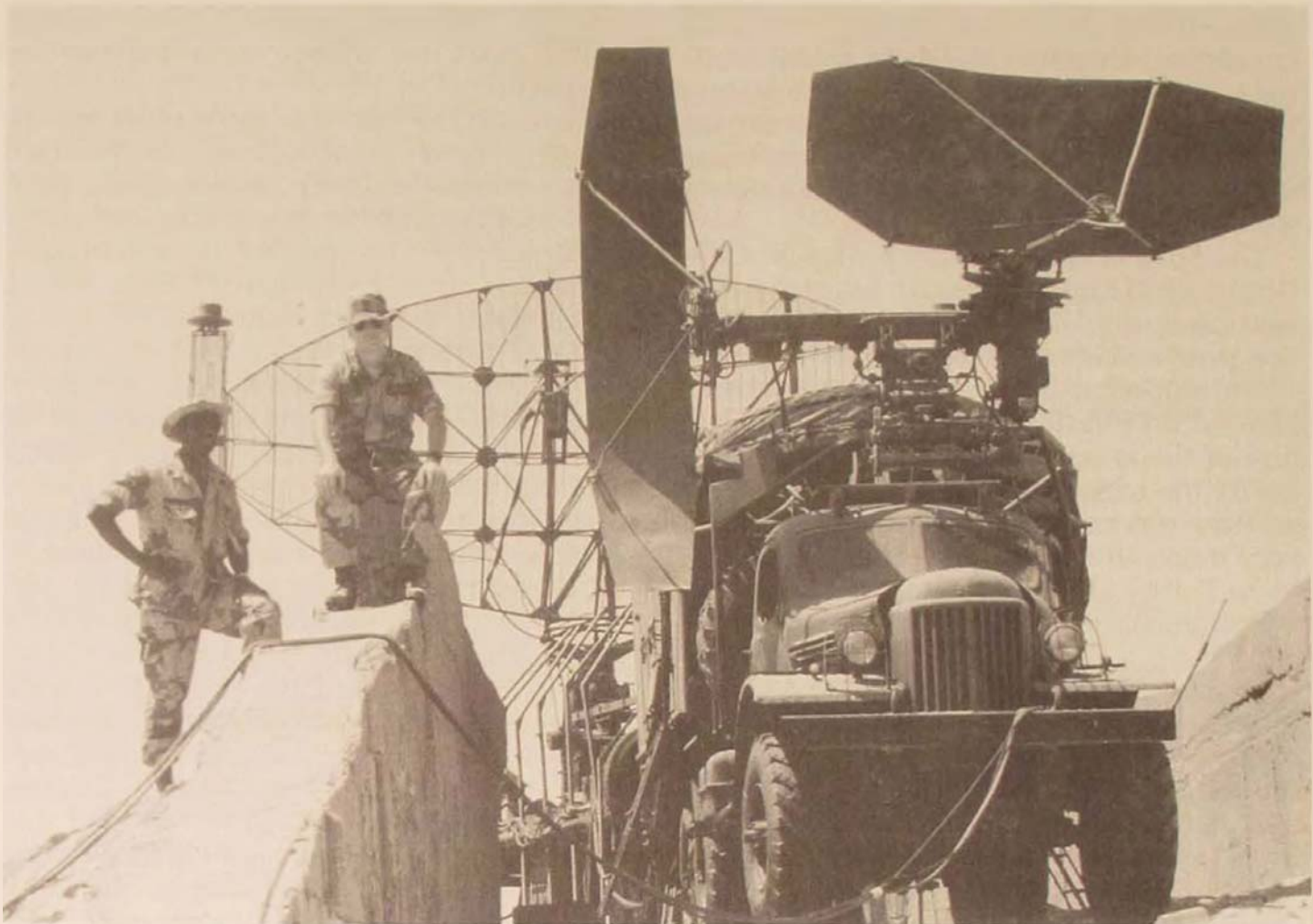
General Tret'yak is a spokesman for the most conservative school of thought among Soviet military leaders in the present strategy debate concerning defensive sufficiency.²⁰ His stance has been characterized as the "traditionalist" view, which emphasizes that "the 'new' defensive doctrine is nothing new, as Soviet doctrine has always been defensive in nature."²¹ This hard-line position is contrary to the prevailing trend, which is radically changing the Soviet military for the purpose of remaking it into a defensive force. The outlook for traditionalists may not be good.²²

Perestroika is often mentioned in military writings in connection with VPVO. The term is usually invoked to criticize and point out problems: absence of discipline, corruption, favoritism, formalism (unrealistic training), lack of initiative, low combat readiness, and so forth. Significantly, however, General Tret'yak has cited another aspect of perestroika which he considers important to VPVO—specifically, its role in increasing the USSR's technological base and providing the military with increasingly modern air defense weapons.²³

Political

The third and most important view of VPVO is that held by the country's political leadership. Movement toward democratization has opened up the political arena to a growing number of individuals. The nature of Soviet politics is changing, but its future course is uncertain. It is not yet clear if the old system of highly centralized decisions will prevail or if political power will shift toward legislative bodies.

The performance of VPVO is often the source of great embarrassment for Soviet leaders. All of the VPVO CINCs since the early 1960s have probably been forcibly removed from their position. Marshal V. A. Sudets (1962–66) was replaced after the mediocre performance of the Soviet-



designed North Vietnamese air defense system. Marshal P. F. Batitskiy (1966–78) was replaced after a Korean Airlines (KAL) Boeing 707 violated Soviet airspace in 1978 and was forced down.²⁴ Marshal A. I. Koldunov (1978–87) was replaced when Mathias Rust penetrated Soviet airspace in a Cessna and landed in Red Square.

Political oversight of the military is changing dramatically in the Soviet Union. For example, the debate concerning the separate status of VPVO has reached the Soviet legislature. Some Soviet deputies are not convinced that the current method of organizing the Soviet armed forces is efficient. During general debate in the Supreme Soviet, Col V. Podziruk—minister of Parliament—is quoted as saying,

Here in this country we have for some reason five armed services, not three as elsewhere in the world. In addition to the usual three we have the Air Defense Forces of the Country, and the Strategic Missile

A defensive-oriented Soviet military would make more extensive use of tactical air defense systems. Above is a Soviet-made Two Spot Par radar unit manned by US troops during the Bright Star exercise of 1985.

Troops. Elsewhere in the world there exist the three armed services: land troops, air force, and navy. . . . This could have been one of the reasons for Mathias Rust landing on Red Square.²⁵

In June 1989 members of the Supreme Soviet, an elected body, formed the Committee for Defense and State Security (KOGB). The KOGB will oversee the activities and budgets of the Soviet military and the Committee for State Security (KGB).²⁶ In theory, the KOGB will be similar to US congressional committees on armed services and intelligence. A group of US congressmen has visited the Soviet Union at the invitation of the KOGB, and

members of the Soviet committee paid a return visit to the US in early 1990.

It is not yet clear, however, exactly what power the KOGB will have or how readily it will exercise that power.²⁷ Debate within the Supreme Soviet has criticized the KOGB for having too many members of the military-industrial complex who will not properly represent the public. The first chairman of the committee, Vladimir Lapygin, countered by asserting that the number of members with defense-related backgrounds is not extraordinarily high and that knowledgeable committee members are desirable.²⁸ However conflicting the interests of the committee members may be, differences are emerging between the KOGB and the military. Lapygin publicly stated his support for a professional (volunteer) military, fewer student draftees, and greater *glasnost* to combat "unjustified secrecy."²⁹ None of these proposals is particularly popular with the military.

Future Issues

A number of issues presently confront VPVO. Although some of them are new, many are long-standing problems which have been exacerbated in the last several years. The resolution of these dilemmas—and the difficult choices involved in that process—will greatly affect the future of VPVO.

Manpower

Ironically, the switch to a defensive strategy will not necessarily benefit VPVO, and it may actually lead to a decline in the service's mission and resources. The unilateral reduction in Soviet troops by 500,000 men presents a particularly difficult problem for the Air Defense Forces for two major reasons—technology and mission requirements.

First, the Soviets have trouble supporting their present level of technology, not to mention new and advanced systems. They have chronic problems with spare parts

and equipment shortages.³⁰ The manpower crunch can delay or make impossible the switch to new technologies. On the other hand, newer technologies may be a means of overcoming manpower problems. For example, the Soviets claim that the Su-27 fighter is easier to repair because its technology is more reliable and is modular in design, thus greatly easing the task of maintaining the aircraft.³¹

Second, the nature of VPVO's mission imposes unusual difficulties on its manpower system. Three mission requirements in particular complicate the manning of strategic air defense units: These units must be constantly deployed, physically spread apart from each other, and located in remote areas. The air defense of the nation requires constant readiness 24 hours a day. Unlike some services whose troops deploy from permanent installations to conduct operations or exercises, VPVO has personnel who stand combat-alert duty—constantly at work and deployed for battle.³² Further, its troops do not agglomerate to take advantage of mass, a classic principle of warfare. Rather, they must deploy to cover a large area and ensure complete and unbroken coverage of territory unprotected by the limited ranges of radars and SAMs.³³ Last, constantly maintaining troops at readiness and spreading them out results in the permanent remote basing of many troops. General Tret'yak has identified this requirement as a significant problem for VPVO, calling the "social conditions" of many units unacceptable.³⁴ Poor housing and facilities, food shortages, and isolation are all serious problems for VPVO personnel.

Arms Control

The strategic nuclear aspect of VPVO's mission may make it a target for future changes. The Strategic Arms Limitation Talks (SALT) I ABM treaty restricted the Air Defense Forces by limiting ABM weapons and the placement of ABM radars. This treaty still curtails the VPVO, as demonstrated by the announcement in October 1989 that the large phased-array

radar under construction at Krasnoyarsk would be dismantled.

The Krasnoyarsk decision also points out a difficult dilemma for Soviet arms control in the future. The Soviet leadership has long been very critical of the US Strategic Defense Initiative (SDI)—an attempt to create technologies capable of defending against ballistic missiles. However, the Soviets' desire to halt SDI puts their negotiators in a bind: Can they decry US research and development on strategic defense while they have the world's only operating ABM system and a massive system of air defense against bombers? Can they support and encourage more rigid controls on nuclear defense (like the ABM treaty) while continuing to make an artificial distinction between space-based and earth-based nuclear defenses? Some Soviet officials have indicated that in Strategic Arms Reduction Talks (START) II treaty negotiations they may be willing to completely abandon the Soviet ABM system.³⁵ The Krasnoyarsk reversal may be the first of many for VPVO if US and Soviet negotiators work to limit strategic defense of all types.

Open Skies

A diplomatic initiative of the Bush-administration known as "open skies" may change the nature of VPVO's mission. Originating with proposals made by the Eisenhower administration in the 1950s, the open skies concept was reintroduced by President George Bush in a 1989 speech.³⁶ The Soviets have expressed interest, agreeing in principle to the idea and to talks on the subject.³⁷ Although no commonly accepted definition exists, the concept generally calls for greater access to a nation's airspace for the express purpose of conducting surveillance. The consequences of such an agreement could be extraordinary for VPVO.

A high-priority peacetime mission of Soviet air defense is the interception of US and European reconnaissance flights near the USSR's borders.³⁸ An open skies agreement which legitimized aerial reconnais-

sance would change the way that VPVO regarded aircraft engaged in this activity. Even if the agreement allowed only very limited flights over prescribed corridors (such as flights allowed under the Conventional Forces Europe treaty), the result would still be a change in the mind-set of the Soviets concerning the treatment of reconnaissance aircraft. According to the Soviets themselves, the threat of a reconnaissance aircraft penetrating Soviet airspace resulted in the shutdown of KAL flight 007 in 1983. At the time, Soviet spokesmen argued that KAL was on an intelligence mission. In Soviet minds, this fact alone was justification enough for the shutdown.³⁹

VPVO would have to accept new rules and a new outlook toward reconnaissance (i.e., perceiving it as a confidence-building measure, as opposed to an activity associated with preparing for and fighting war). This outlook would be especially true if the flights were organized in association with, or as a specific aspect of, an arms-control verification regime. Hostile reactions to such overflights would have grave diplomatic consequences.

Agreement on the Prevention of Dangerous Military Activity

The Agreement on the Prevention of Dangerous Military Activity, signed by the US and the Soviet Union on 12 June 1989, is designed primarily to avoid misunderstandings and confrontations between the two countries and has probably caused major changes in VPVO. This agreement has almost certainly affected the rules of engagement used by the Air Defense Forces when an unidentified foreign aircraft enters Soviet airspace. Whereas the impulse of the Soviets in 1983 was to attack and destroy an aircraft believed to be on a reconnaissance mission, this agreement will require them to withhold fire even if they can positively identify the aircraft as a US reconnaissance flight. The agreement requires the armed forces of the

country whose border is violated to "continuously attempt to establish and maintain communications" for the purpose of determining the intruder's intent or even rendering assistance to the violator (call signs and frequencies are provided in the agreement).⁴⁰ Only intentional intrusions into Soviet airspace are not covered by the agreement.

Since it would be difficult to distinguish between intentional and unintentional violations of borders, the First Agreed Statement was added to the agreement in an attempt to clarify this ambiguity.⁴¹ This statement prohibits the party whose territory is violated from assuming an intentional violation in the absence of an explanation about the circumstances of the unauthorized entry.

A US military representative involved in negotiations over the agreement argues that the First Agreed Statement does not

necessarily cover the problem of determining intentions. That is, the USSR could justify a hostile reaction to a border violator if it claimed to have evidence which proved the violation was intentional and, therefore, beyond the bounds of the treaty.⁴² The requirement to establish communications, however, represents an important modification to VPVO rules of engagement. The KAL shutdown in 1983 may have occurred without any attempt to make radio contact with the 747, which the Soviets later claimed was on a US reconnaissance mission.⁴³

Low Observables

The US has done extensive research on a range of low observable (LO) or "stealth" technologies, whose purpose is to impede detection of targets, and has built two types of aircraft—the F-117A and the B-2—that make extensive use of these technologies. The effectiveness of the new LO aircraft is not yet known. They are not actually invisible to radars, although pop-

The SA-8—a short-range, low-altitude tactical surface-to-air missile—replaced the Soviets' 57-mm antiaircraft gun.



ular accounts of LO technology sometimes give this impression. Actually, these aircraft may become visible to existing radar systems at ranges as great as 30 miles.⁴⁴ Furthermore, some commentary on LO aircraft does not suggest that the USSR is very impressed; rather, the Soviets emphasize the "hype" associated with the aircraft and have suggested that their existing air defense systems would still be capable against this new threat.⁴⁵ One Soviet writer cites "foreign military specialists" to make the point that "with reliable detection and tracking they [LO aircraft] can be destroyed . . . by existing and future surface-to-air missile weapons."⁴⁶

No doubt, new weapons systems will be developed to counter LO aircraft. One notable example of a Soviet technological response to a US weapon is the MiG-25 Foxbat, an aircraft developed for VPVO in the 1960s to counter the XB-70 bomber then being prepared for the USAF.⁴⁷ Although the bomber was never built, the Soviets did build a large number of Foxbats, which represented a quantum leap in Soviet technology at the time. The aircraft set a number of world records, including absolute speed, closed-circuit speed, time to height, and absolute height. The Foxbat's powerful radar, enormous speed, and very high-altitude capabilities were significant technological advances in response to the US threat. A similar program could now be under way to improve VPVO's sensor and weapon technology for use against the latest USAF bomber.

Further, LO aircraft may elicit a political response in addition to—or in place of—a military-technical response. That is, the Soviets may be willing to enter into negotiations designed to limit the production of these aircraft. The cost of persuading the US to accept such limitations, however, could be reductions in VPVO,⁴⁸ a trade that may be acceptable to Soviet leaders but one that could result in a significant loss of VPVO effectiveness.

Such a scenario is bolstered by the fact that the Soviets clearly understand the US concept of competitive strategies. This idea, which originated in the Department

of Defense, advocates the development of technologies that would require the USSR to expend vast sums of money in developing counterprograms. LO is just such a technology, according to Sen Sam Nunn, since it will "render obsolete billions of dollars of Soviet investment in their current Air Defense, and cause them to spend billions more in an attempt to cope."⁴⁹ The Soviets' answer to competitive strategies is "asymmetrical response," which advocates the development of inexpensive programs to counter new US weapons.⁵⁰ Both *institutchiki* and Marshal Akhromeyev cite this idea as the proper guiding principle in finding solutions to the challenge presented by LO technology.⁵¹ The Soviet application of the logic of asymmetrical response could make negotiations a more realistic alternative to fashioning an inexpensive military solution.

Civil Aviation

Civil aviation in the USSR greatly complicates VPVO's mission. To maintain control of the USSR's airspace, VPVO must monitor aircraft flying over the Soviet Union and classify them as friendly, unfriendly, unidentified, and so forth. However, VPVO has difficulty making such identifications because of the lack of cooperation and coordination between VPVO and the Unified System for Air Traffic Control (YeS UVD), the agency responsible for civil air traffic control in the USSR.⁵² An object of criticism in the Soviet press, YeS UVD was described during earthquake disaster relief flights as backward in its technology and organization.⁵³ Thus, many unidentified aircraft operate in border areas, and procedural violations and the lack of radio transponders in aircraft make radar identification impossible. The military has charged that YeS UVD has no interest in maintaining close control of the air because this activity provides no (monetary) bonuses for its personnel.⁵⁴ Critics remain pessimistic that these problems will ever be solved because of the sheer number of separate agencies and departments involved.⁵⁵

VPVO's problems with civil aviation will probably increase dramatically in the near future because of the great demand for domestic and international service. The Soviets are working to meet this demand by establishing a competitor to Aeroflot, the official airline.⁵⁶ Not only will this initiative increase tourism, but also it will enhance economic *perestroika*. That is, the inefficient Soviet distribution system could profit from improvements in air transport that provide more connections through the vast Soviet landmass. Further, the US aircraft manufacturer Piper and the Soviet design bureau Sukhoi are engaged in a joint project to produce a light aircraft intended for both domestic use and international sales. Such ventures are important steps in the conversion of the aircraft industry to civilian production⁵⁷ and are evidence of civil aviation's role in economic *perestroika*.

The Soviet Union will also realize an increase in international air service as a greater number of Soviet and non-Soviet commercial aircraft begin to routinely enter Soviet airspace. Pan American World Airways, presently the only US airline to fly to the USSR, expects to significantly increase the number of these flights, which are presently constrained only by the lack of hotel accommodations in major Soviet cities. Soviet officials are taking steps to remedy this problem.⁵⁸ The USSR has also expressed a willingness to allow overflights of civil air traffic traveling between Europe and Asia.⁵⁹ As was the case with domestic aviation, increased international air service to the USSR will play a role in economic *perestroika* by encouraging tourism, foreign investment, foreign information, and technology transfer.

The Soviet promotion of civil aviation has been accompanied by increasing participation in organizations like the Flight Safety Foundation and the International Air Transport Association. The shutdown of KAL 007 in 1983 led to condemnation by one such group (the International Civil Aviation Organization), as well as an international boycott by pilots and the closure of Aeroflot offices in the United States. In-

dications are that the Soviets will be less likely to risk future KAL incidents, which would incur the same kind of condemnation and suspension of flights that occurred in 1983. This progressive integration of the Soviet Union into the worldwide civil air system, as well as the previously mentioned developments in civil aviation, will further erode VPVO's capability to monitor air traffic—hostile or otherwise—in the Soviet Union. Thus, we can anticipate a more relaxed treatment of civil aircraft by VPVO.

Conclusion

As we have seen, VPVO is changing, in large part because of the new political climate in the Soviet Union. The effect of *perestroika* and *glasnost* has been significant and direct. Unilateral troop reductions are an interesting example of these principles at work under the auspices of defensive strategy. Although defensive in nature, VPVO has not escaped these reductions. In fact, the very survival of VPVO as a separate service of the Soviet military may now be under debate. *Glasnost* and *perestroika* have also had an important indirect effect on the Air Defense Forces in that they have given rise to new groups of people who will shape the future of the military. Moreover, they have fostered treaty negotiations which will affect the air defense mission. Further, economic *perestroika* will complicate VPVO's mission by depriving it of manpower and increasing air traffic to the Soviet Union. Finally, issues involving the US, such as stealth technology, ongoing arms-control treaties, verification and confidence-building measures, and bilateral agreements will all affect VPVO.

It is difficult to tell exactly where these trends will lead. The many issues facing VPVO and the growing number of people who can conceivably affect defense policy tend to complicate analysis. Regardless of the decisions made or the contributions of certain groups to policy-making, Soviet air

defense is becoming a much more difficult task, and a decline in both resources and

mission mandate will make air defense even less viable in the future. □

Notes

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12. Special edition of "View," *Moscow Television Service*, 1700 GMT, October 1989, in FBIS-SOV-89-197, page 98.

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15. Gen M. Moiseyev, "Standing Guard over Peace and Socialism," *Krasnaya zvezda*, 23 February 1989, 2, in FBIS-SOV-89-035, pages 102-3.

16. See, for example, Lt Col V. Astafev, "Topic of the Day: Which Personnel Will Remain?" *Krasnaya zvezda*, 21 September 1989, 2, in JPRS-UMA-89-025, pages 14-15; see also A. Gorokhov, "Far from Moscow: Report from the Air Defense Forces," *Pravda*, 9 April 1989, 3, in JPRS-UMA-89-013, page 28; and *Moscow Domestic Service in Russian*, 0630 GMT, 9 April 1989, in FBIS-SOV-89-068, page 74.

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DEFENSE PLANNING FOR THE MYSTERY TOUR

PRINCIPLES FOR
GUIDANCE IN
A PERIOD OF
NONLINEAR CHANGE

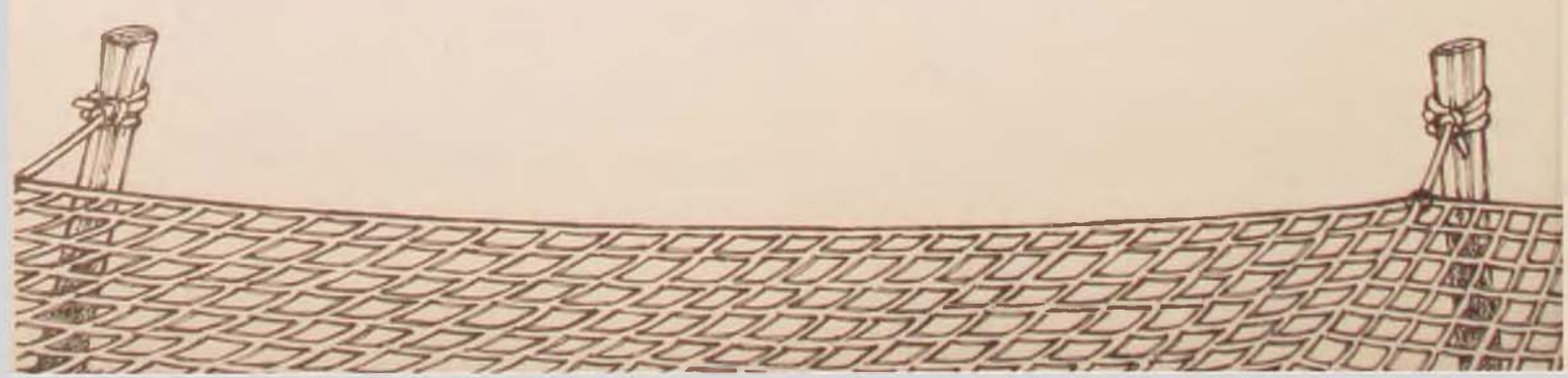
DR COLIN S. GRAY

THE political sustainability of defense effort is not an independent variable. It is dependent on the quality of strategic rationale. The 1990s are shaping up to be a very uncomfortable decade for defense professionals. Erstwhile standing operating procedures are being undermined by reactions to the course of political events. In planning, it is (always) important to ask the question, What is true? Do/Will the Soviets need deterring, and so forth? Since confident identification of truth likely will elude us,

however, the relevant question is, What do we plan for or against in a period wherein old certainties appear to be expiring on a weekly basis?

Threat-Driven, Uncertainty-Pulled

It may be helpful to approach the tasks of defense planning in the 1990s from the starting point of a basic distinction between defense activity that is threat-



driven and defense activity that is *uncertainty-pulled*. Specific threat-driven defense preparation is the only US strategic condition with which contemporary Americans are familiar. Defense life without an overshadowing and multifaceted Soviet threat has been all but unthinkable. However, the endurance, stability, simplicity, and intensity of the Soviet military threat stand out very much as a historical aberration among the strategic histories of great powers. The post-cold-war world is shaping up for US defense planners as a dynamic context characterized by great uncertainty over the leading threats. US defense planning will be *pulled* towards preparation for rather generic kinds of challenges—intervention in regional conflict an ocean away, for example—rather than *driven* by confident recognition of specifically detailed threats.

A situation wherein rival polities bear watching and just might emerge as enemies in surprising combinations is rather more common, historically, than is a phenomenon of bipolar military stand-off. Of course, defense planners must define "threats" as they conduct their regular defense planning and military training activities. Nonetheless, an *uncertainty-pulled* (though disciplined) approach to defense planning is far more likely to serve the nation well—including the ability to attract the necessary domestic political support—in the 1990s than is a continuing endeavor to "fight the problem" of the declining political credibility of a major threat.

The body of this article seeks to identify seven broad principles as candidates for the guidance of defense planning in a decade (or more) of nonlinear change. Further, this article contends that *uncertainty-pull* should inform the spirit of contemporary planning.

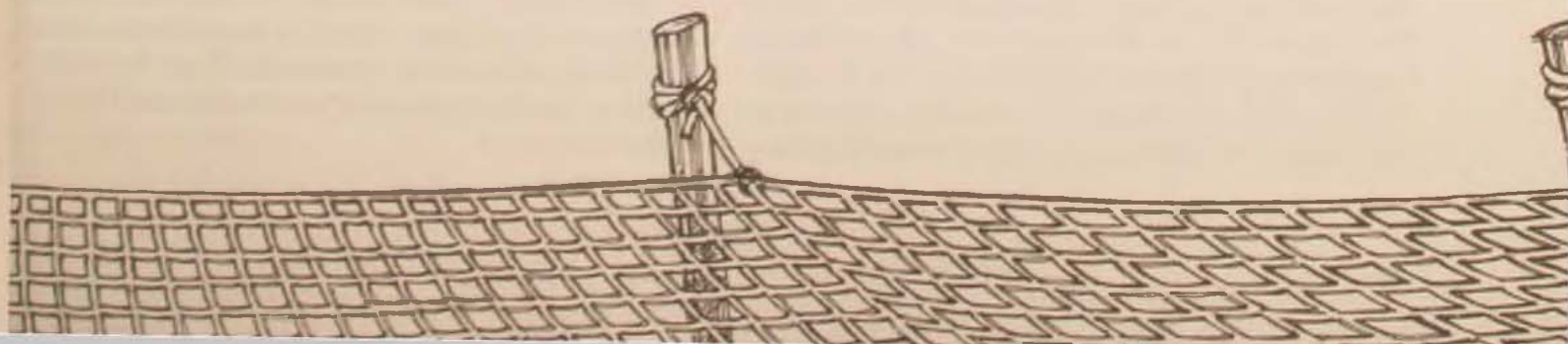
Seven Principles for Defense Planning

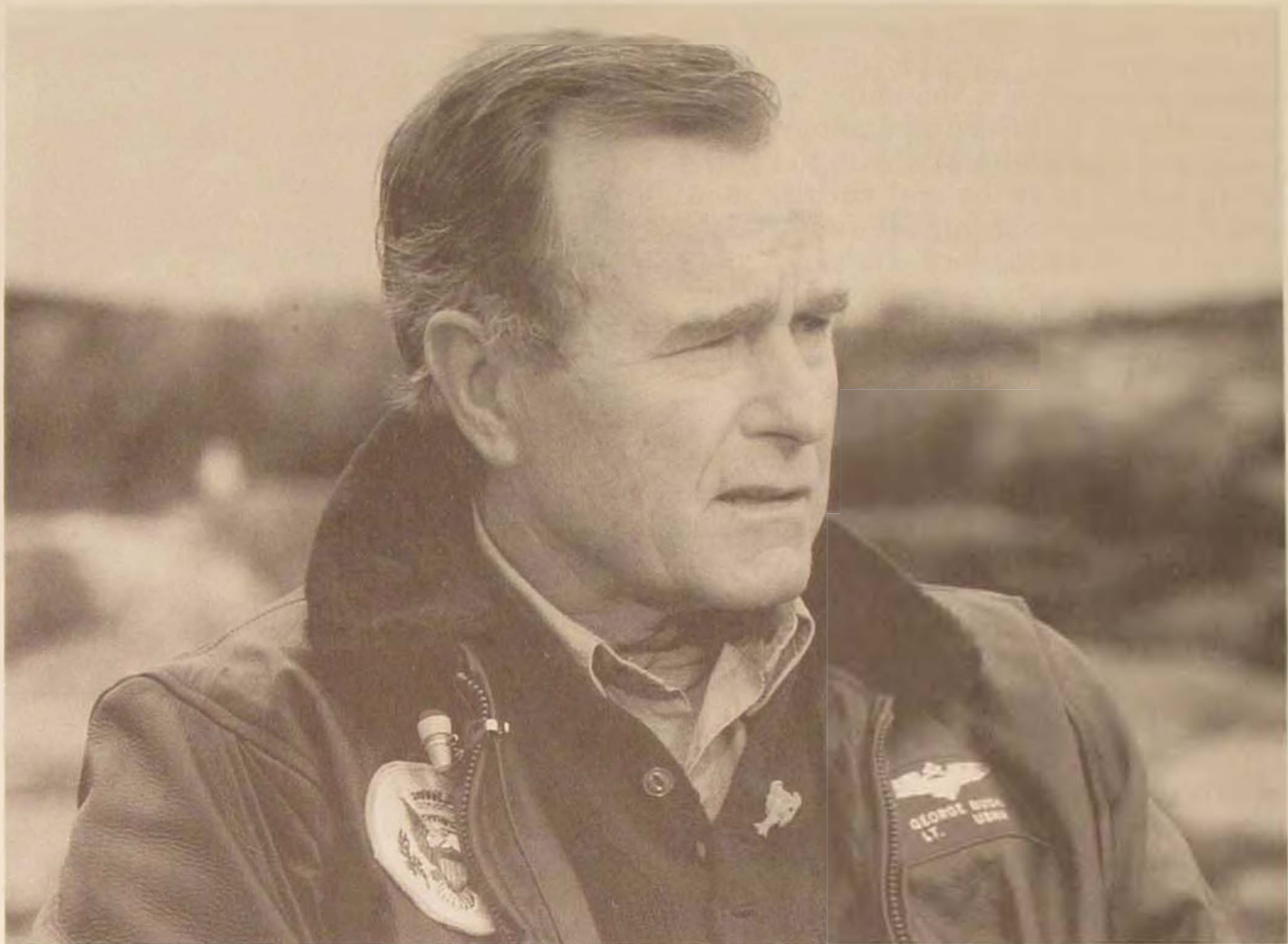
1. Face facts, recognize ignorance.
2. Apply geostrategic priorities for fault-tolerant planning.
3. Recognize that the long term is a succession of short terms.
4. Sustain or acquire flexibility to adjust to changing circumstances.
5. Learn from the past.
6. Play to American strengths.
7. Reexamine assumptions, reshape rationales.

Principle No. 1: Face Facts, Recognize Ignorance

Much that the professional defense planner would like to know is simply unknowable. Ignorance of the future *in detail* is not a problem for, or a weakness in, planning. Rather it is simply a permanent condition for which no apology is necessary. Particular events rarely can be predicted. Wisdom begins with frank recognition that detailed "future history" is beyond research.

Good defense planning, therefore, cannot be a quest after the unattainable. The challenge is to plan intelligently and rationally in the face of massive uncertainties. Military history does not even show that the crises and wars that are planned and then launched deliberately (at times, in places, and with a character carefully preselected) tend to be conducted successfully. Witness the disastrous consequences of German, Italian, and Japanese grand-strategic choices in the period 1939–42.





No less important than recognition of ignorance over the detail of "future history" is appreciation of what is known about future (in)security environments. How long Mikhail Gorbachev will endure as president of a terminally sick USSR is the realm of educated guesswork only. But the United States requires an adjustable military framework for the rapid generation of deterrent or actual war-fighting effect, regardless of who is up or down in the domestic politics of important foreign countries. Defense planners are able to proceed prudently and usefully from the enduring fact that their glass of relevant knowledge will always be half—or more—full. What they know about the structure, or probable structure, of future US defense needs typically will be more than adequate as a basis for the framing of recommendations.

Defense planning in the post-cold war world is characterized by massive uncertainty. If US defense planners use a deliberate approach to their analyses, they may be able to minimize the "anxiety that flows from uncertainty" and present well-reasoned options to the national command authorities.

Defense planners confronting the awesome, potentially paralyzing, fact of their detailed ignorance of the future should be encouraged to develop two lists: the knowns and the unknowns (and unknowables). Even in a context of seismic-scale political shock—à la 1989–90—US defense planners will find, possibly to their surprise, that they know a very great deal about the kinds of demands that foreign policy is likely to lay upon the military establishment.

Principle No. 2: Apply Geostrategic Priorities for Fault-Tolerant Planning

US defense planners do not need a crystal ball (which is fortunate, since crystal balls are out of stock). Instead, they need a gold-embossed plaque on their desks which reads as follows:

- *First Priority:* Strategic (nuclear) and space forces.
- *Second Priority:* Long-range maritime and air forces.
- *Third Priority:* Ground and tactical-air forces.

These "priorities" are not a matter for choice. They are, literally, objectively true for the United States, given the national geography and state of the art of modern technology. Various politicians and defense planners may deny these priorities by ill-considered actions, but that ever-present possibility does not vitiate the objective nature of the truth which they affront.

Having some way to be certain that defense plans were "right" would be very agreeable. Recognizing the unpredictability of events, however, and being dutiful students of Carl von Clausewitz¹ (and Murphy with his Law), it is instructive to ask—brutally perhaps—about the negative consequences of a range of different errors in US military policy. For an effectively (all but) insular—if continental-scale—country in a nuclear age, the priorities specified above should appeal to common sense. In support of that common sense, the three priorities incorporate, in toto, a genuinely unified vision of military policy and—logically and practically—a descending critical dependence. In descending order, the three priorities pertain to (1) the protection of the United States in the most basic ways vis-à-vis the most awesome of dangers, (2) the ability to wage war at long distance abroad, and (3) the ability to conduct large-scale regional military campaigns.

One hardly needs to be a professor of geostrategy in order to appreciate the necessity for the United States to sustain, even enhance (as overseas bases fall away), its long-range air power. Although one can be certain that the next decade will witness a US need for the strategic effectiveness provided by long-range air power, one cannot exactly predict at what time, over what issues, and against which aggressor that demand will arise. The potential for the policy demand is locked into the logic of US foreign policy and strategic geography.

Principle No. 3: Recognize That the Long Term Is a Succession of Short Terms

Long-term hopes for a less bellicose world, in common with visions of a truly all-Eurasian balance of power for those continents, are exactly that—hopes and visions. In the long run most things are possible, if not equally likely. Meanwhile, professional US defense planners are obliged to attempt to write plans for coping with a rather more disorderly world than has been familiar in recent decades.

Common sense, historical reflection, and even the headlines tell us day by day that the fuel for international (and intercommunal, interethnic, interreligious) conflict is increasingly abundant. The bizarre notion that the 1990s and beyond somehow will see the elevation in significance of the politics of international economics—but not of military force to backstop or advance asserted economic interests—should not be accorded great respect.² In short, even though a sharply declining credibility attaches to the canonical major threats of the cold war, the world is probably becoming a more dangerous place.

The US ability to shape its future security environment is real but only partial. A long-term future goal for the United

States must be to encourage the emergence of a new security order in Europe and Asia wherein local polities would ensure a bi-continental balance. In this equation, the United States would play the classic role of "balancer," which sometimes was available to Britain in centuries past. For the time being, however, such a future condition is strictly a matter for speculative enquiry; it will need to be constructed brick by brick, short run by short run. It is at least as likely as not that out of the current turmoil in European politics a superpolity will emerge which will menace the balance of power in Europe and Asia (yet again).

If the United States is to learn from its three twentieth-century interventions in European security politics (1917-18; 1941-45; 1947-early 1990s(?)), it will draw the conclusion that the time to shape the future (and the most economical method for effecting the same) is *as that future is unfolding*. If the United States elects in essence in the 1990s to stand down much of its 1991-extant military posture, it will be repeating past errors and choosing to reduce radically its impact upon the course of Eurasian political history.

Principle No. 4: Sustain or Acquire Flexibility to Adjust to Changing Circumstances

US defense planners cannot know today what policy demands will be placed upon the armed forces five to 10 years hence. But they do know the kinds of demands that could be forthcoming, and they do know the character of military capabilities that the United States will require. For only the briefest of possible sets of examples, US defense planners know that their country must be able to (1) deter and preferably defend (with offensive and/or defensive counterforce—whether nuclear,

conventional, or unconventional) against threats of attack by weapons of mass destruction (nuclear, biological, or chemical); (2) wage and sustain war over very great distances; (3) typically fight alongside friends and allies but possibly effect a forced regional entry; and so forth.

Of course, it is difficult to size forces for a world wherein plausible and semiplausible threats are diffuse. But the very marked increase in uncertainty over future dangers (the absence of self-evident "dominant scenarios" as candidates for force planning), as noted already, means that US defense planning has to be *uncertainty-pulled*—rather than (specific) *threat-driven*. What should discipline the process of defense planning/budgeting in the new era of the 1990s is not so much the identified, or readily predictable, military capabilities of particular states—presumed to be usable in particularly inimical ways—but a more general prudence.

Given the geography of interstate security relationships, the character of US foreign policy (the classes and potential quantities of demand for military backing), and a history-derived prudential wisdom, the United States should have little difficulty specifying, interrelating, and *prioritizing among* the kinds of military capabilities that it should maintain and modernize. Above all else, the United States will need the ability to adjust flexibly to circumstances which are *unexpected in detail* (though not in nature).

Flexibility has many components, including an openness of mind, an excellence in doctrine (or in provision for doctrinal revision), and a suitable elasticity of organizational framework. Also, however, flexibility is a matter of money and time. Almost paradoxically, the basis for flexibility in strategic nuclear employment resides in meticulously detailed (single integrated operational plan—SIOP) mission planning which is already in the computer and has been trained for. Similarly, flexibility tomorrow in the use of military power of all kinds must depend upon decisions made today. Military

investment (and related) decisions in the early 1990s will determine the military capabilities of the year 2000 or—at the level of technology base and human resources—the speed with which the United States could proceed in the late 1990s to implement some kinds of defense mobilization.

The case for the B-2—indeed for truly long-range air power in general—has to be crafted with a view to the kinds of arguments specified or implied here and not with heavy specific reference to residual Soviet dangers. Unquestionably, on the “political velocity” side—though not with regard to actual military capabilities—the Soviet long-range nuclear threat is in the

process of vanishing from the political radar screens of most US federal legislators. That is not the issue and should not be allowed to become the issue. The question is not whether the Soviet “threat” is in full political retreat *at the present time*, but what sort of capabilities are implied by the *uncertainty-pull of a challenging future*.

Principle No. 5: Learn from the Past

History cannot tell us what will happen in the 1990s, but it can tell us what could happen. The past is the repository of experience which should alert us to the questions that may need answers. History does not repeat itself in detail, but the same kinds of problems and opportunities do arise, regardless of changing state players, political leaders, levels of tech-

Civil unrest in Liberia compelled the United States to send in the Marines to augment security at the US Embassy as part of Operation Sharp Edge, August 1990. The ability to project power over great distances has long been a major strength of the US military. Looking to the future, US defense planners must consider both the strengths and weaknesses of the American armed forces.



nology, and so forth. Moreover, statesmen and defense planners are prone to commit old errors in new ways. It so happens, for example, that the principal "lessons" that stand out from the very extensive (14-plus years) experience of the 1920s and 1930s on negotiated "strategic" (in that period, naval) arms limitation fit nearly perfectly the 1970s and 1980s history of the Strategic Arms Limitation Talks.³

The challenge of the 1990s to US defense planners is to cope with a context wherein "yesterday's enemy" remains militarily very much still in the field (with regard to strategic nuclear forces), albeit with political Balkanization threatening. But today's well-settled certainties have a way of being overturned suddenly. Speaking in the House of Commons in 1792, just a year before Britain was obliged to embark upon a 20-year war with France, Prime Minister William Pitt (the Younger) observed—without contradiction from the floor—that "unquestionably there never was a time in the history of this country when, from the situation of Europe, we might more reasonably expect fifteen years of peace, than we may at the present moment."⁴ Pitt was unlucky, not foolish.

Many defense planners in history have faced uncertainties on the scale which confronts Americans in the 1990s. Today's details are unique; the situation is not. Even for great powers—to narrow the mandate—absence of a dominant, specific external threat is far from an unusual state of affairs. The past is there for our education—let us use it.

Principle No. 6: Play to American Strengths

Self-knowledge, as Sun Tzu advised, is critical for success in strategy and statecraft.⁵ Freedom of choice is somewhat constrained among means and methods in national security policy. Nationally preferred approaches to security problems simply may fail to deliver the requisite amount of strategic effectiveness.⁶ None-

theless, a little reflection upon American (or indeed, any country's) history yields the insight that Americans and their polity are better at some kinds of military tasks than at others. This point should occasion no surprise. For good and for ill, each country's armed forces are an expression of the society and political system which they serve. For example, following the military disasters of 1940–42, Gen Alan Brooke, chief of the Imperial General Staff, believed that "we [British] are undoubtedly softer as a nation than any of our enemies except the Italians."⁷ Typical German evaluation of the physical and moral resilience of the American soldier in 1942 (and later) similarly was unflattering.⁸ Nazi German society in the 1930s—not to mention the years of combat experience (in Poland, France, the Soviet Union, and North Africa)—had provided hard schools for the German soldier of 1942–43.

National geography and historical experience forge what is known as a strategic culture. From this culture one can talk of an "American way" in defense preparation and in war. Americans, of necessity, have been excellent at conquering great distances (though mobility can translate into "mere motion" rather than effective fighting power at the sharp end) and at substituting machines of all kinds for scarce or militarily inefficient manpower. As US defense planners consider their options for the 1990s, they should reflect honestly upon those activities which the American armed forces tend to conduct well or poorly. Countries specialize militarily. The priorities specified under principle no. 2 happen (not by accident) to match tolerably accurately—in descending order—the kinds of military power at which Americans excel.

Principle No. 7: Reexamine Assumptions, Reshape Rationales

The size and character of the current US defense posture are the products of strate-



As the cold war thaws, widespread availability of sophisticated weapons systems tends to make the world an even more dangerous place. Here, a Soviet MiG-29 Fulcrum trainer is shown on display at the Farnborough (England) Air Show with a Soviet An-124 Condor transport aircraft looming in the background.

gic assumptions and beliefs that are now between 30 and 40 years old—the age of the foreign policy and grand strategy which US military power serves. Policy and strategy assumptions are not invalid because they are old. Indeed, it can be useful to remember that nothing ages so rapidly as yesterday's (or even this morning's) news headlines. US defense policy cannot, and should not, be remade in accordance with instant judgments on the ebb and flow of current events (or of "trends" that are only days, months, or perhaps a year old).

Policy and strategy which essentially were set in the 1950s and which accommodated many changes at the margin in subsequent decades eventually come to assume an "existential" dignity and authority. In other words, there may still be excellent reasons for maintaining a strategic forces triad, for approaching nuclear targeting via the big-war framework of SIOP planning, or for adhering to a NATO strategic concept of flexible response. But a period can arrive wherein constant or

occasional fine-tuning of the extant concept or approach imposes substantial opportunity costs. In accordance with the paradoxical logic of strategy,⁹ success can breed failure and—following Clausewitz—there is a "culminating point of victory."¹⁰ Quantitative change eventually compels qualitative change.

Much of what the United States militarily has planned to be able to perform for the past 30 years remains relevant for the 1990s. But the political framework for those contingent actions is changing and so must the rationales both understood for planning purposes and advanced for the garnering of the necessary public support. Strategic wisdom bereft of public support in a democracy is just a set of ideas.

Conclusions

An important value of the seven broad principles advanced in this article is that, if followed in practice, they would help to reduce the burden of anxiety that flows from uncertainty. One must assume that on many matters of detail, statesmen and defense planners will be more or less wrong. That notion is a given for this discussion. The challenge is to find an approach to defense planning that provides a high level of insurance against the bad

consequences of unpleasant surprises. On the positive side, if the United States plans for defense in the spirit of this article, it would very likely be as ready as it could be to exploit opportunities for the advancement of a compatible international order. On the negative side, application of these principles should help noticeably to limit the damage that future insecurity conditions could wreak upon US interests. □

Notes

1. Carl von Clausewitz, *On War*, ed. and trans. Michael Howard and Peter Paret (Princeton, N.J.: Princeton University Press, 1976), 119–21.

2. For an optimistic view, see Stanley Hoffmann, "Reflections on the German Question," *Survival* 32, no. 4 (July–August 1990): 291–98.

3. Colin S. Gray, *House of Cards: Why Arms Control Must Fail*, forthcoming, chap. 4.

4. *The War Speeches of William Pitt the Younger* (Oxford: Clarendon Press, 1914), 16.

5. Sun Tzu, *The Art of War*, trans. Samuel B. Griffith (Oxford: Clarendon Press, 1963), 84.

6. Colin S. Gray, *War, Peace, and Victory: Strategy and Statecraft for the Next Century* (New York: Simon and Schuster, 1990), 20–21.

7. Quoted in Charles Whiting, *The Poor Bloody Infantry, 1939–1945* (London: Arrow Books, 1989), 176–77.

8. *Ibid.*, 251–54.

9. The central theme in Edward N. Luttwak, *Strategy: The Logic of War and Peace* (Cambridge, Mass.: Harvard University Press, 1987).

10. Clausewitz argues that there is a culminating point to success or victory beyond which the victorious side both reduces its gains and indeed sets itself up for a devastating counterstroke. The winning side, for example, can register great but fatally incomplete success with the capture of far more enemy territory than it can hold comfortably. Beyond Clausewitz's culminating point of victory, boldness becomes imprudence and logistical nightmares lurk for the unwary. Readers may amuse themselves speculating where and when Hitler's Third Reich passed its culminating point.

Although history alone cannot act as a predictor of events, it can steer defense planners toward the right questions to ask in determining what will happen in the future. Here, the remains of a B-18 lie on the ramp at Hickam Field, Hawaii, shortly after the Japanese attack of 7 December 1941.





Spring 1991

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Capt Brian P. Tice, USAF

for his article

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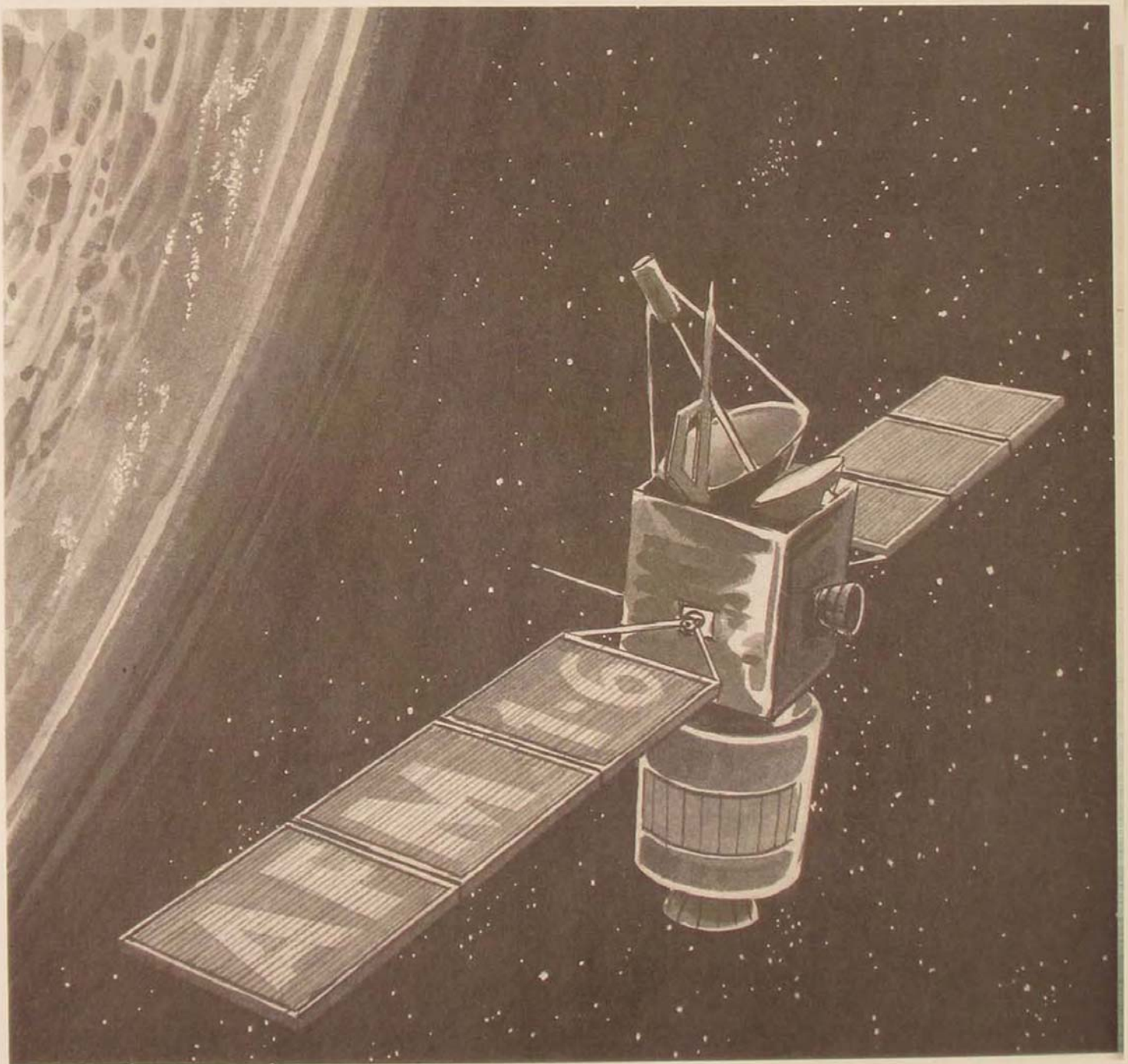
Congratulations to Capt Brian P. Tice on his selection as the Ira C. Eaker Award winner for the best eligible article from the Spring 1991 issue of the *Airpower Journal*. Captain Tice receives a \$500 cash award for his contribution to the Air Force's professional dialogue. The award honors Gen Ira C. Eaker and is made possible through the support of the Arthur G. B. Metcalf Foundation of Winchester, Massachusetts.

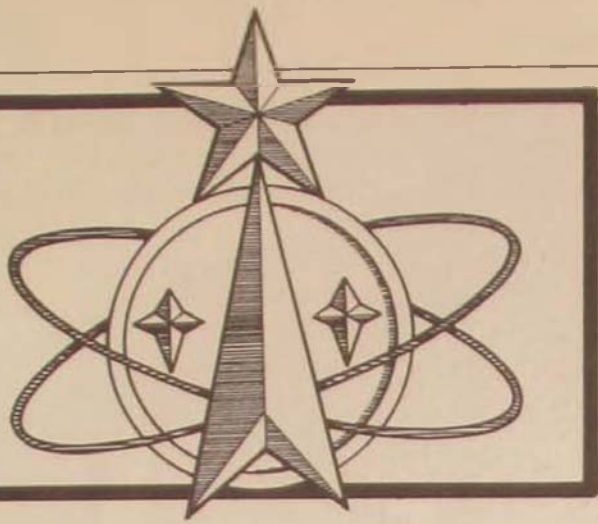
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TOWARD OPERATIONAL-LEVEL DOCTRINE FOR SPACE

A PROGRESS REPORT

CAPT JAMES R. WOLF, USAF





THE United States has had a dedicated military space program for more than three and a half decades.¹ For most of that time, the Air Force has struggled to come to grips with the potential of this “new” medium of space and to incorporate it into Air Force doctrine. Since the first doctrinal acknowledgment of space was made in 1959,² efforts to publish usable and widely acceptable space doctrine have been largely futile.

The reasons for this failure are complex but generally stem from two sources—a number of reorganizations and resulting reassignment of responsibilities for the employment of space forces, and the rapid growth of technology that allows us to constantly envision new possibilities for the exploitation of space to perform Air Force missions. Added to these is the long-standing difficulty in obtaining agreement on many of the basic tenets of military space doctrine.

These factors have led to a situation in which we (the military space community) are charging off in many directions at once without good centralized planning and without basing our decisions on established doctrine and sound strategy. This is not necessarily bad—after all, the Air Force is accomplishing its space missions successfully and our capabilities are increasing at a respectable rate—but it is also not the best way to do business.

In fact, the actual process is backwards. While we cannot and should not suspend

our space program to wait for doctrine, we should make every effort to agree on space doctrine as soon as possible. Sound doctrine combined with national policy, fiscal reality, and other constraints can lead to strategies and plans that would allow us to acquire and employ space forces most effectively in support of national objectives (fig. 1).

The purpose of this essay is to review the current status of Air Force space doctrine, to comment on the necessary ingredients that will result in publication of a useful doctrinal manual, and to report on progress being made toward that publication.

Current Status

Until recently, Air Force space doctrine has received modest mention in Air Force Manual (AFM) 1-1, *Basic Aerospace Doctrine of the United States Air Force*, published in 1984,³ and AFM 1-6, *Military Space Doctrine*, published in 1982 (fig. 2).⁴ The latter document, although it makes some good points, has never been very useful to the Air Force space community.⁵ A new edition of Air Force Regulation (AFR) 1-2, *Assignment of Responsibilities for Development of Aerospace Doctrine*, eliminates AFM 1-6 and proposes a new publication—AFM 2-25, *Space Operations*.⁶ At the same time, a new version of AFM 1-1 that incorporates space into basic doctrine to a greater extent is currently being coordinated.⁷

The Air Force doctrine hierarchy and the placement of space doctrine within it reflect a conscious decision by the Air Force not to separate air and space doctrine but rather to promote the concept of *integrated aerospace power*. This is one of the most divisive issues facing scholars of doctrine and one of the greatest obstacles to publishing Air Force doctrine for space. Regardless of how one feels about whether this is the proper long-term approach, it does reflect the current reality in which the Air Force exercises responsibility in both mediums. Furthermore, it is a work-



able method for publishing new space doctrine in the near future.

The problem is in the timing of the publication of all these new manuals. AFM 1-6 has already been eliminated, yet the publication of a new AFM 1-1 is probably more than a year away and a first draft of AFM 2-25 has only recently been released for comment. This means that we are in for a period with practically no approved space doctrine "on the street."

Air Force Space Doctrine

Doctrine, in general, has three purposes. First, it provides the working medium for a thorough analysis of past experience—the ultimate distillation of lessons learned. Second, it provides the means of passing on this experience by educating and allow-

In conjunction with the Air Staff, doctrine analysts at the Air University Center for Aerospace Doctrine, Research, and Education (AUCADRE) incorporate space operations in AFM 1-1, Basic Aerospace Doctrine of the United States Air Force. Pictured are (left to right) Maj David Booker, Lt Col William F. Furr, John E. Jordan, Col John B. Sams, Jr. (commander), Col Dennis M. Drew, Jerome W. Klingaman, Lt Col Price T. Bingham, and Lt Col Charles M. Westenhoff.

ing successors to avoid repeating the same old mistakes. Third, it provides guidance for future actions and allows for a commonality of understanding between superiors and subordinates that is essential during conflict.⁸

The Air Force attempts to capture a lot of material in a single basic doctrine manual—AFM 1-1. With the elimination of AFM 1-6, the next version of AFM 1-1 must also include basic doctrine for space. Although no small task, it must clearly articulate the similarities and differences be-

tween the air and space environments, as well as between air and space forces, and fit all this within the concept of integrated aerospace power.

At the same time, AFM 2-25, *Space Operations*, should be published as soon as possible. As the highest level manual speaking strictly for space, it should derive from and expand on the space portions of AFM 1-1; yet, to some extent, it must be able to stand alone as a self-contained expression of Air Force space doctrine. Both

of these documents must fulfill the three functions of doctrine stated above, and they have to be consistent with each other. Other, lower-level, more specialized space doctrine manuals will be required as our space capabilities mature, but these are not even in the planning stages.

The effort to publish an operational level doctrine manual for space was begun at Headquarters, Air Force Space Command (AFSPACECOM) in 1985. An Air Force space doctrine symposium was held

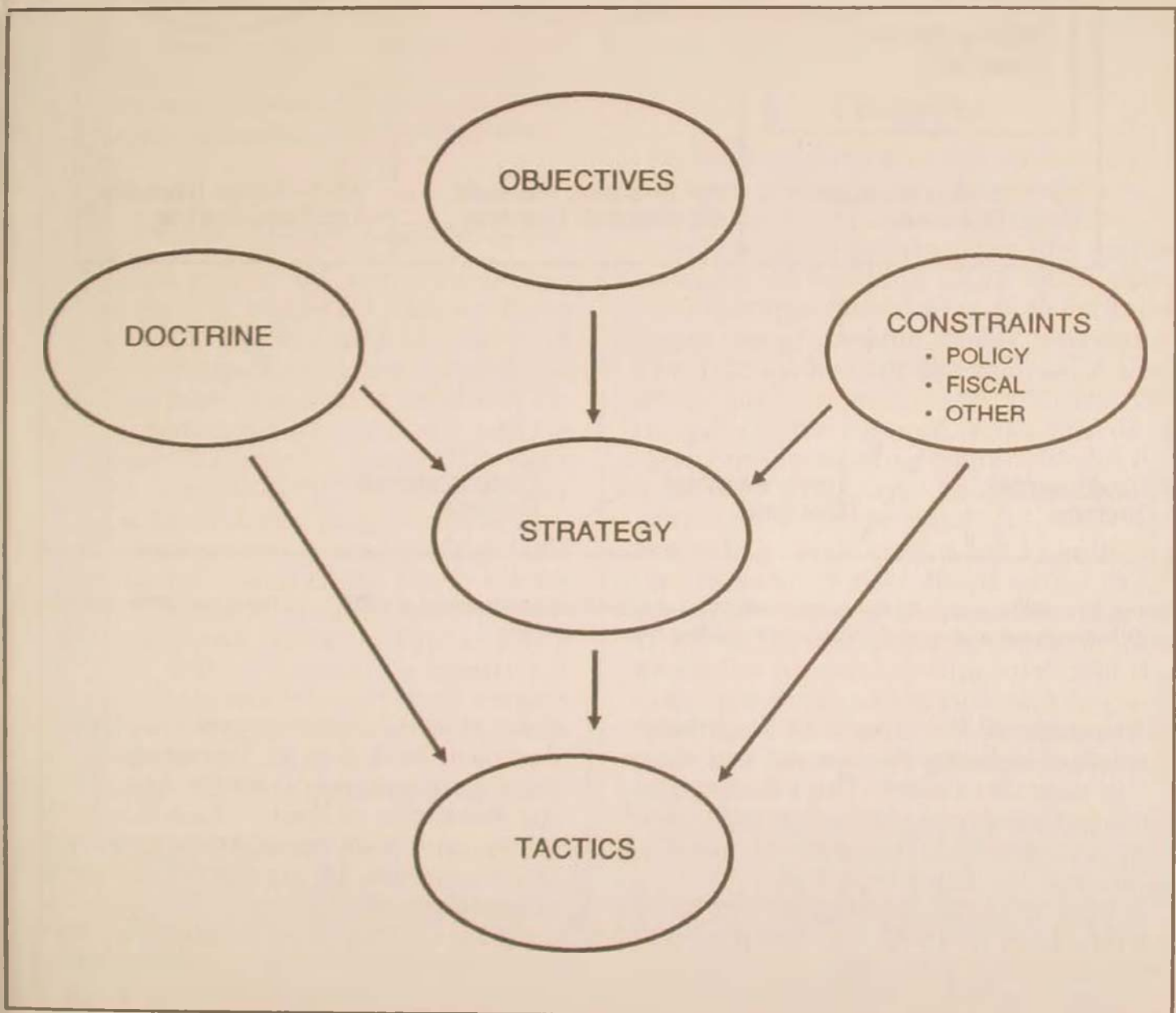


Figure 1. Effective acquisition and employment of space forces depends on balanced strategies and tactics developed from established doctrine and real world constraints. Doctrine and constraints such as policy and cost influence both strategy and tactics, but doctrine itself is unconstrained.

SPACE IN AF DOCTRINE: 1982-90

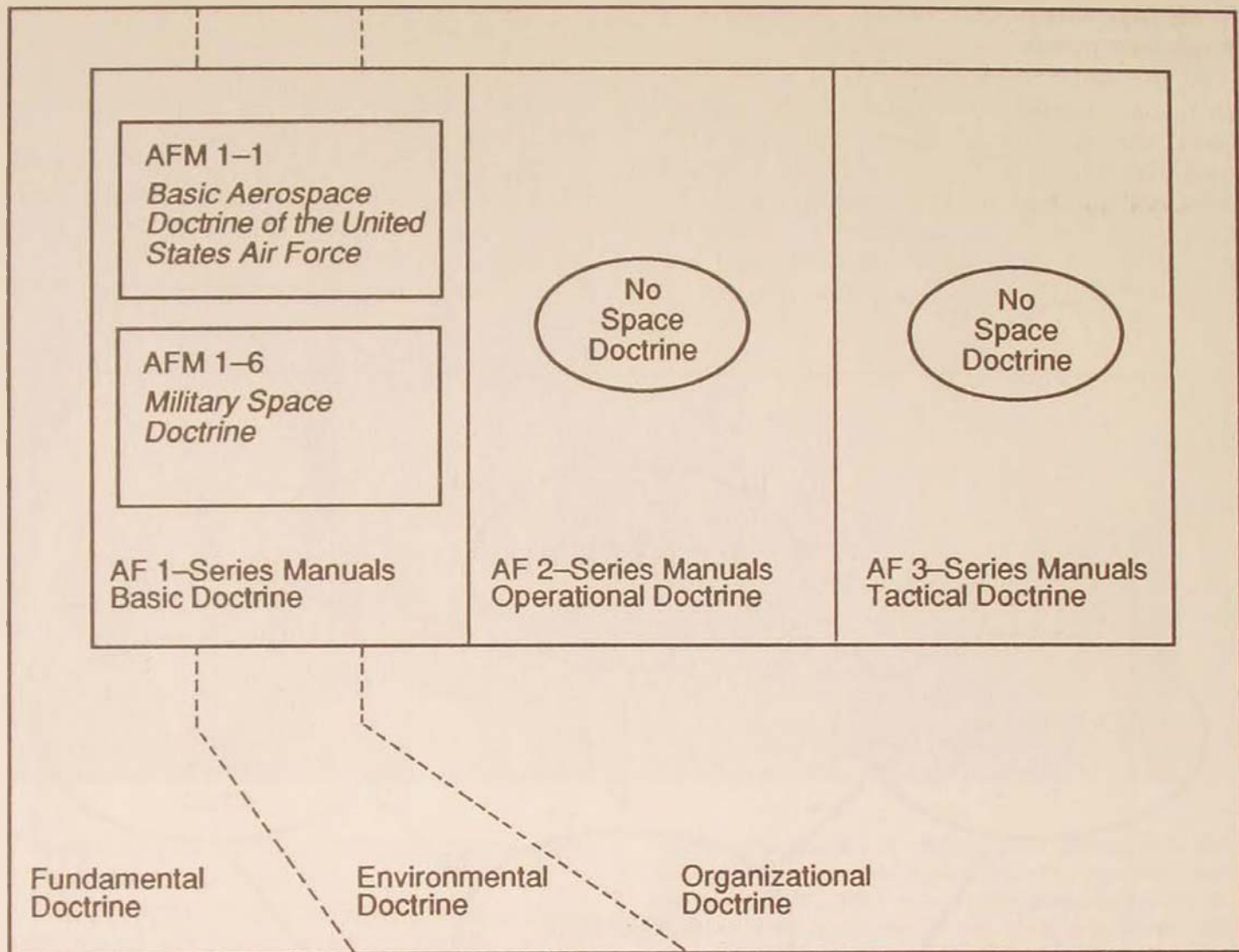


Figure 2. Until recently, Air Force space doctrine received modest mention in AFM 1-1 (1984) and AFM 1-6 (1982). AFM 1-6 was not a very useful document and has been rescinded.

in November of that year with the primary purpose of defining the content and scope of the new document. The effort culminated in the release of a for-comment draft to major commands and separate operating agencies in the summer of 1987.

In May 1988 the project was put on indefinite hold to await the recommendations of the Air Force Blue Ribbon Panel on Space, a senior-level review group whose purpose was to evaluate the future role of the Air Force in space. The panel ultimately identified 28 tasks that are necessary to implement its recommendations,

three of which directly apply to Air Force doctrine. Task 2 is to "revise space doctrine publications to better describe the Air Force role in space." Task 3 is to "develop proposals for addressing national space programs in Air Force doctrine and education and training publications and programs." This is an attempt to provide the widest possible understanding and appreciation for the roles national programs play in Air Force operations. They should be referenced in doctrine and other publications in accordance with the classification of the individual publication. Task 11

is to "integrate, consistent with treaty constraints, the concept of space-based weapons into the Air Force's doctrine. As technology developments permit deployments, integrate space-based weapons into the Air Force's force structure."⁹

Since early 1989, the Air Staff and the Air University Center for Aerospace Doctrine, Research, and Education (AUCADRE) have incorporated this guidance into their ongoing effort to update AFM 1-1. The AFM 2-25 trail was picked up in January 1990 by a more mature AFSPACECOM, and a new version of the manual is currently being drafted for wider Air Force review. The remainder of this article is devoted to describing the premises and philosophy that are going into the new operational-level document.

AFM 2-25, Space Operations

As stated previously, space operations doctrine must be consistent with Air Force basic doctrine. The first draft of AFM 2-25 is being put together on the assumption that a new basic doctrinal manual will indeed be published first and that it will include basic doctrine for space. The basic doctrinal manual—AFM 1-1—will present fundamental doctrine, environmental doctrine for both air and space, and high-level organizational doctrine for Air Force air and space forces, all in the context of integrated aerospace power.¹⁰ This is fairly ambitious and will require a significant departure from the current (1984) version of AFM 1-1. Progress is being made, however, and the latest draft of the new manual (August 1990) incorporates space fairly well.

Nevertheless, the next AFM 1-1 will not be all it could be with regard to space. It is, after all, being written for the entire Air Force, of which the space community is a minority, and it is not being written primarily by "space people." Thus, AFM 2-25 must reach back and cover in detail those areas of environmental space doctrine and high-level organizational doctrine for space not adequately covered in

the basic doctrine manual. This will cause some blurring of the dividing line between the Air Force categories of basic and operational-level doctrine, but the blurring is justified in this case. Not only will it fill in any gaps where space coverage in AFM 1-1 is incomplete, but it will create a stand-alone document for space, complete at the operational level but containing enough higher-level background material to ensure that important distinctions between air and space environments and forces are highlighted. Figure 3 shows where AFM 2-25 will fit into the Air Force doctrine hierarchy.

Premises

AFM 2-25 will contain several philosophical premises, some that apply to all Air Force doctrine and others that are unique to space doctrine. The first premise concerns the extent to which space operations doctrine should attempt to anticipate future capabilities and modes of operation. The initial draft of the manual takes a strong position in favor of futuristic doctrine for three reasons. First, one of the stated purposes of operational-level doctrine is to anticipate change, particularly advances in technology.¹¹ Second, space forces have little choice but to anticipate the future since operational experience in space, particularly in a conflict situation, is extremely limited. And third, the rapid evolution of space technology, and thus the capabilities of space forces, requires that space doctrine be futuristic to some degree in order not to become immediately obsolete.

The second premise concerns the separation of space doctrine from air doctrine. As previously stated, the Air Force has taken the position that it is integrated aerospace power that most effectively accomplishes Air Force missions—not independently operating air and space forces—and AFM 2-25 will toe the party line on this issue. The organizational argument—the fact that the Air Force employs both air and space forces to perform Air Force-



assigned missions—combined with the relative immaturity of space forces' capabilities across the spectrum of conflict, outweighs (for the present) the argument that space ought to be treated within Air Force doctrine as a separate operating environment, coequal with land, sea, and air.

At the same time, there are fundamental differences between the air and space environments and between the characteristics and employment concepts of air and space forces. These differences must be clearly recognized and articulated. AFM 2-25 will be written from the point of view and for the benefit of the operational space forces commander.

A third premise, and one more general in nature, has to do with whether or not doctrine ought to be constrained by policy. AFM 2-25 is written under the assumption that it should be unconstrained. Tying doctrine to current policy is a good way to make it obsolete in a hurry. Doctrine should articulate our views about the most effective ways to employ military forces; it should take somewhat of an "ideal world" view in this respect. Policy represents the "real world" and, more often than not, policy puts constraints on the employment of military force. Taken together, doctrine

The four broad mission areas of space forces—force enhancement, space support, space control, and force application—are key to the draft of AFM 2-25, Space Operations. In a "satellite-hunter" mode, F-15s married with antisatellite weapons (above) could play an important role in the area of "space control."

and policy lead to the development of strategy, and it is strategy—not doctrine—that should be constrained (fig. 1). Since policy constraints are a fact of life, however, the operational commander must be aware of them, and it is appropriate that they be mentioned in an operational-level doctrinal manual. AFM 2-25 will make reference to policy considerations in several places.

Finally, the new manual will explicitly state that no entirely new missions have been assigned to space forces. Rather, use of the space medium enhances and provides flexibility to the performance of the basic Air Force missions and supporting tasks identified in AFM 1-1. This meets the requirement that operational doctrine be derived from basic doctrine and reinforces the Air Force's point of view that, though war may be conducted in space in the future, the focus of conflict will remain on earth. AFM 2-25 will de-

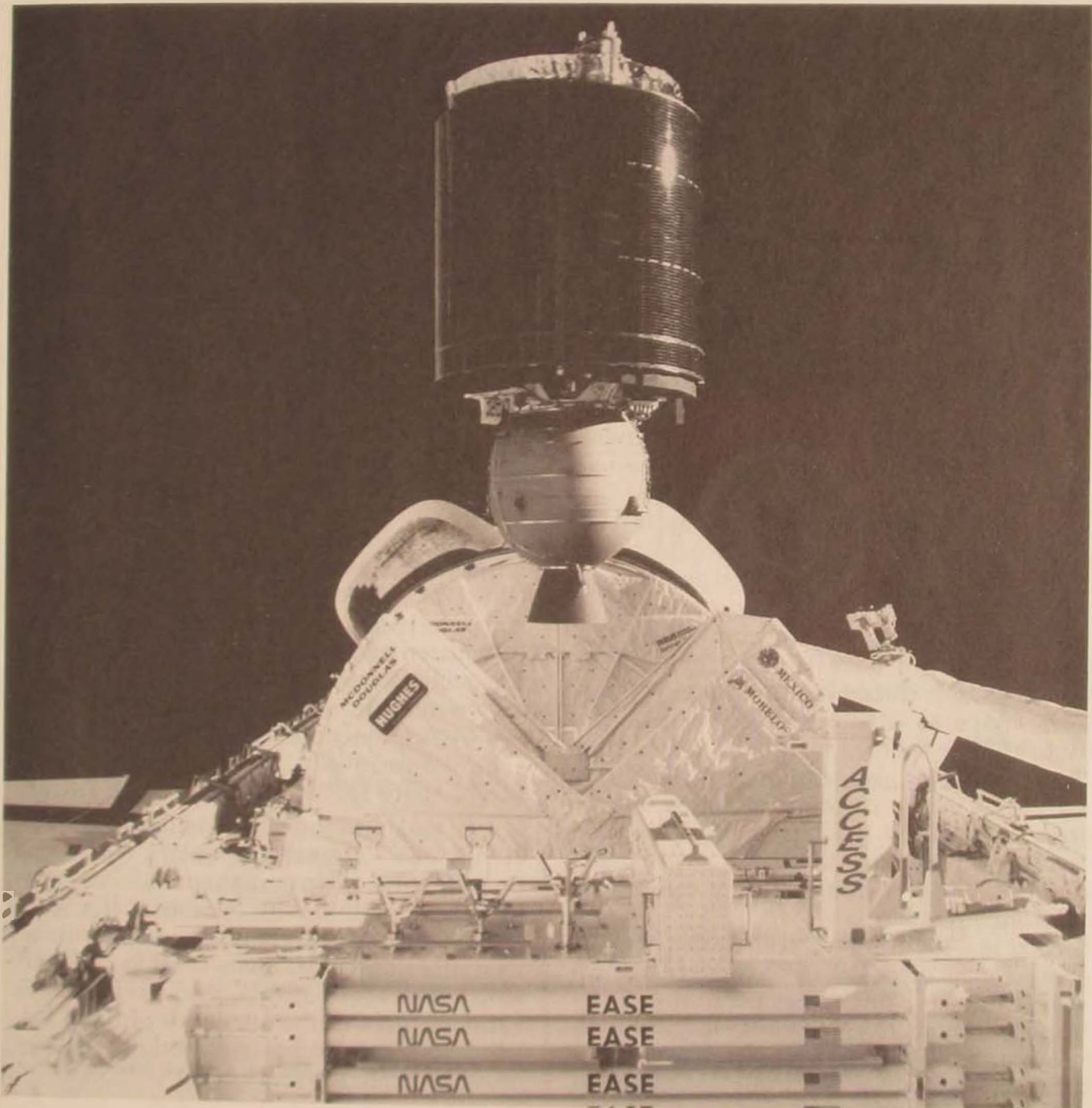
fine the four broad missions areas of space forces—force enhancement, space support, space control, and force application—and will describe them as extensions or larger groupings of basic Air Force missions and

supporting tasks. This format is consistent with both the current edition of AFM 1-1 and the August 1990 draft of a new edition.

The Morelos-B communications satellite emerges from the bay of a space shuttle in 1985. Activities designed to improve terrestrial-based or space-based operations such as air surveillance, navigation, or communications comprise the "force enhancement" mission area of space forces.

Content

The introductory section of draft AFM 2-25 provides the overlapping basic doctrine material mentioned previously, in-





cluding definitions of aerospace power and space power, and some text on the nature and purpose of doctrine. Some of the premises of the manual are reiterated in this section to provide context for what follows. The manual describes space power as "that portion of aerospace power that exploits the space environment for the enhancement of terrestrial forces and for the projection of combat power to, in, and from space to influence terrestrial conflict."¹² This section of the draft also discusses the roles and responsibilities of the Air Force in the conduct of space operations and briefly defines several distinctive terms necessary to clearly distinguish between the various military operating environments.

Next is a section on the characteristics of space forces. The list of characteristics ascribed to space forces has been one of the lesser obstacles to agreement on space doctrine for a long time. This section of AFM 2-25 is adapted largely from Lt Col David

With the ability to cover the entire earth simultaneously, space assets provide a unique global presence not possible with terrestrial forces.

Lupton's excellent book, *On Space Warfare: A Space Power Doctrine*.¹³ The characteristics of space forces are divided into three sections—environmentally influenced characteristics, logistically influenced characteristics, and politically/legally influenced characteristics.

Environmentally influenced characteristics of space forces include the following:

- **Global presence.** Constellations of satellites can "cover" the entire earth and thus provide an instantaneous global presence not possible with terrestrial forces.

- **Position or quasi-position.** The position of unpowered spacecraft is predictable over short periods, thus giving these vehicles more of the attributes of fixed fortifications whose position is known than those of maneuvering forces.

- Cluster areas. Because certain areas of space and specific orbital paths are used more heavily than others, space vehicles tend to be clustered in those areas and orbits.

- Weapon effects. There are significant differences in the effects and effectiveness of nuclear, directed-energy, and kinetic energy weapons in the vacuum of space.

- Vast operating arena. The space environment presents a vast and potentially infinite arena for military operations in which space forces are rarely in physical proximity, at least by terrestrial standards.

Logistically influenced characteristics are based on the fact that space is the most difficult, in terms of both energy and expense, of the military operating environments to reach and that space forces are usually deployed only when their operational advantages outweigh this inherent difficulty. These characteristics include:

- Remote command and control. Space forces are rarely manned and must be employed and maintained remotely from the earth.

- Altitude/security tradeoff. Within the

SPACE IN AF DOCTRINE (PLANNED)

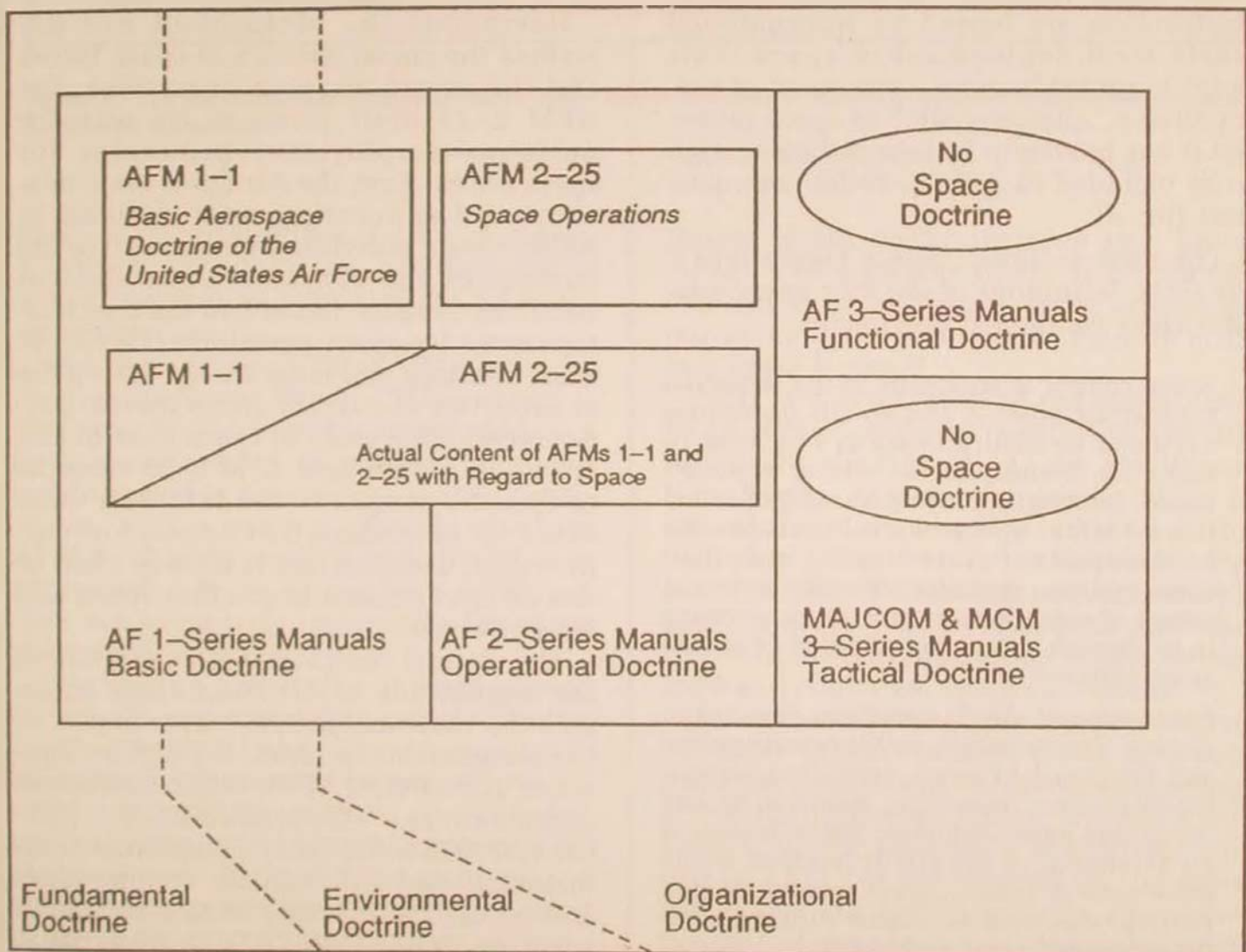


Figure 3. The next AFM 1-1 will better incorporate basic doctrine for space. AFM 2-25 will be primarily operational-level doctrine but will overlap AFM 1-1 somewhat in order to make sure there are no gaps in space doctrine.

constraints of mission coverage requirements, space forces can gain security against terrestrial-based threats by deploying to higher altitudes.

The *politically/legally influenced characteristics* of space forces include:

- **Legal overflight.** Space vehicles can legally overfly sovereign territory in a manner analogous to the right of free passage on the high seas.
- **Vehicular sovereignty.** The sovereignty of space vehicles resides with the vessel itself, not with its location. This implies that space forces cannot rely on protected borders of sovereign areas for warning and defense.
- **Weapon restrictions.** Weapons of mass destruction are barred by international treaty from deployment in space. This point is probably more a statement of policy than a "characteristic" of space forces, but it has proven to be long lasting enough to be included in AFM 2-25 for completeness (fig. 4).

The next section, "Space Operations," provides definitions of the four space mission areas mentioned previously:

Space control is analogous to the terrestrial counter air mission and entails operations designed to ensure freedom of action in space for friendly forces while, when directed, limiting or denying freedom of action to an enemy. Space control includes the broad aspects of protecting US and allied space systems, protecting friendly terrestrial areas and assets from enemy forces operating in or through space, and negation of enemy space systems.

Space support entails operations required to deploy and maintain military equipment and personnel in space, including launching, deploying, recovering, maintaining, and sustaining space vehicles. Space launch is an extension of the airlift mission while other areas of space support encompass supporting tasks such as combat support, combat airspace control, and search and rescue.

Force enhancement entails space-related operations conducted to improve the effectiveness of both terrestrial-based and space-based forces. It encompasses the aerospace

surveillance mission, supporting tasks such as weather and command and control, and other enhancement capabilities such as communications and navigation.

Force application entails combat operations conducted from space for the purpose of affecting terrestrial conflicts. It encompasses the Air Force basic missions of strategic aerospace offense, strategic aerospace defense, counter air, air interdiction, and close air support.¹⁴

These four terms are not universally accepted, but they have become well-ensconced in Air Force documentation over the last few years and have been "blessed" by inclusion in national, Department of Defense (DOD), and Air Force space policy documents.¹⁵

Having set the background and described the characteristics of space forces and the nature of space operations, the AFM 2-25 draft turns to its primary business—employment principles for space forces. First, the Air Force basic missions and supporting tasks defined in AFM 1-1 are individually examined in the context of the characteristics and capabilities of space forces and the four mission areas for space operations. Certain of these missions and tasks are not within the capabilities of current space forces, particularly in the areas of space control and force application, and AFM 2-25 attempts to link the present to the future in these cases by providing that amount of employment doctrine that is already clear or can be extrapolated from other space and air experience.

The manual continues with a section on the organization of Air Force space forces and the responsibilities, respectively, of the commander in chief, US Space Command (USCINCSpace), other combatant commanders, COMAFSPACE (USCINCSpace's Air Force component commander), and subordinate commanders and units. The majority of this section is spent on COMAFSPACE—the operational hat worn by the commander of Air Force Space Command. COMAFSPACE is normally delegated operational control of Air Force space forces at all levels of conflict

ATTRIBUTES OF SPACE FORCES

<i>Environmentally Influenced Characteristics</i>	<i>Logistically Influenced Characteristics</i>	<i>Politically/Legally Influenced Characteristics</i>
<ul style="list-style-type: none"> • Global Presence • Position • Cluster Areas • Weapons Effects • Vast Operating Arena 	<ul style="list-style-type: none"> • Remote Command and Control • Altitude/Security Tradeoff 	<ul style="list-style-type: none"> • Legal Overflight • Vehicular Sovereignty • Weapons Restrictions

Figure 4. The list of characteristics ascribed to space forces has been a moderate obstacle to agreement on space doctrine for some time.

and has responsibilities for the planning, allotting, coordinating, and tasking of space forces based on USCINCSpace's campaign plan.

The next section is titled "Principles for Employing Space Power." These principles are adapted from historical guidance for the employment of military forces and are discussed in the context of space operations. This is another example of where AFM 2-25 must overlap basic doctrine to compensate in an area where AFM 1-1 does not adequately incorporate the space point of view.

Briefly, the principles of employment are to gain and maintain control of space, centralize control and decentralize execution, attack the enemy's centers of gravity, seize the initiative, execute concentrated and persistent attacks, and maintain sufficient reserves. Each of these principles is shown to be applicable to the employment of space forces and together they give the document a decidedly offensive flavor. The concept of offensive rather than action by defensive, reactive space forces needs to be stressed. It is more in line with the

tenets of our basic doctrine and, since AFM 2-25 declares itself to be unconstrained by policy issues, better articulates our ideas of the best way to employ military space forces.¹⁶

Next is a discussion of the space campaign, stressing the responsibilities of and important considerations for the operational space forces commander. This is one of the more lengthy sections of the document, and most of it is devoted to the practicalities of conducting space control, space support, force enhancement, and force application operations. It also covers joint and combined space operations.

A number of paragraphs on preparation of forces follow, broken down into sections on organizing, training, equipping, and sustaining space forces. It closely parallels a similar chapter in the current edition of AFM 1-1 but expands on the space forces commander's concerns and viewpoints. "Organization," the longest of these sections, deals with the operational and support chains of command for Air Force space forces.

The manual concludes with a section in-

tended to reinforce the points that doctrine cannot remain static, that the technology and capabilities of space forces continue to evolve rapidly, and that it is one of the responsibilities of the operational space forces commander to actively contribute to the currency of space doctrine. This section also stresses the concept of integrated aerospace power by stating that

air and space systems have complementary rather than redundant capabilities and are moving toward rather than away from greater coordination and integration as space forces' capabilities evolve across the full spectrum of military conflict. Space power contributes an ever greater amount to the ability of integrated aerospace power to fulfill all Air Force basic missions and supporting tasks.¹⁷

Conclusion

At this writing, the first draft of AFM 2-25 has been approved by AFSPACECOM and forwarded to the Air Staff, where it will be reviewed and sent out to the Air Force at large for further review and comment. This cycle will probably have to be repeated at least once, making it unlikely that the manual will be published before late 1991.

Notes

1. Paul B. Stares, *The Militarization of Space: US Policy, 1945-1984* (Ithaca, N.Y.: Cornell University Press, 1985), 22.
2. Air Force Manual (AFM) 1-2, *United States Air Force Basic Doctrine*, 1 December 1959.
3. AFM 1-1, *Basic Aerospace Doctrine of the United States Air Force*, 5 January 1984.
4. AFM 1-6, *Military Space Doctrine*, 15 October 1982.
5. Maj Robert H. Chisholm, *On Space Warfare: Military Strategy for Space Operations* (Maxwell AFB, Ala.: Air University Press, June 1984), 15-17.
6. Air Force Regulation (AFR) 1-2, *Air Force Basic Doctrine: Assignment of Responsibilities for Development of Aerospace Doctrine*, 10 September 1990, 7.
7. AFM 1-1, "Basic Aerospace Doctrine of the United States Air Force," (draft), August 1990.
8. Lt Col Dennis M. Drew and Dr Donald M. Snow, *Introduction to Strategy*, 3d ed. (Maxwell AFB, Ala.: Air Command and Staff College, 1983), 89-90.

In the meantime, there will be plenty of opportunity to comment on the document, both formally and informally. Information copies have been forwarded to several members of the space and doctrine communities who are known to be interested. Many of the most valuable comments are expected to come back through these informal channels, and every attempt will be made to work them in, for there will certainly be room for improvement in the first draft of this manual.

It is important to remember, however, that it will be impossible to achieve perfect agreement, and there is considerable argument for accepting imperfection in order to get something published to fill the current doctrinal void. There are several widely separated schools of thought on space doctrine, particularly in the area of separation of space doctrine from air doctrine. Proponents of these schools are urged to accept the Air Force doctrinal scheme proposed by the new AFR 1-2 for the reality that it is, to recognize that any official space doctrine publication accomplished in the next few years must fit into this scheme, and to support the compromises that must be made in order to come to an agreement. □

9. *Implementation Plan for Space* (Washington, D.C.: Department of the Air Force, 3 February 1989).
10. Drew and Snow, 91-97.
11. AFM 1-1, 5 January 1984, vi; and AFR 1-2, 3.
12. AFM 2-25, "Air Force Operational Doctrine: Space Operations," (draft), 6 June 1990, 4.
13. Lt Col David E. Lupton, *On Space Warfare: A Space Power Doctrine* (Maxwell AFB, Ala.: Air University Press, June 1988), 19-28.
14. AFM 2-25, 9.
15. *National Space Policy* (Washington, D.C.: The White House, 2 November 1989); *Department of Defense Space Policy* (Washington, D.C.: Department of Defense, 10 March 1987); *Air Force Space Policy* (Washington, D.C.: Department of the Air Force, 2 December 1988).
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TACTICAL AIRCRAFT AND AIRFIELD RECOVERY

CAPT PETER C. BAHM, USAF
CAPT KENNETH W. POLASEK, USAF

The sky is about to become another battlefield no less important than the battlefields on land and sea. . . . In order to conquer the air, it is necessary to deprive the enemy of all means of flying, by striking at him in the air, at his bases of operation, or at his production centers. We had better get accustomed to this idea, and prepare ourselves.

—Giulio Douhet

FROM World War I to Operation Desert Storm, air power has been a decisive factor—if not the decisive factor—in conventional conflicts between mechanized adversaries. Control of the air has influenced operations in the air, on land, and at sea. To control the air, one must have airfields from which to launch aircraft. During the Battle of Britain, Winston Churchill recognized the “value of maintaining this fighting vantage ground [i.e., airfields]” by keeping them operational.¹ If aircraft are unable to oper-

ate from their bases, then the advantages of air power will be lost. Our aircraft no longer have the ability to operate from the rough pastures, dirt fields, or even simple, paved airfields that were typical of earlier conflicts. Modern aircraft require long, hard, smooth runways that are free of dirt and debris. Unfortunately, today's air bases are more vulnerable than the British aerodromes during the Battle of Britain. In the event of war, the enemy will undoubtedly attack US air bases overseas and extensively damage their runways and taxiways. This article examines the importance of airfield operating surfaces to the effective, sustained projection of US air power in future conflicts by reviewing the lessons of history, assessing existing threats to airfields, explaining how air base operability (ABO) is designed to counter those threats, determining the relationship between the recovery capabilities of ABO and the needs of modern



aircraft, and noting Soviet views on operating from damaged/repaired surfaces.

Historical Importance of Airfields

Prior to World War II, airfield construction amounted to little more than finding an open field or pasture suitable as a platform for takeoffs and landings. Aircraft—especially tactical aircraft—seldom required smooth surfaces made of concrete or asphalt. In the First World War, airfields rarely suffered damage; when they did, it was usually caused by the failed landing attempts of friendly aircraft. “In any event, damage to these first airfields was minor and could be repaired in a very short time with a few men with picks and shovels.”² Thus, one could construct airfields that exceeded the requirements of aircraft and that were relatively simple to repair.

World War II

In World War II, the distances within and between theaters required the construction of many airfields. This was clearly the case in the Pacific, where engineers carved airstrips out of island jungles so that our aircraft could operate within striking distance of the enemy. Moreover, the front lines of World War II were not static, as they were in the First World War. Rather, the forward movement of frontlines required the continual construction of more airfields and the repair of captured fields to keep up with the war. Airfield construction became a neverending task and was considered “one of the world’s most dangerous occupations . . . in the Pacific campaigns of 1942–1943” due to the workers’ exposure to the enemy.³

In this war, airfields and associated facilities became primary targets. However,

at this point in the evolution of air power, some tactical aircraft (those needing airfields close to the front line) still operated quite well from unsophisticated surfaces—oftentimes only grass or dirt fields. If a proposed airfield were to handle heavier aircraft or if soil at the construction site were poor, engineers used pierced steel planks (PSP) to build the landing surfaces. Repairing damaged PSP surfaces was a simple matter (by today’s standards), and aircraft could quickly resume their operations.

Korea

By 1950 the USAF was “exploit[ing] jet engine technology to achieve increased (tactical) airborne performance in its fighters”—specifically, the F-80 Shooting Star.⁴ In terms of its performance in aerial combat, the F-80 was superior to World War II propeller aircraft like the P-47 and P-51. When North Korea invaded South Korea in June 1950, however, the F-80’s aerial superiority was compromised by its need for longer, wider runways that were durable enough to handle the weight of the heavy jet.⁵

When the only airfields in Korea capable of supporting F-80s were lost to the advancing North Koreans, the Air Force was forced to fly the jets from bases in Japan. Unsurprisingly, operating from such a distance reduced the aircraft’s responsiveness, persistence, and payload, thereby greatly diminishing their combat effectiveness. Even in Japan, only four airfields had “runways which met the operational requirements of combat-loaded jet fighters.”⁶ Confronted with these realities and the need to base aircraft closer to the fighting, Far East Air Forces (FEAF) leaders decided to convert six F-80 squadrons to F-51 squadrons only two weeks after the fighting began. The F-51 (formerly P-51) Mustangs had to be taken out of storage or re-



called from the Air National Guard. Unlike the F-80, this relatively light World War II-era aircraft "could operate from short, rough surfaces like the 3,800-foot long clay and gravel runway at Taegu [Korea]" and would therefore be closer to the fighting and be able to provide more sorties with greater effectiveness.⁷ Thus, FEAF advanced fighters were virtually ineffective during a crucial phase of the war because they depended on longer, harder runways. If the United Nations and the United States had faced an enemy with the capability to attack airfields from the air, their few operational jet bases could have been critically damaged. Backfilling or laying PSP may not have been enough to repair runway craters. For the first time in its history, the Air Force learned (but soon forgot) that increased airborne performance alone will not guarantee the combat effectiveness of an aircraft.⁸

Vietnam

Between the Korean War and the Vietnam War, the Air Force again neglected the critical role of runways and air bases. "Thus, in continuing to develop fighter aircraft maximized for improved airborne performance, the Air Force also continued to significantly increase aircraft runway requirements."⁹

Although Vietcong and North Vietnamese attacks targeted vulnerable aircraft and facilities at US air bases rather than runways and pavements, the latter suffered collateral damage from mortar and

Commanders quickly realized that sophisticated aircraft of the day, such as these F-80 Shooting Star jets in South Korea in 1951, required harder and cleaner runway surfaces than did the premier fighters of World War II. The primitive condition of runways like the one pictured invited foreign object damage.



rocket fire. "The resultant spalls or small craters were easily repaired with epoxy resins and high early strength concrete components with minimal impact on flying operation[s]."¹⁰ We should note, however, that the damage was caused by ground-attack weapons, which did not have the same effect that aerial attacks would have on operating surfaces. One consequence of these incidents was that the Air Force hardened its air base facilities and sheltered its aircraft, not only in Vietnam, but also in many other operational theaters.

Current Threats to Airfields

In 1921 Giulio Douhet said that "it is more effective to destroy the enemy's aerial power by destroying his nest and eggs on the ground than to hunt his flying birds in the air."¹¹ That observation has lost none of its perceptiveness. Until the late 1960s, US air bases in overseas theaters were considered sanctuaries, and general opinion held that they were invulnerable or immune to conventional and chemical attack. However, following Israel's extremely effective air base attacks in the Six-Day War of 1967, the desirability of providing hardened shelters for aircraft became more apparent. By 1980 Soviet offensive capabilities had improved in both accuracy and range to the extent that our bases were increasingly considered to be at serious risk.¹² Even in today's post-cold war atmosphere, the possibility of an attack on one of our air base complexes overseas by an enemy equipped with modern weapons is not unrealistic. Considering the ever-increasing pace with which weapons of greater lethality and accuracy are being created, "even third world countries are likely to possess significant air base attack capabilities."¹³ Such attacks will involve long-range fighter-bombers with "smart" and special-purpose weapons, or possibly surface-to-surface missiles. Some of the specialized

weapons may be antirunway munitions or fuel-air explosives. The antirunway munitions are specifically designed to cause maximum destruction to airfield pavements. Our bases might also be hit by delayed-detonation air-scatterable mines, which will make airfield recovery hazardous and time-consuming.

Other threats to our aircraft and air bases include Soviet Spetsnaz forces, airborne troops, helicopter assaults, and saboteurs. The Spetsnaz threat is especially serious. The objectives of these special forces include

the capture of key airfields and ports to prevent reinforcement or redeployment, particularly by the United States; the destruction or neutralization of airfield and port facilities not required intact by the USSR.¹⁴

Furthermore,

in the wake of the Intermediate-range Nuclear Forces Treaty (INF) signed in December 1987, allied air assets and air bases would likely become a much higher priority target for Spetsnaz forces after ground-based [nuclear] assets have been dismantled.¹⁵

In light of recent events in Eastern Europe, the Spetsnaz threat has probably diminished, but we must assume that our air bases will always remain high-priority targets for special forces. Furthermore, technological advances by potential enemies constantly intensify the severity of all threats.

In the past two decades, many critical facilities at US air bases overseas have been hardened so that they are more likely to survive an attack. They include aircraft shelters, operations facilities, command posts, and communication and control systems. Despite these precautions, Soviet (and other) planners are well aware of two key facts: (1) most high-performance US aircraft require long, smooth, clean, paved operating surfaces, and (2) runways and taxiways are easier to successfully attack than aircraft in shelters. Thus, the enemy's immediate goal is not necessarily to destroy our aircraft but to prevent them from flying. As Maj Gen George E. ("Jud") Ellis—former director of Engineering and



Services, Headquarters USAF—observed, “Aircraft armed to the gills sitting on the ramp or in shelters don’t win battles.”¹⁶

Air Base Operability

These threats suggest that it will be necessary to perform emergency airfield operations during a conflict with a capable enemy. In the early 1980s, therefore, the Air Force developed the concept of air base operability in response to the potential danger to its overseas bases.¹⁷ Admittedly, the mundane tools of ABO (e.g., armored bulldozers, runway-repair matting, etc.) do not have the appeal of the USAF’s high-tech aircraft and munitions—the so-called sexy weapons systems. No doubt, that is one of the reasons that ABO does not occupy first place on the Air Force’s list of priorities. Considering the sheer

Air Force bases came under attack throughout the Vietnam War. Most damage was inflicted by infiltrators armed with mortars or rockets. The Air Force responded, in part, by constructing hardened aircraft shelters to minimize the damage caused by these strikes. Above, an F-4 exits the runway at Da Nang Air Base, South Vietnam, while the remnants of another Phantom blaze in the distance (this particular loss was not caused by the enemy).

magnitude of the threats that our air bases face, however, no one can dispute the importance of the ABO mission.¹⁸

ABO seeks to (1) reduce the magnitude of an enemy attack, (2) minimize the impact of the attack on sortie generation, and (3) recover from the attack in minimum time. In short, ABO’s critical concerns are as follows:

- defense
- survival
- recovery
- generation
- support.¹⁹

The Air Force civil engineering (CE) community, charged with providing the "necessary assets and skilled personnel to prepare and sustain global installations as stationary platforms for the projection of aerospace power in peace and war,"²⁰ plays an important role in ABO. Principally, CE must "perform emergency repair of war damage to air bases."²¹

To these ends, CE and the support community have developed plans and procedures to deal with base recovery after attack. Specifically, after assessing airfield damage, CE undertakes rapid runway repair (RRR) to provide a minimum operating strip (MOS) and a sufficient number of taxiways and other surfaces for aircraft operations. A "generic" MOS is 50 feet wide and 5,000 feet long, with a roughness that is commensurate with the requirements of the aircraft using the surface.²²

Runways such as the one at Ramstein Air Base, Germany (below), appear vulnerable to incoming enemy missiles or fighter-bombers. The Air Force developed the concept of air base operability to counter the threat that its bases in operational theaters would probably face in time of conflict.

CE's RRR capabilities depend upon and are limited by a number of factors:

- expertise and training levels of repair teams,
- use or threat of chemical weapons,
- manpower levels,
- availability and survivability of heavy equipment,
- unexploded ordnance,
- availability of repair materials,
- possibility of attack during repair operations (including harassment or sniper fire by special forces or irregulars),
- type of aircraft using the airfield,
- weather, and
- time of day.

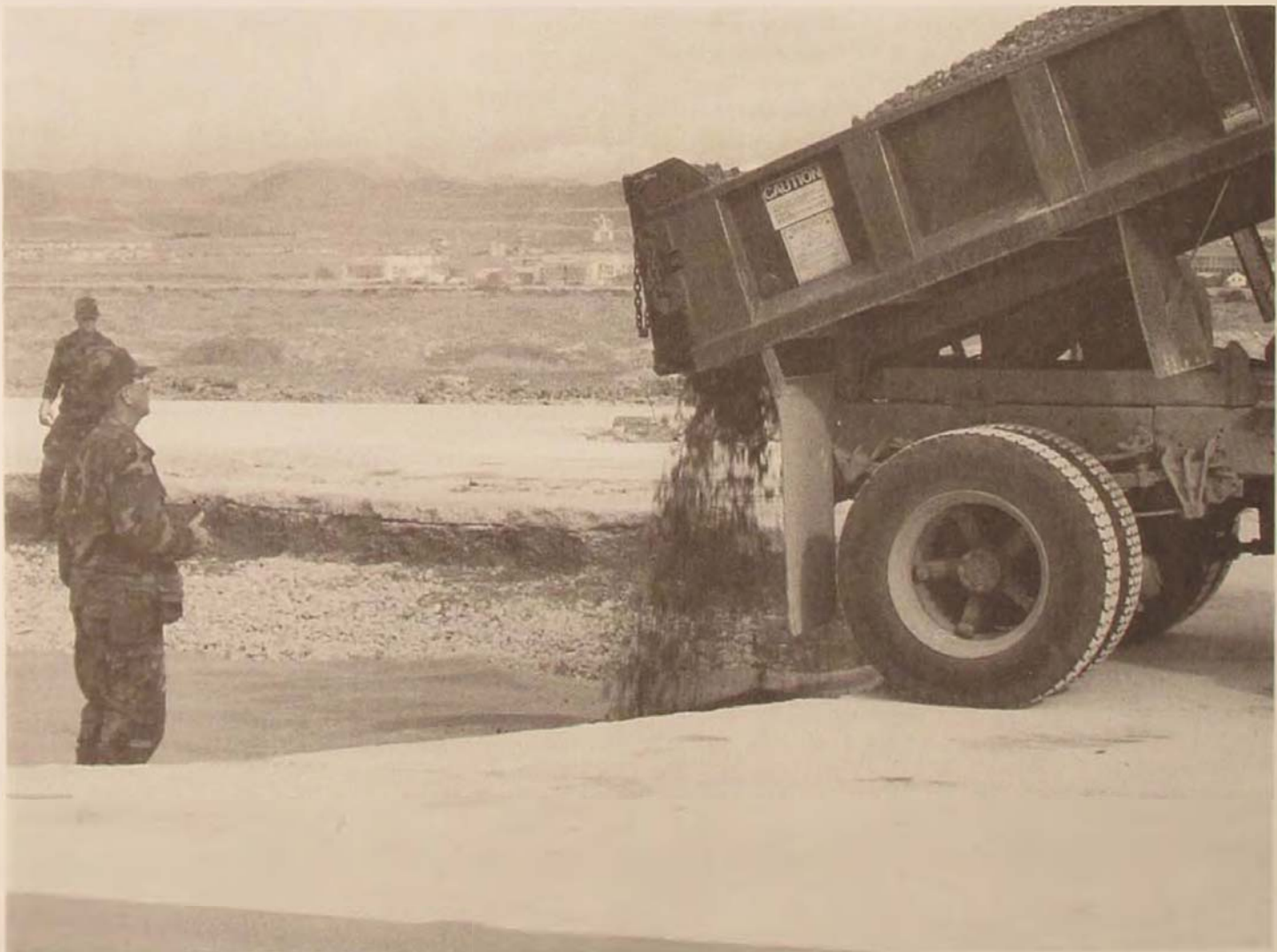
Training for RRR is only a rough approximation of actually performing it in combat. As General Ellis noted, "We have yet to be tested in a war-fighting environment where our basing support structure is seriously damaged and we have to generate sorties while continuously under attack."²³ RRR is an exhausting task for trained per-





sonnel, even under favorable conditions. Certainly, the stress resulting from the dangers of war will multiply the difficulties of RRR, as indicated during the Salty Demo exercise at Spangdahlem Air Base, West Germany, in 1985. The prospect of doing RRR under chemical attack is especially sobering. Experience has shown that only personnel in excellent physical condition were able to complete RRR exercises while wearing chemical warfare gear in moderate temperatures. Even they would not have been able to finish without the help of personnel not wearing chemical gear.²⁴

Air Force civil engineering teams practice to hone their runway-repair skills. To simulate war damage, engineers blow a hole in a runway (left); then they survey the site and fill it as part of the recovery effort (below).



Air Base Operability and Aircraft Requirements

Civil Engineering's runway repair requirements are driven by the needs of the aircraft that will be using the airfield. Thus, numerous factors may become liabilities during future conflicts. First, modern US pilots and aircraft have never had to operate from heavily damaged airfields. Second, the Air Force is moving toward aircraft commonality—that is, using fewer types of aircraft. Third, the design of US aircraft, including the capabilities and limitations of landing gear and engines, places

Laying runway-repair matting of folded fiberglass is the final step in this particular exercise (below). Although rapid runway repair is not the most glamorous of endeavors, it is absolutely vital to air base operability.

certain requirements on MOS length and the quality of repairs.

Experience

Although European tactical-fighter bases are generally considered the best-equipped sites for carrying out wartime operations, our pilots rarely—if ever—practice landing on these bases' taxiways, alternate landing surfaces, or marked MOSs because of safety considerations.²⁵ One wonders how well they would do in an actual wartime environment. Indeed, these pilots might very well be unaware that expedient wartime repairs may provide them with relatively short, bumpy, dirty operating surfaces that are just 50 feet wide.

Pilots have a great deal of influence with regard to the design of aircraft, as well they should. After all, they have to fly them. However, these same pilots are



likely to lack experience operating from alternate or repaired airfield surfaces. Therefore, it is quite possible that the design of future aircraft may not take into consideration the wartime air base environment from which aircraft will have to operate.

Commonality

In the 1950s and 1960s, the USAF had many types of "century series" fighters. Of these, only the F-4 (first designated the F-110) and the F-111 remain in our front-line fighter inventory. The USAF now depends principally on two fighter types—the F-15 and the F-16 (along with the A-10 and the Air National Guard A-7 to conduct close air support). Using fewer types of aircraft was both an economic and logistical decision. Buying more of one or two types of aircraft is more cost-effective than buying fewer numbers of a variety of aircraft and reduces logistical problems associated with the inventory of spare parts.

Indeed, the Air Force may soon restrict itself to just one type of fighter—the advanced tactical fighter (ATF). The disadvantage to such a decision is that any operating vulnerabilities and limitations of the ATF would affect a large portion of the Air Force's inventory. Since the ATF is due to become operational in the late 1990s and will reach maximum production rate only in the next century, the Air Force will have to live with any airfield operating limitations of the ATF for a long time.²⁶

Design

Several factors come into play during landing and takeoff that place requirements on the condition and size of airfield surfaces. These include an aircraft's landing gear and structural integrity, as well as its controllability and engines; these factors must receive consideration during aircraft design.²⁷

The capability of landing gear is of critical importance because it determines the aircraft's allowable sink rate (vertical descent) and the types of surfaces (roughness

and strength) the aircraft can safely operate on. Structural integrity is also important. Theoretically, an aircraft moving over the irregular surface of a repaired runway could reach its natural resonance frequency and suffer serious structural damage.

Controlling the aircraft can be a problem when a pilot tries to land on a short, narrow MOS. The speed of the aircraft during final approach (generally in excess of 140 knots) and crosswinds are critical factors affecting aircraft control, especially if the pilot is trying to land on a MOS that is not parallel with the existing runway and markings (as may be the case during a contingency situation). Speed and crosswinds also become critical if the MOS's threshold is displaced significantly (several thousand feet) from the runway's threshold. Even for "normal" landings, the difficulty of maintaining control is evident in the fact that the number of accidents involving land-based aircraft increases in proportion to the square of the approach speed.²⁸

A related controllability factor is the effect of flaring. Because of the low sink rates that current Air Force tactical aircraft are capable of, the pilot must flare the aircraft before touchdown. Flaring involves decreasing the aircraft's rate of descent just before it touches down. Flaring, as well as the previously mentioned landing-related factors, causes both lateral and longitudinal dispersion of the touchdown point, both of which can cause significant problems—especially when aircraft land on a MOS. Longitudinal dispersion reduces the usable length of a MOS (already short), just as lateral dispersion reduces the usable width of the 50-foot-wide operating surface.²⁹

Finally, critical systems such as engines affect the operating-surface requirements for takeoff and landing. On the one hand, aircraft engines providing short takeoff and vertical landing (STOVL) capabilities or engines equipped with thrust reversers can shorten the length of airfield surface that is required to take off or land safely. On the other hand, engines may be

damaged by the ingestion of debris or other loose matter. This leads to foreign object damage (FOD)—a likely occurrence in the extremely dirty environment of a damaged airfield.

Thus, aircraft requirements directly affect the time and effort CE must expend to provide an adequate MOS for aircraft to operate from:

[The] extreme sensitivities to runway surface roughness of virtually all current tactical aircraft implicitly demand very high-quality, smooth, level repair of runway damage, which greatly extends the time required to restore runway operations after attack.³⁰

That is, the higher the quality of surface repair required by aircraft, the longer the time needed to make the repair. However, by decreasing aircraft requirements (e.g., by using a more durable landing gear or by shortening the required MOS length), CE could reduce its repair time and aircraft could launch sooner.

Aircraft requirements can also affect enemy operations. For example, "the number of [enemy] sorties required to close a runway increases exponentially with a linear decrease in required runway length."³¹ An enemy has to cut an 8,000- to 10,000-foot runway only once or twice to deny an undamaged MOS (assuming MOS criteria dictated by current aircraft) but would need four to six successful sorties if our aircraft required only a 1,500- to 2,000-foot MOS.³² Finally, as the runway-length requirements of tactical aircraft decrease, the number of available runways within a given theater that are usable by those aircraft is sure to increase.³³

One must note that some people have the perception that improving aircraft systems to facilitate operations from repaired airfields would diminish an aircraft's per-

formance. For example, thrust reversers, STOVL capability, better landing gear, and improvements to structural integrity can increase the aircraft's weight—the dread of tactical-aircraft designers. (The increase in weight due to improved landing gear may not be as great as previously thought.) Extra weight can decrease an aircraft's payload, range, and maneuverability, thereby diminishing its performance.³⁴



The already labor-intensive nature of rapid runway repair is heightened in a chemical-warfare environment, here simulated in the 1985 Salty Demo exercise at Spangdahlem Air Base, West Germany. The chemical gear worn by participants proved stifling. Only engineers in the best physical condition could avoid exhaustion and complete the exercise.

Such improvements also increase manufacturing costs. Perhaps for these reasons, demands for such changes have not been forthcoming, despite the fact that much of the technology exists to implement them.

Soviet Perspective

By way of comparison, the Soviets are incorporating rough-field capability and protection from foreign object damage into their latest aircraft designs, such as the Su-27 Flanker and the MiG-29 Fulcrum. In an article on the Flanker, *Jane's Defence Weekly* reports that

the landing gear is remarkably sturdy, designed for high-rate-of-descent touchdowns on poor runways. The nosewheel leg is reinforced by a large trailing link and the main legs are fitted with distinctive locks, which, on extension, mate with fittings at the lower outside corners of the engine nacelles. . . . Like the MiG-29 "Fulcrum," the Su-27 is fitted with a system to keep foreign objects out of low-slung inlets and the suction-relief louvres, which are underneath the inlets. These are metal screens, hinged to the bottom of the duct and rising into an oblique position when the gear is down.³⁵

Obviously, the Soviets have designed the Flanker and Fulcrum to operate in a foreign-object-infested, rough-field environment. Furthermore, this ability helps operations on repaired surfaces: "It is a happy coincidence that if you can operate from fields that have been quickly built, those aircraft can also operate from fields that have been quickly repaired."³⁶

The Soviets believe that designing their aircraft to operate from forward locations will work to their advantage:

They believe [US] Air Force aircraft are "too heavy and sluggish" to be based near the front—a factor that will cause the Air Force's reaction time to be too slow to "meet the norms."³⁷

They are aware of the consequences of attacks on their bases during any future war and evidently intend to make aspects of aircraft design like those mentioned above the focus of long-term development. For

instance, Marshal of Aviation Aleksandr Yefimov, commander of the Soviet air force, declared that "much attention is being given to developing short take-off and vertical landing aircraft capable of operating from damaged airfields." He further emphasized that aircraft operations should not be affected by damaged runways.³⁸ Thus, because the Su-27 and the MiG-29 will be found in the air arsenals of many non-Soviet nations for years to come, the threat from these aircraft promises to become even more formidable.

Conclusion

Recent events show us that we must be prepared for all contingencies and that the reduction in one type of threat does not mean that the other threats go away. Our aircraft need to operate on the ground (air base operability) as well as in the air (aerial performance). Because the number of air bases and usable airfields available to the Air Force worldwide is diminishing, we can no longer simply assume that our aircraft can use other bases if their home bases are damaged. Not only must we be prepared to use a limited number of airfields and runways that are less than ideal, but also we must be prepared to operate from these surfaces after they have been damaged. In order to utilize what is available to us, we may have to change the capabilities, requirements, and designs of our aircraft—perhaps even penalize aerial performance for the sake of increased airfield operability. (At the same time, we should keep in mind that not all such changes need necessarily reduce aerial performance. The technology exists, but does the requirement?) History has shown us that improved aerial performance does not always lead to a proportional improvement in air power. After all, the mission of the Air Force is the projection of air power—not aerial performance. Paying more attention to the practical necessities of operating our aircraft from damaged airfields could help us fulfill that mission. □

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36. Bingham interview.
37. Bingham, "Air Bases and Runways," 18.
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VSTOL AND POWER PROJECTION

A LEAP IN FAITH

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I have sometimes reflected that it was an advantage to the Royal Air Force that we had no long Service tradition behind us, no set ways of tackling our job. Improvisation, which saved us in the Middle East, came the more easily to us, I think, than to our contemporaries in the Army and the Royal Navy.

—Air Marshal Sir Arthur Tedder

SUCCESS in war is often measured by what warriors and societies do between wars. We Americans have traditionally used the interwar years to disproportionately cut our military forces. This tendency stems largely from a sense of postconflict euphoria and partly from an earnest desire to curb federal spending. Today, we find ourselves in much the same situation following the "official demise" of the cold war. Regardless of one's confidence in the longevity of the current political thaw, tensions between the superpowers have significantly lessened. As a matter of fact, the recent dramatic changes in Europe afford us a rare opportunity. For the first time in many years, we can structure our military forces based upon our doctrine, instead of rushing headlong into programs designed to counter the most urgent Soviet threat. To that end, this article revisits the concept of using vertical and/or short takeoff and landing (VSTOL) aircraft for Air Force tactical air operations. Why does VSTOL merit yet another look? Simply because it still offers long-term economic and military solutions to dwindling force-structure capabilities. To accept these solutions, one is asked to embrace only new organizational and basing schemes, not "new science."¹

The Problem

While Congress charts a well-worn course for reductions, the Joint Chiefs of Staff are struggling to adjust American military forces to meet future challenges. The chiefs are faced with the problem of maximizing a smaller force structure to meet enduring national security objectives. Make no mistake—this is not a level-of-effort reduction; it is an asset reduction. In Europe, for example, the Army and Air Force will have to abandon a robust forward-based military presence for an as-yet-undetermined troop ceiling. The hope is that we are able to deploy large forces quickly enough to make a difference in the

event of hostilities in Europe or elsewhere. This concept of rapid, worldwide force projection for the Air Force is captured in the appellation Global Reach—Global Power. Senior Air Force leaders envision conventional air power as the essential force for this power projection.² Ideally, conventional air power should be of the appropriate size and mix to easily integrate into a joint force structure. Many people in the Pentagon and on Capitol Hill feel it is in the Air Force's interest to field smaller organizations that are agile, flexible, responsive to short-notice tasking, and capable of operations across the entire spectrum of conflict.³ According to one Air Force study, however, the prospects for leaner, more flexible forces are remote without "fundamental restructuring of selected Air Force units to make us more nimble."⁴ While this seems a tall order, the goals sought are achievable. One solution presents itself through a *redefinition of the role and makeup of our present tactical fighter wing (TFW)*. Let us look at how a new organization could meet these expectations.

A New Organization

An important characteristic of our notional organization is its composition. Compared to existing tactical fighter wings composed of approximately 72 aircraft of the same mission design and series (MDS) performing a single mission, our new organization would be able to perform several missions using different MDS aircraft. The idea of "composite" air units is not a new one. Tactical Air Command created a composite air strike force (CASF) in the 1950s that included ground-attack and counterair fighters, among others. The CASF was designed to respond to contingencies worldwide on short notice; a crisis in the Middle East prompted one such deployment to Lebanon in the late fifties.⁵ In July 1989 the Air Staff's deputy director for war-fighting concepts sponsored papers and briefings on a similar concept called the

Air Legion. The legion's mix of tactical air assets offered many benefits, among them better training and force employment. The legion's resulting combat capability would have surpassed that of a naval carrier air group. In actuality, our new organization and the Air Legion have many qualities in common.⁶ For the purposes of further discussion and to eliminate any confusion with the Air Legion, we will call our proposed organization a tactical air group (TAG).

Our notional TAG would consist of approximately 54 air-to-air; surface-attack; electronic-combat (EC); reconnaissance; surveillance, command, control, and communications (SC³); tactical-airlift; rescue/special-operations; and security aircraft. Their characteristics and missions are briefly summarized as follows:

- *Air-to-air aircraft*—Gain control of the aerospace environment, thus ensuring protection of friendly forces. Conduct both offensive and defensive operations.

- *Surface-attack aircraft*—Directly support surface operations by attacking targets in close proximity to friendly troops

(CAS); delaying, disrupting, diverting, or destroying an enemy's military potential before it can be brought to bear effectively against friendly forces (interdiction); and suppressing enemy air defenses (SEAD).

- *Electronic-combat aircraft*—Control selected parts of the electromagnetic spectrum in support of strategic and tactical operations. Include elements of command, control, and communications countermeasures (C³CM) and SEAD.

- *Reconnaissance aircraft*—Use tactical airborne sensors to collect intelligence information.

- *Surveillance, command, control, and communications aircraft*—Provide operational field commanders warning of attack as well as the ability to communicate with and control friendly forces.

- *Tactical-airlift aircraft*—Deploy, employ, and sustain military forces.

Because Harriers have a vertical and/or short takeoff and landing (VSTOL) capability, their bases can be located close to the battle. Forward basing allows for a quicker turnaround time, which results in an increased number of combat sorties.



- *Rescue/special-operations aircraft*—Conduct low-visibility, covert, or clandestine military operations and/or rescue efforts.

- *Security aircraft*—Contribute to "air base" security as well as protection of a ground force's rear area. Closely related to CAS.⁷

Although capable of more missions, the TAG would have 18 fewer aircraft than today's tactical fighter wing and a smaller infrastructure. The commander, however, would have a greater war-fighting capability simply because of the group's force mix.⁸ In the course of our discussion, we will see how to enhance agility and flexibility by using air-transportable ground-based elements and by decreasing our logistical requirements. We will also see how to dramatically enhance survivability by using new (at least to the Air Force) tactical-basing operations. With all these benefits, one must assume the application of some new leading-edge technology, right? Not at all. We simply incorporate existing technologies into new weapon systems. Needless to say, we cannot accomplish drastic restructuring of our tactical fighter forces into TAGs overnight. The prudent approach suggests using existing aircraft to form a TAG in the mid-term as a transition to long-term composition. To illustrate how we might effect this transition, let us start by looking at a notional TAG using today's force structure (table 1).

Table 1
Tactical Air Group: Near Term

Mission	Aircraft	Number
Air Superiority	F-15D	12
CAS/Interdiction	F-15E/F-16D/F-111E(F)	12
Reconnaissance	RF-4C/RF-16D	4
Electronic Combat		
Lethal Suppression	F-4G	4
Radar Jamming	EF-111A	6
Communications Jamming	EC-130H	3
Tactical Airift	C-130H	4
Special Operations	MC-130H	3
Security	AC-130H(U)	3
C ³	EC-130E	3
	Total	54

Without considering the A-10 for the CAS role, some combination of F-15Es, F-16Ds, and F-111E/Fs would satisfy the CAS/interdiction requirement. Although the F-15, F-16, F-4, or F-111 airframes could satisfy two mission roles, logic has us replacing the aging RF-4C, F-4G, and F-111E/F before the other airframes listed. This would leave the F-15 and F-16 as our fighter candidates. The C-130H lends itself nicely to several mission areas. The EC-130H Compass Call, MC-130H Combat Talon, AC-130H/U Spectre gunship, and EC-130E airborne battlefield command and control center (ABCCC) aircraft are all derivatives of the venerable C-130 Hercules, still in service as a tactical airlifter. Under our current system, however, decentralization of this many aircraft types to form a new tactical air organization would be a costly, logistical nightmare.

The Cost and Value Added

In many respects, *affordability* is America's real military enemy. For the past three decades we have increasingly priced ourselves out of combat power. We have failed to realize economies of scale in aircraft production because we try to field too many unique, specialized systems. Coupled with our insistence upon new designs (and manufacturers) every 15 years or so, we find that we can't afford to procure the minimum number to meet requirements! Sen Sam Nunn, chairman of the Senate Armed Services Committee, described the problem in a 1987 television interview:

We've got too many weapon systems being produced, and we're not producing any of those weapon systems—or many of them—at efficient rates. That is colossal waste. When you take all the coffeepot scandals and all the hammers and all of those things we read about and worry about and add them all together and multiply them by 10,000, you don't have the kind of waste in dollars that you do when you stretch too many weapon systems and, therefore, don't produce any of them—or many of them—at efficient rates. That's where the real waste and fat is.⁹



Too many weapon systems for limited funding in turn causes Congress or the Department of Defense (DOD) to direct low-rate production so that we can afford all the systems. Another form of program stretch-out, low-rate production helps to ensure that we can maintain an active industrial base (in-place production capability). Unfortunately, the only thing that uneconomical production rates ensure is a loss of productivity and an increase in unit cost. In those rare cases in which we have kept assembly lines open (manufacture of the C-130 being the best example), we still failed to appreciate the benefits of product improvement vis-à-vis new design/acquisition. While leading-edge technological breakthroughs are welcome, and in many cases necessary, we must not deny the advantages of applying mature technologies to improve reliability and sustainability. One may have the most sophisticated weapon system in the world,

The McDonnell Douglas C-17 will airlift outside combat equipment, currently accommodated only by the C-5. The new airlifter would also offer STOL performance now provided only by the C-130. Such an aircraft would play an important role in the proposed tactical air group (TAG) of the future.

but if it never flies because it is not durable, then that system is worthless.¹⁰

This brings us to the second important facet of our proposal: *The key to reducing TAG logistics and cost is the requirement for commonality of airframes.* Put another way, we use the minimum number of aircraft types to perform a variety of missions. Airframe commonality would reduce engineering, production, parts, contracting, and recurring maintenance and training costs. Air Force and DOD savings could be enormous. Use of common, multirole airframes by all the services would reduce maintenance time and enhance spares support on the battlefield and at sea. Critics argue that the Defense

Department tried to do just this sort of thing in the past and failed. In actuality, the McDonnell Douglas F-4, the LTV A-7, the North American Rockwell OV-10, the Lockheed C-130, the Rockwell CT-39, the Northrop T-38 and F-5, the General Dynamics F-16, the Bell UH-1, and the de Havilland C-7—among others—have performed superbly for at least two services. Critics proudly point to the much maligned F-111 (TFX) program in making their case for the lack of airframe compatibility between services. In fact, the Navy's version of the Air Force fighter—the F-111B—performed very well during carrier trials. Even a cross-service requirement as stringent as the capability to operate from an aircraft carrier, however, becomes a nonissue for reasons soon revealed.¹¹

Although the previous discussion re-

Advances in aerial refueling make nearly all military aircraft capable of fulfilling a "strategic" mission, thus offsetting commonly cited weaknesses in the Harrier—specifically, combat radius and range.

duces the number of different aircraft, that number is still far from optimum. The next option, on the other hand, would increase airframe commonality and could be fielded in the midterm (table 2). Notice that we have reduced our basic airframe requirements to two. The F-15 becomes the de facto fighter aircraft. Using the Eagle as a multirole aircraft allows us the flexibility to swing the aircraft to the air-

Table 2
Tactical Air Group: Midterm

Mission	Aircraft	Number
Air Superiority	F-15D	12
CAS/Interdiction	F-15E	16
Reconnaissance	RF-15E	4
Electronic Combat		
Lethal Suppression	F-15E	
Radar Jamming	EC-130H/EF-15E	3/3
Communications Jamming	EC-130H	3
Tactical Airift	C-130H	4
Special Operations	MC-130H	3
Security	AC-130H	3
C ³	EC-130H	3
	Total	54





to-air role for air superiority.¹² Modifications to the E model (Strike Eagle) would satisfy the reconnaissance and lethal-suppression missions. Close-in and penetration-escort radar jamming would rely upon the F-15 airframe once again; increased maneuverability and air-to-air ordnance would greatly improve survivability in high-threat areas. The rest of our missions feature the C-130 airframe. Notice that the EF-111 in a standoff jamming role has also been replaced in this instance by a suitably modified C-130. The ABCCC aircraft in the previous example has been modified to accept an airborne surveillance radar similar to that of the Navy's E-2C Hawkeye, as well as additional ground-surveillance sensors.¹³ This version of the C-130 could very well be a lower-cost alternative to the joint surveillance target attack radar system (J-STARS) and could provide ground commanders the same support.¹⁴ Keep in mind that this is one possible approach—not the

The author's midterm TAG scenario utilizes the F-15 airframe in air-to-air, CAS/interdiction, reconnaissance, and lethal suppression (electronic combat) roles. This minimizes the number of different types of aircraft in the TAG and reduces logistical requirements and cost.

approach. No matter how we restructure our present capabilities, however, one liability remains obvious: we require long runways for flight operations. A TAG of the future would, by necessity, require aircraft with VSTOL technology (table 3).

A Lingering Affair

The corporate Air Force has had a lingering affair with VSTOL technology since at least 1963, when Gen Curtis LeMay, Air Force chief of staff, authorized Project Forecast. The task of Air Force Systems Command (AFSC) was to forecast Air Force missions five to 10 years in the future, linking those missions to available



The C-130 airframe accomplishes the remainder of the midterm TAG's electronic combat requirements, as well as its airlift: special operations, security, and command, control, and communications missions.

Table 3
Tactical Air Group: VSTOL

Mission	Aircraft	Number
Air Superiority	F-xxA	12
CAS/Interdiction	F-xxB	16
Reconnaissance	RF-xxC	4
Electronic Combat		
Lethal Suppression	F-xxB	
Radar Jamming	EC-yyyR	6
Communications Jamming	EC-yyyC	3
Tactical Airlift	C-yyy	4
Rescue/Special Operations	MC-yyy	3
Security	AC-yyy	3
C ³	CC-yyy	3
	Total	54

technologies. This project indicated that significant advances in VSTOL were possible in the 1970-75 time frame, based upon

advances in "materials, propulsion, flight dynamics, guidance, and computer technology."¹⁵ Looking back on his close association with Project Forecast, then Secretary of the Air Force Eugene M. Zuckert described an environment that still rings true:

It took some time for some of our old attitudes and outlooks to change: adjusting to new hardware still seems to be easier than adjusting to new ideas and new methods. New hardware was welcomed with more enthusiasm than were new ideas in the realms of strategy, concepts, and doctrine.¹⁶

Although unexpected events scuttled the establishment of a VSTOL program in the sixties, the concept lived on.¹⁷ In April 1978, the under secretary of defense for research and engineering established a Defense Science Board Task Force on VSTOL Aircraft. The task force's charter was to "evaluate the potential of V/STOL technology for future replacement of our present conventional (CTOL), land-based and sea-



based, supersonic tactical fighter aircraft." Two general conclusions and recommendations having general applicability to all of the armed services bear repeating:

1. The ability of the Military Services to conduct their respective missions can be enhanced by the timely introduction of V/STOL aircraft. The number of potential mission improvements, coupled with the need for increased survivability and operational flexibility, provides a convincing case for the accelerated development of an enhanced V/STOL capability.
2. The technology will currently support

A task force on VSTOL aircraft sponsored by the Office of the Secretary of Defense recommended the "timely introduction" of the Harrier and its derivatives into the military aircraft inventory. Here, a Marine Corps AV-8 participates in flight operations over the Atlantic Ocean.

significant improvements in those aircraft configurations that are not radical departures from existing classes of V/STOL aircraft, notably variants of the helicopter and of the subsonic combat aircraft, the Harrier.¹⁸

The task force's recommendations fell on deaf Air Force ears, however. With so many good reasons to do so, why has the Air Force been so reluctant to exploit this

new capability? The reasons are numerous. Even from the beginning, Air Force leaders viewed the early vertical takeoff/landing demonstrators tested at Edwards AFB, California, as just that—demonstrators. Imagine using a seemingly ungainly, unattractive aircraft as a tactical fighter! Even after the British perfected their Harrier jump jet in the 1960s, it was the Marine Corps—not the Air Force—that realized the applicability to tactical operations.¹⁹ This new technology, argued the Air Force, would limit the combat radius and range of its aircraft; a full load (considered small by Air Force standards) of ordnance would decrease that radius even more. Complicating the issue was the fact that strategic, not tactical, air power was receiving most of the Air Force budget appropriations at that time.

An Operational Philosophy

While Air Force concerns were valid, they were also entrenched in the concept that all tactical fighters be capable of operating great distances from their home fields. By definition, theater-based aircraft had to have “long legs” to reach their targets from bases located well behind friendly forces.²⁰ Why were the bases so far back? Primarily to ensure survivability and mitigate vulnerability. What has changed since then to warrant a change in operational philosophy? First, aerial-refueling techniques have been refined to enable virtually all of today’s Air Force assets to fly “strategic” distances.²¹ Second, advances in VSTOL and other technologies offer potential mobility heretofore undreamed of for wing-sized units. These advances permit the Air Force to abandon the archaic concept of hardening air bases deep in the theater rear area for survivability, while at the same time putting the machines of war closer to the battle.

These two capabilities of aerospace forces—mobility and survivability—are embedded in our doctrine and underpin this proposed operational-basing scheme.

The requirement for true mobility of the entire combat unit—not just the aircraft—cannot be overstated. The face of the battlefield is changing, and we must change with it. What were once static lines on the ground are becoming fluid. The concept of a forward line of own troops (FLOT) and our procedures to protect that line from the air must give way to a rapidly moving, constantly changing environment of violence and speed. The Army saw this change and restructured its doctrine to account for it. Called AirLand Battle, this Army doctrine relies upon tactical air power to attack throughout the depth of the battlefield at the appropriate time to help seize the initiative. Thus, air power must be able to strike more quickly and more often. Air power can meet those requirements only if it is based closer to the battle and if its support base is mobile enough to survive.²²

Even before the raising of the iron curtain, there was a consensus that availability of overseas bases would decline. The White House Commission on Integrated Long-Term Strategy reported in 1988 that

the United States must develop alternatives to overseas bases. In some contexts, to be sure, bases will continue to be critically important—especially when our problem is to defend against possible Soviet aggression. But we should not ordinarily be dependent on bases in defending our interests in the Third World. We have found it increasingly difficult and politically costly to maintain bases there.²³

The commission’s recommendations created yet another persuasive argument for bare-base (VSTOL) capability. Many of today’s Global Reach—Global Power advocates project their combat power from the United States. This basing scheme might be possible for large, multiplace aircraft, but the idea is impractical for fighter-sized aircraft. Even with air-to-air refueling, pilot endurance becomes the limiting factor in staging fighter attacks from 6,000 miles away. El Dorado Canyon, the American military raid on Libya in 1985, is but one

example of crew fatigue associated with long-distance operations. For tactical air forces, the key is not, as one Defense Science Board member put it, "our ability to project power without being there." To effectively employ tactical forces at intercontinental distances from bases in the United States and return them safely will require significant advances in hypersonic flight. Mature VSTOL technology is in hand—hypersonic flight is not.²⁴

Protecting a Smaller Force

In the face of shrinking force structure, the issue of survivability becomes acute. Contrary to what supporters of hardened airfields say about the difficulty of killing them, John Kreis in his book *Air Warfare and Air Base Air Defense* encapsulates the historical changes that lead us to the need for VSTOL:

Since [the World War II] era, faster planes, technologically improved ordnance of increased destructiveness, permanent concrete runways, and the presence of fixed, complex service and support establishments made airfields ever more vulnerable to destruction.²⁵

The need for increased survivability becomes most apparent when we examine our tactical basing in Europe, for example. These airfields have, at tremendous cost, been "fortified" by constructing hardened aircraft shelters (HAS) and operations facilities. This hardening is not cost-effective for two major reasons. First, these bases are fixed and easily targeted. Second, and perhaps most importantly, the enemy does not have to destroy a single HAS to stop air operations—he only has to crater the runway. While we are occupied with the time-consuming job of runway repair, the enemy could gain air superiority and conduct offensive operations at will. Much of the success of tactical air power is based upon timing and tempo. If we surrender the ability to engage the enemy when and where we choose, we lose the

initiative. If we lose the initiative, we could very well lose the war.²⁶ Our fixed-wing technology has driven our operational procedures to a defensive attitude symbolized by hardened airfields.

Since current operations require very large, open areas for runways, aircraft have very little cover or concealment. As a result, we build an HAS for protection. Take away the requirement for a long runway and a new set of options becomes available. One such Allied experience during World War II serves to illustrate the point. To ensure survival of the Red Air Force after 1941, the Soviets prepared hundreds of makeshift airfields to increase mobility. The extensive use of concealment and decoys tremendously complicated the Luftwaffe's targeting problems. According to Kreis, "The crude nature of the landing fields, the hundreds of sites from which to fly, and the emphasis on mobility created an air base system with built in defenses."²⁷

VSTOL technology allows flight operations in relatively small, open areas that take advantage of natural cover and concealment—particularly in forested areas. The US Army, Marine Corps, and the Royal Air Force (RAF) have conducted such operations for some time using Harriers and helicopters. Their experiences in forward basing point to several advantages. First, the ability to change operating locations at will greatly enhances survivability and increases targeting difficulty, as the Soviets demonstrated in World War II. Second, combat-radius shortfalls can be decreased with forward basing. Third, being closer to the battlefield allows for a quicker turnaround time, resulting in more sorties to deliver ordnance. Fourth, one now has the capability to operate from ships and from locations ashore. Finally, the ability to launch or land under weather conditions unsuitable for fixed-wing aircraft increases available combat sorties. Taken as a whole, these capabilities create a force-multiplier effect—so very important in light of planned force-structure reductions.²⁸



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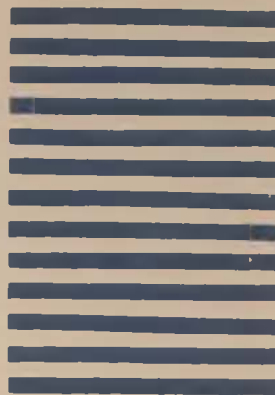
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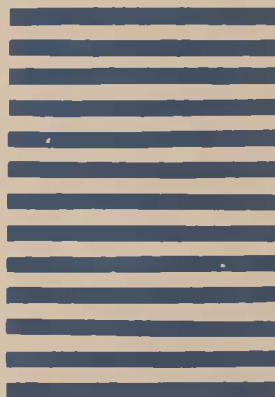
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True Flexibility

For air-to-air combat, VSTOL technology would add the advantage of vectored maneuvering and abrupt speed changes—in other words, the ability to fight in flight regimes not now available to the Air Force. In the air-to-ground arena, this technology would allow the pilot to better evaluate the battlefield visually, as well as afford better in-flight concealment through hover capability. Even though the Air Force is testing STOL updates for the F-15 and

The TAG infrastructure calls for a relatively austere basing setup for VSTOL tactical aircraft, as well as the utilization of lightweight, mobile support facilities. This arrangement precludes the need for expensive, fixed and hardened air bases (such as the one below) from which to launch aircraft into the fray.

F-16, a vertical capability is the key to maximum flexibility.²⁹ During the Falklands conflict in 1982, for example, Harriers landed on small auxiliary ships for refueling. Once a bridgehead was established near Port San Carlos, the Harriers were based ashore, closer to the fighting.³⁰ This procedure is also used by the Marine Corps. Marine operations in the Persian Gulf (Operation Desert Storm) include using the helicopter carrier USS Nassau for Harrier operations.³¹ This kind of flexibility is as valuable to a fast-moving, mobile AirLand Battle scenario as it is to low-intensity conflict (LIC) operations from austere bases. The implications for joint operations are obvious.

The TAG would have a small, organic tactical airlift capability, as reflected in the previous tables. For use primarily during



unit relocation, these assets would revert to theater-level control only to satisfy critical airlift shortfalls. In the midterm, these airlifters should be capable of operating from unimproved operating strips of 1,000–1,500 feet. As unit equipment loads become smaller and lighter, the airlifters will be able to operate in smaller areas using VSTOL technology.³² Whether the new tactical airlifter is a rotary-wing design (a helicopter or a tilt-rotor aircraft like the V-22 Osprey) or a fixed-wing airframe (C-17 or derivative), most people agree that it must have certain attributes. Two of the most important are exceptional takeoff and landing performance from short runways or rugged airstrips, and quick and efficient cargo handling.³³ One cannot overemphasize the capability for logistic support using VSTOL assets. VSTOL aircraft can deliver supplies faster, more often, and to areas inaccessible to wheeled vehicles. VSTOL speed and independence from road systems allow for many more instances of throughput supply distribution and better support to a highly mobile force on a fluid battlefield. This technology has proven its value on the mountains of Korea and in the rice paddies of Vietnam by facilitating rapid casualty evacuation.

A Measured Approach

Progress in other aerospace disciplines makes VSTOL much more viable today than even 10 years ago. Advances in vectoring nozzle engines to redirect thrust; cross-ducted propulsion systems to eliminate hot-gas reingestion; plenum-chamber burning to produce more thrust; the use of composite materials to reduce weight; and "stealth" or low-radar-observable designs and coatings are either being examined for, or incorporated in, future-generation aircraft.³⁴ With these advances in technology, VSTOL aircraft will be at least as capable as today's fixed-wing aircraft. Airframe commonality could reduce engineering, production, parts, contracting, and recurring maintenance and training costs. We

stand to save billions of dollars on runway construction, maintenance, and associated airfield hardening alone.

Even so, these incentives do not warrant an immediate jump to VSTOL; a phased approach based upon viable, long-range planning and acquisition strategies is the best course of action. We must first conceptually embrace the new basing scheme and fully adopt the technology. In the midterm, STOL from austere bases is an attainable goal; we are already exploring this capability using the F-15. Now is the time to step forward and craft a grand design for future systems. Today, AFSC is soliciting more operator input in shaping the Air Force's science and technology investment strategy. As Maj Gen Thomas R. Ferguson, AFSC's deputy chief of staff for technology, put it, "We can't just push our technology into the operational world. There's got to be a pull from the other end."³⁵ A coherent plan to restructure our TFWs to TAGs in the midterm should be the foundation for future acquisition and budgeting approaches. Despite the initial investment to restructure our forces, monetary savings for the Air Force could be very high; savings could be even higher, depending upon how the concept of aircraft commonality is applied across DOD. With the right operational pull, we can serve our doctrine with our technology instead of the other way around.

A New Mobility

Mobile airfield operations are already standard practice for the Harriers and helicopters of the Army, Marine Corps, RAF, and Royal Navy.³⁶ In other words, we already have a wealth of information upon which to base our new TAG infrastructure (table 4). The TAG command post would retain the same basic functions it performs today; specific functional-area cells would perform the necessary coordination for group operations. The mission-area operations facilities would be similar to our current squadron operations facilities. Notice,

Table 4
Tactical Air Group Infrastructure

<i>TAG Command Post</i>	
Flight Operations Operations Plans Air Base Security	
<i>Mission-Area Operations Facilities</i>	
Surveillance/Command and Control (C ²) Reconnaissance Surface Attack/Airborne Security Electronic Combat Airfit Air-to-Air Rescue/Special Operations	
<i>Combat Support Facility</i>	
Supply Transportation Personnel Alternate C ²	

however, the break from a single facility to support a single squadron flying a unique airframe. The combat-support facility would provide the necessary support for group and air base operations. It would also serve as the alternate TAG command post.

Becoming a truly mobile tactical air operation hinges on the type and use of major equipment. The goal here should be to get lighter and move quicker. Recent improvements in expandable shelters for the Army and Air Force underscore our ability to make lighter, easily transportable facilities. Truck-mounted equipment or instrumentation-van arrangements lend themselves nicely to smaller functional operations such as navigation-aid control, aircraft flight-operations control, and so forth. The RAF, for example, currently uses mobile runway supervisory units (RSU) in vehicle-mounted configurations. Setup and relocation times for air base operations could also be greatly reduced by moving away from large, canvas "tent cities." Small, modular, wheeled living quarters similar to current pop-up camp-

ing trailers could easily accommodate four people and be towed by organic vehicles (such as the high-mobility multipurpose wheeled vehicles—HMMWV) or be easily airlifted.³⁷ Dispersal of these independent personnel units would also increase the enemy's targeting problem as well as decrease casualties from air attack. Self-contained liquid-petroleum stoves and refrigerators in each unit would also reduce the size and complexity of field kitchens. Regardless of our equipment configuration, in no case should we create the need to transport outsized TAG equipment or cargo. This kind of inefficiency would not be worth the cost in additional airlift sorties.³⁸

VSTOL operations would also allow us to divorce ourselves from heavy support equipment such as "portable" arresting gear, rapid-runway-repair equipment, runway sweepers and plows, and so forth. Instead of heavy construction materials, we could carry light camouflage materials for aircraft, vehicles, and personnel. Limited quantities of steel matting for aircraft operations would substitute for heavy runway-construction materials in the midterm. We have extensive experience using this sort of matting, dating back to World War II; airfields in Southeast Asia were conspicuous by their use of matting. The greatest difference for VSTOL operations would be in the relatively small quantity of matting required, if indeed it is needed (not all VSTOL operating locations would require matting). As in the case of airframes, we can also realize greater economies of scale through the concept of commonality of support equipment between the services.³⁹

Conclusion

The thawing of the cold war provides a marvelous opportunity to reevaluate our military force structure. If we plan properly, we can craft a cogent program to design, build, and operate tactical air forces that are capable of being truly flexible—both in the air and on the ground. This ar-

ticle has explored the problem of meeting enduring national security objectives with a smaller military force structure. We have seen, using a notional organization called a tactical air group, how force restructuring coupled with VSTOL technology can solve much of that problem. Using common airframes in multiple mission roles obviates the fiscal and logistical constraints we now face—without holding doctrine at risk.

To support the Army's battle doctrine, as well as our own, we must be able to operate tactical aircraft in a lethal, fast-paced, fluid environment. Fixed, hardened airfields have become a by-product of outdated, defensive thinking. Mobile, forward basing would enhance force survival, complicate targeting, and increase sortie availability. Today, VSTOL is a mature, low-

risk technology that offers payoffs in air-combat maneuvering and battlefield surveillance and attack. Airframe commonality would reduce maintenance and parts support, resulting in increased sortie generation and mobility. Using VSTOL to lift and then supplement unit resupply efforts would increase throughput and decrease delivery time.

To realize these benefits, Air Force leadership must embrace a new operational concept, unencumbered by previous attitudes. Facing increasingly capable foes, we can no longer afford to tailor our war-fighting doctrine to outmoded operational procedures. In the final analysis, restructuring today's tactical fighter wings into tomorrow's tactical air groups would most certainly be a leap in faith—but not in technology. □

Notes

1. Whether the cold war can finally be laid to rest remains to be seen. What is tangible, however, is Soviet economic reform of its domestic and military industrial infrastructure, troop reductions in Eastern Europe, and increased warning time of military escalation. A fuller explanation of America's postwar reductions can be found in Russell F. Weigley, *The American Way of War: A History of United States Military Strategy and Policy* (Bloomington, Ind.: Indiana University Press, 1973), 373, 400–401, 447–49.

2. Secretary of the Air Force Donald B. Rice is the acknowledged standard-bearer for Global Reach—Global Power. Briefing, Headquarters USAF/XOXWP, subject: The Air Force and US National Security: Global Reach—Global Power, 1990.

3. Gen Michael J. Dugan, Air Force chief of staff, to Sen Sam Nunn, chairman, Senate Armed Services Committee, letter, 11 June 1990.

4. James W. Canan, "Back to the Future," *Air Force Magazine*, October 1990, 36.

5. *Ibid.*, 34. In response to a leftist military coup in Iraq in 1958, Composite Strike Force Bravo deployed and was on the ground in Lebanon within 12 hours.

6. John Piazza, Point Paper on Air Legion Concept, Washington, D.C., 24 July 1989. Sponsoring this concept was no mean feat, given the historical intransigence of military bureaucracies to consider radical new ideas. After all, tailoring our tactical fighter forces to mirror the capabilities of naval air is a large parochial pill to swallow. For decades now, the US Navy has successfully championed the building of carrier battle groups (CVBG) as America's best solution to projecting military force abroad. The weight of their arguments has rested upon the ability to employ tactical air power from floating "air bases" independent of a shore-based airfield. A supercarrier, they argued, could carry a host of aircraft to fully exploit the complete capability of air power. Unfor-

tunately, the majority of the aircraft carried aboard today's supercarrier is dedicated to CVBG defense. The ability to deliver firepower ashore is thereby greatly reduced. Lacking a better tactical air power projection scheme, however, the Navy's doctrine and funding have continued without serious opposition. See Edward N. Luttwak, *The Pentagon and the Art of War* (New York: Simon and Schuster, Inc., 1985), 220–22, 262.

7. None of these missions break with current Air Force doctrine. All (with the exception of security) are fully explained in AFM 1–1, *Basic Aerospace Doctrine of the United States Air Force*, 16 March 1984, 3–1 to 3–8. At this writing, the Air University Center for Aerospace Doctrine, Research, and Education was circulating a new draft AFM 1–1 for comment. According to the draft reviewed by this author, the same holds true for the future doctrinal publication: SC³ aircraft also offer the advantage of airborne communications relay. The mobile basing scheme that is advocated should help minimize direct threats to the TAG. In the event active defense becomes necessary, however, organic airborne defense assets would augment ground-based defense forces. Security aircraft could also be used for rear-area operations of friendly ground forces. Department of the Army Field Manual (FM) 100–5, *Operations*, 1986, 20.

8. The special qualities required of a TAG commander become readily apparent. He or she must be a true air-battle commander—that is, well versed in the art and science of air operations and combat. Technical skills in a single weapon system will not substitute for this expertise.

9. Quoted in J. Ronald Fox and James L. Field, *The Defense Management Challenge: Weapons Acquisition* (Boston: Harvard Business School Press, 1988), 66.

10. According to Fox and Field, one example of leapfrogging program costs was F-14A procurement. A Comptroller General study in 1979 concluded that a reduction of 66 Tom-

cats from the original buy coupled with a program stretch-out raised the estimated program cost by \$2.3 billion—a 38-percent increase! (page 40)

11. Jay Miller, *General Dynamics F-111 "Aardvark"* (Fallbrook, Calif.: Aero Publishers, Inc., 1982), 49–55.

12. For a fuller discussion of air superiority, see John A. Warden III, *The Air Campaign: Planning for Combat* (Washington, D.C.: National Defense University Press, 1988), chap. 1.

13. The Marine Corps's use of a modified C-130 as an airborne early warning (AEW) aircraft has favorably impressed Congress and shows promise for long-term drug-surveillance force structure. House, *Department of Defense Appropriations Bill*, 1991, 101st Cong., 2d sess., October 1990, 245.

14. J-STARS is a joint Air Force/Army program to integrate a side-looking multimode radar into an E-8A aircraft. The system should allow detection of stationary or moving ground-based objects in support of the Army's AirLand Battle doctrine. Susan H. H. Young and John W. R. Taylor, "Gallery of USAF Weapons," *Air Force Magazine*, May 1990, 148.

15. Robert Frank Futrell, *Ideas, Concepts, Doctrine: A History of Basic Thinking in the United States Air Force, 1907–1964* (Maxwell AFB, Ala.: Air University, 1971), 438–40.

16. Quoted in *ibid.*, 439.

17. The fiscal adjustments recommended by Project Forecast were favorably received by Secretary of Defense Robert McNamara. Unfortunately, those adjustments reached his desk the day President Kennedy was assassinated and were never made to the fiscal year 1965 budget. Michael H. Gorn, *Harnessing the Genie: Science and Technology Forecasting for the Air Force, 1944–1986* (Washington, D.C.: Office of Air Force History, 1988), 94–105.

18. During phase 1, the task force was asked to review previous and current VSTOL concepts, report on the status of current VSTOL technology, perform a risk assessment, and recommend appropriate technology demonstrations. Phase 2 of this effort began in March 1979. This time the group was tasked to review past VSTOL programs that failed to increase military capabilities; review service missions "traditionally associated with CTOL aircraft and determine how V/STOL type aircraft could enhance their capability"; determine which fields of emerging technologies might benefit from VSTOL applications; and recommend an optimum mix of CTOL and VSTOL aircraft for the 1985–2000 time frame. While undecided about naval capability, the task force was more positive about the newest version of the Harrier: "This airplane (AV-8B) lies within today's state of the art and with even further capability improvement could be an extremely flexible weapon system for real military requirements." Office of the Under Secretary of Defense for Research and Engineering, *Final Report of the Defense Science Board Task Force on V/STOL Aircraft* (Washington, D.C.: Government Printing Office, November 1979), 3–4, 40–43.

19. Early American VSTOL efforts centered around the Ryan X-13 and Bell X-14 experimental aircraft. The forerunner of the Harrier was the British Hawker Siddeley P.1127 Kestrel. By 1965 the United States and Germany had become interested in the Kestrel, but after evaluating six Kestrels in this country, the US lost interest and dropped the program. John Trotti, *Marine Air: First to Fight* (Novato, Calif.: Presidio Press, 1985), 98.

20. A fighter used in a tactical nuclear role would normally have targets at the extreme limit of its combat radius. The range of our early jet fighters was extremely limited. As a matter of fact, F-84Es had to be ferried to Korea in 1950 aboard ship. J. C. Hopkins, *The Development of Strategic Air Command, 1946–1981* (Headquarters Strategic Air Command: Office of the Historian, 1 July 1982), 22–23.

21. Aerial refueling was first demonstrated in this country in the 1920s. The most noteworthy early flight incorporating aerial refueling occurred in January 1929 when Maj Carl

("Tooney") Spaatz and his crew flew the Question Mark for a record 150 hours and 40 minutes. Maurer Maurer, *Aviation in the U.S. Army, 1919–1939* (Washington, D.C.: Office of Air Force History, 1987), 260–65. The capability as we know it today was developed by Strategic Air Command in the 1950s to offset the short range of its B-47 bomber. Richard H. Kohn and Joseph P. Harahan, eds., *Strategic Air Warfare: An Interview with Generals Curtis E. LeMay, Leon W. Johnson, David A. Burchinal, and Jack J. Catton* (Washington, D.C.: Office of Air Force History, 1988), 104–8.

22. AFM 1–1, 2–3. The success of the Army's AirLand Battle doctrine to win in the offense is based upon four basic tenets: initiative, agility, depth, and synchronization. FM 100–5, 15.

23. Quoted in James W. Canan, "Global Power from American Shores," *Air Force Magazine*, October 1989, 42, 44. The advantages of being able to "get in and out" of other countries' affairs quickly are widely appreciated by both diplomatic and military leaders. In the event of military action, VSTOL base bases would allow us to do exactly that.

24. The remark was attributed to Gen Russell E. Dougherty, USAF, Retired, in Canan, "Global Power," 42. Although beyond the scope of this article, the Air Force tendency to procure more and more single-seat fighters puts pilot fatigue into sharper focus. Unlike the Navy concept of work-load sharing between two or more crew members, the Air Force feels it can lessen pilot task saturation with improvements in cockpit avionics. In the absence of auxiliary crew members, pilots would be forced to take strong stimulants to be effective, and then for only short periods of time. The efficacy of crew members' using stimulants over a long period of time is highly questionable.

25. John F. Kreis, *Air Warfare and Air Base Air Defense* (Washington, D.C.: Office of Air Force History, 1988), xv.

26. Warden, chap. 1.

27. Kreis also notes that even the efficient German air commanders "described Russian camouflage and deception accomplishments as masterful" (pages 185–88). Our proposal directly enhances three of Kreis's four facets of air base defense: passive defense, dispersal, and attack recovery (pages xvi–xvii).

28. Don Linn, *Harrier in Action* (Carrollton, Tex.: Squadron/Signal Publications, Inc., 1982), 11–12, 28–29. The 1979 Defense Science Board report on VSTOL includes four pages listing the proven advantages of VSTOL attack aircraft (pages 67–70). In one Harrier surge operation in 1980, the Marine Corps averaged 6.4 minutes per aircraft for servicing and rearming. Trotti, 99–100.

29. Bill Gunston, *An Illustrated Guide to Future Fighters and Combat Aircraft* (New York: Arco Publishing, Inc., 1984), 24–29.

30. Jeffrey Ethell and Alfred Price, *Air War South Atlantic* (New York: Macmillan Publishing Co., 1983), 180.

31. *Washington Post*, 22 September 1990, A20.

32. Even with the considerable capability of the C-130, tactical airlift STOL capability has not improved in 20 years. Lawrence J. Faessler, *Transportation Dependence and Tactical Airlift* (Ithaca, N.Y.: Cornell University, 1980), 12.

33. Jeffrey Record, *Determining Future U.S. Tactical Airlift Requirements* (Washington, D.C.: Pergamon-Brassey's International Defense Publishers, 1987), vi, 27–28.

34. Gunston, 47; and F. Clifton Berry, Jr., "The Push for Fighter Engines," *Air Force Magazine*, January 1990, 76–77, 79.

35. Quoted in John T. Correll, "Partners in Technology," *Air Force Magazine*, January 1990, 16.

36. Department of the Army FM 1–111, *Aviation Brigade*, 1986, chap. 2; and Trotti, 93–96.

37. The HMMWV has replaced the venerable jeep as the services' multipurpose vehicle.

38. We seem to be making headway in the airlift required

to support fighter operations. Gen Larry Welch, former Air Force chief of staff, pointed out how we had progressed from using aircraft carriers (mentioned earlier) to using airlift. General Welch further stated that 28 sorties were required to deploy one squadron of F-4 fighters to Southeast Asia; today we can deploy a squadron of F-16s with half those sorties. James W. Canan, "The Watchword Is Flexibility," *Air Force Magazine*, February 1990, 59.

39. During World War II, American combat aviation used temporary runways constructed of "Marston mat." One section of steel mat was 10 feet by 15 inches and weighed 66.2

pounds. Holes punched into each of the three channels reduced weight by 17.5 percent, controlled dust, and allowed drainage. In Southeast Asia, the mat was known as pierced steel planking. Richard K. Smith, "Marston Mat," *Air Force Magazine*, April 1989, 84-88. Recent advances in high-strength composite materials could conceivably reduce weight even more. Reversible mat with a woodland-camouflage paint scheme on one side and a desert scheme on the other could be interchangeably mixed and matched to provide excellent concealment for any location.

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Ricochets

continued from page 3

mations with our collocated bombers, we were able to do some fairly complicated things while emitting very little electronic energy because we could brief and practice together. In comparison, while we were flying with forces from Military Airlift Command and Tactical Air Command, the radio calls, radar usage, and navigation-aid transmissions made us look like Christmas trees to sensors lurking below.

Maj Brian T. Kelly, USAF
USAF Academy, Colorado

Composite wings are a good idea, and it is refreshing to see someone else who thinks so move into a position of authority. Over my last 20 years in the Air Force, I can remember numerous times discussing that issue with other officers and always coming to the same conclusion: it makes a great deal of operational sense. But then some maintenance or logistics type would throw cold water on the idea with numerous reasons why it couldn't or wouldn't work. Unfortunately, in peacetime their views dominated. But at last it appears that might change.

As we start to plan for and form composite wings, I offer some thoughts for consideration:

1. Unless we expect relations with Canada or Mexico to deteriorate rapidly, we don't need composite wings inside the continental United States. The maintenance and logistics expense of several permanent composite wings inside the US would be prohibitively high. It would be both impractical and expensive to put F-4G Wild Weasel, RF-4, EF-111, aircraft warning and control system, and other special aircraft detachments at several composite wing bases.

2. The answer is to leave most of the state-side wings as they are and to consider them solely as training wings whose mission is to provide trained aircrews, support people, and aircraft for provisional composite combat wings. The composite combat wings would pull "slices" from the tactical training wings, as needed, to tailor themselves for the type of war they were about to enter.

3. There could be provisional composite wings for power projection, full-scale general war, low-intensity conflict, battlefield air support, and so on. Once the National Command Authorities decided to commit US forces to an

area, the military chain of command would decide what type of forces to send—including the type of provisional composite wings to activate.

4. The plans for composite combat air wings would be on the shelf, ready to go when activated. Specific squadrons—both support and flying—from the tactical training wings would be designated as components when the plan was activated. The commanders and staffs of the composite wings would be designated ahead of time but wouldn't have direct operational control of their forces until the provisional wings were activated for training exercises, operational inspections, or combat. (In the majority of cases, for reasons of unity of command, a provisional combat wing commander will be one of the tactical training wing commanders.)

5. Obviously, the provisional composite combat wings would have to practice and train together often. The way to do that is through exercises such as Red Flag and Cope Thunder. For a Red Flag, one or more composite wings would be activated, bring all its slices together, and be in the exercise as an entity. Provisional composite wings, rather than the tactical training wings, would receive operational readiness inspections (ORI). The object of an ORI would be to see how quickly and efficiently the composite wing could assemble and deploy, and how effectively it could fight upon arrival. Composite battlefield-support wings would routinely bring all their slices together and deploy to support the major Army ground-training exercises that are held at the National Training Center at Fort Irwin, California, and at the Joint Readiness Training Center at Fort Chaffee, Arkansas.

6. The practice of assembling slices to build a task force or combat team is not new. The Army and Navy have always operated that way. I have been air liaison officer with Army units for seven years of my time in the Air Force and have seen how the Army brings slices together to assemble division, brigade, regiment, and battalion combat teams for the threat they expect to face. A corps or Army group task force going to Saudi Arabia to face Iraqi armor would obviously be much different than a brigade combat team going to Honduras to flush guerillas out of the jungle. One might be heavy in armor, artillery, and attack aviation, while the other would emphasize light infantry, social-action teams, and special forces. The point is that as we start forming provisional composite wings, we can learn a lot by studying what the Army has done.

7. One type of composite wing requiring special attention is the battlefield-support or air-support wing—designed to work closely with and operate alongside the Army in both peacetime and combat. Out of necessity it will have to be closely aligned with both the Army and the provisional composite wing headquarters. It may even be collocated with a major Army headquarters. The ideal Army headquarters candidate is the XVIII Airborne Corps at Fort Bragg, North Carolina. This corps is the United States' primary strategic ground force—kept on constant alert to go anywhere in the world—and is the main component of the US Central Command. Because it is primarily a light force, it is much more dependent upon Air Force firepower than other and heavier Army ground forces. Also, going back to its formation in World War II, there has been a strong sense of cooperation and interdependence between the Army airborne forces and the Air Force.

8. In fact, the alignment of a composite battlefield-support wing with the XVIII Airborne Corps might lead to a new category of military force: an Aerial Marine Corps. (The relationship of the Army's airborne forces to the Air Force has always been very much like the Marine Corps's relationship to the Navy.) The battlefield-support composite wing would have the transport aircraft to carry the airborne forces into battle (just as the Navy provides amphibious vessels to carry the Marine Corps), as well as the fighters and special aircraft to gain air superiority and provide battlefield support for the airborne forces once on the ground (just as Navy and Marine Corps air now supports the Marine Corps after an amphibious landing).

The time for composite air wings is not only ripe, but seriously overripe. Situational and operational pressures indicate that we should have done it long ago. It is interesting to note that one of the reactions to the invasion of Kuwait was to form ad hoc composite wings in Saudi Arabia and Turkey. I am not aware of any stateside wing that deployed to Southwest Asia as an entity, let alone fought as such. The stateside wings provided slices that went into composite wings. Often, a third of the aircraft in a stateside wing stayed back to take care of training, fillers, the sick and lame, permanent-change-of-station transfers, and so on. The next step is to codify what happened and to make it standard operating procedure. But as we do, we must remember that we can learn much from how the Army and Navy have already done it.

Lt Col Gary L. Dikkers, USAF
Sembach AB, Germany

AIR CAMPAIGN COUNTERPOINT

I read with interest Maj Richard Taylor's letter (Fall 1990) about Col John A. Warden's book *The Air Campaign: Planning for Combat*. Although the author of the book is far better equipped than I to reply to Major Taylor's queries, he is probably heavily engaged at the moment, so I'm taking the liberty of joining the discussion—not as an expert, but as another interested reader.

First, a recap of Major Taylor's main points:

1. Colonel Warden omits several Air Force missions that are absolutely essential to any air campaign. There is no mention of strategic bombing. . . . There is not a word on airlift. [There are] no words on combat support. . . . Where is electronic combat?
2. *The Air Campaign: Planning for Combat* flies in the face of current Air Force doctrine. Colonel Warden's thesis . . . rests on numerical superiority. . . . We have spent 20 years building an Air Force that is technologically superior but numerically inferior. . . . Colonel Warden never mentions low-intensity conflict, AirLand Battle [and so forth].
3. Colonel Warden's lessons from history are out of date and are often contradictory.

I stress that the following comments are my very own and that the author of *The Air Campaign* may well disagree. Colonel Warden's emphasis is on the pointed end of the sword. He does not pretend to talk about the hilt, the sword-bearer, or even the rest of the blade. No one will deny that logistics is important (perhaps even primary) and that many collateral missions are essential; however, that's not what the book is about. The core of the book tries to answer a fundamental question: What should be the basic strategy (doctrine, employment) for air power?

I agree that Colonel Warden's book is not exactly synchronized with current US Air Force doctrine, but it does not deviate in the way that Major Taylor suggests. When Colonel Warden talks about outnumbering the enemy as a primary goal, he is speaking about the point of attack and not about absolute numerical superiority. Perhaps Major Taylor will agree that while an air force may be at an overall numerical disadvantage, it may very well (through planning and execution) be numerically superior for a given engagement. I think this follows very closely the classic principle of concentration of forces. He also maintains that air superiority is paramount. Where Colonel Warden departs from current doctrine is in his increased emphasis on targeting the enemy's support for

the war effort and his decreased emphasis on face-to-face, or gun-against-gun, solutions. His argument is that an aircraft killing a tank is not as effective as an aircraft destroying petroleum, oil, and lubricants or a tank-tread factory—which may disable hundreds of tanks. While this may be patently obvious, there is a very definite tendency to hold all Air Force missions to be equally important: counterair (air to air), close air support, long-range interdiction, and so forth. Colonel Warden's point is that the very best close air support, for example, does not entail killing the enemy in the trenches, but insuring that the enemy does not have food, water, ammunition, gasoline, and other necessary items for the conduct of the war. Long-range interdiction or strategic bombing (cutting out the heart of the enemy's war machine or whatever you choose to call it) is the purpose of air power in the long run. He concedes that the results may not be felt immediately and that the situation may not allow you to devote your entire effort. The central issue is one of aim and emphasis, not exclusivity.

I'm almost certain that when Major Taylor writes that "lessons from history are out of date," he really means "inappropriate." I disagree, but without specifics the question is tough to address. I do think that the detailed study of military history is absolutely essential for any and all professional officers and that lessons from even ancient battlefields may be germane to today's air war.

Major Taylor further wishes that Colonel Warden would submit future manuscripts to Air University (AU) to be critiqued for substance and doctrine. I take nothing away from my fellow officers at AU. They are learned and in most cases far more capable than I. However, the creative process is in some ways rigorous and in others fragile. It can heartily withstand a flood of just and unjust criticisms yet be washed away in the committee room.

Lt Col William P. Stroud III, USAF
Langley AFB, Virginia

EDUCATING LIEUTENANTS

I read with avid interest Lt Col Bruce Ullman's article "Officer Professional Development for Lieutenants" (Fall 1990). Having been both a student in and an instructor of a lieutenants professional development program (LPDP), I heartily endorse his recommendation that the Air Force adopt the program universally.

Much of the courseware—from program to program—is similar in content. Ullman men-

tions that the "concept is . . . designed to produce an emotional as well as an intellectual response" (p. 31). LPDP, as does most professional military education, not only reminds us why we are blue-suiters, but also exposes young officers to challenging questions and answers gained only through experience both on and off the battlefield.

Colonel Ullman was correct in recommending that the Air Force implement LPDP. Why? More than anything else, it gives our junior officers a professional reference point that they can use in their decision making. We can't expect our officers to always do things right, but we do expect them to do the right thing. LPDP can help them do just that.

Capt James B. Rake, USAF
Spangdahlem AB, Germany

I read with great interest the article "Officer Professional Development for Lieutenants." This program did not exist during my newly commissioned years. The first opportunity for professional education was Squadron Officer School. This meant that most of us did not get any formalized training as professional officers until the fifth or sixth year of service. I'm happy to see that the Air Force has now recognized and filled this gap.

Many of the points made concerning "institution" versus "career or occupation" are well taken. I can remember several times hearing statements like, "You have to get yourself a sponsor or rising star and latch on for the ride." There was little or no mention of developing your skills as an officer or of duty to country. Too many times you heard officers refer to themselves in occupational terms such as *misileer*, *pilot*, *navigator*, and so forth.

This brings me to my one definite contention with this article. Colonel Ullman clearly points out that the top Air Force leaders developed the ideas behind officer development and a direction away from careerism. However, at the same time, these leaders are nurturing and developing that same occupational concept by increasing pilot—and other specialty—bonuses. With specific reference to the pilot bonus, the Air Force is doing nothing except bribing those officers not to seek outside employment with the air carriers. In essence, we are resorting to the appeal of dollar-driven behavior that we so desperately claim to avoid. This does not instill devotion to duty and country. This does not foster the development of officers and leaders. It violates the basic premise of good officership.

Our leadership needs to rethink this area extensively. Many officers who are turned away from pilot or specialty training are dedicated professionals. Many of us are nonbonus aviators and proud of this fact. If the Air Force wants to develop an officer corps that exudes dedication and provides leadership, then it should rid us of such flagrant contradictions. If not, then it should start educating our younger officers on the protocol of how to get ahead and latch onto that rising star once again.

Maj Michael G. Cozort, USAF
Malmstrom AFB, Montana

I agree with Colonel Ullman's conclusion and recommendations in "Officer Professional Development for Lieutenants" and have something to add. A few years ago I was substituting for my commander while he was on leave. While checking the commander's in-basket, I found a computerized assignment notice for an inbound captain slated for an opening in our squadron as the squadron section commander. Stuck to the printout was a note from the lieutenant currently acting as section commander. The lieutenant's note very forcefully stated that "we need to get rid of this person." The note went on to say that the first sergeant knew the captain from a previous assignment. Feeling that the captain was incompetent, he refused to work with this person ever again. The first sergeant said he would ask for a transfer to another squadron if the captain was assigned as squadron section commander. The lieutenant urged the commander to divert the captain to a different squadron so that we wouldn't lose our first sergeant, who was unquestionably a superior performer.

I decided to talk to the lieutenant. I recommended staying out of the situation. Although the lieutenant was doing a very good job, the squadron was authorized two officers—a captain and a lieutenant. Since the assignment would make the captain the boss, the note made it appear that the lieutenant was attempting to hold onto the position by stabbing the captain in the back. I said that any obvious support the lieutenant gave to the first sergeant could be perceived as maneuvering to keep the section commander title.

The lieutenant's response showed he was attempting exactly that. The lieutenant maintained that working as a deputy to a captain after holding the captain's position and reporting to a lieutenant colonel would show career regression. This person was determined to pro-

tect his career and build on the excellent start he had made in the Air Force. The lieutenant was not about to let an incompetent captain get in the way of promotion opportunities.

Why would any lieutenant make such an attack? Why would someone be so concerned about keeping a position—about not becoming a deputy? What made the lieutenant think the job title was so critical to promotion?

The answer is not a lack of officer professional development for lieutenants. The answer lies with senior officers who have taught junior officers that certain jobs are a "must" for promotion; other jobs are "too easy" and should be avoided if the officer is serious about promotion.

I support Colonel Ullman's recommendations for fighting careerism early in officer development. However, they won't get very far if we continue to divide assignments into promotable and nonpromotable categories. A system that forces officers to jockey for promotable positions communicates the wrong message about emphasizing performance over square filling. If we have certain jobs that are too easy or not worth counting as indicators of potential, let's get rid of them! Some jobs will always be more challenging than others, but as long as jobs are worth doing, they're worth doing well. The way to get that across to lieutenants is to measure potential and promote officers according to how well they accomplish the things they are charged with doing. De-emphasizing the informal comparison of one job to another will allow officers to concentrate on the profession of arms as opposed to the pursuit of career stepping-stones. Officer professional development for lieutenants needs to start with those who sit on promotion boards. By the way, I persuaded the lieutenant to withdraw the note, but he remained convinced of the need to hold onto the position at the expense of the captain. The first sergeant told the commander about his experience with the captain, and the captain was diverted to another squadron.

Maj Leonard S. Olson, USAF
Crane Army Ammunition Activity, Indiana

PONDERING PRIORITIES

Lt Col Phillip Meilinger's article on the future Air Force ("The Air Force in the Twenty-first Century: Challenge and Response," Winter 1990) is perhaps the most comprehensive discussion of Air Force issues since the publication of the white paper on global reach-global

power. It superbly advocates a service responsive to the present and focused toward the future, and stresses the need for incorporating a more clearly defined sense of purpose into Air Force planning.

Colonel Meilinger's discussion of composite wings (organizations based on combat capability instead of peacetime streamlining) follows a section on force structure which emphasizes the need for "range, secrecy, speed, power, precision, and cost-effectiveness" (p. 44). Composite wings with systems which incorporate these attributes will certainly provide a combat force that will strengthen conventional deterrence.

What I find disconcerting is his list on pages 44-45 of "weapons systems that meet these criteria, in order of importance" (e.g., deterrent forces, reconnaissance systems, fighters, tankers, bombers, transports, standoff weapons, and medium strike forces). Such a list seems to argue for spending our first budget dollar on ICBM-centered deterrence and then continuing down the list until the money runs out.

I sincerely doubt that our force structure can be—or should be—aligned in a way that suggests reconnaissance systems are more important than fighters and that bombers are more important than airlifters. Rather, we should seek a force structure whose elements embody the desired characteristics listed by Colonel Meilinger. In this way synergism will truly produce combat effectiveness.

Lt Col Thomas M. Kearney, USAF
Pentagon, Washington, D.C.

CAPTION CONTROVERSY

I call attention to a small but insidious flaw in Lt Col Richard Estes's otherwise fine article "Giulio Douhet: More on Target Than He Knew" (Winter 1990). It is insidious in that it states as unqualified fact something that "ain't so" and—worse—can lead to other flawed conclusions about air power. The caption to the picture on page 74 reads, "World War II disproved [italics added] Douhet's theory that massive raids on cities and industry would undermine the enemy's morale and lead to his surrender. Nuclear warfare, though, has given new life to his conjectures." The *Airpower Journal* knows better—I hope.

At best, World War II failed to prove conclusively that such raids would inevitably lead to enemy surrender. But in fact—on balance—the weight of evidence comes closer to proving Douhet right than wrong. The later stages of air

operations against Japan were almost pure Douhet—incendiary rather than gas. The *Strategic Bombing Survey* stated that

the bombing offensive was the major factor which secured agreement to unconditional surrender without an invasion. . . . The demonstrated strength of the United States in the B-29 attacks contrasted with Japanese lack of adequate defense, made clear to the Japanese people and to the government the futility of further resistance. . . . The atomic bomb and Russia's entry into the war speeded the process of surrender already realized as the only possible outcome.

One need not espouse area—or morale—bombing to give Douhet his due. I for one do not—even for nuclear applications. Estes's underlying point that mass destruction from the air may not inevitably cause defeat is a fair appraisal. But the aim of war is still the enemy's will. The real argument is not that massive countervalue attack won't lead to collapse of his will, but that precise strategic application of air power—as attempted by the Army Air Forces in the European theater and demonstrated in Operation Desert Storm—is a much preferable approach.

Keep up the good work. Make us think!

Col Haywood S. Hansell, USAF, Retired
San Antonio, Texas

EDITOR'S NOTE: To set the record straight and to absolve Colonel Estes, we should reveal that article captions are usually written here at the Airpower Journal. The caption in question was written with the German bombing of Great Britain in mind—an effort that did more to steel British resolve than it did to weaken morale. In that context, the caption was "on target." However, we should have identified the caption's setting more clearly. We'll do better.

AIR SUPERIORITY BOMBER

In the past, diverse and deadly effective enemy defenses pushed air superiority to the forefront of air power planning considerations. The result was a doctrinal emphasis on the primacy of air superiority that subordinated all other considerations. This emphasis obscured the essential truth that air superiority is a means to an end and not an end in itself. The desired end must always be strategic attack against the enemy's centers of gravity.

The precise lethality of the F-117, as evidenced in Operation Desert Storm, has ushered

in a new era of strategic air attack. Its exceptional performance has conclusively demonstrated the effectiveness of stealth and has begun to redefine the meaning of air superiority. By capitalizing on its stealth characteristics, the F-117 surrounded itself with an envelope of air superiority.

The combat success of stealth bombing in no

way negates the need for the air superiority fighter. However, it does provide a springboard for refining air power doctrine and for developing air campaigns that exploit the US technological edge provided by the F-117 and, hopefully, the B-2.

Lt Col Thomas M. Kearney, USAF
Pentagon, Washington, D.C.

net assessment

The Price of Admiralty: The Evolution of Naval Warfare by John Keegan. New York 10014: Viking Penguin, 1989, 368 pages, \$21.95.

The past 15 years have seen John Keegan rise to a position of eminence among Western military historians. For years he was the senior lecturer at the Royal Military Academy at Sandhurst, England, and is now the defense correspondent for the *Daily Telegraph*. His reputation rests on several well-deserved supports: his books read easily and smoothly synthesize large amounts of material, and—possibly most important—he is able to spark the imagination and put the reader in the shoes of the participants.

The Price of Admiralty uses the same methodology as several of Keegan's other books (*The Face of Battle*, *Six Armies in Normandy*, and *The Mask of Command*). That is, the author selects a single battle as a paradigm for an era or campaign. Thus, Keegan examines four different naval technologies through the spyglass of four battles: Trafalgar (1805) for the era of sail; Jutland (1916) for the era of the big-gun, dreadnought-style battleship; Midway (1942) for aircraft carrier warfare; and German U-boat attacks on Allied convoys SC112 and HX229 (March 1943) for submarine and antisubmarine warfare. In each case Keegan succinctly outlines the factors that shaped those engagements: naval strategy and tactics, technology, doctrine, leadership, and so forth. As always, he paints a vivid picture of what battle was like for the participants, from the carnage experienced by Adm Horatio Nelson's gunners to the terror of being under torpedo or depth-charge attack.

The theme that unifies the book's four major sections centers on the technological revolutions that have shaped naval warfare. The first of these revolutions was the development of long-range guns firing explosive projectiles, an innovation that changed the focus of battle from the enemy crew to the enemy ship. At Trafalgar, for example, Nelson's guns were man-killers: the intent was to incapacitate the enemy crew and capture their ship. By Jutland, however, the guns were designed to sink the enemy ships: no one there envisioned trying to capture the enemy.

A second technological revolution occurred in ship mobility, in that the advent of oil-burning, turbine-driven ships meant longer range and higher speeds. The impact of extending mobility into what could be termed the second dimension (underwater/submarines) and third dimension (air power) was so drastic as to be revolutionary rather than evolutionary. Thus, seamen were forced to radically rethink (sometimes grudgingly) the nature of naval warfare. Finally, other technological advances—in electronics, standoff missiles, underwater listening devices, and so forth—have made significant changes in how these major technological revolutions have altered the conduct of maritime warfare.

The most controversial parts of the book are its nine-page conclusion entitled "An Empty Ocean" and its thesis: "Command of the sea in the future unquestionably lies beneath rather than upon the surface" (page 272). From the Falklands War, which he calls the only naval campaign fought since 1945, Keegan draws the critical conclusion that surface ships cannot defend themselves against modern jet aircraft or submarines. He asserts that the submarine is

now the ultimate capital ship—the successor to the ship of the line (Trafalgar), the dreadnought battleship (Jutland), and the aircraft carrier (Midway).

Keegan's conclusion, however, is nothing more than an assertion based on the rather slim supply of historical evidence provided by the events of the Falklands War. He has a good point, and he may be right. Attack submarines certainly pose a significant threat to anything moving on or below the surface of the sea. (Submariners like to say that there are only two types of ships—subs and targets.) But the evidence of the past decade, indeed since the start of World War II, indicates that ships exposed to air power are at a far graver risk than those attacked by submarines. The damage inflicted on the HMS *Sheffield* and USS *Stark* by Exocet missiles highlights recent developments in standoff missile capability. Moreover, if the Argentine Air Force had properly fused its conventional iron bombs, the Royal Navy would have lost several more ships in 1982. Even during World War II, more warships were lost to air power than to any other force. To this reviewer, at least, the message of the past half century is clear: those who go down to the sea in ships better keep an eye on the sky, for air power is the primary threat.

In any event, *The Price of Admiralty* is another fine book by John Keegan. Any work of synthesis can contain errors of detail (such as this book's statement that the US submarine *Nautilus* torpedoed and sank the Japanese carrier *Soryu* at Midway, which has been disproven by several recent authors), but they do not detract from its overall validity. Some matters the author does not address, such as the relevance of Adm Alfred T. Mahan's naval thought or the influence of institutional resistance to new weapons and concepts, but one can pack only so much into a book of fewer than 400 pages. It is a highly readable study that efficiently traces the course of naval warfare between 1800 and the 1990s, draws cogent conclusions about the impact of technology on future naval warfare, and (as always with Keegan) paints a vivid, gripping portrait of war at sea. Worth getting? Definitely.

Lt Col Daniel T. Kuehl, USAF
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The Art of Wargaming by Peter P. Perla. Annapolis, Maryland 21402: Naval Institute Press, 1990, 416 pages, \$29.95.

In *The Art of Wargaming*, Peter Perla systematically surveys modern professional and commercial wargaming with the critical yet non-judgmental eye of one who well knows both the strengths and limitations of his subject. (Perla uses *wargame/wargaming* to denote the integrated process of realistically simulating war, as opposed to the conventional spelling—*war game/war gaming*—which suggests to him a pastime that places less emphasis on the accurate depiction of warfare.) Dr Perla, a naval operations research analyst and wargame specialist at the Center for Naval Analysis, clearly regards wargaming as a potentially powerful tool with which to foster a keener appreciation of the forces and factors affecting decision making in war. However, Perla rightly considers that if the wargame is to effectively achieve this end, it must be properly understood in terms of what it can and cannot do. Further, it must take full account of the equally important disciplines of operational analysis and military history.

By initially tracing the origins and historical development of wargaming to its present incarnation in American military and commercial circles, Perla provides a solid basis for understanding modern wargaming's potential value as well as its limitations. Three critical concepts emerge from his description of wargaming's evolutionary development, which relate directly to a later discussion of wargaming principles.

First, the wargame as a tool, albeit a powerful one, has to be designed and used appropriately if it is to be beneficial (and not simply a waste of time and effort). Perla cites several instances in which wargaming of particular scenarios involving potential adversaries proved uncannily prescient of later operations against the same foes. In some cases (e.g., the development of the US Navy's strategic concepts of a Pacific Ocean war against Japan), the lessons afforded by wargaming were well taken and profitably employed. Conversely, crucial questions and issues raised in wargaming have been ignored, although they could conceivably have altered the outcomes of decisive battles or campaigns (e.g., the Japanese failure to fully consider US countercarrier options prior to the battle of Midway). In yet other instances, and far too frequently, wargaming has failed to prepare participants to consider—much less to understand—the strategic or operational essentials of the problem being addressed. This failure is partly the result of wargaming's inher-

ent limitations (such as scenario dependence, susceptibility to the biases of sponsor and/or designer, the inability to accurately model empirical reality, etc.).

Perla's second emergent theme is that wargaming is part of an ongoing attempt to better come to grips with the innate complexities of warfare at levels ranging from the tactical to the grand strategic. From the Prussian staff rides of the early nineteenth century to today's intricate, computer-assisted global-warfare simulations and sophisticated commercial varieties, wargaming has helped reinforce, for practitioner and hobbyist alike, crucial lessons to be gathered nowhere else but on the battlefield. It is in this role as a window to the human experience in war that Perla sees potential promise as well as a not-inconsiderable danger of abuse.

Perla's final theme is that the potential exists for wargaming to become hostage to, as well as the beneficiary of, available technologies. He illustrates this concern in describing the somewhat less-than-dazzling succession of powerful cybernetic systems that have supported advanced naval warfare simulation models over the last several decades, an experience replicated elsewhere in the professional wargaming community. While Perla considers supporting methodologies important to wargaming's complete mastery of large volumes of detailed information and of the complex interactions of modern combat systems and forces, he reminds us that wargaming is, first and foremost, a process for exploring the human dimensions of warfare. Perla rightly considers the wargame's ultimate value to reside in understanding both the decisions that are made and the factors/circumstances attending them.

In the section on "Principles," Perla makes perhaps his greatest contribution to wargaming as a discipline. His succinct and logical treatment of what goes into the design, development, play, and analysis of wargames is by far the most authoritative, comprehensive, and to-the-point account that I have seen in wargaming literature of any vintage (other than his previous publications). This section is essential reading, whether one is seeking to improve the scope and quality of adversarial play in an interactive game, better simulate the effects of "fog and friction," or simply develop a better feel for what is involved in constructing and/or playing an effective wargame.

Perla covers a lot of ground in discussing the historical development of wargaming, as well

as the principles of wargame design, development, play, analysis, applications, and its future possibilities. He treats these subjects in a workmanlike and engaging style that makes *The Art of Wargaming* both highly informative and eminently readable. Although Perla's detailed treatment of US naval and commercial (or hobby) wargaming occasionally departs from the general reader's "path of direct interest," the book integrates significant historical events and developments in wargaming with objectives and concepts in a consistently stimulating and thought-provoking way.

Further, while Perla forthrightly lists fundamental considerations—both structural and operational—crucial to effective wargaming, his treatment of "principle" is not restrictive in a dogmatic sense. It is evident throughout that Perla has too high a regard for the complexity of the subject (war as well as wargaming) to adopt the "cookbook" approach that is all too common in military literature. A forgivable weakness of the book is that it relies heavily on naval wargaming for illustrative purposes, to the relative exclusion of air and land simulations (this tendency is probably justifiable, given that much of the development of modern wargaming in US military circles has been done by the Navy).

All in all, *The Art of Wargaming* is a dispassionate (but certainly not passionless) description of what wargaming is, what it can be, and what distinguishes it from other forms of military research and analysis. It is a lucid, entertaining, and comprehensive guide to a critically important field of military endeavor, and a work that deservedly should be termed foundational.

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A Country Made by War: From the Revolution to Vietnam—The Story of America's Rise to Power by Geoffrey Perret. New York 10022: Random House, 1989, 629 pages, \$22.50.

Often touted as controversial, Geoffrey Perret's *A Country Made by War* runs contrary to most general histories of the United States or the American military. In particular, it takes issue with a thesis first proposed 100 years ago by Emory Upton in *The Military Policy of the United States*, which held that the US usually enters into military conflicts unprepared. Through nine conflicts (the Revolutionary War,

the War of 1812, the Mexican-American War, the War Between the States, the Spanish-American War, World War I, World War II, the Korean War, and the Vietnam War) and several insurrections (the Indian wars from 1865 to 1898; the Philippine insurrection from 1899 to 1902; and the 1916 Mexican campaign against Pancho Villa), Perret presents a story of the US at war and discusses the impact of war upon the development of the US as a nation and a society. "Since 1775 no nation on Earth has had as much experience of War as the United States: nine major wars in nine generations. And in between the wars have come other armed conflicts such as the Philippine Insurgency and clashes in the Persian Gulf" (page 558).

One threat that runs throughout *A Country Made by War* is the impact of technology on US national development. In his conclusion, Perret speaks of a "dual technology"—industries that serve the needs of both the military and a developing economy. For example, Eli Whitney sought to mass-produce muskets with interchangeable parts and thus created the first generation of machine tools. The concept would be spread across the Union 60 years later in a drive to produce enough small weapons for its armies. Other innovations (e.g., aircraft and electronics) that were promoted and developed in wartime were assimilated by civil aviation, consumer electronics, and the computer industry in peacetime. Moreover, Perret shows that military procurement problems are not new to the post-World War II military-industrial complex. Whitney's first contract came in 10 years after the contract due date and was plagued by cost overruns. Perret also identifies the small things that came home from war with the demobilized troops—regular shaving and the demise of powdered wigs (the Revolutionary War); cigarettes and moustaches (the Mexican-American War); coffee without fresh milk, regular baths, and underwear (the Civil War); safety razors, wristwatches, and perfume (World War I); college education, a baby boom, consumerism, and the end of the Great Depression (World War II).

Because history is about people as well as events, Perret provides us with anecdotes intended to capture the essence of historical figures. George Washington's success is attributed to his multifaceted skills, his interest in military affairs, and his refusal to accept defeat. "The harder the going, the more determined he became to see it through to final victory. Just as

Washington would not admit a mistake, so he would not admit defeat. By some cosmic chemistry he was at his best when the war was at its worst" (page 69). In addition to presidents and generals, Perret introduces the reader to common soldiers, inventors, and government officials.

The author also addresses racial matters in times of war. "Some 5,000 blacks fought in the Revolution. When slave owners tried to reclaim their property at the end of the war they were rebuffed. Their slaves were transformed by service into free men. And hundreds of run-away slaves had been enrolled by desperate recruiters as 'free Negroes.' Now they were" (page 72). In the Civil War, 10 percent of the Union forces were black—180,000 in the Army and another 20,000 in the Navy. Black soldiers of the 9th and 10th Cavalries fought during the Indian wars and served with distinction against the Spanish in Puerto Rico, five of them Medal of Honor winners. True segregation, though, was implemented during the Spanish-American War in accordance with a basic tenet of nineteenth-century imperialism that espoused the inferiority of colored people. Thus, the US removed blacks from all combat roles and created an image that followed them for 50 years. For example, during World War I blacks served with the French rather than with the American Expeditionary Force under Gen John J. Pershing, and in both world wars, they performed a variety of menial duties. A presidential executive order called for desegregation in 1948, and the Army was successfully desegregated under Gen Matthew B. Ridgway. The role of blacks in the American military remains fertile ground for historical research.

This book is a very readable history—what editors of fiction call a "page turner" because it draws the reader into its tale of war and progress. The fact that Perret uses a writing style accessible to the general reader prevents his study from becoming an academic history intelligible only to other historians. The author eschews documentation: his "Notes" chapter at the end of the book is actually an annotated bibliography. This chapter, however, is reasonably comprehensive and provides the reader ample suggestions for further study.

Is *A Country Made by War* must reading? Perhaps. In addition to being an easy read, it presents an interesting perspective of American history—that the US was shaped by war rather than Manifest Destiny and westward expansion. Perret contends that the demobilization

after World War II followed a precedent established in the Revolutionary War, which explains the seductive whisper for a "peace dividend." Thus, by declaring the end of the cold war, Congress is seeking the demobilization of a military that has grown from its silent struggle with the Soviet Union. By making these types of connections, *A Country Made for War* helps put today's changes into historical perspective.

Capt William B. Vleck, USAF
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Screaming Eagle: Memoirs of a B-17 Group Commander by Dale O. Smith. Chapel Hill, North Carolina 27515: Algonquin Books, 1990, 272 pages, \$18.95.

Narratives of aerial combat have my library shelves groaning. Jaded by the "into the meat grinder" tales of aging warriors, I found Dale Smith's chronicle of a year spent as an Eighth Air Force group commander informative and engaging. Although *Screaming Eagle* contains its fair share of histrionics, Smith has much to say about leadership and the business of aerial combat.

The emphasis that Smith places upon fear as a by-product of anticipating combat impresses me more than the equally sincere depictions by authors such as John Muirhead, John Boeman, or William Cubbins. A decade older than these men, he came to war as an experienced pilot, inured to the hazards of ordinary flying that intimidated and killed many of his juniors. Smith understood the threat presented by the German anti-air defenses far better than did the younger men, and his fear of those weapons almost destroyed half a lifetime of military conditioning.

In November of 1943, Smith took command of the 384th Bomb Group, whose previous commander had been relieved. Regarded as a poor performer, the unit had morale problems and resented its new leader. Smith's attempts to resurrect his new command were orthodox but worthy of recounting. Commanders and military students will appreciate his institution of flying discipline, decent food, and base cleanliness. Smith admits to paranoia concerning the fact that his men—particularly his staff—remained loyal to his predecessor. He was not comfortable until he had replaced the staff with men loyal to himself. Although this practice is a common one, I do not recall reading another

account that clearly describes loyalty as a motive for remaking a staff.

In combat, the breadth of Smith's vision encompasses more than the instrument panel and immediate surroundings of his B-17. Scattered throughout the book are passages that reveal his grasp of tactics: the use of wing abreast and combat box formations, glide bombs, pyrotechnics, and fighter cover. The immediacy and detail of his recollections after 45 years is astonishing. Such scope and depth of knowledge—expected of a senior officer—help lift *Screaming Eagle* another step above other Eighth Air Force memoirs.

The principal weakness of the book is the author's reluctance to comment on the policies and actions of his superiors. Winning war through aerial bombardment remains a controversial topic, and a discussion of the Allied force's efforts to reduce *Festung Europa* by strategic bombardment could illumine that debate. Yet, Smith makes only conventional remarks about the force's unprecedented size and its utilization of inadequately trained personnel who sustained horrendous losses to achieve uncertain results. Smith's reticence on the topic I take for tacit agreement with the methods and goals of his superiors. Although a critique of the subject would have been beyond his scope during the war, he is quite capable of addressing it now.

The best accountings by military leaders make readers feel that they too can grab the reins and do a creditable job of running a command. Modern narratives of this quality include *General Kenney Reports* and Lucian Truscott, Jr.'s *Command Missions*. An observant and honest account of Dale Smith's tour as commander of the 384th Bomb Group, *Screaming Eagle* pushes close to the high standard of those two books. Perhaps the value of this memoir will be more practical than historical, concentrating as it does on issues of continuing concern to people who practice the art of military leadership.

James H. Westenhoff
Woodbridge, Virginia

Decisive Factors in Twenty Great Battles of the World by William Seymour. New York 10010: St. Martin's Press, 1989, 385 pages, \$22.95.

The status of military history has changed greatly since the days of Sir Charles Oman,

when historians could talk glibly about battles that changed the future of the world. Since then, the sociological approach to history championed by the *Annales* school has transformed our sense of what constitutes a historical turning point. The historians spawned by this movement saw change as the slow outcome of processes affecting the underlying structure of society. Like Georges Clemenceau, who regarded the fate of nations as too important to be left to generals, they refused to believe that the evolution of a civilization could be altered by the contingencies of character or circumstance manifested in a single battle or campaign. Thus, they relegated military history, along with political history, to the illusory half-world of *histoire eventimentielle*—the mere narration of events. Of course, the wars and high politics of past ages retained their popularity with ordinary readers, and recently there have been signs—even among scholars—of a renewed interest in event-oriented history.

None of these conflicting views of the historian's craft are very relevant, however, to William Seymour's new book. His concern is not necessarily with battles that may have changed the shape of history—some of those discussed most certainly did not have such far-reaching effects. As his title states, Seymour treats decisive factors that determined the outcome of 20 famous battles. A retired British officer who served in combat with the Scots Guards, Seymour believes—like most military professionals—that past conflicts have lessons that can be applied in future wars. He attempts to deduce these lessons from the battles that he examines.

The list of battles that Seymour selects for analysis is eclectic and therefore difficult to reduce to a single theme. A foot soldier, Seymour sticks to what he knows best and deals only with land conflict, but his 20 battles cover all periods in the history of warfare from Rome to Vietnam. Notable battles like Hastings and Waterloo share space with such little-known passages of arms as Hattin (Galilee) in 1187, which ended the first Crusader Kingdom of Jerusalem, and Isandhlwana (Natal, Republic of South Africa), where in 1879 Zulu tribesmen annihilated a force of British soldiers. World War II is entirely neglected, and World War I's only representative is the Battle of Tannenberg (Poland), which occurred on the Eastern Front. To match his taste for important but somewhat obscure battles, Seymour also seems to prefer studying great captains in their weaker mo-

ments. The three Napoleonic battles examined—Borodino (Soviet Union), Ligny (Belgium), and Waterloo—are all from the declining years of the emperor's career, when his powers were on the wane. In a similar fashion, the chapter on the Seven Days' Battle dwells on Stonewall Jackson's uncharacteristic indecisiveness and lethargy during the Peninsula Campaign.

What decisive factors has Seymour isolated? What lessons for military science do his 20 battles reveal? Seymour notes several sources of success in battle, none of them very original. He places surprise—both strategic and tactical—high on his list and, in the tradition of Englishmen, favors the indirect method so well celebrated by Basil Liddell Hart. He sees unexpected maneuvers on overlooked fronts as the key to success in a number of battles—Scipio's defeat of Hannibal at Zama (Tunisia), William the Conqueror's triumph in 1066, and Saladin's destruction of the Crusaders at Hattin amongst them. Morale, supply, and good lines of communications are also stressed as important. The list is banal, but Seymour ought not to be criticized too harshly for it. The short, philosophical chapter at the end is his book's pretext, not its real reason for being. Seymour loves providing short, incisive accounts of battles; at this he succeeds brilliantly.

For what it's worth, let us return in closing to our original question, even though it is not—properly speaking—Seymour's and even though the 20 battles in *Decisive Factors* are not really a fair sample. How deeply has the outcome of great battles affected the course of history? Leaving aside struggles like Isandhlwana, where the course of history obviously wasn't at stake, the answer would still have to be that sometimes they do but most often they don't. Had Richard III defeated Henry Tudor at Bosworth Field, there would never have been a Henry VIII or an Elizabeth I. The English Reformation might never have occurred. But the Yorkist monarchy, of which Richard III was the last representative, prefigured the achievements of the Tudors in concentrating royal power. Thus, the broad shape of English political and social history would probably have remained the same even if the Plantagenet line had survived. Hastings is a better candidate for having had a uniquely fundamental impact on England's future. The defeat of the Anglo-Saxon Harold replaced an insular monarchy oriented toward Scandinavia with expansionist Normans skilled at the manipulation of feudalism

to increase their power and open to Continental influences. As for Waterloo—that archetypal “turning point in history” sort of battle—it only hastened an inevitability. France was exhausted, and Napoléon was mentally and physically in decline. Had he won, a new coalition would soon have arisen to defeat him. His own untameable aggressiveness would have brought it into existence.

Let me repeat, however, that these considerations are irrelevant to the job that Seymour set out to do. His goals were more modest than assessing warfare as a factor in history, so one ought not review the book he didn't write. He set himself the task of furnishing entertainingly written narrative accounts of some battles that interested him, pointing out the ingredients—as he saw them—of victory and defeat. His efforts were victorious, and his well-written book is also a book worth reading.

Dr Lawrence J. Kilbourne
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Military Misfortunes: The Anatomy of Failure in War by Eliot A. Cohen and John Gooch. New York 10022: Free Press, 1990, 246 pages, \$22.95.

In his *Age of Reason*, Thomas Paine wrote that “the sublime and the ridiculous are so often so nearly related, that it is difficult to class them separately.” The same might be said about notions of success or failure in military operations. In their joint effort, authors Cohen and Gooch attempt to clarify this distinction, eschewing the word *failure* in favor of the more benign term *misfortune*. *Misfortune* connotes less personal culpability on the part of commanders for the outcome and thus helps defuse some of the emotion that often attends postfailure handwringing. Having made this point, the authors proceed to use *failure* almost exclusively.

Cohen and Gooch begin by reviewing a number of popular approaches for assessing military failure. Each approach is described and then dismissed in turn, including Norman Dixon's theory that all failure stems from generals who are psychologically anal-retentive. The main reason these approaches are insufficient is that each looks at too narrow a piece of the question. Military failure, especially catastrophic failure, is a complex phenomenon. Thus, the reasons for success or failure are equally com-

plex. There is seldom any one cause; rather, failure stems from the systemic nature of a military organization itself.

As Cohen and Gooch explain, operational environments for warfare can change easily, yet military thinking is by nature conservative and does not readily keep up with such changes. The problem, then, becomes either lack of vision or failure to note a key piece of information at a critical time. Whether through doctrine, training, organizational intransigence, overconfidence, or some other error in perception, the people responsible for military operations at some point overlook or ignore one or more significant aspects of the situation they confront. The result is an inappropriate decision and subsequent failure on the battlefield.

To facilitate analysis of these situations, Cohen and Gooch outline their own three-tiered typology of military misfortune. This scheme includes simple failure—the failure to anticipate, to learn from, or to adapt to changes; aggregate failure—the combination of any two simple failures; and catastrophic failure—the combination of all three simple failures. The authors discuss each type and include a corresponding “matrix of failure” that diagrams the flow of decisions by comparing various command levels with critical tasks or functions performed. Cohen and Gooch seem to think a great deal of their matrixes, using them to help clarify relationships and distill lessons learned.

They also amplify their analytical notions with some superbly balanced historical assessments. The failure of Israeli intelligence in 1973 illustrates the failure to anticipate enemy actions. Failure to learn is depicted by the US Navy's problems with antisubmarine warfare during 1942 (which led to a purported massacre of Allied shipping, as described in Dr Michael Gannon's recent *Operation Drumbeat*). The British experience at Gallipoli (Turkey) in 1915 shows an army's failure to adapt to changes in warfare. The defeat of the US Eighth Army in Korea during the 1950s provides the one example of aggregate failure, combining failure to learn with failure to anticipate. Finally, the authors use the classic capitulation of France to the Germans in 1940 to illustrate catastrophic failure. They also touch briefly on the US military experience at Pearl Harbor but mercifully do not examine the war in Southeast Asia.

Overall, the authors present a curious blend of technocrat and artist. Their typology for failures provides a useful point of departure for

analyzing military operations, but this is less the case for the matrixes. The latter are dissimilar, measure different elements, and enjoy less than two pages of description apiece. Further, since one must examine the history in some detail to develop a meaningful matrix, the potential lessons emerge ipso facto. Why, then, should the authors bother with the matrixes at all? All this raises the question, Are the matrixes designed as a result of the analysis, or are they built to justify the analysis? Either way, their utility escaped this reviewer, and they come across as mere afterthoughts.

Regardless of the intellectual engineering necessary to create the matrixes, the authors generate some sound historical conclusions. Military misfortunes/failures inevitably provide great potential for learning lessons about our craft. Although Cohen and Gooch promise a new means of historical analysis, their straightforward and comprehensive examination of specific events makes the book worth the price of admission.

Lt Col Richard L. Davis, USAF
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Lieutenant Ramsey's War by Edwin Price Ramsey and Stephen J. Rivele. Los Angeles, California 90064: Knightsbridge Publishing Co., 1991, 352 pages, \$19.95.

Lieutenant Ramsey's War is a personal account of one man's struggle against the Japanese in the Philippines during World War II. The first question that an examination of this book brings to mind is, Who is Lieutenant Ramsey? Unless readers have worked with Hughes Aircraft Company and remember him as the vice president for the Far East area, they have probably never heard of Edwin Price Ramsey. Even the majority of his fellow workers had no idea that in 1942 he led the last cavalry charge in US history. Although certainly a distinction, this fact readily draws to mind a quixotic dreamer who was totally out of touch with the mechanized realities of World War II. One would expect the story of a man with such credentials to be one of reckless abandon or nostalgic remembrances of times past. Neither is the case.

With the help of Stephen J. Rivele, Ramsey gives an account of his coming-of-age, which began in Wichita and ended 11 years later in a Topeka hospital. The reader is introduced to a brash, oversized teenager but 300 pages later

says good-bye to a 90-pound lieutenant colonel who is recovering from a nervous breakdown.

In 1934 Ramsey was a "hell-raiser, the boy over whom neighbors wagged their heads." His troubled youth seems to have been the result of a bitter relationship with his father, who had failed the family in many ways and ultimately took his own life after being jailed for domestic violence. His mother was concerned that if Edwin were left to his own devices, he would never amount to anything. Hoping to capitalize on his love for horses, she enrolled him in the Oklahoma Military Academy—one of the best cavalry schools in the country. Young Ramsey excelled there, developing a keen interest in polo. His love of the sport eventually led to his win were left to his own devices, he would posting in the Philippines, where the 26th Cavalry was home to one of the Army's best teams.

Most readers will recall seeing news clips which showed the polo match at Fort Stotsenberg, the Philippines, on 7 December 1941. The clips depict the genteel—almost detached—Army life which epitomized American naiveté on the eve of the war. They show cavalry officers on their mounts, enjoying a colonial lifestyle. Ramsey was at the match, astride his horse Bryn Awryn, playing position number three. He had no idea that the next day he would have his men load their horses onto trucks and deploy to meet the oncoming enemy. Nor did he suspect that a short while later he would lead a small troop of Philippine scouts in a desperate charge against advancing Japanese infantry, earning him the Silver Star. Some would say he was an anachronism, while others would call him the last cavalier. The distinction proves to be irrelevant.

When Bataan surrendered, Ramsey was deep in the jungle on patrol. As he and his men made their way back south, they ran into stragglers who told them of the surrender and the infamous death march. Ramsey's unit found themselves alone, starving, and surrounded; rather than surrender, though, they decided to continue the struggle. The resultant three-year struggle against the Japanese, disease, and treachery is recounted as *Lieutenant Ramsey's War*.

Because the book is a personal account and is not meant to provide historical reference, the reader must overlook the simplistic treatment of strategies and campaigns. The only true shortcoming is that the writing lacks vitality and is at times wooden. However, it does succeed in removing Ramsey from the shadows of history. Indeed, one walks away from this book

feeling that it should become a movie. Only later does it become obvious that no Hollywood hero would be allowed to suffer the self-doubts and uncertainties which plagued Ramsey. Nor could he do justice to the triumph of human spirit which makes Ramsey a true hero. *Lieutenant Ramsey's War* is well worth the few hours needed to read it.

Lt Col Thomas M. Kearney, USAF
Washington, D.C.

The Elephant and the Tiger: The Full Story of the Vietnam War by Wilbur H. Morrison. New York 10016: Hippocrene Books, 1990. 703 pages, \$24.95.

Using the analogy that the powerful elephant (the United States) was no match for the elusive and cunning hit-and-run tactics of the tiger (North Vietnam), Wilbur H. Morrison argues unconvincingly that inept military and political leadership in the United States was responsible for the loss of the war in Vietnam. The author does correctly identify policy decisions that weakened the ability of the US to wage war and achieve victory. He criticizes President Lyndon Johnson for ignoring the advice of his Joint Chiefs of Staff to mount a massive air campaign against the lucrative targets of Hanoi. American generals should have resigned in protest, Morrison suggests. US military leaders also should have insisted that a centralized command be established so the US could control and coordinate combat operations of South Vietnamese forces. Finally, the US miscalculated by supporting the corrupt South Vietnamese regimes, a decision that contributed to the poor leadership in the Army of the Republic of Vietnam (ARVN).

What is frustrating about this book is the conflicting evidence and twisted logic that lead to a flawed thesis. Throughout, the author makes abundant references to the ARVN soldiers as "determined" fighters who "man for man were vastly superior to their adversaries." Yet, US military leaders routinely complained about the ARVN's lack of inspiration and reluctance to fight. The ARVN seemed more content to defend the nation's population centers than to sustain aggressive offensive operations in the field and destroy the enemy army. The South Vietnamese air force—ineffective in close air operations—avoided flying at night or on weekends, a practice that did little to raise morale or

to improve the chance for combat success. The South Vietnamese navy had virtually no effect on the outcome of the war.

Other factors influenced the poor performance of the ARVN. Desertion rates remained high (around 10 percent) throughout the war; draft dodging was extensive; and because of political favoritism, there was—in most cases—inadequate leadership at the highest levels of command, contributing to the low morale of the troops. A massive program to train ARVN soldiers beginning in 1965 produced mixed results at best.

In comparison with the North Vietnamese Army (NVA), the ARVN seemed to hold every advantage—specifically, extensive US aid in arms, equipment, money, and combat ground troops. Even when President Richard Nixon relinquished combat responsibilities and withdrew US ground forces as part of the start of Vietnamization in 1969, ARVN soldiers still outnumbered the NVA in the south by a two-to-one margin. In addition, the North had no air force in the South yet had to contend with tactical and strategic strikes by US pilots.

Morrison seems to change course at the end of his book by confirming that "despite incredible losses in men and material, the North Vietnamese emerged victorious. They did so because their leaders refused to admit defeat and inspired their soldiers to fight on, often against impossible odds." But he fails to adequately answer the fundamental question: If the ARVN fought so well, why were they unable to consistently defeat the enemy on the battlefield? That is, why was the will to win so much greater with the NVA? Despite suffering significantly more combat deaths (1 million, compared to 250,000 for the South), the North remained deeply committed to a protracted war and victory.

There were bright spots in the ARVN's performance, especially the airborne and ranger units who fought valiantly during Tet and the Easter offensive of 1972. However, these were exceptions to the norm of a long series of defeats over an extended period.

Other aspects of this book are troublesome. Although the author states that he read over 10 million words and consulted numerous detailed reports, he shares none of this information with the reader—there are no footnotes. The most recently published book in the bibliography is dated 1983; thus, Morrison leaves out more recent and important interpretations by such writers as Gen Bruce Palmer, Jr., Lt Col

Andrew F. Krepinevich, Jr., and Lt Gen Phillip B. Davidson. Morrison's claim that almost half of US veterans who served in Vietnam were exposed to moderate-to-heavy combat would be quickly challenged by infantrymen who fought in that conflict.

This is a provocative, well-written, and interesting book that is worth reading, if only to become familiar with an apologist's view of the South Vietnamese. Morrison has the facts right in this lengthy work, but his conclusions do not follow. The US did not lose the war in Vietnam. Although many factors contributed to defeat in that country, the failure of ARVN combat operations in the field was the primary reason North Vietnamese tanks rolled into Saigon in April 1975.

Dr Robert W. Duffner
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Secrets of the Vietnam War by Lt Gen Phillip B. Davidson, USA, Retired. Novato, California 94949: Presidio Press, 1990, 193 pages, \$18.95.

Put yourself in the shoes of the military commander who, believing the adage History Repeats Itself, reads and studies in hopes of never being surprised by the enemy's secret intentions. The latter comprise Lt Gen Phillip B. Davidson's *Secrets of the Vietnam War*. Perhaps those aren't the secrets one would expect from Gen William C. Westmoreland's top intelligence officer (from May 1967 to May 1969), and in more ways than that, the title of his book is misleading. *Secrets of the Vietnam War* is actually the epilogue of Davidson's 1988 *Vietnam at War*, in that it reads very much like what the author really intended as the wrap-up to that mammoth effort. In fact, the chapter "How We Lost the War" is nearly identical to a chapter in *Vietnam at War* titled "Why We Lost the War."

Two-thirds of *Secrets of the Vietnam War* is excellent and pertinent. General Davidson is a superb writer and has succeeded in drafting a very readable, useful, methodical analysis of Ho Chi Minh's revolutionary strategy, as well as an account of how the US leadership at all levels misinterpreted and badly countered that strategy. He follows that portion with an insightful treatment of why we lost the war and (most important for today's warriors and leaders) what we could have done to win it. The remaining one-third consists of two chapters dealing with General Westmoreland's legal

battle with Columbia Broadcasting System (CBS) over its coverage of his reports on troop strength and casualties. With the predictable bias of a longtime friend, Davidson comes to Westmoreland's defense. Although convincing, his argument would have been better suited to a magazine article. It does not belong in a treatise on lessons of Vietnam.

According to General Davidson, the great secret which ultimately led to the United States' losing the strategic war—despite winning the tactical battles—was the inability of all levels of leadership to recognize the North Vietnamese strategy of revolutionary war. We failed to apply the lessons that should have been apparent from a decade of French defeat in Southeast Asia. Our leaders, both military and political, keyed on ethnocentric Western measures of merit (troop strength, body count, etc.) instead of properly analyzing and countering the phases of the revolution.

Along the way, Davidson introduces a list of myths, the belief in which led to US impotence. With the help of President Lyndon Johnson, at least two of the myths aspired to the status of truth and are very instructive in light of Iraq's 1990 invasion of Kuwait. First, President Johnson incorrectly likened Communist aggression in the post-World War II era to Hitler's aggression in Europe prior to World War II. (Present-day political leaders have invoked Hitler on more than one occasion.) Second, there was a prevalent feeling that air power alone could win the Vietnam War. Davidson cites this myth as the reason for Johnson's piecemeal deployment of ground troops to the war. He acknowledges that the premise of air supremacy was never really tested because of the lack of commitment to the air power effort. (Apparently, our current leaders—despite latching on to the hope that air power can "do it all"—have also listened to strategists and have massed an overwhelming ground force to deal with reality.)

At the very least, military and political leaders should read the final two chapters of *Secrets of the Vietnam War*. In just 40 gripping pages, Davidson convincingly tells how we lost the war in Vietnam and what we could have done to win it. He places the lion's share of the blame directly on the president's shoulders: "The brutal truth is that Johnson fought the Vietnam War as a secondary adjunct to his domestic political aims. . . . The great strength of the United States lay in our massive military power. The American weakness was in our in-

ability to sustain a long, indecisive war. . . . Realities dictated that the United States wage a short, savage war, using the maximum force necessary."

Secrets of the Vietnam War is must reading for students of the Westmoreland/CBS saga. Its information and perspective on that issue are found nowhere else. For military and political leaders who want a brief, incisive analysis of how we lost the war and why, there are few treatments better than Davidson's.

Maj Rick Taylor, USAF
Washington, D.C.

To Inherit the Skies: From Spitfire to Tornado: Britain's Air Defence Today by R. A. Mason.
London: Brassey's, 1990, 102 pages, \$12.95.

Fifty years after what Air Vice-Marshal Tony Mason and many others call the "greatest air battle of this century and one of the most decisive events of the Second World War," the publication of *To Inherit the Skies* is a most appropriate celebration of Britain's victory over Germany in the Battle of Britain. It is an insightful look into the "inheritors" of that spirit and tradition begun a half century ago—the No. 11 Group of the Royal Air Force (RAF). Air Vice-Marshal Mason not only describes the sophisticated aircraft, equipment, and rigorous training of today's modern RAF, but also continually compares the RAF of 1940 to the RAF of 1990. Although there are incredible contrasts in technology, tactics, and missions, he emphatically shows that the quality and dedication of the present RAF's men and women are unsurpassed, as they were 50 years ago when Winston Churchill said, "Never in the field of human conflict was so much owed by so many to so few."

Mason begins his book by noting that the most obvious changes in today's RAF are due to the current overall strategic environment. Reasons for these differences today include the presence of NATO, changes in the threat to the United Kingdom, and the improved range, endurance, and weaponry of today's aircraft. Chapter 2, "The Making of the Fighter Crew," follows the current training of RAF aviators from the Initial Officers' Training Course through a flying training squadron and a tactical weapons unit to an operational conversion unit. Particularly insightful are Mason's interviews with combat pilots and his discussion of a primary lesson learned from the Battle of Britain: "Never again would novices be put into battle against hardened veterans."

Chapter 3, "The Front Line Squadrons," looks at the men, women, aircraft, equipment, and mission of the nine frontline squadrons of the RAF today. Chapter 4, "Squadron Leadership," portrays the senior officers of a fighter squadron of the RAF, including the squadron commander, the qualified-weapons instructor, the flight commander, and the squadron instrument-rating officer. Chapter 5, "Flying Support," describes the three types of crucial complementary flying activities of a successful RAF: electronic-warfare squadrons with the Canberra T17, in-flight refueling squadrons with the VC10 K tankers, and airborne early warning squadrons with the E-3D Sentry. Chapter 6, "Groundwork," reviews the critical importance to the RAF of ground control (radars, communications, and data links), surface-to-air defenses, maintenance, security, engineering, supply, and simulator training. The final chapter, "United We Stand," contains interesting profiles and interviews of numerous exchange pilots from other nations flying with the RAF today.

Air Vice-Marshal Mason's *To Inherit the Skies* is a wonderfully researched and detailed look at the Royal Air Force today, but—even more—it is historical. For every part of the RAF examined in this book, Mason takes the reader back to the RAF of 1940, not only depicting those times and comparing them to today, but discussing lessons learned and conveying the strong tradition and heritage felt by current Royal Air Force members.

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Bouncing Back: How a Heroic Band of POWs Survived Vietnam by Geoffrey Norman.
Boston 02107: Houghton Mifflin Co., 1990, 248 pages, \$19.95.

The Zoo, the Plantation, Dogpatch, Camp Unity, and the infamous Hanoi Hilton were locations where American servicemen spent years of their lives in oftentimes excruciatingly painful deprivation and confinement. Upon their return to freedom many were asked repeatedly, "How does it make you feel to know that you wasted all those years?" Most of them, however, have been able to respond with the amazing proclamation that "those years weren't wasted; we lived hard all the time." Norman's book offers insight into just how these brave souls lived hard, draining the maximum possible essence from each breath.

As the war recedes in our experiential memory, it is good for us to read works such as *Bouncing Back*. When some younger servicemen and women question the reason for our annual POW/MIA remembrance ceremonies, it would be helpful to share with them a small taste of what these patriots suffered for weeks, months, and years as the cost of defending freedom. Many were sustained through the thousands of days by the belief that the war could not last "more than six months longer."

This conviction was based upon several sources of information. Most of the POWs heard broadcasts of Hanoi Hannah. In addition, various prisoners were forced to read "local news" reports over the camp's loudspeakers (replete, as a form of resistance, with intentional mispronunciations and grammatical errors). The most accurate source of news came from recently downed pilots.

This is not the account of all POWs but essentially of pilots downed over North Vietnam itself. Even more narrowly, it is the account of Lt Comdr Al Stafford and those men he grew closest to during his confinement. It begins on board the USS *Oriskany* as Stafford awakes on the morning of his final A-4 bombing mission. During the course of the story, we are introduced to various other prisoners and hear portions of their stories. Still, it is Stafford that we follow throughout his captivity to the eventual reconstruction of his damaged life. Thus, the book reads much more like a novel than a study of the lives of POWs in general.

The title points to the overriding theme of the volume—the evolution of the military doctrine of survival known as "bouncing back." As a result of the horrendous treatment of POWs during the Korean War, the services developed a code of conduct for POWs. Still, those people imprisoned by the North Vietnamese found the code's resources inadequate, for they were not even regarded as prisoners of war but as war criminals and were treated accordingly. Bouncing back was forged in this torturous furnace. It affirmed, in essence, that even after you had been broken and had violated the code by cooperating in some fashion with your captors, your goal was now to regain your strength and will to resist tomorrow. You would bounce back from this failure and strive to your utmost to win the next round.

Bouncing Back is filled with numerous episodes that open a window through which outsiders can view life in these camps: a man deprived of water so long that he would eagerly "lick the floor where the tiles joined, hoping

that some water had accumulated there"; men buried under the shame of having been broken, confessing their failure to the first American they encountered, only to be overwhelmed with relief when they learned they were not alone; and prisoners exercising with the only thing available to lift—"buckets full of human waste."

One message coming through clearly is that humor can sustain people even under the most vicious of circumstances. Prisoners laboriously communicated sophisticated puns called "Aesop's Feebles" from cell to cell in order to challenge each other's minds and lift spirits. Often taking days to tap out these puns letter by letter, the POWs inevitably produced some corny twisting of a familiar proverb or saying. These "feebles" required concentration to create, and even the poorest of them could at least raise a smirk of disgust.

Humor possesses a healing power as well. After being "interrogated" over a period of days, a "bloody and uncomprehending" prisoner was returned to his cell. Knowing that rebounding quickly from such experiences was especially critical, his neighbors tapped out to him the following, albeit somewhat crass, thought: "Research proves that ninety-nine prcnt of POWs jack off. We need your help to make it one-hundred prcnt." After the war, he would declare that this timely message had helped save his sanity, if not his life.

A similarly spirited message was relayed across the camp to celebrate a special event and offer some of the encouragement unique to humor when Stafford reached to the back of his throat and removed a six-inch parasite which had begun to cut off his breathing: "Congratulations to Lt Comdr Al Stafford who gave birth at 1630 hrs to a six-inch, five-ounce worm. Both Stafford and worm doing fine."

Few military members will be able to read the book without asking, subconsciously at least, Could I make it through such traumatic circumstances? Hopefully, that question will remain academic for all of us. But should such a day come, the lessons learned by these men and offered to us in books such as this could aid immeasurably—not only in promoting our survival, but even our personal growth during the trials themselves.

The author, a former editor of *Esquire*, writes with an emotion that suggests a personal exposure—through Stafford and others—to the horrors of life for the American POW in Vietnam. Some readers may be distracted by a subtle bias toward pilots (e.g., at the expense of

"mere backseaters"). Likewise, some generalizations (e.g., "like most pilots he had no gift for introspection") may not be helpful. Nevertheless, the book remains well worth reading.

The work is more than simply a biography. It touches on varied issues relating to broader subjects: the classes they taught one another on subjects as diverse as sailing and wine appreciation; the medical and psychological studies of returning POWs which found, among other things, an "increase in their IQ scores"; the arbitrary treatment of POWs and the efforts of senior officers to direct their subordinates to refuse any special treatment; and the actions of (unnamed) collaborators who seized opportunities to return to the States with delegations of antiwar activists such as Daniel Berrigan and Tom Hayden. The book offers a wealth of insight into numerous similar matters.

The volume is appropriately dedicated to the men of the Fourth Allied POW Air Wing "who endured and prevailed." They provide a superb example, worthy of study and reflection, for all of us serving in our nation's armed forces today.

Chaplain, Capt. Robert Stroud, USAF
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Reserve Forces and the British Territorial Army: A Case Study for NATO in the 1990s
by Wallace E. Walker. London: Tri-Service Press, 1990, 203 pages.

At the Battle of the Chippawa during the War of 1812, a brigade of regulars under the command of Winfield Scott met a contingent of professional British soldiers. The British commander, believing that Scott's army was comprised mainly of militia, pushed for an engagement. What was at first thought to be an easy British victory turned into a rout for the Americans. The English commander found out too late that the Americans were well-trained regulars—not the ill-equipped and poorly disciplined militia.

The dichotomy between regular army and the militia (volunteer civilian army) is at the heart of a shared Anglo-American military heritage. This heritage can be described from two different perspectives. From an active duty point of view, volunteer armies are neither reliable, efficient, nor professional. The public, on the other hand, views these volunteer soldiers as rooted in democratic values and as pillars of civilized societies. While professional armies

are treated as necessary evils, volunteers are seen as quintessential soldiers—protecting home, family, and culture.

Wallace Walker, US Army colonel and professor of public policy at West Point, has written a well-polished work on the current state of Britain's territorial army (TA—the equivalent of the US National Guard). In his *Reserve Forces and the British Territorial Army*, he rightly argues that in order to make qualified judgments about the TA's future, policymakers must understand both its history and corporate culture. Moreover, other institutions such as the government, various political coalitions, and the regular army also must be studied to see how their traditions and beliefs affect their judgment of the TA system.

The first two chapters are scant overviews which narrate the British civilian-military tradition from 1016 A.D. and describe the various public agencies which interact with the TA. His conclusions are not surprising. Politicians at the local level are more interested in the TA than are any of the political parties or the houses of Parliament. This generalization can best be understood in light of chapter 3, "Combat Clans," which categorizes the territorial army as a loose confederation of localized regimental-size groups who are attracted to serve out of a volunteer ethic. These groups are self-contained, self-regulated, and obtain a degree of self-consciousness.

Entrance into these clans resembles primitive joining rituals, requiring extensive preparation in understanding the group's historical antecedents and mythical traditions. Those who fail these "rites of passage" are usually exorcised by the group and are reflected in the TA's low retention rate. Those who remain, however, identify only with the local clan and usually do not view themselves as part of a larger territorial army.

Later chapters demonstrate how this "unit identity" is not well understood by regulars, who usually command local companies and make manpower policies at the higher staff levels. When factoring the territorial army into a total-force concept, officials see the TA as a unified military body ready for deployment as part of a NATO force or for home defense. This, according to Walker, is a critical mistake. The nearsightedness of territorials, combined with their equipment and training deficiencies, makes them more useful for home defense rather than for inclusion as an important leg of an advanced multinational defense force.

British politicians and the regular force must come to grips with the TA's inadequacies and realistically address them. The first place to start, according to the author, is to redefine the territorial army's mission. The second is to institutionalize, centralize, and standardize territorial policy and culture. Using the US National Guard as an example, Walker advocates full-time territorial officers, more professional education, high-level representation at the general-staff level, more training time, sophisticated equipment, and increased pay and benefits. Unless these things are done, he warns, the territorial army is—and will continue to be—a hollow one.

At times, the book is redundant and overly rhetorical. Walker is good at pointing out paradoxes and ironies but rarely adequate at explaining them. Additionally, the bulk of his analysis is predicated upon more than 80 telephone interviews with various political and military officials, whom he does not name. I am left wondering if Walker wants his readers to take his word on their representativeness and credibility. Scholarship demands more. These caveats aside, this timely book deserves reading by a broad array of staff officers and future commanders because it not only has important implications for all reserve forces, but also teaches the value of placing military institutions within their political, economic, and social milieu.

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Dirty Little Secrets: Military Information You're Not Supposed to Know About by James F. Dunnigan and Albert A. Nofi. New York 10016: William Morrow and Co., 1990, 464 pages, \$19.95.

An old adage states, rather bluntly, that knowledge is power. In the military, knowledge is often the difference between the success or failure of an operation. Unsurprisingly, then, military organizations throughout the world go to great pains to safeguard information that would allow any potential adversary an advantage in a conflict. The United States military, for example, expends enormous resources to obtain knowledge of the capabilities and capacities of potential opponents and to simultaneously ensure that its secrets are denied to any unfriendly powers. In an open democratic society like that of the United States, secrets are anathema, yet military necessity requires them.

Several years ago a war-gaming company was designing a "conflict simulation" of modern mechanized warfare in Europe between NATO and Warsaw Pact armies. Information on the Warsaw Pact armies was relatively easy to obtain. Documents released by the US military gave a great deal of detailed, in-depth information on Soviet armor, air support, fire support, and so on. Information on US forces in Europe, however, was less forthcoming. Most of the information provided by official sources was rather vague and fuzzy. A chance visit to the bookstore run by the Soviet Union in New York City and the purchase of several books published by the Soviet Union on NATO military forces provided the war gamers with the detailed information they desired. Interestingly, the information in the Soviet sources on the Warsaw Pact forces was just as vague as NATO's had been about NATO.

The desire to be knowledgeable about the military—given recent world events—has escalated in recent months. In *Dirty Little Secrets*, authors Jim Dunnigan and Al Nofi provide the general public with the "info-bite"—the literary equivalent of television's "sound-bite." Using only those open sources available to the public and drawing upon the expertise developed over decades of designing war games ("conflict simulations"), the authors have assembled over 900 info-bites of military information—the "dirty little secrets" alluded to in the title.

Using seven topic areas (ground forces, air forces, naval forces, high technology, logistics, human factors, and war and society), Dunnigan and Nofi marshal a wide variety of fascinating info-bites—ranging from quotations to facts and (often pithy) opinions—into a manageable framework. The following are examples of the "secrets" found in these info-bites:

- There are 836 tanks per million people in Israel, 255 per million in Iraq, and 67 per million in the United States.
- "The best tank terrain is that without anti-tank obstacles" (Soviet military doctrine).
- "Modern air power has made the battlefield irrelevant" (John Slessor). "Nobody has yet found a way of bombing that can prevent foot soldiers from walking" (Walter Lippmann).
- Only 5 percent of the aircraft downed during the 1979-88 Iran-Iraq war were victims of engagements with other aircraft.
- In Israel, 12.1 percent of the population serves the armed forces in some capacity; in Switzerland, 9.8 percent; in Sweden, 8.2 per-

cent; in the United States, 0.9 percent; and in the world, 0.6 percent.

- The Swiss army still maintains over 20,000 carrier pigeons to back up its electronic communications systems—"they're cheap." "If you load a mud foot down with a lot of gadgets that he has to watch, somebody a lot more simply equipped—say with a stone ax—will sneak up and bash his head in while he is trying to read a vernier" (Robert A. Heinlein).

- In 1986, one decoration (counting only the Distinguished Service Medal, the Legion of Merit, the Meritorious Service Medal, and the appropriate service's Commendation Medal) was awarded by the US Air Force to every 7.6 men and women under arms, to every 7.9 by the Army, to every 60.1 by the Navy, and to every 86.7 by the Marine Corps. "Give me enough ribbon and I'll give you an army of heroes" (Napoleon Bonaparte).

While providing many amusing anecdotes and quotations, the authors also include some thoughtful insight into many contemporary military problems and are quick to comment or give an opinion about a particular subject: They propose using the B-1B as an aerial mining platform; several info-bites suggest possible future military roles for Japan and, as a whole, paint a picture somewhat at odds with the usual image of Japan as a nonparticipant; and the use of Freon—a chlorofluorocarbon—in new Army field laundries to assist with the decontamination of uniforms in a chemical environment elicits tongue-in-cheek praise for the Army's concern for the environment.

A caution: soldiers and marines *do not* carry umbrellas in their left hands, leaving their right hands free for saluting, because soldiers and marines *do not* carry umbrellas. The Army will allow soldiers to carry umbrellas when the Marine Corps allows marines to carry umbrellas, and vice versa. The end result: soldiers and marines will probably *never* carry umbrellas. How did Dunnigan and Nofi miss that one?

Maj Hubert D. Capps, US Army
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The Airmen: The Story of American Fliers in World War II by Edwin P. Hoyt. New York 10011: McGraw-Hill Publishing Co., 1990, 418 pages, \$22.50.

As the men who fought World War II grow older and as more of them pass away, the desire to record their individual stories grows. The

history of battles and campaigns from World War II is fairly well documented. Most of the recent books on that war have been of the "there I was" variety of personal reminiscences. *The Airmen* is a compilation of these stories by Edwin P. Hoyt, a respected and prolific writer who has concentrated on the human side of war. This book consists of short chapters that take the reader through the military life of World War II fliers from shortly before the war began for the United States; through their training, early attempts to enter the war, and combat; to the end of the war.

This is not an oral history, although it has that flavor. Many of the stories are republished from unit histories—which are published in small numbers and not well known or easily available to the public—such as *The 390th Bomb Group Anthology* or from unpublished manuscripts. Still others are reprinted from more well known works. The serious military historian may consider this a drawback, but the reader who simply wants to capture the flavor of combat life for airmen during this time will find an excellent variety of experiences from fighter pilots in combat as well as from airmen who never left the continental United States.

Hoyt is especially noted for his work on the war in the Pacific, and that emphasis dominates the better-known and more-often-recorded stories of the air war in Europe. Hoyt's accounts of the Pacific air war are the real highlights of this book. They are more detailed, better written, and less likely to be tales repeated from other sources. They shed a good deal of light on an often-forgotten part of World War II. European enthusiasts should not despair, though, because the book includes some well-told accounts of that theater of operations as well. Especially noteworthy are stories of the 100th Bomb Group—the "Bloody Hundredth"—and of life as a prisoner of war.

The short-story style of this book makes it a convenient work to read in spare moments. As with most anthologies, the quality of writing varies from chapter to chapter. Most are interesting and exciting accounts of air combat, although a few chapters could have been shortened without taking anything away from the value of the book. The World War II-era airmen have been the basis for the traditions and heritage that have developed within the United States Air Force. It seems appropriate that we should be familiar with their exploits as a way of understanding where we came from as a service and as airmen. The time available to

capture that heritage is rapidly passing. *The Airmen* assists us in fulfilling that mission.

Lt Col Michael A. Kirtland, USAF
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The First Air War, 1914-1918 by Lee B. Kennett. New York 10022: Free Press, 1991, 275 pages, \$24.95.

Professor Lee Kennett's very readable book on World War I aviation is intended to provide the reader with a balanced view of the use of aviation in several roles on several fronts rather than limiting itself to the "usual" aerial duels of the Western Front. That is, it tries to avoid being another account of "Snoopy and the Red Baron" and almost succeeds.

The book undervalues Russian strategic aviation (by Sikorsky and others) and examines (but understates) the tremendous documentation on life in two-seater (reconnaissance and attack) units. Furthermore, any commentator on military subjects who derides a fellow author for a "mysterious quality" called *situational awareness* seriously damages his own credibility with the military reader, who knows that this mysterious quality is the origin of knowledgeable tactical decision making.

A problem with Professor Kennett's work is that he is too much the academic historian, overly concerned with his source material. He praises (rightly) the Gorell Collection of World War I US Air Service documentation in the National Archives but demeans the four-volume summary of it released by the Office of Air Force History.

This sort of thing, as well as Kennett's lack of understanding of situational awareness, forces the professional military reader to be wary of his claims and conclusions. Even though the book is enjoyable and even though this reviewer might independently agree with most of the author's theses, these and other problems detract from the study's readability and degrade the solid credibility one hopes for. For example, Kennett comments that thousands more people claimed membership in the Lafayette Escadrille than could ever legitimately have served in it; he even gives the figures. Those figures make legitimate historians of World War I aviation cringe, for they show that he has confused the Lafayette Flying Corps (almost all of the Americans who flew for France before US entry into the war) with the Lafayette Escadrille (the single original squadron from which the

Lafayette Flying Corps grew). Admittedly, Kennett was quoting another author at that point—but neither of them had bothered to do his homework! For many recreational readers, these points will be only minor blemishes on a readable work. But this review addresses a professional military audience, and Professor Kennett claims to be a military historian.

I reviewed Professor Kennett's earlier book on the evolution of strategic air doctrine for *National Defense* magazine. Similarly enjoyable, this study covered much of the same period. The previous book's greatest shortcoming was an incorrect assessment of the limitations imposed by the time needed for technological development to match brilliant conceptions. That point is critical to the military acquisition community but has less effect on other military readers. Again, the earlier work is commendable for its pleasant readability.

While engaged in air museum management, I was much aware of a continuing and bitter duel between academic historians and aviation historians. Both of Professor Kennett's books suffer from attempting to straddle these two camps. He has followed the criteria of academia in endnotes, citations, and even in discussions of source material. Further, he has attempted to follow the dictates of the better aviation historians in seeking to place World War I aviation in its proper perspective. Despite his many invaluable insights and sound conclusions, I lost faith in his accuracy and judgement.

As an aeronautical engineer and military officer, I have been attempting for over 30 years to apply the lessons of earlier conflicts to the development of air weaponry for future generations. In that pursuit, historical works like Kennett's have been invaluable. *The First Air War* is an enjoyable book to read—it simply falls short of what its author intended and is capable of.

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Air Guard: America's Flying Militia by George Hall. Novato, California 94949: Presidio Press, 1990, 130 pages, \$12.95.

The total-force concept is now more than 17 years old, but there is still confusion in some military circles about the operation of the Air National Guard. George Hall has cut through the "fog of war" and uncertainty about this component of air reserve forces, which com-

prises the fifth-largest air force in the world. He begins the narrative by stating that the Air Guard is the least understood component of the Air Force. Given the size and missions of the Air National Guard under total force, this lack of understanding may be the best reason for readers to have *Air Guard* on their shelves.

The publication of this book comes at a time in military history when the roles and missions of the Air National Guard are changing. As military budgets shrink and the drawdown overseas continues, the reserve components will inevitably take on more responsibility for defense. At the same time, the smaller active forces will find themselves working ever more closely with these reserve forces to accomplish the missions. To this end both active and reserve components must have a mutual understanding of the capabilities which each possesses.

Air Guard succeeds in exposing the reader to operations of the Air Guard, along with some of its history and total-force philosophy. The author begins with a glossary of terms that are very helpful to a reader who is unfamiliar with the vernacular of military aviation. The list of acronyms includes a couple of rather colorful and perhaps objectionable definitions, but they do not detract from the overall quality of the book. This chapter is followed by a brief general history of the National Guard that begins to dispel one of the long-standing myths about this organization—that "National Guardsmen are perceived as a group of misfit Gomer Pyles out playing Army on the weekends." The author cites—as an example of the Air Guard's expertise and professionalism—a situation he observed during a Red Flag exercise. The example involves a group of obviously older Air Guard F-4 Phantom pilots who "beat the pants off" younger active duty fighter pilots flying more modern F-15 Eagles and F/A-18 Hornets. The author goes on to quote a young Marine Hornet pilot: "These guys have forgotten more about ACM [air combat maneuvering] than we're ever

going to learn. They're awesome." George Hall's unbridled enthusiasm for the Air Guard is apparent throughout this book.

The heart of the book covers the various aircraft flown by the 91 flying units of the Air National Guard and acknowledges the vital contribution of all members of this organization. The aircraft and crews may be the point of the sword, but the men and women who provide all the support services are the hilt—without which the point would be useless (my analogy, not his). George Hall covers the aircraft by nicknames somewhat related to missions rather than by specific type or mission. These categories include the "teen fighters" like the F-16 and F-15; "mud movers" such as the A-10 and A-7; "phabulous Phantoms," "Herks," and "Heavies" like the KC-135, C-141, and the C-5. Each aircraft in the Guard inventory is described by its mission tasking, as well as the ample personal testimony of the people who operate, maintain, and support these aircraft.

This book is for people who love aircraft and for professionals who are—or will be—strategists in the coming decade. It is a primer for people who need to know the capabilities of the reserve air force that will be working more closely with the active forces in the future. The writing is accurate and enthusiastic, and the photography is outstanding. One must, however, add a caveat to the content of the book. Some of the author's anecdotes about individuals and individual units are not totally accurate with respect to current Air National Guard policy or procedure—specifically, the "wild and crazy guardsmen" who took the Soviet pilot for a ride in their F-4. This incident is in direct contrast to the professionalism discussed in the rest of the book.

Air Guard is a useful addition to the bookshelves of people who will be managing and planning operational Air Force missions of the next decade. It is also invaluable for the shelves of such organizations as recruiting detachments and unit history offices.

Lt Col William I. Smith, ANG
Maxwell AFB, Alabama

Notices of upcoming conferences, seminars, and other professional events of a noncommercial nature should be sent to the Editor, Airpower Journal, Walker Hall, Bldg. 1400, Maxwell AFB AL 36112-5532. We reserve the right to edit material for length and editorial content.

Air University Review Index

The Air University Press has published a complete index of the *Air University Review* (1947-87). This reference work contains an author index, a title index, and a cross-referenced subject index. Any Air Force or other government organization, college or university library, or similar organization with a need for this index can be placed on distribution. Requests for distribution and other inquiries should be addressed to Capt John Doherty, AUCADRE/RI, Walker Hall, Bldg. 1400, Maxwell AFB AL 36112-5532. Captain Doherty can also be contacted at DSN 493-6629 or (205) 953-6629.

USAFA Instructor Opportunities

The Military Studies Division at the United States Air Force Academy is seeking highly qualified captains for instructor duty in the summer of 1991 and beyond. 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 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 Bob Angwin, Headquarters USAFA/CWIS, USAF Academy CO 80840-5421 or call DSN 259-3257/3248.

Uniformed Services Medical School Training

The Uniformed Services University of the Health Sciences is seeking students for its medical training and graduate medical-education programs. Medical students are commissioned as ensigns or second lieutenants and draw full military pay and benefits. There is no tuition, and all books and equipment are provided. At graduation, students are promoted to naval lieutenant or captain and have a seven-year service obligation. Both civilians and military personnel with a college degree may apply for the four-year medical program. Applicants must be no older than 27 (or 33 with prior military experience) when they enter school. The university also has a graduate program in basic medical sciences open to civilians and military. Civilians are not commissioned into the military. Graduate students serve as teaching and research assistants. For more information, contact the Office of Admissions, Attn: PAC, Uniformed Services University, 4301 Jones Bridge Road, Bethesda MD 20814-4799 or call (202) 295-3106.

Historical Research Center Grants

The United States Air Force Historical Research Center (USAFHRC) announces the availability of research grants to encourage scholars to study the history of air power through the use of the center's US Air Force historical docu-

ment collection, located at Maxwell AFB, Alabama. Applicants must have a graduate degree in history or related fields, or equivalent scholarly accomplishments. Their specialty should be in aeronautics, astronautics, or other military-related areas. Topics may include—but are not restricted to—Air Force history, military operations, education, training, administration, strategy, tactics, logistics, weaponry, technology, organization, policy, activities, and institutions. Preference will be given to those proposals that involve the use of primary sources held at the center. Residents of Maxwell AFB are not eligible. Applicants may request an application from the commander, USAF Historical Research Center, Maxwell AFB AL

36112-6678. The deadline for receipt of the completed application is 31 October 1991.

F-4 Fighter Memorial

The commander of the 633d Air Base Wing is seeking information regarding the F-4 Phantom aircraft and its historical involvement with Andersen AFB, Guam, during and after the Vietnam conflict. The gathering of information on the aircraft is part of the wing's effort to build an F-4 memorial. Information, documents, and photographs should be forwarded to Capt James Folan, 633d ABW/HO, APO San Francisco CA 96334-5000. All items will be copied and returned.

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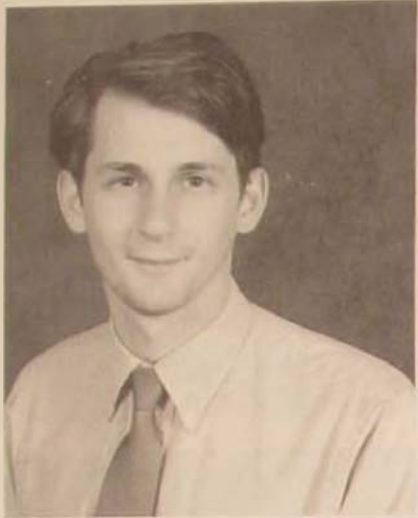
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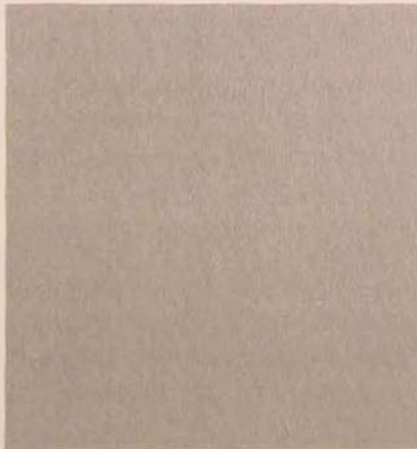


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