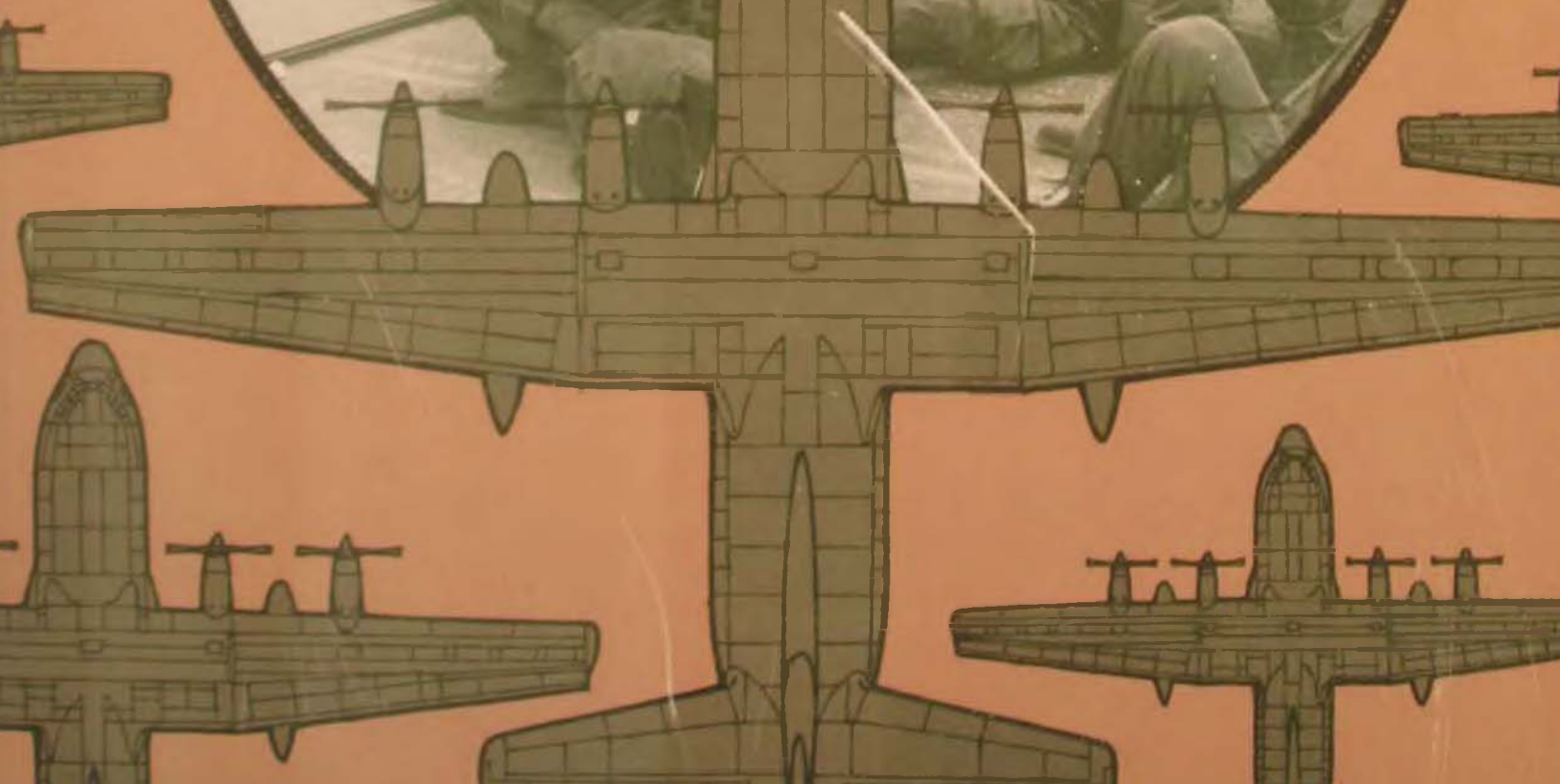




# AIRPOWER

Winter 1988

## JOURNAL



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# **AIRPOWER**

## **JOURNAL**

WINTER 1988, Vol. II, No. 4

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# EDITORIAL

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## Staying In Touch

WITH this issue, *Airpower Journal* is again closing out a publishing year. As once before, this event offers an opportunity to reflect on where we are. It is still too early for comments to have arrived concerning the questions raised in the guest editorial of the Fall 1988 issue. And while we fully expect and hope for those comments, we will defer the question of proper focus until you have made your input. In the meantime, there are other items to which we can turn our attention.

First is the issue of distribution of the *Airpower Journal*. By far, the most pervasive complaint received in these offices is about the lack of access to copies of the *Journal*. The system of official distribution on which we rely is a "pull" not a "push" system. That means that if you want copies, you must ensure that your unit is "on distribution" as explained on page 94 in this issue. If your unit is "on distribution" but you still don't see the *Journal*, consider that there are 20,000 officially funded copies of the *Journal*. By the time the necessary administrative copies are ripped "off the top" of a production run, there remains roughly one copy for each six or seven active-duty officers (with apologies to the Air Reserve Forces, enlisted corps, and civilian component). Each officially distributed copy must be shared among those interested in reading the *Journal*. Please note that you can freely reproduce what interests you in an issue and that the option of a personal, paid subscription is available.

Commanders and supervisors can help in this regard. We see the *Airpower Journal* as a working document to be read, discussed, marked up, pulled apart, reproduced, and generally hard used by you. We are not so naive as to think that each of you is reading each page in each issue, but we do hope you are finding something in most issues that

strikes a responsive chord and that you share with your superiors, peers, and subordinates. Agreement is not necessarily the goal; interchange is. The contents of the *Journal* are not The Word, The Company Line, or generally the product of anyone but you, the corps. Sure, we edit copy and accept useful articles from those outside the Air Force, but in general the *Airpower Journal* is a forum to present the best of the corps' ideas that reach it. What we ask of ourselves (that means you, all of "us") is an appreciation of our colleagues' contributions, a critical assessment of what they write, and an exchange of ideas, criticisms, and accolades. Leaders play in this arena; they foster the environment for contribution, critical thinking, and feedback.

Finally, the *Journal* wants and needs your reactions to its contents. One gratifying trend this past year has been the increase in letters to the editor. We like to think this means that you are being struck (in every sense) by what you read and that you are willing to share your reactions. While we are pleased if you are reacting and sharing locally, we would be even happier to print those reactions in "Ricochets" for the benefit of all. We don't promise to print every letter we receive, but so far we have printed most and will continue to do so until we run out of space. Guidelines of good sense and courtesy do apply. We occasionally edit for length or structure. We do not usually print very general comments such as "good job" or "poor show" without supporting rationale. Otherwise, "Ricochets" is wide open to you so that you can contribute to the dialogue. Rest assured that our authors want all the feedback they can get. The *Journal* wants feedback because it tells us if we are doing our job or not. The corps wants feedback because the corps is all of us, and we do need to stay in touch with one another. Another year has passed; a new one is coming up. Stay in touch. KWG

# ricochets

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

## CAREERISM

I read with interest Maj Michael Mosier's article, "Getting a Grip on Careerism," in the Summer 1988 issue of the *Airpower Journal* and agree that a reaffirmation of the "fundamental ethics that stress duty over self" is essential to a professional officer corps. However, in discussing the symptoms of careerism, the author failed to focus on the biggest—perhaps central—cause of the current situation and the major reason why the careerism problem will be extremely difficult to solve: there has been a fundamental change of attitudes in society at large.

People who grew up (matured) in the 1960s and 1970s acquired along the way a different set of cultural assumptions than did previous generations. Concepts such as *do your own thing, be your own man or woman, individualism, self-assertion, what's in it for me, aspirations of the yuppie* (and all that term connotes), and other similar philosophies serve to enhance what we consider to be the negative aspects of careerism. Unfortunately, many of these cultural assumptions are at the subconscious level and difficult to alter. Just as every child in Western society knows that good must triumph over evil, he or she also knows that to get ahead in life, you have to assert yourself and elevate your views above those of your peers. No one has sat the child down and formally presented this idea; it has been culturally assimilated by observing the interaction between parents, sports heroes and their teams, businessmen and unions, and by watching TV and movies. The recent insider trading scandals and the drug epidemic are two of the extreme examples of these cultural assumptions (attitudes) at work. Just as it is difficult to realistically expect a young victim of urban poverty making \$2,000 a week selling drugs on the street corner to "just say no," it is also difficult to expect a young lieutenant or captain with two children and high aspirations for a

successful future to enthusiastically PCS to a job in the trenches at Out-of-the-Way Air Base and leave the up-or-out gates to the system. This dilemma is especially acute if the "definitely promote" quota is back at headquarters, thousands of miles away.

As another example, take the lieutenant colonels striving for colonel and the colonels with stars in their eyes who thrash their troops 18 hours a day to be the number-one squadron or wing in the command. Are they motivated by professionalism or careerism? Only they know for sure; however, the impression they impart to their people is often one of careerism. And the promotion and assignment systems will reward them accordingly. Is the dilemma we face how to take these high achievers, decisionmakers, hard chargers, and future leaders, and divorce them from their inborn goals, aspirations, and natural desire for a successful work experience (career), or can we find some happy middle ground?

Unfortunately, neither Major Mosier nor I have any quick solutions. Maybe if we continue to treat the symptoms long enough, as the recent changes in the personnel system seem to do, we can stave off the advance of the disease. However, if we are looking for a cure, we must go after the cause and start by setting the example from the top down. When junior personnel see senior officers happily sacrificing their future (careers) for the higher good or see the promotion system reward those at Out-of-the-Way Air Base who made the hard choices, we may be able to alter or channel those cultural assumptions I discussed earlier.

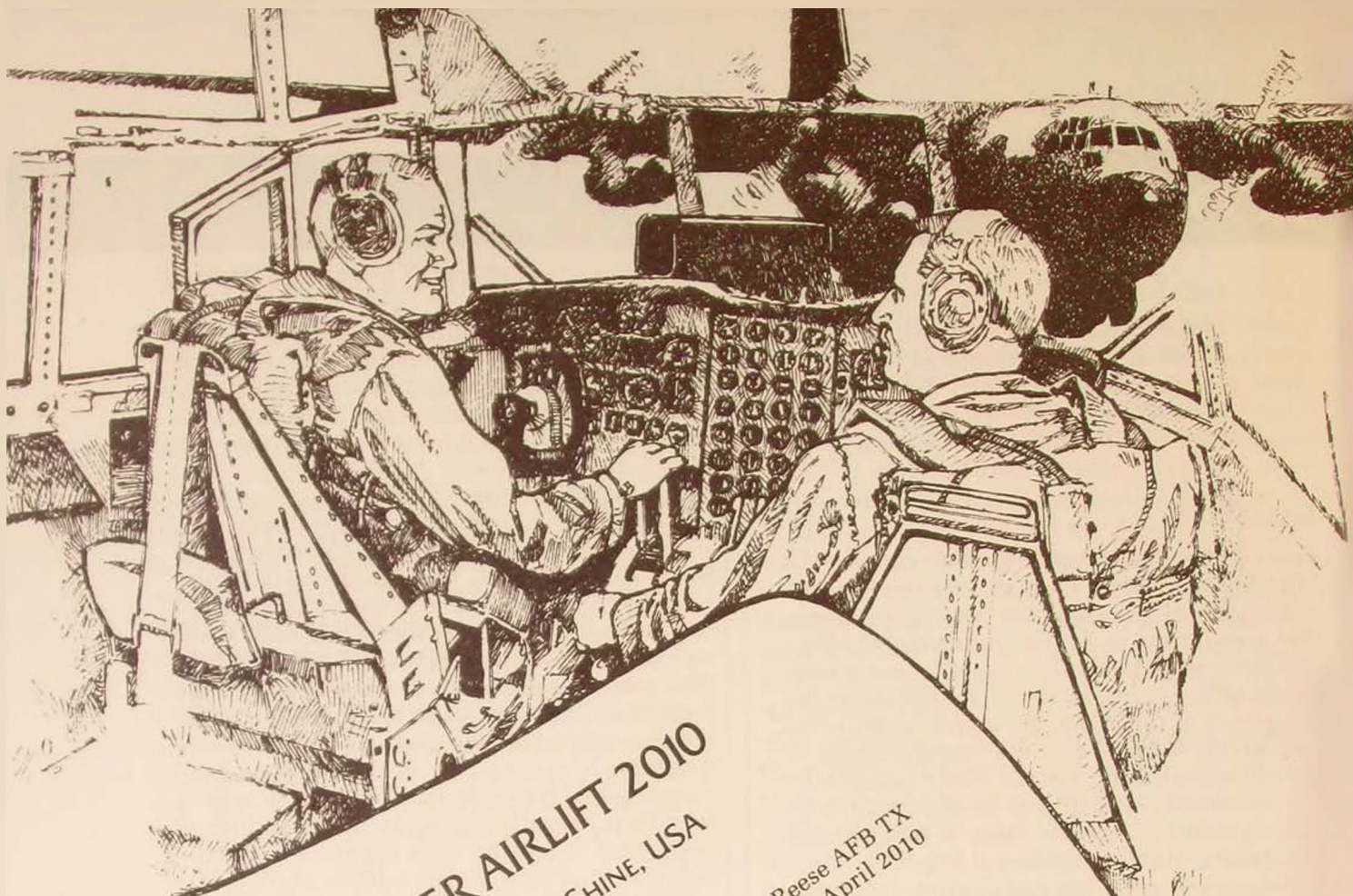
Forcing people to go where they don't want to certainly isn't the answer unless they are consistently and fairly rewarded for their sacrifice. Today, there are too many other options open to people with talent and potential for a successful "career."

Lt Col David M. Rigsbee, USAF  
Gunter AFB, Alabama

Maj Michael L. Mosier's article, "Getting a Grip on Careerism," in the Summer 1988 issue of *Airpower Journal* raises some interesting issues in

continued on page 86





# THEATER AIRLIFT 2010

COL ALEXANDER P. SHINE, USA

Reese AFB TX  
23 April 2010

Dear Grandpa,

Well, I made it. Just like you told me, it was tough! But when the colonel pinned those silver wings on my chest today, I thought the buttons on my blouse would pop off. And I could feel Dad standing right beside me, with his chest pumped up just as high as mine.

But there's even better news—I got my orders yesterday, and would you believe it, I'm going to be flying C-130Ks! The "K" has been stretched a little bit and has a few more gadgets on it than you may remember. Basically, though, it's the same beautiful, old bird you flew in Vietnam and Dad flew when he won his Air Force Cross in the El Toro Valley.

I guess it's in the blood, Gramps. I'm going to be another "cigarette-and-puke-for-breakfast-in-the-mud Herc driver." And don't worry, I'll be the best you're feeling better. Hi to Oma.

Love,  
Jay

P.S. In case you haven't heard from Stan, he's got three weeks to go at Rucker, and he found out that he'll be flying Chinooks just like Uncle Terry and Great Uncle Jerry. Between the two of us, I doubt there is an airlift mission in the world that we Moxes can't handle.



**A** LETTER like that would have to bring a lump to the throat of an old airlifter or even an old soldier, for that matter. It suggests that finally we did something right. Instead of continuing with the notion of "buy 'em, fly 'em, throw 'em away, and buy a new gadget," we decided to stick with a couple of old horses that are doing the job.

Good idea? Maybe, but maybe not. I think not. After more than 25 years using the C-130 and CH-47 as their basic trash haulers, the Air Force and Army should seriously consider the possibility that the theater airlift fleet of the twenty-first century ought to have at least one or two new components. This article suggests what those components might be and some of the things we need to think about in deriving those components.

Many people in the Air Force, the Army, and the major aircraft industries have been working on the issue of future theater airlift for quite a few years. Most significant has been the combined work of the Military Airlift Command (MAC), Air Force Aeronautical Systems Division (ASD), and contractors from Boeing, McDonnell Douglas, Lockheed, and the General Research Corporation, under the heading of Advanced Transport Technology Mission Analysis (ATTMA). The ATTMA study attempts both to define requirements and suggest technological possibilities for an advanced theater transport (ATT). The MAC-TRADOC ([Army] Training and Doctrine Command) Airlift Concepts and Requirements Agency (ACRA) published a study in 1985 that sought to generally define theater airlift requirements (though not much beyond the mid-1990s). The mammoth and long-awaited Worldwide Intratheater Mobility Study (WIMS), cochaired by the Office of Secretary of Defense (OSD) and the Joint Chiefs of Staff (JCS), was published in February 1988 and for the first time provides analytically supported, gross, quantitative requirements for future theater airlift (along with other transport modes). On the Army

side, the need for what has come to be termed the advanced cargo aircraft (ACA) has been recognized since the 1970s, and the first of many draft organization and operation plans for an ACA was completed by the Army's Aviation Center in May 1985.

The bottom line is that we have done a lot of research on the issue, there are many ideas out there, and it is now time to start sorting through the research and pulling those ideas together into some specific proposals. This article is such a proposal. I have borrowed heavily from the information in the various studies mentioned above, particularly the excellent work done by ASD and the civilian contractors in the ATTMA study.<sup>1</sup> I have tried to bite the bullet and make decisions on tough trade-offs: "If I were CINCWORLD and had to make a decision based on what I know today, this is what I would do and why." I hope before too long a joint group will be tasked to take on this project officially, and when they do, this article might serve as a starting point.

## Theater Airlift Missions

For clarity, we need a brief comment on what theater airlift does. What it does not do is fly across oceans, closing 10 divisions in Europe in 10 days. That is a job for strategic airlift. Theater airlift (sometimes called "tactical" or "intratheater" airlift) moves people and things within a theater of operations. Specifically, theater airlift moves forces and equipment to their initial employment locations (deployment); it then moves forces around within the theater (employment), moves supplies and personnel (sustainment), and evacuates casualties (aeromedical evacuation).

Theater airlift does all these things in support of both conventional and special operations forces (SOF). The unique nature of special operations, however, frequently requires special capabilities from airlift aircraft. This article focuses on airlift support for conventional operations, with some limited discussion of SOF needs.



*Theater airlift is designed to move troops and equipment within a theater of operations. The C-130 has been the workhorse in theater airlift for many years, but by the next century the Air Force will need to replace it with an even more capable aircraft.*

Airlift aircraft have also been frequently used for nonairlift missions. These include use as command and control and electronic countermeasures platforms, gunships, spray aircraft, and vehicles for leaflet drops. Although it is good to keep some of these uses in the back of our minds during aircraft design, for the most part we should build an

airlift fleet to do airlift. We can then adapt the aircraft to do other things as their capabilities allow. Consequently, these nonairlift missions will not be considerations in my discussion.

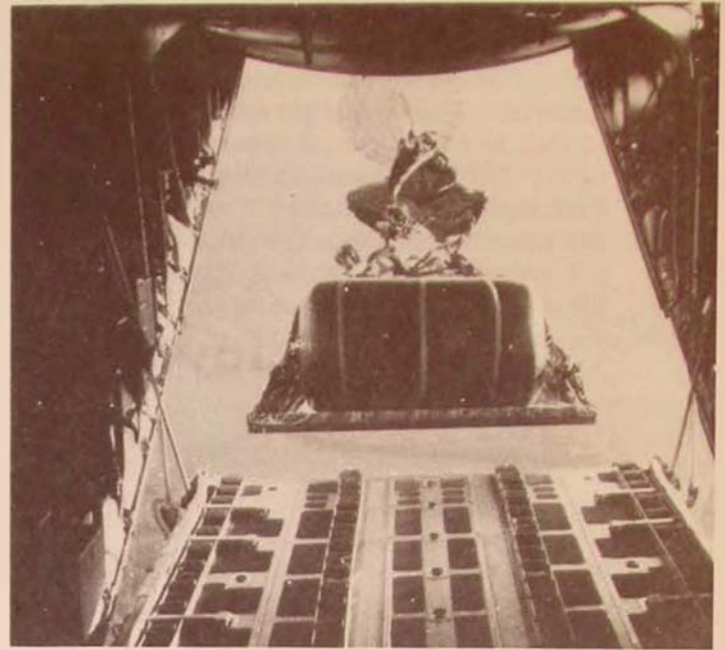
Before plunging into the design of specific aircraft, we need to lay some groundwork and make some assumptions. First, we should design an airlift *fleet* for the twenty-first century, not a single airlift aircraft. If we assume that there will be more than one sort of air vehicle involved in airlift, these vehicles should complement each other, and there should be little overlapping of capabilities and missions.



Furthermore, we must recognize that the Air Force is not the only service involved in the airlift business. If we define *airlift* as "transportation by air," it is clear that—whatever terms they use for them—all services currently fly airlift aircraft. Thus, in designing a theater airlift fleet for the future, we should do one of the following: (1) design it generically and then divide it up among the services or (2) define the service roles for airlift and then try to ensure that the individual service's aircraft are designed to fulfill those roles. I will use the latter approach, and I will focus on the Army and the Air Force on the assumption that they are the biggest users and providers of theater airlift. (Normally, Marine and Navy requirements will either be met by aircraft designed for Army-Air Force users, or the requirements will be so particular that the way to meet them will be with service-unique aircraft.)

### Army-Air Force Responsibilities for Airlift

Attempts to divide responsibility for airlift between the Army and Air Force have a



*A replacement aircraft with short takeoff and landing (STOL) capability will reduce the need for airdrop and low altitude parachute extraction system (LAPES) missions (above), although these procedures will remain important during the next century. The Army will need large helicopters (below) to meet its tactical and special operations requirements.*

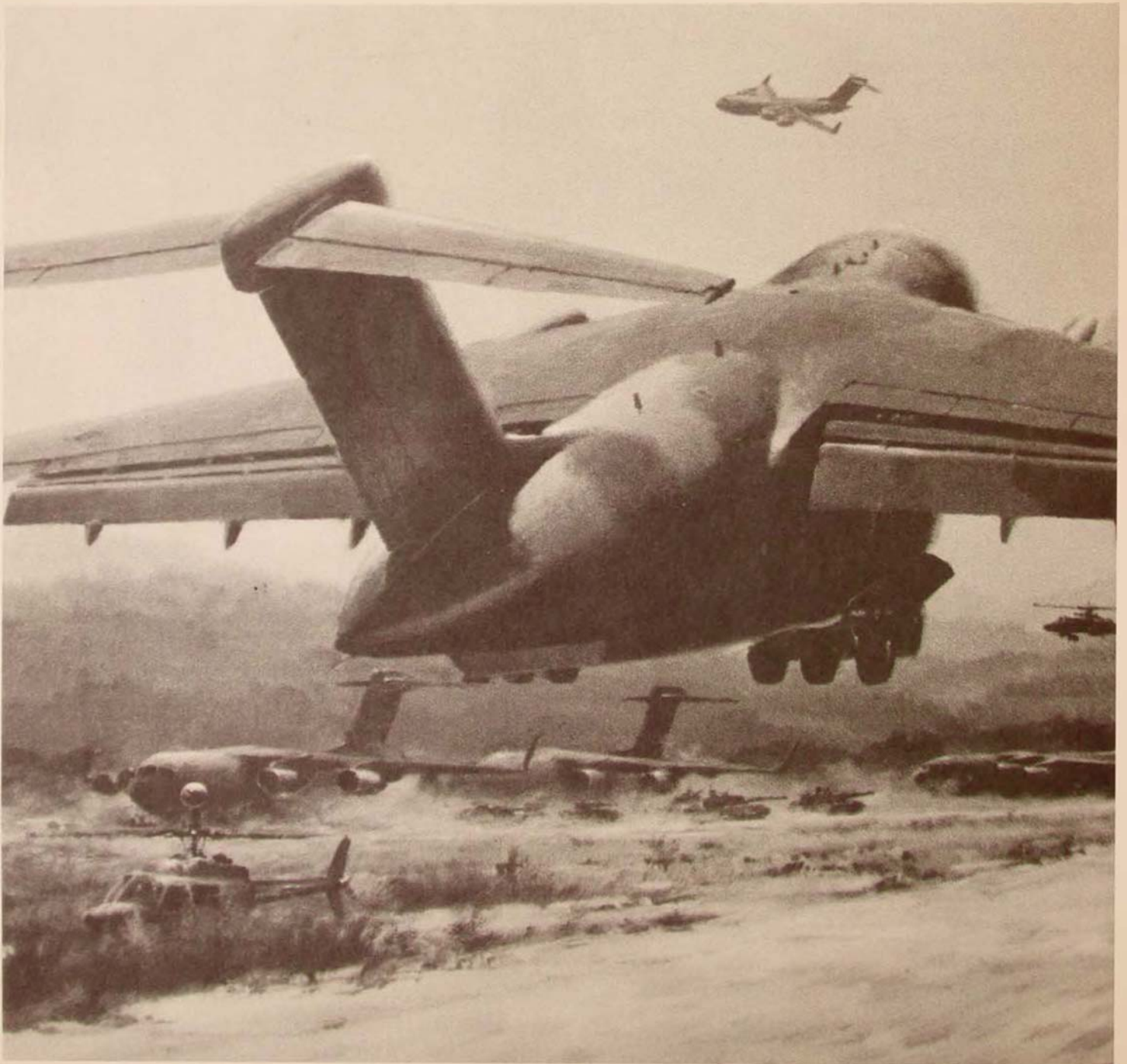




long and frequently bloody history. Criteria have included range, payload, and the technology-based Johnson-McConnell Agreement of 1966, which gave fixed-wing airlift to the Air Force and rotary-wing to the Army. This division worked well for the Vietnam era, but it does not work so well for the present, let alone the future. For example, what about the V-22 Osprey? Is it a fixed-wing or a rotary-wing aircraft?

An Army-Air Force Memorandum of Agreement (MOA) on Manned Aircraft Sys-

tems dated 15 May 1986 superseded the Johnson-McConnell Agreement and used broader guidelines. The MOA states that the Army will normally be the "executive service" (developing and operating service) for "manned aircraft systems that are designed to be operated and sustained in units organic to a land force and employed . . . within the land force commander's area of operations." The Air Force will normally be the executive service for "manned aircraft systems that are designed to be most effec-



tive when organized under centralized control for theater-wide employment."<sup>2</sup>

Applying these criteria specifically to airlift and trying to tighten them up just a little bit, I am suggesting an organizationally based division of responsibilities. Airlift designed to support corps and smaller unit requirements should be Army while airlift support for echelons above corps should be Air Force. Obviously, this definition is fuzzy in application (how big is a corps sector?), but it gives us a logical yardstick with-

out locking us into a technology-based box. The assumption is that most intracorpairs airlift missions will be Army, usually relatively short and light, and frequently requiring rather quick response. It is at echelons above corps that most Air Force and other service requirements arise (along with Army requirements), and these missions tend to be bigger, longer, and a little less immediate. Of course, there are exceptions, but these can be treated as such.

### Definition of Requirements

Having agreed to design a fleet of aircraft and having determined at least roughly how to determine service responsibility, we are ready to face the big issue of requirements. What do we need the fleet to do? Unfortunately, defining requirements suffers at the outset from a semantic problem. The term requirements, when applied to acquisitions, is a classic example of bureaucratic elasticizing of the English language. A Department of Defense (DOD) requirement can mean anything from "something we are quite confident we really have to have in order to ensure battlefield success" to "something we sure would like to have if no one would fuss too much about it."

If theater commanders were asked to describe the capabilities they would really like for a future theater airlifter, they would probably reply something like this: "We want a cheap, compact, totally self-loading aircraft, which flies at Mach 2.5, is invisible, can carry a tank platoon in a single lift, and lands in a cow pasture without stirring up the manure." Unfortunately, it is unlikely that such a machine will be produced in the lifetime of our grandchildren. So we have to set our sights a little lower.

*The C-17 is designed for major intratheater airlift, mainly in protected and low-threat environments. It should be complemented by aircraft able to enter more hostile areas and land at unimproved sites.*





## Technological Possibilities

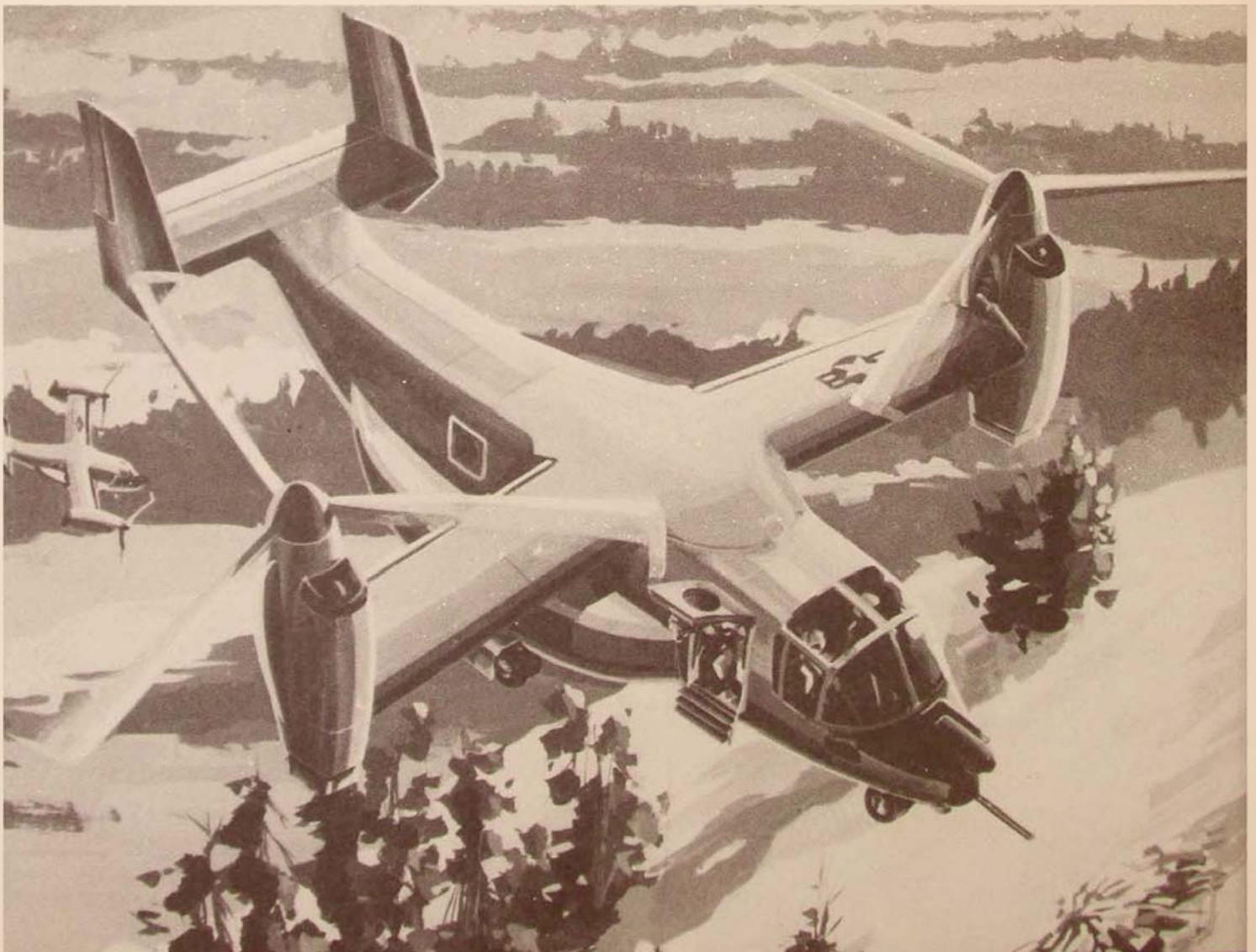
In the discussion that follows, I have tried not to exaggerate requirements. Instead I have consciously decided to design a theater airlift fleet that can do well what I think it really has to do and can also do fairly well what I think it would ideally do. But in considering the realm of wishful thinking, I have given heavy consideration to cost and technological risk. In this regard, the work done for the ATTMA study has been very helpful.

By giving us a fairly good idea both of technological possibilities and relative costs, the ATTMA study has provided the data to make some realistically based, cost-benefit, trade-off decisions. Based on ATTMA inputs, it is fair to say that a few basic generalizations can be made. Using the C-130 as a baseline, we could produce a

newly designed theater airlifter with improved capabilities but without substantial cost or technological risk that would

- Increase the payload up to nearly twice that of the C-130, without major increase in the wingspan of the aircraft.<sup>2</sup>
- Increase the box size, both in length and cross section.
- Improve short takeoff and landing (STOL) capability to about half the field required by a C-130.
- Fly at about Mach .7, 200-300 feet above ground level in all weather, thereby making

*The vertical takeoff and landing (VTOL) capability of the V-22 Osprey makes it useful for special operations and rescue missions. This aircraft also performs the more conventional missions expected of a small, advanced tactical transport.*





a marked increase in survivability against ground-to-air and air-to-air weapons.

- Include fairly effective infrared (IR) countermeasures without undue cost or weight penalty.

There are also other areas where substantial improvement is possible but at significant increases in cost and technological risk:

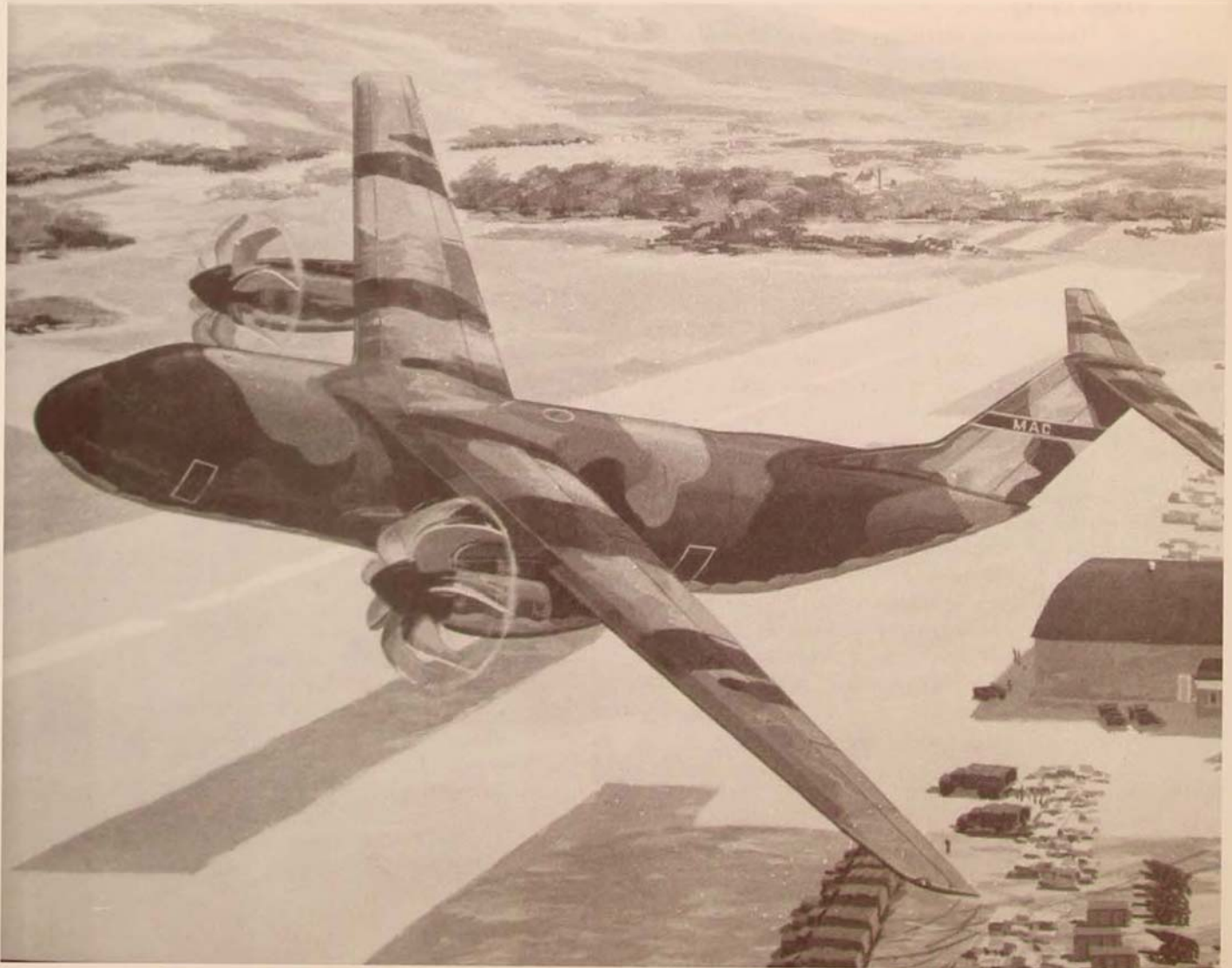
- Development of a large airlifter capable of vertical/short takeoff and landing (VSTOL).
- Development of a large airlifter with significantly improved survivability. A fixed-wing airlifter can be made somewhat more

survivable with costly, payload-reducing, electronic countermeasures (ECM). Low-observable (LO) design is also possible but at substantial increases in cost and with questionable payoffs in terms of lessened attrition.<sup>4</sup>

- Development of a much larger airlift aircraft, to include one with outsized payload capability. However, there are bends in the curve where the cost for increased payload starts to rise rapidly. The physical size of the aircraft also becomes a problem.

There is no ATTMA study dealing as specifically with future potentials for rotary-wing systems, but it appears that increases in payloads up to more than twice that of the CH-47 with concurrent 50-100 percent increases in range are possible. However, these improvements would be gained at the expense of a substantial increase in size, equal or lower speeds, and a substantial in-

*The proposed Lockheed two-engine tactical airlifter is a possible successor to the C-130. Its replacement will need a longer and wider fuselage, shorter takeoff and landing capability, and self-loading systems.*



crease in cost. Another problem is "disk loading," which is a technical name for "blow down" or "rotor wash." These larger-load helicopters would likely develop two to four times the disk loading of the CH-47.<sup>5</sup> By inclusion of onboard ECM, large, rotary-wing airlift aircraft could also be made significantly more survivable than current systems. However, this addition will be costly, and its effectiveness is open to question.

These possibilities lead to some conclusions that are reflected in both the rotary and fixed-wing fleet designs:

#### Rotary Wing

- Helicopters will remain short-range systems with improved but still relatively small payloads.
- Transport helicopters will have to gain their survivability primarily by threat avoidance, low-level flying, ballistic tolerance, crash worthiness, and avoiding easily targeted landing zones.

#### Fixed Wing

- Fixed-wing airlifters can be designed to carry payloads up to about 60,000 pounds without undue cost or increase in size. Above that weight, the cost/payload trade-off gets increasingly steeper, and the aircraft starts taking up a good deal more space on the ramp.
- Enlarging the box cross section to equal that of the C-141 or even a little larger is not a major problem.
- Lengthening the aircraft is not a major problem, limited mainly by choices relating to the optimum size of an aircraft from the standpoint of ramp space and ground maneuverability.
- Designing a theater transport that can land with a substantial payload on 1,500-foot strips with a California Bearing Ratio of 6 will not be difficult or costly. However, VSTOL capability will come only at great cost and technological risk.
- Fixed-wing transports will have to gain their survivability primarily by threat avoidance, low-level flying, ballistic tolerance, and avoiding easily targeted landing zones.

Armed with pertinent technological information, we are now ready to plunge into

determination of requirements with some idea of the boundaries of the possible. But we have another problem—a standard problem faced by anyone who is forced to look very far into the future. We do not really know how, where, or by whom future wars are going to be fought, nor do we know what weapon systems we will fight them with. For purposes of this article, 2010 is the target year. There is no special reason for that specific year, but it gets us far enough out that we could reasonably expect to design and acquire new airlift systems by then, but not so far out that our crystal ball gazing will not at least have a fair possibility of being relatively accurate. It also is in the time frame that will be addressed in the Army's developing futures concept, "Army 21." The following are the major assumptions I have made about the AirLand battlefield of 2010 that bear on my choices for a theater airlift fleet:

- The United States must be prepared to fight in both high- and low-intensity conflicts.
- In comparison with today, the high-intensity battlefields of 2010 will be characterized by
  - Increased mobility at both the tactical and operational levels.
  - Greater fluidity. The forward line of own troops (FLOT) will be more porous than it is today. Nonetheless, there will still be forward and rear areas of the theater, and the rear area will be predominantly under friendly control.
  - Greater lethality and accuracy of ground-to-air, ground-to-ground, and air-to-air systems. Shoulder-fired IR ground-to-air weapons will be found throughout the theater, though in limited numbers in the friendly rear areas. Ground-to-ground extended-range systems will reach many hundreds of kilometers into our rear areas but will still be limited in number and selective in targeting. Artillery will still be the primary ground-to-ground system and will be limited in range to about 40 kilometers (km) across the FLOT. Air-to-air systems will be highly lethal against airlifters though some degree of evasion will be possible by terrain flying.

— Selectivity. Airlift aircraft will generally not be a first-priority target for enemy anti-air efforts.

- Low-intensity battlefields will be similar to those of today but with more sophisticated weapons. Of particular importance to airlift will be the wide distribution of hand-held IR ground-to-air missiles.
- Ground weapon systems will be of the same general type and have the same approximate weight and dimensions as those of today.<sup>6</sup>

In sum, AirLand Battle 2010 will not be radically different from AirLand Battle today, but it will be more fluid and more lethal. Airlift will be required more than ever

*Future airdrop requirements will remain essentially the same as they are now. Large aircraft, such as these C-141s, will drop loads of up to 60,000 pounds and be capable of dropping personnel from the doors and ramps simultaneously.*

to provide rapid, responsive, nonterrain-restricted mobility for forces at both the tactical and operational levels of war. It will also be heavily involved in sustainment of these forces. It will have to operate to some degree throughout the battlefield while facing increased threats.

Now let us consider the proposed fleet itself. My discussion focuses on capabilities of the aircraft, primarily as they relate to user needs. In the case of any new aircraft, there would obviously also be improvements in capabilities that would make it easier, more efficient, and more effective to fly and maintain; but these are airlift provider concerns beyond the scope of this article. Since any airlift aircraft is a flying truck, the main criteria for designing





it must always be what the users of the truck need it to do for them.

## Army Airlift Fleet

The Army fleet should consist, as it does today, entirely of vertical takeoff and landing (VTOL) aircraft. There are at least two reasons for this requirement. First, corps or smaller elements frequently will not be able to collocate with an airstrip. Second, it would be more efficient in terms of training and maintenance to keep most Army aviation VTOL. A portion of the fleet should be focused on small, clearly internal Army requirements, such as those currently performed by utility and observation helicopters. It is not necessary in this discussion to suggest designs for this part of the Army airlift fleet since it is solely Army business.

It is at the level of medium or heavy lift (the currently proposed advanced cargo aircraft) that Army requirements and potential capabilities start to have a major impact on the design of the overall theater airlift fleet. The ACA should be sized to carry about a platoon of infantry or three to four 463L system pallets internally, or about 25,000–30,000 pounds externally. A combat radius of 150 nautical miles (NM) under standard operating conditions with the above loads would be sufficient. This range would enable it to cover a corps sector in most theaters. It should also be able to lift loads as heavy as armored guns or infantry-fighting vehicles distances of about 20 nm. This capability would increase its utility for logistics over-the-shore operations and—equally important—would facilitate assault crossings of rivers or other narrow obstacles.

The ACA would gain survivability primarily by flying low, avoiding the enemy, maintaining ballistic tolerance, and improving crash worthiness. It would have heat shielding and ECM to improve its survivability against IR missiles. A few aircraft used for more exotic missions may include some additional ECM equipment, but—for the most part—ACAs would survive like an

infantryman with a flak jacket and Kevlar: protect the vital parts, be able to take a few hits without dying, but mainly avoid being hit. Additionally, we gain fleet survivability by having lots of relatively cheap systems.<sup>7</sup>

## Air Force Airlift Fleet

The Air Force fleet should consist of three types of aircraft: (1) a very-heavy-lift, fixed-wing aircraft (the C-17); (2) a heavy-lift, fixed-wing advanced theater transport (large ATT); and (3) a medium-lift, fixed-wing transport (small ATT). All Air Force airlifters should have the full range of air-drop and low-altitude parachute extraction system (LAPES) capabilities to include personnel, equipment, and cargo. They all should have locking rails to enable simple command release of loads. All should have inertial navigation systems. All should be capable of operations at night and in bad weather. All should be designed for speed and simplicity of onloading and offloading to include the capability to offload bulk loads in combat. All should be protected by heat shielding and onboard (or strap-on) ECM to allow fairly safe operations in areas threatened by low numbers of hand-held surface-to-air missiles. If required to fly in mid- to high-threat environments (as they sometimes will), these aircraft would limit attrition primarily by low-level flight, ballistic tolerance, threat avoidance, and external assistance for suppression of enemy air defense. All should provide nuclear, biological, and chemical (NBC) protection for the crew. It will probably not be feasible to provide NBC protection for the cargo compartment, but a major effort of development should be directed toward making the cargo compartment easy to decontaminate. None of the aircraft needs to be VSTOL.

### *Large Advanced Theater Transport*

The workhorse of the fleet would be the large advanced theater transport (L-ATT), replacing the C-130 as it is phased out. It

would be an improvement over the C-130 in two primary areas: larger payloads and shorter field capability. It would, nonetheless, be relatively simple and inexpensive. Its primary roles would be the deployment and employment of ground and air units at the operational level of war, and bulk sustainment of air and ground forces. The L-ATT would not be designed for a high degree of survivability in a mid- or high-threat environment, and it would seldom air-land within artillery range of the enemy. It would, in short, be a flying truck—simple, reliable, and very capable but clearly designed to do most of its work in rear or semi-protected, forward areas. Its length would allow it to carry the 155-mm towed howitzer—with prime mover—its payload to carry the multiple launch rocket system (MLRS), and its cross section to carry the Bradley fighting vehicle (in all cases, with a little extra room for growth). These capabilities would enable it to carry all the equipment of a light infantry division. The aircraft would also be able to carry Hawk and Vulcan air defense systems, many of the lighter pieces of engineer equipment, and most of the combat-service-support equipment designed to support mechanized forces.

The L-ATT would not carry main battle tanks, heavy engineer equipment, or heavy maintenance equipment. It would be nice if we could design the ATT to carry these items also, but here we start to run into the technology barrier discussed above. To go much beyond a 60,000-pound payload, yet retain the STOL airfield capability desired, would mean a significant increase in cost. This capability would also require the aircraft to be much bigger, thus making it inefficient for smaller loads and causing ramp-space problems in many of the smaller assault strips. Considering these factors and recognizing that theater airlift moves of very heavy equipment will be relatively rare, we should limit the size of the L-ATT and depend on the C-17 to fill in when required (as discussed below). The L-ATT should be able to land on a 1,500-

foot runway carrying the loads previously indicated, to include gravel and dirt strips at least as primitive as those currently used by the C-130. With these payloads, it should have a combat radius of at least 1,000 NM.<sup>9</sup>

Improved capability for self-loading cargo should also be a major feature of the L-ATT. Unquestionably, it should have a winch system and ramp/rollers carefully designed for ease of loading. It should be able to self-load and combat offload the standardized shipping containers increasingly used by the Army and Marine Corps.

Ideally, it would also have some form of overhead crane to pick up and set down bulk loads without material-handling equipment (MHE). This is an area for continued technological exploration. If possible without undue cost in dollars or payload reduction, this capability would make the ATT the airlift equivalent of the Army's new palletized loading system (PLS) (a self-loading truck). However, we should not accept too great a penalty for this capability. Unlike trucks, big aircraft don't back up into any old storage area to pick up a load; they need some form of airfield. Thus, for the most part, some type of MHE will be required to bring the load to the aircraft. Usually, that same MHE can also load the aircraft. (Incidentally, the ATT should definitely be able to drag on and push off the rack for the PLS since this feature will be increasingly important to the Army's transportation system. Current aircraft do not have this capability. Whether the rack should be modified or the L-ATT specially designed to handle the rack is an issue for the technologists to sort out.) The ATT should be our most effective airdrop aircraft, capable of command-selected, forced bundle delivery; airdrop of loads up to 60,000 pounds; and airdrop of personnel and equipment from the doors and ramp simultaneously.

#### C-17

At the higher end of the spectrum, the C-17 would supplement the L-ATT for any thea-



ter airlift missions except those requiring the ATT's very short, rough-field capability. As originally intended, the C-17 will be primarily a strategic airlifter, gradually replacing the C-141 as the workhorse of the strategic fleet. In comparison with the C-141, however, the C-17 will be a strategic workhorse with many theater capabilities. It will be rugged and capable of landing on airfields comparable to those currently used by C-130s. Consequently, it will eliminate some theater airlift requirements by strategic "direct delivery" of loads from CONUS to their final theater airlift destination.

MAC's plan to phase in the C-17 also assumes phaseout of some C-130s with the intention that C-17s coming into theater on strategic missions will frequently fly one or more theater "shuttles" before returning to CONUS. Therefore, C-17s will be routine players in future theater airlift and will actually increase total theater airlift capability, even with retirement of some C-130s. Additionally, large numbers of C-17s can sometimes be pulled from the strategic flow and temporarily concentrated in theater for major unit moves. Examples would be movement of a self-propelled artillery battalion, a Hawk battalion, or occasionally even battalions or brigades of heavy combat forces. C-17s would carry the outsized equipment while ATTs carry the rest.

#### *Small ATT*

A third Air Force aircraft is needed for efficiency in moving smaller loads, particularly in support of low-intensity conflict (LIC). Many theater-level airlift missions require the range, speed, and operating costs of a fixed-wing aircraft but have loads too small to efficiently use the L-ATT. For example, such missions might include movement of 40 replacements forward to a division or brigade, movement of one or two aircraft or tank engines to a fighter base or Army depot, air evacuation of 30 patients from a corps evacuation hospital to a hospital in the theater rear, and so forth. The

small advanced theater transport (S-ATT) would fill the role of today's C-23 in the European Distribution System and the role left unfilled in LIC environments (to the long consternation of successive CINCSOUTHS) by the retirement of the C-7 Caribou.

The design of this aircraft should be deliberately focused on the requirements of LIC in areas like Latin America, Africa, and parts of the Pacific. Its payload should include a 35-to-45-man rifle platoon, with weight and cross section determined by the high-mobility multipurpose wheeled vehicle (HMMWV) with TOW antitank missile mounted (about 25,000 pounds) and length determined by the HMMWV with towed 105-mm howitzer. This capacity would enable it to move all the key combat equipment of a light infantry division, as well as the division's small emplacement excavator. Most frequently, however, the S-ATT would move companies and battalions (rather than divisions) in conflicts where small units make a big difference. Its combat radius with these loads should be at least 500 nm. It would be the primary theater air evacuation vehicle from the corps rearward and thus should be designed to facilitate quick conversion to an air-evac configuration. It should be able to airdrop personnel, an HMMWV, and container delivery system (CDS) bundles.

At least three key assumptions make this aircraft a cost-effective addition to the total airlift fleet:

- It can carry about as much as the ACA, but it can carry the load considerably farther, quicker, more efficiently, and with fewer density-altitude concerns. It is also less expensive and complex than the ACA.
- It is significantly less expensive than the L-ATT because it is much smaller.
- It has considerably improved STOL capability in comparison to the L-ATT, routinely landing on very rough assault zones of 1,000 feet or less.<sup>9</sup>

Like the L-ATT, the S-ATT should be a relatively simple and inexpensive aircraft. It would not be highly survivable (without help) in a mid- to high-threat environment.



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It would normally be the first aircraft of choice for fixed-wing airlift in higher-threat environments simply because it would be small, cheap, and have a comparatively small payload. The S-ATT would thus be a somewhat less tempting target than the L-ATT or C-17 and would also, frankly, be more expendable.

Because the S-ATT is inexpensive and simple to operate, it would be easily transferable to less sophisticated third world allies. Its size and short-field capabilities suggest numerous commercial applications, so there is a high probability that it would be a militarized version of an off-the-shelf civilian aircraft (or perhaps more likely, the commercial versions would be civilianized versions of an aircraft designed for military specifications). It would have many strap-on packages, making it easily convertible into a command, control, and communications (C<sup>3</sup>) platform, psychological operations (PSYOPS) aircraft, and so forth. A gunship version would also be a logical possibility.

#### *Large ACA Vice Small ATT*

One of the most difficult choices concerning the total airlift fleet is to recommend a comparatively small advanced cargo aircraft and fill the gap between its capabilities and the large advanced theater transport with a small ATT. If we had an ACA with substantially increased payload and range, it might be possible to eliminate the S-ATT altogether, which would have some obvious advantages. This type of decisionmaking is an area where assumptions about technological potential are critical. Current evidence suggests that we cannot build a rotary-wing or tilt-wing/rotor airlifter with payloads approaching 30,000 pounds and combat radii of 400-500 NM without excessive cost, both in procurement and operation. Also, the problems with disk loading appear insurmountable. Thus, a somewhat more modest ACA coupled with a simple, cheap, fixed-wing STOL is the best choice, even though that decision adds one more system to the fleet.

But if some technological breakthrough comes in this area and we do go to a large-load, long-range ACA in lieu of a small ATT, we have another question: Who should fly it—the Army, the Air Force, or both? I would vote Army on the grounds that a high percentage of its missions will be Army and that the aircraft will be VTOL, like all the other Army systems. However, if the Army were chosen to fly this aircraft, it must unequivocally accept a common-user responsibility for small- to medium-sized airlift missions. The Army would also have to structure its forces accordingly.

### Special Operations Airlift

In 2010, as today, airlift support of special operations will present a dilemma for the budget-constrained designer of a theater airlift fleet. The basic lift requirements of SOF will approximate fairly closely the capabilities of the small ATT, but SOF support definitely needs a VTOL capability and needs to have vastly improved penetration survivability over the proposed S-ATT. It is also desirable that an SOF theater airlifter be pressurized and be able to handle near-strategic deployment legs. (If push came to shove, however, that part of an SOF mission could be met by strategic or commercial aircraft.)

Unfortunately, I see no option other than designing one or two airlifters specifically for the SOF mission. If possible, the same frame used for conventional airlift would be modified for SOF. Since VTOL capability is a requirement, the aircraft would have to be a modified ACA in the fleet described here (or perhaps an improved V-22). If we could get the range and payload required out of this aircraft, we could eliminate a fixed-wing SOF theater airlifter altogether. If we do need a fixed-wing, the obvious candidate would be the small ATT, modified like today's MC-130. Either way, the design of the ACA and/or the small ATT should consider convertibility for SOF.



## Summary

There it is—one man's stab at making a snowball out of quicksilver. There are a few key decisions reflected in my fleet design, any one of which is open to challenge, and successful challenge of any could lead to significantly different fleet designs. Among those decisions were the following:

- We will not build any conventional airlifters with a high level of self-contained threat survivability (except for IR countermeasures). Therefore, we will not routinely operate them in mid- to high-threat environments, and when we must do so, we will either protect them or expect some fairly high attrition.
- We will not build an Air Force VSTOL. Conversely, the Army will not operate fixed-wing airlifters.
- The ACA payload and range will remain relatively small. Unlike some proposals, it will not approach 50,000-pound payloads at a combat radius of 200(+) NM. These missions will be left to the Air Force.
- We will have a genuine need to regularly move light- and medium-weight combat and combat

support forces around the theater by airlift, but we will not have an equal need to do the same for heavy forces. Hence, we need to build an L-ATT—the theater airlift workhorse—with considerably more payload than the C-130 but much less than the C-17. The L-ATT will also have substantially improved STOL capability over the C-130.

- We will need a small, simple, fixed-wing aircraft to support low-intensity conflict and fill in the gap between the L-ATT and ACA.

*Finally, we do need to get serious about future theater airlift planning.* A letter like the one at the beginning of this article, for all its nostalgic appeal, would reflect some serious shortcomings in our preparations for future warfare. There comes a time when, even if the basic job hasn't changed dramatically, the possibilities of doing that job a lot better have changed dramatically, and it is both operationally and economically foolish not to get something new. The time to get serious in determining what that something new should or should not be is now. □

## Notes

1. In using ideas or data from ATTMA, I have tried to generalize from volumes of data that are often very specific. With two exceptions, I have not footnoted sources since the ideas in this paper are usually a conglomeration of thoughts from many sources.

2. Department of the Army/Department of the Air Force Memorandum of Agreement on Manned Aircraft Systems, 15 May 1986.

3. This is a generalization based on the data in ATTMA. Each of the three contractors in the study provided a number of notional aircraft designs. Their specific proposals differ in many ways. They all agree, however, that improvements in engine and lift technology would enable them to build an airlifter with a substantially bigger payload without significant increase in size over the C-130. Those desiring access to the ATTMA study should contact Aeronautical Systems Division/XR, Wright-Patterson AFB, Ohio 45433.

4. There is much difference of opinion on the issue of low-observable (LO) design. Everyone involved in ATTMA agrees that a large LO aircraft can be built. But there is considerable debate on the extent to which the radar cross section can be reduced and the significance of radar-directed threats to airlifters. I also confess a certain amount of skepticism. I don't know exactly how, but as a layman I have a sneaking suspicion that the technologists specializing in shooting down airplanes will develop new ways of doing so before too long and thus will negate much of the benefit currently gained by LO construction.

5. Bob Chisolm, Boeing Wichita, telephone interview with author on 5 May 1988. Chisolm has been working on compar-

ison between rotary-wing, tilt-wing, and fixed-wing airlift systems in the 30,000–50,000-pound payload category.

6. This assumption, of course, is easily challenged, but it is the best we can make at this time. We can be fairly confident that we will still fight with tanks, artillery, infantry-fighting vehicles, armored gun systems, helicopters, and so forth. We know that these systems will change, but we don't yet know how they will change. At some time, though, we will have to make a decision. We will have to size the box and payloads of future theater airlifters around current or programmed systems, adding a small margin for expansion if possible. Since the decision point is now for this article and since the characteristics of most twenty-first century ground systems are still very speculative, I have chosen to assume that future systems will be about as big and heavy as their existing counterparts (e.g., a future infantry-fighting vehicle will have about the same weight and cube as the current Bradley).

7. Some may note that I have not mentioned the V-22—the new tilt-rotor aircraft coming soon into the Marine inventory. The reason is that I don't think the V-22, as currently designed, is a good buy for the Army. It just doesn't do enough things more or better than the UH-60 or CH-47 to make it worth the money or effort to add it to the inventory. However, that does not mean that there is no future for tilt-engine or tilt-wing airlift. These types of craft have the advantages of speed, range, endurance, and lower fuel consumption over helicopters and the advantage of VSTOL over fixed-wing. It is very possible that either the utility or the medium-lift aircraft of the future Army fleet might be tilt-engine/wing. But if so, it should be

simpler, cheaper, and have greater capability than the V-22. The V-22 is the Model A of tilt-engine airlift. The Marines may be able to make good use of it for over-the-horizon, ship-to-shore operations. But the Army ought to let the Marines work out the bugs and then consider the Model B or C version when it comes along.

8. A key issue in determining the L-ATT payload may be the development of the armored family of vehicles (AFV). If the AFV includes light and heavy versions, if the basic light version is some form of armored fighting vehicle, and if it weighs in at not much more than 30 tons, it would make sense to design the ATT to carry this load. However, if light AFVs get much heavier than 30 tons, they will weigh themselves out of routine theater airlift, depending instead on as-required airlift by C-17s.

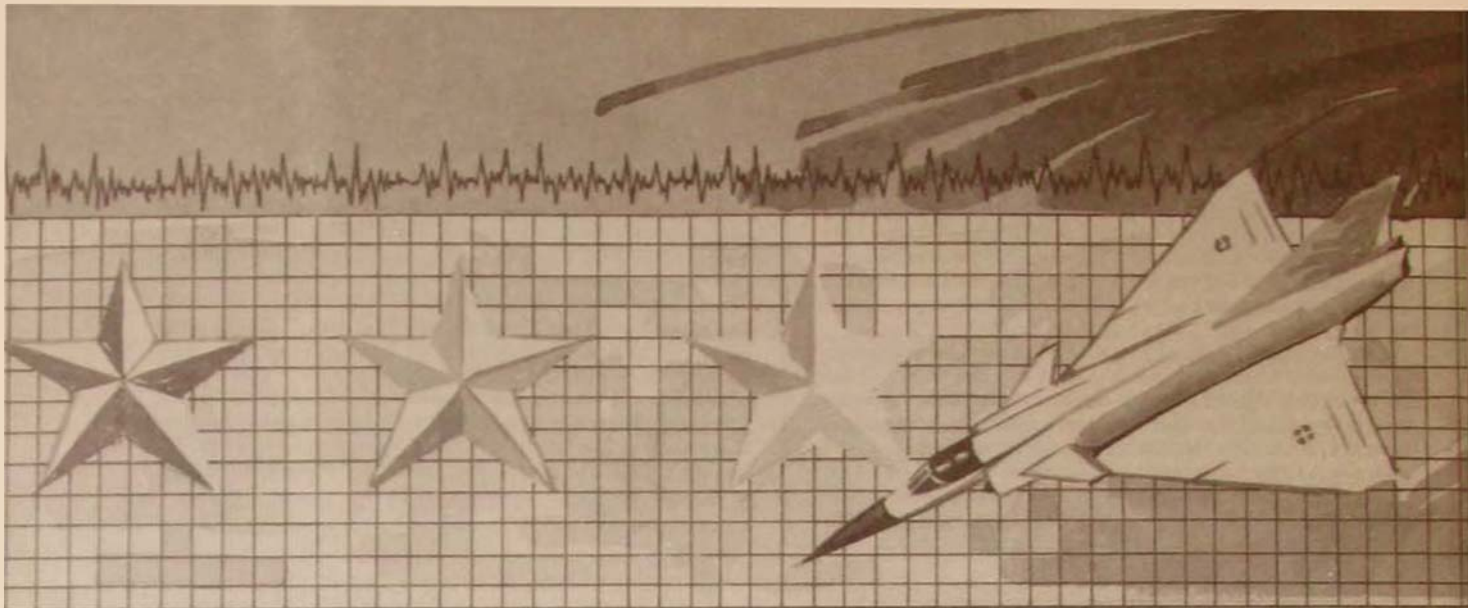
9. The reason for making the S-ATT a 1,000-foot STOL is not that there are large numbers of identifiable airfields in the 1,000-foot-or-less category—ATTMA-related studies suggest there are not. Rather, there will be many roads, fields, stretches of highway, or sections of damaged airfields that will be inaccessible even to the 1,500-foot L-ATT. In fact, a VSTOL capability in this aircraft would be highly desirable. The assumption of this article is that technology will not be able to produce a cost-effective and operationally simple VSTOL airlifter with the required range and payload by the early twenty-first century. The focus of VSTOL technology development, however, should be on an aircraft of about the size of the S-ATT rather than that of the V-22 or L-ATT.

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## TO FLY AND FIGHT AT THE OPERATIONAL LEVEL

COL WAYNE A. POSSEHL, USAF

**T**HE mission of the United States Air Force is to fly and fight. By keeping this in mind, we will win the air. By winning the air, we will win the battle, and by winning the battle, we will win the war. Or so the adage goes.

Does winning the air battle or even the ground battle necessarily mean that we will win the war? Vietnam would seem to be a brutal example of just the opposite: "You know you never defeated us on the battlefield," said the American colonel. The North Vietnamese colonel pondered this remark a moment. "That may be so," he replied. "but it is also irrelevant."<sup>1</sup>

### Winning Wars, Not Only Battles

We have to win wars, not just battles. To do so, we have to train to win when and where it counts. And in order to train properly, we have to think war. Thinking war means getting out of the peacetime mentality of sortie generation rates, OER on-time rates, budget battles, and even air superiority tactics and spending time thinking and

talking about the "what ifs." Thinking and talking about winning wars must be done at the operational level—war at the level where generals fight, and we who serve them must be ready to help. Thinking about war at the operational level should be natural for us in the Air Force—after all, it is the level for which we have always been organized. In actuality, it does not come easily and we do very little of it.

The reasons that we don't do much corporate thinking on this problem is that it's not immediate and it's not comfortable. It doesn't help with the budget, fly the plane, string the communications, or set up the command and control system any faster or better. It doesn't help motivate people, communicate ideas, or seem to be related to getting promoted. War at the operational level takes for granted all these critical but subordinate tasks and concentrates on questions such as where to put the weight of the air effort, how to get inside the enemy commander's decision cycle, and what to do to bring the campaign or war to a satisfactory end. It is powerful but frightening stuff. It's not something we are very comfortable with.





Another reason that we don't do much talking, thinking, and writing about this issue is that as soon as we do, we seem to concentrate on history: and history is boring, not something we were very good at in school or something that someone else always seems to know better. Although studying war at the operational level involves learning the lessons taught by the great thinkers of the past and the not-so-distant past, it is important to remember that we do so not to know the names of each commander involved (who would ever want to know that?) but to apply the thinking and experiences of the past to the problems of tomorrow's war.

Reading Carl von Clausewitz, Giulio Douhet, Henri Jomini, and Sun Tzu teaches us about the nature of war—not so we can learn a list of principles, but so we can understand the complexity and continuity of war. The problems they talk about are as relevant today as they were hundreds or thousands of years ago. Recognizing this gives us

a better perspective on the nature of our business.

Studying Sir Basil Henry Liddell Hart, William Slim, and Cornelius Ryan teaches us the lessons of World War II—not so we can remember how to invade Europe, but so we won't forget the mistakes made in that great conflict. Harry Summers, Leslie Gelb, and Bernard Fall help us make sense out of what happened in Vietnam—not so we can remember Route Pack I, but so we can see what lack of direction can do to a great nation. We study military history not for history's sake but because it is the heritage and legacy of our profession.

Another reason we tend to shy away from studying war is that it seems to have its own language—one that we aren't very comfortable with and one that tends to scare us away. In some respects the turnoff is justified. The language of war can be hard to learn. The terms are new, their meanings often conflict with more familiar ones, and it seems more attuned to land forces than those that fly. We aren't comfortable with phrases such as *center of gravity*, *culminating points*, and *grand strategy* because they aren't used in our everyday conversation. Yet we must become familiar with them to understand some of the larger concepts and to focus our attention at the proper level. Other terms such as *restrictions*, *restraints*, and *constraints* are familiar, but in the context of operational war they mean entirely different things. Still others such as *opening engagement*, *operational maneuver*, and *branches and sequels* seem to be more at home at Leavenworth than at Nellis.

The trick to learning this language, though, is to learn the meaning of the concept—not to get caught in a “how many angels can sit on the head of a pin” philosophical discussion of exact usage. In studying the basics of the flying business, we learned such seemingly arcane terms as *Mach*, *sortie*, and *Immelmann*, and now use them freely because they work. The terms of warfare are equally useful. They help win wars.

There appears to be some truth, though,

in the comment that everything written about operational warfare seems to be directed at the ground-force commander. The Armed Forces Staff College in Norfolk, Virginia, is home to a great military library. Its staff catalogs, by subject, articles written in military and military-oriented publications. Fifty-one such articles have been written in the recent past on the topic of operational warfare, all but a handful by Army officers and, in most cases, published in US Army publications. The 1986 edition of the *Air University Library Index to Military Periodicals* lists 20 such articles under “War, Operational.” Eighteen of them were in US Army publications. In the 1987 *Index*, 19 articles have been listed so far, 14 of which are Army-sponsored.

The point is not that the ground forces seem to have a lock on the subject but that the Air Force has an equally vital interest in the subject and should be getting its own intellectual act together. Why we seem reluctant to do so is unclear. It's not for lack of opportunity or example. Several of the authors mentioned above wrote almost entirely on the subject of air power. And the *Airpower Journal*, for example, “focus[es] on the operational level of war.”<sup>2</sup>

So how do we go about training ourselves to think at this war-winning, operational level? And what, or where, is the operational level? Who conducts it? Why? When? How? And what the hell is this other thing we hear about—OpArt?

## The Art of Operational Warfare

Last things first. OpArt is shorthand for the study of the art of operational warfare. The use of the word *art* recognizes that, at the level we are talking about, warfighting is more than a science. War at the operational level—or the art of war at the operational level—is the thought patterns of winning generals. It is more than identifying the people who have the most bombs on board or the sun at their backs. It is more than always



bombing the enemy back into the Stone Age. It is even more than the necessity of confronting enemies every time and everywhere they fly. It is knowing when to fight and when not to, knowing which battles to win and which to avoid. If necessary, it is spending the blood of the guys in the cockpit and those on the ground, but doing so very dearly and meaningfully.

The art of war at the operational level involves putting forces in such a position that the outcome of the battle is not left purely to luck or individual heroism. The science of war teaches the advantage of speed, firepower, training, and/or skill. The art of war-fighting teaches looking for the enemy's

*Air Marshal Sir Arthur Tedder (at left) was an officer who thought very clearly about the operational level of war. The ability to visualize how the air war supports the overall objectives of a campaign is essential to success.*

weaknesses and attacking them; going head to head only as a last resort; and recognizing your vulnerabilities and acting to hide or protect them. It emphasizes taking maximum advantage of all your strengths and those of your fellow services and allies to end the war on your terms.

It is said that war at the operational level is logistics, and that observation may be true. Adm Ernest J. King is reputed to have said of this traditionally unglamorous field, "I don't know what the hell this logistics is that Marshall is always talking about, but I want some of it."<sup>3</sup> War at the operational level may be logistics, but assuming then that it is the purview of the logistician is wrong and a gross oversimplification. Logistics is certainly inseparable from war at the operational level, but bombs, bullets, and meals ready to eat don't win wars. Put in the right place at the right time, however, they can. It is the warfighting general, think-





ing and planning at the operational level, who makes that happen.

More important than logistics, war at the operational level is knowing your objective and then deciding how you are going to get there. Put more simply, it is knowing how you will know when you've won. The objective was fairly simple in 1945 and, perhaps, in Grenada. It was not clear in Vietnam, and that may have been the fundamental error. It was certainly unclear for the marines in Lebanon, as well as for the ANZAC (Australia and New Zealand)

troops clinging to the cliffs of Gallipoli. An objective is as fundamental as knowing what the target is and at times as hard to pin down as knowing what the American people really want from their Air Force. Without that answer, though, all is lost.

So, where in the Air Force is the operational level? With apologies to Col Clifford R. Krieger,<sup>4</sup> except for the rarest and most unconventional of situations, the wing is not at the operational level. The wing is firmly entrenched at the tactical level and well suited to that crucial function. As the



air component commander's planning and operations center, the Tactical Air Control Center (TACC)—or in Allied Command Europe, the Allied Tactical Operations Center (ATOC) or the Air Combat Operations Center (ACOC)—is the operational level in a deployed Air Force. You are forgiven for not realizing this fact, though, for these command centers tend to get deeply involved in the planning of specific force packages. In so doing, they become immersed in the tactical level and far removed from the big picture—the operational level. If they aren't



*Aerial resupply (at Khe Sanh, left) and interdiction (above) were missions that the US Air Force performed well in Vietnam. Nevertheless, we lacked overall objectives and a sense of how the air war meshed with the total effort. Our inability to see beyond the tactical level was costly.*



working the operational problem, though, nobody is.

The air component commander, however, is the air operational commander, regardless of his operating location. He is the one who takes the overall objectives as established by the political leaders and turns them into firm plans that will support the theater commander's intent. The component commander is at the lowest level of decisionmaking authority that permits him to act as an operational commander. People at lower levels follow orders.

The air commander doesn't operate alone, though. His staff identifies the weak spots for him, collects the situational information on friend and foe, and suggests options. This is the point where the rest of us come in. Although there can be only one operational commander, there is plenty of room for people to think and plan at the operational level.

### Thinking and Planning at the Operational Level

Thinking and planning at the operational level is more than reporting enemy movement—it is divining intentions. It is more than counting bombers and tanks—it is figuring out how to stop them, whether by destruction, isolation, or starvation. It is even more than assigning targets and ordnance loads—it is calculating how to strike the enemy's center of power (center of gravity?) with overwhelming force. It is more than always talking in sweeping generalities. It is getting down to specific enemy commanders and their personalities, specific theater scenarios and how we might respond to them, and specific political objectives and how we could accomplish them. Thinking at the operational level is not something we do very often nor something most exercises are designed to test.

Yet, it is one of the easiest educational programs to start. It doesn't take a state-of-

the-art simulation center, a multimillion-dollar budget, or a massive manpower effort. All it takes is a commitment on the part of military professionals to spend the time necessary to read and discuss the past masters, study the maps and area abstracts, and brainstorm the what-ifs. Time is what it costs, and although time doesn't come cheap, it's not subject to budget cuts.

This time should first be spent in professional reading. There are two types: the classics (and near classics) and the professional journals. By reading this article, you already know of and read one of the journals. There are many others. Get on the distribution list for the Army's *Military Review* and *Parameters*. The former is published by the Army Command and General Staff College, and the latter is the journal of the Army War College. You should also read the *United States Naval Institute Proceedings*, *Naval War College Review*, and the *Marine Corps Gazette*. These are professional publications written by your contemporaries. If you are a field-grade officer or above, you should see every issue. You won't read every word, but you will find a relevant article in each. Your base library should have them. If it doesn't, request them.

You must also read the classics. This task is formidable and time consuming because there are so many of them. Some, however, are the standards. As Dr Alan Gropman suggests in "An Airman's Quintet," the first of these is Clausewitz's *On War*.<sup>5</sup> This 717-page encyclopedia of warfighting principles is probably the most quoted and least read of any military book in print. For those of you who want to continue this tradition, there are numerous extracts and edited versions in print. Find one and read it. If it whets your appetite, read the complete work.

One classic that needs no editing, yet is also little read and often quoted, is Sun Tzu's 2500-year-old masterpiece *The Art of War*. As James Clavell states in the introduction to his 80-page edition,

I truly believe that if our military and political leaders in recent times had studied this work



of genius, Vietnam could not have happened as it happened; we would not have lost the war in Korea; the Bay of Pigs could not have occurred; the hostage fiasco in Iran would not have come to pass; the British Empire would not have been dismembered; and, in all probability, World War I and II would have been avoided.<sup>6</sup>

There are many other "must reads," and a number of suggested bibliographies can be obtained from any of the professional military schools. Also available from various commercial and government sources are many published collections of significant writings.

Reading is only one of the ways we can prepare ourselves to start thinking at the operational level. Talking about warfighting with other professionals is another. Eisenhower used this method extensively, as did Patton and others.<sup>7</sup> Those who have gone through a staff or war college recently, either in residence or by seminar at their home base, have used this method extensively and may have strong feelings about its value. Frankly, discussion groups can either be stimulating or boring. Wargaming can be square filling or thought provoking, depending upon the participants, their professionalism, and the relevance of the issue. It is vital, however, to avoid thinking in a vacuum. The intellectual honesty that comes from many minds challenging and questioning one another is the key to finding real answers to problems, as is the motivation that comes from being with peers and superiors.

A few notes of caution are necessary, however. One is that it is easy to begin a discussion of operational warfare or a war game and immediately reduce it to the tactical level. When you start to name specific units, pieces of equipment, and even specific types of aircraft, or start time-phasing specific actions, you may have gone too far. This trap is easy to fall into and for good reason.

We have all spent most of our careers at the tactical level, whether we came up through Tactical Air Command, Military

Airlift Command, Air Force Systems Command, and so forth. Tactics is what we know the best, are most comfortable with, and, perhaps, perform the best. It is natural, therefore, that we tend to emphasize that level. When we are talking at the operational level, though, it is vital to remember that the tactical level is no longer our responsibility. Others will take care of training, maintaining, and supplying. Others will lead the flight or motivate the troops. The operational commander and staff have to look at the bigger picture. At the operational level, if the operational capability and reporting system says that a unit can do a mission, we must assume that it can. That may be a tough assumption to make, but it is vital to do so. You have to let the other people do their jobs.

It is probably also a waste of time to talk about situations that have no relevance to the organization involved. A command primarily concerned with airlift may have to disregard the counterair battle. An organization located in the Far East is probably not going to be sent to the defense of northern Norway. Spend time thinking through your theater and the tasks your organization is likely to face. Do not, however, always limit your discussions to "the big war." The art of operational warfare is equally applicable to all levels of conflict.

Thinking through relevant scenarios also has the direct advantage of clarifying for everyone the boss's thinking, and it gives the "nuts-and-bolts" planners something that they usually don't have—firm guidance on what the war plan is. It also allows the commander and the senior staff to tell the planners how the war is to be fought, rather than relying on a briefing by the duty action officer on what "the plan" says. In effect, this procedure puts the responsibility for making major warfighting decisions where it is supposed to be and out of the plans shops. The planners will welcome the guidance.

There is a danger in sticking too close to home, though. The nice thing about operational-art wargaming is that you can project

your organization into any situation you deem feasible. And it is important to do so. Continually studying the same scenario is stagnating. Let the mind work a little. What would you do if you had to move a force into a new area? How would you get there? Where would you base? What infrastructure would be available? Who are your allies? What are their capabilities? Who are your enemies? What are their capabilities and objectives? Where would they base? What would you do if you won? Make your intelligence staff work. Task them to give you some answers, and then work the operational plan based on what they tell you. They will welcome the challenge.

Finally, don't ignore the other services. There never has been, nor ever will be, a modern single-service war. Joint and—in all probability—combined warfighting will be the norm. This principle was codified as early as May 1943 by then Brig Gen Laurence S. Kuter, who concluded that

it is clear that a modern battle is not fought or won by a ground force alone or by a naval force alone. Any modern successful battle consists of a battle in the air which must be won before the surface battle is begun. If the air battle has been won the surface forces are freed from effective hostile air attack and the offensive power of the free air force can be applied directly in support of the surface forces. Modern battles are fought as intensively in the air as on the ground. They are combined battles in which the air forces are placed in a supporting role no more often than the ground or naval forces. Each carries out its part of the task to attain the common goal.

This conception cannot be applied if one force is subordinate to another. An air force coordinate with the ground force and the naval force is the only solution by which the three forces can be made to play coordinate roles.<sup>8</sup>

If your discussions lend themselves to input from other services or nations, strive to include them in your group. You will benefit from their contributions. You will find them to be as responsive, knowledgeable, and opinionated as you are. You may have to command them some day. It is wise to know them.

## Conclusion

We are in this business to win wars. To attempt to do so without preparing our minds as well as we do our bodies, organizations, or machines is negligent. Thinking, talking, reading, and writing about what it means to be at war and how we will win the next one are vital parts of this personal preparation. Leaving the intellectual level of activity to civilian think tanks, educational establishments, or someone else is negligent, or worse.

It simply is not enough to be a good pilot, maintainer, or battle manager. We have good lieutenants and captains to do those things. Nor is it enough to be a part of a gaggle at a Blue Flag, an eager participant at the wargaming center, or a member of the warfighting directorate. We need to be all of these, but we must also do the hard, intellectual work needed to train our minds. Anything less is unprofessional. □

### Notes

1. Harry Glenn Summers, *On Strategy: The Vietnam War in Context* (Carlisle Barracks, Pa.: Army War College, Strategic Studies Institute, 1981), 1.

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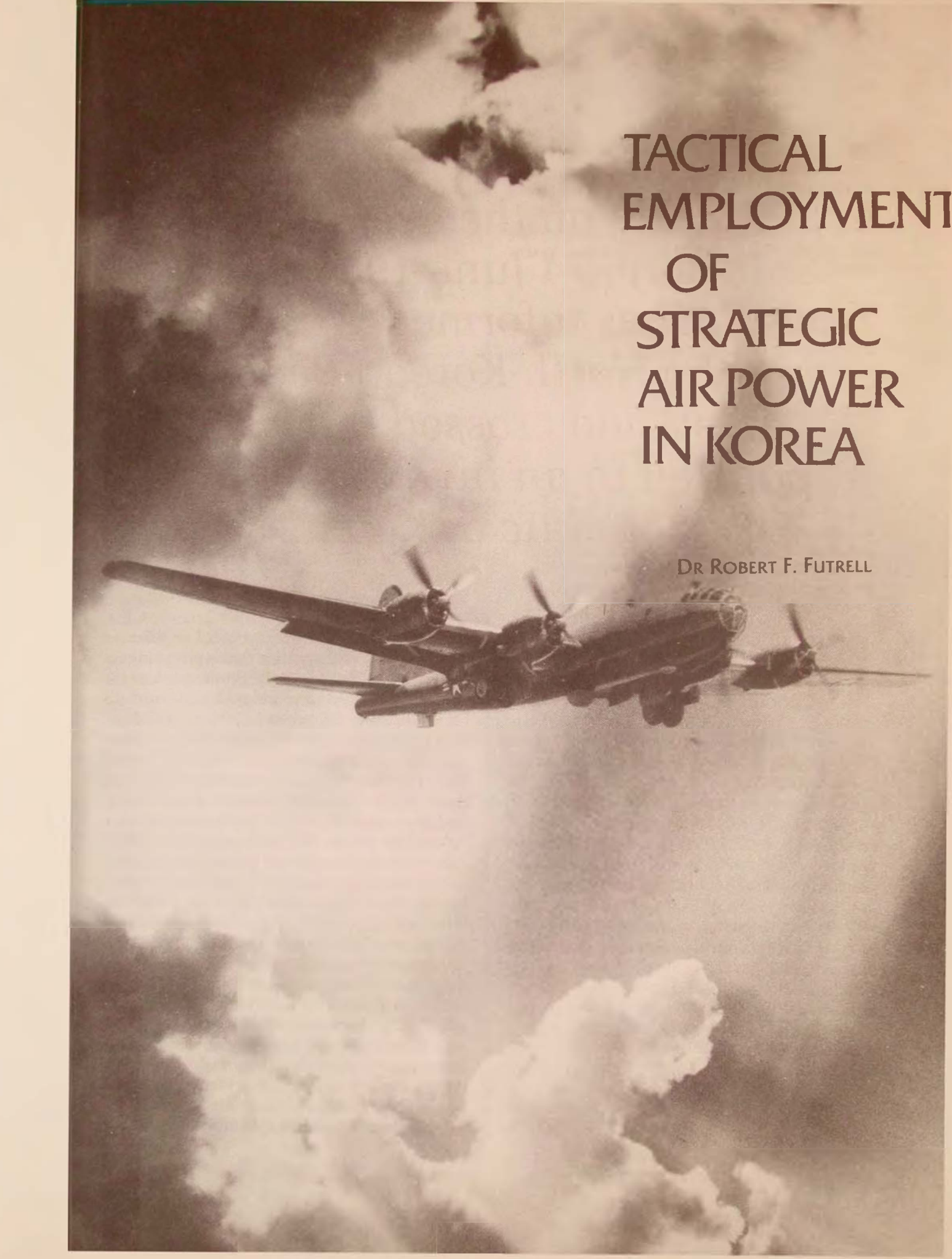
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TACTICAL  
EMPLOYMENT  
OF  
STRATEGIC  
AIR POWER  
IN KOREA

DR ROBERT F. FUTRELL



Early on the evening of Saturday, 24 June 1950, press news flashes informed Washington that the North Korean People's Army had crossed the 38th parallel in an invasion of the Republic of Korea.

**P**RESIDENT Harry Truman was in Missouri, and in the first hours Washington policymakers hoped that the South Koreans could withstand the invasion. When the situation worsened, Truman flew back to Washington for a Sunday-evening dinner meeting with the secretaries of state and defense and the members of the Joint Chiefs of Staff. For some time Gen Hoyt S. Vandenberg, chief of staff USAF, had feared that an outbreak of war was going to come somewhere in the world. He also knew that after the postwar demobilization, the US Air Force was, in his words, "a shoe string air force."

Vandenberg would remember that most of the discussion at the Sunday meeting was speculation about whether the Soviet Union or China might take a hand in the

fighting. There was no argument or discussion about the difficulties that were going to be involved if the poorly prepared American armed forces were ordered into combat. However, one thing was certain: Vandenberg knew and frequently told listeners that the US Air Force was on trial in Korea. Based on his wartime experience as a foremost tactical air commander, Vandenberg had an interesting view of the unitary nature of air power. He had hoped to rid the Air Force of the arbitrary separation of combat units into "tactical" and "strategic" forces. In Korea, strategic B-29 bombers were going to deliver the heaviest blows against the Communist invaders.

At the outbreak of the war, General Headquarters (GHQ), US Far East Command (FEC), in Tokyo had no combat mission relevant to the Republic of Korea. The Far East Air Forces (FEAF) was geared for air defense provided by the Fifth and Thirteenth Air Forces. FEAF had, however, managed to retain the Twentieth Air Force with one B-29 wing on Guam. This unit was the 19th

This article is derived from a presentation Dr Futrell gave to the Air Power Symposium held at the Air War College in March 1988. For those readers who have followed the development of the conventional bombing role for the B-52, this article may ring some familiar bells.

Wing, and it was the only strategic wing not assigned to Strategic Air Command. In an expedited movement, the 19th Group's air echelon immediately moved to Kadena Air Base on Okinawa, from which location an Army staff group in GHQ undertook to direct its employment in support of friendly ground forces in Korea.

The effort to manage the B-29s from GHQ was somewhat short of successful. For an initial strike, aircraft were loaded with fragmentation bombs and directed to hit Red aircraft at Wonsan. The strike was diverted to attack Han River bridges at Seoul, where the frags were virtually useless. In the days that followed, the B-29 crews were ordered to search out and bomb enemy tanks. Another mission was ordered out to destroy bridges at coordinates on a supposed east coast rail line. This task was difficult since the rail line, though shown on a map consulted, had never been built. Out of 220 targets designed by the GHQ Target Group from 17 July to 2 August, some 20 percent did not exist. The principal reason was inaccurate maps, but in one instance the Target Group misread a map and ordered B-29s against a river "bridge" that was marked as a ford on the map consulted.

In Tokyo, Lt Gen George Stratemeyer acknowledged that Korea would doubtless have fallen to onrushing Communist tank columns without all-out air attacks of some sort. He also knew, however, that continued air employments at the front lines in always "urgent" strikes would be extremely wasteful in a war of any duration. Acting on his own initiative in Washington, General Vandenberg got approval to move two medium-bomber groups—the 22d and 92d—from Strategic Air Command's Fifteenth Air Force to the Far East on temporary duty. He sent the B-29 groups because of "the vital necessity of destruction of North Korean objectives north of the 38th parallel." "While I do not presume to discuss specific targets," he informed Stratemeyer, "it is axiomatic that tactical operations on the battlefield cannot be fully effective unless there is a simultaneous interdiction and de-

struction of sources behind the battlefield." Vandenberg sent out Maj Gen Emmett O'Donnell, Jr., Fifteenth Air Force commander, to serve as the first of a succession of bomber commanders. O'Donnell would remember being called to Washington, where Vandenberg simply said, "Rosie, go out there and do some good and take some pictures of it."

General O'Donnell established Headquarters FEAF Bomber Command (Provisional) at Yokota Air Base in a directly subordinate status to FEAF. From this location on 13 July, only nine days after movement orders were issued, O'Donnell sent the 19th and 22d Groups against railway yards and a major oil refinery at Wonsan. O'Donnell would later recall:

It was my intention and hope that we would be able to get out there and to cash in on our psychological advantage in having gotten into the theater and into the war so fast, by putting a very severe blow on the North Koreans, with an advanced warning, perhaps, telling them that they had gone too far in what we all recognized as being a case of aggression . . . and go to work burning five major cities in North Korea to the ground, and to destroy every one of about 18 major strategic targets. . . . Tell them to either stop the aggression and get back over the thirty-eighth parallel or they had better have their wives and children and bedrolls to go down with them because there is not going to be anything left up in Korea to return to.

When Stratemeyer heard O'Donnell's proposal, he told him that overriding political and diplomatic considerations prevented its acceptance. The order was out that indiscriminate use of incendiaries would not be sanctioned and that no unnecessary civilian casualties would come from air attacks. Before long, O'Donnell remarked, "We are fighting distinctly 'under wraps'."

After the attack on Wonsan, Gen Douglas MacArthur, commander in chief (CINC), United Nations Command (CINCUNC)/Far East Command (CINCFE), gave the Eighth US Army in Korea (EUSAK) first claim on all B-29 resources for supporting strikes to be flown between the battle line being drawn around the Pusan perimeter and the

38th parallel. Maj Gen Otto P. Weyland, who was FEAF vice commander and who would take command when Stratemeyer suffered a heart attack, argued for a comprehensive air-interdiction plan reaching far into North Korea. Otherwise, Weyland said, "It was like trying to dam a stream at the bottom of a waterfall."

On 24 July, Weyland persuaded the FEC staff to accept a general scheme whereby two B-29 groups would attack deep communications, and one would provide close support. Since this plan meant that no B-29s would be available to bomb war-supporting industrial targets in North Korea, the Joint Chiefs of Staff indicated that they were prepared to dispatch two additional B-29 groups on temporary duty to be used against targets they would name in North Korea. General MacArthur accepted, and the 98th and 307th Groups commenced moving across the Pacific. The 98th joined the 92d Group at Yokota, and the 307th joined the 19th and 22d Groups at Kadena. A Bomber Command Advance Echelon was opened at Kadena to handle any last-minute changes in mission orders issued by FEAF. Logistic support for the B-29s was scarce; accordingly, it became standing procedure that there would be no changes in bomb loadings at Kadena.

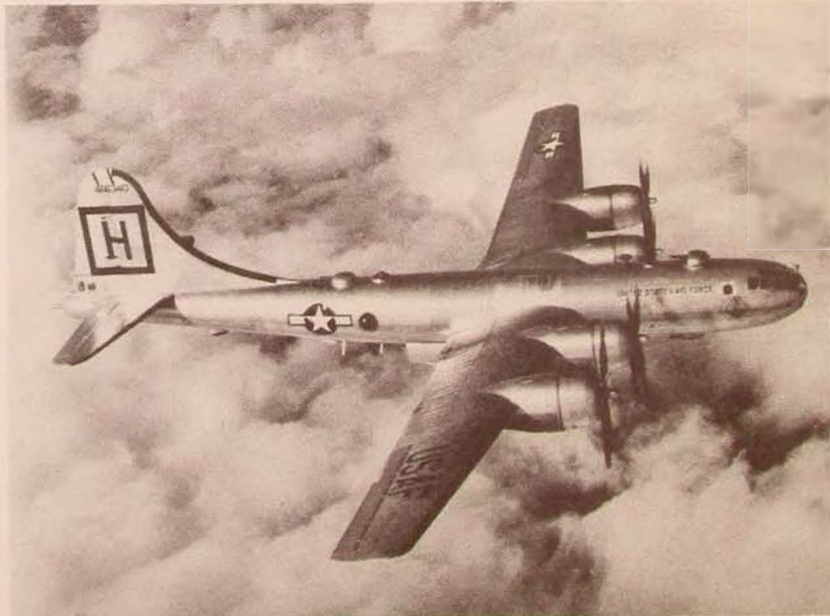
The FEAF Bomber Command had no difficulty handling the industrial targets in North Korea, but its major task was in cutting bridges and knocking out marshaling yards ranging roughly from the Han River toward the Yalu. Enjoying control of the air and operating without meeting much ground fire, the B-29s cut concrete-span bridges rather easily with 500-pound general-purpose (GP) bombs—admittedly not the best choice in armament but versatile enough to be used despite frequent last-minute changes in targets. The Japanese had previously spanned major streams with heavy steel bridges, and these were more difficult to drop. No bridge was so perverse as the steel-cantilever, west railway bridge across the Han at Seoul. Only the 19th Group had racks for large bombs, so its



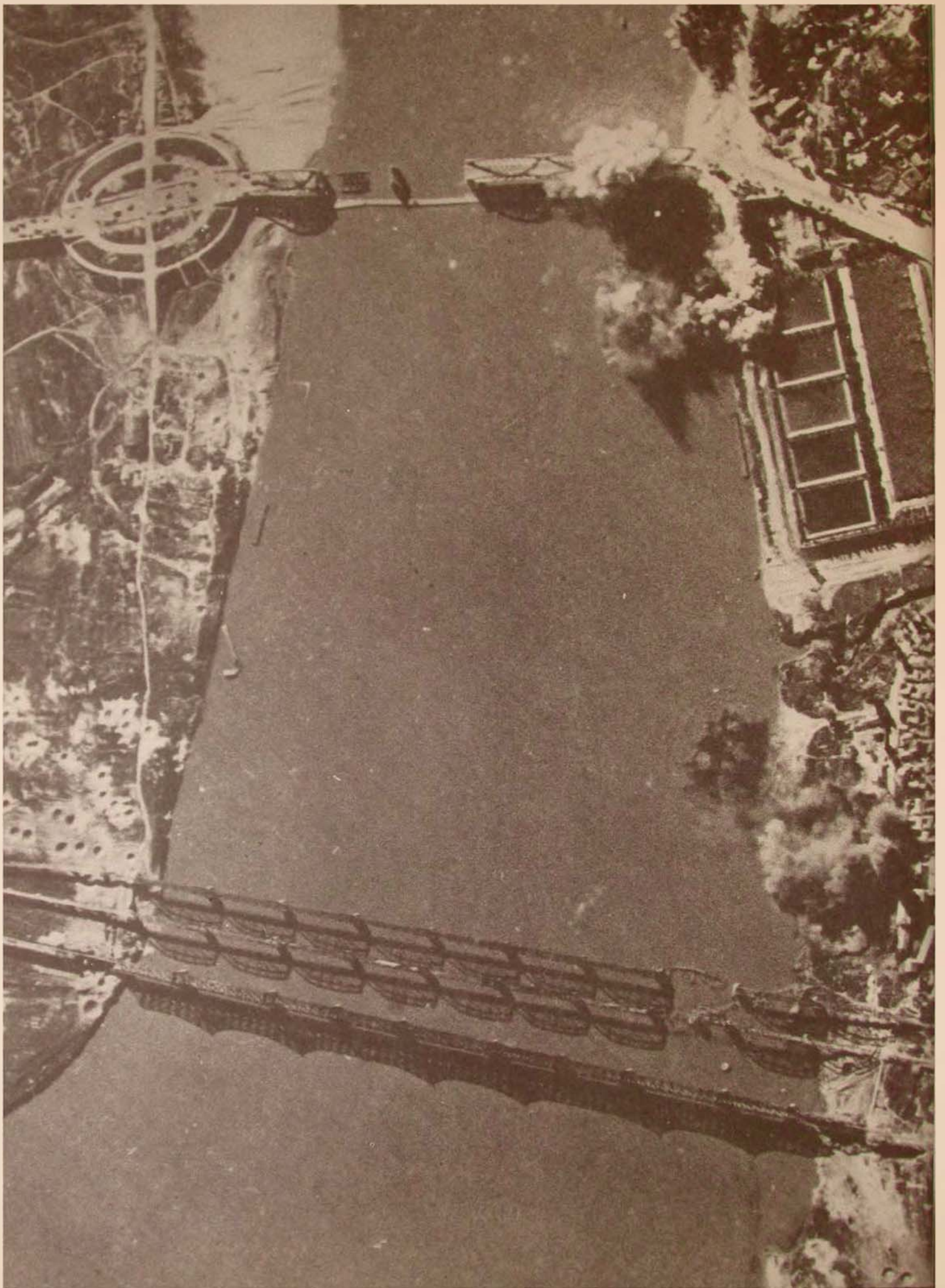
The B-29 Superfortress (above) was used in Korea to attack strategic targets and to support tactical operations. Because the B-29s were hastily moved from their permanent bases on Guam and in the United States to Okinawa and Japan, initial maintenance operations and logistical support for the bomber units (right) were hampered.

When properly used, the B-29 was an effective instrument of war. However, lack of accurate maps and long-distance management from FEAF Headquarters often sent B-29s like this one from the 98th Bombardment Wing (far right) against inappropriate targets or with inappropriate bomb loads.

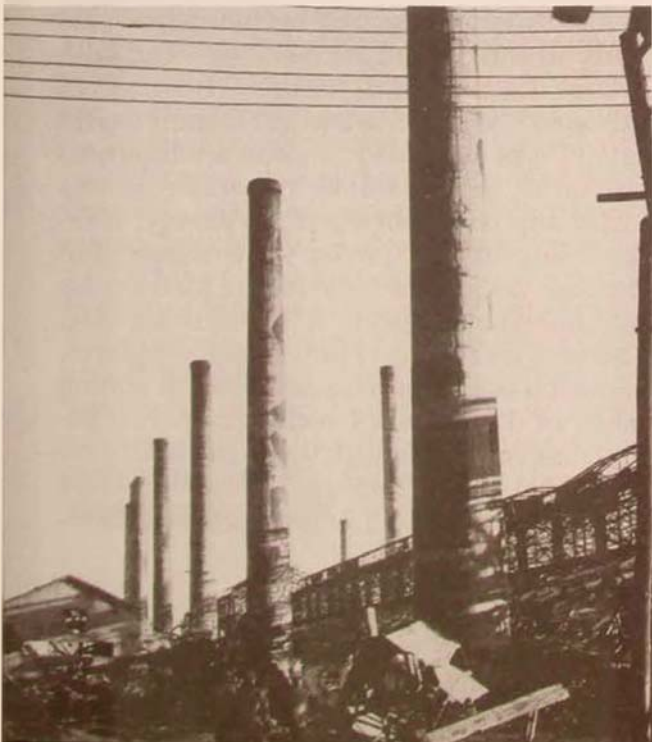
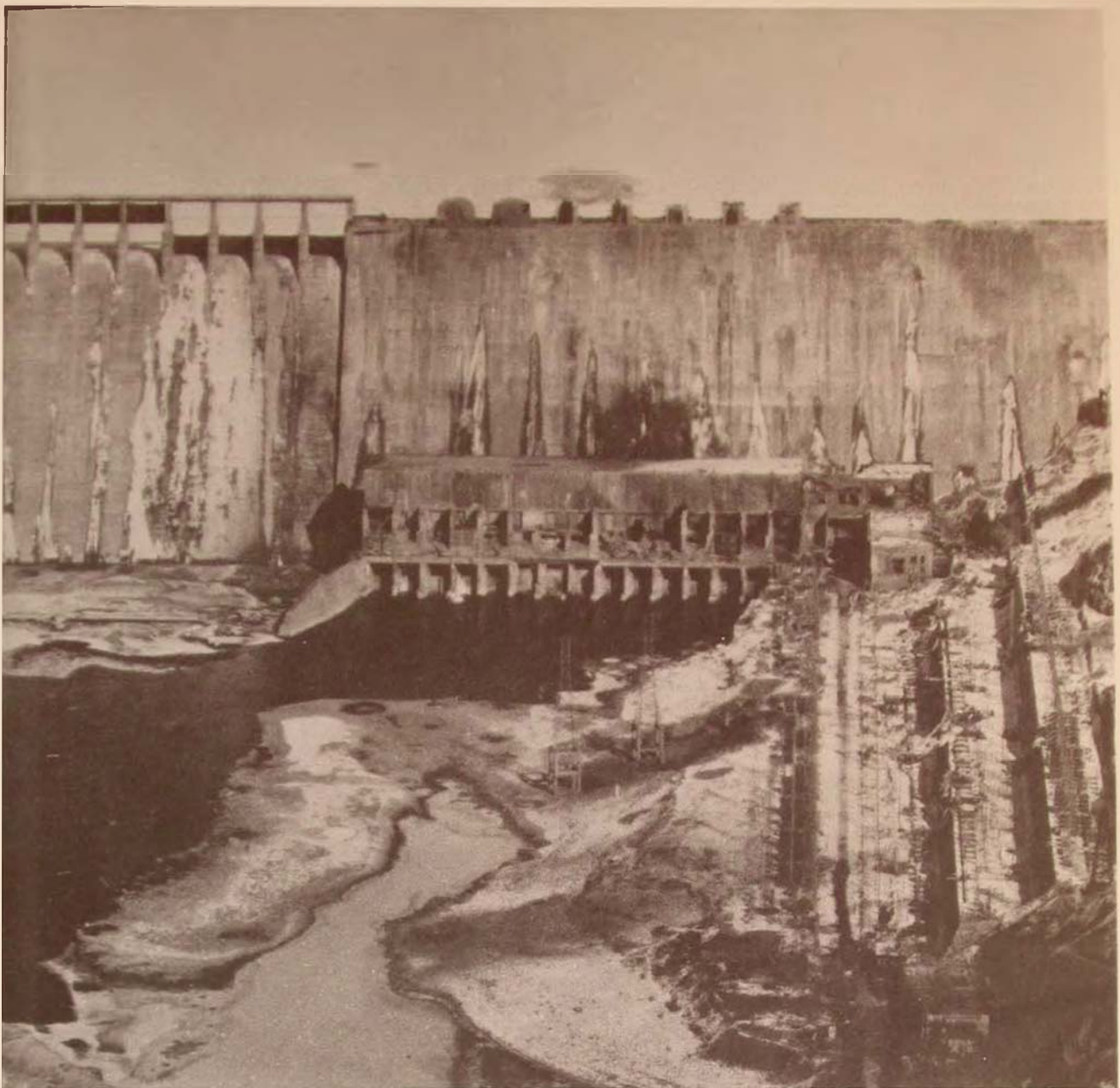












*The concrete highway bridge over the Han River (far left) was a tough target for B-29s using general-purpose bombs. FEAF aircraft had more success against North Korean industrial targets such as this power plant (above) and this steel mill (left), which was 90 percent destroyed.*





*A major reason the B-29s were kept in Korea was that light aircraft, such as these B-26s, could not carry sufficient ordnance to destroy their targets.*

planes attacked the bridge almost daily with 1,000-pound, 2,000-pound, and 4,000-pound GP bombs. A Navy carrier-based squadron joined the strikes on 19 August, and that night the weakened structure collapsed. In all, the destruction of this bridge had used up 80 Bomber Command sorties and 643 tons of bombs.

By mid-August 1950, General MacArthur, feeling that the defense of the Pusan perimeter was stabilizing, was planning an amphibious landing at Inchon, near Seoul. The Eighth Army, however, was still fighting hard to keep the key city of Taegu, and an enemy force was believed to be building up just across the Naktong River. MacArthur called in Stratemeyer and O'Donnell on 14 August and gave the entire B-29 force to the

Eighth Army for a carpet-bombing mission. According to O'Donnell, MacArthur went to his situation map, laid his hand flat—covering terrain behind the Naktong—and said, “Rosie, I want you to make a wilderness of this area.” With 98 B-29s, O'Donnell would say, “I was supposed to make a wilderness out of 27 square miles, in which no one knew any whereabouts of an enemy, if indeed any enemy forces were there.” But Bomber Command took on the mission for psychological reasons if for nothing else. The area was divided into 12 equal squares, and each squadron was assigned an aiming point in the center of each square. Just before noon on 16 August, the B-29s went over the target in 30 minutes, dropping 3,084 500-pound and 150 1,000-pound GP bombs.

O'Donnell remained over the area for two and one-half hours without seeing any evidence of enemy activity. The Eighth Army did not advance into the area, so an assessment of the results of the massive Waegwan carpet-bombing attack was never possible.

The combination of Eighth Army defense and the aerial interdiction of daytime movement southward sapped the strength of the North Korean army. Captured consumption figures for one North Korean division showed that the division had received 206 tons a day to mid-July, 51 tons a day to mid-August, and 21.5 tons a day to mid-September. Early in September, the Korean Reds were desperate. On 9 September, attacks launched against the US 2d Division on the Naktong line were in five waves; the first three waves were armed, and the last two were sent onto the battlefield to pick up weapons from the dead and dying. To hasten the North Korean collapse, General MacArthur launched the US X Corps in an amphibious landing at Inchon on 15 September 1950. Remnants of the North Korean People's Army fled into North Korea, and United Nations forces followed with little initial opposition.

To accompany the collapse of the North Korean armed forces, FEAF had been urging an all-out incendiary assault against the North Korean capital at Pyongyang. Headquarters USAF, however, instructed that any such attack would have serious political implications and would not be undertaken. Since United Nations forces were not meeting much opposition and were expecting to occupy North Korea, the Joint Chiefs on 26 September canceled any further strategic targets. In late September and early October, B-29s hit enemy troop cantonments, but these strikes were suspended on 11 October when it was reported that friendly prisoners of war were being held in these camps. With the Eighth Army forging ahead in western Korea and the X Corps advancing in eastern Korea, it was no longer advisable to cut bridges. Targets got so scarce that one 92d Group crew chased an enemy motorcyclist down a road, toggling

off bombs until one threw him into a ditch. On 10 October, FEAF reduced Bomber Command's sorties to about 25 a day, some of which dropped psywar surrender leaflets. And on 25 October, MacArthur released the 22d and 92d Bombardment Groups to return to the United States.

From the start of the Korean conflict, United Nations airmen were charged to keep well clear of the Manchurian and Siberian borders. The rule became more restrictive as ground forces moved closer to the Yalu. The restriction was tightened further still after the 98th Group inadvertently bombed the Chinese city of Antung on the night of 22 September. Unknown to the United Nations Command, Chinese Communist troops began to cross the Yalu on 14 October. Hiding in tunnels by day, they traveled south by railroad into the gap between the Eighth Army and the X Corps. Swept-wing MiG-15 jet fighters showed up across the Yalu, and on 2 November an American cavalry regiment was mauled by Chinese troops in northwestern Korea. In his office in Tokyo, MacArthur did not believe that the Chinese would cross the Yalu in force. If they did, he was sure that they would be slaughtered by air attack. On 5 November, MacArthur ordered FEAF to lay on two weeks of maximum effort. He said, "Combat crews are to be flown to exhaustion if necessary."

Starting southward from the Yalu and exempting only a few proscribed objectives, FEAF was "to destroy every means of communication and every installation, factory, city, and village." The first overwater spans of all international bridges on the Yalu were to be destroyed. In all, there were 12 of these strongly built, steel bridges of much the same construction as the Han River bridge that had been so difficult to drop. The bridge targets plus cities and towns were assigned to Bomber Command. Because of the magnitude of the task, the use of incendiaries on the cities and towns was authorized in order to destroy shelter that would be used by troops coming in from Manchuria. With Fifth Air Force fighter cover, 79 B-29s

dropped 584.5 tons of 500-pound incendiary clusters and 1,000-pound bombs against Sinuiju on 8 November, devastating the city's built-up area and hitting the approaches to the international bridge.

In the next two weeks, fire attacks destroyed large portions of 10 other cities immediately south of the Yalu, depriving the Chinese of badly needed shelter. Chinese prisoners would later reveal that they had suffered markedly in the harsh, frigid weather. Most of the troops of the Third Chinese Field Army were natives of a mild climate in Shantung Province and felt the cold sorely. Nevertheless, soldiers from this field army detrained at Chian in Manchuria, crossed the Yalu on pontoon bridges shortly after 10 November, and passed through the city of Manpojin before the B-29s burned it. From there, they traveled south by train to get into the position from which they were going to ambush US Army and Marine Corps troops around the Choshin Reservoir in the east-central Korean mountains.

The Japanese had built the Yalu River bridges to withstand great natural adversity. They would have been difficult targets for iron bombs in any event, and the difficulty was compounded by the high-level injunction that B-29s must not fly over Manchuria. The presence of MiG fighters and anti-aircraft artillery added to the bombing problem. The B-29s started bridge bombing on 8 November, but the strikes were then delayed by unfavorable cloudy weather. Since the B-29s were not getting results, US Navy dive-bombers were added to the fray, beginning on 12 November. By the end of November, the United Nations air effort had cut four of the international bridges and had damaged most of the others. By this time, the Chinese had thrown a number of pontoon bridges across the Yalu. The river was freezing hard enough so that heavy loads could cross on the ice. Accordingly, the Yalu bridge attacks were suspended as of 5 December, to be renewed again with the spring thaw in 1951.

On 9 December 1950, FEAF ordered that the main medium-bomber effort would be

an interdiction program to limit hostile troop movements and resupply by rail southward from the Yalu. This program would focus on enough bridge cutting so that the enemy would have no stretch of usable rail longer than 30 miles. Because of the MiG interceptors, most bridge attacks were now made by four-ship flights for mutual support and with fighter cover. During February, these demands for fighter cover were so great that the Fifth Air Force attempted to take over the job of bridge cutting in the area of northwestern Korea that was being described as "MiG Alley." The tactical fighters, however, could not carry enough ordnance to handle the task, and effective 1 March the detail was given back to Bomber Command.

At the end of March, Yalu River ice was beginning to break up, and the B-29s sought to resume the international bridge attacks. Adverse target weather plagued what had to be visual bombing and diverted attacks to alternates quite frequently. By mid-April, however, persistent Superfortress attacks had severed most of the key bridges with the notable exception of the massive railway bridge at Sinuiju, which refused to fall, even after being attacked on 12 April by 39 aircraft using 2,000-pound bombs. Even though the B-29s were covered and escorted by F-80s and F-86s, the MiG fighters were able to penetrate the cover. They shot down a B-29 on 7 April and three more on 12 April. On 12 April, seven other B-29s were damaged but managed to survive.

Even though the Sinuiju bridge was still standing, Bomber Command had to shift to a more ominous target system on 13 April. The Soviet Union had elected to equip the Chinese Communist air force with MiG interceptors that did not have range enough to get to the battlefields in South Korea if they flew from operational bases in Manchuria. In preparation for their spring offensive in 1951, Chinese ground troops were led to believe that they would have tactical air support, even though the MiGs would require forward airfields within North Korea. In March, the Chinese began to repair 10 air-



fields in North Korea. It was Bomber Command policy not to strike an airfield until it was nearing operational status. After 13 April, the medium bombers began a priority neutralization of all North Korean airfields. Bomber Command scheduled an average of 12 planes a day to crater runways and strew delayed-action explosives over each of 11 fields. This activity continued to get main emphasis until the end of April, by which time the Communists gave up the repair effort. That FEAF had not been stalking a bogey was later obvious when a copy of a report by a Red Chinese aviation inspection group came to hand. This report bitterly deplored the lack of success in rehabilitating North Korean airfields and asserted, "If we had had a strong air support we could have driven the enemy into the sea."

Since Communist ground forces generally preferred to fight at night, General Stratemyer announced quite early that FEAF must find control techniques to permit close air support during limited visibility. Strategic Air Command had developed AN/MPQ-2 radars for judging simulated bombing, and three detachments equipped with this radar were brought to Korea. At the end of February 1951, the MPQ-2 radars were able to control both B-26 and B-29 aircraft in strikes along the front lines. Starting on 6 March, Bomber Command committed one or more B-29s to MPQ missions each night. In these strikes, 58 B-29 missions dropped 557.95 tons of bombs in April, and in May 208 sorties dropped 2,042 tons immediately behind the front lines.

The radar-controlled missions were essentially simple. The MPQ-2 radars (later replaced with AN/MSQ-1 sets) were detached to each US corps. Individual B-29s reported to these "tadpole" controllers each 30 minutes, flew assigned courses, and dropped bombs as directed. Ordnance was usually 500-pound general-purpose bombs, with proximity-fused nose, delay arming, and nondelay tail fusing. Each B-29 so loaded could rain down 600,000 high-velocity fragments, which by all reports proved deadly to enemy personnel caught

in the open forming for attack. Especially with the X Corps, the B-29 night bombing was highly successful. The X Corps got targets from prisoners, observation posts, artillery observers, last-light fighter pilots, and spotted areas where enemy troops were disposed. Lt Gen E. M. Almond, X Corps commander, called the ground-radar-controlled night bombing "an epic in our warfare."

After the collapse of their 1951 spring campaign, the Communists were on the brink of a military disaster in mid-June. On 23 June, the Soviets proposed cease-fire discussions, and armistice negotiations began on the morning of 10 July. General Weyland, who had taken command of FEAF, announced that combat operations would continue at a normal rate, but there was a question as to what would be the best air employment. Air partisans in Washington urged General Vandenberg to come out in favor of suspending close air support and concentrating everything on interdicting supplies to the Chinese armies. Vandenberg demurred, remarking that "we used to bomb and close the Brenner Pass every day, and the Germans opened it every night." He also knew that successful air interdiction depended on heavy ground fighting to force the enemy to consume supplies faster than they could be delivered.

Nevertheless, the Fifth Air Force opted to emphasize a rail interdiction effort that was nicknamed "Strangle." Most work would be done by tactical fighters against stretches of rail track, while Bomber Command was tagged to make strikes on major bridges and marshaling yards. The interdiction program apparently took the Reds by surprise and was initially going well. But at the end of September, a tactical reconnaissance plane discovered an entirely new runway under construction far south, near the end of MiG Alley. More recce showed two more new fields, evidently designed for permanent occupancy. With MiGs based so far forward, the Communists could expect to extend air coverage as far south as Pyongyang.

On 18 October, the B-29s commenced daylight attacks against the airfields and

met determined MiG opposition. The B-29s were covered by F-84s and F-86s, but no amount of cover could prevent the Red interceptors from getting through. The MiGs shot down a B-29 on 22 October, and the disaster was capped when three B-29s were downed on 23 October and five received major damage. The old Superfortresses could no longer work against Communist jets in daytime skies. At this time, some B-29s had been equipped for SHORAN\* bombing so they could lead formations in adverse weather. This capability enabled the B-29s to keep flying against MiG Alley airfields and bridges during nighttime. There was some difficulty with mapping errors that had to be corrected, but the bombers kept the airfields under attack.

For a while, Communist ground repair kept pace with bomb craters, but during December the Reds called a halt to the repair effort. As it happened, the Communists had ample supplies of manual labor, and they could repair several craters as quickly as they could one crater. Bomber Command, moreover, habitually used 100-pound GP bombs to get good patterns. Intelligence would later point out that most of the Red airfields were built on low-lying flood plains. Consequently, hits by 500- or 1,000-pound bombs penetrated the water table, making waterlogged craters that were quite difficult to repair.

In eagerness to speed cease-fire negotiations, United Nations representatives proposed in October 1951 that existing battle lines become lines of demarcation at the conclusion of a cease-fire. On 15 November, Gen Matthew Ridgway, who had become CINCUNC/CINCFE, directed the Eighth Army unilaterally to cease offensive actions and begin an active defense on its front. The Communists took advantage of this respite. They first secured their forward positions and then echeloned the preponderance of

their armies back toward the Yalu, thereby greatly simplifying their logistic support requirements in the forward areas. After November-December 1951, the situation in Korea was rather much like it would be in South Vietnam two decades later. The Chinese fought only when they wished, expended supplies judiciously, and offered few gold targets to air power until the closing weeks of the war. At that time, they launched large ground attacks, apparently to pretend that they were ending the conflict on a winning note.

With the ground front stalemated, the Fifth Air Force early in January 1952 sponsored an interdiction plan aimed at then developing interdiction targets. One thought was that the bombers (either B-26s or B-29s) could saturate a given chokepoint on rail and road nets, thereby backing up traffic for destruction by tactical fighters. One such happening was the so-called Wadong chokepoint attack: in 44 days of bombing ending in March 1952, the bombers saturated a rail and road link through a supposedly impassable defile. This massive effort blocked the rail line for only seven days and the highway only four days. Elsewhere during the spring, B-29s were able to cut bridges with SHORAN-directed strikes, but the Communists got the bridges back in operation very quickly.

In April 1952, Gen Mark Wayne Clark became CINCUNC/CINCFE, and before long he informed the Joint Chiefs of Staff that the "underlying reason for the failure thus far to achieve an armistice is that we have not exerted sufficient military pressure to impose the requirements for an armistice on the enemy." On 10 July 1952, FEAF issued a new operational policy directive calling for applying the pressure of air power against the Communists to speed armistice talks. Bomber Command was to direct its efforts against communications centers, manufacturing facilities, supply concentrations, and the like. The idea was to undermine the North Korean regime by inflicting economic damage that would become a drain on peacetime recovery. Bomber Command ex-

\*The SHORAN (short-range navigation) bombing system paired two ground radar beacons and a transceiver in the aircraft to give the aircrew a positive location above an enemy objective at night or in bad weather. In Southeast Asia, the system would be called SKYSPOT.

pected to hit between 60 and 80 diversified SHORAN targets a month, many of which were inexactly located on existing maps. A number of the targets also lay up near the Yalu, and Communist MiGs, which voice traffic analysis showed to be flown by Russians, had begun to appear at night.

Another difficulty was a worsening shortage of B-29 replacement crews; Strategic Air Command was fast converting to jet aircraft, and conventional pilots were becoming scarce. In the last months of the Korean hostilities, the US Air Force had some headaches in attempting to provide requisite rotational B-29 personnel. Communist night air defenses became effective in the winter of 1952-53, and between 18 November 1952 and 30 January 1953, five B-29s were destroyed, and three others so badly damaged as to require depot reclamation.

At this juncture, Bomber Command gave rigid attention to mission planning. For one thing, Red interceptors were locating the B-29s by trailing their contrails on moonlit nights. Such nights were now avoided. Another useful undertaking was the provision of high cover for the bombers by Marine Corps night fighters. Intervals between planes in SHORAN-guided bomber streams were greatly compressed, thereby reducing the time in hazardous areas. After January 1953 no more B-29s were lost. Quite fortunately, however, the Communists did not elect to use night interceptors equipped with airborne intercept radar.

After the conclusion of the armistice agreement with the Communists in July 1953, the Far East Air Forces noted appreciation for the role played by B-29s, but its official report was reluctant to suggest that happenings in the limited Korean conflict

were indicative of the future. In a final statistical summary of the Korean conflict, the B-29s had flown 20,448 sorties (10,125 by day and 10,323 at night). They had dropped 168,368 tons of the total 386,037 tons of bombs dropped by all US Air Force aircraft. Lost to enemy action were 24 B-29s, including 17 in air-to-air combat. In retrospect, it is difficult to see how the United Nations air forces would have managed the interdiction of major bridges and the neutralization of Red airfields without the large bomb capacity of the Superfortresses. The radar-controlled MPQ and MSQ nighttime close air support by the B-29s was a substantial aid to the United Nations defeat of the Communist human-wave ground attacks.

In a summary article on the Korean War, General Weyland was highly complimentary of the B-29s, saying that their employment served notice that air power was indivisible and ought not to be arbitrarily classified by types of aircraft, targets, or operations. Examining the experience from the vantage point of more recent times, it is apparent that the cooperative employment of the Fifth Air Force and FEAF Bomber Command was successfully orchestrated. In the last months, enemy opposition was such that our strike and support forces had to begin integrating into packages, foreshadowing arrangements that would be used over North Vietnam. This successful integration of tactical and strategic aircraft was facilitated by the change of operational control of bombers from Strategic Air Command to the FEAF commander. And, to put the bottom line bluntly, tactical employment of strategic B-29s in Korea was essential to the success of the United Nations air campaign. □

#### Sources

This essay is principally based upon three declassified historical monographs prepared by the author as official Air Force histories. They are USAF Historical Study no. 71, *United States Air Force Operations in the Korean Conflict, 25 June-1 November 1950* (1 July 1952); USAF Historical Study no. 72, *United States Air Force Operations in the Korean Conflict, 1 November 1950-30 June 1952* (1 July 1955); and USAF Historical Study no. 127, *United States Air Force Operations in the Korean Conflict, 1 July 1952-27 July 1953* (1 July 1956). These three monographs and other sources were used by the author

in a more popular history, *The United States Air Force in Korea, 1950-1953* (New York: Duell, Sloan and Pearce, 1961). This history was reprinted by the Office of Air Force History in 1983. Discourse of the irrepressible Maj Gen Emmett "Rosie" O'Donnell, Jr., is recalled from a conversation with the author at Yokota Air Base in October 1950. Views of General Vandenberg appear in Brig Gen Noel F. Parrish, "Hoyt S. Vandenberg: Building the New Air Force," in *Makers of the United States Air Force*, ed. John L. Frisbee (Washington, D.C.: Office of Air Force History, 1987), 205-23.



# Clausewitz and the Indirect Approach

*Misreading the Master*

CAPT KENNETH L. DAVISON, JR., USAF



**I**N virtually all discussions of military strategy, one of the experts to whom we turn is Carl von Clausewitz or, more precisely, to Clausewitz's *On War*. This posthumously published work is a reference that, like most great works, is often quoted but seldom read. As such, it has been the target of much misinterpretation and angry attack. One of the most condemnatory attacks was written over 100 years





after Clausewitz's death by one of the best known strategic thinkers of our own century—B. H. Liddell Hart.

Liddell Hart's vehement critique of Clausewitz in *Strategy: The Indirect Approach* is obviously strongly felt and immensely readable. His was the voice that rose above those condemning the slaughter of World War I to point out the culprit Clausewitz—the strategist whose writings nursed the generals responsible for the tragedy. Liddell Hart abandoned his own "indirect strategy" to attack head-on with all rhetorical guns blazing, accusing Clausewitz of shortsighted errors and blaming the misinterpretation he invited for "both the causation and character of World War I."<sup>1</sup> Simple-minded and straight-ahead strategies, obstinate generals who remained determined to gain their objectives no matter what the cost, and the welcoming of heavy casualties as a sign of moral strength were all sins to be laid at Clausewitz's grave. The carnage they caused was the legacy of his exaltation of moral factors in warfare and his simple prescription that blood is the currency of war.




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*"... to use Liddell Hart's own words against him, he attacked Clausewitz's 'surface meaning, missing the deeper current of his thought.' "*

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Liddell Hart's repugnance at the enormous loss of life in the Great War clouded his historical perspective. He attributed the brutality to purely military causes, failing to recognize that the character of the war was

the result of nineteenth-century Europe's social, political, and technological circumstances. A less emotional reading of *On War* reveals that Liddell Hart's criticisms of Clausewitz's theories are due less to Clausewitz's shortcomings than to the critic's own misunderstanding of the material. To use Liddell Hart's own words against him, he attacked Clausewitz's "surface meaning, missing the deeper current of his thought."

To discover and follow that current in *On War* is not a simple task. The uneven and disorganized manuscript—some books complete and some merely "sketches," all written in a cumbersome, self-invented German vocabulary—was published in 1832, the year following Clausewitz's death, by his widow, who was not, unfortunately, a professional editor. In an unfinished note of introduction, Clausewitz explained that the only chapter he had finished was the first chapter of the first book; the remainder, he confessed, was "nothing but a collection of materials from which a theory of war was to have been distilled."<sup>2</sup> Still, he hoped an unprejudiced reader might benefit from his "years of reflection on war and diligent study of it" (C,70). His approach to that study and the resulting emphasis were as much influenced by his personal military experience as by the intellectual climate in which he lived.

Clausewitz's military career began in 1792 with service in the professional eighteenth-century armies that were washed away as Napoléon's wave rolled across the continent. After the turn of the century, he resigned from Prussian service to join the Russian army that would eventually turn the Napoleonic tide, but he was later readmitted to the Prussian army to take part in defeating the French during the Waterloo campaign. His experience began with eighteenth-century warfare of siege and maneuver, the means cautious commanders used to protect their small armies of regular soldiers from wasteful destruction in battle, and it ended with service in the vast national armies of conscripts that met in great clashes of tens of thousands of men. Clause-



witz appreciated these changes in both the composition of armies and their implementation, and he developed an understanding of war as a great sociopolitical activity rather than just a craft. So he began to write, urging the replacement of the previous century's theories of maneuver and avoidance of battle with a theory recognizing that battle, an army's fighting activity, was the only true means at an army's disposal, and developing his theory that war served a wholly political end.




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*"... the commander displayed his genius not by recognizing and abiding by 'laws of war,' but by creating his own rules and seizing the opportunities that are the uncertainties of war."*

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Clausewitz's intellectual approach to his subject was also very much influenced by his times. The scientific rationalism of the eighteenth century had prompted men to search for rules governing nature and man's activities in it, including war. With the turn of the century, this objectivism gave way to more subjective thought that emphasized man's interaction with knowledge and his ability to mold the world to his own consciousness. The new philosophers argued that there were no scientific absolutes for man to discover and resign his actions to but that each man continually created his own "rules" through the power of his living will. War, as a man-made activity, then, was itself creative, Clausewitz concluded, a

clash of moral forces, a contest of the wills of the commanders. The commander displayed his genius not by recognizing and abiding by "laws of war" but by creating his own rules and seizing the opportunities that are the uncertainties of war.

Theories of war, then, were not the march-tables or geometric relations of supply lines to fronts or any of the "scientific" dictates popular in existing military thought. They were instead the lessons drawn from experience that could serve to "light his [the commander's] way, ease his progress, train his judgment, and help him to avoid pitfalls" (C,141). (Emphasis added.) Theory's purpose was not to provide technical expertise but to provide points of reference to allow better cultivation of individual judgment.




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*"B. H. Liddell Hart looked on the warfare of the Western Front as proof that Clausewitz's theories had, on the contrary, poisoned the judgment of commanders."*

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B. H. Liddell Hart looked on the warfare of the Western Front as proof that Clausewitz's theories had, on the contrary, poisoned the judgment of commanders. At the heart of the matter were two major problems in Clausewitz's definition of strategy. Strategy was defined in *On War* as "the use of the engagement for the purpose of the war" (C,177), war being "an act of force to compel the enemy to do our will" (C,75). The first defect Liddell Hart detected was that

his definition of strategy "intrudes on the sphere of policy . . . which must necessarily be the responsibility of government" (LH,333). He offered a more proper definition of strategy as "the art of distributing and applying military means to fulfill the ends of policy" (LH,335).

The difference is one of semantics, not substance. Liddell Hart complained that Clausewitz appeared to be encouraging generals to overstep their bounds and make policy subservient to military operations. There is no more Clausewitzian dictum than "*war is nothing but the continuation of policy with other means*" (C,69), the postulate basic to *On War*, but it is a gross misunderstanding to conclude that Clausewitz intended the military to determine the policy that is "continued." He repeatedly stressed that "political aims are the busi-

ness of government alone" and that military operations are subservient to political aims since both the military objective and the amount of effort to be expended in the attempt to attain that objective are to be determined by the political goal (C,89,81). He emphasized that political leaders, not military commanders, were to make political decisions, adding that "only if statesmen look to certain military moves and actions to produce effects that are foreign to their nature do political decisions influence operations for the worse" (C,608).

To give the government an adequate appreciation of the military instrument and to prevent statesmen from using it improperly, Clausewitz recommended that the military commander should be made part of the cabinet in time of war. The commander's expert military advice would prevent statesmen from using that instrument in a manner contrary to the political purpose they desired to gain and would allow the cabinet to "share in the major aspects of his [the commander's] activities" (C,608).<sup>3</sup> The commander would serve in the cabinet because of political interest in the military, not vice versa—as would be the case in World War I. "The purpose of war" was, for Clausewitz, to "fulfill the ends of policy," and those ends were expressly reserved for the determination of the political leadership by both Clausewitz and Liddell Hart.

Just as *purpose of war and ends of policy* are different terms for the same idea, so is the word *engagement* no more than the equivalent Clausewitzian expression for Liddell Hart's *military means*. Although Liddell Hart objected that the use of that word conveyed "the idea that battle is the

*A nuclear weapon, like this multiwarhead Minuteman III, is an example of military force constrained by political goals because it is more useful to us in deterring war than in attacking a target. Clausewitz would have understood this concept. Over 150 years ago, he claimed that the positioning of forces for an engagement was just as important as the engagement itself. Clausewitz used the term engagement to refer to "fighting activity" that was either real or possible.*





*President Truman relieved Gen Douglas MacArthur of his command because MacArthur tried to make policy rather than give advice on policy. Clausewitz, too, stressed the importance of military advice to civilian leaders but insisted that military commanders refrain from determining political objectives.*

only means to the strategic end" (LH,333), when Clausewitz's logic is carefully followed, the controversy again becomes merely semantic. In *On War* the term engagement is "fighting activity" that is either real or possible because the consequences are the same—the mere threat of a fight compels the enemy to take certain actions (C,95,181). Clausewitz's assertion that the only means in war is combat was based on his understanding that "everything that occurs in war results from the existence of armed forces" and "whenever armed forces . . . are used, the idea of combat must be present" (C,95). He argued that this is valid "even if no actual fighting occurs, because the outcome rests on the assumption that if it came to fighting, the enemy would be destroyed" (C,97). The concept of nuclear deterrence today, which is predicated on the significance of the effects of unfought but threatened engagements, illustrates his point.

Realizing that the threat of the use of force permeates all warfare—economic warfare, psychological warfare, and other looser definitions of the term warfare notwithstanding—it is reasonable to say that the only means in war is combat, the real or potential fighting activity of existing forces. Clausewitz recognized that *military means* consisted of fighting or the threat of fighting, which he placed under the term engagement, and he defined "the purpose of war" as "fulfilling the ends of policy." In the final analysis, his definition of strategy is the equivalent of Liddell Hart's.<sup>4</sup>

Liddell Hart also accuses Clausewitz of being a simplistic advocate of "absolute war" and straight-ahead bashing of armies in battles to the death. One does not have to read beyond the "Notice of 10 July 1827" at



the beginning of *On War* to recognize this accusation to be blatantly false. The author's intended revision of the "rather formless mass" that was the first six books would bring out "with greater clarity" that

war can be of two kinds, in the sense that the objective is to overthrow the enemy . . . or merely to occupy some of his frontier-districts so that we can annex them or use them for bargaining at the peace negotiations. (C,69)

Liddell Hart's "strategy of limited aim" is offered instead of the all-or-nothing strategy



*French troops assault an enemy position at Verdun. To suggest that Clausewitz would have approved of repeated mass assaults against modern weapons such as the machine gun is a misreading of his theory of the importance of moral factors.*

allegedly espoused by Clausewitz to any government that

may calculate that the overthrow of the enemy's military power is a task definitely beyond its capacity or *not worth the effort*—and that the object of its war policy can be assured by seizing territory which it can either retain or use as bargaining counters when peace is negotiated. (LH,334)

These “differing” strategies are nearly word-for-word identical.

Liddell Hart not only missed the “Notice” but also somehow missed throughout *On War* the fundamental thesis of the dual nature of war, both “absolute” in its violent tendencies and “limited” by its political aims and the moral inertia of the men and societies who employ it as a political tool. The dialectic of opposed but linked

concepts—absolute/limited, theory/reality, attack/defense, moral/material, and especially ends/means—that forms the intellectual underpinning of *On War* is traceable to the philosophical fashion of Clausewitz's time. The Platonic dichotomy between the logical ideal and its imperfect worldly shadow captured the imagination of intellectuals in the early nineteenth century and inspired the style of their arguments, which were often characterized by the mental construction of logical “absolutes” against which reality could be measured and better understood. Clausewitz followed this form when he created an absolute model of war in the initial chapter of book 1, and then devoted the overwhelming majority of that book to those factors that “modify” it in the real world (C,76–89). However, in Clause-



witz's dialectic there is no Hegelian synthesis, only a dynamic linking in which war consists of "a continuous interaction of opposites" (C.136).




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*"For the most part, Liddell Hart's criticisms of Clausewitz derived from his misunderstanding of Clausewitz's rhetorical style."*

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For the most part, Liddell Hart's criticisms of Clausewitz derived from his misunderstanding of Clausewitz's rhetorical style. His charge that Clausewitz exalted a theory of absolute warfare that "reduced the art of war to the mechanics of mass slaughter" (LH.355) was a confusion of the model with reality. Clausewitz carefully constructed a theoretical model of "absolute warfare" *solely for purposes of comparison*, not to portray a perfection of warfare toward which commanders should strive. This was a *Platonic* ideal, a logical absolute constructed to emphasize that the intrinsic nature of war is total: "war is an act of force," and, in isolation, "there is no logical limit" to an act of force (C.77). Clausewitz not only immediately and clearly stated that this "extreme" *could not* be attained in reality due to forces in society and human nature but, more important, that it *should not* be the goal because, as a political tool, war is *tempered by the political objective that motivated the resort to war* (C.78.81).

True, Clausewitz urged a commander to approximate the ideal "when he can or when he must," but only because extraor-

dinary moral strength would be needed to overcome the "moral force of gravity" in human nature that acts to make men tentative and afraid to take the initiative (C.581,217). Only very serious goals necessitated resort to war, and Clausewitz concluded that the determined efforts required to achieve those goals would force men nearer to the ideal absolute use of violence. Clausewitz warned on the first page of book 1 against the fallacy that defeating the enemy without too much bloodshed is the true goal of the art of war. He did not issue this warning because of a lack of compassion or out of bloodthirst, but because war is "such a dangerous business," he would allow no commander to think he could ingeniously disarm the enemy without bloodshed (C.75). Since war arises from passion, not cool reason, it seemed inconceivable that "one would never really need to use the physical impact of fighting forces" (C.76). "The character of battle . . . is slaughter," he wrote, "and its price is blood." This statement was descriptive, not prescriptive. Slaughter was neither Clausewitz's tactic nor his goal, simply his description of "the bloodiest solution" in war: battle (C.259).

Likewise, Clausewitz's statement that "only a [single] great battle can produce a major decision" was not a prescription for "mass slaughter." He stated that a great battle can be one of the decisive factors determining the outcome of a war but not necessarily the only one, and explained that the decision a great battle precipitates "does not of course depend entirely on the battle itself" but on "countless other factors that affect the war potential of each side." He cautions finally that "those cases in which [great battles] have settled an entire war are very rare exceptions" (C.260). The achievement of the political goal must always remain the end, with war a means to be tailored to suit it—a deadly means.

Recognizing war's essence as violent and absolute, yet viewing war in the real world as an extension of politics, Clausewitz stressed that many roads lead to success and all do not involve the destruction of the en-

emy's forces. In fact, the word *destruction* was not used as a term for annihilation but merely for "a reduction of strength relatively larger than our own" (C,230). This definition reflects Clausewitz's constant concern with the *moral* victory as the most telling in war: a victory resulting in a gain in the relative numerical situation would lead directly to a reduction in the *moral* capacity of the enemy to resist; numbers were a *physical* means to a *moral* end. Other means toward this end, the moral victory that was Clausewitz's key to war, were operations with "*direct political repercussions*" such as disrupting or paralyzing opposing alliances, or gaining allies. He wrote that such efforts could form a "much shorter route to the goal than the destruction of the opposing armies," as could efforts directed at wearing down the enemy by exhausting his physical and moral resistance (C,92-93).

Some readers seize on Clausewitz's statement that the "dominant consideration in war" should be the destruction of the enemy's forces and that in the engagement this goal is often the primary one. Still, even when discussing the engagement, Clausewitz added the caveat that other objectives "may be added and . . . to some degree may even dominate" (C,230). On the broader, strategic level rather than the tactical level of the engagement, however, Clausewitz left no room for an attentive student to misunderstand. He emphasized that "all our energies should be directed" toward the enemy's "center of gravity . . . the hub of all power and movement, on which everything depends" (C,595-96). This hub is often not the enemy army but an ally of the enemy, an area, or a leader. Military strategists who interpret Clausewitz as advocating nothing short of the destruction of the enemy's military forces—his physical means to resist—are confusing Clausewitz's simple *tactical* truth (that on the level of the engagement the primary consideration is usually the destruction of the enemy's forces) with a strategic imperative. Strategically, Clausewitz was essentially espousing what Liddell Hart termed the *indirect approach*: concen-

trating strength against the decisive vulnerability of the enemy, his "center of gravity."

Yet, in the list of possible "centers of gravity," conspicuously absent was the opponent's economic base, a target Liddell Hart was quite fond of. A variety of explanations can be offered for this omission. In his study, Clausewitz was not concerned with details of administration, logistics, and so forth, only with the successful conduct of operations. Economics in general were not relevant at the operational level except in naval operations, where it was historically commonplace for European navies to target the economic base that enabled their opponents to continue the war. But Clausewitz was a professional soldier writing for his professional Prussian colleagues. Naval operations were of little interest to land-oriented Prussia, and the Napoleonic wars that shaped Clausewitz's career and dominated his imagination were almost exclusively grand land campaigns. For Clausewitz's purposes, the maritime dimension and its prime target, economics, could be largely ignored, so his definition of strategy and those historical examples he offered were land-oriented and dealt exclusively with the employment of armies in engagements. To be fair, it must be noted that efforts against the economic base of the enemy would fit well into Clausewitz's strategy as either efforts to exhaust the enemy's "physical and moral resistance" or operations with "direct political repercussions." In fact, Michael Howard points out in his introductory essay to the edition of *On War* quoted here that Clausewitz's ideas were applied to naval warfare by such men as British naval historian Sir Julian Corbett (C,38-39).

Liddell Hart also charged that Clausewitz placed excessive emphasis on numerical superiority, but again, this insistence is more apparent than real. Clausewitz discussed "superiority of numbers" as only one of about a dozen important factors in the engagement. In the context of numerical advantage, he wrote that usually the most important factor was "strength at the really



vital point" (C,195). How does this declaration truly differ from Liddell Hart's own aphorism that *concentration* is the single word into which "the principles of war . . . can be condensed" (LH,347)?

Generals who felt they were following the precepts of the author of *On War* in their conduct of World War I were tragically mistaken. Clausewitz would have been surprised to note that in 1914 man's usual trepidation at taking the offensive was lost by all belligerents, and he would have been deeply disturbed that his explicit statement on the inherent strength of the defense over the offense was roundly and tragically ignored. Likewise, his dichotomy of limited wars fought for favorable peace terms and total wars fought for the elimination of the opponent's political existence was forgotten. His writings on political primacy over the military objective were also dismissed or twisted so that once war was declared, political considerations were considered suspended.

Clausewitz was much discussed in the years leading up to World War I, and, while many of his theories were misunderstood or discarded, some ideas were enthusiastically accepted. The emphasis he had placed on moral factors in the commander, such as determination and perseverance, were translated into World War I charges "over the top" into machine guns and barbed wire, with the casualties being stoically, almost gratefully, accepted as proof of martial virtue. Scepticism for strategic maneuver during the war was also derived from Clausewitz, who, in his zeal to discredit eighteenth-century tactics, virtually equated maneuver with battle avoidance and an improper comprehension of the use of armies. Finally, the passion to destroy the enemy's army and the tendency to see any battle in which greater losses were inflicted on the enemy as a victory were often based on a partial reading of *On War*.

However, the brutal character of World War I was not due so much to Clausewitzian strategists as to more comprehensive factors that Clausewitz would have easily under-

stood, considering war as a great *sociopolitical* activity. The trinity of forces that formed one of the themes of *On War*—the government, which made policy and directed the war; the army, the professionals who conducted the war; and the people, who supported the government and filled in the army—set the broad stage upon which the war should be played. This trinity interacted to set the limits to any war, sometimes bringing it closer to the absolute and other times restraining it. Europe, early in the nineteenth century, exemplified a trinity poised for the former.

The massive armies involved in the Great War were not the result of Clausewitz's call to put the largest possible army in the field but of social, technological, and political circumstances. Technology, through advances in munitions and mass production, had created armies of such deadliness that they could hardly be contained, while the spread of democratic principles had made governments more, rather than less, belligerent. The passions of the people—transmitted through the government and the army—influenced the war in progress and did much to influence those who before the war seized upon only certain of Clausewitz's writings. Clausewitz expressed an understanding beyond Liddell Hart's of the forces snapping the character of war when he summed up chapter 3 of book 8 with the following:

The aims a belligerent adopts, and the resources he employs, must be governed by the particular characteristics of his own position; but they will also conform to the spirit of the age and its general character. (C,594)

Liddell Hart complained that Clausewitz wrote in such an abstract and abstruse fashion that "ordinary soldier-minds" couldn't follow his arguments, but Liddell Hart's critique is evidence of his own difficulty. His allegation that World War I was played out according to Clausewitz's design is unconvincing and smacks of single-cause history. Liddell Hart had allowed his impatience with the incompetence of World War I commanders to influence his reading of Clause-

witz so that he, like those commanders, failed to grasp the fundamental theses of *On War*. Admittedly, Clausewitz wrote in a confusing and tedious style, penning kernels of thoughts that appeared to convey extreme ideas, but these were parts of a carefully prepared argument. To attack these thoughts or slogans without regard to

their context is unfair and false. To understand Clausewitz's arguments in *On War* requires much more attentive reading than is necessary to understand Liddell Hart's *The Indirect Approach*. But beneath the surface of the words they chose, a similar current can be discerned—despite the reservations of Liddell Hart. □

#### Notes

1. B. H. Liddell Hart, *Strategy: The Indirect Approach* (New York: Frederick Praeger, Inc., 1954), 353–54, 357. Further references to this work will appear in the text in parentheses with the identifier "LH" and the page number.

2. Carl von Clausewitz, *On War*, ed. and trans. Michael Howard and Peter Paret (Princeton: Princeton University Press, 1976), 70. Further references to this work will be in parentheses in the text with the identifier "C" and the page number.

3. The footnote on page 608 of the quoted edition of *On War* traces the misinterpretation of Clausewitz's purpose for military representation in the government. This misinterpretation

would reach the extreme conclusion that, once war was declared, political considerations would cease to have any impact on military actions. This notion can hardly be Clausewitz's intent since war is an extension of politics, not a replacement.

4. In his introductory essay, Michael Howard, while disagreeing in many respects with Liddell Hart's critique of Clausewitz, agrees that some of it was justified. He, too, faults Clausewitz for proposing a definition of strategy that "ignored all save purely military means" (C,41). As we have seen, Liddell Hart's definition explicitly excludes nonmilitary means as well.





Fall 1988

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# **Real Tenets of Military Space Doctrine**

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THE origins and deficiencies of current space doctrine are well articulated.<sup>1</sup> Although doctrinal issues concerning space continue to abound,<sup>2</sup> they elude resolution for political, programmatic, and organizational reasons.<sup>3</sup> In basic US Air Force doctrine, for example, space capabilities are incorrectly derived simply by applying the term *aerospace* to what is an otherwise comprehensive "air power" doctrine, tried and tested in war many times over.<sup>4</sup> This practice reflects a political reality because senior Air Force officers who formulate and promote doctrine have a base of operational knowledge that is rooted mainly in air experience.

The status of our doctrinal dilemma with respect to space is perceptively summed up as follows:

Our current space doctrine is highly constrained by contemporary national policy and the misapplication of air principles to space. As a result, our present space doctrine contains few, if any, statements of unalterable truths regarding the conduct of military operation in space.<sup>5</sup>

It is the objective of this article not only to focus on the invalid applications of air doctrine to space capabilities<sup>6</sup> but also to prescribe those "unalterable truths" that actually characterize military space operations. Instead of being extrapolated from air experience, these concepts are based on fundamental knowledge that has been well tested and proven by military space practitioners during the past quarter century.

### The Context of Space Doctrine

The context of doctrine can be more complex than the doctrine itself. According to Lt Col Dennis M. Drew, there are three types of doctrine: fundamental, environmental, and organizational.<sup>7</sup> Fundamental doctrine is based on analyses of history, applies in all operating mediums, and "consists of beliefs about the purposes of the military, the nature of war, and the relationship of military

force to other instruments of power."<sup>8</sup> Environmental doctrine "is a compilation of beliefs about the employment of military forces within a particular operating medium."<sup>9</sup> Organizational doctrine consists of those current "basic beliefs about the operation of a particular military organization," such as the Air Force, in a particular operating medium.<sup>10</sup>

On the other hand, the Air Force articulates doctrine at three levels of detail: basic, operational, and tactical.<sup>11</sup> Basic doctrine states those fundamental "beliefs which guide the proper use of aerospace forces in military action," and it provides broad "guidance on how Air Force forces are prepared and employed."<sup>12</sup> Operational doctrine applies basic doctrine to military actions "in the context of distinct objectives, force capabilities, broad mission areas, and operational environments."<sup>13</sup> Tactical doctrine "applies basic and operational doctrine to military actions by describing the proper use of specific weapon systems to accomplish detailed objectives."<sup>14</sup>

AFM 1-1, *Basic Aerospace Doctrine of the United States Air Force*, and the accompanying space doctrine in AFM 1-6, *Military Space Doctrine*, are defined as "basic" doctrine but do not rigidly exclude discussions of operational or even tactical doctrine.<sup>15</sup> AFM 1-1 and AFM 1-6 are also characterized as organizational doctrine although they contain material on fundamental and environmental doctrine.<sup>16</sup> There are no precise boundaries for this subject, but the intent here is to use the above framework to present "basic space doctrine" in the same context as AFM 1-1. The theory is that if current air doctrine can be accurately portrayed in AFM 1-1, the same format could be used to describe a separate military doctrine for space. The focus, however, is on those key aspects of environmental and organizational doctrine at the heart of AFM 1-1.

Drew's view of doctrine raises an issue that is not addressed here but may shed more light on the space doctrinal dilemma discussed above. As a statement of organi-

zational doctrine, AFM 1-1, by its very nature, "cannot provide the context needed to logically address many of the difficult issues facing the military."<sup>17</sup> If it were developed, a fundamental doctrine might provide a historical basis for analyzing the purpose of military space forces and their relationship to other military forces and instruments of national power. Further, a well-grounded environmental doctrine might provide a basis for teaching space doctrine by accommodating "lessons learned" as they relate to space operations.

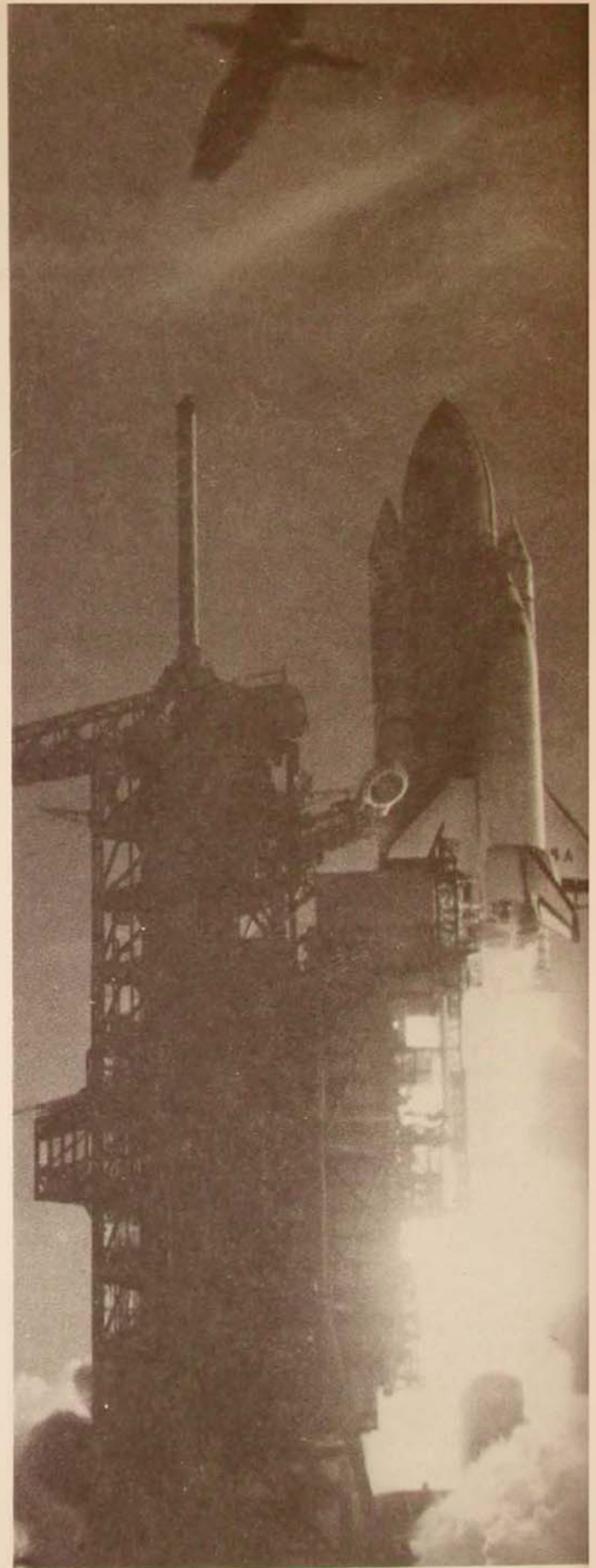
This article places Drew's point aside—however valid it may be—and focuses on realistic tenets of basic space doctrine in environmental and organizational contexts. It examines the way space capabilities are actually employed in space operations as opposed to the way air capabilities are employed according to AFM 1-1.

### The Compromise of Space Doctrine

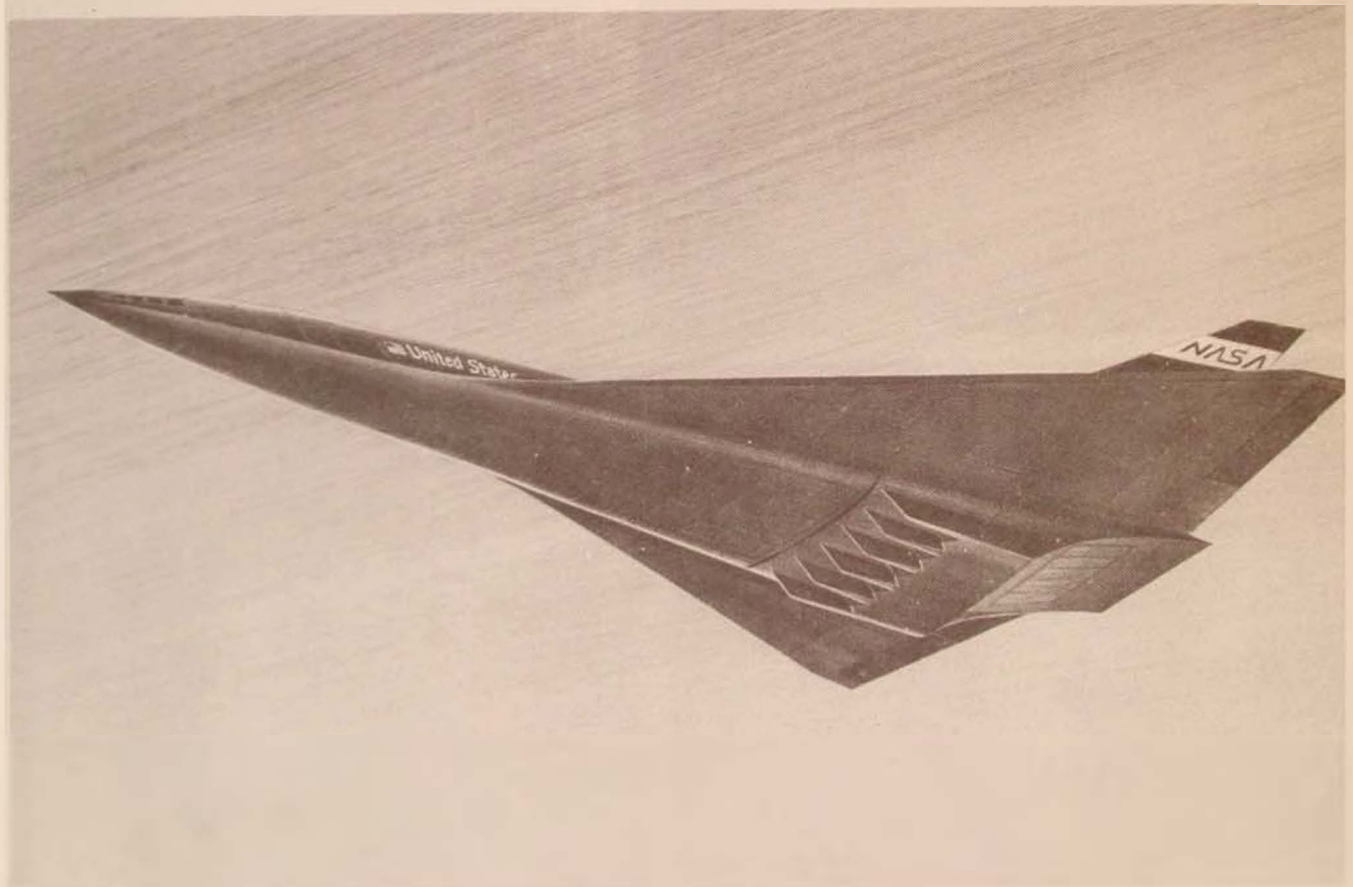
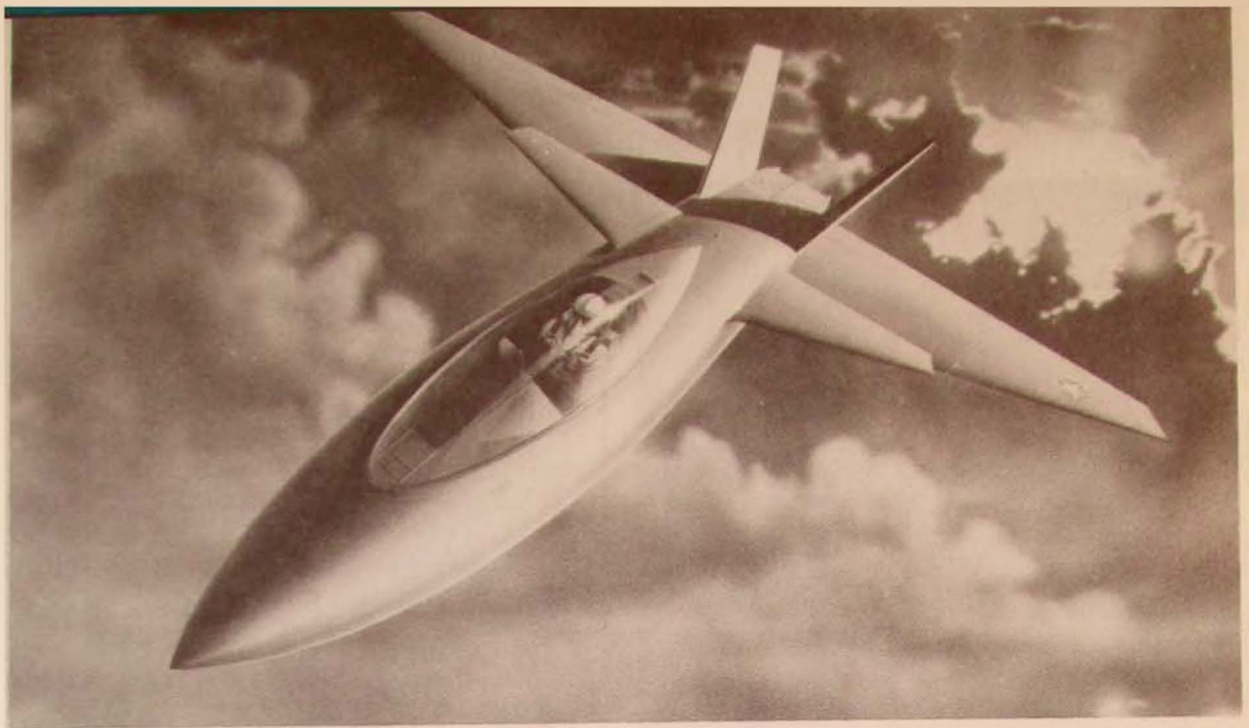
The discussion argues first for a realistic space environmental doctrine to correct three major "compromises" made to space doctrine in order to "force fit" it into air doctrinal thinking. Specifically, the environment, the characteristics of the systems, and the capabilities of space forces differ sharply from those of air forces, just as these elements differ between air, land, and sea forces.

Similarly, in arguing for a realistic space organizational doctrine, the article shows that the resulting space employment concepts have functional parallels with, but distinctly different implementations from, those for air, land, and sea forces.<sup>18</sup> But this finding serves as a corollary to the thesis be-

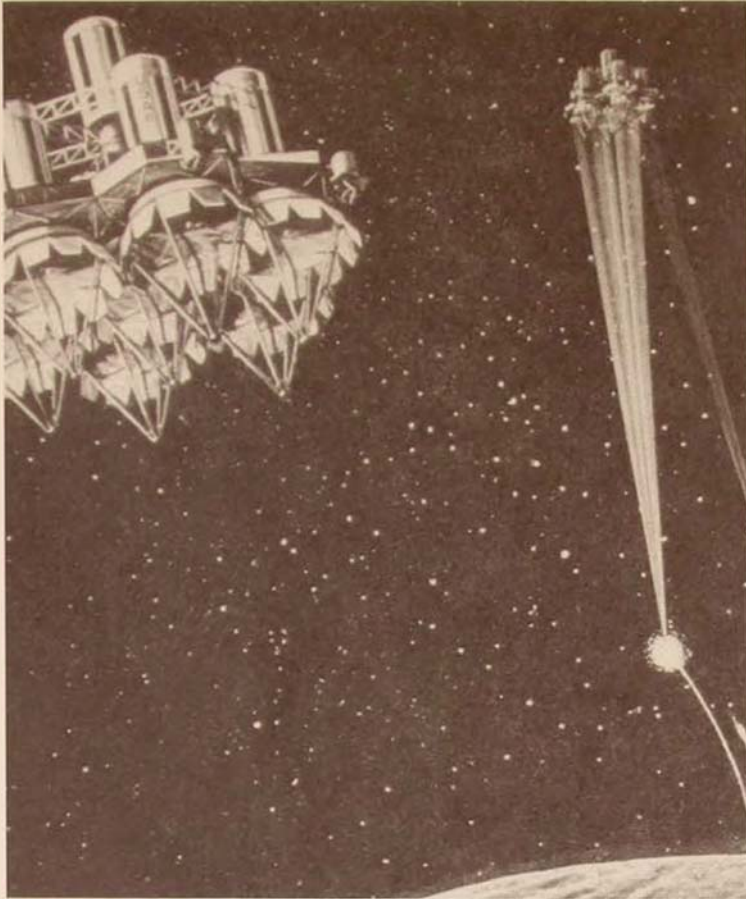
*Space forces could launch attacks on enemy territory that would be inaccessible to forces operating in other media. Nevertheless, current Air Force doctrine does not recognize the difference between space and air.*







Although AFM 1-1 acknowledges no distinction between air and space, even the most modern aircraft, such as the proposed advanced tactical fighter (top), could not operate in space. A transatmospheric vehicle (above) might cross that boundary, but these distinctive media still demand a doctrine that addresses their differences instead of simply applying the term aerospace to both environments.

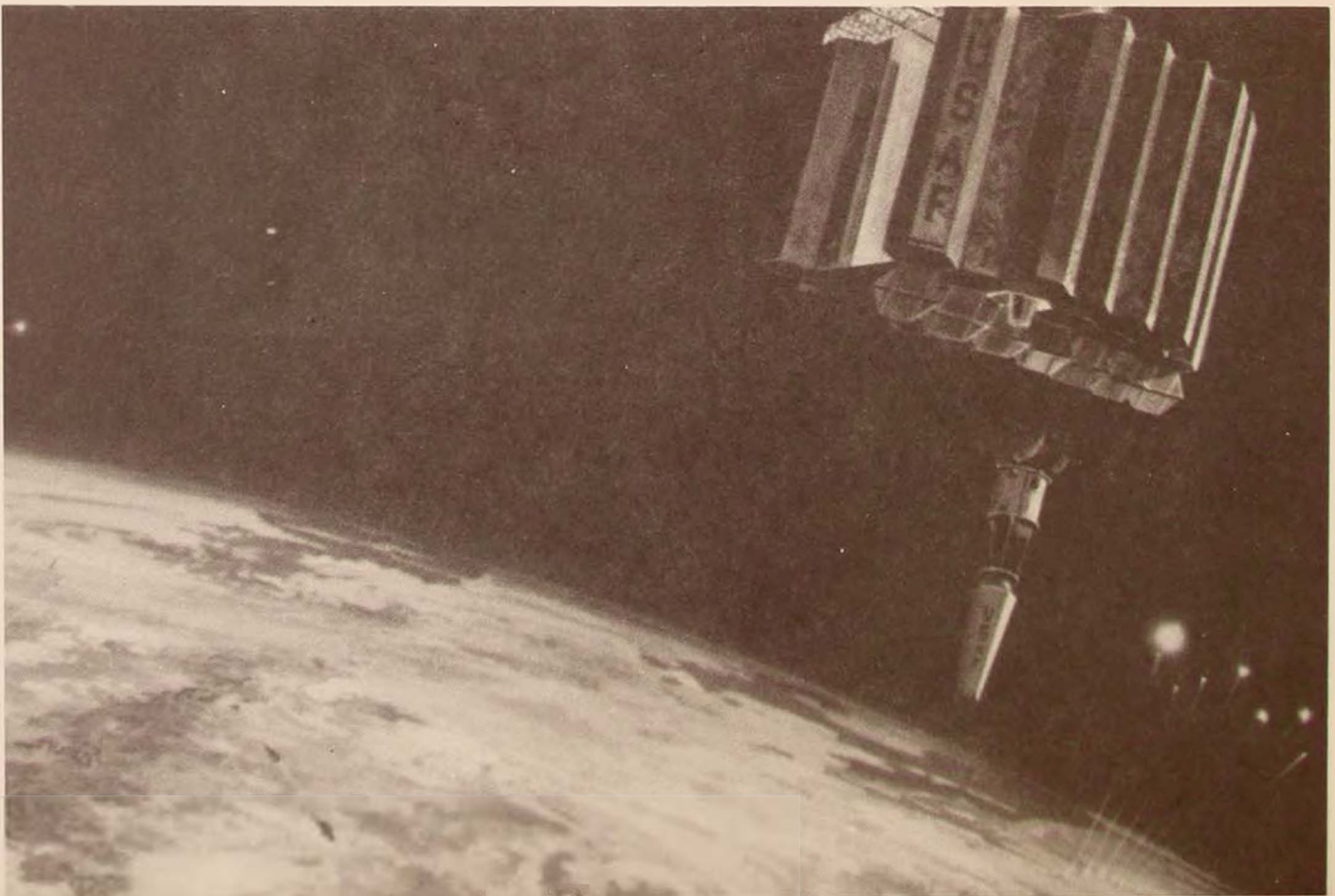


cause the functional correspondence further reinforces thinking on the unique nature of military space force employments. Finally, the article argues that military missions that are now (or will soon be) conducted in space should subscribe separately to elements of a "fundamental doctrine" for military forces. Once space is recognized as a distinct realm of military operations, it can be more effectively integrated with other US defense forces<sup>19</sup> by a well-articulated environmental and organizational doctrine for space forces.

### *Space Environment*

Current doctrine defines the "aerospace" environment as a "total expanse beyond the Earth's surface" and "space" as the "outer reaches of the aerospace operational me-

*Force application would be a major mission of space assets. Their constant presence would allow them to provide near-instantaneous response to enemy actions. The notion of a forward edge of the battle area would not apply to space assets, which would remain nonhostile until needed in war.*





dium."<sup>20</sup> Based on this sweeping premise, space doctrine seems to be formulated simply by substituting the word *aerospace* for air in well-proven air power doctrine. The oft-posed argument that no boundary separates air from space thereby results in the first major compromise of environmental doctrine for space.

Actually, the space environment is readily discerned from air when a vehicle attains *orbital flight* capability outside the earth's atmosphere. Moreover a distinct threshold is crossed when atmospheric forces and powered flight yield to a hard vacuum and a state of *weightlessness* where dynamical motions are governed solely by natural forces. Although multidimensional, space is an infinitely larger operating medium than air. Furthermore, the absence of both gravity and a molecular environment provides a distinctly different operating regime than the atmosphere.

#### ***Characteristics of Space Systems***

The second major compromise of space doctrine derives from the characteristics currently attributed to "aerospace" forces—speed, range, and flexibility.<sup>21</sup> These characteristics well exemplify the attributes of airplanes, and they lie at the heart of air doctrine. However, the speed and range of airplanes pale in comparison with those of satellites; conversely, airplanes are far more flexible than satellites. Therefore, these are not the key characteristics that should be ascribed to satellites as effective military assets. These characteristics in no way capture the global context and unseen but ubiquitous nature of satellite operations that should comprise the very core of space doctrine.

In actuality, the relevant characteristics of space forces are *emplacement*, *pervasiveness*, and *timeliness*. The space environment allows emplacement of satellites in prescribed mission orbits from which rapid, efficient operational support may be provided to defense forces. Manned or unmanned space assets, on station contin-

uously, are always ready to support a broad spectrum of potential conflict. There is no need for a "call-up" or a deployment of space forces because satellites are constantly maintained in a high state of wartime readiness. In contrast with other defense forces—generated only during training or actual hostilities—satellites are fully operational in peacetime; they execute their missions day and night, and they are inherently ready to support military operations at all times.

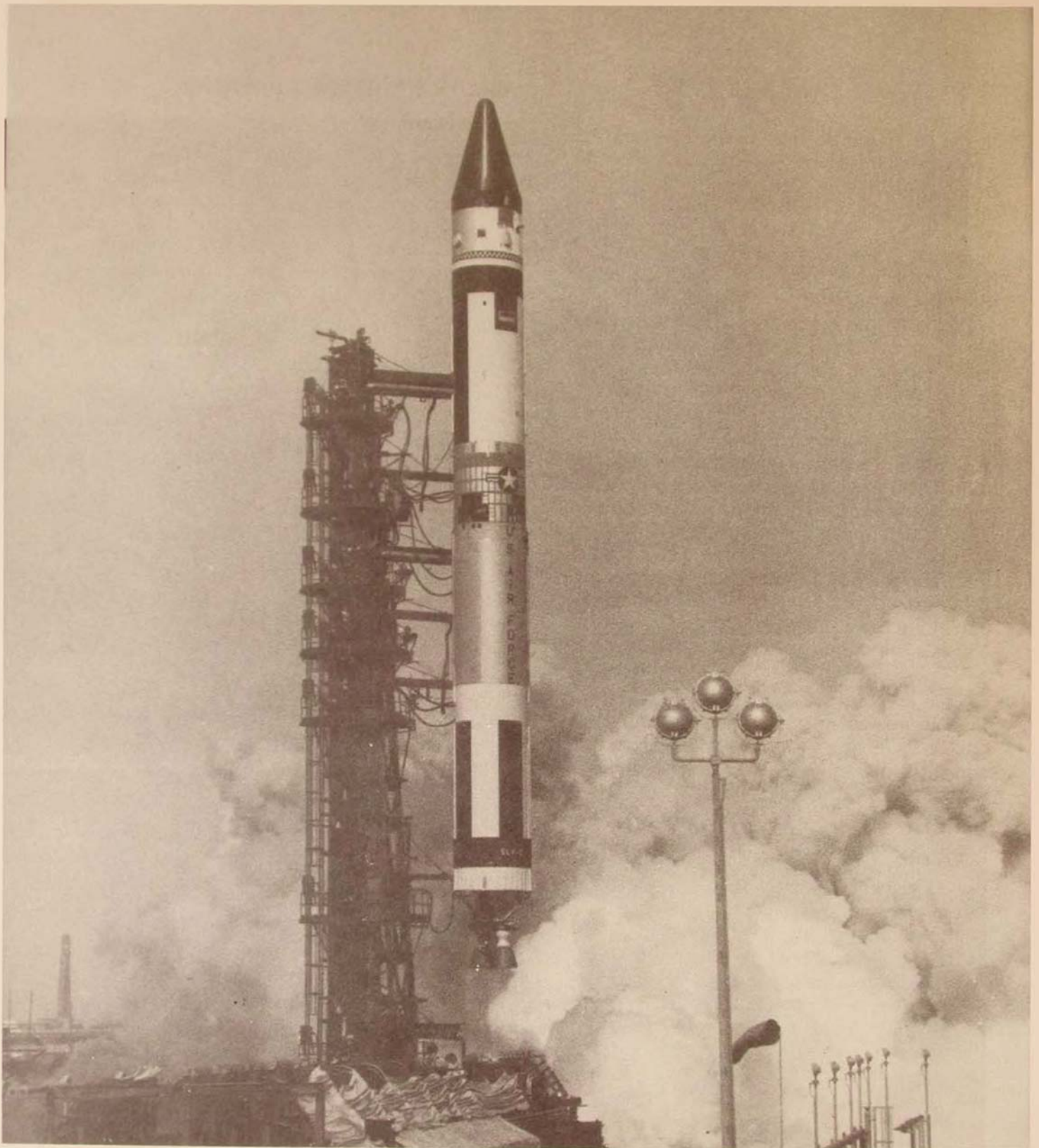
The pervasiveness of space forces reflects the ethereal nature of their operations and capabilities. The space medium is all-encompassing—surrounding the media of land, sea, and air. This fact permits an omnipresence or a proliferation of space forces for support of defense requirements at any air or terrestrial location. Their consistent presence over enemy territory serves as a strong deterrent, for they can constantly monitor the readiness and status of opposing forces. Satellites therefore diminish the element of surprise and deny sanctuary to enemies except for those forces that enemies themselves may attempt to hide in space.

Timeliness of space forces is closely related to the first two characteristics. Satellites, always ready and omnipresent, can provide near-instantaneous response to military commanders anytime, anywhere. Unlike many defense forces, they rely inherently upon electronic phenomena and electromagnetic propagation of signals and radiation in conducting their missions. Thus, satellite operations are conducted at the speed of light, permitting near-real-time transfer of information and facilitating rapid application of force upon an enemy.

#### ***Capabilities of Space Forces***

The third major compromise of space doctrine occurs when the capabilities of airplanes are ascribed to satellites. The environment and characteristics of forces combine in doctrine to yield the "potential to exploit certain fundamental combat





*The ability to access space in a timely manner, whether through expendable launch vehicles (above) or on-station spares, is essential to effective space operations. Launch reserves should always be available to replace critical satellite capabilities.*

*Telemetry tracking and control (TT&C) of satellites is analogous to piloting an airplane. A sophisticated command and control network is required to maintain effective control of space. This system must connect not only space support functions but also theater commanders around the world who will use space assets.*

capabilities which can significantly enhance the effect and influence of military actions."<sup>22</sup>

The canonical set of capabilities attributed to "aerospace" forces in current doctrine is as follows: they can be responsive, mobile, and survivable; they can show presence, deliver destructive firepower, and provide unparalleled observation.<sup>23</sup> These descriptors are quite appropriate for air power. Some of them apply only indirectly to space forces, but others are highly inappropriate. Moreover, they are far removed from the on-line, pervasive, and timely capabilities actually available to military commanders from satellites.

The real capabilities of space forces, contrasted with the capabilities of air forces in table 1, are as follows: they provide access and linkage; they can capture the high

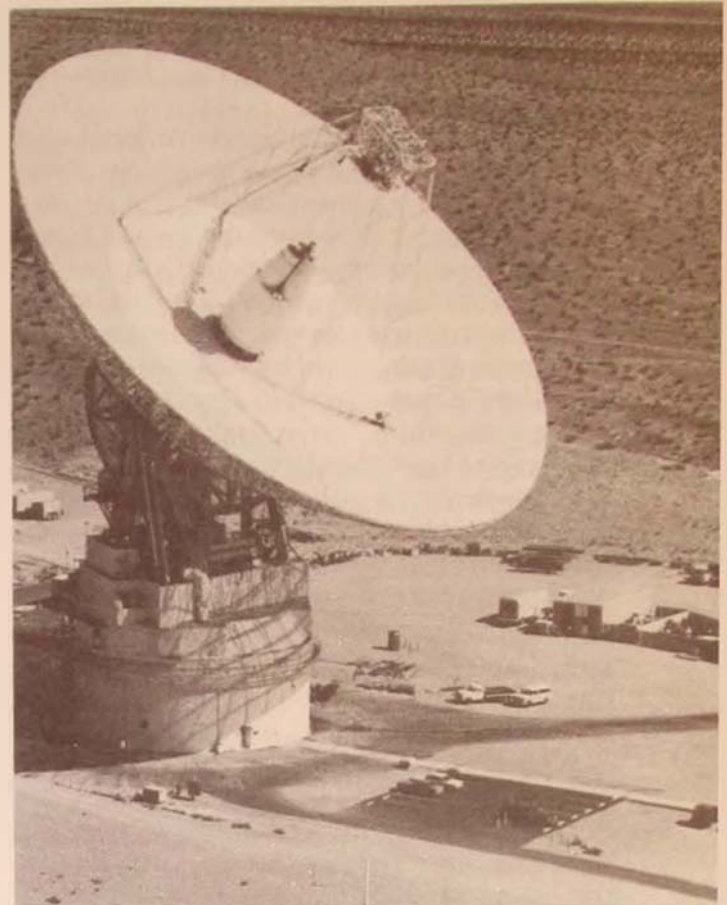


Table 1  
Environmental Doctrine

Medium	Environment x Characteristics		Capabilities
Space	Orbital Flight Vacuum Weightlessness	Emplacement Pervasiveness Timeliness	Access Linkage High Ground Elusive Information Unimpeded Force
Air	Multidimension Atmospheric Forces Powered Flight	Speed Range Flexibility	Responsive Mobile Survivable Presence Firepower Observation

ground and elude the enemy; and they can transfer large volumes of information and facilitate application of precise, unimpeded force on enemy targets.

By virtue of the space environment and the characteristics of space forces, satellites can overfly any terrestrial location at any time. This capability provides access to enemy forces as well as to friendly forces operating in remote areas. Satellites are nonprovoking in their vast international operating medium, and they have no political boundary constraints, no forward edge of battle area, and no terrestrial weather limitations on their operations. They can therefore penetrate geopolitical boundaries with impunity and conduct operations above enemy territory at will.

Space forces can provide linkage between combatant commanders and their subordinate force components. By virtue of their characteristics, they provide a ready means of connectivity to land, sea, and air forces deployed worldwide. Space assets can provide secure, reliable communications between operational commanders to commit, redeploy, or withdraw forces. Furthermore, they can provide linkage between space forces to further enhance satellite capabilities in support of operational commanders.

The all-encompassing nature of space and the pervasiveness of space forces combine to allow satellites to be distributed at high, global vantage points around the earth. From this high ground, satellites can monitor worldwide activities and environmental conditions; they can provide a continuous manned or unmanned presence for sustained support of defense forces deployed in air and terrestrial media. By observing and reporting on worldwide events, satellites can bring the full capabilities of air and terrestrial forces (such as responsiveness, mobility, and destructive firepower) to bear against enemy activities. This capability tends to multiply the effectiveness of the entire military force structure.

Space forces, operating unseen and unheard in the vastness of space, can be elusive. Although satellites can be detected

and tracked, particularly in lower orbits, they are formidable targets. For example, small tracking errors against a target satellite will result in a large miss. Satellites can be attacked only at a high cost to the enemy because the attack must generally be mounted one-on-one, will likely be detected early, and may pose direct risks to the enemy's own spaceborne assets. Finally, it is possible to evade enemies in space once their offensive assets are committed, and by thwarting or moving out of range of enemy sensors, it even becomes possible to hide in space.

Satellites can collect, process, and relay large volumes of information faster and more efficiently than communication systems employed in other media. The operating environment and characteristics of satellites permit wider information bandwidths and narrower transmission beams, enhancing telecommunications security and operational flexibility. Timely information from satellites is one of the commander's most valuable resources. Real-time information on the status and location of enemy as well as friendly forces counter-veils the fog and friction of war.

In the absence of atmospheric or other natural terrestrial constraints, satellites can transmit unimpeded force through space. The near absence of viewing constraints permits direct application of force on enemy targets in space. Mass can be propelled at high velocities, unhindered by the effects of air resistance and gravity. Energy can be propagated in the form of radiation—unattenuated outside the earth's atmosphere—at the speed of light. Thus, reaction can be swift and surprising, and mass or energy can be concentrated with precise, devastating force on enemy targets in space.

## Space Force Employment Concepts

Since current "aerospace" doctrine fails to distinguish between the operating environment, characteristics, and capabilities of



satellites vis-à-vis airplanes, it should not be surprising that the broad employment concepts defined in AFM 1-1 have little relevance to space forces.<sup>24</sup> However, it is possible to synthesize some broad concepts of employment for effective space operations, based on experience and proven operational practices in the military space community.

The synthesis starts by surveying the various mission areas that are (or soon could be) accomplished by space forces. Then, by invoking the above tenets of environmental doctrine, the article develops real concepts for employment of space forces similar to those espoused for air doctrine in AFM 1-1. This procedure relies on the oft-invoked premise that, although no base of experience exists for war in space, "doctrine may (and should) still be developed by analysis of postulated actions"<sup>25</sup> or by a "theory [that provides] . . . the framework for future application."<sup>26</sup>

**Military Space Mission Areas**

Military missions in space may comprise both combat and combat support missions, as depicted in table 2.<sup>27</sup> None of these vital national defense missions is directly addressed in AFM 1-1. Instead, the focus in AFM 1-1 is on air missions like strategic offensive and defensive air operations, counterair, close air support, and airlift. The only

reference to space capabilities appears with the word *orbital* in a discussion on the Air Force mission of aerospace surveillance and reconnaissance, where the stated objective is to "collect information from airborne, orbital, and surface-based sensors."<sup>28</sup>

Combat missions in space include two categories: space control and force application. The *space control* category provides for freedom of action in space for friendly forces while denying space to the enemy.<sup>29</sup> It encompasses counterspace operations, which can be either spaceborne or terrestrially based. This mission includes capabilities to ensure survivability of friendly space assets and to nullify or destroy enemy space capabilities. The *force application* category includes potential combat missions, such as future space missions that might support strategic defense against ballistic missiles.<sup>30</sup>

The combat support missions in space include two additional categories of missions: force enhancement and space support. The *force enhancement* category comprises those missions that directly support both space and terrestrial combat forces but do not by themselves counter or apply force against enemy targets.<sup>31</sup> This mission encompasses most of the space systems that currently support land, sea, air, and space operations. Specifically, the following key military missions are now being effectively conducted from space: worldwide surveillance, attack warning and assessment,

Table 2  
Military Space Mission Areas

Combat		Combat Support	
<i>Space Control</i>	<i>Force Application</i>	<i>Force Enhancement</i>	<i>Space Support</i>
Counterspace Operations	Strategic Defense Against Ballistic Missiles	Surveillance Attack Warning Meteorology Navigation Communications	Launch Operations Orbit Transfer On-Orbit Control Space Tracking Logistics Training

global environmental monitoring, navigation, and communications.

The *space support* category includes all missions required to launch, deploy, and sustain military space systems.<sup>32</sup> It involves activities such as prelaunch preparations, launch, on-orbit satellite control, manned space support activities, orbital maneuvers, space tracking, logistics, communications, training, and personnel.

### *Military Space Organization*

The organizational concept for space systems and operations is decentralized in accord with the mission areas developed above.<sup>33</sup> Decentralization is necessary for effective execution of the various space missions, but there must remain a *central authority* for overall space command. This concept is consistent with fundamental military doctrine and joint principles.<sup>34</sup> *Centralized direction* is essential to coordinate the efforts of all space forces. There must be a space commander in chief (CINC) who has a clear understanding of the threat and the overall conflict situation.<sup>35</sup> The CINC alone must decide how to employ space forces in conjunction with land, sea, and air forces.

*Decentralized execution* is required not only for effective military space operations but also for delegation of specific missions and actions to subordinate commanders. No single commander could possibly control the complex operational activities of all space systems simultaneously. However, a consensus or a "common doctrine" is required between the central authority and subordinate space commanders. This agreement will ensure that timely and effective actions are taken by all concerned in the event of hostilities or in the absence of specific instructions.<sup>36</sup> Termed the "broad plan of employment" in AFM 1-1, this consensus is intended to develop a "bond of mutual understanding and common conviction between commanders and subordinates that is essential to coordinated action in combat."<sup>37</sup>

Although the space employment concept for centralized control/decentralized execution is consistent with joint doctrine as well as air doctrine, little else in the broad plan of employment of AFM 1-1 pertains to space. For example, the discussion on employment of aerospace power as an indivisible entity<sup>38</sup> does not apply because some space forces are commanded or controlled by military component commanders or government agencies other than the Air Force. Similarly, the discussion on conduct of simultaneous strategic and tactical air actions<sup>39</sup> is not pertinent to space warfighting, which largely supports the strategic and tactical objectives of land, sea, and air forces. Thus, a common doctrine for space does not exist in AFM 1-1, and the treatment of employment in AFM 1-6 is negligible.<sup>40</sup> However, the following framework (illustrated in table 3) is offered to exemplify employment concepts that realistically apply to space forces.

### *Employment Concepts for Real Space Doctrine*

The elements of common doctrine for force employment in the space arena entail, first and foremost, that space forces maintain *control of the space environment*. This principle corresponds with the basic objective of land, sea, and air forces in their respective operating environments.<sup>41</sup> *Space control* is vital if the military missions in space are to survive and sustain their role in support of other military forces. The CINC must have control of space to retain the freedom to defend against enemy space forces. Once control is attained, enemy space capabilities can be denied, and air and surface forces will derive greater flexibility and effectiveness in carrying out their warfighting tasks. Thus, space control becomes a prerequisite to the success of air, land, and naval forces in battle.

Effective space control requires a global *space surveillance* capability in order to detect, track, and identify enemy targets in space. A complete catalog of space objects must be maintained to facilitate timely at-

tack assessments and give sufficient warning to operators to evade impending attacks. Although the function of space surveillance roughly corresponds to that employed in land, sea, and air operations, the implementation is entirely different. The space environment and the characteristics of satellites require a vast array of sensors and computational methods specially tailored for the space surveillance function.

Space system force status must be continuously maintained to assess the readiness and vulnerability of friendly space forces. In the event of hostile action, it is imperative that the central authority and field users who are dependent on satellites be con-

stantly apprised of the status and capabilities of each space mission. Monitoring force status is a formidable task because military space forces are closely coordinated and cooperatively linked through national security and defense policy with the space capabilities of civil, commercial, and other governmental agencies.<sup>42</sup> Thus, unlike land, sea, and air forces, a multitude of agencies and support elements is involved in the reporting of systems and force status. Moreover, a large variety of military users is affected by changes in status of operational satellite capabilities for the various agencies.

Once control of the space environment is established, the CINC can employ all the characteristics and capabilities of satellites to favorably influence the outcome of hostilities. Force application missions—such as defense against ballistic missiles—may be efficiently employed, and force enhancement missions can be freely employed to support military operations on land, sea, air, and in space itself. However, in each of these space mission areas, additional common doctrine applies for truly effective space mission employment.

The CINC must engage in a common global warfighting strategy with the unified and specified commanders. Since space is all-encompassing, all theater commanders in chief may be supported by space capabilities. Space force enhancement must be carefully integrated into the operations plans of every unified and specified command to ensure full exploitation of the pivotal capabilities of satellite systems. The CINC must then employ space forces to support both strategic warfighting requirements of these commands and the tactical needs of individual combat commanders worldwide.

An effective command, control, and communications architecture is vital for successful accomplishment of each military space mission. This requirement encompasses not only the need for communications between the CINC and subordinate commanders but also interoperable control and

Table 3  
Employment Concepts for Space Forces

<p><b>Central Authority</b></p> <ul style="list-style-type: none"> <li>- Centralized Direction</li> <li>- Decentralized Execution</li> </ul>
<p><b>Control of the Space Environment</b></p> <ul style="list-style-type: none"> <li>- Space Control</li> <li>- Space Surveillance</li> <li>- Force Status</li> </ul>
<p><b>Space Mission Employment</b></p> <ul style="list-style-type: none"> <li>- Common Global Warfighting Strategy</li> <li>- Command, Control and Communications                             <ul style="list-style-type: none"> <li>- Command Connectivity</li> <li>- Interoperable Control</li> <li>- Space Communications Relay</li> </ul> </li> <li>- Space Intelligence</li> <li>- Space Environmental Forecasting</li> </ul>
<p><b>Space Flight Operations</b></p> <ul style="list-style-type: none"> <li>- Mission Requirements and Priorities</li> <li>- Access to Space</li> <li>- Satellite Control                             <ul style="list-style-type: none"> <li>- Telemetry, Tracking &amp; Commanding</li> <li>- Network Scheduling</li> <li>- Operational Administration</li> </ul> </li> </ul>



communications among the various space systems. The CINC must have reliable, secure *command connectivity* with subordinates to ascertain the threat, vulnerability, and status of all satellites and to issue direction on employment of space forces.

Unlike the relationship between terrestrial forces, critical operational interdependencies exist between the various space missions. For example, space navigation satellites rely on environmental monitoring satellites for space environmental forecast information; in turn, the environmental satellites require precise positioning information from the navigation satellites. Thus, effective military space operations rely on *interoperable control* architectures that ensure the sustained support of each space mission despite the loss of critical nodes.

This interdependency is also reflected in the extensive satellite communications interconnectivities associated with each mission for *space communications relay* of vital command/control, telemetry, and mission data.<sup>43</sup> Communications satellites relay commands from mission control centers to surveillance satellites and transmit environmental satellite mission data to military weather forecasters. Even greater complexity and interconnectivity loom for command and control of the exotic space weaponry contemplated in new strategic defense technology concepts.<sup>44</sup>

Accurate and timely *space intelligence* on the enemy space order of battle is critical to the CINC for effective and efficient employment of space forces. Space provides a unique environment for collection of a vast array of intelligence data on space targets. However, these data must be processed in a dedicated space operational intelligence information system and disseminated in timely fashion through a responsive network to the CINC, to the CINC's subordinate commanders, and to the terrestrial warfighters. Unlike the scope of air and terrestrial intelligence operations, space intelligence collection is not localized to a theater of operations but encompasses a threat that pervades both earth and space.

Accurate *space environmental forecasting* must be available to all space commanders to support mission planning requirements. Predictions of solar flares and geomagnetic activity (i.e., space weather) are critical to minimize any detrimental effects on sensitive space hardware and to understand both natural and wartime-induced environmental effects on space communications and mission planning. The most apparent benefit of our meteorological satellites is the timely support they provide to air and terrestrial users, but space users have equally important operational needs for this vital information.

Although the effective employment of space forces requires control of the space environment, it also depends on efficient allocation of resources and a strong, sustaining base of *space flight operations*. Broad mission requirements and priorities must be established for employment of each space mission. Space operations involve a unique four-way link between space system users, space system owners or operators, research and development organizations, and system support agencies.<sup>45</sup> The CINC must allocate and prioritize space support to the theater commanders, consistent with both the mission requirements of terrestrial forces and the capabilities of the various space systems. The commander for space has a different task than air or terrestrial commanders because space operations directly involve a multitude of military, governmental, and contractor agencies that must vie together to accomplish mission requirements successfully.

Our current space launch predicament<sup>46</sup> exemplifies the need to sustain a responsive means for *access to space*. That is, space launch vehicles not only must establish the satellite constellations required for each space mission but also must replenish satellites within the constellations before they degrade and fail. A robust launch capability, including launch base and support crew, must be maintained for each mission to ensure that satellites may be launched when required. Alternate means of access

should be available for all space missions in the event of launch booster problems such as those involved in the Titan 34D failures or the *Challenger* tragedy.<sup>47</sup> Finally, launch reserves should always be available to replace critical satellite capabilities destroyed by an enemy.

Each space mission requires unique satellite control procedures and capabilities to accomplish the mission and to sustain the health and status of the satellite constellation. Satellite control is the mainstream operations activity in space support, and it involves several key functions. The primary function, commonly termed *telemetry, tracking, and commanding* (TT&C), is analogous to piloting an airplane, sailing a ship, or driving a tank; but a host of different operator skills and talents is required. Even when astronauts are employed in manned space operations, much of the vehicle control in space is accomplished remotely from terrestrial command/control stations. Electronic commands are transmitted to satellites as automatic control inputs, and telemetry from the satellites is employed for proper onboard response verification.

Although TT&C is a mission-specific function, it is frequently conducted through the use of a common network of tracking stations, communications data relays, and control nodes. Therefore, an intensive background and real-time *network scheduling* function is required for these common satellite control facilities. Simultaneous need of the same facilities by more than one satellite requires conflict resolution. This action may involve changes in operational

tasking, operational support, or communications linkages for the affected satellites. Finally, *operational administration* functions such as orbital-vehicle spacing and radio-frequency allocations are required to distribute satellite capabilities in such a way that they neither interfere with each other nor infringe on the rights of other users in space.

## Summary

Although real space doctrine remains unrecognized, undocumented, and unaccepted, it has been practiced, proven, and implemented at mission and operational levels of space organizations for over 25 years. An operational command hierarchy, the United States Space Command (USSPACECOM), has been activated for control of these space forces.<sup>48</sup> A major challenge facing the USSPACECOM is to evolve and promulgate a realistic space doctrine based on those "unalterable truths" that have already been learned and experienced in military space operations. Only through an understanding and acceptance of such a doctrine can the unique environment of space be efficiently exploited by military forces. Only by recognizing the distinct characteristics of space can the full benefits of military space operations be realized. And only by properly employing the formidable capabilities of space forces can our air, land, and sea forces remain effective in deterring or winning future military conflicts. □

### Notes

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3. Lt Col Dino A. Lorenzini, "Space Power Doctrine," *Air University Review*, July-August 1982, 16-21.

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10. *Ibid.*, 45.
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16. Drew, 46. See also Friedenstein, 16, 17.
17. Drew, 48.
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19. The Joint Chiefs of Staff, *Unified Action Armed Forces (UNAAF)*, ICS Pub. no. 2 (Washington, D.C., December 1986).
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## STRATEGIC LITERACY

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**A**RGUING for strategic literacy in the Department of Defense (DOD) is an ambivalent enterprise.<sup>1</sup> In some respects it may seem like preaching to the choir, and in others it's like campaigning for virtue in a bawdy house. The main obstacle is today's cadre of officers for whom military art has not previously been important. This problem is best illustrated by a dilemma recently encountered at Air University by a group of field-grade officers who were charged to build a course on strategy for general officers.<sup>2</sup> Two

questions arose at the start: (1) if strategic education doesn't begin until an officer becomes a general, isn't it a little late? and (2) if officers don't need to understand strategy to become generals, why should they believe it's important now?

Refresher courses for generals will not enliven professional interest in the military arts and sciences. At the same time, it is also clear that existing policies and practices have contributed to the intellectual drought in military thought. Moribund attitudes toward military literature are particularly troublesome. At the moment, there are at least three obstacles to any improvement in the quality of military thinking and writing: (1) it's too much trouble, (2) it's too risky, and (3) there are no rewards. This essay reviews some of these problems and offers some suggestions that might get us out of the rhetorical rut and back on the road to strategic literacy.

## The Thought Police

The question of security and policy review has long been a sensitive subject for the services. In a nutshell, military professionals are required to submit anything they say or write for clearance before it is published—even by house organs like the late *Air University Review*. Speeches, articles, or books submitted for clearance generally undergo a tedious review, during which time the whole text or portions of it may be rejected by a legion of anonymous “thought police” whose arbitrary judgment, often without explanation, is final.<sup>3</sup> After rejection an author might appeal the process, but having gone through the first drill, the prospect of going the second mile becomes an exercise in self-abuse.

At first glance, the Air Force policy on clearance seems quite benign.<sup>4</sup> Specific offices at all headquarters are designated for security and policy review. In practice, however, most supervisors and commanders believe that they also have de facto if not de jure authority to suppress anything written by subordinates—especially if it does not cast their weapons, operations, or practices in the most favorable light. Thus, anything written for publication faces a double threat: the chain of command and the formal review process. Almost anything can potentially be rejected on “policy” grounds.

Both the official and unofficial clearance gauntlets in most commands are formidable.<sup>5</sup> And the output of such a system is predictable. Smarmy bureaucrats prime the official pump with mindless blather that offends no one and says nothing, or conscientious officers bash their way through the system and pay the price when their effectiveness reports are written by some self-appointed censor. Yea, the system forces the thoughtful officer to make some unwholesome choices between integrity and career.

The issue isn't whether or not some small number of manuscripts make it through the mill, nor is the issue what does get published: *the issue is that ideas don't make*

*their way into print because prevailing attitudes neither encourage nor reward the exchange of ideas.* At the Headquarters USAF level, the Air Force Public Affairs Office reviewed 2,545 manuscripts for public release in 1987. Most of these were official speeches. Journal articles numbered 345, and of these approximately 10 percent were denied clearance.<sup>6</sup> These numbers tell an interesting story. In 1987, only one in 311 officers was likely to write for publication—.003 percent of all active duty Air Force officers. The figure for all ranks was .0005 percent. The number for all Air Force employees is smaller still.

Surely these percentages do not represent all material submitted for clearance at every Air Force echelon. No doubt, base newspapers and command vanity publications are reviewed locally. However, local media are not often a venue for debate or controversy. Serious essays or papers that might be widely read or deal with Air Force policy, programs, or operations are likely to be passed to Washington for clearance. Thus, the Headquarters USAF numbers are probably a fair gauge for serious professional military literature.

Yet the available statistics, sad as they are, don't tell the whole story. How many drafts were cleared but not released? Procedures for clearance and release can be separate drills.<sup>7</sup> How many drafts had partial deletes? How many drafts never made it through the chain of command and into the clearance mill, the only venue where statistics are kept? How many drafts were never written because the system is so incredibly hidebound? Taking the trouble to think and write is one problem. Undergoing a ritual in humility before or after publication is another problem altogether. Military authors who have been frustrated by the morass of Air Force clearance and review can take some small comfort in knowing that the situation isn't much better in other services.<sup>8</sup>

The contrast provided by official biographies of American and Soviet officers is also revealing. Both contain similar personal data, but a Soviet military biography will

also show a lengthy list of books and articles charting the officer's written contributions to military theory. No such list enriches official American military biographies.<sup>9</sup> Soviet officers are expected to contribute to the world of ideas. The American profession of arms is not energized by similar expectations. Although a Soviet officer might be motivated to "publish or perish," an American might rewrite the maxim to read "publish and perish."

It might also be of some interest to the anti-intellectuals to know that the most influential uniformed thinker of our generation is a Russian—Nikolay Ogarkov. Marshal Ogarkov is the former chief of the Soviet General Staff and an editor of/contributor to the latest edition of the *Soviet Military Encyclopedia*. He is also the author of numerous controversial and "revolutionary" arguments concerning nuclear forces, conventional doctrine, and the future of weapons developments in the Soviet Union.<sup>10</sup> Ogarkov's ideas, more than those of any other officer, have redefined the military agenda in a country not known to suffer reformers gladly.<sup>11</sup> If strategic thinkers don't make good warriors, this fact seems to have been lost on the Soviet Politburo. At the moment, Marshal Ogarkov is the *field commander* of Soviet forces facing NATO in central Europe.<sup>12</sup>

Even those few US senior officers who do contribute to serious strategic thought, and for whom clearance is surely less of a chore, are likely to take their ideas to journals outside of the Department of Defense.<sup>13</sup> This practice says more than a little about the prestige of departmental forums and professional military journals.

A recent, anonymous *Airpower Journal* (APJ) spokesman stated that Air Force Chief of Staff Larry D. Welch had addressed "this issue in a most positive light."<sup>14</sup> The spokesman went on to say that it wasn't Air Force policy "to penalize its people for writing."<sup>15</sup> Yet here the apologists miss the mark. General Welch's policy was never the problem. The real issue is the practices of supervisors and commanders. Penalties may not be of-

ficial policy, but the very fact that APJ raised the question of penalties is in itself convincing evidence of the threat. The message is clear: it is both difficult and risky to write as an Air Force officer unless you're writing a puff piece.

Public affairs officers and APJ spokesmen often defend the existing system as if problems are illusory. At the same time, many officers complain about the quality and quantity of professional military writing. This dissonance should illuminate the obvious—that linkage between a sorry farm and sad produce. The official rhetoric to date has been less than candid. As an example, DOD regulations will claim it takes a minimum of 10 days for clearance. Anyone who has ever dealt with large headquarters knows that the Pentagon couldn't clear its throat in 10 days. In any case, what's the value of a minimum standard when there is no upper limit?

## Disarming the Mind

The Air Force debate of record on this problem of policy and security review came to a boil in the final years of *AU Review*. The high point was a clever essay by William S. Lind, accusing the Air Force of "unilateral disarmament in the world of ideas."<sup>16</sup> It should be noted that Lind entered the fray with some baggage, including a reputation as a defense critic and advocate of military reform—none of which was likely to endear him to guardians of the status quo. Nonetheless, his reasoned attack on Air Force clearance practices was like throwing gasoline on smoldering embers. Soon the pages of *AU Review* were hot with argument. Predictably, junior officers clamored for change, and senior officers argued that the existing system was necessary and prudent. In the end, something did change—someone shot the messenger. *AU Review* was consigned to the boneyard.

In fairness to *AU Review*, its last two editors did attempt to make the journal something more than a house organ—an effort



that may have hastened its passing. Clearly, military professional journals do not have powerful constituencies among the brass nor among the rank and file—a double bind that does not bode well for the future of military thought or the quality of military literature.

The official explanation for the demise of *AU Review* was budgetary. Yet, Air University could hardly lay claim to its charter without a journal, nor could the Air Force be the only military service without one. Thus, *Airpower Journal* appeared like a rabbit out of the budgetary hat. And the rabbit came out dressed to kill—as a “warfighter.” The stated purpose of the new Air University journal was to focus on “warfighting” and operational art.

It's probably too early to judge whether or not *APJ* is a warrior or just another rabbit, yet the early signs are not promising. On the warrior question, the first issue of *APJ* printed two professional reading lists: an airman's quintet of books and a list of the top 10 recommended readings from Project Warrior.<sup>17</sup> Neither list contained any book by a recent or potential military adversary of the United States—no Vietnamese, no Russians, no revolutionaries, and no Marxist generals! Who or what does *APJ* or Air University, for that matter, believe US forces might oppose in the future? Recommending a list that includes Clausewitz, a dead Prussian, and excludes live Russians is not exactly a tough call. The lists published are irrelevant, not for what they include but for what they exclude. What they exclude is the horse's mouth. The “reading list” approach by itself may be just another symptom of how shallow warfighting programs have been to date. If this is the best that our journals can do, the blind are still leading the blind in the quest for strategic literacy.

Warrior preparation is less a function of knowing what some philosopher or academic says about combat and more practically a function of knowing what likely enemies believe. Indeed, military-school journals are a mirror of the very same prob-

lems that plague entry-level and professional military schools. Neither has defined the disciplines that set its profession apart from others.<sup>18</sup> Military arts and sciences are neither recognized nor studied. As a result, it is no surprise that our “military” journals all but ignore the professional military literature of potential enemies.

Nor are the early signs promising on the question of operational art. Operational art is the bridge between strategy and tactics. By definition—which, incidentally, you will not yet find in the *DOD Dictionary of Military Terms*—it is the orchestration of joint and combined arms.<sup>19</sup> A magazine that changes its logo from *AU Review* to the more parochial *Airpower Journal* may have narrowed its sights right off the target. No one disputes the merits of air power, yet an extension of this logo-logic might see the Navy call its senior journal “Seapower” and the Army call its senior journal “Landpower.” At a tactical school, a journal with *Airpower* in its title would be appropriate; at the operational/strategic level, such myopia is a step backward, not forward. The focus of midlevel and senior military schools and of professional military journals should be military art and science in the joint/combined arena. Service and allied institutions continue to act like they will fight the next war alone—precisely the kind of misguided energy that got us in the warfighting pickle to begin with.

The term warfighting itself is a symptom, not a solution, of the problem of military competence. Traditional and prudent military concerns don't need to be obscured by mindless jargon. The issue that the warfighting rhetoric obscures is military performance or, better still, competence in military art—the successful integration of strategy, operational skills, and tactics. These matters are not clarified by a euphemism, especially this particular gerund—a poor verb and a worse noun. Any concept that fails tests of grammar and semantics is unlikely to have any lasting impact on theory or field applications. *Strategic pidgin* isn't the antidote for strategic illiteracy.

## Antidotes for Strategic Illiteracy

A cynic might argue that the only events likely to change our way of thinking would be a military disaster or another war. If this speculation were true, Vietnam should have precipitated a renaissance. Others might also argue that the problem of strategic literacy is only the military "school-house" problem come home to roost. Here, meaningful change may have to await the next generation of officers. However, if all progress must begin somewhere, the world of ideas seems as good a place to start as any.

Ironically, on the question of military writing, the problem isn't that there is too little—in fact, there's too much. Indeed, too many dullards have access to typewriters. The average officer produces a bumper crop of paper—most of it in the form of point papers, issue papers, background papers, briefing items, memos, electrical messages, staff summary sheets, summaries of summaries, regulations, operating instructions, and associated bureaucratic pulp.<sup>20</sup> This "junk food" approach to military writing and thinking is actually encouraged by official guidance.<sup>21</sup> A close reading of most official "writing" guides might lead you to believe that the average flag officer has the attention span of a cocker spaniel. Yet, none of the pulp is washed through the formal review process, and much of it actually embarrasses or constipates the system it is designed to serve. In contrast, those few thoughtful essays or research papers that might make a contribution to professional innovation are put through a wringer that might have intimidated Chaucer. This inversion of values is a symptom of the need to give the security and policy review process an administrative enema.

(In an aside, it is only fair to note that there is a category of military writing that has been raised to a high, if not noble, art. This class is known as officer effectiveness reports. Here, an officer might be consigned to oblivion, yet the report is written in such terms that the victim might actually look

forward to the trip. Indeed, the services have developed a thousand ways to damn with faint praise. In the Air Force, such reports are known as "velvet stilettos.")

The separate services frequently lament the endless micromanagement of military affairs by DOD and Congress. The latest manifestation is the Defense Reorganization Act of 1986. There is a message here. Congress is motivated to mandate change, in part, because professional soldiers neither encourage original thinking nor develop innovative solutions within the ranks. It is absurd to complain about handicaps while we continue to shoot ourselves in the foot.

All professions need a forum where new concepts, ideas, and theories can be argued and developed. This forum must be open. If it is not, learning, new knowledge, and progress are difficult if not impossible. The question here is not a legal one. This debate does not concern the First Amendment. It is simply a question of the need—indeed, the requirement—to exercise intellectual muscles. You can't just "outfight" the enemy; you must outthink him. The way to do this is not just to *allow* officers to write and speak out but to encourage, recognize, and reward the practice.

We might start by shooting the "thought police." We don't need official censorship that is draped in the flag of "security review." What fools would use classified data, sign their names to the manuscript, and send it off to a journal? It might be in the national interest to allow such idiots to expose themselves. Still, the possibility of inadvertent disclosure can't be ignored. Yet it is a *relatively* minor issue compared to potential abuses that at the moment include using security to stifle prudent debate, mask programmatic funding, or deny necessary data to field forces. Worrying about inadvertent disclosure at the expense of these larger threats is a little like seining for plankton from the back of a whale.

The real issues here are trustworthiness, integrity, and the good judgment of officers. No security system will compensate for the absence of these qualities. If we can safely

assume that most officers possess such virtues, the military services have nothing to fear from their officers or the world of ideas. Editors are more than equal to the task of rejecting drivel; if they are not, the marketplace of ideas will expose the frauds and the security risks.

At a minimum, that unofficial legion of censors in the supervisory chain of command should be put on notice that they do not have a charter to kill drafts before they reach the official clearance mill. If every drone in the military bureaucracy has the power to suppress the written word, "innovation at every level" is just more rhetoric.<sup>22</sup> Of all the services, it is no accident and more than a little ironic that the Air Force—a corps inspired by the vision of Billy Mitchell and Hap Arnold—is now a slack player in the world of strategic ideas.

Some modest prestige instead of stigma might also be attached to the written word. Intelligence officers now take great pains to assemble, if not read, the writings of Soviet officers. The purpose of collecting this information is to allow our analysts and commanders to audit and understand the operational and strategic thought processes of Soviet military commanders. Aren't the thought processes of our commanders equally important? Every officer effectiveness report has a block called "communication skills." Let's stop just checking those squares and start appending lists of published works to official personnel records and personal biographies. Official officer effectiveness reports are notoriously inflated. We need another vehicle to know how, what, and if our officers think.

## Epilogue

Anti-intellectual jokes have become a staple in the Air Force in recent years—no doubt a sign of the times. In the current favorite, one colonel asks another, "What's the definition of an Air Force intellectual?" The second replies, "An intellectual is a

line officer who can spell his last name without looking at his shirt."

This black humor is directed at that group of uniformed dolts who believe that thinkers somehow don't make good warriors. Such beliefs are a symptom of the prevailing ignorance of US military history and traditions. Just to name two warriors of some renown, Gen W. T. Sherman was a seminary provost, and Gen "Stonewall" Jackson was a professor before the start of the American Civil War.

The substitution of the *Airpower Journal* for the *Air University Review* might be another symptom of the anti-intellectual mood of the Air Force—an attempt to put some distance between warrior preparation and the military schoolhouse. Surely the professional military schools have earned such a slight. Historically, our "professional" schools have contributed little to the practice of the military profession. Our academies and senior schools produce neither specialists in the military sciences (intelligence, planning, logistics, etc.) nor practitioners of the military arts (strategy, operational art, tactics, etc.). If recent events provide any clues, these institutions don't educate resource managers either.

This state of affairs is, no doubt, a function of the overwrought separation of "training" and "education"—as if training in specialties (military sciences) is a thing apart from the theory of applications (military arts). Today, our military technical training programs are an unqualified success, and our military education programs are a qualified disaster. Military education has become a square filler on the road to promotion, rank is now confused with achievement, and theoretical or applied competence has become irrelevant. At the technical/tactical level we have kept the focus on skills necessary for soldiering; at the doctrinal/strategic level, we have lost our way. The gap between the two levels is likely to grow wider if we don't start rebuilding bridges.

The void between tactical and strategic competence has been created, in no small



measure, by our inattention to theory—the faculty that allows us to join parts in a larger whole. Just as an architect's abstractions bridge the gap between the skills of a carpenter and the art of a building, so does operational theory bridge the gap between tactical skill and strategic success. *Professional literature is not an option for the development and exposition of theory—it is a necessity.*

In short, the issues of thinking and fighting—strategic literacy and military competence—are inseparable. If we want to

improve military performance, we must have new ideas and a forum for those ideas. Military training, military education, military theory, and strategic competence are inextricably bound. We need to rebuild the bridges that bind these four elements. We can start by clearing the security/policy review minefield, taking supervisors/commanders out of the censorship business, and creating some concrete incentives to stimulate serious contributions to military thought. □

#### Notes

1. In this essay, the adjective *strategic* and the noun *strategy* are used in their traditional senses (i.e., military plans or theories about how military forces might be used).

2. The Joint Flag Officer Warfighting Course is a two-week course jointly offered by Air University and Army War College three times a year. In addition to strategy, this course also includes doctrine, enemy capabilities, and problems of coalition warfare.

3. Official spokesmen on this issue often claim that authors are provided with rationales for deletions or rejections. In practice, however, the "explanation" is often no more than brackets around the objectionable material, with the words *policy* or *security* as marginalia.

4. See AFR 190-1, *Public Affairs Policies and Procedures*, February 1982.

5. At the Air Staff level, there are no fewer than seven regulations (including DOD guidance) that are applicable to policy on clearance, review, and release. When local supplements are added to this number, the task of understanding all the issues is formidable indeed. Besides, none of these regulations are likely to be available in a single place.

6. Statistics for 1987 provided by the secretary of the Air Force, Office of Public Affairs, Operations Division.

7. See para 1b of Headquarters Operating Instruction 190-13, *Air Force Security and Policy Review Procedures*, 28 February 1985.

8. See Comdr Bruce Linder, "Security Review Is a Quagmire," *US Naval Institute Proceedings*, June 1988, 89. Incidentally, here is another military author who feels compelled to make his arguments outside of the Department of Defense.

9. Official biographies for senior American and Soviet officers are available from the Department of Defense. However, Soviet biographies are often classified.

10. See Marshal Nikolay Ogarkov's *Always in Readiness to Defend the Homeland* (Moscow: Voenizdat, 1982) and *History Teaches Vigilance* (Moscow: Voenizdat, 1985) for two

samples of his lucid style and iconoclastic argumentation.

11. For a complete discussion of Marshal Ogarkov's role in the "new revolution" in military affairs, see Rose E. Gottemoeller's *Conflict and Consensus in the Soviet Armed Forces* (Santa Monica, Calif.: Rand Corporation, May 1988).

12. Ogarkov might be considered a living example of what the Soviets call the "principle of the first leader." This theory holds that the best person to implement a new doctrine or strategy is the same person who developed and sold it. The idea is to give the responsibility for implementation to a person with a vested interest in its success.

13. See Gen John Chain, "Strategic Bombers in Conventional Warfare," *Strategic Review*, Spring 1988, 23-32.

14. "Writing for the *Airpower Journal*," *Airpower Journal*, Fall 1987, 85.

15. *Ibid.*

16. See William S. Lind, "Reading, Writing, and Policy Review," *Air University Review*, November-December 1984, 66-70.

17. Dr Alan L. Gropman, "An Airman's Quintet," *Airpower Journal*, Summer 1987, 55-59, and "Project Warrior Top Ten," 85.

18. The Air Force Academy catalogue provides an illustration. The 1987 edition (p. 40) lists 25 disciplinary majors. Of these, only one (Operations Research) approximates a military specialty.

19. US Army Field Manual 100-5, *Operations*, 5 May 1986, does contain a comprehensive definition of operational art.

20. This author's prosaic favorite is a recent Air Staff requirement for a "background paper" on a unit picnic.

21. See AFR 10-1, *Preparing Written Communications*, March 1985.

22. "Innovation at every level" is the theme of the Air Force's Model Installation Program (MIP), an internal campaign to stimulate local solutions to problem solving and free units from "over regulation."

## net assessment

**Embattled Courage: The Experience of Combat in the American Civil War** by Gerald F. Linderman. New York 10022: Free Press, 1987, 357 pages, \$22.50.

A natural question to ask is why anyone in today's high-technology Air Force would want to read a book about the Civil War. The answer comes easily. *Embattled Courage* offers useful insights into human behavior in combat as well as interesting parallels with more recent twentieth-century conflicts.

According to Linderman's thesis, the Civil War can be divided into two distinct periods. The initial phase of the war, 1861–62, was marked by intense idealism at both the front and at home. Courage, godliness, duty, and honor were commonly accepted values. In particular, courage stood at the core of each soldier's value system—something difficult to comprehend in our age of rampant cynicism and disillusionment. Religious fervor was reflected in the widespread belief that God's will would determine the outcome of the war. Ultimately, war was an adventure—dangerous, but for the most part an extension of life at home. Typical of the leaders of this period was Northern commander George McClellan, who relished personal displays of courage, who wished to win the war by spilling as little blood as possible, and who was largely ineffective.

The second phase of the war, 1864–65, was marked by drastic changes in personal values, as Linderman vividly recounts. Courage was insufficient in the face of evolving technology and tactics. Rifled muzzle-loaders with increased range and accuracy made frontal assaults futile. Of the 15,000 men in Maj Gen George Pickett's charge at Gettysburg in 1863, only half returned, and Grant's frontal assault against entrenched Confederates at Cold Harbor in 1864 produced 7,000 Union casualties in less than an hour (compared with only 1,300 for the Confederates). Death came on a scale incomprehensible then or now—over 600,000 dead and more than 1 million casualties in four years of war.

Increasingly, the war the soldiers fought was not the one they had set out to fight. No longer was it possible for the individual to feel he was

in control of his fate. War had ceased being a gentlemanly contest. Killing became a craft. As one soldier explained, "We are the best killers. . . . That establishes the righteousness of our cause." Mere survival superseded such values as courage. For some soldiers, the contrast between their original, ideal conception of war and its stark reality was so great that they no longer thought of themselves as survivors. Their future was simply a "blank."

The changing face of war also brought new leaders to the fore—leaders who viewed war in anything but sentimental terms. Linderman portrays Grant as a modern warrior. The victorious side would be the one that, in Grant's words, "never counted its dead." Gen William Tecumseh Sherman was even more blunt. Linderman quotes him as saying, "I begin to regard the death and mangling of a couple thousand men as a small affair, a kind of morning dash." At first glance it is difficult to take him seriously, but an examination of his record shows that he meant every word of it. Ultimately, Grant and Sherman were practical men who rejected any notion of war as a heroic enterprise.

For many Civil War veterans, the immediate postwar years were not a time for fond reminiscences, so shattering had their wartime experiences been and so great the need for national healing. Much like Vietnam veterans more than 100 years later, soldiers returning from the Civil War quickly turned their backs on the conflict. In extreme instances, veterans even deleted mention of their wartime service from biographical directories. Not until almost 15 years after the war did widespread interest revive and wartime service again become a point of honor.

*Embattled Courage* is a superb piece of writing and research, well balanced with both Northern and Southern experiences. The rich accounts of Civil War soldiering and combat action will fascinate any reader. Most important, however, is the lasting impression that in the end the Civil War was largely a grinding struggle for personal survival and not always the heroic, gentlemanly contest we often imagine it to have been.

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**Innovation and the Arms Race: How the United States and the Soviet Union Develop New Military Technologies** by Matthew Evangelista. Ithaca, New York 14851: Cornell University Press, 1988, 300 pages, \$32.95.

Innovation in the development of new military technologies is a complex process that is receiving widespread attention in today's academic institutions and public media. In this book, Matthew Evangelista looks at military innovation as it pertains to both the United States and the Soviet Union. The book is divided into two sections—the first dealing with the theory of innovation within the two superpowers and the second applying this theory to the development of tactical nuclear weapons.

The author bases his theories of innovation on the premise that innovation is an extension of the innate behaviors of the two countries. The United States, because it is a more open and free society, draws innovation from free thinking and the work of creative scientists at low organizational levels. These ideas are then presented to the internal bureaucratic and political powers of the day. This process relies on a "bottom-up" philosophy of matching innovation to a particular military requirement. On the other hand, the Soviet Union—tied to its system of secrecy and compartmentalization—relies upon reactions to external stimuli (primarily from the United States) to generate major weapons innovations. This reactionary mode results in a system that relies primarily upon a "top-down" process for innovation.

Evangelista uses extensive and detailed historical data in the development of his two theories of innovation. These "models of innovation" trace the innovation of new weapons through a five-step process—from inception of the idea to eventual deployment. The US model relies upon the creativity of the US scientific and developmental community to generate feasible ideas. These ideas are then promoted through the military-political community. Once accepted, the idea is pushed into production for military purposes via a "window of vulnerability" from perceived or actual threats. Finally, high-level approval for full-scale production is granted and extensive deployment occurs.

The Soviet model of innovation, however, is reactive in nature. The Soviets realize an external threat and, through the high levels of the government or military, react to the threat. Demands for new weapons are passed down to scientists

and engineers based upon this reactionary prioritization process. Creativity of scientists and engineers at the lower organizational levels is stifled by this procedure. Additionally, the myriad of administrative processes surrounding the secretive nature of the Soviet technical community inhibits the flow of information from one design center to the next. This bureaucracy often results in duplication of effort. Once developed, however, the new weapons are rapidly mobilized, with mass production quickly following. Major publicity of the new weapons comes from high-level military and political leaders, usually at times when the most political as well as technical impact can be achieved.

The author tests his innovation models in a case study relating to the development of battlefield tactical nuclear weapons. This portion of the book is a significant account of the historical development of tactical nuclear weapons, from the US as well as the Soviet perspective. The serious student of nuclear weapons development will benefit from the detail and depth of the accounts. The novice, however, may be overwhelmed by the rapid introduction of information and characters comprising the history of nuclear power and weaponry. The case study is extremely effective in explaining the models of innovation—so effective that I was left wondering if the models were specifically designed for this application.

The final point of interest in this work is the use of the models to predict future efforts in weapons development—particularly the Strategic Defense Initiative and the Soviet response to this effort. It is here the author moves from his stated purpose—a comparison of the processes of innovation—to a political soapbox relating to the issues of arms control. Barring brief moments of political finger pointing and arms control rhetoric, *Innovation and the Arms Race* would make an excellent addition to the library of people involved in technical military innovation.

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**Wild Blue Yonder: Money, Politics, and the B-1 Bomber** by Nick Kotz. New York 10022: Pantheon Books, 1988, 313 pages, \$19.95.

Pulitzer Prize-winning journalist Nick Kotz has written a provocative exposé of the B-1 bomber acquisition and, by extension, modern



American defense politics. The work has enjoyed enormous praise in the press, and small wonder—it is eminently readable, with an easy style, short chapters, and an eye and ear for the telling example and the right phrase. His portraits of the movers and shakers among the nation's political, economic, and military leadership are as incisive as his overall judgments about defense policies and practices are sobering. But before being seduced by its charming style and sensational accusations, one needs to critically examine the book's arguments and evidence.

The story begins with the ill-starred B-70 high-altitude supersonic bomber of the late 1950s, continues through the first version of a low-flying advanced manned strategic aircraft in the 1960s, and concludes with the successful 17-year effort of Air Force generals and Rockwell Corporation executives in acquiring the 100 B-1s currently gracing the US arsenal.

Along the way, four presidents—Eisenhower, Kennedy, Johnson, and Carter—challenged the military requirement for a penetration bomber, favoring instead cheaper and quicker missiles. But these leaders hardly emerge as heroes since their support for more lethal ballistic missiles succeeded in subverting arms control. The three presidents who supported the B-1—Nixon, Ford, and Reagan—are made to appear to have done so out of narrowly conceived political calculations, not carefully considered security needs. Throughout, contractors engaged in ambitious lobbying—first with Air Force complicity and then using Republican congressional allies—to keep constant pressure on decisionmakers. Finally, the Air Force operated from an irrational bureaucratic interest in strategic bombing, wedding the service to increasingly obsolescent manned bombers. In pursuit of this goal, the service traded sound military and strategic priorities for political support. Not surprisingly, policy appears nothing less than a political and military disaster.

The author claims to have undertaken the study with no other purpose than to understand how defense politics works. As this summary suggests, Kotz's book is based on a number of debatable propositions, the validity of each resting on the strength of his analysis and evidence. In advancing these arguments, the author resorts to a variety of conflicting viewpoints. In many ways the book is a compendium of every conceivable argument from every conceivable perspective against military politics. He questions the utility

of strategic weapons and the efficacy of manned bombers. He attacks from both arms control and budgetary angles. He condemns the military, the contractors, and the politicians for their morally odious behavior, and the American public for their excessive security fears and blind faith in military spending. Everyone involved is to blame.

Interestingly, his evidence suggests considerable pluralism in terms of how defense decisions are made. At no time did any one participant win a total victory. The service and the contractors kept the program alive during the lean years through research and development funding but were consistently forced to modify requirements in light of political direction. Presidents engaged in wide swings between strategic buildup and arms control but had to consider the concerns of bomber proponents. There is little here that is new.

His insights into the revolution in the congressional committee system and its significance for defense policies and procurement are valuable and have implications for many weapon systems. In a political system based on influence peddling, the decline in power of committee chairmen has led congressmen to compete for defense contracts and bases for their constituents. Yet, the author's view of this political "fragmentation" within Congress could easily be called "democratization." Similarly, the procurement strategy of Rockwell to broaden the B-1's political base meant economic "democratization" as well, since hundreds of subcontractors now enjoyed access to defense spending. The question of whether these developments were harmful to American security is clearly a matter of judgment and perspective. Far from Kotz's claim of being the neutral effort simply to understand how defense politics work, his book is at times excessively critical.

The author calls for open discussion of defense issues as a means of informing the public and combating the inordinate public fears influencing defense politics. Ironically, at crucial points his case rests on testimony from unidentified individuals. This is true of alleged warnings given a senator before an important appropriations committee vote delaying production of the B-1 and of warnings given Boeing Corporation during its campaign to retrofit B-52s with new engines. Other examples include the pressure the Pentagon was said to have applied to Rockwell to accept a fixed-price contract for the B-1, the claim that Rockwell kept two sets of

books on B-1 costs, and the halting of an investigation by the House Appropriations Committee into misuse of stealth bomber funds for the B-1. Such examples inflame rather than inform. At bottom lies a problem with the author's evidence, which relies heavily on unnamed interviewees. In such instances, we are not given so much a picture of what happened as a description of what many claim to have happened. For this reason, the work remains as much journalistic as historical.

Kotz claims the B-1 is illustrative of major problems in defense practices. He sees waste as a predictable outcome when self-interested parties seek to influence defense policy. But how predictable is the process? Could anyone have predicted the economic rationality of a 30-year campaign for a new bomber, the various presidential reversals on nuclear weapons, the behavior of the Soviets at crucial points over this period? What emerges from this study is the extreme uncertainty of defense politics. Calls for coherence, efficiency, and virtue in military policy fail to come to grips with this reality. Although one questions Kotz's alarmist conclusion that defense policy is "out of control," there is much here to think about for people engaged in the management of the nation's defense.

Dr Julian DelGaudio  
Norton AFB, California

**The Ravens: The Men Who Flew in America's Secret War in Laos** by Christopher Robbins.  
New York 10003: Crown Publishers, 1987, 420 pages, \$19.95.

Christopher Robbins has written a superior book about one of the most successful US military campaigns in Southeast Asia—the Central Intelligence Agency (CIA) paramilitary operation against the Communist insurgency in Laos. Using interviews and recently declassified documents, Robbins tells the story of the secret Laotian base at Long Tieng and the forward air controllers (FACs) who flew the O-1 Bird Dog.

Located in the Plain of Jars, Long Tieng at the time was "the most secret place in the world." Flying out of Long Tieng and using the call sign "Raven," US Air Force pilots used the O-1s to mark targets for Laotian T-28 attack aircraft. The base was also host to most CIA activities in Laos, which included covert operations by the CIA-owned Air America airlines.

For this highly select group of Air Force pilots, being a Raven FAC was adventurous, challenging, rewarding, and very dangerous. These pilots were attracted to the Raven program by the relatively unrestricted rules of engagement (ROE) because the war in Laos was virtually free from the self-defeating, demoralizing ROE that plagued the air war in Vietnam. The Ravens were a raucous crowd who fit in well with their CIA counterparts. When not flying, the Ravens were partying heavily and for good reason—their casualties were so high that the Ravens were never sure if their next mission would be their last.

Robbins's interviews with former Ravens bring out miraculous stories of "dead-stick" landings behind enemy lines. For example, Capt Fred Platt landed his crippled O-1 on a road surrounded by enemy troops. While carrying his injured Laotian backseater, Platt held off the Pathet Lao with a grenade launcher until rescued by an Air America helicopter. Indeed, being a Raven required true flying skills, a warfighting spirit, and a little luck.

Robbins, though, has not just given us another book about some very impressive combat flying. The horror of war comes through very clearly. The author gives an emotional account of how Capt Chuck Engle developed a "death-wish" attitude after extremely strenuous, prolonged combat sorties. The pressure was too much for the young pilot, who was killed stunting his O-1 at low level on a noncombat mission. It was an ironic death for one of the Ravens' most highly decorated combat heroes.

Another Raven, Capt Craig Morrison, returned home after his Raven tour physically sound but emotionally unprepared to be a civilian. He could not adjust to life in the suburbs and was amazed at the lack of interest Americans had for the war. Robbins makes it clear that the fliers, as well as the grunts, also suffered deep emotional scars from the war.

Another strength of *The Ravens* is that it does not forget the native Laotians after the American withdrawal. Very little has been written about the genocide inflicted upon the Hmong tribesmen who lived and fought with the CIA, but Robbins appropriately recognizes the Hmong plight. The Hmong were a proud mountain tribe famous for their wartime courage. Their suffering did not end with the war in 1975. Virtually abandoned by the CIA, the Hmong tried to flee to Thailand to escape Communist persecution. Very few Hmong survived.

The author glorifies the Hmong's controversial

leader, Vang Pao. General Pao was unquestionably the true leader of the Hmong and was a major reason why they were feared warriors. The stories of his leadership and dedication to his people as well as the suffering experienced by all the Hmong make the book well-rounded with a much broader appeal.

During the height of the war, Long Tieng was probably the finest CIA paramilitary operation in history. It maintained its secrecy extremely well and was very effective in controlling the North Vietnamese and Pathet Lao. Key factors for the CIA's success that we should note were a decentralization of authority, a "can-do" attitude, and a definite sense of their mission.

This book is highly recommended for all military officers. In our peacetime Air Force of high-tech widgets, underground sprinkler systems, and leather jackets, *The Ravens* offers a timely lesson on what is truly important to fight a war.

Capt Thomas L. Driehorst, USAF  
Nellis AFB, Nevada

**Soviet Military Strategy in Space** by Nicholas L. Johnson. New York 10003: Jane's Publishers, 1987, 287 pages, \$34.95.

As the Strategic Defense Initiative (SDI) grows in centrality and the issue of weaponization in space becomes a major military concern for both the United States and Soviet Union, this book has a remarkably topical importance. There is little doubt among students of Soviet space activity—among whom Johnson is well known as a leading figure—that the overwhelming bulk of Soviet space activity and research is oriented toward military use of space. Thus an objective, unexaggerated account of Soviet activity is very much called for at the present time. And this is what Johnson delivers.

Not only does Johnson detail the extent of the Soviets' military space program but also he makes some telling observations about the Soviet perspective on space-based military operations. Thus he observes that the Soviet conception of space military operations bears considerable similarities to their naval strategy and doctrine. Such a perspective is somewhat opposed to that of American thinkers who tend to see space as an upward extension of the air battle or theater. Under such wartime conditions, Johnson rightly expects the Soviets to aim at either selective or total space control. Space control means not only protection of assets in space and denial of space re-

sources to the enemy but also the unhindered operation of all procedures needed to protect and employ military power—both offensive and defensive—in space while denying it to the enemy.

For the Soviet military, space control ultimately entails power projection across the entire theater of war. Granted, the Soviet Union possesses a burgeoning and competent space program whose exploits and capabilities are increasingly publicized. More important, its attitude toward space control suggests that it possesses a coherent military doctrine and strategy for the deployment and use of space-based or space-traversing military assets in service of clear political and military goals. Although Johnson's description of the program up to the time of publication is exemplary, it is here that he and many others fall short. The only criticism one can make is that Johnson nowhere gives a coherent, single exposition of what (in Soviet terms) their strategy and doctrine mean.

For the United States, such an omission only compounds the implications of the failure of our military-political leadership to judge Soviet strategy and doctrine for space apart from Soviet capabilities, which are well documented within their limits of public disclosure. Gorbachev's recent admission that the Soviets do indeed have an SDI program (in fact, it goes back at least 30 years as a research project) forces us to confront the situation realistically: although we may be technologically advanced, our advantage will be meaningless unless it is joined to a coherent strategy and doctrine of military activities and goals in space.

As an example of this need for strategy and doctrine, Johnson cites V. Petrov who, as early as 1960, stressed the advantages of surprise and striking first to maintain the initiative in space combat. From such an observation, one might also sense the importance the Soviets attach to the initial period of war—a major focus of military study in the USSR—and to concealment (*maskirovka* in Russian), which also plays so great a role in Soviet strategy and operations. More to the point are recent writings suggesting that the decisive zone of operations at the theater level is shifting to "low space" and writings examining the implications of space-based weapons for theater and naval operations generally. In comparison to these published Soviet examinations of the implications of space military operations and weapons, our own strategic thought seems to be fixated on simply building the weap-





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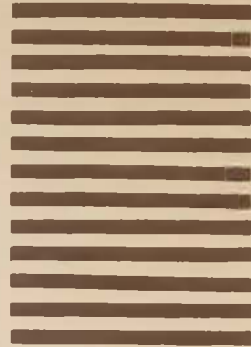
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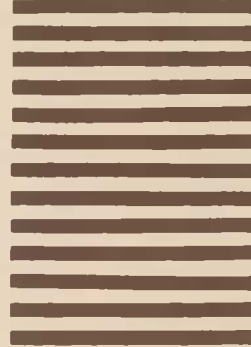
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ons and then figuring out what to do with them. The sophistication and range of Soviet thought on these issues is something our military must confront, and books such as Johnson's are therefore highly recommended as essential reading for individuals who monitor space activities and the development of Soviet weaponry.

**Dr Stephen Blank**  
Maxwell AFB, Alabama

**The Dragon's Teeth: Inside China's Armed Forces** by John Robert Young. New York 10003: Orion Books, 1987, 224 pages, \$29.95.

This book is a personal account of the author's visit to the People's Republic of China (PRC) and to its People's Liberation Army (PLA) in 1986. He uses a mainly travelogue approach, with a color photograph on almost every page and with maps and drawings as needed. The writing focuses more on the people and less on the strategy and doctrine of the PLA.

The author has divided the book into three sections. The first is historical background tracing China's past through the dynasties to the revolution under Mao Tse-tung, the Long March, World War II, the victory of the Communists over Chiang Kai-shek's Nationalists in 1949, and China under Mao and his successors to date. The second part is the real point of the book. It begins in 1986 and is a detailed chronology of the author's visit to the Chinese armed forces. The last section is an almanac of weapon systems, pay scales, and tables of organization of the PLA.

The historical background segment is a brief roundup of China's dynastic past, the emergence of the Communist state, and the continuing revolution under Mao. Of particular note is the author's explanation of how the four strata of Chinese society were transformed under communism. Where the scholars and administrators (Shih) had been preeminent prior to Mao, the peasant farmers (Nung) and craftsmen (Kung) ascended after the Communist victory. The merchants (Shang) remained at the bottom. The book clearly shows how simple guerrilla tactics helped the Chinese Communists to persist through the Long March and World War II and to eventually overcome the forces of the Nationalists. Chiang's insistence on fighting the Communists rather than the Japanese, even to the point of negotiating with the Japanese to let him fight Mao exclusively, hoping for British/Ameri-

can intervention, led to his subsequent defeat. Defeatism among his generals and lack of popular support contributed to his loss as well.

The army, designated the PLA by Mao following the victory, saw action in Korea, India, and Vietnam over the next three decades. It did not fare well against Vietnam in 1979. Modernization of the PLA is one of the PRC's four modernization programs, although it is last among agriculture, industry, and science and technology.

Young's odyssey is a personalized chronicle written in the first person. He devotes much attention to clothing, weather, terrain, locations, distances, personal descriptions and anecdotes, and even food and drink consumed at meetings. He begins with his initial request at the PRC's London embassy to travel to the PRC and study the PLA. He found officials there and later throughout China to be quite accommodating to his requests. His initial visits in Peking included a military museum, the civil defense tunnel system (with concealed entrances, yet containing banquet halls and shops!), a military band, and the PLA's August 1 Sports Training Camp—named to honor the founding of the Red Army after the Nanchang uprising on 1 August 1927.

The principal visits were to the Peking 3d Garrison Division, the 38th Division of the PLA Air Force (PLAAF), and the North Sea Fleet of the PLA Navy (PLAN). He describes the PLA's strategy as defensive—entice an enemy to invade, then envelop the invaders with sheer masses of troops. The doctrine involves speed of maneuver and confined operations. He goes on to identify the two principal dependencies of the PLA: (1) research and development to acquire missile and nuclear technology and (2) troop strength.

The PLA is plagued with cutbacks and reductions, austerity, obsolete equipment, and lengthy training pipelines. The PLAAF pilots have few flying hours (about 10 per month), are confronted with poor maintenance, and are limited to fair-weather flying only. Normally, the pilots do not use G-suits, so their training is limited to less rigorous regimes. The pilot-training wash-out rate in the three-year program is very high, conservatively estimated to be 20 percent. Finally, the PLAN is obsolete. Currently its utilization is limited to brown-water coastal defense. But the PRC hopes to modernize it and make it a truly blue-water navy.

Besides the equipment and strength (or lack thereof) of the PLA, Young describes the people, men, women, families, and children in detail,



noting their new uniforms (especially those of the women), a pending return to a rank structure, openness and frankness, cooperation, humbleness, and devotion to the family. Women make up a small fraction of the PLA, including transport pilots in the PLAAF. The author found at least one family in which both mother and father were in uniform. Like the Soviet Union, each PLA unit has a political commissar for political strategy, ideology, and security.

The third part of the book contains drawings and descriptions of the PLA's weapon systems, showing much of it to be old and outmoded. But Norinco, the China North Industries Corporation, is developing new systems, many for export, of which the HY-2 Silkworm antiship missile is an example. In addition, this part includes organizational diagrams of the political and military structure and various types of PLA and PLAAF divisions (but not the PLAN) with order of battle data. It also has an officer and enlisted pay chart (data are estimates and are expressed in pounds sterling).

The book concludes with a postscript that discusses the PRC in the world order and its need for stability and technology. The author finishes by echoing the caution of Cambridge's Bob Sloss against undue adulation of the PRC and its government or its achievements, and he urges us to judge it by the standards we use to judge other nations.

Although short of details on strategy and doctrine, this book is the one to buy if one seeks to learn of the men and women of the PLA.

Lt Col James H. Smith, USAF  
Maxwell AFB, Alabama

**We Shall Return** edited by William M. Leary.  
Lexington, Kentucky 40506: University of  
Kentucky Press, 1988, \$25.00.

There is a particular fascination with watching the ebb and flow of historic events. Watching the ebb and flow of theories about history is only slightly less interesting. All of this should therefore make *We Shall Return* doubly interesting. Leary's work discusses the role of General MacArthur in the Pacific theater during World War II but provides new twists to this familiar topic by questioning a number of commonly held beliefs concerning that leader and by focusing the majority of his book on seven of his subordinate commanders rather than on MacArthur

himself. These new perspectives result in a valuable contribution to military literature.

Leary's purpose in writing is to acquaint us with MacArthur's key subordinates, the "forgotten men of World War II." He does this by compiling short biographies of each commander, written by a recognized authority, and uniting the work under some basic assumptions. His contention is that the success of Allied operations in the Southwest Pacific was due to the talent of these men rather than to MacArthur's skills. Leary and his contributors, in fact, view MacArthur with something considerably less than awe. In this sense, they are representative of a new wave of historians that questions MacArthur's basic achievements and claims.

The first writer, Stanley Falk, sees MacArthur as a user of others' ideas rather than as an innovator, which is his common image. He further paints him as a rash, egocentric commander, dominated by an obsession for the Philippines and contemptuous of his Australian allies. Other contributors dwell on MacArthur's poor reputation with his troops during the phase of the war following Japan's invasion of the Philippines. They believe that his reputation as "Dugout Doug" was deservedly created because of his infrequent visits to the battle zones. The writers have other, more substantial criticisms. MacArthur claimed that his strategy drastically reduced the numbers of casualties incurred during his campaigns, and he attempted to contrast his losses with the higher losses other commanders suffered. Falk contradicts this claim, stating that "the myth that the general's brilliant maneuvering would produce the war's shortest casualty lists does not hold up under analysis." He backs this statement up by showing how MacArthur suffered the same loss rates as other commanders when faced with enemy forces that were equal in size to his own or those that could not be bypassed. Falk goes on to say, "Despite his reputation for military genius, it is not at all clear that he displayed the attributes of a great commander." The writer asserts that the uncertainty is due to MacArthur's overwhelming resources, intelligence (from decrypted enemy messages disseminated under the code name Ultra), industrial base, and a high command that prevented him from making excessively rash decisions. Falk concludes by saying, "MacArthur's successes in World War II are manifest. But in the final analysis, his contributions toward victory were no greater than those of other major commanders." While it is most certainly

harsh and controversial, Falk's article succeeds in reducing the image of MacArthur sufficiently to allow us to concentrate on his commanders. In doing so, Falk makes the finest contribution to the book.

Leary gives us an excellent cross section of MacArthur's subordinates. He includes biographies of two Army, two Navy, and two Air Force commanders, together with one Australian commander. The selection is balanced, reflecting the joint-force nature of that theater of operations. The approach taken is primarily chronological, but the styles of each writer make the reading somewhat uneven. The biographers of MacArthur and Gen Sir Thomas Blamey relay their information with an objective, critical style. Those writing about Gen Walter Krueger and Adm Thomas Kinkaid are less critical, but they do devote time to addressing negative points of view. The other articles come fairly close to canonizing their subjects. Though all of the articles are interesting and informative, I could not help feeling that the contributors had left out important information with their desire to give these men the credit they deserve. All are useful in showing the significant role of creative and flexible decisionmaking in the ultimate success of the Allied forces.

The book is an absolutely necessary addition to World War II literature and should be a part of any library focusing on the Pacific theater. It would be an excellent companion volume to more comprehensive histories such as *Eagle Against the Sun* by Ronald H. Spector. The book has a fair amount of overlap and redundancy from article to article; paradoxically, this trait is a strength, not a weakness. Each of the writers displays a slightly different perspective. Leary provides a service by letting us see each and decide for ourselves.

Capt Bill Nikides, USAF  
Langley AFB, Virginia

**Sound Off! American Military Women Speak Out** by Dorothy and Carl J. Schneider. New York 10016: E. P. Dutton, 1988, 257 pages, \$18.40.

*Sound Off! American Women Speak Out* is being published at a time when the military is emerging from a period of great change. It is clear that even more changes are forthcoming. The authors, Dorothy and Carl J. Schneider, are college teachers who, a few years ago, asked themselves

the question, "What does the growing presence of women in all branches of the peacetime armed services mean for the military and for the country?" They have answered this question by surveying women in today's military, asking them what military service is like, what their problems are, how they deal with them, what their motivations are, and how they are accepted. In two years, they interviewed over 300 females, from E-3s to brigadier generals, in all branches of the armed services.

It is apparent that this book is written with care, thoughtfulness, and respect for the people in our society who serve in our country's armed forces. The message that comes across is that women are human beings—they are not men, and their problems are not always the same as men's problems. But they share, as fully as the men who have long been asked "to give the last full measure of devotion," a pride in America, a sense of obligation, and a patriotic duty.

The book is more than simply interviews strung together. The authors analyze these conversations and illustrate summary statements about recurring themes with excerpts from the interviews. At many places, the Schneiders augment the interviews with various statistics and references, and the book contains a brief chronology of women in the military.

Subjects discussed during the interviews are logically organized, beginning with reasons for joining the military and identification of stereotypes of women in the military. Many of the reasons for joining are the same as those for men: the opportunity to serve one's country, the educational benefits, appealing advertisements, travel, job experience, as well as equal pay and increased responsibility. The second major subject covers the experiences of females as a minority (10 percent of the military), while the third subject covers women's jobs and presents the conflict of women's rights and responsibilities versus the view that women should be protected and are unable to defend themselves.

The authors' presentation of the problem of combat exclusion is particularly well done. They feel that women have difficulty being accepted as full members of the military both because of their minority status and because they are not permitted to fight. The Schneiders argue that the exclusionary policy consists of a jumble of laws, many cases of multiple interpretation by the different services, and thousands of administrative decisions. This hodgepodge invites disagreement and frequent changes of practice, in

many cases at the expense of careers for females in the military. A clear distinction is made between the equal pay that they receive and the lack of equal opportunity for career advancement, especially that caused by denial of command experience to female officers because of their exclusion from combat situations.

Fraternization is another important subject dealt with here. The military is known for its discipline, training, and emphasis on controlling emotions so that men and women will perform as expected. The separation of ranks has often been an important component of that discipline, but in enforcing good military discipline, separation sometimes appears to be simple harassment, especially when the people involved are not in the same chain of command.

One subject I wish the authors had covered in more depth is the problem of single parents in the military. I also would have welcomed more views of females who chose to begin families, and more could have been written about child-care facilities in the different services.

I can highly recommend this book. In some respects it was an eye-opener for me. I previously had no idea how bad the situation was for females in the military 20 to 30 years ago. I can recommend *Sound Off!* to anyone who is curious about what women are doing in the military today and to anyone who wants to know how the treatment of women varies among services. In some of the branches of service, there is uncertainty about institutional efforts to combat sexual harassment. The Air Force, however, is an acknowledged forerunner in the move toward equal opportunity and the treatment of women. *Sound Off!* is a good place to begin reading about the little-known history of women in the military during the last 70 years.

Lt Sarah K. Kirtland, USN  
Charleston, South Carolina

**Twentieth Century Warriors** by Field Marshal Lord Carver. New York 10022: Weidenfeld & Nicolson, 1987, 468 pages, \$24.95.

The formidable task Great Britain's Field Marshal Carver designed for himself is spelled out in his subtitle: *The Development of the Armed Forces of the Major Military Nations in the Twentieth Century*. The definitive treatment of this subject would fill (and has filled) many weighty volumes. Carver has sought to make a concise presentation with an interesting twist—

attempting to avoid authorial bias by consciously taking the point of view of each nation (Britain, France, Germany, Russia and the Soviet Union, the United States, Japan, and China—each of which is treated in separate chapters). In this regard, he has been reasonably successful—perhaps more successful than one might expect.

Carver is also quite successful in solving the dilemma posed by demands for detailed explanations in a very constrained format. For the most part, he has produced an appropriate balance and thus managed to treat most of the significant events and trends within a few short pages. Potential American critics should ask themselves if they have ever seen a better discussion of the development of the American military through two world wars, two "limited" wars, incredible technological change, and a near reversal of attitude in foreign policy, in just 70 pages. Few, if any, authors can match Carver's achievement with regard to the United States or any of the other military establishments surveyed in this book.

Unfortunately, Carver's treatment is somewhat plodding and repetitious (the latter more a natural outgrowth of the book's design than the author's style). Readers familiar with the style and grace of other noted British authors specializing in military subjects (e.g., Michael Howard and John Keegan) will find Carver's penchant for long sentences (106 words was the worst I found) and indefinite antecedents to be frustrating. In Carver's defense, both of these problems should have been eliminated by alert editors.

Airmen will not be happy with Carver because he is no friend of air power. For example, he claims that strategic bombing made no significant contribution to the European campaign in World War II (not a new assertion but one disputed by the Strategic Bombing Survey) and contributed even less to the Pacific campaign (an assertion that flies in the face of almost all available evidence). This reviewer believes that Carver's extensive background as an armor and infantry commander (prior to becoming chief of the General Staff in 1971 and chief of the Defense Staff in 1973) has colored his opinion of air power.

Carver's biases are further revealed in his final chapter. Referring to the two world wars, he concludes that

there was no short cut to victory, no magic formula—maritime strategy, independent air power or the indirect approach—which made it possible to evade the need to defeat, indeed almost totally de-



stroy, the enemy's armed forces in battle. Not until then, in the case both of Germany and of Japan, was the object of strategy to be attained: the imposition of the victor's will on the vanquished. (p. 440)

This assertion would seem to contradict Carver's own earlier statement that, even in defeat, the Japanese army was "still in occupation of almost all its conquests, and at a strength of 171 divisions, of which 55 were in Japan itself" (p. 372). Apparently, in spite of Carver's contrary conclusions, there was a "short cut to victory" that forced Japan to surrender in spite of a largely undefeated army overseas and a fresh, undefeated army ready to defend the homeland. Perhaps air power, particularly strategic bombing (even without atomic weapons), had something to do with this anomaly.

Interpretive problems, such as those outlined above, lead to questions concerning sources. The reader is frustrated by the almost total lack of footnotes (19 in all) and a bibliography that can most charitably be described as "spartan." Further, his sources on the development and employment of US forces are far from the best available (in some cases among the worst available) and do not include any recent scholarship, the latest entry being from 1978.

In spite of its faults, Field Marshal Carver has produced a book of some value to the nonspecialist. The glimpses he provides are—for the most part—enlightening, accurate, and fairly drawn. More important, the reader can compare and contrast alternative schemes of military development and examine both world wars from a variety of viewpoints. Such an opportunity is well worth the price of the book and well worth the efforts of Field Marshal Carver in attempting his daunting task.

Col Dennis M. Drew, USAF  
Maxwell AFB, Alabama

**SDI: What Could Happen** by John Rhea. Harrisburg, Pennsylvania 17105: Stackpole Books, 1988, 136 pages, \$7.95.

Few recent subjects have generated so much literature in so short a time as the strategic defense initiative (SDI). Much of this literature, however, is clearly intended for an audience of professional defense analysts and is as likely to grip the attention of the ordinary reader as a booklet of grand tournament chess matches would appeal to the checkers and baseball crowd. Even SDI articles intended to inform the general public often assume a public with an elevated sense of its duty to become informed. For

those readers wishing to know what is at stake in the "Star Wars" debate but who lack the time or patience to pour over the pages of *Foreign Affairs*, *Space World* editor John Rhea has provided a clever popular treatment that presents the issues clearly and entertainingly.

Written in the form of newspaper stories dating from the 1990s, *SDI: What Could Happen* projects hypothetically the consequences of the various decisions that might be made about SDI. The futuristic scenarios are sketched superficially but never stretch plausibility too far. They range from the United States and the Soviet Union both choosing to deploy a ground-based SDI around their missile fields (with the world made safe for conventional war, the Warsaw Pact overruns Western Europe), to full US deployment of a boost and midcourse interception system (Miami and Dallas are lost, but otherwise our defenses hold and Moscow sues for peace), to the United States junking SDI to cut defense spending (the Soviets achieve a breakthrough in antisubmarine warfare, and the United States withdraws from NATO in return for guaranteed oil supplies).

Although this reviewer suspects that Rhea is a proponent of SDI (the scenarios in which we have it turn out rather better than those in which we don't), his book is far less tendentious than most "Star Wars" journalism and honestly confronts the pros and cons. One might, nevertheless, find fault with him for a couple of the scenarios he omits. Rhea includes no scenario in which a space shield is used to mop up a ragged retaliatory response to a first strike. Yet, this is one of the scenarios in which even a somewhat porous SDI works well and is precisely what makes such a system—declaratory policy of the nuclear superpowers notwithstanding—potentially destabilizing. Nor does Rhea discuss the effect that so large a divergence of funds over a period of many years into a highly specialized sector of the defense industry might have on the shape of the US economy or on the prioritization of other national goals.

But we cannot expect so brief a book to exhaust so complex an issue. *SDI: What Could Happen*, despite its omissions, remains a well-written introduction to its subject. It would make an especially good text for stimulating challenging discussions in high school or junior college current events classes or at meetings of civic groups.

Dr Lawrence J. Kilborne  
Peterson AFB, Colorado

**Ricochets**

continued from page 3

an area of fog and quicksand. I can understand his call for reformers to proceed with caution, but his toothless solutions would provide no relief at all. To quote directly, "Air Force officers must examine careerism in the light of day and see it as a betrayal of the ethic of duty, honor, country." He goes on to add that "there are no miracle cures for the scourge of careerism, and a heavy-handed approach can produce undesirable results." To me, this sounds remarkably close to asking all sinners to drop to their knees and pray for a better world.

Careerism exists primarily because the system demands it and secondarily because the Air Force senior leadership promotes it. In today's armed forces, promotions are the systemic goals. It's not a group of self-interested individuals who define rules of excellence but the system itself (e.g., early promotions are good, and on-time promotions are mediocre). This is carried farther into the general-officer grades, whose numbers are chosen virtually 100 percent of the time from those who have been promoted below the zone to major, lieutenant colonel, or colonel—or all three. The senior leadership, in turn, perpetuates a two-tiered system through patronage. The officer corps is divided into two distinctive, unequal parts. For one part, all rules apply: time-on-station, time-in-grade, AFSC commitments after training, and so on. For the other part, there are no rules. Jobs are swapped every year or less, and promotions come predictably early. All of this is careerism, pure and simple, with promotions perpetuated as the be-all and end-all. The answer to the cancer of careerism lies not in the aspirin and Band-Aid solutions proposed by Major Mosier but in radical, corrective surgery in two areas—promotions and education.

Field-grade promotions come too early to produce mature, experienced middle leadership. A by-product is that the Air Force rank structure is too top-heavy. Both problems could be solved by adding three years to the primary promotion zones for major, lieutenant colonel, and colonel, with below-the-zone promotion to major eliminated and capped at 1 percent for the other two grades. Woebegoners will clamor that good people will leave the service as a result of such a rapid downshift. I say that good people are already leaving and will continue to leave for a variety of reasons. How many Rhodes scholars stick around for 30 years? Along with the "good

people," a lot of opportunists will also depart. You cannot create professionalism, but you can create an atmosphere that fosters its growth.

The 1920s and 1930s come immediately to mind. Between the first and second world wars, the promotion system was a quagmire. Many officers who had advanced to the rank of colonel were summarily reduced in grade to captain or major. General of the Air Force "Hap" Arnold was one of these, and by 1934 he was still a lieutenant colonel (24 years of service), despite having won two Mackay trophies and a peacetime Distinguished Flying Cross! Generals of the Army Eisenhower and Bradley were lieutenant colonels in 1939, also with 24 years of service. The quality of officers who endured those tough times are proof that the Air Force doesn't need a rapid-fire promotion system to attract "the best." In fact, the systemic emphasis on advancement is at the expense of duty, honor, and service to the country. The good, dedicated professional approaches the military as a calling—an impatient opportunist does not.

Another part of the systemic change lies in the hope of the new officer evaluation system (OES), which judges on performance and makes everyone play by the same rules. A new OES, however, will be only eyewash unless the promotion cycle is changed and we get a grip on below-the-zone advancement. The senior Air Force leadership has to believe that talent will seek its own level and that the truly dedicated will endure without the direct intervention of their fatherly hands.

Still another part of the answer lies in education. A specific body of knowledge is a distinguishing feature of any profession. It is my understanding that the Air Staff is revising curriculums of the various PME schools to heavily engage students in a study of military history, strategy, and so on. The number of classes is doubling. If that is true, bravo! But we need more. At present, we may call ourselves professionals, but few of us could reasonably discuss more than the nuts and bolts of our daily jobs. If—as Major Mosier claims—careerism is prospering to the bane of duty, honor, and country, an overriding reason is that we do not have a sense of calling that is grounded in an awareness of our place in military history, the working of the American military system from the JCS on down, and the evolution of that system. Without that innate feeling of our place in the greater whole, we have a job—not a tradition and not a profession. Our sense of direction becomes

skewed by the pressures of immediate problems. Project Warrior was a good push to bring PME into the field, but it has failed. We need commanders' calls with blood-and-thunder films. We need programs of reading and discussion. Military education has to come alive and be an integral part of every officer's life. Interest in and the study of the profession of arms has to be a reason for joining the Air Force. If it is not, we're attracting the wrong people.

No matter what else we do to hasten the demise of careerism, until we have a fair system that values service and experience over promotion, and a militarily educated officer corps, we are building on blowing sand.

Careerism is not the shrouded, mystical figure that Major Mosier makes it out to be. We can identify it and, to a great extent, provide a climate that does not foster its growth. Whether or not we choose to do so is another question.

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

## DUAL TRACKING

Major Kirtland's editorial on the dual-track system in your Summer 1988 issue cuts to the heart of the current US Air Force shortage of fighter pilots. The problem is neither money nor image and can't be remedied by bonuses or leather jackets. The problem is job satisfaction and a personnel system that admittedly cannot provide job satisfaction throughout an entire career.

In my recent experience as a supervisor of fighter pilots, I have seen the individual, career decision processes Major Kirtland mentions, made at the 12-to-15-year point. Fighter-pilot major selectees often agonize over accepting their promotion and the assignment that will likely follow. Unfortunately, under the present system, the decision is between the unsatisfying job offered by our present personnel system or separation from the Air Force. With the present availability of commercial airline and Air National Guard opportunities, the Air Force often loses an irreplaceable asset. The loss, however, is not caused by those outside opportunities—the cause is within the Air Force.

Fighter pilots are concerned with maximizing their own combat skills and their unit's combat capabilities. Informal conversations are rarely about the timing or amount of our last or next pay raise or about our public image. They are predominantly about building true combat ca-

pability. Perhaps our leaders are unaware of the real concerns of a young captain or major.

Major Kirtland's comments about selection against the most stringent of standards are well taken, and that concept would be crucial to the effectiveness of our fighter units. Officers on the "other track" must be technical experts and be recognized as such by those on the command/promotion track. The sanctity of military rank and command relationships must not be degraded.

Under the present system, personnel officers at MAJCOM and Headquarters USAF levels face considerable difficulty in filling instructor pilot positions at fighter training bases, and combat wings suffer from lower than optimum experience levels. It is imperative that we find a way to retain experienced pilots at the top end of the 6-to-11-year group (the Air Force's targeted group) and beyond into the 12-to-15-year group also. I believe that a well-reasoned, carefully implemented, dual-track system is a potential answer. I for one would give up my promotion to O-5 and the money that went with it to be a respected O-4 flight commander, weapons officer, or instructor pilot in a combat or training squadron for the remainder of my service. I am not alone.

**Lt Col Ralph E. Dunbar, USAF**  
Wheeler AFB, Hawaii

My thanks to Maj Mike Kirtland for his editorial on the proposed dual-track system ("My Friend Mich and the Dual-Track System," Summer 1988). It's good to know that you can still hear the voice of reason in otherwise emotional discussions. Major Kirtland's evaluation was right on target, but there are a few additional points worth considering.

The dual-track system can and should work for everyone in all AFSCs. If the dual track is designed to retain our people and their specific skills without forcing them to "career-broaden," why shouldn't we use this idea to keep all of our valuable people—not just pilots? Additionally, choosing the second track should not exclude individuals from command. Command billets up to and including the squadron level are ideal for officers who have chosen to remain in their functional fields. Up to this level, they can use their specific job knowledge most effectively because they are still close enough to the unit's primary mission. Beyond the squadron level, the requirements of command become much more



diverse and probably do require someone with career-broadened experience.

Above all, however, if any proposed changes are to work, we must change our collective attitudes. We must eliminate the stigma of deciding not to try to become the chief of staff. We must all recognize and appreciate the complexity and value of each other's job and work together—across the board—to keep the tip of the sword sharpened to a fine edge. Our adversaries are not across the street in headquarters, personnel, operations, maintenance, supply, or support. Our adversaries are on the other side of the fence. Let's all work together to keep them there.

**Capt Thomas J. Van Kleef, USAF**  
NAS New Orleans, Louisiana

### OPS/INTEL ENCORE

The discussion of the interrelationship between operations and intelligence (Winter 1987–1988, Summer 1988) is exactly where I left it when I departed the 42d Bomb Wing at Loring AFB, Maine, in April 1955.

That is not a bad thing. What it says is that there is and always will be a certain degree of tension between those two staff functions. It is a healthy tension so long as intelligence does not come under the domination of operations. In part or in whole at various times, that is what has happened in the CIA. The result is that intelligence is now thought of by most Americans as a form of covert military operations and by foreigners, including many of our friends, as something much worse.

I think Lt Col Frank P. Donnini and Capt Theresa A. McClure (Ricochets, Summer 1988) have things about right with the exception of Captain McClure's reservations about orientation rides in mission aircraft.

When such rides are physically possible, nothing else so vividly impresses upon the intelligence officer the capabilities and limitations of the aircraft and crew. Nor is there anything

else so effective in establishing the rapport essential for effective cooperation between the intelligence section and the aircrews. I saw that develop instantly among the young intelligence specialists who responded to my requests that they ask for such rides, and I saw it forever denied to the NCO and officer who refused to participate and who could not be ordered to do so. Not much more than a gesture, perhaps, but the aircrews understood and responded to that gesture.

My guess is that the human chemistry at work in that situation is the same today as it was from 1953 to 1955.

**Col William V. Kennedy, USA, Retired**  
Wiscasset, Maine

### MORE ON "BETTER WRITING"

Kudos to Col Samuel Riddlebarger for his "Better Writing" in your Winter 1987–1988 issue.

After 20-plus years of striving to speak and write intelligently and intellectually, I find no end to the practice of being required to "speak down." I have found more literate phrases used in comic books and sports pages than I am permitted to use in my own base paper.

I understand that the best effective-writing course is only as good as its students allow, but how do we justify single-syllable words in 10-word sentences when our people are working daily with some of today's most sophisticated technology. To be blunt, this attitude just doesn't cut it.

The English language is alive and growing in leaps and bounds. With the computer age, our day-to-day dialect has probably doubled in the last decade. To promulgate a reading-level requirement relegates us toward a fate similar to that of Latin. Let's stop removing the literacy from our literature.

**CMSgt George S. Roof, USAF**  
Dover AFB, Delaware

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## **VMI/American Military Institute Military Education Conference**

The Virginia Military Institute's Department of History and Politics will host the annual meeting of the American Military Institute on 14-15 April 1989 in Lexington, Virginia. The conference theme is "Military Education and Thought." For more information, contact the AMI Conference Coordinator, Department of History and Politics, VMI, Lexington VA 24450.

## **Old Dominion Soviet Military Doctrine Conference**

Old Dominion University is sponsoring a conference on "Soviet Military Doctrine in an Era of

Change" to be held at Old Dominion University on 25-27 May 1989. For more information, contact Philip S. Gillette, Graduate Program in International Studies, Old Dominion University, Norfolk VA 23529-0088 or call (804) 440-4643.

## **Command and Control Workshop**

The Joint Services Working Group on Command and Control Decision Aiding will hold its Sixth Annual Workshop on Command and Control Decision Aiding on 21-23 February 1989 at the Naval Ocean Systems Center, San Diego, California. For conference information, write NOSC, Code 444, Attn: Mr Eddington, 271 Catalina Blvd, San Diego CA 92152 or call (619) 553-4146.

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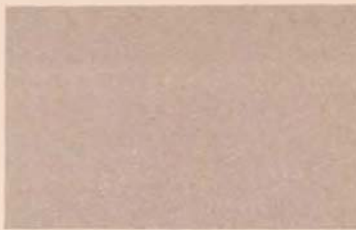


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