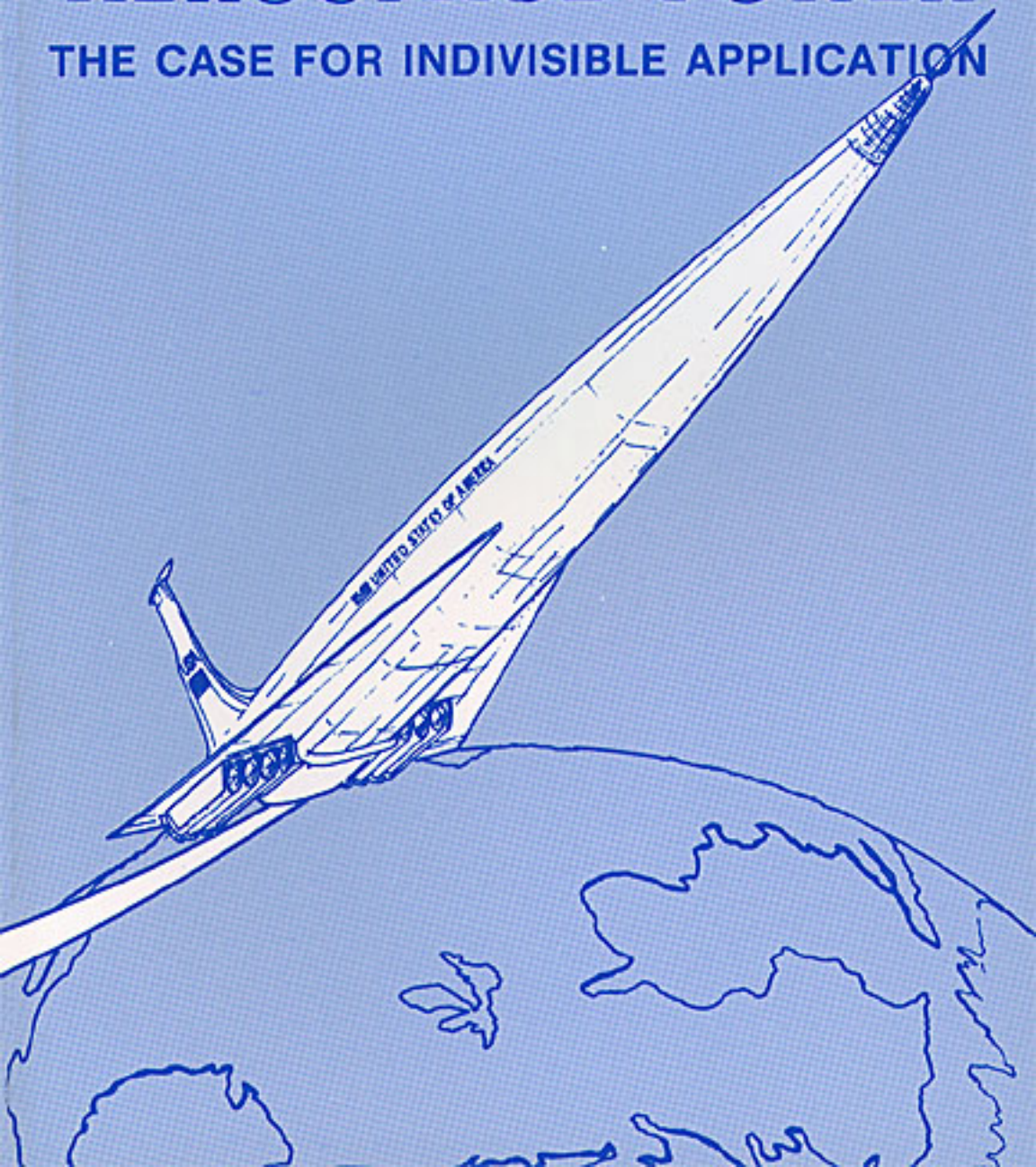
AEROSPACE POWER

THE CASE FOR INDIVISIBLE APPLICATION



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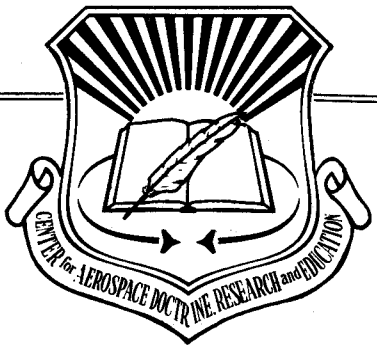

AEROSPACE POWER

The Case for Indivisible Application

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Air Force leaders of today and tomorrow have a clear and overriding mandate to ensure that all US air power resources are developed in harmony to meet a growing global threat of multifarious dimensions. I have confidence that they can do so, but it will require more than just wisdom in professional military planning, government, developing, producing and operating. In our system of government, in which decisions evolve from bureaucratic consensus, the "indivisibility of telling" is as important as the "indivisibility of doing."

And there must be the will to do both.

BRUCE K. HOLLOWAY
General, USAF (Ret.)

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FOREWORD

Air power doctrine is comprised of both a formal literature such as the Army's Field Manual 100–20, *Command and Employment of Air Power* (published during World War II), or today's Air Force Manual 1–1, *Basic Aerospace Doctrine of the United States Air Force,* and an informal and uncodified set of doctrinal perceptions that, although they are not in the official literature, affect the way our military forces do business. This second category, the unofficial doctrine, represents a sort of corporate consensus of "how we really do business" and is generally based on a combination of "real world" observations and political necessity. This study addressed just such an unofficial doctrine.

A persistent legacy of the World War II era of strategic bombardment and the postwar requirement for nuclear deterrence is the association of long-range combat aircraft (bombers) with the strategic nuclear mission and, conversely, the assumption that the far more likely nonnuclear conflicts will be handled by the "tactical" elements of our aerospace forces, our fighters. This study offers a serious alternative to this "aerospace folklore."

The proposals put forth here are based on the indivisible air power concept which suggests that strategic and tactical classifications are purely transitory and depend on how a weapon is used, not on its size, speed, range, payload, employment medium (space or air), or service or command affiliation. The doctrinal framework presented in this study, if applied to all our aerospace systems, should result in a far more flexible aerospace force structure, one that gets the most from our increasingly expensive and limited assets. More important, it should improve our ability to rapidly respond to global crisis and conflict and to apply the appropriate level of force at the right place and the right time.

Donald D. Stevens

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Maj (Lt Col selectee) Grover E. "Gene" Myers enlisted in the Air Force in 1969 and served as a maintenance analysis specialist until entering Officer Training School (OTS) in September 1970. A distinguished OTS graduate, he was commissioned in December 1970. He then entered undergraduate helicopter pilot training at Fort Wolters, Texas, and Fort Rucker, Alabama. Assigned to the Aerospace Rescue and Recovery Service (MAC), Major Myers first served as a HH-43 pilot at Clark AFB, Republic of the Philippines (including a two-month temporary tour in Thailand). He was then assigned as an instructor pilot to the 1550th Aircrew Training and Test Wing, Hill AFB, Utah, in the HH-43 and H-1F and N model aircraft. Beginning in August 1976, he attended fixed wing conversion at Webb AFB, Texas, and the B-52 Combat Crew Training Course at Castle AFB, California. Major Myers then served as a B-52G copilot, pilot, instructor pilot, and flight commander with the 596th Bombardment Squadron, 2d Bombardment Wing, Barksdale AFB, Louisiana.

Major Myers was assigned to Headquarters SAC in December 1981 as the strategic policy and doctrine analyst in the Directorate for Plans, Deputy Chief of Staff, Plans. In this position he was responsible for drafting command policy statements to the US Congress and command level policy and doctrinal issues worked at Headquarters USAF and the Department of Defense. He was selected as a SAC command-sponsored visiting research fellow at the Airpower Research Institute, Maxwell AFB, Alabama, to complete doctrinal work begun at the headquarters. He completed this manuscript while at Maxwell.

Major Myers received a BS in industrial management from Clemson University in 1968 and an MS in international relations (strategic studies emphasis) from Utah State University in 1981. He is a graduate of Squadron Officer School and the Air Command and Staff College.

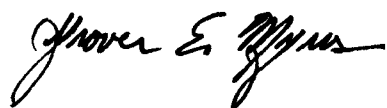
PREFACE

The opportunities for extended research and concentrated work on a particular subject are rare for the military officer. The demands of the operations or staff environment—getting the job done—are such that chances for real reflection do not often occur. A year as a command-sponsored visiting research fellow at Air University Center for Aerospace Doctrine, Research, and Education (CADRE) presents just such an opportunity. After 16 years "in the trenches," I am grateful for a chance to express some of my ideas. Many of the concepts expressed in this work were originally conceived while I was assigned to Strategic Air Command (SAC) headquarters. The need to develop these ideas—to research the thoughts of others and reflect my own—"pushed" me to apply for and gratefully accept this task. I firmly believe that the doctrine of indivisible air power is a much needed conceptual foundation for all our aerospace forces.

I wish to thank Gen Bennie L. Davis, the recently retired commander in chief, Strategic Air Command, and Lt Gen George D. Miller (USAF Retired), former vice commander in chief of SAC, for their support of the visiting research fellow program and for the faith they placed in me. I must also thank Cols William E. Cassady, Henry E. Shinol, and William A. Doorley, Jr, of the SAC staff for their personal support and encouragement and professional insights.

Special thanks are due to Dr Stanley Spangler, CADRE senior visiting research fellow from Tufts University, Fletcher School of Law and Diplomacy, who as my academic advisor was an invaluable counselor, a source of encouragement, and a superb example of the virtue of patience; and to my editor, Hugh Richardson, for his efforts in making proper English of my ramblings. To Dorothy McCluskie and her staff, thanks for a job well done.

And finally, to my family, who endured the burdens, pain, and expense of separation and the inattention to domestic details as I mused over "important" doctrinal matters, my belated thanks and love. May what we have together accomplished contribute to the safety of our children.



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CHAPTER 1

A MATTER OF DOCTRINE

Gordon McCormick recently observed that "history suggests that the principal catalyst of doctrinal change is military disaster."[1] Unfortunately, even though there are examples to the contrary, McCormick's association of doctrine and calamity is essentially valid. A detailed historical analysis of this premise would be beyond the scope of this volume; others have dealt with this subject very well.[2] However, some glaring examples come immediately to mind: the slaughter in the mire of World War I trenches caused to a major extent by a religious adherence by both sides to the spirit of the offense; the virtual strangulation of the British Isles during the first years of World War II for lack of antisubmarine warfare training and equipment even though the effectiveness of the submarine was proven during the previous war; and, of course, the prohibitive losses suffered by US bombers early in the European "strategic" air war due to Air Corps insistence on unescorted bomber penetrations (as compared to their splendid success after escorts were provided).

These lessons, which evoke images of mounted cavalry with sword and lance charging into the murderous fire of machine guns and repeating rifles, are vivid testament to the tenacity of doctrinal theory based on organizational biases. They document the fact that doctrine has a tendency to develop a life of its own and outlive its usefulness. McCormick concludes that "if we are to avoid such failures in the future, doctrinal innovation must become a natural part of planning."[3] We cannot assume that established doctrine has an inherently enduring character regardless of institutional legitimacy. We must therefore be willing to revise our fundamental beliefs as the military environment warrants.

Definitions

That is what doctrine is—a set of fundamental beliefs—or, as Dr I. B. Holley defines it:

> Doctrine is officially approved prescriptions of the best way to do a job. Doctrine is, or should be, the product of experience. Doctrine is what experience has shown usually works best.[4]

Doctrine is not a statement of national policy or even military strategy; it is nothing more than a set of beliefs based on historic precedent that forms a framework for military action. It is a component or input—along with foreign and domestic political and economic considerations, threats, geography and cultural norms (in Soviet terms, the "correlation of forces")—that eventually determines the course or strategy a nation may take in pursuing its national objectives. For the soldier, sailor, or airman, it is a guide to the proper employment of the elements of military power—the best way to do a job. It is a point of departure for military recommendations. Doctrine must be flexible and frequently reviewed to allow for changes in the technology of warfare or the experience base (through actual conflict or exercises). Joint Chiefs of Staff (JCS) Publication 1, *Dictionary of Military and Associated Terms* (the official listing of Defense Department terminology), defines doctrine as the

> fundamental principles by which the military forces or elements thereof guide their actions in support of national objectives. It is authoritative but requires judgment in application.[5]

The US Air Force discusses doctrine in the following way:

> Once the decision to use military force is made, doctrine describes the best way to employ military forces to achieve objectives.[6]

When all is said and done, this monograph is about doctrine—aerospace doctrine. It is an attempt to distill a set of principles from historic precedent as modified by advances in technology. It has as one vitally important goal the avoidance of disaster by making doctrinal innovation an integral part of planning. It attempts to bring down the monuments to interservice and intraservice rivalry by suggesting both organizational and force structures that complement theater requirements and by advancing the idea of indivisible air power—a concept that insists there is no such thing as an inherently strategic or tactical or even nuclear weapon system.

This paper will assert that the United States can no longer afford to dedicate aerospace forces to what are fast becoming artificially imposed mission categories—"strategic deterrence," "tactical air warfare," "theater nuclear deterrence," "tactical or strategic airlift," and others. Instead, it will insist that aerospace power should be applied from an integrated, global perspective according to the individual (weapon and carrier) system's ability to accomplish the mission at hand. Whether a system is strategic, tactical, offensive, or defensive is determined by how it is used—how it *can* be used—and not by predetermined notions of function (such as "strategic bomber," "tactical fighter," etc.). Gen Bruce K. Holloway, former commander in chief of Strategic Air Command, recently wrote that the indivisible air power concept "offers an

escape from the costly myopia in the US defense establishment that confuses the needs of warfighting with bureaucratic biases."[7]

This idea, the concept of indivisible air power, is not new. It has been around since at least the immediate post-World War II era when such noteworthy air power advocates as Gen Hoyt Vandenberg supported an end to the parochial strategic/tactical division of labor. However, since General Vandenberg advanced his theories in the early 1950s, the concept has been overcome by the requirements of nuclear deterrence and the realities of budget allocations. Since that time when we were still sorting through the lessons of World War II and developing a way to manage the emerging nuclear nemesis, we have become so immersed in the mythology of nuclear deterrence and so accustomed to the presence of "strategic forces"—nuclear bombers, nuclear missiles, and nuclear submarines—as to lose sight of the real military value of a large portion of our military forces.

By the same token, even during the era of flexible response, air power flexibility was limited. One writer summed the problem up in this way:

> Strategic Air Command bombers were "strategic retaliatory," the words nuclear and strategic now being roughly equivalent. Tactical air power came under the more general rubric of "general purpose forces." The flexibility in the response was to come from increases in the general purpose forces.[8]

A reasoned analysis of our wartime experience would reveal that our "tactical" air forces are no more just theater-oriented conventional warfighters than our long-range bombers are purely doomsday machines of "strategic deterrence" aimed at the USSR. Yet that is precisely how many in the US and allied civilian community, the political leadership, and even the upper levels of the military hierarchy see them. Over the past 40 years the words "strategic nuclear" have been increasingly associated with those air power assets having a long-range combat capability such as the heavy bomber or the intercontinental ballistic missile (ICBM). In the same manner, "tactical" has to many come to represent those forces available for conventional warfare—the forces that operated in Vietnam or Grenada—with little thought being given to strategic application, even though we have applied our air assets in a far more flexible manner in wartime.

Direction

The purpose of the following discussion is to attempt to dispel these admittedly unofficial but nonetheless damaging notions and to suggest an air power doctrine based on flexibility, indivisibility, and global capability—to continue with and expand on the indivisible air power concept resurrected from its peacetime doctrinal coma by the most recent statement of Air Force basic

doctrine, Air Force Manual (AFM) 1–1, *Basic Aerospace Doctrine of the United States Air Force*. In discussing this concept, Col Clifford Krieger (former chief of the Air Staff office responsible for publishing air doctrine) wrote that even though the indivisible air power idea has been addressed at least briefly in AFM 1–1, "this is an area where our understanding of our doctrine must be refined."[9] This volume attempts to fulfill Colonel Krieger's request. It will do so in the four chapters to follow.

The second chapter will briefly examine the wartime utilization of air power. The history of air warfare from World War II through Korea and Vietnam is replete with examples of how the traditional strategic and tactical organizational barriers were crossed in times of necessity—of tactical forces supporting and accomplishing strategic missions, and of strategic elements being successfully used for tactical operations. Yet, as in pre-World War II doctrine, interwar national policy and military doctrine insisted on a division of labor between what we called strategic and tactical air forces.

The third chapter will discuss the effects of technology on doctrinal evolution—how new weapons, planes, computers, and materials will enhance our ability to apply aerospace power in an increasingly flexible manner on a global scale. Today, technology in the form of long-range standoff "smart" weapons, more efficient and powerful engines, and lighter and less radar reflective materials (to name just a few) is improving the capability of all the facets of military air power to perform numerous missions across the spectrum of conflict from low-level precision strikes on guerilla forces to an all-out nuclear (or nonnuclear) homeland exchange. The inherent characteristics of a particular aircraft such as speed, maneuverability, range, or heavy payload are being enhanced by technological innovation while weaknesses are increasingly being compensated for by the speed, range, agility, and destructiveness of the weapons they carry.

While acknowledging the importance of technology in improving the "tools of deterrence" and offsetting the Soviet/American numerical imbalance, this discussion would be remiss in its primary doctrinal duties if it did not point out the pitfalls of a myopic pursuit of the philosophers' stone of military technology. There comes a time when even the most expensive, sophisticated systems can be overwhelmed; a time when, given roughly equivalent capabilities (or even significant disparities), that the side with the superior doctrine and the best training and leadership will win. Moreover, there are the problems directly associated with the technology itself—higher costs forcing fewer weapons, the blurring of the historic nuclear/conventional firebreak, and the requirement for increasing numbers of technically skilled personnel to man and repair hi-tech systems.

This book advocates the advancement of military technology while warning against a "gadget mentality." It stresses, as all doctrinal studies should, a balanced approach to the military art—one that treats the requirement for

effective doctrine, strategy and tactics and the need for advanced weapon systems with equal regard.

The fourth chapter will combine the previous three into a general discussion of current and suggested future aerospace doctrine. It will begin by stressing the concepts contained in the most recent edition of AFM 1–1—that the terms "strategic" and "tactical" refer to actions required, not forces employed, and that aerospace power should be applied for strategic and tactical action as an indivisible entity. The chapter's main theme is that aerospace doctrine must reflect the lessons of history as modified or magnified by the advances of technology. It must stress in positive terms that air power is flexible and is most effective when applied from a global perspective. This means that aerospace (not air *and* space) power must be seen less as tactical, strategic, or even theater but as a global power capable of conducting strategic or tactical, space or terrestrial, nuclear or conventional operations. Aerospace doctrine should insist that aerospace forces are not tied to a specific command structure, environment, theater of operation, or type of weapon.

The final chapter will present recommendations and the conclusion. Its theme is balance—a balance of strategic and tactical, nuclear and nonnuclear forces; a balanced approach to organizational structure; and a balanced defense policy in which arms and arms control elements are equal. The object here is to place both the forest and the trees in clear focus—avoiding a cure-all (gadget or arms control) approach to defense problems while at the same time taking advantage of new technologies and tactics. This approach advocates a balanced aerospace offense and defense that is capable of both independent global-scale operations as well as direct support of theater requirements. It further stresses an arms control posture that supports this goal by recognizing its role in support of rather than independence of national security policy.

In 1970 Perry M. Smith, now an Air Force major general and commandant of the National War College, wrote:

> Once a military doctrine is established it is difficult to change, especially if technological advancement in weaponry seriously brings into question a doctrine upon which a specific military service is based. Like policy, doctrine has a gyroscopic effect.[10]

As we shall see in the next chapter, the US Air Force was built on the concept of strategic air power. Pre-World War II doctrine stressed the invincibility of massed bomber formations, and postwar doctrine was firmly centered on the need for strategic nuclear bombardment. Both our prewar and postwar doctrines neglected the requirement for flexibility in air power application. Today we realize that nuclear attack is not the only mission of air power, but we have retained much of the conceptual baggage generated during the era of massive retaliation and nurtured by the mutual assured destruction (MAD) theory. We still in many ways associate bombers with the strategic nuclear mission and visions of decimated societies and nuclear wastelands. This causes severe

problems as these perceptions are carried over to the arms control arena where "nuclear delivery systems" such as the B-52 or B-1B are limited by international treaty with apparent minimal regard for their tremendous nonnuclear utility. Have we forgotten or simply ignored the repeated lessons of warfare that clearly demonstrated the need for a balanced force? Has the need to justify itself before those with the national purse strings become the overriding factor in Air Force planning? The gyroscopic effect described by General Smith is still with us.

Despite the many lessons of World War II, Korea, and Vietnam, we still insist during the annual budget battles that our bombers be placed under the heading of strategic nuclear forces and our fighters under tactical forces. This volume will attempt to change some of these perceptions but hopefully will not simply replace one "gyroscope" with another. Aerospace doctrine should be as flexible and subject to change as the forces it supports, for it is the military force that recognizes or perhaps even causes change that will have the greatest chance of emerging victorious in future conflict.

In discussing aerospace doctrine this study will frequently compare two particular elements of aerospace power, the fighter and the bomber (or long-range combat aircraft). These are used because they are easily recognizable representatives of the traditional strategic and tactical components of aerospace forces and are not selected to avoid discussion of other types of aerospace hardware such as airlifters, reconnaissance systems, or special operations forces. These latter systems will be only briefly discussed since the basic principles surrounding the application of aerospace power to strategic and tactical actions apply to these systems as well as to the more traditional "firepower delivery" aircraft.

The first step in the development of a doctrine that emphasizes the flexibility and indivisible nature of air power is to briefly review the history of US air power employment—the basic "stuff" of doctrine. In this case, the discussion will begin with World War II.

NOTES

1. Gordon H. McCormick, "The Dynamics of Doctrinal Change," *Orbis* 27, no. 2 (Summer 1983): 271.

2. For example, see in addition to the McCormick article listed above, I. B. Holley, "Of Saber Charges, Escort Fighters, and Spacecraft," *Air University Review* 34, no. 6 (September–October 1983): 2–11; and Russell F. Weigley, *The American Way of War* (New York: MacMillian, 1973).

3. McCormick, "Doctrinal Change," 272.

4. Holley, "Of Saber Charges," 4.

5. The Joint Chiefs of Staff, *Dictionary of Military and Associated Terms,* JCS Publication 1 (Washington, D.C.: JCS, 1974).

6. Air Force Manual (AFM) 1–1, *Basic Aerospace Doctrine of the United States Air Force,* 16 March 1984, 1–1.

7. Bruce K. Holloway, "Strategic Airpower—A Look at the Future," an editorial in *Strategic Review* 13, no. 1 (Winter 1985): 5.

8. Thomas A. Keaney, *Strategic Bombers and Conventional Weapons: Airpower Options* (Washington, D.C.: National Defense University Press, 1984), 16.

9. Col Clifford R. Krieger, "USAF Doctrine: An Enduring Challenge," *Air University Review* 35, no. 6 (September–October 1984): 22.

10. Perry McCoy Smith, *The Air Force Plans for Peace, 1943–1945* (Baltimore and London: Johns Hopkins University Press, 1970), 30.

CHAPTER 2

THE HISTORIC PRECEDENT: A REQUIREMENT FOR FLEXIBILITY

> Air power is indivisible. We don't speak of a "strategic" or a "tactical" Army or Navy, yet those terms constantly are applied to the Air Force.
>
> The overriding purpose of every plane, whether it is a bomber or a fighter, is to win the air battle on which final victory on land or sea is predicated.[1]
>
> Gen Hoyt S. Vandenberg, 1951

These words are just as relevant today as they were in 1951—at a time when the lessons of the most catastrophic war in history were still fresh in the minds of those who fought it and when new lessons were being learned and old lessons reinforced on and above the Korean peninsula. During these conflicts air doctrine had come of age. The Air Corps, and later the Air Force, had proved that air power, while not the absolutely decisive element envisioned by some pre-World War II air power advocates, was nonetheless crucial to successful military operations in all theaters.

We had learned, contrary to prevailing prewar wisdom, that no specific element of air power was supreme—not the bomber or the fighter, or more generally as General Vandenberg saw it, not the "strategic" or "tactical" air forces. Both were vital to attaining air superiority and destroying the enemy's ability to wage war. In other words, air power was indeed indivisible. Bombers required fighter escort to successfully accomplish their strategic mission, and, as a by-product of these combined bomber/fighter operations, to destroy the enemy air force (perceived as a tactical requirement).

The Lessons of War

Unfortunately, we tend to forget the lessons of war during our peacetime struggles to formulate coherent air power doctrine within an environment of

"nuclear reality" and fiscal restraint. We have assumed that somehow the requirements have changed and that the ominous presence of nuclear weapons has altered the proven interrelationship between "strategic" and "tactical" forces and the missions they accomplish. We have allowed the supreme requirement of preventing nuclear war to color our perceptions of how to apply aerospace power in nuclear or nonnuclear warfare.

As a result, the concept of strategic air power has come to be associated almost exclusively with nuclear weaponry while tactical systems are seen as carrying the burden of conventional warfare. Many civilian and military leaders have associated the strategic nuclear mission, and therefore the requirements of deterrence, with bomber aircraft while assuming that "the fighting" will be done by F-15, F-16, and F-111 aircraft. This perspective has diluted the prime attribute of aerospace forces whether bomber, fighter, or satellite—flexibility. In 1950 Col Dale O. Smith and Maj Gen John DeF. Barker discussed the requirement for flexibility.

> One of the greatest strengths of an airplane is in its flexibility. . . . The airplane can be used for many military purposes, and it has a mobility that surpasses any other man-carrying weapon. To tie this versatile instrument of war down to a few specific tasks and thus deny it other objectives which at times might be far more productive toward eventual victory would seem to be a profligate waste of force.[2]

Yet today we persist in defining the mission of our aircraft as strategic or tactical and even identify certain ones, at least by association, as nuclear or conventional. While, as Smith and Barker point out, "Such a piecemeal commitment of air strength is not . . . a true doctrine of the Air Force,"[3] doctrinal statements do tend to foster misperceptions. Although a statement of doctrinal principle may not necessarily intend to foster restricted employment of air assets, it does reinforce an already existing misperception by stating, for example, that "strategic aerospace offensive forces serve primarily as a deterrent to nuclear war."[4]

Misperceptions go far beyond statements of military doctrine. A president or secretary of defense making a statement to the press or Congress on "strategic policy" is more than likely discussing US nuclear weapons policy. The Strategic Arms Reduction Talks (START) are not intended to reduce strategic weapons but strategic *nuclear* weapons. When the secretary of defense in his annual report to Congress discusses our fighter aircraft requirements under the heading of "Tactical Air Forces," and bombers under "Nuclear Forces," he is making a clear distinction in the role of these aircraft, even though the text may state that bombers can accomplish conventional tasks.[5] When another defense secretary states, "Our primary measure of strategic capability is our ability to retaliate after a Soviet first strike on our forces,"[6] it is obvious he is discussing nuclear weapons.

The discussion to this point reflects a perception of air warfare doctrine that is contrary to the lessons of history. It represents a rigidity of thinking that prevents

the full utilization of our aerospace forces. World War II proved that a truly effective strategic campaign does not require nuclear weapons and that bombers were no more purely "strategic" weapons than fighters were "tactical." Korea, Vietnam, and other conflicts reinforced these lessons and stressed the need to apply the elements of air power according to each weapon system's suitability for the task at hand and not according to a preconceived notion of a traditional strategic or tactical role.

Albert Speer, Adolph Hitler's armaments minister, discussed the "tactical" application of bomber aircraft against massed ground forces.

> Sepp Dietrich gave me a vivid account of the demoralizing effect of massed bombing on his elite divisions. The soldiers who had survived were thrown completely off balance, reduced to apathy. Even if they were uninjured, their fighting spirit was shattered for days.[7]

In the same vein, Colonel Smith and General Barker described the flexibility of both strategic and tactical aviation when discussing the requirement for air superiority.

> For the purpose of securing air superiority, "tactical" and "strategic" aviation are employed in an identical manner. It is all one air force with one major objective. The same fighters used to support front lines are used to escort bombers which stimulate enemy air opposition. Precisely the same F-47's* that escorted B-17's to Berlin were strafing the beaches at Normandy.[8]

The concept of the indivisibility of air power had its genesis in World War II operations, even though prewar air doctrine stressed the separate missions of heavy bomber and fighter aviation and gave major emphasis to the strategic mission. Essentially, those who developed prewar air doctrine advanced a strategic offensive strategy based on the perceived ability of large formations of heavily armed, unescorted bombers to penetrate enemy defenses and deliver decisive blows to his homeland and his will and ability to wage war. The prewar preoccupation with the strategic mission and the long-range bomber in that mission resulted not only in a lack of adequate air superiority and tactical offensive capability, but it froze the perception of the heavy bomber as a strictly strategic asset—a perception that, contrary to established evidence, is with us today.[9]

And the evidence is substantial. War Department Field Manual 100–20, *Command and Employment of Air Power* (published in July 1943), stated that the "aim of the strategic air force is the defeat of the enemy nation" and that these forces could "be joined with the tactical air force and assigned tactical air force objectives" when the "action is vital and decisive."[10] The same manual described the mission of tactical air forces as first, air superiority; second, prevention of hostile troop and supply movement; and third, participation in a

*During the war this aircraft was designated "P-47." The "P" was changed to "F" after the war.

"combined effort of the air and ground forces to gain objectives on the immediate front of the ground forces."[11] Thus, while Field Manual 100–20 specifically divided direct air combat forces into strategic and tactical air forces, early experience in the war had taught air planners that some strategic and tactical force cooperation would probably be necessary when the "action is vital and decisive." This, however, did not express the high degree of flexibility and cooperation that would eventually be required to win the war.

The first deviation from the rigid prewar doctrines was the necessity for fighter escort of daylight bomber raids in Europe. It must be emphasized that prevailing ideas stressed, as one scholar put it, that "properly constructed bomber formations could provide sufficient self-defense against hostile pursuit."[12] In fact, some maintain that Air Corps leaders were unwilling to question the prewar bomber supremacy theories even in the face of much improved defensive technologies such as radar and advanced fighters.[13] Initial attempts at daylight bombing seemed to prove, or were interpreted to prove, the predetermined conclusion that unescorted bombers could in fact conduct precision daylight attacks. As Dr I. B. Holley reports:

> After a mere fourteen heavily escorted shallow penetrations, the commander of the Eighth Air Force made an inferential leap, reaching the unwarranted conclusion that bombers could successfully perform strategic missions without fighter escorts.[14]

This initial assessment was to prove short-lived. When in the summer of 1943 deep strikes into Germany were finally begun, bomber losses soared. Losses for the month of October alone were reported at 9.2 percent (148 bombers lost in six days). On 14 October 1943, 60 bombers were lost out of the 229 that made the second strike on Schweinfurt (26 percent).[15] A further 50 percent of the survivors of this raid required "extensive repairs."[16] These losses were blamed to a large extent on the lack of deep escorting fighters and the notion that bomber formations could adequately defend themselves against intense fighter attack.[17] Problems in attack timing and routing certainly contributed to the Schweinfurt losses. It was evident, however, that continued unescorted deep penetrations, even if perfectly executed, would encounter stiff opposition and suffer serious losses.

The solution to this problem was relatively simple—to increase the range of escort fighters by providing expendable fuel (drop) tanks and to apply "tactical" air power in a way advocated by a few but not planned prior to hostilities. Of course, the arrival on the scene of the new P-51 fighter (with drop tanks) greatly increased both fighter range and overall combat effectiveness.

As it turned out, the combination of heavy long-range (strategic) bombers and extended-range (tactical) fighters did more than enhance allied ability to ravage the enemy homeland. What evolved was an airborne offensive machine that mauled the German economy while, at the same time, it was sweeping the Luftwaffe from the skies. The relentless attacks on Germany's urban and

industrial centers forced German air power to take a defensive posture. German aircraft had to come up and fight, and when they did they were immediately engaged by escorting American fighters. One researcher described the effects of this campaign this way:

> As the bombers continued the strategic attack [early 1944] long-range fighters engaged the Luftwaffe in the air, and although enemy fighter opposition against the bombers increased for a few months, a precipitous decline in Luftwaffe opposition started in May. By the end of March repeated attacks had been made against Berlin targets and the Luftwaffe no longer appeared capable of sustained counterattack.[18]

Thus, elements of what had been designated as strategic or tactical air forces and assigned mutually exclusive missions by prewar doctrine had been combined by wartime necessity into an effective offensive force. This combination was so effective that a large portion of the European P-51 force was assigned to the strategic air force. Lt Gen Elwood Quesada (USAF Retired), at the time commander of IX Tactical Air Command in Europe, stated that the P-51 was "so superior in the role of defending the strategic air forces and making the Germans fight" that "I didn't resist [assigning them to the strategic effort] . . . a goddamn bit." He admitted to needing these aircraft for tactical missions but accepted the fact of more profitable employment.[19]

Of course, the strategic effort against the German homeland is not the only example of the indivisible application of air power to emerge from World War II. Heavy bombers were used very effectively on numerous occasions to support tactical operations. For example, as General Vandenberg reported, "The greatest concentration of heavy bombers ever seen was assembled to give direct support to ground troops for the breakout at Saint-Lo on July 25, 1944."[20] In fact, the success of the Normandy invasion itself was due, in a major way, to the effective application of air power. The vicious strategic/air superiority battles over Germany during the preceding months severely damaged German industry and mortally wounded the Luftwaffe, assuring absolute Allied air superiority over the French beaches.[21] Additionally, we threw basically everything we had, from bombers to fighters, into the direct support of the invasion force to provide close air support of ground forces and to interdict enemy lines of communications.[22]

In the Pacific theater, heavy bombers took the air war to the enemy in a wholly unprecedented and violent fashion with fire bomb raids that literally gutted the heart of one major city after another. As the US Strategic Bombing Survey (USSBS) reported, the number of civilian deaths due to fire bombing "exceeded the number of strictly military deaths inflicted on the Japanese in combat by armed forces of the United States."[23] However, as devastating as these bomber attacks were, the strategic effort against Japan was not the B-29's private party. Naval carrier-based aircraft operated over the Japanese home islands to accomplish both direct strategic attacks and air superiority operations against the

Japanese air force.[24] Once again, fighters, bombers and fighter-bombers operated in a complementary way to accomplish a strategic objective, only this time it was carrier-based air power in the fray.

During the Korean conflict, necessity once again forced cooperation between forces. Combined bomber and carrier-based fighter-bomber attacks had almost completely destroyed the North Korean air force by the end of August 1950.[25] Early in the war the severe shortage of "tactical" strike aircraft forced the use of B-29s in interdiction and close-air-support roles. During the critical month of July 1950, every available combat aircraft was directed against invading North Korean ground units and their supply lines in a successful combined arms action.[26] Dr Robert F. Futrell described the theory under which the air war in Korea was managed.

> Old concepts that certain targets were "tactical" and others were "strategic" were abandoned, and so far as FEAF [Far East Air Force] resources were concerned, airpower was undivided by artificial and unreal attempts to classify targets by types of aircraft.[27]

Regardless of the repeated success of the indivisible approach to air operations, as illustrated in Dr Futrell's evaluation of Korean methodology, there are those who continue to argue for the sanctity of the strategic or tactical mission and the purity of the aircraft that perform those missions.

Before and during World War II, strong arguments were made that long-range bombers should perform only the strategic homeland mission and that to remove them for other duties would be a blatant misuse of resources.[28] On the other hand, tactical aviation enthusiasts proposed that air power is best used in support of surface forces and in the air superiority battle. However, the hard lesson of battle is that both perspectives are necessary. The bottom line is that it does not matter what kind of aircraft is applied against a particular mission as long as it meets one overarching criterion—effectiveness. It is important to remember that ultimately Allied air superiority over Europe was a result of Germany's inability to replace its air losses. Stated another way, the bombers prevented them from replacing the aircraft our fighters shot down. Even more important, as one study concluded about the success of the European strategic air campaign:

> A combination of numerical superiority, technical advantage, long-range fighter escort and the degradation of German forward defenses by Allied ground troops after 1944 was required before the German industrial heart could be ravaged as the theorists had prophesied.[29]

In the final analysis, then, the success of US air power in World War II or even Korea did not rest solely on the indivisible air power concept but on a much broader requirement—the interdependence of the elements of national power. Without the vast US industrial potential, the ability to marshal the resources of a diverse technological base, and the cooperation of the other military arms, our air effort would have been feeble indeed. Without the tremendous Allied air

fleets—the fighters, bombers, transports and observation aircraft—the ground campaigns would have surely failed. The ground forces—by overrunning enemy air fields, capturing enemy antiaircraft positions, and allowing more forward deployment of Allied air power—facilitated the successful air assault on Germany's homeland, which in turn reduced the ability of the Germany army to resist the Allied ground offensive. This victory came as a result of the efforts of ground, naval, and air forces, wisely employed in not only traditionally conceived roles but in ways necessitated by the actual requirements of combat.

The Korean conflict reinforced these lessons as air power was applied with an eye toward effectiveness, not dogma. However, the development of atomic weapons at the close of World War II and the desire to reduce military spending after two long and bloody wars were to combine to obscure the lessons of those wars and taint future air power doctrine. The requirements of first, massive retaliation and then, under numerous theoretical labels, nuclear deterrence became a driving force of aerospace doctrine to the detriment of the requirements of warfare.

The Nuclear Imperative

> On 19 October 1948 [General] LeMay took command of SAC [Strategic Air Command] and quite shortly announced that "the fundamental goal of the Air Force should be the creation of a strategic atomic striking force capable of attacking any target in Eurasia from bases in the United States and returning to the point of takeoff." A USAF Board of Senior Officers advised that the air atomic offensive must have priority, with the result that as of 1 December 1948 General Vandenberg reduced the Air Defense Command and the Tactical Air Command to a status of operational headquarters without assigned units under a new Continental Air Command.[30]

During the 1950s, the Eisenhower administration launched the New Look strategy, which emphasized the threat of massive retaliation for aggression against US allies or interests. Even though Eisenhower and Secretary of State John Foster Dulles are given the lion's share of credit for initiating the US-Soviet nuclear arms race and professing the now discredited theory of massive retaliation, reliance on nuclear weapons as the prime element (some would argue virtually the only element) of US military strategy did not begin with these gentlemen.

The end of World War II brought with it an understandably strong desire within the United States for a "return to normalcy," which would naturally include a substantial reduction in military spending. However, while it is necessary and quite easy to reduce spending from the high levels required for total global war, it was something else again to severely cut funding and still face a powerful enemy—the Soviet Union. The Berlin crisis and the descending "iron curtain" made evident a continuing need for military forces, especially in Europe. But postwar spending cuts that virtually overnight reduced US military strength to a mere shadow of its wartime level made adequate conventional

combat capability an increasingly unlikely possibility. For example, the postwar Air Force was fighting to retain 70 active air groups (as compared to the wartime maximum of 243) and 400,000 personnel.[31]

As a result of this force shrinkage and the national reluctance to spend large sums on conventional forces, nuclear weapons came to the forefront of military doctrine. The United States developed the concept of nuclear deterrence, which, at least during the 1950s, meant the threat of massive retaliation or the actual use of nuclear weapons to stop either nuclear or conventional Communist aggression. Gen William Momyer (USAF Retired) described the environment in which the postwar Air Force was operating.

> At the time (late 1940s) the Air Force was shrinking and funds were short . . . it wasn't easy to find money for conventional tactical weapon systems. Understandably, most of the Air Force budget was earmarked for that part of the force which would have to deter or win a general nuclear war with the Soviet Union.[32]

In fact, in 1948 the Air Force described its mission as:

> The launching of an atomic offensive and the defense of the Western Hemisphere and the essential base areas from which to launch the atomic offensive must be considered as the primary mission of the Air Force and must be given the highest priority and consideration.[33]

Thus, by 1950 strategic nuclear forces were established as the prime element of US military power, with the US Air Force and specifically the Strategic Air Command holding the key to that power. Even the Korean conflict, which proved both the necessity for conventional forces and the requirement for flexibility, failed to shake the preeminence of "strategic forces." The post-Korean War Air Force, and in particular SAC, continued a fairly rapid growth while other services took considerable cuts indicating "a clear orientation toward massive retaliation."[34]

By 1954, Secretary of State Dulles had announced the New Look policy under which, as Jerome Kahn describes it, "US strategic forces were to deter not only nuclear attacks on this nation or its allies but also a broad spectrum of potential Communist actions."[35] Nuclear weapons, delivered primarily by "strategic" B-29, B-36, and B-47 aircraft were seen as providing the panacea for military costs—in short, deterrence on the cheap. Once built and deployed, these systems were relatively cheap to maintain, and far fewer nuclear forces would be required to inflict a particular level of damage than nonnuclear forces. For example, it required literally thousands of long-range bombers, hundreds of thousands of people, millions of bombs, and at least two years to accomplish the devastation of Germany during World War II. With nuclear weapons, the same level of damage could be attained by just a few squadrons of bombers, an economical force structure when compared to the requirements for a major land war in Europe against the Soviet Union.[36]

With respect to conventional or "tactical" air forces, Maj Gen Lauris Norstad, Air Force chief of plans and a tactical air commander in World War II, stated at the time that he had long believed that the tactical air force was the outstanding development of World War II, except now the atomic bomb had possibly made the tactical force "as old fashioned as the Maginot Line."[37]

The policy of nuclear substitution for conventional warfighting capability was naturally far more effective in the 1950s when the United States possessed massive nuclear superiority than in later years. As time passed American policy was required to recognize the emergence of the Soviet Union as a nuclear power. By the late 1970s US nuclear superiority was pared to "essential equivalence." US strategic policy went from massive retaliation through flexible response and assured destruction to the countervailing strategy and what some refer to as the "new flexible response."

US policymakers recognized as early as the 1950s that the threat of nuclear retaliation would become decreasingly credible as the Soviet Union developed larger and more effective nuclear forces. Therefore, beginning with the Kennedy administration in the early 1960s, they began developing conventional forces to deal with everything from brushfire contingencies to a major battle in Europe. The relative contribution of nuclear weapons began to vary somewhat with the perceptions of the incumbent administration. However, the 1983 President's Commission on Strategic Forces (the Scowcroft Commission) reminded all in unambiguous terms that the threat of nuclear warfare is still not very far below the surface when it comes to US military strategy.

> Effective deterrence requires that early in any Soviet consideration of attack, or threat of attack, with conventional forces or chemical or biological weapons, Soviet leaders must understand that they risk an American nuclear response.[38]

The purpose of this discussion is not to argue the relative merits of various nuclear policies (mutual assured destruction, countervailing, etc.) but to make clear the idea that the advent of nuclear weapons and the requirement to prevent their use distorted the lessons learned in the bloody skies over Europe, Japan, Korea, and even Vietnam. The deployment of truly intercontinental bombers and ballistic missiles armed with nuclear weapons would obscure General Vandenberg's plea that air power be treated as an indivisible whole and not parceled out into "strategic nuclear" or "tactical conventional" packages.

Before World War II US military planners conceived of an air corps dominated by strategic bombardment. We learned through our experiences over Schweinfurt and Ploesti, North Africa and Normandy, Hiroshima, Pusan, and Hanoi that fighters, fighter-bombers, and medium bombers played as significant a role in war as did the heavy bomber forces. We learned that our long-range "strategic" bombers could be very effectively applied to tactical tasks as well as to the pounding of the enemy's homeland.

Gen James Ferguson (USAF Retired) discussed how the idea that range determined the mission of an aircraft had changed.

> In Europe [World War II] we considered a target out to six hundred miles as strategic; fighters seldom ranged beyond three hundred for ground attack. Yet when we looked at Spike's [General Momyer] more recent experience in Vietnam, we saw B-52s hitting close-in targets and fighters doing the deep penetrations.[39]

The fact that General Ferguson seemed somewhat surprised at this is in itself somewhat surprising. While it is true that during the war in Europe air power was in fact divided into strategic and tactical air forces, this arbitrary division was crossed on numerous occasions in response to wartime necessity. While it has been argued with some justification that we did not always apply our air power in Vietnam in optimum fashion, we generally did not allow rigid prewar notions of mission category to interfere with the application of forces. A glaring and ironic exception to this was the prohibition until quite late in the war of "strategic" B-52 strikes in North Vietnam (discussed further in chapter 4). Some air power advocates would argue that targeting decisions were in error and that certain aircraft (like the B-52) were misused in "tactical" operations in South Vietnam.[40] This criticism has merit when directed against the exclusive use of the B-52 for such operations, but not in toto. One must remember that an aircraft's optimum or designed mission is not necessarily its only mission—the B-52 could and should have been used for tactical support *as well as* for strategic operations. If exclusive specialized use were the rule, our bombers would still be cloistered, as indeed they were for many years, within the specialized world of the nuclear SIOP (Strategic Integrated Operational Plan—the integrated plan for employment of US "strategic" nuclear forces)—and the F-15 would never have been allowed to replace the F-106 as a "strategic" interceptor.

Those that criticized the use of heavy bombers for close support of ground troops as not befitting a "strategic" weapon obviously have not discussed the issue with the marines that fought at Khe Sanh. During this three-month battle, B-52s provided extensive direct support to engaged US Marines with as many as 20 percent of their strikes being "close-in" (a total of 2,602 sorties and 75,000 tons of bombs flown in "tactical" support). Gen William C. Westmoreland, the American commander in Vietnam at the time, described the effect of these operations as "the decisive force in breaking the siege of Khe Sanh."[41] While it could be argued that a large-scale strategic air campaign should have been launched against North Vietnam early on (including B-52s as well as F-111s, F-4s, F-105s, etc.), it does not mean that certain systems should have been reserved exclusively for that effort at the expense of other missions such as the support of the embattled outpost at Khe Sanh.

Neither does this mean that all attempts at tactical application of bomber aircraft met with equal success. Dr Donald Mrozek clearly described the essential failure of several tactical B-52 attacks in Vietnam and ascribed this lack of success to overly optimistic expectations after the Khe Sanh episode and a lack of proper prestrike preparation including extensive intelligence information.[42] He concluded that while Khe Sanh and other operations such as

Con Thien were highly successful applications of "strategic" assets to "tactical" tasks, "the success with the B-52s at Khe Sanh was not repeatable without technical preparation," something that was lacking in several subsequent operations.[43]

However, the theories expressed during the 1950s by Truman, Eisenhower, and Dulles and epitomized by air commanders such as LeMay, while essentially obsolete by today's standards, have left an enduring mark on national policy and military doctrine. This rather distorted viewpoint led Carl H. Builder to write in 1983:

> Today strategic conflict seldom implies anything other than a nuclear war fought with long-range nuclear weapons, which are often referred to as central strategic systems or strategic rocket forces. The words strategic and nuclear may have become so synonymous in common usage as to impair objective consideration of either strategic or nuclear war.[44]

Strategic warfare is not necessarily nuclear nor is it accomplished exclusively by "strategic systems" such as the bomber or intercontinental missile. By the same token, tactical warfare is not just conventional conflict by "tactical weapons" such as F-15 or F-111 fighter aircraft. As a matter of fact, there are more "tactical nuclear weapons" than "strategic" ones. To label particular delivery systems as strategic or tactical, nuclear or conventional, is to place artificial barriers on both military operations and the tools with which those operations are accomplished.

If there are in fact no strategic or tactical aircraft or even correspondingly convenient classifications of warfare, how then do we discuss combat systems or plan for their use? The answer is, of course, that labels don't matter and, in fact, get in the way of effective operations. The prime criterion for employment of any military system should be its ability to accomplish the mission at hand, be that destroying Soviet missile silos or supporting an amphibious landing in Grenada. Strategic and tactical are actions, not weapons, and in that light should not be associated with military systems be they fighters, bombers, transports, or reconnaissance systems.

NOTES

1. Hoyt S. Vandenberg and Stanley Frank, "The Truth About Our Air Power," *Saturday Evening Post* 223, no. 34 (17 February 1951): 21.

2. Dale O. Smith and John DeF. Barker, "Air Power Indivisible," *Air University Quarterly Review* 4, no. 2 (Fall 1950): 7.

3. Ibid., 8.

4. Air Force Manual 1–1, *Functions and Basic Doctrine of the United States Air Force,* 14 February 1979, 2–7.

5. See the *Report of the Secretary of Defense Caspar W. Weinberger to the Congress on the FY 1984 Budget, FY 1985 Authorization Request and FY 1984-88 Defense Programs, February 1, 1983* (Washington, D.C.: US Government Printing Office, 1983).

6. "Triad's Air Breathing System" (Statement by the Honorable Harold Brown, Secretary of Defense, before the House Armed Services Committee, 2 August 1977, presented in the *Supplement to the Air Force Policy Letter for Commanders,* October 1977, 2).

7. Albert Speer, *Inside the Third Reich: Memoirs by Albert Speer,* trans. Richard and Clara Winston (New York: Macmillan, 1970), 354.

8. Smith and Barker, "Air Power Indivisible," 15.

9. Dr Robert Frank Futrell wrote, "If you will look at our pre-World War II writing, it's almost all devoted to the employment of strategic aviation against the heartland of a nation." Futrell, "The Influence of the Air Power Conception Air Force Planning, 1945–1962" (Paper prepared for the US Air Force Academy Historical Symposium, 12 October 1984), 2; Dr I. B. Holley, Maj Gen (USAF Retired), implied that during the 1930s bomber aviation was seen as superior to the fighter element: "The appearance of the Martin B-10 bomber which could outfly the older fighters in the Air Corps inventory, ushered in a whole new attitude. If the bombers could outrun fighters, what could stop them? Fired with a new enthusiasm, some of the bomber boys began to suggest that there was no longer a need to invest funds in other types of aircraft. By 1934 the official Air Corps text on 'Air Force' was asserting unequivocally that the bomber was the principal weapon, and its offensive role was the principal mission of the air arm." I. B. Holley, "Of Sabre Charges, Escort Fighters, and Spacecraft," *Air University Review* 34, no. 6 (September–October 1983): 7.

10. War Department Field Manual (FM) 100–20, *Command and Employment of Air Power,* 21 July 1943, 9.

11. Ibid., 10–11.

12. Thomas A. Fabyanic, "Strategic Air Attack in the United States Air Force: A Case Study," Air War College, Maxwell Air Force Base, Alabama, 1976, 29.

13. In this context, Perry McCoy Smith wrote: "Air Corps leaders had reached a doctrinal decision by 1935 as to the efficacy of unescorted long-range strategic bombardment and were unwilling either to question that decision or even to observe technological advances that might cause them to modify this doctrine until 1943 when the whole concept of strategic bombardment was

endangered by the horrendous losses over Germany." See Smith, *The Air Force Plans for Peace, 1943–1945* (Baltimore and London: Johns Hopkins University Press, 1970), 31.

14. Holley, "Of Sabre Charges," 9. Dr Fabyanic quotes the report "The First 1100 Bombers Dispatched by the VIII Bomber Command" (9 December 1942), Part I, Missions 1–6, Tactical Lessons, in discussing these first daylight raids into France (not Germany): "The ME-109F and FW-190 (German fighters were) no match for close formations of B-17s and B-24s in units of 12 or more. . . . Operations in daylight have been concluded with less than half the losses of the British Bomber Command operating under the protection of darkness—1.6 percent of planes dispatched as against 4 to 5 percent for the British." Quoted in Fabyanic, "Strategic Air Attack in the USAF," 10.

15. Fabyanic, "Strategic Air Attack in the USAF," 90–91.

16. Holley, "Of Saber Charges," 9.

17. Williamson Murray in *Strategy for Defeat: The Luftwaffe 1933–1945* (Maxwell Air Force Base, Alabama: Air University Press, 1983), 173, writes, "The heavy losses that American bombers suffered in the summer [of 1943] directly reflected the insufficient range of escorting fighters. This was a result of Anglo-American attitudes that regarded the use of long-range fighter aircraft not only as technologically impossible but in some cases as not really necessary."

18. Fabyanic, "Strategic Air Attack in the USAF," 92. Additionally, Williamson Murray writes, "Toward the end of February [1944] . . . the greatest air battle of World War II began. . . . Fighters now attacked German fighters on sight, and Eighth (Air Force) went after the Luftwaffe wherever it existed. With drop tanks that would carry P-51's to Berlin, American operations attacked production facilities throughout the Reich. . . . German industry responded to the attack on aircraft factories in such outstanding fashion that fighter production rose dramatically in the coming months, but the nature of the target forced the Luftwaffe to come up and fight. As a result, American fighter escorts decimated the Luftwaffe fighter force." Murray, *Strategy for Defeat,* 237.

19. See Richard H. Kohn and Joseph P. Harahan, eds., *Air Superiority in World War II and Korea: An interview with Gen James Ferguson, Gen Robert M. Lee, Gen William Momyer, and Lt Gen Elwood R. Quesada* (Washington, D.C.: Office of Air Force History, 1983), 48–49.

20. Vandenberg, "The Truth About our Air Power," 100.

21. Williamson Murray reports in *Strategy for Defeat,* 243, that "the attrition of German fighter pilots and aircraft reached a new high point in March [1944]. Luftwaffe units wrote off 56.4 percent of single-engine fighters available on March 1, while crew losses reached nearly 22 percent of pilots present on February 29."

22. Armitage and Mason write in this context, "A considerable contribution to exercise 'Overlord' in June 1944 was the interdiction of German reinforcement routes in Normandy. Railways, marshalling yards, bridges and highways were systematically destroyed by Allied heavy bombers so that German reserves had to make constant detours, were frequently delayed and consequently unable to mount counterattacks in sufficient force. Again, however, the interdiction campaign was centrally directed and co-ordinated with fighter activity which ensured almost complete air supremacy in the region." See M. J. Armitage and R. A. Mason, *Air Power in the Nuclear Age* (Urbana, Chicago, London: University of Illinois Press, 1983), 9.

23. USSBS quoted in Fabyanic, "Strategic Air Attack in the USAF," 116. Fabyanic also writes that "when the intense incendiary attack ended on 19 March [1945], 32 square miles of Japan's four main cities were completely destroyed at a cost of 21 B-29s, or a loss rate of 1.4 percent," ibid., 110.

24. Smith and Barker describe naval air participation in the assault on the Japanese homeland: "It must be obvious that the large, naval air forces operating in support of the 'naval' mission in the Pacific during World War II would have been idle for weeks on end if used only for naval roles. As it was, they were effectively used to hit at the Philippines and Japan to supplement the 'tactical' and 'strategic' air force operations and to erase from the skies a large proportion of Japanese air power." See Smith and Barker, "Air Power Indivisible," 17.

25. See Armitage and Mason, *Air Power in the Nuclear Age,* 23.

26. Ibid., 24. Also see Fabyanic, "Strategic Air Attack in the USAF," 148. In this context, Smith and Barker write, "Recently in Korea, the B-29s not only attacked factories, ports, depots and marshalling yards; but bridges, troop concentrations, and strong points. The carpet bombing near

Taegu was another example of the extreme flexibility of air power." See Smith and Barker, "Air Power Indivisible," 9.

27. Robert F. Futrell, *The United States Air Force in Korea, 1950–1953* (Washington, D.C.: Office of Air Force History, 1983), 504.

28.Dr Fabyanic reports that "the early plans for the air war against Germany stressed the decisive potential of strategic air attack, which was denied, according to the bomber advocates, by diversion of bombing effort to support the invasions of North Africa and Normandy." Fabyanic, "Strategic Air Attack in the USAF," 104.

29. Armitage and Mason, *Air Power in the Nuclear Age,* 13.

30. Futrell, "The Influence of the Air Power Concept," 7.

31. Herbert M. Mason, Jr, records the dismantlement of American air power after the war: "On hand (at war's end) were 68,400 aircraft of all types at home and overseas, and USAAF strength numbered 2.2 million men. . . . Twenty-one months after victory in the Pacific, two thirds of the aircraft inventory was scrapped and personnel numbered only 303,000. . . . In short, the strength of the US Army Air Forces in 1947 was reduced to the strength it enjoyed [may be a mischoice of words] on the day Pearl Harbor was bombed." See Herbert Molloy Mason, Jr, *The United States Air Force: A Turbulent History* (New York: Mason/Charter, 1976), 207. For a discussion of postwar air strength and attempts to maintain the 70-group force, see Robert Frank Futrell, *Ideas, Concepts, Doctrine: A History of Basic Thinking in the United States Air Force, 1907–1964* (New York: Arno Press, 1980), 102–11.

32. William Momyer, *Air Power in Three Wars,* ed. A. J. C. Lavalle and James C. Gaston (Washington, D.C.: Department of the Air Force, 1978), 2.

33. Futrell, *Ideas, Concepts, Doctrine,* 223–24.

34. Thomas A. Keaney writes that SAC, between 1949 and 1954, increased from 71,490 to 189,106 personnel, from 868 to 2,640 aircraft, and from 17 to 41 bases. Further, he writes that "the fiscal year 1955 budget called for expanding the Air Force from 114 wings in 1954, to 120 wings in 1955, and to 137 wings by 1957. At the same time, the budget called for a 13-percent manpower cut for Army, Navy, and Marine Corps in 1955, with further cuts the next 2 years." See Thomas O. Keaney, *Strategic Bombers and Conventional Weapons* (Washington, D.C.: National Defense University Press, 1984), 14.

35. Jerome H. Kahn, *Security in the Nuclear Age: Developing US Strategic Arms Policy* (Washington, D.C.: The Brookings Institution, 1975), 12.

36. Charles Krauthammer writes that "a shift away from strategic to conventional weapons would be extremely expensive. That is precisely why the West decided in the 1950s and 1960s to rely so heavily on nuclear weapons and to permit the current conventional imbalance in Europe." (Note the use of the word "strategic" as an obvious synonym for "nuclear"—a further example of a common misunderstanding.) See Charles Krauthammer, "On Nuclear Morality," in *Commentary,* October 1983, 51.

37. General Norstad was quoted in Futrell, "The Influence of the Air Power Concept," 2.

38. *Report of the President's Commission on Strategic Forces* (Washington, D.C.: President's Commission on Strategic Forces, April 1983), 6.

39. Kohn and Harahan, *Air Superiority in World War II and Korea,* 51.

40. For example, General Momyer wrote, "Although most experienced airmen would have chosen to employ our strategic bombers against the enemy's major target systems and to have used them for close support only in emergencies, the use of B-52s for in-country missions was in consonance with the Secretary's [Secretary of Defense's] view that the place to destroy the enemy was in South Vietnam." William Momyer, *Air Power in Three Wars,* 21.

41. See Robert F. Futrell, "Air Power Against North Vietnamese Aggression, 1965–1971," in *A Quarter Century of Air Power,* ed. John H. Scrivner, Jr (Maxwell AFB, Ala.: Air University, 1973), 40–41; and Keaney, *Strategic Bombers and Conventional Weapons,* 23.

42. See Dr Donald J. Mrozek, "The Limits of Innovation: Aspects of Air Power in Vietnam," *Air University Review* 36, no. 2 (January–February 1985): 65–68. On page 67 Dr Mrozek described one particularly strong example of exaggerated expectations of B-52 performance. "Randolph Harrison,

an Army officer in the Daniel Boone-Salem House reconnaissance operations into the Cambodian border area, recalled that he 'had been told that B-52 strikes will annihilate anyone down there.' He added: 'We were told that we would go in and pick some of these guys up [as enemy prisoners; and] if there was anybody still alive out there, they would be so stunned that all you will have to do is to walk over and lead him by the arm to the helicopter. Such optimism was excessive. Harrison recalled that a reconnaissance team that went into Cambodia after one B-52 strike lost ten out of thirteen men.''

43. Ibid., 66.

44. Carl H. Builder, *Strategic Conflict Without Nuclear Weapons,* prepared for the Ford Foundation by the Rand Corporation, April 1983.

CHAPTER 3

THE EFFECT OF TECHNOLOGY

The basic historical foundation of the indivisible air power concept is sound; the doctrine does have a proven genesis in combat operations. However, there is more to the formation of military doctrine than historic precedent. Technology, as evidenced by new weapons and improved means of delivery, has a profound effect on how a nation's military forces plan to do their business.

Past advances such as the machine gun, the submarine, the airplane, and nuclear weapons have caused significant changes in military doctrine. There are those who would argue that doctrine should point the way for technological innovation and not be reactive to it. Then there are those who feel that to do so would restrict the creative process and force innovation down a predetermined path. This argument over the preeminence of doctrine or technology in the military planning process is an old and continuing one. In reality, both perspectives have relevance; total dependence on technological innovation for doctrinal advancement is no more desirable than a situation where the creative process is dampened by the requirement to comply with predetermined doctrinal precepts.

This chapter will review some of the trends of military technology in light of the previous discussion of the indivisible air power concept and its historical derivation. It will provide the second of the two doctrinal ingredients identified in the introductory section—technology. In doing so, it will discuss both the reactive and prescriptive changes—how technology is changing doctrine and how doctrinal precepts drive the creative processes. This chapter will establish the technical portion of the doctrinal framework to be completed in chapter 4.

It is important to note at the outset of this discussion that technology is not a cure-all for our military problems. There is, for example, a limit to the ability of new weapons, no matter how sophisticated, to make up for large numerical deficits; sooner or later they are overwhelmed. Nor is technology a substitute for adequate training or dedicated, skilled leaders. History abounds with examples

of small, technically inferior but well-trained and well-led forces defeating a numerically and technically superior foe.

Americans place great faith in their technical prowess and they tend to assume that the next generation of "gadgets" will solve the problems this generation did not. The problem is, of course, that this next round must face many totally new obstacles, very often self-generating. New weapons are vital. "Smart" weapons are inevitable, but they do extract a toll in their cost (forcing fewer weapon purchases) and in manpower availability (soldiers must be more educated and technically skilled).

On the other hand, new weapons will improve the capability of existing systems, while innovations in propulsion, construction materials, or electronic warfare will provide new systems with radically new capabilities. There is a possibility of rejuvenating older weapons, reducing the need to retire them as early as has been the custom. Advances in range and payload capability of air-breathing systems, accuracy and nonnuclear destructiveness of missiles (cruise or ballistic), and the global coverage and ultrafast response capability of space-based systems will force a less theater-oriented view of aerospace power application and more of a global perspective. This may eventually provide incentive for a policy shift away from reliance on nuclear weapons to provide the basis of military deterrence.

Real Smarts in Small Packages

Strategic Air Command's 1984 statement to the US Congress discussed the effect of technological advances on basic aerospace doctrine:

> Recent advances in the technology of aerospace warfare such as increases in weapon accuracy and aircraft delivery capability, more efficient engines, and standoff weapons have increased the efficiency, range and combat effectiveness of all types of systems to a point where traditional distinctions between strategic and tactical systems are not clearly defined. The technology of the future will further increase the ability of all aerospace systems to perform both strategic and tactical actions at any level of conflict.[1]

Examples of this "emerging technology," or "ET" as it is referred to in defense technology parlance, abound either in already existing systems or weapons that are just around the corner, and they form the basis for the changing military perspectives explored in this paper. For example, nuclear and nonnuclear cruise missiles such as Harpoon, short-range attack missile (SRAM), and Maverick have increased the ability of all forms of attack aircraft to strike strategic or tactical targets with either nuclear or conventional weapons. They effectively extend the strike range of their delivery aircraft, help them avoid high-density terminal area defenses, and improve their ability to attack a variety of targets from ships to land-based command centers.

Near-term technology such as very high-speed integrated circuits (VHSIC) has the potential to increase the capability of all our military systems while, at the

same time, reducing their size and weight. As Gen Robert T. Marsh, former commander of Air Force Systems Command, put it, "It will allow us to put real smarts into much smaller packages," increasing the capability of on-board computers, allowing "launch-and-leave" (does not require operator guidance to the target) missiles, and improving electronic warfare systems.[2] George H. Heilmeier, senior vice president and chief technical officer of Texas Instruments, Inc., wrote that by 2001 we "will see new technologies that could make an order-of-magnitude difference." The results of these ET innovations will include, according to Heilmeier:

- A leak-resistant, nonnuclear ballistic missile defense.
- Standoff, robust, near-zero Circular Error Probability (CEP) weapons [CEP-a measure of weapon accuracy; in this case, near perfect].
- Brilliant weapons that seek out and destroy *specific* targets such as tanks and missile sites; weapons that are patient and can pursue goals over time; weapons that can wait for specific targets to appear; weapons that can autonomously perform entire missions.
- Worldwide target acquisition and tracking systems.[3]

Whether all of Heilmeier's predictions will come true remains to be seen, but there is no doubt that by the year 2000, the advances represented by the Exocet missile, used with such impact by Argentina during the Falklands battle, will be seen as just a modest beginning. The CEP of new weapons will likely be approaching zero; size will decrease while destructive power increases; range will increase; and detectability (ability of the enemy to "see" the weapon—a function of radar reflection, speed, heat signature, etc.) will decrease.

The end result, of course, will be to improve the ability of any weapon carrier (aircraft or missile) to strike a wide variety of targets. New "smart" or, as Heilmeier describes them, "brilliant" weapons will enhance the inherent characteristics of a particular aircraft. For instance, the ability of an F-16 to avoid enemy defenses through speed, maneuverability, and comparatively small size will be magnified by a standoff precision-guided missile that covers the last and most dangerous ground on its own. The fighter's in-theater rapid response capability and inherent flexibility will improve as "black box" technology advances. By simply changing circuit components or missiles, the same aircraft could fly deep interdiction, defensive counterair, and close-air-support missions on the same day. The same applies to the long-range bomber. New smaller, lighter, and more accurate and destructive weapons (essentially the same ones carried by the F-16) would enhance this system's global range, heavy payload capacity by allowing it to strike either strategic or tactical targets from outside enemy terminal defenses while operating from airfields that are out of range of most enemy theater forces.

The point here is that the weapons carried by modern combat aircraft are evolving faster than the aircraft themselves and in the process improving the inherent flexibility of the entire weapon system (aircraft plus weapons). In some cases the "force-multiplier" effect of these new weapons may approach that of buying a whole fleet of new special purpose aircraft, except for the fact that if the now multirole aircraft is lost to enemy action, so are *all* of its functions, not just a close support, air superiority, or interdiction capability. This is a crucial facet of the technology/numbers debate. Fewer, more expensive multirole systems are more dear than cheaper limited-purpose systems, less likely to be risked in combat, and more damaging to the overall military capability if lost.

However, this does not negate the utility of such systems, especially if they are "acquired" as a result of comparatively inexpensive modifications and application of emerging "smart" weapon technology. An inescapable fact in this regard is that modern weapon technology is rapidly rendering any residual distinctions between "strategic" and "tactical" systems purely artificial and is reinforcing the lessons of World War II, Korea, and Vietnam. Col Dale O. Smith and Gen John Barker said it in 1950:

> Each weapon possesses certain characteristics, singular strengths and weaknesses. We use each weapon so as to take advantage of its capabilities and allay the effects of its limitations. One of the greatest strengths of an airplane is in its flexibility.[4]

That flexibility has increased immeasurably since Smith and Barker wrote their article over a third of a century ago. The effect of technology is not felt just in the weapons carried in the bays or on the wings of aircraft. Such advances as more powerful and efficient engines, lighter and stronger materials, low radar reflective "stealth" technology, and the widespread use of aerial refueling have increased the overall capability of the fighters and bombers that engage enemy forces, the airlifters that support them, and the reconnaissance aircraft that "see" for them.

We frequently hear US and allied government officials decry the Soviet Union's quantitative advantage—more missiles, tanks, planes, and so on. The answer to this we most frequently hear involves the application of superior Western technology. Secretary of Defense Caspar W. Weinberger was quoted in this regard:

> Since Soviet-bloc forces would probably enjoy numerical superiority in most theaters in which they might launch a conventional attack, we must be able to offset that advantage with qualitatively superior conventional forces.[5]

The former chairman of the NATO Military Committee, Johannes Steinhoff, wrote more specifically that

> NATO has never intended to confront Soviet forces with equivalent numbers—its members cannot or do not wish to find the money to match the Soviet Union quantitatively—so the aim is to use NATO's lead in most fields of technology instead.[6]

Many (probably most) of the weapons NATO is producing are in fact superior to their Warsaw Pact counterparts, but, as Soviet technology improves, NATO forces are not as superior as they were just a few years ago. The following question must be asked: Even granted some permanent margin of qualitative advantage, at what point are even the most sophisticated combat systems simply overwhelmed and, more important, at what point is the nuclear option exercised? In attempting to stop a massive Warsaw Pact assault on Western Europe, as one writer put it, "Targets arrive faster than cannoneers can reload, aircraft rearm and missile gunners engage the next target before they are simply overrun or overwhelmed."[7]

Exacerbating this problem is the recently expressed nuclear winter theory, which states in a nutshell that nuclear detonations, especially in urban areas, may produce enough soot, dust, and debris to block out a large portion of the sun's energy for a prolonged period (months) before being "washed out." The theory states that enough heat and light could be blocked from the earth's surface to cause a prolonged winter—potentially severe enough to destroy global agriculture and, through this and other effects such as damage to the earth's ozone layer, imperil all life on earth. Of course, no one now knows how many nuclear weapons, of how much destructive power, aimed at what kind of targets will cause the projected ultimate nuclear catastrophe; scenarios vary widely.[8]

The point here is that, if proven even partially correct, the presence of the nuclear winter phenomenon could restrict allied options in dealing with a major Soviet action such as an invasion of Western Europe. If only low to moderate numbers of nuclear detonations are eventually seen as causing a severe climatological disruption, the threat of nuclear response may lose credibility, placing heavy reliance on our ability to stop an invasion using nonnuclear means. A scenario in which Warsaw Pact forces overwhelm our highly sophisticated and expensive forces is not a good candidate to replace the current theories of extended nuclear deterrence so important to many European leaders.

To be sure, more advanced, highly accurate weapons and faster, longer range, greater payload-capable aircraft are an absolute necessity; but as the other side improves its quantitative (and qualitative) position, it costs more to maintain the "edge." For example, Secretary Weinberger reported that over the past nine years the Soviets have produced "54,000 tanks and other armored vehicles" and "6,000 tactical combat aircraft." The United States, on the other hand, was credited with "11,000 tanks and other armored vehicles" and "3,000 tactical aircraft."[9] It would follow that to overcome a Soviet advantage of two, three or even four to one in some combat systems, plus advantages of surprise and timing that belong to the attacker, our systems would have to be very sophisticated indeed and hence very costly.

Every nation is resource constrained, even the Soviet Union; but its ability to outspend the United States, unbothered by interference from an informed public, gives it a distinct advantage. Further, as Secretary Weinberger reports:

> Heavy Soviet investment in military research and development, coupled with the purchase and theft of Western high technology, is most disturbing because it has eroded the qualitative advantage that the West needs in order to maintain the military balance.[10]

Unfortunately, the bottom line in this discussion is that the Soviet Union could soon be in a position of having more *and* better weapons—or, if not absolutely superior, certainly good enough to easily overwhelm smaller numbers of US or NATO forces. John W. R. Taylor maintains, "Today, the quality of aircraft like Fulcrum, Flanker, and Blackjack appears to be so high that the East/West technology gap is near to closing and the numerical balance is becoming critical."[11]

Technology, then, can be a mixed blessing. On one hand it can improve the performance of existing weapons systems while providing totally new ones with revolutionary characteristics. It can also provide the edge in situations where the adversary has the quantitative advantage. On the other hand, a myopic pursuit of technological advantage can lead to spiraling costs and reduced force structure with a resultant quantitative-qualitative force mix that is insufficient to overcome enemy advantages. The United States must ensure that its military force structure does not overly emphasize either qualitative or quantitative extremes but reflects a reasonable balance between numbers and sophistication. For example, it may be better to forego some "promising" and very expensive new system that would improve an aircraft's performance by five or six percent and spend that money on buying more aircraft. The temptation to wait for the next "gadget" is strong and frequently not worth the wait or expense.

A second major problem centers on the increasing worldwide availability of advanced, highly sophisticated weapons—in other words, technology proliferation. For example, one report states that the French-made Exocet antiship missile is in use by "18 different navies." When third world nations such as Libya, Iran, and Iraq possess sophisticated weapons of the quality of the Sidewinder air-to-air missile, Exocet, and the Maverick air-to-ground missile, the challenges faced by US military forces become even more formidable.[12] The United States/NATO and the Soviet Union/Warsaw Pact nations are not the only ones with new high-technology weapons. The world is fast becoming an even more dangerous place; even military superpowers must exercise extreme caution when "showing the flag" to avoid major losses along the lines of the British in the South Atlantic (discussed in chapter 4). Even though these new smart weapons are becoming increasingly expensive, they provide an attractive alternative to the prohibitively expensive machinery of global power such as that possessed by the United States and the Soviet Union. As one article put it:

> The smart weapons themselves are not cheap: a new Sidewinder air-to-air missile costs $60,000; the Harpoon antiship missile, almost $500,000; and the new infrared Maverick air-to-ground antitank missile over $125,000. But most striking are the price tags of their potential targets; a new F-15 jet fighter, almost $50 million; a new nuclear-powered aircraft carrier, over $3 billion; and the M-1 Abrams tank, $2.6 million.

> As these weapons escalate in cost far beyond the rate of inflation, they are purchased in fewer numbers and become more dear. Ironically, they may also become more vulnerable to attack.[13]

These new nonnuclear smart weapons represent a tremendous force-enhancement capability. Weapon systems such as the MiG-19, F-4, or the B-52, considered by many to be on the verge of obsolescence for many sophisticated combat environments, will receive new life from weapons that can outmaneuver even the most advanced fighter or cover hundreds of miles to strike targets with accuracies of 30 feet or less.[14] Any nation with a reasonable delivery capability, even with "older" aircraft, can with the fruits of the ET revolution, become a fairly formidable adversary and threaten even the highly complex, mega-expensive war machines of the superpowers. Former Under Secretary of Defense for Research and Engineering William J. Perry said with respect to emerging weapons capabilities, "If you can see the target, you can expect to kill it."[15]

The technology revolution is enhancing the ability of virtually any weapon system from tank to long-range bomber, and virtually any nation's military forces from Argentina to the Soviet Union, to accomplish a spectrum of combat missions with rapidly increasing effectiveness. The mixed nature of the "blessings of technology" is becoming daily more evident as fewer and more sophisticated and expensive US weapons are facing a multitude of potential adversaries that possess dangerous new capabilities and, in the case of the Soviet Union, also outnumber us.

In this increasingly hostile environment, we can no longer afford the luxury of dedicated strategic nuclear or theater tactical aerospace forces. We no longer possess the massive fleets of aircraft with which we fought World War II nor are we ever likely to have them again. They are simply too expensive. For the same reasons, we cannot afford, in the face of active hostilities, to experiment with doctrinal theories as we did in World War II. The premier lesson of air warfare, that air power is indivisible, is becoming even more important as emerging technologies enhance the capabilities of all combat systems to perform multiple missions.

The need to take advantage of this multimission capability is becoming crucially important to countering the growing US-Soviet quantitative disparity. This requirement must be tempered, however, by the realization that more multirole weapon systems cannot be used as justification for large force reductions; 50 dual-mission aircraft cannot replace their 100 single-purpose counterparts; rather, 100 previously single-role systems, with the application of ET innovations, can become reasonably effective multimission systems and serve to balance some of the Soviet quantitative advantages. Weapon systems once considered as obsolete may have great utility in this regard as the weapons they carry become increasingly capable, vastly improving the system's overall performance. These "older" systems surely cannot be expected to last forever, nor can they perform as well against as sophisticated an adversary as the Soviet

Union as our newer systems. They can, however, perform very well in less-sophisticated environments and can reinforce our front-line aircraft even against the Soviets, leaving those systems free to tackle the most demanding tasks.

The second prominent feature of the US postwar air power landscape, the influence of nuclear weaponry, will also undergo its share of change due to both the necessity for indivisible air power application and the technological revolution. The first concern centers once again on the requirement to break the traditional linkage between long-range or "strategic" forces and nuclear weapons. In an era of quantitative inferiority, exacerbated by a rising Soviet technological base, US aerospace resources must be used for more than just nuclear deterrence. The same technologies that improve F-15 performance against deep targets in the European theater provide similar improvements in the performance of bomber forces in the same nonnuclear scenario.

The second concern in this context is that the same revolution in military technology that is producing these advanced, smart weapons and faster, longer-range aircraft is also on the verge of blurring the practical distinctions between nuclear and nonnuclear weaponry. At the same time that nuclear weapons are being made smaller and less destructive for more specialized "precision" applications, nonnuclear ordnance is becoming more destructive and capable of wider usage, including roles previously considered within the nuclear domain.

Near Nukes and Real Nukes

US defense policy has, at least since the demise of the massive retaliation theory, relied on a psychological firebreak between conventional and nuclear weapons and their application in war. The basis of this division of forces is destructive potential. Simply, a nuclear conflict could produce the combined destruction of the six years of World War II in a matter of a few hours. This is a reality that will not change. Nuclear weapons have the potential to ruin nations and decimate populations, and perhaps end all life on earth.

This, however, is the extreme position, the end-game scenario, that is not likely to occur out of the blue. If Armageddon does occur, it will almost certainly be as a result of an escalatory process, including a conscious decision at some time during the process to cross the nuclear threshold. In some instances, deterrence may rely on the threat of early use of nuclear weapons—a conscious crossing of the psychological firebreak as a result of the inability to field sufficient forces to stop a conventional assault. In another case, it might be hoped that enough nonnuclear force would be available to deter a conventional attack or, if required, defeat it. In any case the crucial factor is the nuclear threshold, in that it has always represented a fundamental change in the nature of any ongoing conflict. In one instance it is used for purposes of direct intimidation; in another case it is avoided. In both it is an always present factor, coloring the nature and intensity of international competition, especially

between the superpowers. Carl Builder of Rand Corporation discussed the ultimate threat of nuclear weapons—a threat not likely to diminish appreciably in the foreseeable future.

> Nuclear weapons are and will remain unique in their credibility as a threat to destroy entire cities and societies in a single attack. Because of that unique quality, they will also remain the most potent political instruments and national symbols of power.[16]

The threat of nuclear annihilation will remain the ultimate sanction and the final step in warfare escalation. Nations now possessing nuclear weapons will very likely retain them (especially the superpowers even in the face of the nuclear winter threat), and regardless of attempts to stop it, proliferation will probably continue. As Builder put it, nuclear weapons have become "the most potent political instruments and national symbols of power." Nations such as India, Pakistan, and Iraq, faced with severe internal political and economic problems, will likely continue to devote very scarce resources to the pursuit of nuclear weapons. If nothing else, the threat of nuclear blackmail will force the nations with established nuclear forces to maintain their arsenals as long as any of their adversaries have them. They may manage mutually agreed reductions; they may even be able to eliminate certain classes of nuclear weapons, but the fear of the ultimate sanction will force negotiating caution. A failure in verification could prove catastrophic.

The problem therefore becomes one of ensuring that these symbols of power remain just that, and are not used for any purpose other than political persuasion. There are basically two deterrence options: emphasizing the nuclear arsenal and the escalation potential to prevent attacks of any kind (the cheap course), or building sufficient nonnuclear or "conventional" forces to defeat a conventional attack while holding nuclear weapons in reserve as the ultimate dissuader. With the advent of US/Soviet nuclear parity, many observers believe the former strategy to be obsolete and lacking credibility. This leaves increasing reliance on nonnuclear forces as the primary option. The idea that by increasing the size, capability, and availability of our conventional forces we reduce our reliance on nuclear weapons has received substantial attention over the past few years. Dr Fred C. Ikle, the under secretary of defense for policy, writes in this context:

> Given the loss of an overall American nuclear advantage that once shielded our allies as well as ourselves, it is more imperative than ever that NATO mount a posture that promises to frustrate a conventional attack by Soviet forces in Europe without early resort to nuclear weapons.[17]

A substantial number of civilian publicists and governmental officials are advocating the use of new technology nonnuclear weapons to replace nuclear weapons in many of their traditional roles, particularly in theater scenarios. The champions of these highly accurate new munitions claim they both make up for the quantitative disadvantages discussed earlier in this chapter and can also

accomplish tasks previously reserved for nuclear weapons. The improved accuracy attainable with evolving guidance systems, when combined with the rapidly increasing destructive potential of nonnuclear munitions, will allow nonnuclear warheads (certainly not "conventional" in the classic sense) to destroy many targets such as command bunkers or missile silos, previously considered as "nuclear only." Carl Builder maintains that the emphasis of strategic conflict has shifted from large area targets such as cities to an emphasis on the enemy's weapon systems, and that "those forces—unlike cities and industries—can now be destroyed or neutralized without nuclear weapons."[18] He goes on to write that "nonnuclear technology has already reached the point where it can provide capabilities competitive with those of nuclear weapons for some tactical applications."[19] In the same vein, Gen B. L. Davis stated:

> For many years we have lived with the expectation that future scientific improvements will present us with systems even more destructive than thermonuclear weapons. In reality just the opposite may be true. Technologies on the horizon (and even some that exist today) may present us with vastly more effective nonnuclear weapons perfectly capable of performing many of the missions we assign to nuclear weapons today.[20]

The combination of new and more effective nonnuclear munitions, highly accurate smart weapons, and the improved flexibility, range, and payload of new combat aircraft do present an opportunity to substitute nonnuclear weapons for nuclear ones in some instances. If the objective of military forces is to be prepared to destroy the opponent's combat capability, then this would seem to provide an attractive alternative to nuclear confrontation and would appear to add an extra rung in the escalation ladder between nonnuclear and nuclear warfare. A question to be answered then is this: If critical targets previously considered too secure or too large to be effectively struck by nonnuclear weapons are now vulnerable to such action by way of new technology weapons, why continue to threaten nuclear holocaust? One writer stated the case for NATO this way:

> Another impetus to the new [nonnuclear] arms race is opposition to NATO's nuclear weapons modernization program. Although continuing to push for the deployment of theater nuclear weapons on the continent, European and American leaders have accelerated the development of sophisticated conventional weapons that could be substituted on an almost one-to-one basis for tactical nukes, should popular pressure force them to eliminate the latter.[21]

There are even those who would argue that these new ET systems may even break the nuclear "cheap deterrence syndrome" that has hampered efforts to build a robust conventional force structure, especially in Europe. In fact, one analyst estimates that for less than the cost of one additional mechanized division (an expenditure of between $2 and $4 billion per year) NATO could purchase enough new nonnuclear deep-strike weapons to "make a significant contribution to NATO's ability to win a European war."[22] This view is particularly valid if a nation does not have to purchase the ultra-expensive delivery and supporting

systems such as F-15s, nuclear-powered aircraft carriers, or long-range airlift systems that are the trappings of a modern major military power concerned with global power projection. Even though, as noted earlier, these munitions are becoming increasingly expensive, the secret of their success is their high efficiency and the extremely high value of the ships, planes, and tanks that are their targets. For example, West German Defense Minister Manfred Woerner estimated that "advanced systems would be such efficient killers that the amount of ammunition needed to destroy a typical Soviet attack group could be cut to 500 tons from 33,000 tons currently."[23]

While some of the more extravagant claims for ET weapons may rightly be the subject of some debate, there is little doubt that for theater warfighting purposes nonnuclear weapons could supplant their nuclear counterparts in many cases. A reliable nonnuclear warfighting capability would enhance the credibility of our (and NATO's) military forces. As discussed earlier, the threat of a nuclear response to a conventional attack by a nuclear-armed enemy is losing its credibility.

This does not assume that nuclear weapons would disappear as a result of the deployment of advanced technology nonnuclear weapons. While they may be replaced for many military functions, their political utility for peacetime coercion and as the ultimate wartime sanction will remain. Former Secretary of Defense Robert McNamara argues that "nuclear weapons serve no military purpose whatsoever . . . except to deter one's opponent from using them."[24] This may increasingly be true from a purely military perspective; however, their political importance will remain high and will carry great weight internationally. Further, with respect to the Soviet view, Strobe Talbot, noted strategic analyst, maintains that

> many students of the Soviet system and mentality believe that Kremlin leaders will never give up their ultimate weapons, since military strength is both the symbol and substance of their power, and the major compensation for their many weaknesses.[25]

Essentially, the impetus of the ET effort is to widen the firebreak between nonnuclear and nuclear warfare and allow more military choices prior to being faced with the decision to cross the nuclear threshold. Gen Bernard Rogers, supreme allied commander in Europe, remarked that "the current conventional posture of Allied Command Europe does not provide our nations with adequate deterrence, and leaves the nuclear threshold at a disturbingly low level."[26] He maintains that the combination of highly efficient near real-time intelligence and sophisticated emerging technology weaponry will allow rapid, effective strikes on enemy targets deep behind enemy lines—such targets as reinforcing armor formations, bridges, rail yards, air bases, and supply dumps.[27]

Carl Builder in *Strategic Conflict Without Nuclear Weapons* takes this concept one step further by advocating the application of new technologies for central strategic actions. He argues, as pointed out in chapter 1, that "today, strategic conflict seldom implies anything else other than a nuclear war fought with long-

range nuclear weapons." He then supports the thesis that "nuclear armed states in conflict will increasingly have the incentives and the means for attacking the enemy's source of power without resorting to nuclear weapons." The essence of his argument is that advances in nonnuclear offensive and defensive technologies will make a major contribution to finally divorcing the concept of strategic action from the nuclear nemesis.[28] Dr George Keyworth, the President's science advisor, generally agrees with Builder's assessment that strategic and tactical actions can be accomplished without nuclear weapons. He sums up his philosophy in the following manner:

> Although almost everyone is enthusiastic about technology to reduce reliance on tactical nuclear weapons, many of those same people run in the other direction if it's suggested that we can use technology to reduce our reliance on strategic nuclear weapons.
>
> The reason, I think, for this reaction has little to do with technology, but a lot to do with a kind of theology—that is, a set of beliefs that have become deeply ingrained and resistant to questioning. The real challenge today is to step back from that dogma and become more willing to rethink the role of strategic nuclear arms in assuring national security.[29]

In an era of nuclear parity, or "essential equivalence," nuclear weapons do seem to have lost much of their military value. The threat of a "tactical" or "theater strategic" nuclear response in Europe has lost its omnideterrent characteristic, as has (many would argue) the "strategic" arsenal, for the same reasons. In fact, for all practical purposes there is no more difference between strategic and tactical nuclear weapons than between their nonnuclear brothers. Adm Noel Gayler, former commander in chief of US forces in the Pacific and a former director of the National Security Agency, made the somewhat bold statement that "Europe was not especially threatened by [deployment of the Soviet] SS-20s [intermediate-range missiles] because any of the Soviet intercontinental missiles could be fired at European targets" (about 6,000 warheads).[30] The admiral, when asked the difference between strategic and nonstrategic weapons, replied that "there isn't any real distinction" and that "it is a totally arbitrary classification."[31]

This does not mean that the SS-20s are not dangerous or do not present a serious threat—they do. What it means is the threat is not new. Even disregarding the older Soviet "theater" nuclear weapons such as the SS-4 and SS-5 (admittedly far less capable than the SS-20), European cities have been threatened by the same Soviet "strategic" SS-9, SS-11, SS-13, SS-17, SS-18 or SS-19 ICBMs—along with Soviet bombers and SLBMs—that have threatened the United States for many years. Additionally, from their point of view, the destruction of Bonn or the crippling of their national electrical system are as much strategic actions to the West Germans as similar actions on US soil would be to us. Thus, as with virtually everything else, whether an SS-20 is strategic or tactical (or in US parochial terminology, "theater strategic") depends upon what is being done with it.

The same can also be said about the new technology nonnuclear weapons that are intended to assume some of the old nuclear taskings. They may be classified as long-, short-, or intermediate-range—nuclear or nonnuclear—but to an increasing degree, whether they are strategic or tactical is purely a function of how they are used. Perhaps more important, this discussion emphasizes the fact that a weapon does not have to be nuclear to be useful for strategic action.

While these new perspectives will likely become more prevalent with time, they also bring some problems with them that will become increasingly evident. There are two potential wrenches in the theoretical machinery. First, as Richard K. Betts of the Brookings Institution and Columbia University concluded, "Pure conventional deterrence raises the danger of nuclear war by making the potential consequences of resort to conventional war less unthinkable for the attacker."[32] It can be argued that the presence of these nonnuclear ET weapons will make warfare between the superpowers more likely since it would be seen as less destructive if conducted at the nonnuclear level; and, ironically, rather than raising the nuclear threshold, these new technologies could actually lower it by making the superpowers less reluctant to fight in the first place.

While this view could prove painfully true, the opposite view must also be addressed; a strong nuclear and conventionally armed adversary may see threats of nuclear retaliation for conventional aggression from a power possessing primarily nuclear weapons as hollow since it invites a similar response. Such concerns caused the demise of the massive retaliation theory; as the Soviet Union gained nuclear prowess, US nuclear weapons lost military relevance. Thus, the United States must now walk a narrow path between these two views, requiring that we maintain viable nuclear and nonnuclear capability. Simply stated, as long as nuclear weapons exist (and they probably always will) someone may be tempted to use them or threaten to use them if he perceives weakness, be that weakness in nuclear or nonnuclear capability. Even though a nonnuclear war may seem "less unthinkable" because of nonnuclear (ET) weaponry, it could still result in nuclear war through escalation, especially when one side sees no other alternative but defeat. The result could be the same if a nation sees itself as superior in nuclear weapons and fails in an attempt at nuclear blackmail.

Those who argue that "conventional" war may be more likely if seen as divorced from potential nuclear consequences are represented by Mary Kaldor, who wrote:

> The terrible destructive power of nuclear weapons may lead us to condone conventional weapons as a lesser evil. This is something new. After World War I, there was widespread revulsion against war in all its forms. Yet a modern conventional war with the weapons now available could in the words of a British lieutenant colonel "recreate the conditions of 1914–15" . . . the carnage would be fearful with modern weapons making the World War I casualty lists look brief by comparison.[33]

In other words, a major nonnuclear war between NATO and the Warsaw Pact could conceivably be as destructive and deadly (albeit probably longer) as many

theater nuclear scenarios. The trigger of war may seem easier to pull, given that the potential level of destruction may not appear as great. But nearly total destruction is still possible. During World War II, the firebomb raids on cities like Dresden and Tokyo killed far more people than the nuclear strikes on Hiroshima and Nagasaki. Europe lost a generation (somewhere around 15 million men) in the trenches of World War I.

To make matters worse, the second concern centers on the fact that some analysts are raising serious concerns as to the viability of even the nuclear/nonnuclear distinctions. In the heat and fog of battle, commanders may have a difficult time determining what kind of weapons are being used against them, especially in tactical situations. The standard image of nuclear warfare—the razing of entire cities in a single multimegaton nuclear blast and the virtual elimination of entire societies in a matter of a few short hours—while a worst-case possibility, is a long way from the battlefield situations in which nuclear weapons will most likely see their first use. Large-yield nuclear weapons of the "city-busting" class could certainly be used in such situations, but they have more important uses as the Armageddon-makers—the bludgeons of ultimate deterrence—and they also invite their use by the other side.

Both the United States and the Soviet Union have developed small, lower-yield weapons with good accuracy that are specifically intended for tactical action but that presently are distinguishable from their nonnuclear counterparts. However, for the future, the same technologies that are producing such radical improvements in conventional weaponry will surely affect the nuclear arsenal in similar fashion. Nuclear-delivery systems will become more accurate as advanced inertial- and terminal-guidance systems are deployed, reducing the requirement for large-yield warheads. The desire to limit collateral damage, especially in Europe, will foster further accuracy refinements and yield reductions. At the same time, nonnuclear weapons are increasing in destructive potential. For example, Gen Robert Marsh described the potential of the new nonnuclear explosive metastable helium (MSH) as having "more than five times the stored energy capacity of TNT" and the capability to produce "thirty times the overpressure on a target of a TNT munition of similar weight at the same miss distance."[34] Another writer compared existing systems: "It has been estimated that an aircraft equipped with the type of cluster bomb used by Israel in Lebanon has the same immediate destructive effect as a Lance missile equipped with a one-kiloton [an explosive power equivalent to 1,000 tons of TNT] nuclear warhead."[35]

Thus, the combination of smaller, more accurate nuclear munitions and larger, more destructive nonnuclear weapons, both designed to accomplish the same tasks, may eventually blur the distinctions between nuclear and nonnuclear warfare. The critical firebreak that is so important to deterrence theory may become very indistinct if not nonexistent.[36] To be sure, there are differences between nuclear and nonnuclear weapons even at lower yields, most notably radiation and fallout (although even these can be minimized); but a military

commander, surrounded by the urgencies and confusion of battle, is not likely to wait for fallout reports before recommending what he may see as appropriate nuclear retaliation. Matters are made even worse by the fact that in modern warfare even a large-scale "conventional" (in name only) war may be seen as a possible option because of the emergence of such precise and potent nonnuclear weapons.

Carl Builder, while arguing for the necessity and feasibility of nonnuclear strategic capabilities, maintains that efforts to make nuclear weapons more "usable" from a military standpoint (smaller, more accurate, and therefore more discriminating) will not make them politically more justifiable since the reluctance to use them "is rooted more in an appreciation of their societal risks than in their military utility."[37] This is essentially true; nuclear weapons do tend to serve a more political than military purpose—at least in peacetime. Once again, however, in a combat environment thick with immensely effective nuclear and nonnuclear weapons, a military commander is not apt to attempt to divine the enemy's political justification for using what might have been a nuclear weapon. He is, by the nature of his position, required to act fast or suffer defeat, and political leaders, not on the scene, will rely on the commander's impressions and recommendations for the basis of their nuclear decisions. Therefore, in a worst-case scenario, what was perceived as a response or "second use" of nuclear weapons could in reality be a first use.

However, rather than worrying about political justifications and mistaken impressions, we should concentrate on preventing such ambiguous situations. Colin Gray writes, "One of the essential tasks of the American defense community is to help ensure that in moments of acute crisis that the Soviet general staff cannot brief the Politburo with a plausible theory of military victory.[38] This means very simply and emphatically that in order to prevent war, especially with the Soviet Union, we must be visibly capable of conducting it by either nuclear or nonnuclear means. The best way to avoid ambiguous situations is to convince the Soviet leadership that a conflict with the United States or NATO is a "no-win" proposition.

ET weaponry has many potential uses outside of a US-Soviet death struggle in Europe and would undoubtedly improve overall US warfighting ability. However, it is necessary to keep potential problems and ambiguities in mind as we plan for the employment of these systems. Marshal Nikolai V. Ogarkov, at the time chief of the Soviet General Staff (he was relieved of his position soon after the interview quoted here), summarized the basic concerns surrounding the deployment of new ET weapons.

> Rapid changes in the development of conventional means of destruction . . . make many types of weapons global and make it possible to sharply increase (by at least an order of magnitude) the destructive potential of conventional weapons, bringing them closer, so to speak, to weapons of mass destruction in terms of effectiveness. The sharply increased range of conventional weapons makes it possible to immediately extend active combat operations not just to the border regions, but to the whole country's territory, which was not possible in past wars.[39]

Emerging technologies will improve the destructive potential of all types of weapon systems—fighters, bombers, or missiles. The range, speed, and payload of all classes of air-breathing systems has been vastly improved over the past four decades since World War II. More important, the weapons they carry bear scant resemblance to the airborne weapons that caused so much destruction during that war. They have added tremendous new capabilities to even the oldest delivery systems and are providing many third world nations with dangerous new ways to challenge major military powers. Old strategic and tactical concepts are falling to the lessons of history that are being reinforced by new weapon technologies. Individual nuclear weapons are becoming less destructive while "conventional" systems are becoming more so, blurring the crucial thresholds of deterrence and posing new questions for policymakers.

While technology is having a tremendous effect on the way we think about the more traditional elements of air power (air-breathing and rocket-propelled systems), another operational medium, space, has until recently been the recipient of a steadily increasing but largely unnoticed infusion of military technology. The recent public attention given to space by the Reagan administration has taken space off the political and public "back burner" and placed it squarely in the limelight. To the military doctrinaire and strategist, the development and deployment of many of the proposed space-based military systems will only serve to hasten the demise of the convenient and long-cherished strategic and tactical weapon classifications.

Space: Star Wars in Context

President Reagan's 23 March 1983 national ("Star Wars") speech has kindled a lively global debate on the necessity and advisability of engaging in a new "space-based arms race." Many concerned and well-intentioned observers from both the public and private sectors are arguing against spoiling the sanctity of space. They maintain that the "militarization" of space would begin a dangerous new round in an already deadly arms race and could, as one article put it, "undermine the very foundation of strategic stability, namely the concept of Mutual Assured Destruction. . . ."[40]

While there are others, this discussion will focus on the following three main areas of contention surrounding the President's announced intention to begin work on a "strategic defense" system: (1) should an active defense system replace, or at least displace a large portion of, the reliance on an assured nuclear retaliation capability to provide central deterrence of the Soviet Union; (2) should a large-scale defense system be extended to include major US allies; and (3) should the United States, in providing for this defense, place weapon systems in space? Many observers would include arms control issues (space weapon and ABM prohibitions) as a fourth area of contention, as essentially they are, but arms control is not central to the subject at hand—a discussion of the

effects of technology on aerospace doctrine. Arms control as it relates to our general policy and doctrinal precepts is discussed in the final chapter of this volume.

This paper will not proceed much beyond a brief general discussion of the first two questions since our intention is to deal with military doctrine, not broad national policy. Further, to fully explore them in detail would require a discussion too lengthy to pursue here. However, some discussion is necessary since the questions of offensive-defensive balance and a more global defensive orientation are vital to determining the proper size, composition, and deployment of aerospace forces. The resolution of these questions will have a tremendous impact on the shape of all US military forces and accompanying theories of employment. Further, the discussion of all three issues is important to the development of the final recommendations or organizational structure, force structure, and arms control contained in chapter 5. The issues surrounding our military space program are clearly crucial to the development of a global indivisible perspective.

The first issue (and the central one) of whether or not we can or should actually supplant the threat of nuclear retaliation with an active defense (space-based or not) rests on our perception of what deters an adversary, in this case the Soviet Union. What makes this such a difficult issue from the military perspective is that it requires more than a simple yes or no answer. Few would argue that an active defense would not have significant military value, if just from an uncertainty perspective, but the central issue is how much. At what point does a very expensive defense by drawing national resources from other competing areas, replace enough offensive capability to damage rather than enhance deterrence? We must concern ourselves here with that theoretical point at which, given an active defense of their own, the Soviets perceive our offensive capability as sufficiently weak to warrant the risk of an attempt to break through our defenses and deliver a counterforce strike, trusting their defenses to handle a weak US response. Conversely, assuming we launched a plan to deploy a robust defense as well as to maintain a credible offense, at what point would Soviet concerns over a potential US first-strike capability cause them to launch a preemptive strike? It is these types of questions, along with considerations of the relative cost of appropriate offensive countermeasures, that must be addressed in order to decide whether the "risks of taking up shields" are indeed tolerable.[41]

The second issue, the degree to which our allies are included within the US defensive network, could become a major determinant of US effectiveness on the international scene. If our allies see us as retreating into our own secure shell, or "fortress America," they may be inclined to pursue a more neutralist or even Soviet-oriented course, isolating the United States diplomatically and militarily. Many in Europe are already concerned that the United States may be, as one commentary put it, "less careful about avoiding situations that could trigger nuclear war in Europe" or that the tremendous expenditures required for the "Star Wars" defense might "force a cutback in other areas of military spending of direct consequence to the defense of Europe."[42] Others, such as West German

Defense Minister Manfred Woerner, worry that deployment of an effective strategic defense by the United States could "decouple" the defense of Europe from that of the United States, possibly splitting the alliance.[43] However, at least theoretically, the President has included allied nations in American defense strategies. In his now legendary "Star Wars" speech, President Reagan presented a "vision" of world stability based not on the threat of nuclear retaliation but on the ability to "intercept and destroy strategic ballistic missiles before they reach our soil or that of our allies."[44] As the President is obviously aware, the prospect of extending the defense umbrella to our allies is central to maintaining viable military alliances.

By proposing a multilayered, largely space-based strategic defense, President Reagan's Strategic Defense Initiative (SDI) intensified an already existing and totally separate debate over the legality, morality, feasibility, and cost of placing weapons in space. This is the essence of the third major issue addressed earlier: can or should we place weapons, offensive or defense, in space? To a very large extent this is a question that must be answered by our political leaders. From a military viewpoint, however, the assumption must be made that the worst will occur, that weapons of all types—offensive and defensive, nuclear and nonnuclear—will eventually be deployed in the heavens and thus must be planned now. Regardless of who is most likely to initiate a space-based arms race, regardless of the attractiveness of a weapon-free space environment and the well-founded desire to avoid a new twist in an old arms race, the military leadership has no choice but to expect such an occurrence since it deals primarily in capabilities.

From a practical viewpoint, space is already militarized; military-specific surveillance and communications systems have been in orbit for quite a few years. These systems do provide significant "force enhancement" to existing terrestrial forces—improving their effectiveness by providing targeting, damage assessment, navigation/weapon guidance, military surveillance, and crucial communications functions—even though they do not have direct "force-application" capabilities. As these enhancement functions improve, however, the gap between enhancement and force application will narrow, until the practical difference between, for example, space-based guidance and the earth-based weapon it guides becomes irrelevant—one cannot function without the other.

The existence of fairly sophisticated space-based force-enhancement systems and a proven (though questionably effective) Soviet antisatellite (ASAT) weapon tend to argue that we already have at least a limited capability for combat in space. The further development and deployment of more complex systems (lasers, rail guns, ground-launched ASATs, etc.) by the United States, the USSR, or other advanced nations, if they occur, will have myriad applications—strategic, tactical, offensive, and defensive against targets in space or on earth—and thus will play an ever-increasing role in the realization of the indivisible air power concept.

What is at issue here is not the moral or political factors surrounding the decision to place actual weapons in space, but the doctrinal implications of such a decision. A major doctrinal (and organizational) problem arises when we attempt to determine the proper role of these systems. As with terrestrially based airborne systems such as the bomber or fighter, what the system is (strategic or tactical, offensive or defensive) depends on how it is being used at the time. For example, attempting to define a space-based laser weapon as strictly "strategic defensive" is akin to calling the F-15 an interceptor; while it may serve that purpose, this categorization ignores its potential for many other offensive and defensive missions. A technology such as directed energy, if proven effective and deployable as an ICBM defense weapon (and there is continuing debate on this issue), will surely have tremendous added utility in a tactical offensive mode against the adversary's satellites. By the same token, a space-based weapon designed for offensive force application against terrestrial targets—for example, a kinetic energy projectile, missile, or an advanced laser—should not be seen as being exclusively strategic or tactical since it would likely have equal applicability in both arenas. In fact, an orbital weapon could theoretically perform almost simultaneous strategic and tactical actions. Given the immense field of fire of an orbital system, the difference may just be a matter of changing the aim point a few degrees.

Therefore, any attempt to define future space-based weapons (especially those designed for offensive application against terrestrial targets) as strategic, tactical, or even theater strategic is doomed, if not to absolute failure, then to endless debate. Many of the same emerging technologies that are currently providing radical new capabilities for terrestrial forces (VHSIC, lightweight materials, terminal guidance, etc.) will also supply the foundation for new space-based systems, and will make the distinctions among our aerospace forces even more confusing to those used to the old, convenient categories.

Some proposed systems may even eliminate the distinction between airborne and space-based systems. General Marsh described one prospect, the aerospace vehicle, this way:

> The aerospace vehicle could take off, climb out of the atmosphere, and achieve a partial orbit on its way to the target; possibly even attack an enemy's low-orbit space-based assets while in orbit; reenter the atmosphere and attack a ground-based target; and leave the atmosphere again and orbit to return to its home base. Strategic missions would take about the same time that tactical missions do today.[45] [Note that General Marsh seems to equate the strategic/tactical differentiation with range to target.]

Even though the aerospace vehicle may sound fantastic, General Marsh is by no means the only advocate of such a system. One article reported that "it could serve as either a bomber or a fighter." The same source quoted Lockheed Corporation's TAV (Transatmospheric Vehicle—another name for aerospace vehicle) program manager as saying this type of system would be "primarily

engineered for high altitude weapons deployment'' but could also be ''effectively used on reconnaissance missions or as a supersonic or subsonic cargo carrier.''[46]

What will emerge if this technology comes to fruition is a system that is capable of strategic and tactical actions in both the atmosphere and in space against terrestrial or space-based targets. Needless to say, this could really confuse matters by distorting perceptions of air and space systems and their roles within the current command structure.

For all practical purposes, systems such as this will (or certainly should) complete the disintegration of traditional mission boundaries and, by their very existence, reinforce the main lesson of wartime air power application that in the more modern context, *aerospace* power is indivisible. New systems, such as the aerospace vehicle are admittedly now just promising concepts, but they are representative of a vast set of new ways to accomplish the timeless missions of aerospace power (namely, strategic offense and defense and tactical offense and defense). It is important to remember that a system such as the space shuttle—a reusable vehicle that launches like a rocket, enters orbit, and then lands like an airplane—seemed incredible not that long ago.

The President's proposal for strategic defense represents just one potential application of technology within the medium of space, and is not, current rhetoric notwithstanding, the be-all of military space operations. Political considerations will, to a large extent, determine whether we pursue this course in the mid- to far-term using some of the more exotic technologies now being discussed (space-based lasers, particle beam, kinetic impactors, etc.). For the near- to mid-term (and possibly longer), the vast improvements in weapon guidance, propulsion, and computer circuitry discussed earlier in this chapter are merging to produce surprising advances in what is generally viewed as the more traditional terrestrially based antiballistic missile (ABM) interceptor.

Recently, the United States conducted a successful test of a direct-impact ICBM interceptor. As one account reported, the interceptor was able to hit a dummy ICBM warhead ''100 miles above the earth'' at a combined closing speed of 18,000 mph.''[47] The truly spectacular aspect of the test was that the intercept required a direct hit since no explosives, nuclear or otherwise, were involved. The upshot of this discussion, regardless of current arms treaties, is that there are numerous possibilities for defensive systems, not the least of which is terrestrially based. Further, the efficacy of nonnuclear weapons in ''strategic'' roles is enhanced by this type of technology, as with the other newly proposed space and terrestrially based systems, since in earlier ABM schemes, nuclear warheads were essential due to system inaccuracies.

Doctrinally speaking, space is nothing more than a vertical extension of the traditional air environment. It does possess certain unique environmental characteristics that require special equipment and procedures; but even this is a matter of degree. For example, while the differences between the space shuttle and a C-5 might be extensive, the same is not true of the SR-71/TAV

comparison. The SR-71 operates at speeds of more than Mach 3 and at such extreme altitudes that the crew must wear essentially the same pressure suits as do astronauts. A TAV would just "fly" higher and faster. The necessity to operate outside the atmosphere and to deal with the requirements of orbital mechanics does not mean that "space vehicles" will have unique missions. (After all, the laws of aerodynamics place constraints on aircraft that do not apply to spacecraft.) The basic actions will remain the same—strategic and tactical, offense and defense. Reconnaissance and weapons systems in space operate higher than their air-breathing counterparts and therefore can cover larger areas of the earth's surface. This allows for more readily apparent multiple strategic and tactical applications; however, the same is increasingly said to be true for the more traditional air-breathing aircraft such as the F-15 or B-52. As in space, technology will enhance the ability of these aircraft to perform these roles but will not change the nature of the roles themselves. Space systems are more evolutionary than revolutionary; air, space, and aerospace vehicles are being improved by advances in the same basic technologies.

The President's SDI program, if carried out, will not embody new military concepts. It will be a system primarily intended to provide strategic defense of US and possibly allied territory. In its most advanced form, it will be nothing more than a defensive network comprised of air-breathing interceptor aircraft, ground-launched ABM interceptor missiles, and space-based surveillance and weapon systems. Many of the weapons will be new; many of the technologies incorporated within those weapons could be considered revolutionary; but what will be done with them is as old as the idea of self-defense.

Alvin Toffler, in his book *The Third Wave,* wrote:

> Old ways of thinking, old formulas, dogmas, and ideologies, no matter how cherished or how useful in the past no longer fit the facts. The world that is fast emerging from the clash of new values and technologies, new geopolitical relationships, new life-styles and modes of communication, demands wholly new ideas and analogies, classifications and concepts.[48]

Toffler was describing the effect of the new "high-tech" society on the way we will live, think, and work. The changes brought by technology will affect the profession of arms as much as, if not more than, that of medicine, law, or engineering. However, in anticipating these changes—in proposing modifications to the form, structure, and methodology of the way we do business—we must be both selective and ruthless. We must eliminate the parochialisms that foster the "parceling out" of aerospace forces into strategic or tactical, space, or terrestrial packages while retaining the doctrinal principles such as the indivisibility of *aerospace* forces proved at such great cost during America's wars.

We cannot allow the competition for scarce resources to color our perception of the best ways to accomplish our warfighting mission. In other words, "strategic" and "tactical" divisions among our aerospace forces are still there

more for bureaucratic than practical military reasons. We lump forces into convenient categories in order to achieve philosophical and, most important, monetary support for those forces. While this bureaucratic shorthand may reduce some of the complexities of the planning and budgeting maze, it also fosters false "mythologies" that eventually prevent the most effective application of aerospace forces. As a result, we see strategic forces (bombers, ballistic missiles, etc.) as nuclear; tactical forces (fighters) as conventional; and space forces as somehow different from all the rest. Parochial advocacy of strategic, tactical, or space systems leads to plans for separate, disjointed application of those systems.

The next chapter will attempt to combine the lessons of history with the advances in military technology into a doctrinal synthesis—an application of the indivisible air power concept. It will propose a global perspective for offensive and defensive forces which acknowledges that strategic and tactical are actions, not forces, and that nuclear forces are just that—nuclear—not inherently strategic or tactical.

NOTES

1. See "FY 84 CINCSAC Posture Statement," Headquarters Strategic Air Command 8 February 1984 (SECRET RD). All references are taken from unclassified paragraphs.

2. Gen Robert T. Marsh, "A Preview of the Technology Revolution," *Air Force Magazine* 67 (August 1984): 44

3. George H. Heilmeier, "Military Technology Policy: 2001," *Defense Technology 2000+*, August 1983, 7.

4. Col Dale O. Smith and Maj Gen John DeF. Barker, "Air Power Indivisible," *Air University Quarterly Review* 4, no. 2 (Fall 1950): 7.

Brig Gen John E. Ralph discussed the flexibility of "tactical forces" in 1975. In discussing the missions assigned to tactical forces (tactical air reconnaissance, counterair interdiction, air interdiction, and close air support), he wrote, "Despite efforts to be precise these definitions overlap considerably. Tactical interdiction targets could also be strategic targets. Close air support, counterair, and armed reconnaissance forces have on various occasions, accomplished what could be termed interdiction missions. The same crew in the same aircraft may fly one sortie as counterair, the next as close support, and another as interdiction." These astute observations certainly point out the flexibility of fighter or "theater range" forces but do not go quite far enough. The forces are still defined as tactical even though he acknowledges the potential for strategic action. See John E. Ralph, "Tactical Air Systems and the New Technologies," in *The Other Arms Race: New Technologies and Non-Nuclear Conflict*, Geoffrey Kemp, Robert L. Pfaltzgraff, Jr, and Uri Raanan, eds. (Toronto and London: Lexington Books, 1975), 19.

5. Weinberger was quoted in Edgar Ulsamer's article "The New Five-Year Defense Plan," *Air Force Magazine* 67 (April 1984): 81.

6. Johannes Steinhoff, "The Scope and Direction of New Conventional Weapons Technology," *New Conventional Weapons and East-West Security*, Part I, Adelphi Papers, no. 144 (London: The International Institute for Strategic Studies, 1978): 16.

7. See Daniel K. Malone, "A Realistic Conventional Deterrent," *National Defense* 67, no. 379 (July–August 1982): 53.

8. For a more detailed discussion of the nuclear winter phenomenon, see Carl Sagan, "Nuclear War and Climatic Catastrophe: Some Policy Implications," *Foreign Affairs* 62 (Winter 1983–1984): 257–92.

9. See *Report of the Secretary of Defense Caspar W. Weinberger to the Congress on the FY 1984 Budget, FY 1985 Authorization Request and FY 1984–88 Defense Programs* (Washington, D.C.: US Government Printing Office, 1 February 1983), 21.

10. *Report of the Secretary of Defense Caspar W. Weinberger to the Congress on the FY 1985 Budget, FY 1986 Authorization Request and FY 1985–89 Defense Programs* (Washington, D.C.: US Government Printing Office, 1 February 1984), 20.

11. John W. R. Taylor, "Jane's Aerospace Survey 1985," *Air Force Magazine* 68, no. 1 (January 1985): 66.

12. For a discussion of "smart weapon" proliferation, see Paul F. Walker and James C. Mihori, "Smart Weapons and Warfare: Facing Up to Hi-Tech Vulnerability," *Environment* 26, no. 6 (July–August 1984): 38–39.

13. Ibid., 39.

14. Charles A. Sorrels reports that in 1981 a Tomahawk cruise missile flew a test course of 300 miles to "hit a target the size of a small three-story building, using a terminal guidance system with an optical sensor." This equates, according to Sorrels, to an accuracy of about 30 feet. See Charles A. Sorrels, *US Cruise Missile Programs: Development, Deployment and Implications for Arms Control* (New York: McGraw-Hill, 1983), 103.

A 1983 newspaper article stated that currently deployed nuclear air-launched cruise missiles are capable of "flying at low altitude for 1,500 miles" and are "believed capable of striking within 200 yards of their targets." This is also somewhat remarkable considering the distance traveled, the age of the technology (early- to mid-1970s), and the fact that no terminal guidance is used. (Two hundred yards is quite adequate for most targets with a nuclear weapon.) See Rudy Abramson, "Cruise Missile Called a Revolutionary Weapon," in the *Los Angeles Times*. This article was run in the *Omaha Sunday World–Herald*, 23 January 1983, 12-A.

15. William Perry was quoted in Michael T. Klare, "The Conventional Weapons Fallacy," *The Nation* 236 (9 April 1983): 439.

16. Carl H. Builder, *Strategic Conflict Without Nuclear Weapons*, prepared for the Ford Foundation by the Rand Corporation, April 1983, 43.

17. Dr Fred Charles Ikle, "Strategic Principles of the Reagan Administration," *Strategic Review* 11 (Fall 1983): 13–18.

Former Under Secretary of Defense for Policy and former Advisor to the Secretary of Defense for NATO Affairs Robert W. Komer wrote, "While deterrence remains NATO's overriding aim, the advent of nuclear stalemate has engendered a growing recognition that nuclear deterrence-on-the-cheap (even cheaper for the Europeans) is eroding in credibility." He continues to say that public concern "about nuclear devastation" is resulting in "a renaissance of interest in conventional deterrence, particularly since the gap between Warsaw Pact and NATO conventional (including chemical) capabilities is far wider than that in nuclear capabilities." See Robert W. Komer, "A Credible Conventional Option: Can NATO Afford It?" *Strategic Review* 12 (Spring 1984): 34.

18. Builder, *Strategic Conflict*, v.

19. Ibid., 20.

20. "FY 84 CINCSAC Posture Statement," (SECRET RD), 72–73. Taken from an unclassified paragraph.

21. Klare, "The Conventional Weapons Fallacy," 440.

22. Mark Hewish, "Attacking Targets Beyond the FEBA," *International Defense Review* 17, no. 8 (1984): 1053–54.

23. Manfred Woerner was quoted in Gerald F. Seib's article "NATO Hopes to Curb Nuclear Peril by Using 'High Tech' Devices," in the *Wall Street Journal*, 5 June 1984, 1.

24. Robert S. McNamara, "The Military Role of Nuclear Weapons: Perceptions and Misperceptions," *Foreign Affairs* 62 (Fall 1983): 79.

25. Strobe Talbott, "Upsetting a Delicate Balance," *Time* 125 (11 March 1985): 15.

26. General Rogers was quoted in James W. Canon, "NATO on the Upbeat," *Air Force Magazine* 67 (September 1984): 134.

27. Ibid., 134–39.

28. Builder, *Strategic Conflict*, 2–3.

29. George A. Keyworth, "Technology and the Nuclear Treadmill," *Air Force Magazine* 67 (November 1984): 127.

Dr Keyworth goes on to discuss the major factors that will foster a "major shift in the way we think about nuclear weapons." The first factor is arms control and the increasing public awareness of the need to break away from nuclear stalemate to achieve agreement. The United States and the Soviet Union see nuclear weapons in different ways. "The central stumbling block is the difficulty of coming up with a formula that suits both sides." The second factor involves advances in nuclear technology. The once-secure Triad is becoming increasingly vulnerable to nuclear attack. (Both

bombers and ICBMs already are, according to Keyworth—and it's just a matter of time for submarines.) The stability produced by invulnerable nuclear weapons is disappearing. The third factor concerns the advances in nonnuclear technology. The day is coming when we can achieve strategic and tactical objectives using nonnuclear weapons. This will allow us to get off the "nuclear treadmill." See page 128.

30. Admiral Gayler was quoted in "Debating the Role of Nonstrategic Nuclear Weapons" (a discussion with Ambassador Jonathon Dean, Dr Sidney Drell, Adm Noel Gayler, and Dr Peter Sharfman), in *Environment* 26, no. 6 (July–August 1984): 11.

31. Ibid., 9.

32. Richard K. Betts, "Conventional Deterrence: Predictive Uncertainty and Policy Confidence," *World Politics* 37, no. 2 (2 January 1985): 154.

33. Mary Kaldor, "Technology and the Arms Race," *The Nation* 236 (9 April 1983): 420.

34. Marsh, "A Preview of the Technology Revolution," 47.

35. Kaldor, "Technology and the Arms Race," 420.

36. Michael T. Klare writes that "with the advent of 'near-nuclear' weapons—conventional munitions with the destructive potential of tactical nuclear warheads—the critical 'firebreak' between nuclear and conventional weaponry may disappear altogether." See Klare, "The Conventional Weapons Fallacy," 438.

37. Builder, *Strategic Conflict,* 11.

38. Colin S. Gray, "What Deters? The Ability to Wage Nuclear War," in *American Defense Policy,* 5th ed., John F. Reichart and Steven R. Sturm, eds. (Baltimore and London: Johns Hopkins University Press, 1982), 172.

39. Interview with Marshal Nikolai V. Ogarkov in *Krasnaya Zvezda (Red Star),* 9 May 1984, 2–3.

40. See "Reagan for the Defense," *Time* 121 (4 April 1983): 9. The article is a good discussion of the major objections to the President's plans for a space-based strategic defense. Also see Strobe Talbott, "The Risks of Taking Up Shields," ibid., 20–21.

41. Quoted phrase is from Strobe Talbott's article of the same name, "The Risks of Taking Up Shields."

42. Quoted from "'Star Wars': Misgivings in Bonn," in the *Los Angeles Times,* 15 April 1984, 17.

Also see "Reagan for the Defense," 14; and Hubertus G. Hoffman, "A Missile Defense for Europe?" *Strategic Review* 12, no. 3 (Summer 1984): 45–54, for a discussion of European concerns.

43. Hoffman, "A Missile Defense for Europe?" 47.

44. See *New York Times,* 24 March 1983, 20.

45. Marsh, "A Preview of the Technology Revolution," 47–48.

46. See James W. Canan's discussion of the aerospace vehicle (TAV–Transatmospheric Vehicle in this article) in "Bold New Missions in Space," 88–91.

See also Alton K. Marsh, "USAF Studies Transatmospheric Vehicle" in *Aviation Week & Space Technology* 119 (7 November 1983): 44–45.

47. See "Bull's-Eye in Space," *Time* 123 (25 June 1984): 28. Also see Clarence A. Robinson, Jr, "BMD Homing Interceptor Destroys Reentry Vehicle," *Aviation Week & Space Technology* 120 (18 June 1984): 19–20.

48. Alvin Toffler, *The Third Wave* (New York: Bantam Books, 1980), 2.

CHAPTER 4

APPLYING THE LESSONS: CHANGING AEROSPACE DOCTRINE

Gen B. L. Davis, commander in chief of Strategic Air Command, wrote in 1984:

> Indivisible air power is not a new concept. In combat, the need to get the most from each air power asset has regularly forced us to set aside artificial restrictions on how we employ our weapons. Until recently, however, in peacetime we have tended to disregard valuable wartime lessons about the optimum application of air power.[1]

The need to apply aerospace power in an optimum fashion—in such a way as to get the most from costly equipment—has received increased emphasis recently, as evidenced by General Davis' comments. The indivisible air power concept is not something that was briefly discussed just after World War II and forgotten; it may have been misplaced for a while, but it was not a flash in the pan. It is a living idea that is becoming more relevant as we recognize the need for flexible military forces that can deter war on any level by possessing visible capabilities on any level.

The US Air Force is currently in the midst of incorporating the indivisible air power concept into its active doctrinal statements. As General Davis said, and as discussed in chapter 2, the concept is certainly not new, but it must be brought into the forefront of current air power doctrine. We have had a tendency between wars to forget the lessons of war and to allow bureaucratic momentum ("strategic and tactical" organizations) to replace historical precedent and dictate the military planning process. Within this organizational aberration, strategic forces compete with tactical forces for budgetary consideration; and frequently, because of traditional associations, this means nuclear versus conventional. We have, to a large extent, failed to recognize or have been unwilling to take advantage of the interdependence and interoperability of strategic and tactical forces. However, we are now taking the first of the many

steps necessary to revise our thinking and to assure that our forces are employed in the most effective manner in the future.

The Importance of Actions

The most recent edition of Air Force basic doctrine, Air Force Manual (AFM) 1–1, *Basic Aerospace Doctrine of the United States Air Force,* states that an air commander's "guiding principle is to employ aerospace power as an indivisible entity based on objectives, threats, and opportunities."[2] This places the indivisible air power concept at the very center of modern air power thinking. This manual does not identify a command or weapon with any particular mission or role, but instead stresses the need for flexibility and the optimum application of all available forces. The terms "strategic" and "tactical" are identified by AFM 1–1 as actions required, not forces employed, and nowhere are nuclear weapons associated with a particular aircraft or type of action. These crucial definitions state that

> strategic actions normally involve attacks against the vital elements of an enemy's war sustaining capabilities and his will to wage war.
>
> Tactical actions are battle-related and normally urgent actions conducted against an enemy's massed or deployed forces, his lines of communication, and his command and control structures used to employ forces.[3]

The manual goes on to discuss the relationship between strategic and tactical actions and the aerospace forces that accomplish them:

> Strategic and tactical actions are not necessarily tied to specific geographic areas, operating environments, or types of vehicles. An air commander may employ any or all of his assigned forces to produce integrated strategic and tactical effects to support the overall objective.[4]

Thus, the new manual ignores the traditional strategic and tactical, terrestrial and space compartmentalizations and emphasizes the inherent flexibility of aerospace forces to accomplish a multifaceted mission. According to this theory, there are no inherently strategic or tactical weapons, just strategic and tactical actions that can be accomplished in numerous ways by a variety of weapon combinations. It is what is done with an aircraft, missile, or space system that is important to this determination, not how far it goes, how big it is, or even the size of its payload.

For example, the B-52 bomber has, since its first flight in 1952, been considered a strategic asset. According to traditional nuclear-era thinking this was because it could carry nuclear weapons over intercontinental distances. The fact that its primary target has been the Soviet Union, a very distant and similarly armed adversary, adds to the "strategic mystique." Gen Curtis LeMay's dream

of "a strategic atomic striking force capable of attacking any target in Eurasia from bases in the United States" became a reality in the 1950s with the deployment of intercontinental bombers such as the B-36 and B-52.[5] These were seen as truly strategic assets assigned to the *Strategic* Air Command. Of course, the mission of such a command would be to be prepared to conduct strategic nuclear warfare against our primary antagonist, the Soviet Union. Essentially, with the emergence of massive retaliation, US military planning reverted back to the pre-World War II style theories of the dominance of strategic bombardment.

The B-52 was in fact a strategic weapon simply because that was the only way we planned to apply it. We forgot, in our admittedly justifiable haste to reduce military spending and prevent nuclear war, that it is the ability to engage in warfare, nuclear and conventional, that prevents it. However, during the 1950s and early 1960s we built an Air Force that could not fight a conventional war because its training and equipment were designed for nuclear war. Our bombers, large numbers of our fighters, and later our missiles became the backbone of nuclear deterrence at the expense of the requirement for a flexible, well-rounded Air Force documented so painfully during World War II and Korea. It took another war, this time in Vietnam, to teach those lessons one more time.

Gen William W. Momyer in writing about the early years of US involvement in Vietnam wrote:

> With the war moving toward higher levels of violence, the tactical Air Forces in the United States were rapidly being trained and equipped for conventional actions. Since the Korean war, relatively little attention had been given to refining or building non-nuclear weapons or to training aircrews for delivery of non-nuclear weapons.[6]

Thus, by the early- to mid-1960s, the nuclear imperative had become so pervasive that neither our fighters nor bombers were equipped or trained to fight a conventional war. Once again, as in World War II and Korea, we were forced to abandon prewar concepts because of real-world wartime requirements. In the case of Korea and especially Vietnam, we should have known better, but we succumbed to the lure of nuclear deterrence—the hope that we could prevent all wars by relying on a comparatively cheap arsenal of both "strategic" and "tactical" nuclear weapons.

Today, after the military and political agonies of the Vietnam War and with an ever-increasing demand for the reduction of the world's arsenal of nuclear weapons, the American defense establishment is attempting to provide a doctrinal foundation for the development of future weapons and the training of future personnel. For the Air Force, this means returning to the proven principle of flexibility. Weapons can no longer be bound up in neat strategic or tactical packages or reserved exclusively for nuclear or conventional confrontation.

AFM 1–1 attempts to reduce this system orientation by first defining strategic and tactical actions and then discussing the need for offensive and defensive actions.[7] The manual goes on to describe the nine basic missions that aerospace

power must be prepared to accomplish.[8] These aerospace missions are not divided among the various weapon systems (fighters, bombers, interceptors, etc.) or the existing air commands (Strategic Air Command, Tactical Air Command, Military Airlift Command, etc.) but are to be accomplished by a flexible aerospace force. As General Vandenberg pointed out, there is no "strategic or tactical Army or Navy."[9] The same should apply to air power.

Current doctrine as outlined in AFM 1–1 recognizes four basic military actions: strategic offense, strategic defense, tactical offense, and tactical defense. The nine aerospace missions can all be placed in at least one of the four action categories. For instance, counterair, generally considered a tactical action, can be either offensive or defensive and can be accomplished by an F-16, F-111, or B-52. Which system is chosen is purely an operational determination dictated by such factors as forces available, range to target, expected defenses, and weapon reliability. Who "owns" the various systems considered is irrelevant.

The common perception of modern aerospace power is depicted by figure 1. In this simplified view, the four basic military actions—strategic offense and defense and tactical offense and defense—are presented in matrix form. The "traditional" view of air power application (strategic = nuclear = bomber and tactical = fighter = conventional) is then imposed on the matrix. In this approach the mission of combat aircraft is directly associated with a particular action or actions. (In the case of the "tactical" mission, fighters perform both offense and defense.)

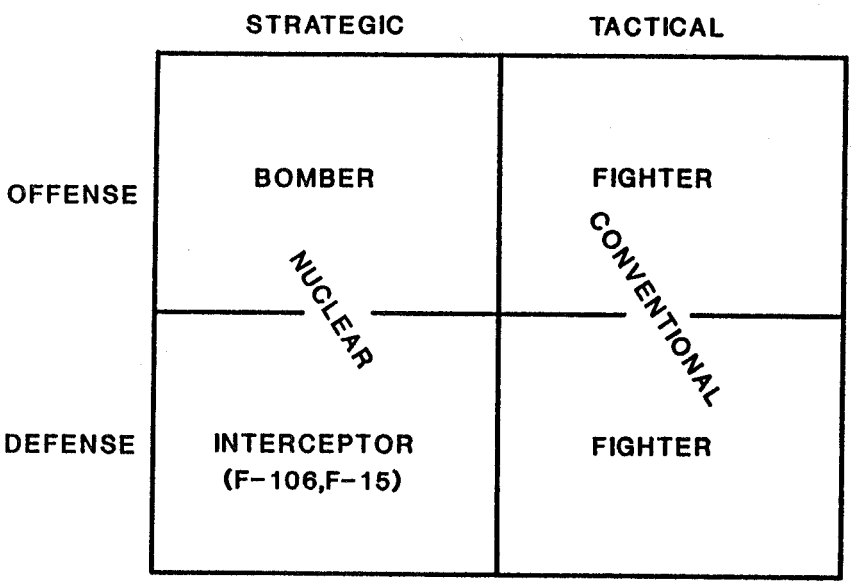


Figure 1. Military Actions: The Traditional View.

It must be emphasized at this point that the distinctions between roles and missions depicted in figure 1 do not represent established doctrine, nor are they intended to represent an official view of either civilian or military leadership as a whole. What they do represent is a sort of unofficial consensus or military folklore that has been reinforced by years of association and nuclear confrontation. The danger of this perception, which began with the theory of massive retaliation in the 1950s, is that like some literary folklore it can become confused with reality. An excellent example of this phenomenon is contained in a passage from W. Hays Parks' article on air power in the Vietnam War, "Rolling Thunder and the Law of War." In discussing the purpose and conduct of the 43-month bombing campaign against North Vietnam, Parks wrote:

> Nuclear weapons would not be used; targets in populated areas would not be attacked. Tactical rather than strategic assets would be used to emphasize the limited nature of the campaign.[10]

Another author wrote in the same context that

> the strategic deterrent role restricted all facets of B-52 employment in Vietnam. Until quite late in the war, B-52s were not sent over North Vietnam because of the potential repercussions, both tactical and political, if one were lost. General Momyer, commander of 7th Air Force in Vietnam from 1966 to 1968 and later commander of Tactical Air Command, pointed out that US civilian leadership was concerned "about the effect losing even a single aircraft would have on the image of our strategic deterrent."[11] [Note again that "strategic" appears as synonymous with nuclear.]

It appears then that "strategic assets" were excluded from this campaign because the connection between our B-52 fleet and nuclear weapons (or at least "strategic destruction") had become so strong as to preclude even their consideration for a nonnuclear effort against the enemy's homeland. Even those who advocated a strictly strategic role for these aircraft were put off by this decision. The mythology of military application had in fact become confused with reality, a situation that would not be remedied until the Linebacker air campaign against the North seven years later.

In contrast to the traditional perspective, figure 2 presents the integrated view of air power application. In this diagram, strategic and tactical offense and defense still describe the basic aerospace missions; however, in this view, the boundary between the roles of traditionally strategic and tactical systems (bombers and fighters in this representation) is not well defined. Instead, there is an area of integrated application between the historic functions of these systems in which either aircraft type can perform either strategic or tactical actions. This "gray area" represents the previously discussed naval air strategic effort against Japan, the B-17 and B-24 carpet bombing campaign in support of the Normandy invasion, and the combined bomber/escort fighter air superiority struggle over Germany. This perspective acknowledges both the necessity of bombers and

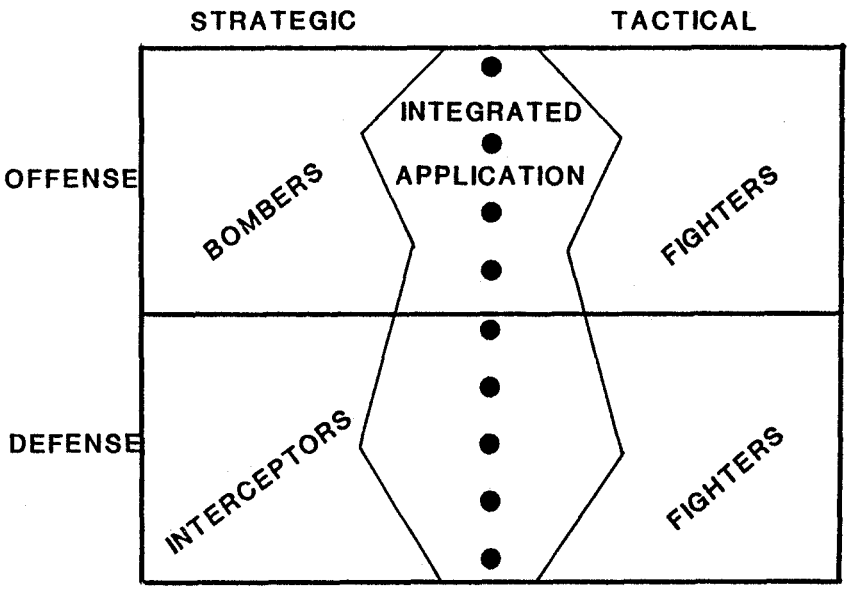


Figure 2. Integrated Application.

fighters (and missiles and space systems) in their traditional strategic or tactical roles and also the historic requirement for flexibility in air power application.

The nuclear/conventional argument is obviously missing from this discussion simply because it is irrelevant for our purposes. Nuclear weapons are not the exclusive domain of any system—bombers, fighters, or ICBMs—and can be used for both strategic or tactical actions. This does not presume to lessen the impact of using or threatening to use nuclear weapons, but implies that the devastation caused by their use should not blind military planners and political leaders to the inherent flexibility of the means of delivery—including the most "nuclear" of all aerospace systems, the ballistic missile.

The world's military arsenal is overflowing with nonnuclear missiles—theater, tactical, short-range, medium-range, cruise, and ballistic. But somehow, to suggest that an ICBM could be nonnuclear is heresy. It is nothing more than another delivery system that should not be automatically and irrevocably limited to nuclear delivery.

In the future, the area of integrated application will no doubt grow as technology provides increasingly accurate and efficient nonnuclear and nuclear weapons. As air-launched cruise missiles and ICBMs increase their range and accuracy, as aircraft become lighter, faster, and more fuel efficient, and as space-based systems play an increasing military role, the difference between what were considered strategic and tactical systems will be almost indistinguishable—unless, of course, the distinctions are artificially maintained.

The Global Perspective

In addition to recognizing the nature of and necessity for an indivisible approach to aerospace power application as presented thus far, we must appreciate the global nature of aerospace power. In a modern "hi-tech" environment, it is not enough to admit that particular systems can and do perform numerous tasks. We must also acknowledge that aerospace forces are not now strictly theater assets and will be even less so in the future. To artificially restrict our forces to particular geographic boundaries is as potentially damaging to effective wartime employment as the superficial strategic or tactical labels we tend to place on them. Gen Russell Dougherty (USAF Retired) former CINCSAC, wrote in a recent article:

> The nation that best masters aerospace technology—and can demonstrate that mastery to command, defend, and control global access—has the upper hand in deterring actions that threaten its security and interests, and thus is the one best able to assert its global power efficiently without using it at all.[12]

Flexibility and extended range have always been the hallmarks of air power; however, we have at times artificially restricted the full utilization of those attributes. During World War II, after considerable high-level debate fostered by considerable German success against American air power in North Africa, the decision was made that air forces should be under separate command. This meant, as Gen James Ferguson put it, that air power should not be seen as just another "corps of the Army and considered as an extension of the field artillery."[13] It was necessary to form air component commands under the overall control of the theater commander rather than assign air power resources to ground force division and corps commanders. Combat experience dictated that in order to meet the myriad demands for available forces and take maximum advantage of air power flexibility and range, a theater perspective rather than a narrow division or corps front perspective had to prevail. In order to defeat the Luftwaffe and respond to the ground threat, air power had to be managed from a macroperspective and could not be parceled out among various ground commanders.[14]

Today, a need is arising for another change of aerospace perspective not unlike that created by the realities of air combat in North Africa during World War II. In this case, however, instead of parceling aerospace assets out among the various theater commanders, we are increasingly developing the capacity for global power projection and application. Therefore, a purely theater force today can be compared to the air assets assigned to the ground commanders in North Africa during World War II. Our global-range bomber aircraft such as the B-52

and B-1B are already capable of both nuclear and conventional, strategic or tactical actions worldwide, and in fact are the subject of numerous contingency plans in every United States theater command. As air-refueling aircraft are improved and made more available, and as advanced "theater" systems such as the F-16XL (or its derivative) are produced with greatly extended range and improved payload capability, our ability to operate on an intertheater scale will dramatically increase.[15] As space-based systems from the more traditional force-enhancement and support roles to the more exotic future force-application and space-control weapons perform increasingly larger and more complex military functions, traditional theater boundaries will become much less meaningful than they are today.

This should not be construed as advocating dismemberment of existing theater commands but rather as an argument for a change in perspective, a lessening of command biases. We will always need theater organizations that are familiar with the specific military, climatic, cultural, and geographic features of particular regions such as Europe, Latin America, and the Middle East and that are ready to immediately confront challenges in their areas. However, forces nominally assigned to one theater will increasingly be required to be prepared to operate in others. As the cost of military technology rises there will be fewer weapons to cover the same areas and accomplish the same tasks as today. However, the weapons we will have *should* be qualitatively better and more capable of global rather than purely theater orientation.

In the final analysis, then, the indivisible air power concept encompasses requirements for both a global perspective and the integration of "strategic" and "tactical" forces. It upholds the principle of unity of command while insisting on a broad view of the responsibilities and capabilities of aerospace power, and it advocates the application of technology to current problems while avoiding a myopic approach to a "gadget force."

Unfortunately, the need for quick reaction to selected threats and for in-depth knowledge of particular geographical regions (characteristic of theater commands) conflicts with the realities of scarce resources and the expanding reach and flexibility of global aerospace forces. Examples of this conflict include the debates over the command of SAC's long-range combat aircraft during regional conflict and the Navy's carrier battle groups under the same circumstances. Multiple and conflicting demands for certain scarce assets such as the B-52 (which is committed to the nuclear SIOP as well as to numerous nonnuclear theater contingencies) require that these assets be under overall central command while at the same time acknowledging the need for theater tasking of those assets when necessary.

The same kinds of conflicts will arise—and already have arisen to some extent—over the command and control of limited space systems, especially if and when more specialized space weaponry is deployed. The requirements for US homeland and allied defense if an SDI-type defense is deployed could result in numerous conflicts over very limited and potentially costly systems. The

global nature of our long-range combat and airlift aviation and our space-based assets demands that they be applied from a macroperspective that takes both unified theater and specified global requirements into account. In other words, a requirement for strategic and tactical capabilities exists in both global and theater forces simultaneously. Global commitments are demanding increasingly more from limited military resources.[16]

Aerospace doctrine and strategy must complement national security policy and provide a central foundation for employment planning. The following pages will suggest a theoretical foundation for such a doctrine. It is firmly based on the precepts of current US Air Force doctrine (AFM 1–1) and draws on the historical requirement for a flexible, indivisible approach to air power application. This discussion is more an attempt to change prevailing attitudes and perceptions rather than weapons and organizations, although it will propose some changes that are contrary to currently accepted arrangements. While upholding the principle of unity of command, it will insist on an overall global approach that uses existing and emerging long-range forces to both reinforce theater assets and act independently to accomplish strategic and tactical actions.

Proposals for the Future: A Doctrinal Synthesis

> National safety would be endangered by an Air Force whose doctrines and techniques are tied solely on the equipment and processes of the moment. Present equipment is but a step in progress, and any Air Force which does not keep its doctrines ahead of its equipment, and its vision far into the future, can only delude the nation into a false sense of security.[17]
>
> Gen H. H. "Hap" Arnold, 1945

We have now discussed at some length how the hard lessons of war and the advances of technology are requiring a shift of doctrinal emphasis from a strategic/tactical to an indivisible perspective. Thus far, this chapter has addressed the current approach to the indivisible air power concept and the need for a global rather than narrow theater perspective. Now we turn to fulfilling General Arnold's prescription for a robust air power structure—a doctrinal vision of the future. In this section we will attempt to suggest a means of resolving the conflicting theater/global demands of aerospace force application discussed earlier and will hopefully make at least the first difficult steps toward synthesizing a prescriptive view of aerospace doctrine.

The three basic assumptions (developed by previous discussion) of this approach are:

1. Aerospace power (not "air" or "space" power) is indivisible. Its elements are not inherently strategic or tactical, nuclear or conventional, but are capable of a large variety of strategic or tactical actions. How each system is used should be determined by the capabilities of the system (weapon + carrier) as matched to the requirements of the mission.

2. Aerospace power, because of its increasingly global nature, will require a command and control philosophy and structure that enhances its changing nature. Both central and theater planners must develop a global perspective toward aerospace operations.

3. Technology in the form of such advances as improved standoff weapons; faster, longer range aircraft; smaller, faster, more capable circuitry; and emerging low radar reflective (stealth) materials and techniques is providing the capability of a truly indivisible aerospace force that can accomplish short notice strategic or tactical, nuclear or conventional actions worldwide.

This "proposal for the future" envisions the utilization and expansion of intercontinental-range aerospace forces (B-52, B-1B, space systems, ICBMs) into global offensive and defensive commands that would operate independently (for example, to defend the United States or strike Soviet strategic targets) and also would provide vital tactical and strategic support to theater commanders. These commands would take full advantage of the inherent flexibility of our long-range aerospace forces to accomplish strategic and tactical offensive and defensive actions.

Under this concept all aerospace weapons, regardless of type or unit of assignment, would be placed into one of three categories depending on how they were being used at the time (fig. 3):

1. Central systems. Those forces such as long-range combat aircraft, ICBMs, or space-based weapons that are employed at the direction of the national command authorities (NCA) or JCS to respond to conflict (nuclear or conventional) worldwide.

2. Deployed central systems. Those forces that are assigned from central systems for strategic or tactical offensive and defensive actions at the direction of the theater commander as tasked by the NCA, JCS, or the theater commander.

3. Theater systems. Other force elements assigned to the theater air commander and generally stationed within the geographic boundaries of the theater command for strategic and tactical offensive and defensive actions (those forces not normally considered central or global systems).

The proposed global offensive and defensive commands would manage and command those forces associated with categories 1 and 2 while theater air component commanders would maintain command of the third grouping and would attain at least tasking authority for the deployed central systems assigned to them during wartime/crisis. Figure 3 demonstrates this relationship among our forces and command organizations. Although it addresses only the offensive half of the equation, the relationships are the same—with only some of the weapon systems being different—for the defense. This proposal stresses the application of aerospace forces according to their capabilities and the elimination of the rigid strategic and tactical stereotypes.

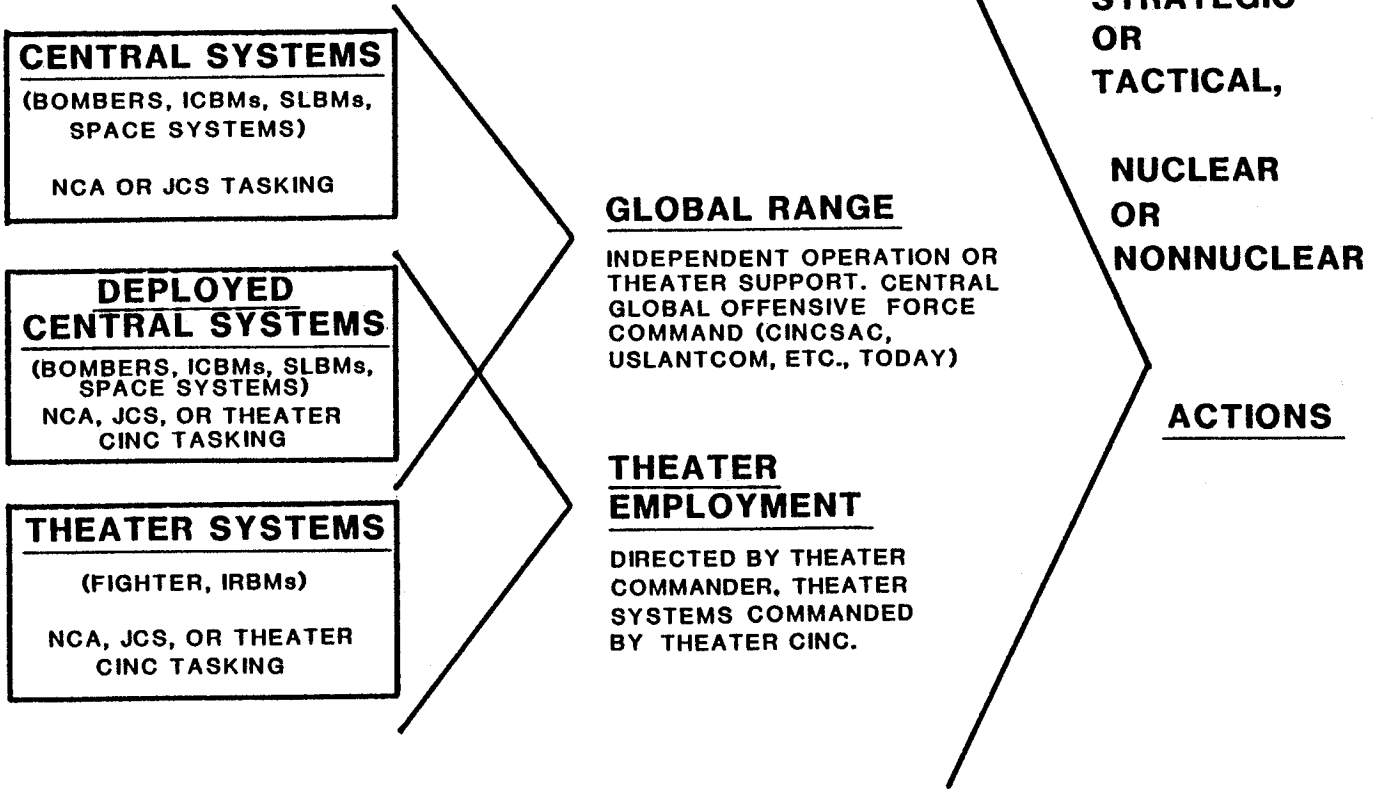


Figure 3. Aerospace System Employment.

These global commands are not all that far from reality even now. Strategic Air Command already possesses all of the US Air Force's long-range offensive firepower (nuclear and a fast-growing nonnuclear capability). What remains is to stress the indivisible nature of those forces and their inherent ability to provide tactical as well as strategic firepower (as enhanced by recent advances in both weapon and aircraft technology). Essentially, then, SAC is already a global offensive command. It (or its successor) must in the future possess the advanced systems, including any future space-based offensive forces, that will allow it to provide required global offensive capabilities. Of course, the name "Strategic Air Command" may have to change since the organization's charter will encompass more than just strategic actions, but this is (or should be) a minor matter.

The defensive half of this global capability does not seem to have quite as clear an antecedent. As discussed in chapter 3, the President has initiated a quest for a national (strategic) defensive capability. The point was also made that allied pressure and fear of "fortress America" may force the expansion of such a system, if developed, to cover more than US soil.

If it is eventually proven that space-based weapon systems can provide a reasonably effective defense against missiles, and possibly aircraft, the same structure built to provide strategic defense for the United States could conceivably provide comparable strategic and tactical capabilities for theater commanders. In fact, a theater-based antitactical missile (ATM)—antistrategic to most Europeans—has already been discussed and, if approved, is not far from deployment. Eventually, this system could provide basic point defense of US targets and become an element of our theater defensive systems.[18] The more advanced and quantitatively limited SDI systems could then be assigned to the global defense organization, very possibly a direct descendant of the current North American Air Defense Command (NORAD), that would be responsible for providing forces for the defense of both the United States itself and theater commands. As with their offensive counterpart, these forces would be classified as central or deployed central depending on how they were assigned at the time.

A major reason for the development of this global offense and defense structure is the cost/demand factor. Major global weapons such as the B-1B, Advanced Technology Bomber (ATB—"Stealth"), or space-based offensive and defensive weapons are so expensive as to prohibit the production of enough systems to satisfy the force structure demands of all potential users—unless, of course, we made the decision to rely exclusively on these forces for our aerospace force structure. This decision would undoubtedly prove to be a grave error, as was our decision during the 1950s to rely almost totally on "strategic" nuclear and "strategic" defensive forces. As with the World War II decisions to macromanage air power in order to meet the entire air and ground threat, there must be a central structure for applying vital global resources to effectively meet the greatest threats in today's world, regardless of location.

The nuclear nemesis also plays into this discussion. The majority, if not all, of the systems assigned to these global commands would play a crucial role in both nuclear and nonnuclear conflict. Chapters 2 and 3 of this paper stressed the indivisible nature of aerospace forces by stating in part that virtually no system, including bombers and missiles, could or should be considered as exclusively either nuclear or conventional. However, the realities of a nuclear-armed world require integrated application of nuclear capable systems into structures such as the SIOP and will likely require a similar structure for those US forces designated for defense against Soviet nuclear weapons. The deterrence of nuclear warfare (strategic, theater strategic, or tactical) requires nothing less than a visible capability to conclude such a conflict on favorable terms.[19] The dilution of our long-range nuclear offensive forces and our strategic defense into permanent theater packets does not project this kind of capability.

At the same time, to ignore the increasing potential of these force elements for nonnuclear tasking would be tantamount to a major force structure reduction for our theater commanders. As discussed earlier, the Soviet Union does not present the only threat to US and allied security. The varied and dispersed nature of potential military threats makes the availability of rapid-response, global-range forces an important element of our overall military capability. As one senior Defense Department officer wrote in discussing the need for nonnuclear bomber forces:

> Without a strong, rapid-response conventional force that has credibility, and the resolve to use it, the United States can have very little impact on many of the world's potential trouble spots which are critical to our national interest.[20]

If the United States and its allies are indeed serious about constraining Soviet expansion, but are not able or willing to quantitatively match Soviet and Warsaw Pact military forces, then we must begin to incorporate our global-range forces into our military plans in a major way. It is highly unlikely that NATO, the most powerful of the alliances, will ever be able to match the sheer size of the Warsaw Pact military establishment. To make matters worse, the alliance is finding it increasingly difficult to maintain the qualitative edge it has relied on for so long to deter Soviet aggression. But, as suggested by the quote above, threats to US security and interests are global, not just in Europe, and they come from sources other than just the Soviet Union.

Continuing turmoil in the Persian Gulf area, Lebanon, Central America, the Philippines, and Southeast Asia, along with the direct Soviet involvement in Afghanistan and new challenges in the Caribbean (e.g., Grenada), gives rise to serious concerns about US ability to "cover all the bases" and still maintain a strong presence in some of the more traditional hot spots such as Europe (plagued by persistent unrest in Poland and increasing terrorist activity) and Korea ("hot" since World War II). In order to deal with an ever-increasing list of contingencies and increasingly well-armed potential adversaries (superpower

or third world), our air power must be applied from a global, indivisible perspective. Simply put, our highly capable theater-based F-15s and F-16s or carrier-based F-14s and F-18s can have little impact in the Persian Gulf if they are in Europe or even in the Mediterranean. While it is true that these forces can be redeployed (and indeed are highly trained for such operations), redeployment requires time, landing and basing rights, aerial refueling and possibly numerous defense and support vessels, and most likely the ability to shift forces from one theater to another. The problem is that while all this is occurring and a proper command structure is being formed, an aggressor is consolidating his position and building up a much-needed supply base. The best way to illustrate the merits of global aerospace power in such a context is through the use of a recent example.

The Falklands: A Global Scenario

An admittedly somewhat overused but still highly relevant example of the necessity for quick-response, global-range forces is the 1982 Falkland Islands conflict during which the United Kingdom, equipped primarily for conflict in Europe, was required to project a sizeable combat force 8,000 miles to the extreme South Atlantic. This long-range "dust up" proved at least three points that are germane to this discussion: (1) Even an emerging third world military power, with enough nerve and a few advanced weapons can be a deadly foe; (2) a nation that neglects its ability to project military power over long distances in a timely manner cannot retain claim to global power status; and (3) aerospace power is crucial to such an endeavor.

British losses during the campaign bear ample witness to both the determination and deadlines of Argentine forces, especially their air power: 255 dead, 777 wounded; 6 ships sunk and 10 others "more or less badly damaged."[21] This is not meant to belittle the British effort; it was, considering the availability and disposition of forces, a brilliantly planned and executed operation requiring tremendous military expertise and ingenuity. While the British did achieve their goals, the margin of success was frightfully narrow.

A major shortfall in British capability was in the ability to rapidly project offensive power. It required 10 days for the first military element, the submarine *Spartan,* to reach the Falklands and 27 days for the first fleet elements to arrive on station (a remarkable feat in itself).[22] Not until 1 May, one month after the invasion, was long-range air power used; a single British Vulcan bomber struck the Port Stanley airfield, as one account put it, "serving notice on the Argentines that the airfield and any resources that the Argentines might seek to deploy there were at risk from long-range air power deployed on a secure base well outside the theater of operations."[23]

The Falklands battle was the spark for numerous lingering controversies, primarily over the response capability and vulnerability of large naval surface forces and major capital vessels such as modern aircraft carriers.[24] This discussion does not address the details of such matters except to emphasize that it requires *time* to deploy major military forces over the distances involved in operations such as the Falklands. A carrier battle group can provide excellent theater force capability once it is in range; a US Air Force F-16 wing (approximately 72 aircraft) is a potent theater offensive and defensive force once it arrives in theater (assuming there is an existing runway) and then can have around 72 hours to set up its operations. Time is the enemy in situations like the Falklands conflict or a major Soviet action in the Persian Gulf region. In the days and weeks required to deploy major theater naval, air and ground units, the enemy is gaining ground, reinforcing his position and developing a supply base—all of which make it more difficult to dislodge him once proper forces arrive.

The ability to apply direct force in a matter of hours (24 to 48) in situations like these can be invaluable. While adequate long-range nonnuclear air power such as the B-52 in all probability could not have by itself forced the Argentines to withdraw from the Falklands, it could have made consolidation and reinforcement during those very crucial first days a very difficult and unpleasant task for the Argentines and would certainly have demonstrated resolve early on. In this respect one researcher concluded:

> It is well recognized by military planners that the first 48 to 72 hours of a conflict are potentially crucial. With a minimum or no warning time the LRCA [long-range combat aircraft—B-52, B-1, etc.] is the only conventional military force we can project to stem the tide of battle in those first crucial hours.[25]

Unfortunately, the British on 1 April 1982 did not possess a real long-range nonnuclear air capacity. The 1 May Vulcan strike and those that followed did prove that an essentially medium-range combat system, designed and deployed for "strategic" nuclear conflict, could be deployed for long-range conventional "tactical" operations. However, it required a month to reconfigure the aircraft, train the crew, and establish the logistics for the action. Unfortunately, the result was little more than a show of force simply because of limited assets and the hardships involved.[26]

A centralized global offensive force consisting in the near-term of long-range combat aircraft, and possibly in the future space-based or transatmospheric systems, could probably not "solve" a crisis such as the Falklands. It cannot land troops, supply them, and then occupy the islands. However, as a central force it can deliver the crucial early blows at consolidating land and sea forces and at supporting airfields; and then upon arrival of theater forces, it can act as a deployed central force under the direction of the theater commander. Modern standoff weapons either would allow air operations against valuable targets in high-threat areas well before other forces arrive or would allow long-range

elements to act as immediate reinforcement of existing in-place theater assets (as in Europe), possibly from CONUS airfields.

This is essentially what is done now; SAC tankers and several B-52 units are assigned conventional as well as nuclear missions. However, as a senior Defense Department official wrote:

> The only national asset we have which is capable of projecting heavy conventional firepower on a global basis within 24 hours is long-range airpower. Yet, surprisingly, we have not managed to keep that asset current in the technology of conventional warfare.[27]

In the same vein, another article on SAC's forces maintained that there were two main problems with respect to providing extensive global nonnuclear support—not enough aircraft and a "lack of appropriate munitions." It maintained that highly accurate standoff weapons were crucial to future effectiveness but concluded in dismay that "at present SAC has nothing good in its stockpile for attacking major theater targets."[28]

Col Clyde Bodenheimer's study of new technology weapons and long-range air power concluded that our B-52 fleet is limited by the fact that current gravity bombs are inadequate for many potential targets and that delivery of what we do have requires direct target overflight, an "unattractive option" in an era of sophisticated defensive systems.[29] In other words, if the United States were to face a Falklands-style conflict today, the only aerospace forces available for truly rapid global response would be limited in both numbers and weapons capability. In the future, as new aircraft such as the B-1B and ATB and new accurate standoff weapons enter the inventory, global offensive capability should be much improved. Even further into the future as space systems evolve new capabilities and functions, global offense should develop effectiveness and responsiveness only dreamed of heretofore.

The same is true, of course, of the defensive side of the equation. As air-breathing "interceptors" increase their range and as programs such as SDI produce operational systems (whether actual weapons or sophisticated surveillance and guidance systems), the ability to project defensive power should markedly improve. If just sophisticated surveillance systems had been available to the British in the South Atlantic, most of their losses might have been avoided. Fleet elements could have had ample warning of Argentine air attack, something British forces were sorely lacking during the battle. It can reasonably be argued that modern US carrier battle groups could supply such capabilities for both surveillance and active defense.[30] It can also be argued that global aerospace forces could have begun operations well before arrival of fleet elements and could have then supported them afterwards. It is important to understand that these global combatants are intended to complement, not compete with, theater forces.

In this context, it is worth repeating that no force element—central, deployed central, or theater—has a monopoly on either strategic or tactical actions. It is

not a function of range, payload, or size but how the weapon is used. The combination of both deployed central and theater assets tends to compensate for the weaknesses of each individual element; the potential vulnerability and long deployment times of aircraft carriers and in-theater Air Force assets is offset to a large degree by the extended range and rearward basing of global forces. At the same time, forward theater forces have greater short-term responsiveness to real-time battlefield and air threats than do long-range combat aircraft, and in sophisticated defensive environments are vital to the maintenance of air superiority. The theater responsiveness of aircraft such as the F-4, F-15, or A-10 is complemented by the global responsiveness of long-range combat aircraft such as the B-52 or B-1B and the worldwide access of space systems.

The technology/numbers controversy, as discussed in chapter 3, was summarized by Secretary of Defense Weinberger in discussing the increasing complexity and cost of the traditional "tactical" air arm.

> The cost of buying and operating our tactical Air Forces are taking an increasing share of the defense budget. Their increasing complexity is a significant factor not only in this growth, but also in an increasing difficulty in maintaining the combat readiness of our aircrews and their equipment. These trends, if continued, could jeopardize our ability, to maintain a force that is large enough, that is modern enough, and that is ready enough to carry out our war plans.[31]

Secretary of Defense Weinberger has expressed a valid and widespread concern that our increasing reliance on highly sophisticated equipment is restricting the size and overall capability of our aerospace forces. An indivisible/global approach to aerospace employment would help ease these concerns in three ways:

1. The application of new technology weapons would extend the useful lives of such older systems as the F-4 and B-52 by providing them new capabilities such as standoff attack and highly accurate and maneuverable air-to-air missiles.
2. The elimination of residual parochialisms will allow the application of all elements of our aerospace forces—bombers, fighters, space systems, missiles—according to their ability to accomplish the task at hand and will foster intertheater, intercommand, and interservice cooperation.
3. The same open-minded approach to aerospace power application will provide tremendous force enhancement and multiplier effects as weapon systems are applied against several mission categories and across the various theater boundaries (including space).

As mentioned in chapter 3, none of this—the ET weapons, global forces, theater commands—relieves us of the responsibility for developing skilled and dedicated leaders, trained and disciplined personnel, and sound well-founded doctrine. The time is gone when we could count on materiel superiority and bludgeon tactics to carry the battle. What the British lacked in numbers and hi-tech equipment during the Falklands battle they made up for in leadership, skill, ingenuity, and courage.

By the same token, the Argentine air force with a total of five Exocet missiles, an arsenal of World War II vintage iron bombs (many with defective fuses), and more than their share of tenacity and courage almost wrecked British plans to retake the islands.

While they caused much debate, ET weapons did not dictate the outcome of the battle. The deciding factors were training, determination, and (in the case of the British at least) a military doctrine that encouraged initiative and flexibility in all areas particularly in their air power.[32] By contrast, the Argentine army was accused of "tactics, fieldcraft and motivation" that were "lamentable" and "American training that had taught them to rely too heavily on resources rather than human endeavor."[33]

This chapter has presented an overview of the requirements for developing an indivisible approach to aerospace doctrine. The importance of seeing the terms "strategic" and "tactical" as actions required, not forces employed, is central to this perspective—to overcoming the folklore of military application. The second major element is a global perspective. In order to effectively meet our global responsibilities, we must think, plan, train, and equip for worldwide force employment. Our attention seems riveted on Europe and the Middle East; and while no one should doubt the seriousness of the threat to those regions, we must not allow ourselves to be surprised by a long-range Falklands-type aggression and to be hobbled by an inability for rapid response to such a crisis anywhere on the globe.

NOTES

1. Gen Bennie L. Davis, "Indivisible Air Power," *Air Force Magazine* 67 (March 1984): 46. Additionally, John T. Correll in his article "Deterrence Today," *Air Force Magazine* 67 (February 1984): 41, wrote, "With air power of all sorts at a premium, interservice and intercommand mission boundaries appear to be fading in importance. A concept that SAC calls 'indivisible air power' is taking hold, and says that forces ought to be employed according to capability and targets to be hit, not by hidebound tradition or absolute separation between strategic and tactical roles."

2. Air Force Manual (AFM) 1–1, *Basic Aerospace Doctrine of the United States Air Force,* 16 March 1984, 2–11.

3. Ibid.

4. Ibid.

5. LeMay quoted in chapter 2, page 22.

6. Gen William Momyer, *Air Power in Three Wars,* ed. O. J. C. Lavalle and James C. Gaston (Washington, D.C.: US Air Force Association, 1978), 16–17.

7. See AFM 1–1, 2–15 to 2–17, for a discussion of the requirement for offensive and defensive actions.

8. Ibid., 3–1 to 3–6. The nine missions are defined as strategic aerospace offense, strategic aerospace defense, counterair, air interdiction, close air support, special operations, airlift, aerospace surveillance and reconnaissance, and aerospace maritime operations.

9. See the Vandenberg quote at the beginning of chapter 2.

10. W. Hays Parks, "Rolling Thunder and the Law of War," *Air University Review* 33 (January–February 1982): 3, 6.

11. Thomas A. Keaney, *Strategic Bombers and Conventional Weapons: Airpower Options* (Washington, D.C.: National Defense University Press, 1984), 20.

12. Russell E. Dougherty, "An Editorial: Hay for the Yaks," *Air Force Magazine* 67 (September 1984): 4.

13. Richard H. Kohn and Joseph P. Harahan, eds., *Air Superiority in World War II and Korea: an Interview with Gen James Ferguson, Gen Robert M. Lee, Gen William Momyer, and Lt Gen Elwood R. Quesada* (Washington, D.C.: Office of Air Force History, 1983), 34.

14. For further discussion of the air power command debates and arrangements in North Africa, see ibid., 30–36, and Momyer, *Airpower in Three Wars,* 39–45.

15. John W. R. Taylor in "Jane's Aerospace Survey 1985," *Air Force Magazine* 68 (January 1985): 63, wrote that "it is worth recording that the F-16XL could take off and land in two-thirds of the distance required by an F-16 A/C, carry double the weapon load (seventeen stores station, with twenty-nine hardpoints beneath wings and fuselage), and operate over a forty-three percent greater combat radius on internal fuel or eighty-three percent with external fuel."

16. Dr Lawrence Grinter noted with respect to intertheater competition that "the vast global diffusion of power underway for at least a decade is creating and accelerating rivalries and conflicts in

the non-NATO areas that bear on US national security interests and military strategy. US security policy must be highly flexible, capable of doing many things simultaneously, but it must also be guided by a central conceptual foundation. Without that conceptual foundation, the whole will be simply the sum of the parts." Lawrence Grinter, "The United States: Military and Political Perspectives," in *Nonnuclear Conflicts in the Nuclear Age,* Sam C. Sarkesian, ed. (New York: Praeger Publishers, 1980), 91.

17. General Arnold is quoted in AFM 1–1, 4–7.

18. One author reported that "the Summary Report of the Study Group headed by Fred S. Hoffman, which had been charged with exploring the US policy parameters with respect to BMD, focused strongly on an antitactical missile (ATM) defense as an 'intermediate' option in the long-term development of BMD. It adduced to the option the combined virtues of: (1) promising a relatively early availability; (2) involving systems that could fend against both nuclear and nonnuclear means of attack; (3) incorporating components that might later be included in a more intricate and comprehensive defense of the United States; (4) serving as a reassuring signal to the allies of the continued US commitment to their defense; and (5) being compatible with the ABM Treaty." See Hubertus G. Hoffman, "A Missile Defense for Europe?" in *Strategic Review* 12, no. 3 (Summer 1984): 51.

Additionally, another article reported that the United States was developing "a joint antitactical missile system . . . to protect US and allied forces in Europe against aircraft and conventionally armed ballistic and cruise missile attacks by the Soviet Union." Of course, there is no reason why the same system could not be applied against nuclear targets. See Clarence A. Robinson, "US Develops Antitactical Weapon for Europe Role," *Aviation Week & Space Technology* 120 (9 April 1984): 46.

19. In this context, Secretary of Defense Caspar Weinberger stated, "We must make sure that the Soviet leadership, in calculating the risks of aggression, recognizes that because of our retaliatory capability, there can be no circumstances where the initiation of a nuclear war at any level or of any duration would make sense." See the "Statement of the Honorable Caspar W. Weinberger, Secretary of Defense," Senate Foreign Relations Committee, *Hearings,* 97th Cong., 1st sess., United States Senate, 14 December 1982, 3.

20. See Stanley B. Alterman (assistant deputy under secretary of defense for strategic aeronautical and theater nuclear systems), "Long-Range Airpower and Emerging Technologies," in *Defense 84,* July 1984, 24.

Gen B. L. Davis wrote with respect to the bomber force, "Although sometimes overshadowed by its nuclear mission, the strategic bomber is equally effective in a conventional role. It is capable of four distinct conventional applications: show of force, area denial, precision attacks, and area bombardment." See Gen B. L. Davis, "The Manned Bomber," in *NATO's Fifteen Nations* 27, no. 1 (February–March 1982): 40.

21. Max Hastings and Simon Jenkins, *The Battle for the Falklands* (New York, London: W. W. Norton & Company, 1983), 318.

22. Ibid., 342–46.

23. M. J. Armitage and R. A. Mason, *Air Power in the Nuclear Age* (Urbana, Chicago, London: University of Illinois Press, 1983), 208.

24. For a discussion of these controversies, see, in addition to the two books referenced in notes 21 and 23, Adm Thomas H. Moorer and Alvin J. Cottrell, "In the Wake of the Falklands Battle," *Strategic Review* 10 (Summer 1982): 23–28.

25. Col Clyde E. Bodenheimer, *Impact of New Technology Weapons on SAC Conventional Air Operations* (Maxwell AFB, Ala.: Airpower Research Institute, 1983), 2.

26. Armitage and Mason described the 1 May Vulcan strike: "This raid by a single aircraft carrying 21 1,000-lb bombs, was supported by a chain of Victor air-to-air refueling tankers for its 8,000 or so miles round flight to the Falklands and back [from Ascension Island]. This flight, and the subsequent similar ones were the longest ever made by bomber aircraft in the history of air warfare." [It is assumed the authors mean the longest actual combat mission since bombers have certainly flown longer sorties.] See Armitage and Mason, *Air Power in the Nuclear Age,* 208.

27. Alterman, "Long-Range Airpower," 20.

28. Correll, "Deterrence Today," 41.

29. Bodenheimer, *Impact of New Technology Weapons*, 2.

30. This argument is strongly made in Moorer and Cottrell, "In the Wake of the Falklands Battle," 25–27.

31. Weinberger was quoted in Benjamin F. Schemmer, "Pentagon, White House and Congress Concerned over Tactical Aircraft Complexity and Readiness," *Armed Forces Journal International* 117 (May 1980): 29.

32. See Armitage and Mason's conclusions about British air power flexibility and the ingenuity with which it was modified and applied. Armitage and Mason, *Air Power in the Nuclear Age*, 219–22. Hastings and Jenkins, *The Battle of the Falklands*, 326, write: "One SAS [Special Air Service] officer remarked during the campaign on the problem that afflicts many Third World armies, of concentrating on acquiring expensive technology rather than applying basic training and skills. On his own travels abroad, he said, he found again and again that his hosts disbelieved all that he told them about the achievements of the SAS being based on intensive, ceaseless, meticulous training and preparation."

33. Hastings and Jenkins, *The Battle of the Falklands*, 326.

CHAPTER 5

RECOMMENDATIONS AND CONCLUSION: A SEARCH FOR BALANCE

In a world increasingly plagued with highly sophisticated and deadly weaponry and dominated by an ideological/military competition potentially more dangerous than any and all before it, we clearly cannot abandon our pursuit of technological excellence. But neither can we fail to learn from those like the British and Argentines who have experienced both the successes and failures of military technology. A nation that has been historically blessed with abundant resources, manpower, and a massive industrial base would be foolish not to take advantage of them; but the nation that relies too heavily on resources degrades the value of "human endeavor" and thereby risks defeat at the hands of those with superior will and skill. In this context, how we use our weapons is every bit as important as the weapons we use.

If this volume has one overriding purpose, it is to stress the indivisibility of aerospace power and the resilience and ingenuity of the people that make it work despite the "handicaps" of a computer age society. This study unfortunately cannot provide these people with will and skill; that is a function of leadership and training. It can, however, suggest a doctrine of flexibility that would provide a basic framework within which those vital human elements can be most effective. The philosophy of indivisible air power and global perspective provides the basis of this framework. What remains to consider is a brief discussion of the mechanics—the specific recommendations—that turn philosophy into action. This final section will include a discussion of three elements: organizational structure, force structure, and arms control. To be truly effective, these elements must be accompanied by a fundamental shift in doctrinal perspective—how we think about the weapons we use. Without this, these proposals may represent nothing more than a shuffling of bureaucratic interests.

Organizational Structure

There seems to be a common tendency within large bureaucracies to view "surgery" on wiring diagrams as a prime remedy for organizational maladies—to perform a simple realignment of responsibilities to do basically the same things (hopefully) better. By itself, a change in organizational structure is no cure for doctrinal ills. It cannot make people *think* differently. However, that does not mean that a review of our bureaucratic "habits" is not in order as a part of a deeper examination. This section will, as a part of a more complete doctrinal review, attempt to present one organizational proposal that is intended to foster a change in how we think about application of aerospace power—away from historic strategic and tactical compartmentalization and toward an indivisible perspective. It is not the only possible route to this end; it is just one view based on current research.

The purpose of any organization's structure should simply be to enhance the organization's ability to perform its task. Since in this case the task or mission is to be prepared to carry out aerospace warfare, the structure should provide a means for effectively integrating air and space forces for the purpose of accomplishing strategic and tactical offensive and defensive actions. Figure 4 presents in graphic form the command structure discussed in the previous chapter. It is not in any major way different from the current US structure in that it emphasizes what are essentially specified and unified commands with broad global or more specific theater responsibilities. The global (specified) commands would retain their broad continuing worldwide responsibilities while the theater (unified) commands would accomplish area-specific, multiservice missions as both the specified and unified commands do today.

The three global commands depicted in figure 4—Global Offense, Global Defense, and Military Airlift—would be responsible for accomplishing their tasks alone (central force) or in conjunction with theater forces (deployed central) at the direction of the theater commander through the air component commander. These commands would possess the requisite air and space forces for a truly global offensive, defensive, and airlift capability. This structure would manage quantitatively limited, global-range forces capable of both strategic and tactical action and would therefore have forces readily available for application where most needed (with both nuclear and nonnuclear weapons in at least the case of global offense, much as SAC does today). The Global Defense would retain the current NORAD (North American Air Defense Command) mission of aerospace defense of the United States while the Global Offense would be responsible for long-range offensive force application against the Soviet homeland.

In this structure, theater (unified) commands are responsible for accomplishing strategic and tactical actions that affect the outcome of conflict

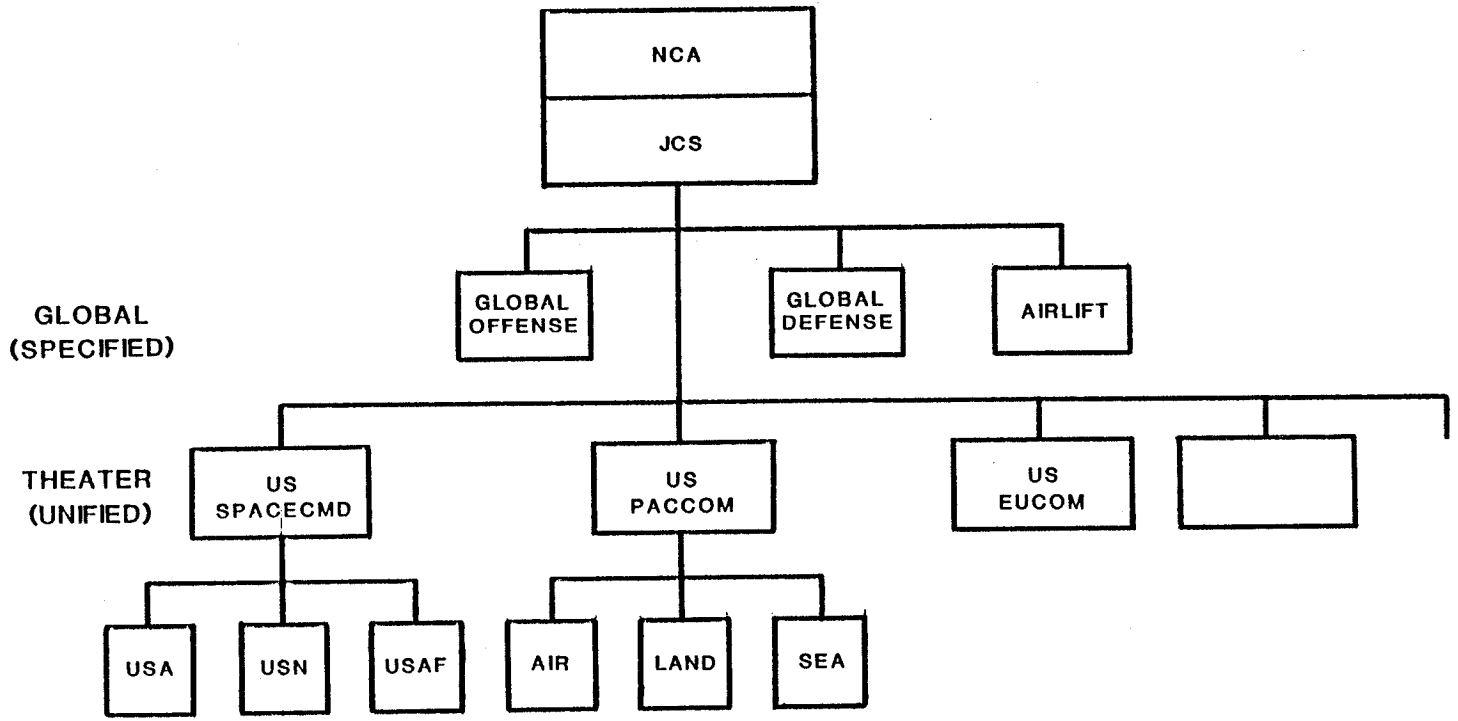


Figure 4. Proposed Structure of Combat Commands.

within that specific geographical region, or environment in the case of Space Command (SPACECMD). Global offensive and defensive forces assigned to the theater will be under the direction of the air or Air Force component commander and will operate in conjunction with theater forces. Further, to provide a truly flexible force, theater forces should be prepared to deploy to other theaters as the overall situation dictates.

The theater air component commander is responsible for theater air control. In the case of SPACECMD, its primary mission would be to control the space environment with assigned forces and to support the space-based forces of all users (launch, recovery, weather, global reconnaissance, multiuser communications, etc.). This doctrine sees the commander of Space Command as essentially another theater commander, with control of the space environment as important to him as air control is to the air commander in Europe. As we noted earlier, the indivisible air power doctrine does not associate functional uniqueness with the space environment. It is seen as an environment (albeit somewhat more inhospitable) from which global offense and defense may be accomplished. Although "higher altitude" does prevent easy access to the medium, it allows more direct, quick-response global access.

This suggested organizational framework should improve the overall effectiveness of aerospace forces by recognizing both the global nature and inherent flexibility of those forces. It rejects the institutionalization of the strategic and tactical missions and by emphasizing global and theater commands, highlights the growing capability of aerospace forces for multiple strategic and tactical application. The philosophy behind this structural framework recognizes the necessity for unity of command and regional expertise while reducing the effects of limited resources by stressing global application.

It is not fundamentally different from the way we do business now. The basic command structure already exists—SAC, ADCOM, MAC, and the theater commands such as EUCOM, PACOM, and SPACECMD. As mentioned earlier, what is therefore necessary is more of a change in perceptions than in organizations and in attitudes rather than weapons. This is nothing more than an attempt to get the most from current and future forces through organizational flexibility.

Force Structure

The second issue also involves flexibility. It concerns the weapons required for a truly flexible aerospace force—the force structure. The focus here will be primarily on the global force requirements rather than the theater (unified) systems (a detailed treatment of both would be beyond the scope of the project).

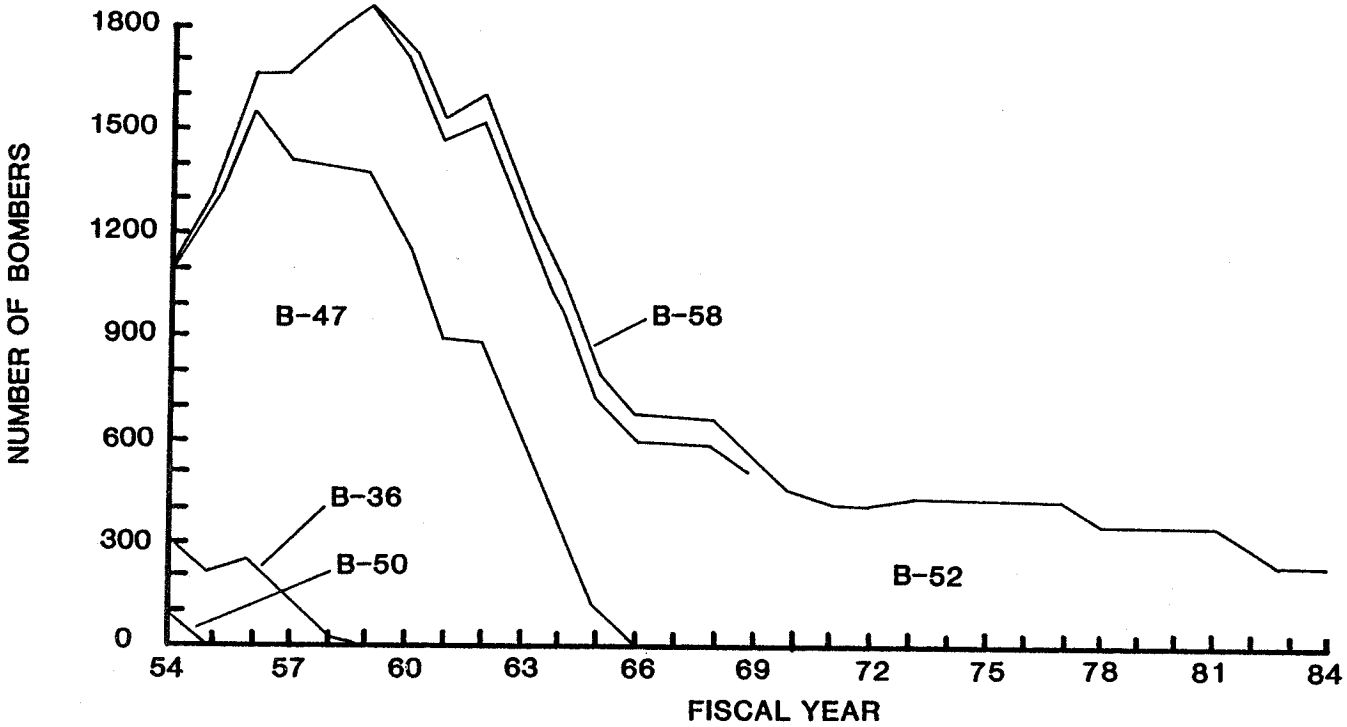
With respect to one element of our global offensive capability, one officer wrote:

> The fact that long range bombers were procured as nuclear delivery vehicles blinds many critics to their conventional utility. This has led to steady, force structure attrition. . . . In conventional war, numbers count. . . . The decisive military result demands adequate numbers of aircraft, crews, munitions and support required to do the job. The United States is perilously close to allowing its long range airpower force structure to subside below the level required to support low intensity conflict while still reserving a meaningful alert force.[1]

This reemphasizes the quantitative argument made earlier—we require enough global-range offensive forces to accomplish vital nuclear and nonnuclear, strategic and tactical taskings. It stresses the requirement for both an adequate force structure and central control of such valuable and limited systems as the B-52 and B-1B. Figure 5 vividly demonstrates the decline of our long-range bomber force over the past 26 years—from a high of over 1,800 aircraft in 1959 (nothing in comparison to World War II levels) to less than 300 presently, hardly adequate for the force's currently substantial and still-growing nuclear and nonnuclear taskings.

To allow further erosion of this vital and flexible resource would be to endanger US capability for rapid nonnuclear force projection since it can be assumed that nuclear tasking will remain. (US political and military leadership can be seen as legitimately reluctant to further compromise what they see as an already strained nuclear capability.) This does not imply advocacy of a return to the late 1950s heyday of the long-range strategic nuclear bomber. The cost of such a move would likely entail a severe restriction of other equally useful and flexible central and theater forces (ICBMs, F-16s, etc.), upsetting an already delicate balance from the other direction. Moreover, it has been sufficiently demonstrated that bombers alone are certainly no substitute for a well-rounded aerospace force structure. However, the advent of the B-1B and the somewhat less-defined (at least publicly) ATB presents an opportunity to adjust the balance by reintroducing the bomber's unmatched global-range, large payload flexibility into the conventional force structure. The combination of the new B-1B and ATB airframes with the B-52 rearmed with modern standoff weapons and improved defensive equipment would present a highly flexible mission spectrum available for short-notice use virtually anywhere in the world.[2]

By the same token, a highly flexible theater force structure consisting of modern F-15, F-16, and A-10 aircraft, reinforced by F-4s and F-111s rearmed with new ET weapons and a force of short- and medium-range missiles present a tremendous capability for strategic and tactical action. In developing future force structures for both central and theater forces we must be aware of the increasingly critical quantity-quality dilemma. While high-quality, sophisticated aircraft are crucial to a strong defense posture, so are adequate numbers. The application of new standoff air-to-ground and air-to-air weapon technologies and improved ECM systems will complement the advanced characteristics of our most modern systems as well as improve the overall performance of "older" but still very useful airframes. As we plan for the future it should be kept in mind



Source: Col John J. Kohout, "Long-Range Airpower in Low Intensity Conflict," prepared for presentation at the Ninth Air University Airpower Symposium, Air War College, Maxwell Air Force Base, Ala., 11–13 March 1985.

Figure 5. Long-Range Combat Aircraft, 1954–84.

that advances in weapon technology are as important as improvements in the aircraft that carry the weapons, if not more so.

In the more distant future, space systems may provide a significant portion of our global defensive and possibly offensive warfighting capability. Indirect combat missions such as weapon guidance, targeting, and surveillance already play a major role in our overall military capability. The crucial point in developing space-based systems is conveyed by a phrase frequently heard in military and Defense Department discussions: "Space is a place not a mission." In other words, it is just another place to perform the traditional air power missions; it is not "owned" by any one organization and not dedicated to any one mission. We must not develop a stereotypical view of this environment as the exclusive domain of the strategic defense or of one command structure. To do so would be to repeat the same type mistakes as the pre-World War II air power planners who recognized the tremendous potential of the air environment and the strategic offense, but in their haste to prove the value of the air arm and develop a rationale for independence, proceeded to restrict air power by advocating a primarily strategic offensive force structure as the way to win future wars. The war proved, of course, that no force could stand alone—not bombers or fighters; not air forces, naval forces, or ground forces—and certainly no single weapon or medium was "decisive."

What is being advocated here is nothing more than a balanced approach to aerospace force structure issues—a balance of force elements (bombers, fighters, etc.), mission orientation (strategic and tactical, offense and defense), and environmental factors (air and space). To attain a more balanced force structure, we clearly require a larger, more flexible force of long-range combat aircraft, a force that is not restricted to or by the historic nuclear imperative. We must also not allow the increased attention paid to space, and particularly to the potential defensive uses of the medium, to overshadow the requirement for a balanced *aerospace* force capable of offensive as well as defensive actions. As AFM 1–1 states with respect to the mission of aerospace forces:

> The basic objective of aerospace forces is to win the aerospace battle—to gain and/or maintain control of the aerospace environment and to take decisive actions immediately and directly against an enemy's warfighting capacity.[3]

A balanced aerospace force of the future may very well require more attention to a strategic defense against ballistic missiles, but that in no way reduces the requirement for theater forces or strategic offense. In fact, it is difficult to imagine a military force that relies on strategic defense as its primary nuclear deterrent as actually being able to maintain deterrence. Nevertheless, an effective strategic defensive component may eventually require a space-based element, but this requirement does not of itself eliminate the need for a means of "space control" and offensive force application. In other words, a capable offense will *always* be required.[4] A balanced global/theater aerospace force mix

capable of offensive and defensive actions will, or certainly should, be an integral part of overall US military force structure for at least the foreseeable future.

Arms Control

Arms control efforts have tremendous potential for affecting this balanced aerospace capability. The banning or severe restriction of certain types of weapons may be seen as lessening the threat of nuclear warfare by simply reducing the machines of nuclear destruction; but the same act, by eliminating one category of weapon (for instance the bomber), may also reduce the means by which we conduct nonnuclear warfare and may therefore adversely affect the overall military balance. Thus, arms control can be a two-edged sword, reducing on the one hand the weapons of nuclear war, but at the same time causing an increase in the reliance on nuclear weapons to prevent all forms of war, especially if long-range forces are important to a nation's overall capability (as with the United States).

We do well to remember that an arms control agreement does not necessarily lessen the differences between nations. Weapons are not the cause but are mere manifestations of those differences. Walter B. Slocombe sums up this view this way:

> At bottom, arms control is an aspect of dealing with the unpleasant fact that the USSR will not disappear and is not likely to reform. It is clear that we must not fail to compete diplomatically and militarily, including by conventional defense adequate to the myriad of more likely immediate confrontations and by nuclear programs adequate to sustain a military balance in any event.[5]

The Soviet Union, as Slocombe points out, will surely not disappear, nor is it likely, as much as we may wish it, to reform. It will probably remain a strong ideological adversary as well as military rival for many years to come. It is only reasonable and prudent to attempt some form of mutual arms restraint; however, that attempt to limit nuclear arms should not be allowed to hobble our nonnuclear advantages. Even if mutual, verifiable reductions in nuclear arms are achieved, the Soviet Union will remain along with, it must be remembered, Iran, Cuba, North Korea, Nicaragua, Libya, the non-Soviet Warsaw Pact, and others. As nuclear arms are reduced, more pressure will most likely be placed on conventional forces to maintain our defense and international influence. Many analysts are convinced that combined NATO theater and American nuclear forces have, for many years, prevented the titanic clash of modern conventional armies that would greatly exceed even the violence of World War II.[6]

Thus, our arms control policy, as with our organizational and force structures, should strive to preserve a balance of aerospace forces—a balance of strategic and tactical capabilities. This is the vital contribution of the indivisible air power

concept. Strategic does not mean nuclear, and space is not just a place to defend against nuclear weapons. We must be careful that in our zeal to reduce the world's massive nuclear arsenals we do not render ourselves vulnerable. To eliminate all space weapons in the name of Soviet-American nuclear arms control is to ignore other requirements such as the need to control that medium against actions by all adversaries or the potential for tactical nonnuclear actions from space. By the same token, a continual reduction of our long-range combat air assets under the auspices of nuclear weapon control is to eliminate a very valuable asset for intercontinental, quick-response, nonnuclear force projection, just as the limitation or removal of F-111s from the US European forces would severely impair our dual-role deep-strike capability. To do this is not to reduce nuclear weapons; it is to eliminate only the means of their delivery, along with numerous other valuable functions from sea surveillance to large-scale conventional area bombardment.

To further complicate matters, the recent nuclear winter studies and debates surrounding this issue may eventually have a significant impact on the arms control process. If a nuclear winter effect is officially recognized as possible by the major nuclear powers, governments may view the arms control process as a major if not the only means of preventing global calamity. (There are, in fact, preliminary indications that the US government may be accepting at least the essence of the nuclear winter theory.)[7] However, regardless of the official view, continued public debate could result, at least in the Western nations, in tremendous public pressure to freeze, reduce, or ban what is seen as a bloated and now useless stockpile of nuclear weapons and, more important for this argument, the systems that deliver them. In this environment, Western governments must be prepared to resist impassioned public outcries for the carte blanche reduction of nuclear weapons. We must be careful not to focus on reductions to such an extent as to create dangerous vulnerabilities and instabilities. We must also be careful not to throw the baby out with the bath water, so to speak; that is, we should not unnecessarily restrict or eliminate systems that have utility outside the nuclear arena. There surely must be yet-unexplored ways to limit the nuclear delivery capability of these systems as necessary while not totally eliminating them (much as the Soviets have done with their Bear bombers).

As stated earlier, as much as we may wish it, nuclear weapons will not disappear, even if the worst nuclear winter scenarios are accepted. Arms control efforts may be mankind's last great hope, but to assume that they will result in the complete elimination of nuclear weapons is a false hope. Dr Kissinger advocates reducing nuclear warheads over their means of delivery.[8] Edward Rowny, former chief US strategic arms negotiator, writes that "the new approach is to reduce warheads . . . the things that really count" and not to concentrate on delivery vehicles.[9] This approach makes sense from both the perspective of nuclear stability and weapon system flexibility. The President's Commission on Strategic Forces insists that ensuring stability (expressed by a

low military incentive to strike first) is far preferable to a near-sighted drive to reduce numbers and that "stability at a higher level is preferable to instability at a lower level."[10] This may prove to be a prudent attitude, even considering the nuclear winter phenomenon since no one knows the level of intensity at which nuclear winter occurs. There is no guarantee that a quick exchange of a few hundred "tactical" nukes will not produce the necessary conditions. Therefore, it would seem far more desirable to work toward elimination of incentives to strike first (secure weapons; secure, effective and redundant command and control; and a credible nonnuclear as well as nuclear capability) as a necessary precondition to large-scale reductions. This does not advocate an increase in numbers of nuclear weapons but does require their improvement.

Further, as we reduce delivery vehicles (be they bombers, fighters, or missiles) in the presence of MIRV (multiple independently targetable reentry vehicle—numerous warheads on one vehicle, most commonly associated with ballistic missiles), we may actually be increasing the first-strike threat. Simply stated, as targets become fewer, the possibility of a successful first strike increases, and it could be argued that so does the temptation to do so if our systems are not secure. Dr Henry Kissinger put it this way:

> This problem cannot be solved by deep reductions in delivery vehicles. Given the disproportion between warheads and launchers, reductions either are irrelevant to the danger of surprise attack, or perversely, increase it. With present [multiple warhead] weapons, the greater the reductions, the fewer would be the targets for a first strike and the greater would be its calculability.[11]

Thus, stability, as represented by (at a minimum) secure weapons, is the key to the prevention (or deterrence) of war. This applies as much to nonnuclear as nuclear forces, for a lack of credible conventional warfighting capability is a sure ticket to either capitulation or nuclear conflict. A balanced deterrent requires a balanced force structure; this should be the aim of our arms control effort, not simply an agreement for its own sake. Part of this vital process is the recognition of the flexibility of aerospace forces to provide both nuclear and nonnuclear firepower against any potential adversary (not just the Soviet Union) anywhere in the the world (not just in Europe). We must, and probably can, reduce the risk of nuclear conflict through negotiation, but we must not forget that the US-Soviet relationship is and will continue to be a competitive one, even after we sign another agreement, just as it has been after all the past agreements.

Our aerospace doctrine should be concerned with assuring US ability to cope with the military aspects of that competition. In the present case, doctrine is advocating a truly flexible, global aerospace force as one way to address the growing numerical disparity that past arms agreements have done precious little to correct. While not an element of military doctrine, our arms control policy should at least be sensitive to the goals set out in military doctrine. In this sense our approach should be security and stability over numbers, for once a truly stable relationship is attained it becomes much easier to then reduce absolute numbers of weapons.

During the Geneva arms talks, we must ensure that we do not collaterally damage our nonnuclear capabilities since in a post-Strategic Arms Reduction Talks (START) world where nuclear weapons, while not eliminated altogether, are substantially reduced, nonnuclear weapons will be required to do many of the things we now rely on nuclear weapons to do—mainly to prevent war. Furthermore, in today's context (exacerbated by the possibilities of nuclear winter), the reduction of some forces such as the long-range combat aircraft in the name of nuclear arms control is to eliminate a highly flexible combat system that is much more than the popularized perception of the Armageddon maker and increasingly valuable because of that flexibility.

Conclusion

Giulio Douhet, in his 1921 dissertation on air power employment entitled *The Command of the Air,* wrote that "victory smiles upon those who anticipate the changes in the character of war, not upon those who wait to adapt themselves after the changes occur."[12] General Douhet would undoubtedly agree that those that do not anticipate the changes in the character of war and adapt their doctrine accordingly are, as Gordon McCormick would believe, doomed to face the "catalyst of disaster."

Disaster is too high a price to pay for failing to make needed doctrinal reforms, especially in an era that has produced such ominous terms as "massive retaliation," "assured destruction," and "nuclear winter." Future US military doctrine, to be truly responsive to the large variety of potential threats, must be flexible. It must insist on organizational, force structure, and weapon-application flexibility. In order to do this, we must put aside stereotypical views of strategic, tactical, theater, and space forces and adopt a more balanced or indivisible view.

The primary lesson of air warfare has been that our aerospace forces are indeed indivisible. World War II proved that while the long-range bomber was indispensable to victory it was neither invincible nor decisive, as prewar doctrine had maintained. The war further demonstrated the vital need for "tactical" air power and the awesome power of a combined air offensive. Korea and Vietnam vividly demonstrated the need for nonnuclear combat capability (and conversely disproved the massive retaliation theory) and validated the bomber's role as both a strategic and tactical weapon.

The expansion of the Soviet nuclear arsenal made it essential that we possess a force capable of deterring nuclear attack against both our homeland and those of our allies. At the same time, the rise of well-armed third world nations (Soviet clients and others) and the increasing need to counter history's largest "conventional" military force have led to growing pressure for larger, more capable conventional forces. These frequently conflicting and increasingly expensive demands for a larger variety of capabilities can only be met by fully recognizing the inherent flexibility of the individual elements of aerospace

power. Only by deemphasizing the concept of strategic and tactical systems and structures and by applying our forces according to their capabilities can we hope to maintain a high confidence in the face of increasingly powerful and dangerous adversaries.

This change in perception is enhanced by recent technological innovations. The ET revolution brought about by advances in such technologies as high-speed miniature circuitry, stealth technology, and high-efficiency propulsion systems will do much to improve the multimission capability of our aerospace forces. It will provide totally new air and space systems with advanced applications and improvements to existing systems that will enhance their performance and extend their useful lives. These advances have also provided the capability for a truly global aerospace force. As weapon and delivery system ranges increase, and as we rely more heavily on space, aerospace forces will be increasingly capable of global-range, multitheather operations.

This dual perspective of the indivisibility and global nature of aerospace forces must be incorporated into the way we do our business—how we think, organize, and plan for applying aerospace forces. The United States is no longer the undisputed global power it was during the first two decades after World War II. We no longer face just one adversary but a lengthening list of countries armed with everything from massive nuclear and sophisticated conventional weapons to nothing more than obsolete small arms and a large dose of religious zeal. Countering these diverse and widespread threats requires more than a strategic Triad and a NATO war plan; it requires will and skill and carefully balanced organizational and force structures. In addition to planning for those things we would least like to occur, we must plan for those things that are most likely to occur. This means thinking about unconventional war and Grenada- and Falklands-style incursions as well as nuclear war and the invasion of Western Europe. It means taking maximum advantage of technological innovations while not expecting the miracles from them that only human endeavor can provide. It means divorcing our weapon systems from antiquated concepts of application that limit their overall effectiveness. This volume opened with the frightening association of doctrine and disaster. It is only fitting that it close with a prescription for success rather than failure. It comes from the same author, Gordon McCormick, and serves to reemphasize the need for a balanced, flexible aerospace force—an indivisible perspective:

> Ideally, the assumptions upon which doctrine is based should be subject to frequent re-examination. In the end, doctrine, whether it serves as a precept for action or as a guide to weapons development, can be no more effective than the assumptions that underlie it are accurate.[13]

NOTES

1. Col John J. Kohout III, "Long-Range Airpower in Low Intensity Conflict" (Paper prepared for presentation at the Ninth Air University Airpower Symposium, Air War College, Maxwell Air Force Base, Ala., 11–13 March 1985), 28.

2. Deputy Under Secretary of Defense Stanley B. Alterman suggested a nonnuclear alert bomber force. He examined the flexibility of the bomber in this role. "If the long-range bomber force is equipped with the proper sensors and standoff weapons, it could monitor [from airborne alert] assembly areas, chokepoints, border lines, and shipping lanes while remaining outside enemy territory. If the enemy violates the neutral zone, the bomber force would strike back using force levels adequate to stop the attack." See Stanley B. Alterman. "Long-Range Airpower and Emerging Technologies," *Defense 84*, July 1984, 24.

3. Air Force Manual (AFM) 1–1, *Basic Aerospace Doctrine of the United States Air Force*, 16 March 1984, 1–3.

4. An article in *Foreign Affairs* quotes a statement by Lt Gen James Abrahamson, director of the Defense Department's SDI Organization (SDIO), that "a perfect defense is not a realistic thing." The same article states that "in response to searching questions from Senator Sam Nunn of Georgia, the senior technical official of the Defense Department, Under Secretary Richard De Lauer, made it plain that he could not foresee any level of defense that would make our own offensive systems unnecessary." See McGeorge Bundy, George F. Kennan, Robert S. McNamara, and Gerard Smith, "The President's Choice: Star Wars or Arms Control," *Foreign Affairs* 63, no. 2 (Winter 1984–1985): 266.

5. Walter B. Slocombe, "Arms Control: Prospects," *Nuclear Arms Ethics, Strategy Politics*, R. James Woolsey, ed. (San Francisco: ICS Press, 1984), 140.

Also, Senator Malcolm Wallop wrote: "History affords no example whatever of nations possessed of serious reasons to fight one another who disabused themselves of those reasons by agreeing to limit the means by which they could fight. Nevertheless, the desire for peace is so natural and strong that it has always made attractive the claim that perhaps, just perhaps, all men are sane and all sane men want peace—which is in everyone's interest—and that the danger of war issues from the weapons themselves." See Malcolm Wallop, "Soviet Violations of Arms Control Agreements: So What?" *Strategic Review* 11 (Summer 1983): 14.

6. Hedley Bull wrote in 1980 that "on the evidence so far, the system of mutual deterrence is fulfilling its promise. There has been no nuclear war, nor war of any kind between the super powers or between the European alliances built around them, nor indeed any war between fully industrialized powers." Hedley Bull, "The Prospects for Deterrence," *American Defense Policy*, 5th ed., John F. Reichart and Steven R. Sturm, eds. (Baltimore and London: Johns Hopkins University Press, 1983, 199.

7. Numerous stories have been circulating recently in the US press about the acceptance at least by the Defense Department of the nuclear winter theory. See, for example, Wayne Biddle (*New York*

Times writer), "Pentagon accepts as valid theory about nuclear winter," the *Alabama Journal and Advertiser*, 2 March 1985, 1A-2A.

8. Henry Kissinger, "A New Approach to Arms Control," *Time* 121 (21 March 1983): 25.

9. General Rowny was quoted in "Perspectives on Arms Control: Session I," the *Center Magazine*, January–February 1985, 9.

10. Letter, Brent Scowcroft, chairman, President's Commission on Strategic Forces, to President Ronald Reagan, subj: [arms control issues], 21 March 1984. Just prior to the quoted sentence, the letter states that, by itself, arms control is unlikely to reduce the casualties and damage should a nuclear war occur. Only a small number of nuclear weapons are required to inflict unbelievable damage on civilian populations. "Attempting to reduce the arsenals on each side to safe numbers would risk instabilities which could themselves enhance the likelihood of nuclear conflict."

11. Kissinger, "A New Approach," 25–26.

12. Giulio Douhet, *The Command of the Air*, trans. Dino Ferrari (New York: Coward-McCann, Inc., 1942); reprinted by the Office of Air Force History, Washington, D.C., 1983, 30.

13. Gordon H. McCormick, "The Dynamics of Doctrinal Change," *Orbis* 27, no. 2 (Summer 1983): 268.

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