

CHAPTER 5

Organizing for Space:

The Air Force Commits to Space and an Operational Space Command

In the early 1970s the American space community found itself in disarray. The post-Apollo future for civilian and military space agencies brought indecisive space policy, uncertainty over roles and missions, and fragmented organization. As the primary military space service with responsibility for 80 percent of the Defense Department space budget, the Air Force reflected the weaknesses in the national space program. For most Air Force leaders, space seemed more an element within the research and development arena than an operational field. Many doubted whether space programs represented dedicated Air Force programs per se. Rather, the Air Force seemed to manage space activities for others, as part of larger tri-service or joint efforts that Defense Department officials favored to lower costs and minimize interservice rivalry. As a result, Air Force leaders and the wider Air Force community did not make space operations a genuine institutional commitment.

A decade later, however, military space had undergone a remarkable transformation. Gone was the disarray over policy, organization, and future roles and missions. By the early 1980s, the nation boasted a clear and decisive space policy supported by initiatives to improve and expand space programs and infrastructure to the end of the century. Above all, the Air Force created a centralized organization for space that committed the service to an operational rather than a research and development focus. Normalizing and integrating defense-support space missions throughout the service would become the major space objective for the future as leaders moved to take advantage of the growing importance of space for operational forces.

Pressures from without and within the Air Force account for the upturn in fortunes. At the national level, space became a central focus against the backdrop of the decade-long debate over the merits of détente and arms control. Both critics and opponents of arms control agreements increasingly came to rely on space systems to provide crucial national technical means of surveillance and verification. The deficiencies in the space arena alarmed leaders and convinced them to support major policy and organizational initiatives.

Air Force leaders felt compelled to reassess the importance of space for operational commanders and the service's institutional commitment to space operations. Beginning in the mid-1970s leaders began a long process of building consensus for some type of centralized space organization and integrating military space requirements into mission and system architecture planning. The process seemed incredibly slow and contentious to space enthusiasts, who found allies primarily within the middle strata of the officer corps rather than the senior leadership. As a result, it took several years of space studies and forums to create a better understanding of space and an appreciation of its importance for corporate Air Force interests. Space proponents received major help from the operational maturity of space systems themselves—the Defense Meteorological Satellite Program (DMSP), the Defense Satellite Communications System (DSCS), the Global Positioning System (GPS), and the early warning Defense Support Program (DSP)—which, over the course of the decade, became increasingly important throughout the defense community. Above all, the advent of the Space Shuttle crystallized the pressure within the Air Force for change. This, the most expensive and technologically complex space project in the nation's history, raised important questions about cooperation between the civilian and military space communities, the future role of military manned spaceflight, the feasibility of exclusive reliance on a reusable launch vehicle, and the most appropriate organizational structure for Shuttle operations. The Shuttle precipitated an intense competition for operational responsibility among four major Air Force commands, each of which considered itself the logical choice to become the operational space command. By the end of the decade, the Air Force found itself in the midst of a series of important organizational changes that set the stage for the creation of an operational space command to follow.

In this era of change and reassessment a number of space “missionaries” played vital roles in moving space to the forefront of Air Force interests. Dr. Hans Mark and Lieutenant General Jerome O'Malley led the charge for an operational space commitment, often in the face of reluctant or overly cautious senior leaders. With the arrival of the Reagan administration in early 1981, the pace of events threatened to outrun the ability of Air Force leaders to control it. The overwhelming momentum for change compelled senior leaders to act before outside elements imposed solutions that might not reflect institutional interests. The result proved to be a

major victory for the operational Air Force with establishment of the Air Force's Space Command on 1 September 1982.

A Space Community in Disarray

From the vantage point of the early 1970s Air Force space enthusiasts would be hard pressed to envision an operational space command only a decade into the future. At the national level, the budget-conscious Nixon administration responded to the public's disinterest in major post-Apollo space initiatives by canceling the final two Apollo lunar missions along with the Air Force's central manned program, the Manned Orbiting Laboratory (MOL). Additionally, the President eliminated important advisory bodies for space issues, the President's Scientific Advisory Council (PSAC) and the Federal Council on Science and Technology, while Congress transferred space responsibilities from its standing space committees to the more widely focused House Science and Technology and Senate Commerce committees. The concerns of both Congress and the White House centered more urgently on budget priorities to deal with the legacy of the Great Society's social agenda and the incessant demands of the Vietnam conflict. Oil shortages following the 1973 Arab-Israeli conflict heightened the financial crisis and set a tone of lower expectations and malaise for the remainder of the decade. An ambitious military space agenda could hardly flourish in this atmosphere, and the declining space budgets during the early 1970s provide the best evidence of the military space program's woeful status.^{1*}

Disarray and disinterest best characterized the condition of military space activities during the first half of the 1970s. Air Force commanders seemed reluctant to accept the importance of space and to support space program initiatives during crucial budget proceedings. Military space missions—communications, meteorology, early warning, and navigation—comprised defense support functions rather than the traditionally more prestigious and appealing offensive operations. Moreover, while the Air Force controlled the newly-operational Defense Support Program early warning satellite network, it shared all other military satellite programs with other civilian and military agencies or, in the case of the sensitive national reconnaissance program, played a significant supporting role.

At the same time, the dispersed nature of space systems within the Air Force, as well as throughout the military and the civilian space communities, created more immediate management problems. The Office of the Secretary of Defense, for example, through the Defense Communications Agency, often participated in day-to-day management of communications satellites, while the Air Staff monitored an increasing number of space programs and functions that normally would have been

* See Appendix 3-2.

assigned to a single major command. Army and Navy planners faced similar hazards in handling their terrestrial mapping and navigational satellite programs, respectively, while other government and civilian agencies often followed their own relatively independent courses of operation. The lack of central direction not only led to management inefficiency and duplication, it prevented the creation of constituencies to effectively advocate and support space systems during the budget process.²

The fragmentation nature of the military space program in the 1970s reflected the absence of both a comprehensive employment doctrine for space and any significant change in executive policy or military space strategy since the Eisenhower and early Kennedy years. Military activities in space received little open attention in the age of Apollo and the era of Soviet-American détente in the early 1970s. The Defense Department's directive of September 1970, which overturned the Air Force's decade-old exclusive responsibility for military space research and development programs, further fragmented operational space planning and control by allowing each service and Defense Department component to pursue its own course. In short, dispersed authority made it difficult to coordinate military space requirements and operational concepts from a broad, national security perspective.³

The space policy vacuum and organizational fragmentation did not go unnoticed by interested observers. In a widely quoted article in late 1974, retired Air Force general and NASA manager, Jacob E. Smart, accurately described the condition of the space community.

Presently there are multiple agencies of the U.S. government engaged in space related activities, each pursuing programs to fulfill its own missions. This of course is proper but points up the question: Does the sum of the individual agency's perceived roles adequately fulfill the total national need? There is no central policy coming from the top, guiding and coordinating these efforts.⁴

Given these developments, space did not acquire the status of a dedicated "Air Force" mission or lead to a specific "user" space community. Moreover, without an Air Force major command for space, officer career progression and space program advocacy suffered. For many, space seemed to represent an additional level of abstraction, one in which commanders often felt insecure about relying on supporting elements beyond their direct sight or control. As one Air Staff planner observed, "space...requires first of all, a psychological adjustment to and philosophical acceptance of the use of space assets and warfare conducted in space." Air Force commanders needed to understand the operational importance of space activities for themselves. Despite the contribution of communications and weather satellites during the Vietnam war, an institutional commitment to space seemed far off in the early 1970s.⁵

Nevertheless, the space community was on the threshold of change. A number of developments already underway would lead to a major reassessment of the

military's role in space. The most important forces for change involved, first, the many-sided national strategic debate over the policy of détente and the efficacy of arms control measures and, second, the advent of the Space Shuttle. Both would bring space issues to the forefront of the national agenda.

The National Debate over Détente and Arms Control

The debate over America's strategic nuclear policy in the 1970s took place against the backdrop of the continuing shift in national defense policy from deterrence of the 1960s to the countervailing nuclear warfighting strategy of the Carter administration. The evolution in nuclear strategy paved the way for the emergence of a reinvigorated, modernized strategic policy and force structure under the Reagan administration's Strategic Modernization Program and centerpiece Strategic Defense Initiative (SDI).

During the 1970s, it became clear both to strategic policy analysts and the public alike that America could no longer take comfort in its traditional position as the dominant nuclear superpower. By 1974 the Soviet Union had overtaken the United States in total number of ICBMs and SLBMs, achieving a figure of 2,195 ballistic missiles in contrast to the United States' 1,710, and appeared hard at work developing a multiple independently targeted reentry vehicle (MIRV) capability.⁶ Given the alarming increase in Soviet offensive nuclear weapons, events during the decade increasingly centered on the vulnerability of the Minuteman retaliatory force and what should be done to protect it. Could the nation's traditional policy of mutual assured destruction—or second-strike retaliation—continue to reflect the nuclear warfighting realities of the 1970s?⁷

To President Richard M. Nixon and his advisors, the assured-destruction strategy seemed to offer the dilemma of the single alternative. One faced the choice of either massive nuclear retaliation or not launching missiles at all, which could very well amount to surrender in the nuclear age. Nixon wanted more options along the spectrum of deterrence, and his Secretary of Defense, James R. Schlesinger, responded by focusing on flexibility and increased targeting options. Under the so-called "Schlesinger Doctrine," he developed the concept of providing "selective, small scale options" or target packages for rapid use in a variety of nuclear contingencies along the "spectrum of deterrence." The Schlesinger Doctrine reflected the concerns of many, both inside and outside of government, that the United States should prepare more effective contingency plans for fighting a nuclear war.⁸

At the same time, many looked to détente and arms control agreements as offering the best hope for underpinning and establishing rough nuclear equivalence at lower force levels and, thereby, reducing the danger of nuclear war. By terms of the Strategic Arms Limitation Treaty (SALT) I Interim Agreement on Strategic Offensive Weapons, signed in May 1972, the Soviet Union and the United States agreed to a

five-year freeze on missile launcher construction as a prelude to further, more sweeping arms control measures. However, the agreement capped the Soviet ICBM arsenal at 1,618 ICBMs, in contrast to the American figure of 1,054, and did not include MIRVs. During the same month, the two sides recognized the impossibility of protecting their countries from a large-scale missile attack by agreeing to limit further deployment of their anti-ballistic missile systems. The Anti-Ballistic Missile (ABM) Treaty restricted both sides to two limited ABM systems, one deployed around the national capital, and the other at an ICBM site. The two sides formally recognized the role of satellite surveillance by agreeing that verification would be conducted by “national technical means...consistent with generally recognized principles of international law.” As John Newhouse, former Assistant Director of the U.S. Arms Control and Disarmament Agency pointed out, “each side surrendered any meaningful right to defend its society and territory against the other’s nuclear weapons.”⁹ In short, the ABM treaty made credible the policy of mutual assured destruction. Yet, another provision of the treaty would prove contentious in future years. According to Article V, “each Party undertakes not to develop, test, or deploy ABM systems or components which are sea-based, air-based, space-based, or mobile land-based.” This proviso would seriously challenge the legality of President Ronald Reagan’s Strategic Defense Initiative. Critics of the arms control process, however, bemoaned what they considered the failure of *détente* to prevent the establishment of a permanent state of American strategic inferiority.¹⁰

In this arena, both critics and proponents of *détente* depended on space reconnaissance and the related surveillance systems and associated warning infrastructure to provide the so-called “national technical means” of arms control verification. Consequently, the nation’s satellite systems and ground-based space surveillance network became increasingly important to verify arms control compliance or to support charges of a growing potential Soviet threat from space. Moreover, a policy calling for flexible response required more sophisticated strategic surveillance, warning and, possibly, active defensive systems. For administrations searching for greater options along the spectrum of deterrence, improvement of space capabilities would become a growing priority over the course of the decade.

Indeed, by the mid-1970s, the primary mission of NORAD, the binational U.S.-Canada command, had become surveillance and warning of impending attack rather than active defense, and the once elaborate air defense structure controlled by the Air Force’s Aerospace Defense Command (ADCOM) continued to decline in terms of quality and quantity of forces as it underwent organizational restructuring. Interceptor aircraft could not respond to ICBMs. Henceforth, space systems assumed greater importance, and ADCOM and NORAD commanders looked to space to preserve command prerogatives—with wider implications for the future of the Air Force space community.¹¹

The Air Force Commits to a Space Shuttle

A second development in the rise to prominence of space involved the national commitment to develop as successor to the Project Apollo lunar program a national space transportation system that would serve both civilian and military agencies. The Space Shuttle represented tremendous potential with its promise of routine access to space. At the same time, it presented enormous challenges because of its technical complexity, high cost, and promise, as a joint civil-military program, to satisfy both NASA and Defense Department requirements. For the Air Force, the Defense Department executive agent for the Shuttle, the advent of the Shuttle represented a new era of military manned spaceflight, an end to dependence on its fleet of costly, expendable launch vehicles, and the reassertion of Air Force dominance in the national space program. Along the way, the Air Force also found itself compelled to reassess its institutional commitment to space if it intended to realize its claim to space leadership. Over the course of the 1970s, the Shuttle prompted planners to increasingly reassess space policy, technological feasibility, and optimum organizational structures in preparation for what advocates confidently proclaimed to be the “age of the Shuttle.”

Shortly after taking office in 1969, President Nixon, as part of his initial program review, formed a Space Task Group to determine the best direction for the nation’s post-Apollo space program in a future beset by declining interest in space and budget constraints. In September, shortly after *Apollo 11*’s historic July lunar landing, the group’s report outlined three long-range possibilities. The first two comprised variations on an expensive, ambitious program to launch in the 1980s a manned mission to Mars. This would occur after first establishing a lunar base and a fifty-person earth-orbiting space station supported by a fully reusable transportation system to “shuttle” between Earth and the space station. The third alternative, which involved only the space station and Shuttle, appealed to a cost-conscious Nixon administration determined to pursue a less challenging post-Apollo space future. Before giving formal approval, however, NASA and the Defense Department needed to assess the Shuttle’s technical feasibility, projected cost, and civil and military requirements.¹²

For NASA, the Shuttle represented the centerpiece of its future manned space program in the wake of the administration’s cancellation of the final two Apollo lunar flights and reduction of the Apollo Applications program to the Skylab mini-space station. For the Air Force, initial enthusiasm was tempered by NASA’s central responsibility for Shuttle design and development and by questions about the system’s long-term benefits. At first the Air Force focus centered on the project as a cost-effective replacement for launching future larger, heavier satellites that would require lifting capacity greater than the Atlas and Titan expendable boosters could provide. Very soon, however, Air Force leaders came to see in the Shuttle a multi-purpose vehicle with the means of preserving the Air Force’s traditional interest

Right: General Henry H. "Hap" Arnold; below (left to right): Dr. Theodore von Kármán, chairman of the Scientific Advisory Group; Brigadier General Donald L. Putt, Director of Research and Development, Office of the Deputy Chief of Staff for Materiel; and Dr. Albert E. Lombard, Jr., head of the Research Division under General Putt.





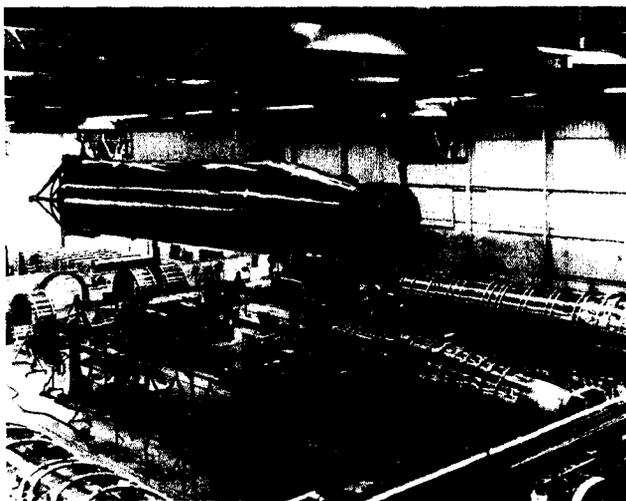
Above: Officials of the Army Ballistic Missile Agency at Huntsville, Alabama: (counterclockwise from top right) Major General H. N. Toftoy, Commanding General; Dr. Ernst Stuhlinger; Hermann Oberth; Wernher Von Braun; and Dr. Eberhard Rees; right: Major General Curtis E. LeMay.





Above left: Dr. Robert H. Goddard beside his liquid-fuel rocket before launch, Auburn, Massachusetts, 16 March 1926; above right: Trevor Gardner, Assistant Secretary of the Air Force for Research and Development; below: German V-2 rocket.





Above: Atlas intercontinental ballistic missile assembly plant; below: General Bernard A. Schriever with models of the missiles he helped develop and build.

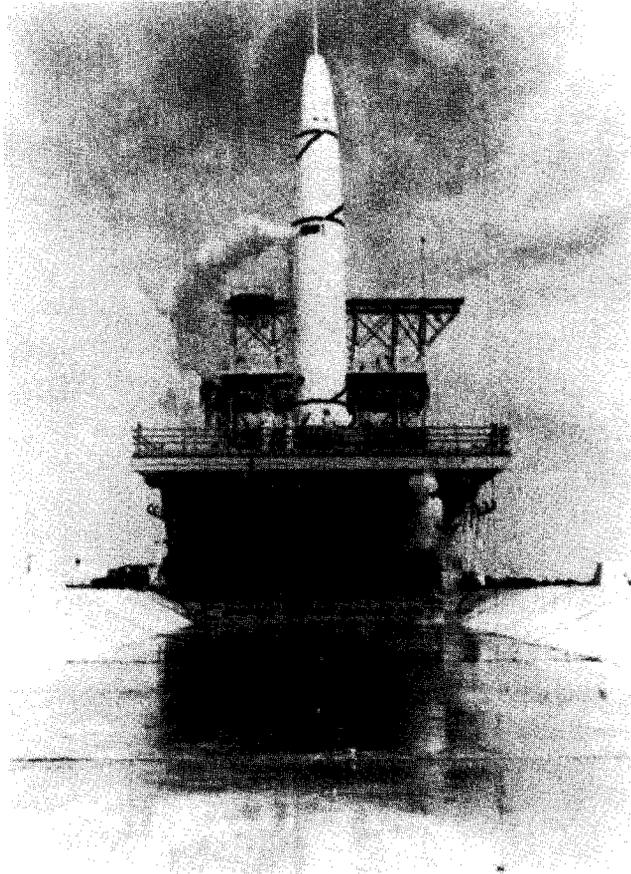




Dr. Simon Ramo, a founder of
the Thompson-Ramo-
Wooldridge (TRW) Corporation



Dr. John von Neumann



Above: Technicians prepare a Thor intermediate range ballistic missile for a test launch, *ca.* August 1957; left: Model of *Sputnik 1*, the first man-made satellite to orbit the earth; launched 4 October 1957.



Above left: Secretary of Defense Neil H. McElroy; above: Secretary of the Air Force Eugene M. Zuckert; lower left: Secretary of the Air Force Donald A. Quarles.

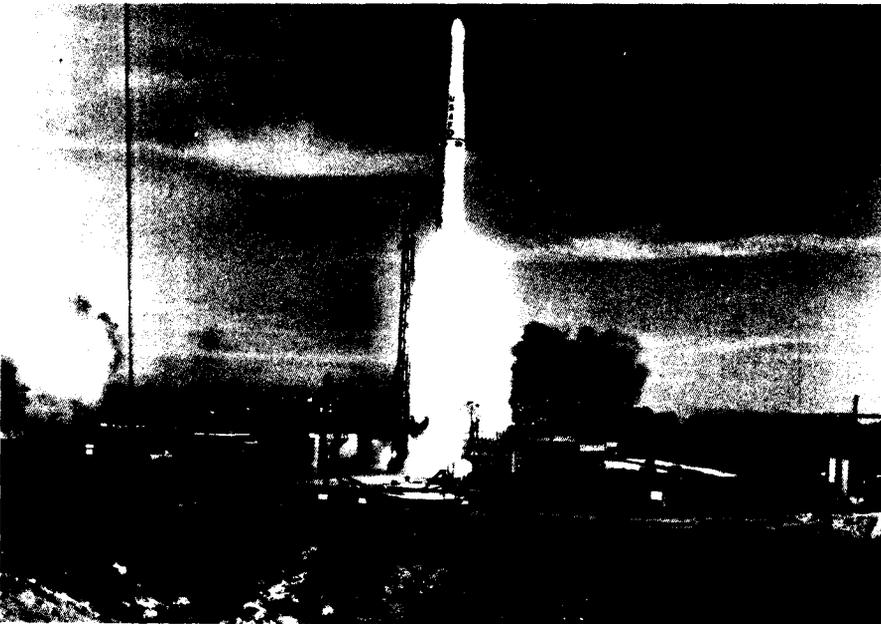


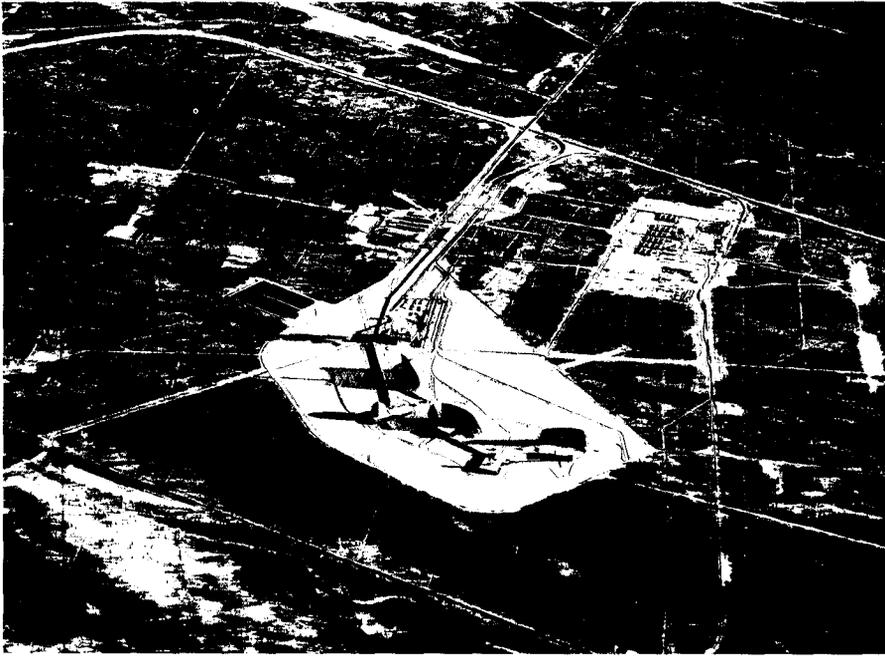
Above: President Dwight D. Eisenhower and Chief of Staff of the Air Force General Thomas D. White (center) view the *Discoverer 13* capsule, the first object recovered from space, at the White House; right: Ivan A. Getting, one of the creators of MOSAIC (Mobile System for ICBM Control), a precursor of the Global Positioning System.



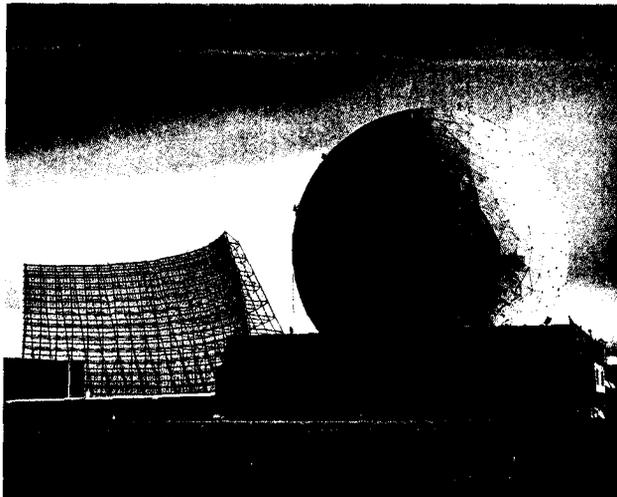


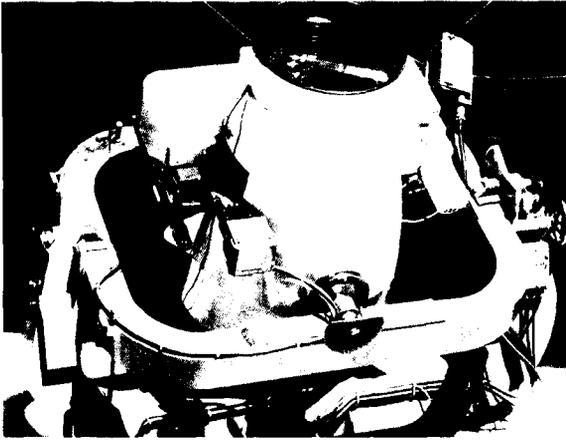
Left: Air Force systems and facilities, from the Atlas booster to ground-based range systems, were critical to the success of the NASA manned spaceflight program. Pictured is the launch of *Friendship 7* with astronaut John H. Glenn, Jr., aboard; below: Air Force Thor launch, *ca.* 1963.



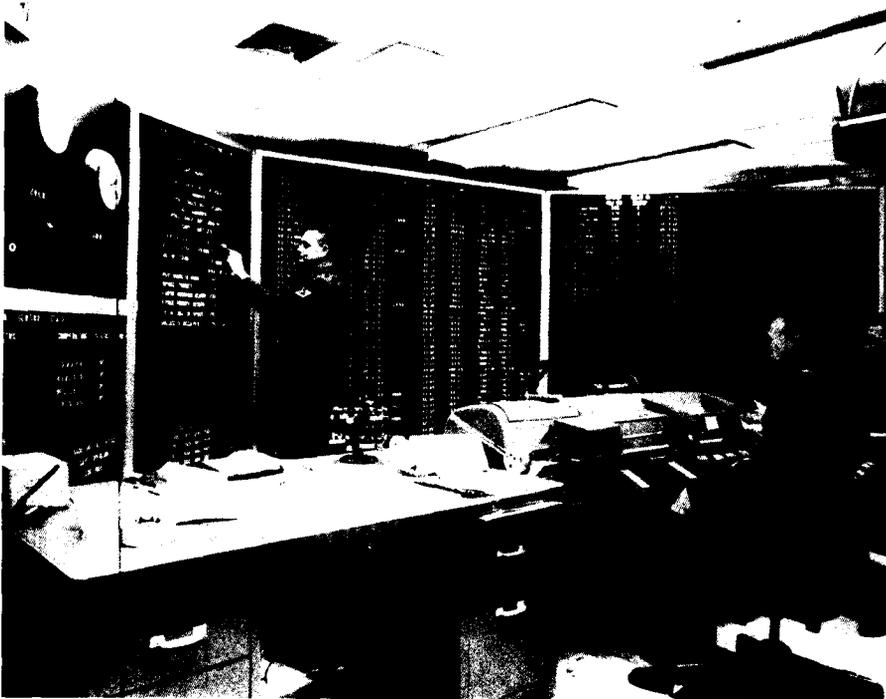


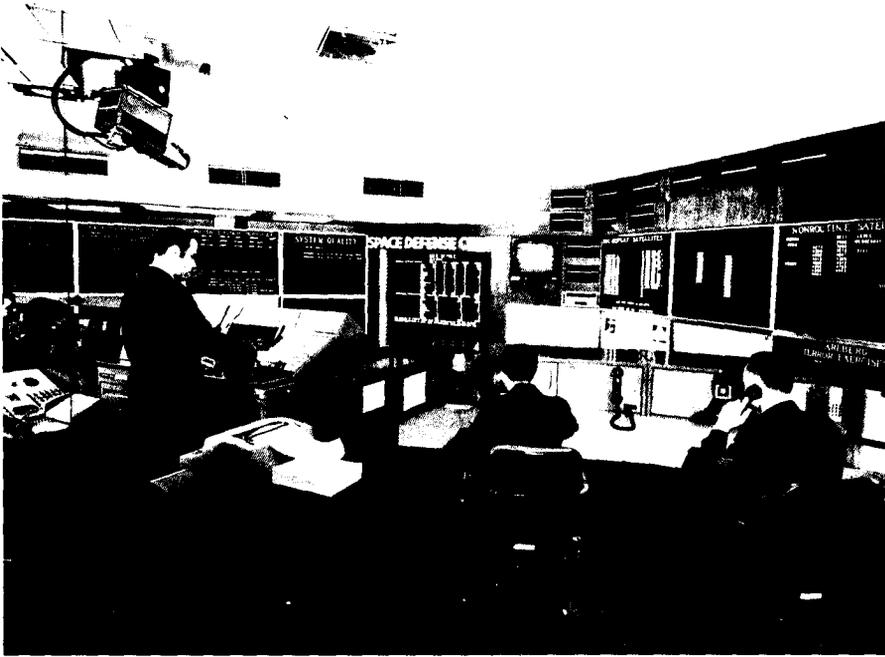
Above: Aerial view of Site II of the Ballistic Missile Early Warning System (BMEWS) at Clear Air Force Station in central Alaska; below: Ground-level view of a radar fan (left) and tracking radar radome at BMEWS Site II.





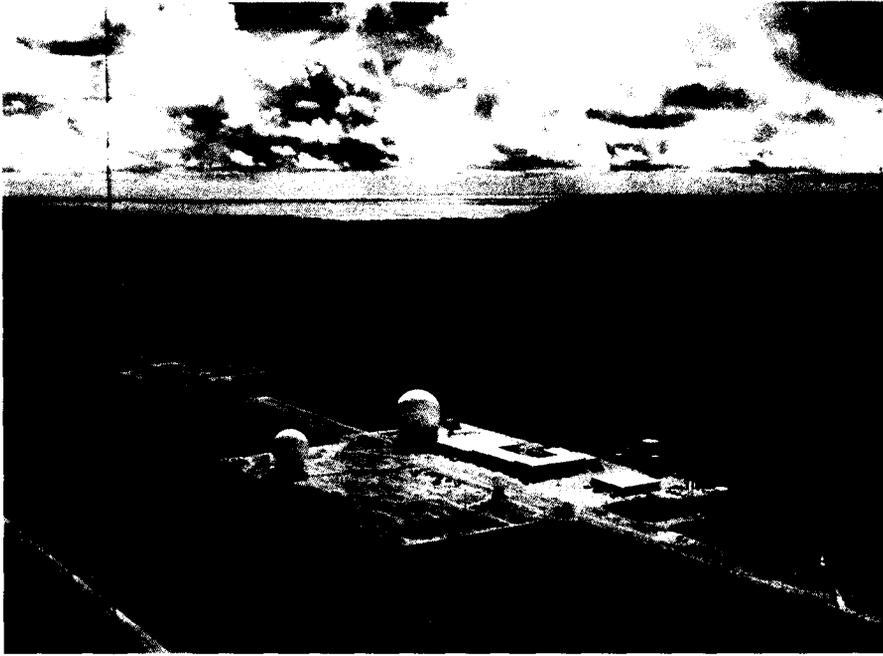
Above: Baker-Nunn satellite tracking camera, a workhorse in the Air Force's Spacetrack network for three decades; below: Space Detection and Tracking System (SPADATS)-Spacetrack Operations Center at Ent Air Force Base in Colorado Springs, Colorado, in the early 1960s.



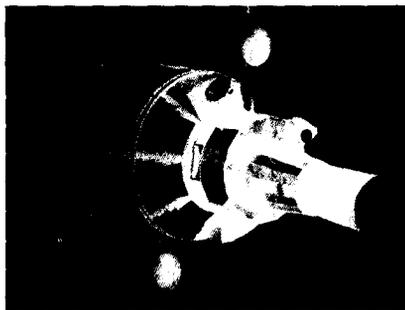
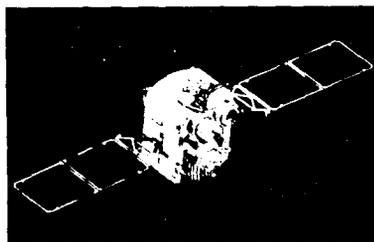


Above: Space Defense Center at the Cheyenne Mountain Complex in Colorado Springs, Colorado, in 1973; right: Artist's conception of an Initial Defense Communication Satellite Program (IDCSP) satellite.

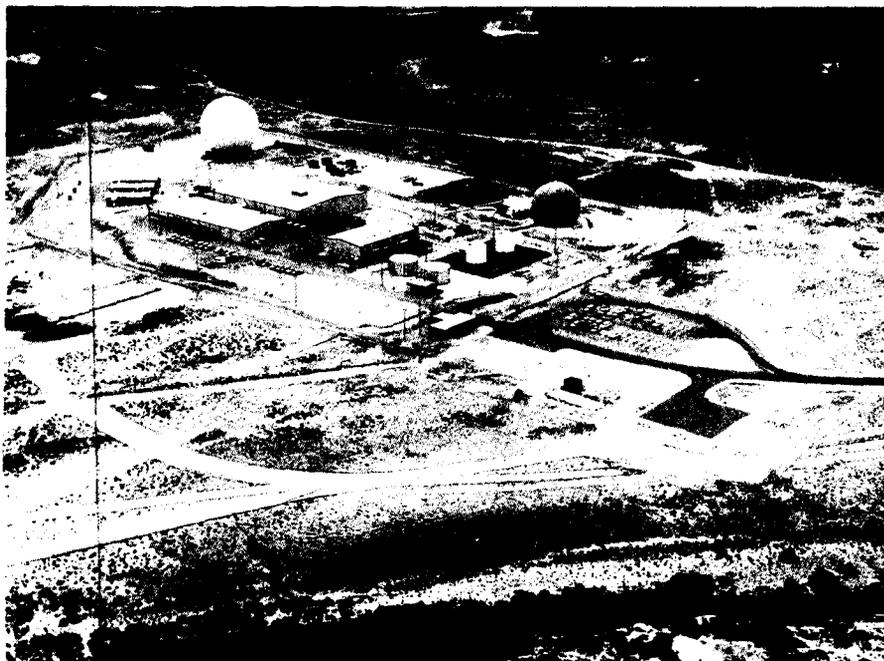




Above: Air Force Satellite Control Network station at Anderson Air Force Base, Guam; left: Secretary of Defense Harold Brown.

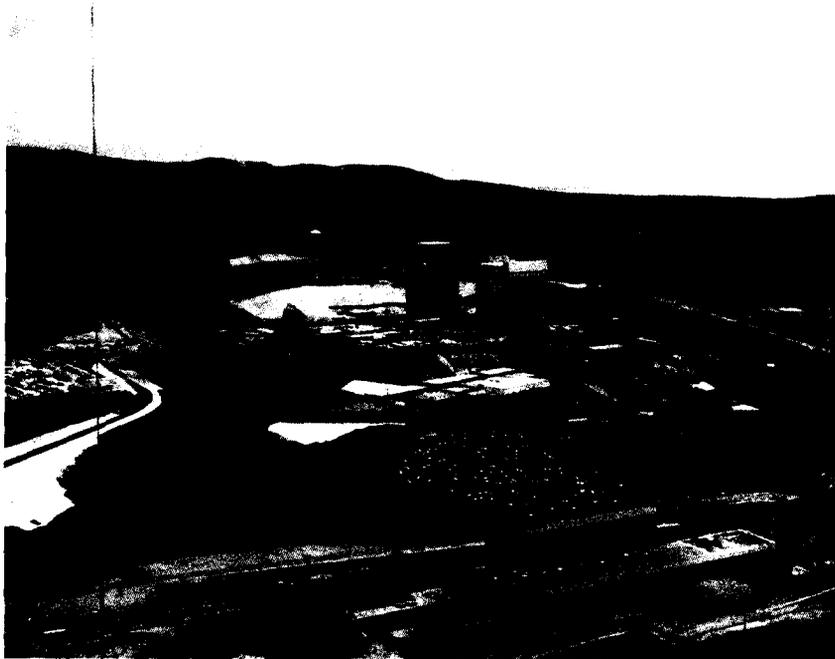


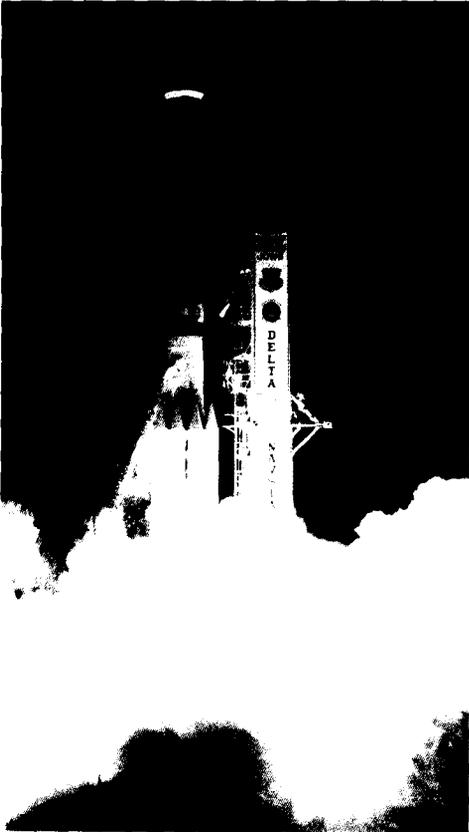
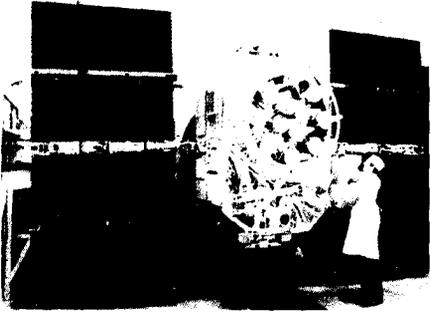
Top right: Defense Satellite Communications System (DSCS) III satellite (artist's rendition); right: Defense Support Program (DSP) satellite (artist's rendition); below: Defense Support Program Overseas Ground Station at Woomera, Australia.





Above left: General James E. Hill; above right: General James V. Hartinger; below: Space Launch Complex (SLC)-6 at Vandenberg Air Force Base, California, in 1986, at the height of preparations for west coast Shuttle operations.





Above left: Global Positioning System (GPS) satellite; above right: An F-15 fighter carrying an air-launched antisatellite weapon, a system cancelled by Congress in the mid-1980s; left: An Air Force Delta II launch vehicle lifts off from Cape Canaveral Air Force Station carrying a Global Positioning System satellite into orbit.

in manned spaceflight following cancellation of its Manned Orbiting Laboratory program in 1969. The Shuttle would represent the Air Force's third attempt to achieve a man-in-space capability, a quest that began with the aerospace plane "lifting body" experiments of 1950s, proceeded with the ill-fated Dyna-Soar boost-glide space-plane, and culminated with the MOL.¹³

By 1972, Air Force leaders like Secretary Robert C. Seamans, Jr., chose to emphasize the variety of services they expected the Shuttle to provide:

The shuttle offers the potential of improving mission flexibility and capability by on-orbit checkout of payloads, recovery of malfunctioning satellites for repair and reuse, or resupply of payloads on orbit thus extending their lifetime. Payloads would be retrieved and refurbished for reuse and improved sensors could be installed during refurbishment for added capability.¹⁴

The Secretary's rationale, which became the Air Force position in the years ahead, also encompassed the requirements of the surveillance and national reconnaissance "black world" space programs.

Moreover, Air Force leaders quickly realized the advantages of supporting a joint program that found NASA in the forefront. One legacy of the Kennedy-McNamara era continued to be the integrated nature of the nation's space program, which called for agreement between the civilian and military agencies on major national programs like the Shuttle. Although the Shuttle became a "NASA program," the civilian agency realized that Congress would not support the project unless military requirements could be satisfied. Tactically, the Air Force let NASA promote the Shuttle's man-in-space mission—and supply the bulk of project funding—while it stressed the economic advantage of saving up to 50 percent of projected launch expenses by adopting for the 1980s reusable boosters that, according to NASA projections, would average 60 flights annually. Characteristically, in the 1970s NASA would focus on its always uncomfortable budgetary battles with a parsimonious congress while the Air Force stayed in the background and remained uncompromising on military requirements. Evolving mission needs and technological challenges involving the most complex spacecraft yet attempted both added to the Shuttle's checkered course of development. Design changes would lead to cost increases, new launch-site requirements and, ultimately, schedule delays.¹⁵

Equal Air Force representation with NASA on the newly-formed Space Transportation Committee ensured that military requirements would be included in the various contractor design studies that assessed technology, scope, timing, and cost. From the start NASA and the Air Force differed over design and performance specifications—most notably those for payload weight and Shuttle size. NASA favored a cargo compartment 12 feet in diameter by 40 feet in length, but the Air Force insisted on dimensions of 15 feet by 60 feet. Likewise, the Air Force favored an expanded Shuttle design capable of launching a 65,000-pound payload into a

low-inclination earth orbit (38.5 degrees), and a 40,000-pound spacecraft into low-earth (100nm) near-polar orbit (98 degrees). It estimated that fully half of its future launches would involve heavy payloads in higher or geosynchronous orbit. This meant that the Shuttle would need to accommodate these payloads as well as Lockheed's so-called Orbit-to-Orbit Shuttle (OOS), or Space Tug, that would "shuttle" the spacecraft to higher orbits and return to the orbiter. NASA, on the other hand, preferred reduced requirements to keep down steadily rising projected development costs that threatened to jeopardize congressional funding approval for both the Shuttle and the agency's unmanned programs.¹⁶

Although the Air Force, fully supported by Defense Department officials, remained inflexible on its weight and size requirements, during 1971 the two sides reached agreement in a number of important areas. NASA responsibilities would continue to encompass design, development, and fabrication, with the Air Force serving as Defense Department agent responsible for military requirements. The two agencies would act jointly to choose launch sites, with the Air Force funding a second site, if needed, and launch rates and costs would be apportioned according to the type of mission and amount of supporting equipment used. Meanwhile, congressional scrutiny continued to compel NASA to extend design study deadlines in order to consider ways of achieving lower development costs. By the end of the year, NASA had decided to forego its earlier plans for a reusable, manned, flyback booster and to accept, instead, a simplified booster design in conjunction with a smaller, more efficient orbiter using an external, liquid hydrogen-liquid oxygen tank. Final design specifications, however, remained unsettled when President Nixon, with one eye on the ailing aerospace industry, gave formal approval to the Space Shuttle on 5 January 1972.¹⁷

In announcing the \$5.5 billion, six-year development program, the President declared the future Shuttle the "work-horse of our whole space effort." He said it would replace all expendable boosters except the smallest (Scout) and the largest (Saturn). By March of that year, NASA and the Air Force had reached agreement on the Shuttle's design. A delta-winged orbiter would be launched into low-earth orbit by the force of its three 470,000-pound-thrust liquid rocket motors in the orbiter, and two water-recoverable, solid-fuel rocket motors on the booster, each capable of four million pounds of thrust. An expendable, external, liquid-fuel tank completed the basic design. Following reentry, the orbiter would land on a conventional runway using a high-speed, unpowered approach. In effect, the Orbiter and Solid Rocket Boosters would be recovered, refurbished, and reused. Significantly, the 156-inch-diameter booster motors were the product of the Air Force's large-rocket development program that dated back to 1960. Although the new booster concept resulted in a drop in overall development cost from \$5.5 billion to \$5.1 billion, operational cost rose to \$10.5 million per mission, more than twice the original estimate. In the future, cost-efficiency would be dependent on achieving the high

launch rate projected for the 1980s. By this time, however, NASA had canceled plans for both the Space Tug and a fifth Shuttle orbiter, which contributed to a drastic reduction in annual flights and an increase in operational costs.¹⁸

In April 1972, NASA and the Air Force chose both the Kennedy Space Center and Vandenberg Air Force Base as sites for future Shuttle operations. Each would allow for water recovery of the booster motors. The Florida site would support research and development test flights and easterly launches, while Vandenberg would be used for payloads requiring high inclination polar orbits. The development schedule called for the first “horizontal” flight test in 1976, to be followed by manned and orbital flights in 1978, with full operations commencing by 1980.¹⁹

Yet, precise Shuttle objectives remained undetermined. As one author has noted, “the Space Shuttle emerged, but no decision on the goals of future spaceflight. Apollo was a matter of going to the moon and building whatever technology could get us there; the Space Shuttle was a matter of building a technology and going wherever it could take us.”²⁰ Such uncertainty, however, applied more to the civilian side of the Shuttle than to the military. To establish military utility, specific missions, and coordinate with other military departments, the Defense Department created in November 1973 the Defense Department Space Shuttle User Committee chaired by the Air Staff’s Director of Space. By the end of 1973, the Air Force and the Defense Department had agreed on a December 1982 operational date for Vandenberg based on refurbishing the old MOL Space Launch Complex 6 (SLC 6), and it had scheduled a phased replacement of the expendable boosters extending from 1980 to 1985. At the same time, an Upper Stage Committee appointed by the Space Transportation Committee examined Space Tug requirements and reaffirmed that a full-scale Space Tug with retrieval capability should be developed by NASA. In order to ease NASA’s ever-present budget hurdles and provide the agency a more deliberate development schedule, the Upper Stage Committee suggested the Air Force demonstrate its commitment to the Shuttle by developing a less costly Inertial Upper Stage (IUS) based on modification of an existing vehicle. The Air Force agreed, and accepted as its responsibility the interim upper-stage vehicle along with the Shuttle launch site at Vandenberg.²¹

Although the basic elements of the Shuttle program had fallen into place by 1974, technical and political problems would continue to play havoc with developmental and operational milestones. Along with its responsibilities for constructing the Vandenberg launch site and producing an interim upper-stage vehicle in place of a Space Tug, Air Force concerns would focus on how best to protect and control classified military space missions from NASA’s Johnson Space Center (JSC). Should they be handled by NASA’s controllers alone, or by an Air Force element collocated at the JSC? Or should the Air Force develop a new organization to replace or augment its overworked Satellite Control Facility in Sunnyvale, California? This organizational issue became one of many that confronted the Air Force in the latter half

of the decade. Already in 1974, however, the Shuttle had precipitated another, more contentious internal organizational dilemma. Because of the poorly defined line separating experimental from operational space systems, AFSC performed an operational role with on-orbit spacecraft. Understandably, AFSC received military development responsibility for the Shuttle through its SAMSO program office. But what of future responsibilities? Would SAMSO also serve as the military's "operational" organization for the Shuttle?²²

In April 1974, NORAD and ADC commander General Lucius D. Clay, Jr., seized the initiative by submitting a ten-page position paper to the chief of staff calling for an immediate decision to award ADC operational responsibility for the Shuttle. He argued that his command possessed the requisite experience through its service as the operational command for the ground-based space surveillance system and the newly operational Defense Support Program. Less direct in General Clay's argument was his motivation to justify the importance of his command's space role through award of the Shuttle. With the waning of ADC's air defense mission, the Shuttle could perhaps serve to preserve the existence of the command itself. Shortly thereafter, the Military Airlift Command (MAC), as the Air Force "transportation" agent, along with the Strategic Air Command (SAC) and Air Force Systems Command entered the bidding, each staking out its claim to the Shuttle.²³

The imminent operational status of new systems like the Shuttle compelled Defense Department and Air Force officials to begin reassessing whether systems should continue to be assigned to commands on an individual basis or, by contrast, be centralized in a single operational Air Force command. Traditionally, the Air Force and the Defense Department assigned space systems on a functional basis to the command or agency with the greatest need. As a result, Air Force Systems Command, for example, controlled military communications satellites, and Strategic Air Command managed meteorological satellite outputs, while the Aerospace Defense Command (ADC) operated the space surveillance and missile warning system. This arrangement proved workable as long as defense officials had to handle only a few satellites with modest capabilities. By the latter 1970s, programs such as the Global Positioning System (GPS), which possessed multiple capabilities serving a variety of defense users, promised to blur the functional lines enormously. If the Space Shuttle presented Air Force leaders with their greatest dilemma, by the end of the decade defense satellite systems provided an impressive array of potential applications for battlefield commanders. In a fragmented space community, however, many questioned their operational effectiveness.²⁴

The Growing Prominence of Space Systems in the Late 1970s

Few would argue that space systems in the 1970s achieved important milestones and became more important to military commanders. Yet, they experienced a variety of problems that prevented them from reaching their full potential. Both the opera-

tional capabilities they achieved and the frustrating limits on realization of their full potential made the military simultaneously more dependent on, and more concerned with, space systems by decade's end.

For example, by February 1974 the second series of Defense Satellite Communications System (DSCS) satellites had reached its full orbital configuration of four operational and two spare satellites positioned in synchronous equatorial orbit to provide global coverage to 72 degrees latitude. The DSCS II satellite network provided super-high-frequency communications support, without the problems of orbital drift and limited channel capacity that its predecessor series, the Initial Defense Communications Satellite Program (IDCSP) experienced. In February 1977, the Defense Communications Agency authorized full-scale development of the next generation, DSCS III, which would provide greater flexibility and security over six channels instead of two, as well as better jam-resistant and nuclear-hardening capabilities. Planners estimated DSCS III satellites would have a ten-year design life. On the other hand, developmental problems and funding shortfalls had pushed the expected operational date from 1981 to 1984.²⁵

The Navstar Global Positioning System also made good progress by decade's end. Rockwell International commenced full-scale engineering development in mid-1979, although four test satellites had been launched the previous year. Despite failures of atomic clocks which required the replacement of two satellites, by 1981 the full complement of five test satellites provided three-dimensional data one to two hours per day in support of a variety of Navy requirements. Originally, the three-phase project was to have a full complement of 24 satellites operational by 1984. By the early 1980s, however, budget shortfalls and technical problems led planners to conclude that it would be late in the decade before a fully operational system could be deployed to provide a 24-hour-a-day capability for global, three-dimensional positioning and weapons delivery. At the same time, budget reductions now had resulted in eliminating three satellites, which meant deploying an 18-satellite configuration with three spares. Program managers hoped that constant funding uncertainty would not produce "stretch outs" that would further delay operational milestones.²⁶

The Defense Support Program early warning satellites had performed admirably since the first launch in May 1971. Three years later the three operating satellites had detected nearly 1,300 missile launches, including 966 Soviet and 16 Chinese test flights, and they had exceeded or were approaching their estimated 15-month design life. Fortunately, in the mid-1970s, the unexpectedly long life of the satellites allowed engineers to retrofit those in the inventory with improved infrared sensors that provided more accurate missile launch counts and launch point determination. By the end of the decade, upgrades included a more sensitive Mosaic Sensor System to offset scanning limitations by continuously "staring" at the earth's surface, and a Sensor Evolutionary Development program. The latter included developing

mercury-cadmium-telluride sensor cells to give a larger number of infrared detectors greater sensitivity. Improved ground station computers and software completed the scheduled modifications underway by the early 1980s. At the same time, NORAD operators worried about coverage deficiencies and their inability to convince the Defense Department to provide backup satellites before deficiencies appeared with the operational spacecraft.²⁷

While all three military satellite systems experienced technical, managerial, and budget challenges that tended to characterize highly complex and advanced technological projects, none approached the difficulties surrounding the Air Force-managed, joint service Defense Meteorological Satellite Program (DMSP). A new generation of polar-orbiting satellites, known as Block 5D-1, was to provide better quality and more reliable weather data from its Operational Linescan System and twelve new or improved secondary optical and infrared sensors. From the first, delayed launch on 11 September 1976, however, a variety of technical and management failures continued to limit operational effectiveness of the two-spacecraft system to the point where Defense Department users at times had to rely on low-altitude National Oceanic and Atmospheric Administration (NOAA) meteorological satellites for weather data. Like the communications satellite program, DMSP also underwent protracted "convergence" discussions in the late 1970s to determine the feasibility of combining civil and military polar-orbiting weather satellite programs in order to avoid duplication and cut costs. Once again, the dedicated military program survived, but the uncertainty about its future contributed to delays in development of an improved Block 5D-2 series satellite, which would produce 25 percent more power from its solar array and use larger on-board computers and eleven special advanced sensors. Moreover, program manning and funding had failed to keep pace with the increased complexity and risk of the program. Indeed, the DMSP system remained largely nonoperational from December 1979 until the first launch of the new series on 20 December 1982.²⁸

The DMSP experience revealed the limitations in attempting too wide a technological leap between generations of satellites in an evolutionary system. At the same time, all satellite programs suffered from inconsistent funding, technical deficiencies, management weaknesses, and political interference. In the early 1980s all would require reconfiguration at great cost, first to allow launch by the Air Force Titan 34D booster and, then, to accommodate transition to the Space Shuttle. The advent of the Shuttle and the challenges involved in achieving reliable operational status of the satellite programs demanded greater attention in the last half of the decade.

The Space Detection and Tracking System's (SPADATS) ground-based space surveillance sensor network also improved its capabilities with the acquisition of three major new systems in the late 1970s and early 1980s. Operational since 1977, the Cobra Dane radar located on Shemya Island in the Aleutian chain, employed the new phased array technology which permitted the system to maintain tracks

on multiple satellites simultaneously. Three years later, two additional phased array radars joined SPADATS as collateral sensors. PAVE PAWS radars at Beale Air Force Base, California, and Otis Air Force Base, Massachusetts, functioned primarily as missile warning detectors for SLBMs, but also provided precise detection and tracking of satellites. A third new system joined SPADATS in the early 1980s first as a supplement, then as a replacement, for the aging Baker-Nunn deep space optical telescopes. Earlier, in 1978, the Air Force added the Maui Optical Tracking and Identification Facility (MOTIF) to the network. Unlike the Baker-Nunn cameras, the Maui system provided near-real-time observations by means of linking an optical telescope to a computer and television camera. The major improvement in deep-space detection capability, however, proved to be the Ground-based Electro-optical Deep Space Surveillance (GEODSS) System. Beginning in 1982, the Air Force expected to inaugurate the first three of five sites, each of which would operate two deep-space tracking sensors and one wide-area search telescope for coverage of lower altitudes. Yet, despite these improvements, proliferation of satellites in deep space and persistent coverage gaps promised to challenge the capabilities of SPADATS in the years ahead.²⁹

From its inception, the worldwide, ground-based space surveillance infrastructure had remained operationally focused, with assets owned by the Air Force and centralized under NORAD's operational control. By contrast, the satellite infrastructure, under the tutelage of Air Force Systems Command, always emphasized the research and development elements of its growth and operations. Only the Defense Support Program (DSP) early warning satellite system linked the two military space communities. Developed by AFSC, but operated by NORAD, DSP also represented the only operational satellite system wholly controlled by the Air Force. All others reflected tri-service or joint management and development. Little wonder that within the Air Force the perception developed that space systems perpetually remained in research and development rather than transition to the operational side of the service in the traditional manner, or that space systems represented Defense Department rather than Air Force programs and, consequently, did not deserve Air Force advocacy or funding. Any future organizational initiative would have to stress operational applications and more effectively combine the orbital and ground-based space communities.³⁰

NORAD and ADCOM commanders hoped their experience with both orbital and ground-based systems would enable ADCOM to serve as the space command of the future. Clearly the growing maturity of, reliance on, and problems associated with space systems in the late 1970s increased the pressure on Air Force leaders to normalize space operations by means of a more centralized organizational focus. At the same time, without a stronger national space policy, centralized management and control, and more capable systems, political and military leaders could not rest assured that increasingly important space systems would survive in the face of what

seemed a concerted Soviet effort to develop the capability to threaten Western satellites and their supporting facilities with antisatellite (ASAT) weapons. The fragmented military space program needed improvement across the board. For the Air Force, this challenge, if handled properly, could be a superb opportunity for the service to lead the effort to improve the military space program and, in so doing, perhaps regain its preeminent position as sole executive agent for Defense Department space activities.

Soviet ASAT Testing Prompts Space Initiatives

The ongoing national debate over détente, arms control, and the Soviet military buildup entered a new phase late in the Ford administration when the Soviets resumed antisatellite testing after a four-year moratorium. Renewed Soviet anti-satellite testing in early 1976 provided the impetus for political leaders, who already were alarmed about Soviet military expansion, to reassess all facets of the American space program. The resulting momentum for change produced major policy and organizational initiatives that had by decade's end put the nation firmly on the path to what advocates termed space "normalization," the integration of space assets in all phases of military planning and operations.

When the Soviets resumed co-orbital satellite interception testing in mid-February 1976, the United States had no antisatellite system operational or prototypical. The previous year it had finally terminated its only operational antisatellite system, Program 437, an Air Force project which involved launching nuclear-equipped Thor boosters from Johnston Island in the Pacific. Hampered by reliability and cost problems, as well as diminishing interest in a nuclear capability in the era of détente, officials placed the program on standby status in 1970 when Air Force launch personnel transferred to Vandenberg, and they deactivated the system on 1 April 1975. Later, in the fall of 1976, President Ford authorized a ground-based replacement in National Security Decision Memorandum 333, which resulted in a program calling for launch of a Miniature Homing Device from an F-15 aircraft.³¹

Shortly after the initial Soviet antisatellite test on 12 February 1976, Dr. Malcolm Currie, Director of Defense Research and Engineering, testified before Congress that "satellite vulnerability has to be a major issue for us, a major topic of study and of planning over the next few years. The question is, can we maintain space as a sanctuary or not?"³² That April, Dr. Currie requested from Air Force officials a thorough assessment of the Space Detection and Tracking System, the worldwide network of sensors linked to the NORAD Space Defense Center and responsible for locating and tracking all objects in space. Likewise, when his counterpart, Assistant Secretary of the Air Force for Research and Development John Martin, responded on 1 June with the first of three major studies, titled "Plan for the Evolution of Space Surveillance Capabilities," he approached the problem not by emphasizing the potential Soviet threat from weapons in space but from the "significantly enhanced military opera-

tions in other theaters made possible by the use of space systems.” In the years ahead, Air Force and Defense Department officials would continue to stress this theme of normalization, the application of space activities to military forces, throughout their struggle to bring some degree of order to the space program. The Air Force study submitted to Dr. Currie in the spring of 1976 proved to be just one of many analyses of space systems prepared during the next several years. The long and difficult process of developing an integrated systems approach to space requirements would culminate in 1982, with publication of the first portion of the Air Staff’s *Space Systems Architecture 2000*, which established plans and programs through the end of the century. Likewise, policy and organizational studies abounded during this period. If the many studies and analyses appeared symptomatic of problems in the space program, they also proved to be a means of promoting agreement on space issues throughout the defense community and, especially, within the Air Force. Without general consensus, necessary support for major organizational and doctrinal changes leading to an operational space focus would not be forthcoming.³³

In August 1976, the Ford administration continued to demonstrate its serious interest in space defense improvements by directing a “significant” increase in the Air Force’s space research and development funding and, in early November, establishing a Space Defense Working Group that consisted of representatives from the Defense Department, including the Defense Advanced Research Projects Agency (DARPA), the Joint Chiefs of Staff, and the services. Secretary of Defense Donald Rumsfeld recognized the divergent views present in the space community and called for a deliberate approach designed to “educate” people, create general agreement, develop a “broad-based understanding of DoD-wide Space Defense efforts..., facilitate the exchange of information..., and illuminate the important issues.” Although the working group could accomplish little before Ford administration officials left office in January 1977, it nevertheless helped pave the way for the Carter administration’s space initiatives.³⁴

Despite President Jimmy Carter’s reputation as a nuclear weapons “disarmer,” his administration ultimately belied its critics and profoundly affected the direction of strategic aerospace defense.³⁵ Under considerable pressure and much against his basic view of the country’s military requirements, President Carter found himself compelled to take increasingly bold measures to improve the nation’s defensive posture. Responding to changing perceptions of the Soviet threat, efforts to make the country’s command, control, and intelligence systems function effectively pointed toward a greater need for improved air, missile, and space defense. On the surface, one saw the stream of now predictable studies dealing with space policy and operations, which might suggest that officials achieved little of substance. Yet, by 1981, when the Carter team left office, the nation had received a revised, comprehensive national security space policy as part of what his Defense Secretary, Harold

Brown, termed the “countervailing strategy.” According to the new national defense strategy, the nation must be capable of responding to any type of nuclear or conventional threat.³⁶ The expanded national defense commitment resulted in strategic defense improvements in all areas, including space. The Carter years would prove decisive in setting the direction of the country’s space program, and Air Force leaders could cite major progress in organizational, doctrinal and system upgrade initiatives. Indeed, at decade’s end, the Air Force appeared on the verge of consolidating its claim to sole-agent status for Defense Department space matters.

Normally one would expect a new administration to take a deliberate approach to reassess defense programs through the customary procedures for policy review. Although the Carter team’s space policy did, in fact, emerge following a lengthy internal review, the new president’s interest in arms control issues prompted immediate action in space matters. During a press briefing on 9 March 1977, President Carter announced that he intended to propose to the Soviets mutual restrictions on antisatellite weapons, which accorded with established policy on peaceful uses of space. On the eve of Secretary of State Cyrus Vance’s visit to Moscow later that month, where he would raise the subject with the Soviets, President Carter signed Presidential Review Memorandum 23 which directed the newly established National Security Council Policy Review Committee to “thoroughly review existing policy and formulate overall principles which should guide our space activities.” Chaired by Frank Press, Director of the Office of Science and Technology Policy (OSTP), the committee intended to pay special attention to the problem of ineffective coordination and friction among the four major space users: the intelligence community, the Defense Department, federal space agencies like NASA and the National Oceanic and Atmospheric Administration (NOAA), and the commercial sector.³⁷

For over a year the OSTP assessed space policy issues before President Carter, on 20 June 1978, issued Presidential Directive 37, which described the “basic principles” of the nation’s space program. His directive focused on defense priorities. A National Security Council policy review committee would provide “a forum to all federal agencies for review of space policy and...rapid referral of open issues to the President.” NASA would continue to bear the overwhelming financial burden for the Shuttle, while the Defense Department, in the name of national security, had priority on all future Shuttle flights. Moreover, the Defense Department would emphasize satellite survivability and develop the antisatellite system that President Ford had approved. As the press release on the directive concluded, “the U.S. space defense program shall include an integrated attack warning, notification, verification and contingency reaction capability which can effectively detect and react to threats to U.S. Space Systems.”³⁸

Although the directive sounded like music to the ears of Air Force space enthusiasts, in the aftermath of its public unveiling the civilian space community found the policy too heavily weighted on the military side and pressed for an adjustment. As a

result, the Policy Review Committee prepared what became Presidential Directive 42, "US Civil Space Policy," issued on 11 October 1978. In this directive, the president focused on the potential for new nonmilitary space applications and explorations after Shuttle development resources had diminished. The administration also addressed the old issue of fragmentation of resources and stressed the importance of cooperative efforts to eliminate duplication. This set the stage for the "convergence" efforts to combine military and civilian communications and weather satellite programs. With the two directives, the nation now possessed a forceful, declaratory military space policy to serve as a point of departure for developing an effective, long-term space program. Even so, Air Force officers later would criticize the directive as not going further toward explicitly establishing the need for a warfighting capability in space.³⁹

Air Force leaders had not remained idle during the Carter administration's policy review. In fact, Air Force deliberations had begun late in the Ford administration with a reassessment of several tenets that over the years had developed as extensions of general national policy guidelines. Echoing General Thomas D. White, Air Force leaders affirmed that aerospace was a medium for performing missions rather than a mission in itself. Second, they said military space programs should be centered in one service, the Air Force, to promote maximum efficiency and economy. Third, the major factor in deploying space systems would be their potential effectiveness for space applications. Fourth, the Air Force would vigorously guard the principle of "space for peaceful purposes" while maintaining the military options to guarantee these purposes. Finally, Air Force policy called for strong, consistent support of, and cooperation with, NASA.⁴⁰

To generate momentum on space policy within the Air Force, the Air Staff's office of the Deputy Director for Plans and Operations proposed several new space tenets and sought support by soliciting comments in mid-November 1976 from Air Staff agencies and field commands. By January 1977, it reported to Vice Chief of Staff General William V. McBride that the respondents generally supported the tenets dealing with space for "peaceful purposes," cooperation with NASA, and the importance of the "aerospace" medium for the Air Force. Many of the respondents seriously disagreed, however, with the remaining two tenets, because assertion of Air Force space prominence had strong interservice implications. A cautious Air Force Chief of Staff General David Jones chose to await the incoming Carter administration's initiative on space issues before taking further action.⁴¹

By that spring, with the administration's policy review underway, the Chief of Staff acted. In a major Air Force policy letter issued in May 1977, General Jones seized the opportunity to establish an updated set of space policy tenets describing Air Force responsibilities that, he asserted, could provide the framework for further Air Force "efforts to develop plans and capability objectives for space." At the same

time, he hoped to influence the administration's deliberations on space. In response to "increasing reliance on space operations" and a "growing threat to the free use of space," Air Force space policy would comprise the following:

1. The Air Force affirms that among its prime responsibilities are military operations in space, conducted by the letter and spirit of existing treaties and in accordance with international law;
2. As DoD executive agent for liaison with NASA, the Air Force affirms its responsibility for close coordination on projects related to national security and for cooperation and support on projects of mutual benefit;
3. The Air Force affirms its responsibility for maintaining the freedom of space by providing needed space defense capabilities.

Space doctrine and employment discussions initiated at the time, however, would continue to founder for lack of consensus, and General Jones' policy letter would remain the official Air Force position on space for the next six years.⁴²

Although Air Force leaders carefully omitted claims to preeminence in the space community, the series of space studies and analyses that appeared in the next few years were less restrained. One of the first, and most important, appeared that July when the Air Staff's plans and operations office issued *A Study of Future Air Force Space Policy and Objectives*. It provided a crucial point of departure for efforts to achieve consensus on space within the wider Air Force, and it asserted the service's pretensions to space leadership.

Taking the now traditional view of "aerospace," the study's authors asserted that space should be viewed as a continuation of the atmospheric arena, where activity was most efficiently performed under a single manager. The Air Force possessed the expertise and a history of exploiting technology that made it most qualified to be that manager. In other words, it should actively pursue a "sole agent" policy by seeking, as a minimum, recognition as de facto executive agent for the Defense Department in all space matters and, ultimately, formal designation as sole executive agent. This represented the most explicit declaration in favor of advancing a "sole agent" policy within the Defense Department. As a first step, the study argued, the Air Force must put its own house in order by updating important documents and establishing a set of "corporately-endorsed" goals and policies for space. Overcoming this major obstacle would clear the path to the best use of space systems, whose capability objectives should focus on providing greater operational support to ground forces and credible deterrence at all levels of conflict. Although the authors endorsed the policy promulgated in May by General Jones, they believed further action would be necessary to convince the skeptics who questioned the survivability and usefulness of space systems. The authors harbored no doubts about the situation at hand. "We are presently at a juncture which presents the Air Force with a unique opportunity to set unambiguous policy and objectives for the future to maintain US military leadership in space."⁴³

In the wake of the July report, General Jones established a Space Operations Steering Group to provide a central Air Staff focus for space issues. Although the study's ringing call to action did not result in additional major initiatives during the remainder of 1977, subsequent comments and decisions suggest that the July 1977 Air Staff study established a benchmark for stimulating discussion and action on key space issues.⁴⁴ Unfortunately for advocates of rapid change in the space community, attention within the Air Force for the next two years too often focused on the slow death of the Aerospace Defense Command.

ADCOM's Demise and the Search for Space Consensus

Periodic threats to ADCOM's existence were nothing new in the first half of the 1970s. With its original anti-bomber defense mission in decline, it continually faced congressional and Defense Department pressure to streamline operations by cutting costs as well as eliminating personnel and subordinate headquarters functions.⁴⁵ In 1977, however, ADCOM's future also became enmeshed in the ongoing assessment of space organization and issues.

Early that year, an internal Air Staff evaluation of ADCOM led to a major review titled, *Proposal for a Reorganization of USAF Air Defense and Space Surveillance/Warning Resources*, known informally as the "Green Book" study. It proposed eliminating ADCOM entirely and parceling out its air defense resources to the Tactical Air Command (TAC), its communications facilities to the Air Force Communications Command, and its space assets to the Strategic Air Command (SAC). ADCOM's flamboyant commander, General Daniel "Chappie" James, labored mightily to save the command but to no avail. Although in the end he failed, his often contentious counterattack against the Air Staff's agenda sharpened the focus of the debate on space and contributed to major changes following his departure in late 1977. James' successor, General James E. Hill, arrived in December 1977 to assume command of a NORAD that had shrunk to 25 percent of its original 1957 contingent. Although he had no significant air defense experience, he became a strong advocate of air defense. He sought to prevent reorganization of the command by stressing the importance of the Canadian role in NORAD and the "logic" that would have ADCOM remain as a major command with responsibility for space operations.⁴⁶

General Hill found a key ally in Under Secretary of the Air Force Dr. Hans Mark, who objected to the element in the reorganization plan that called for combining strategic offensive and defensive forces in one command, SAC. Not only did the Canadians find this disquieting, said Mark, but advocacy for essential space modernization improvements would not receive sufficient attention from an offensive-oriented command. The energetic under secretary looked to ADCOM to establish a preeminent role for the Air Force in space. After a visit to NORAD/ADCOM headquarters in April 1978, for example, he expressed to General Hill his belief in the

future importance of space operations, and of ADCOM taking a “leading role in developing the requirements for the kinds of operations that we will have to carry out in space.” Mark actively—if unsuccessfully—pursued his argument for ADCOM’s space role at the highest levels of the Pentagon.⁴⁷

General Hill also vigorously lobbied the Joint Chiefs of Staff, General Jones and his successor, General Lew Allen, as well as his colleagues at the “Corona” conferences of four-star generals. His argument centered on the need for an Air Force space operations command. In the absence of an operational focus for space activities, he declared, key issues were surfacing which required immediate attention. Among these was the need to designate an operator for the Space Shuttle and Navstar GPS as well as a focal point for the man-in-space program and military use of the Shuttle. He also stressed the need for a responsive, dedicated military launch capability, and the integration of space systems into normal Air Force logistic-engineering channels. Overall, there had to be a focal point for operational requirements. Whereas the service had designated Air Force Systems Command to oversee the development of space systems and ADCOM to manage defense of space systems, no single command had been selected as the operator of space systems. General Hill proposed ADCOM as the logical choice.⁴⁸

The ADCOM commander next took his case to the Corona Pine meeting of four-star commanders in October 1978. He commented afterward that space had received considerable discussion, but he was surprised and disappointed at the lack of understanding of the issues among leaders from the other major commands and the meager support they demonstrated for his position. He noted that Air Force Chief of Staff General Lew Allen had responded coolly to his presentation, advocating instead the development of a “Space Defense Operations Center” and declaring that space represented a “long term thing.” He did not think a space command was not needed at that time. General Allen did, however, mention that he would form an Air Staff group to examine the feasibility of a future space command.⁴⁹

In fact, in September Dr. Mark had convinced Air Force Secretary John Stetson to suggest such a study group to General Allen. It would prove to have a major impact on Air Force space thinking. In early November General Allen appointed a nine-member Space Mission Organization Planning Executive Committee to examine all facets of space mission management including organizational responsibilities, operator participation, and command and control of space mission resources. Although general officers comprised the committee’s steering group, action officers under Colonel G. Wesley Clark of the Air Staff plans office bore the major research and analysis responsibilities. One of these, Lieutenant Colonel Thomas S. Moorman, Jr., future commander of Air Force Space Command and Vice Chief of Staff of the Air Force, recalled the crucial impact this committee had on later developments because of what he termed its “extraordinarily important socialization process,” which took place in two ways. Over the course of several months,

group members, who represented the entire spectrum of the space community, debated all aspects of the space program among themselves and with the generals who, in Moorman's words, became "socialized for the issues." The action officers benefited similarly, and many would play key roles in the subsequent establishment of the Air Force's Space Command. Colonel Moorman's experience also suggests that a recurring theme in the search for consensus on space involved bridging the gap between the larger group of committed middle-echelon officers and the more hesitant, skeptical senior leadership.⁵⁰

The *Space Missions Organizational Planning Study* that appeared in February 1979 described five alternatives ranging from the status quo to establishment of an operational space command. Although it had found consensus for greater centralization of space operations and for seeking Air Force designation as Defense Department executive agent for space, timing and specific organizational structure remained unclear. The Air Force's four-star generals received a briefing on the study at their February 1979 Corona meeting, where General Hill's efforts to provoke wide-ranging discussion on space once again proved unsuccessful. Although he noted that most generals favored aggressive, centralized management of space activities in principle, they remained divided on the specifics. Perhaps most significantly, General Allen at this time did not seem to favor centralized organization for space at all.⁵¹

General Hill continued to argue that ADCOM's space resources should be left in place to serve as the core of a future space command. Nevertheless, Air Force leaders proceeded with the reorganization of the air defense and space missions, which resulted in disestablishment of ADCOM as an Air Force major command (leaving the specified ADCOM in place*) with its air defense systems and its missile and space defense systems parceled out to Tactical Air Command and Strategic Air Command, respectively, in 1979 and 1980. Following extensive discussions, General Hill succeeded in retaining operational control of aerospace defense forces and responsibility for systems advocacy with the Joint Chiefs of Staff and Air Staff. Reflecting later on the turbulent years of ADCOM's demise and his efforts to retain a space mission, General Hill strongly believed that had Air Force leaders agreed with his proposal, they could have successfully achieved an operational space command four years earlier than they eventually did. On the other hand, commenting in 1982, on the eve of the Air Force's new Space Command, the retired former NORAD/ADCOM commander admitted that there existed, then, "a crystallization, an understanding, of where we are in space and an appreciation for the requirement for a space

* ADCOM, the Air Force major command, was inactivated on 31 March 1980 and replaced by a direct reporting unit, the Aerospace Defense Center. ADCOM, the specified command serving as the United States component of NORAD, continued until 16 December 1986, when it was inactivated and replaced by US Element NORAD.

command now that didn't exist 4 years ago and that I was unable to persuade people of."⁵²

As the ADCOM experience demonstrated, Air Force leaders like General Jones and his successor, General Lew Allen, preferred to compromise and proceed cautiously until they could be assured that parochial command interests had abated and that a sizable consensus within the Air Force would support new departures. The deliberately slow pace also reflected their own doubts, as well as their intention not to create unnecessary opposition from the Joint Chiefs of Staff, the other services, and Defense Department agencies. While the ADCOM reorganization plan postponed rather than precipitated final decisions on Air Force space arrangements, the process allowed time to build greater appreciation for space within the institution. The reorganization of ADCOM in 1979 represented only one of a number of important organizational changes for space that took place during the last two years of the Carter administration. These changes reflected pressure to accommodate the advent of the Space Shuttle, as well as the difficulty of achieving consensus on centralization of operational space activities.

The Organizational Prelude to an Air Force Space Command

The *Space Missions Organizational Planning Study* set the stage for a number of changes from 1979 to 1981 that consolidated space activities and emphasized the normalization of space operations. Understandably, most of the key changes involved the space research and development community and the imminent arrival of the Space Shuttle. On 1 October 1979, the day the Air Staff announced the inactivation of Aerospace Defense Command, Secretary Mark officially approved the Air Force decision to split out the functions of the Air Force Systems Command's Space and Missile Systems Organization (SAMSO), replacing it with two organizations—the Ballistic Missile Office (BMO) and the Space Division. Similar to the reorganization of 1961, this change reflected the strain placed on a single organization to manage ambitious missile and space programs, in this case the Missile-Experimental (MX) and the Space Shuttle. Unlike the earlier reorganization, however, the eagerly anticipated Shuttle had promised to produce the expanded "space age" that had failed to materialize in the 1960s.⁵³

Already the Air Force had for the first time centralized all launch functions under a single management headquarters, having reassigned the Eastern Test Range to SAMSO on 1 February 1977. Later that year, SAMSO formed a Space Transportation System Group at Vandenberg to prepare for Shuttle launch operations from the Western Test Range. With the activation of Space Division on 1 October 1979, the Air Force renamed the Patrick and Vandenberg Air Force Base range sites the Eastern and Western Space and Missile Centers, respectively, and subordinated them to the newly-designated Space and Missile Test Organization (SAMTO) at Vandenberg, which replaced the earlier Space and Missile Test Center.⁵⁴

The importance of impending Shuttle operations led planners to create two additional organizations. On 1 September 1980, a Space Division Deputy Commander for Space Operations was made responsible for all non-acquisition space functions, including coordination with NASA and the integration and operational support of all military Shuttle payloads. In effect, for the first time, the research and development community separated acquisition and non-acquisition activities, but it did little to clarify the line between experimental and operational systems. As a briefing paper produced by the Air Staff plans directorate stated, "We have recognized that space systems are different from other Air Force systems and have affirmed a much closer relationship between operator and developer for space." The old issue of development or operational priorities and responsibilities remained unresolved. Even for the plans and operations office, which invariably led the effort to have operational commands play a larger role in space activities, operational space systems still seemed to require special consideration from the research and development community.⁵⁵

The new organization also reflected the Shuttle's operational impact and challenges. Since early 1975 the Air Force had realized that NASA possessed inadequate facilities to protect classified data during military Shuttle missions. Although the Sunnyvale Satellite Control Facility handled classified satellite missions, concerns about its capacity and its vulnerability to sabotage or earthquakes made another location desirable. While planners studied the possibility of constructing a new control facility for both satellite and shuttle operations, they decided to establish a temporary secure, or "controlled mode," facility at NASA's Johnson Space Center in Houston, Texas. On 1 June 1979 Space Division activated the Manned Space Flight Support Group to handle Defense Department Shuttle missions and master the complexities of Shuttle operations in preparation for establishment of the Air Force's own Shuttle Operations and Planning Complex. The latter would join a new Satellite Operations Center in what planners referred to as the Consolidated Space Operations Center (CSOC). Meanwhile, the Sunnyvale Satellite Control Facility would report through Space Division's Deputy Commander for Space Operations.⁵⁶

Hans Mark led the Air Force effort to consolidate Shuttle and satellite operations under a new, single management headquarters and, along with NORAD commander General Hill, he emphasized the operational advantages of having the CSOC located in the Colorado Springs area close to Cheyenne Mountain. With strong support from the Colorado congressional delegation, they proved successful in having the Colorado site selected. Construction would begin during fiscal year 1982, with a scheduled completion date of 1985.⁵⁷

General Hill also succeeded in another area of space control. Since early 1978 he had lobbied to replace NORAD's Space Defense Center with a more ambitious, operationally-oriented control center in Cheyenne Mountain. Late in 1979, he received permission to form the Space Defense Operations Center (SPADOC), which

would serve as the sole “focal point for national space defense functions.” When completed by the mid-1980s, officials expected it to handle not only expanded SPADATS operations, but also to control potential antisatellite countermeasures. With the creation of SPADOC, the Air Force took another step toward an operational focus for military space.⁵⁸

A final organizational change on the road to a space command occurred when, in September 1981, the Air Staff created the Directorate for Space Operations within the office of Lieutenant General Jerome F. O’Malley, the Deputy Chief of Staff for Operations, Plans and Readiness. Since his arrival on the Air Staff in the spring of 1979, he had been a tireless champion of normalizing space operations in the Air Force. Complementing Hans Mark on the civilian side of the Air Force, General O’Malley provided a crucial, high-level, uniformed voice on operational space issues. His new office, he declared, was to “provide an intensified space focus...and to help reorient USAF philosophy toward an operational approach” by advocating the operational use of space systems at the highest levels of the Air Force. It would, he said, “provide a renewed emphasis that the Air Force plans to stay in the lead in military space operations.”⁵⁹

General O’Malley’s new office resulted from a recommendation by a study prepared in the summer of 1980 under the auspices of the Scientific Advisory Board. Although another in the long string of studies on space, it proved remarkably influential, even if its immediate impact disappointed the authors. Under the chairmanship of former Air Force Secretary John L. McLucas, fourteen distinguished civilian and military space authorities met in July 1980 to conduct what became known as the *Scientific Advisory Board Summer Study on Space*. The group concluded that, while the Air Force had done good work over the past fifteen years in evolving experimental systems into reliable operational ones, its leaders had only begun to recognize the capability of these systems for military operations. The study, which appeared in August 1980, focused on general deficiencies in the Air Force’s ability to perform the space roles outlined in the current draft manual on space doctrine. Technology in space, the *Summer Study* asserted, “does not provide” support to commanders; operational space objectives “are not clearly defined;” space systems are “not integrated” into force structures; and space requirements and employment strategy for operations “are [neither] clearly understood nor fiscally obtainable.”⁶⁰

“Inadequate organization for operational exploitation of space” accounted for much of the problem. This, the insightful study asserted, resulted from “a continuing perception that major Air Force commanders do not generally believe that the space program is an Air Force program in which all can take pride, can use to their advantage, can count on, and thus can support.” The authors concluded their analysis with a series of recommendations ranging from the importance of operational priorities to the need for inclusion of space systems in an integrated forces

architecture of the future. They also urged the Air Force to embrace a long-term “mixed fleet” launch strategy rather than to rely entirely on the Shuttle. This, they argued, would be the best way of ensuring reliable, timely military launches in the likely case that NASA’s ongoing Shuttle management and budget problems caused schedule delays and diminished capabilities.⁶¹

How influential was the *Summer Study*? In the near future the Air Force would develop an integrated space systems architecture that projected developments to the year 2000. A year after the study appeared, the Air Force officially adopted the mixed-fleet approach of using the Shuttle and expendable launch vehicles for the 1980s. General O’Malley found the *Summer Study*’s findings especially important. Not only did he act to establish the Directorate of Space, he worked to have Air Staff space program element monitors transferred from the research and development office to his own Directorate of Operations and Readiness, headed by Major General John T. Chain. General Chain and his staff of space reformers proved to be the driving force for organizational change in support of General O’Malley’s efforts. As O’Malley confidently declared, “I believe we can gain MAJCOM support by transferring space systems...into the operational community. If steps are taken at the Air Staff level to normalize space systems, these efforts will eventually permeate the MAJCOMs and the desired pride of ownership will take form.”⁶²

On the other hand, reflecting on events after the *Summer Study*’s appeared, Secretary McLucas ruefully observed that when he and fellow group member General Bernard Schriever approached the Chief of Staff about presenting the study’s findings at the October 1980 Corona conference, General Allen remarked that an already overcrowded agenda precluded discussion of their space analysis.⁶³ Later, the Chief of Staff lauded the report as part of several efforts, including several recent symposia on space and an important ongoing *Space Policy and Requirements Study*, for helping to focus Air Force efforts on near-term publication of an Air Force doctrine for space. Yet, in the fall of 1980, General Allen, whose strong research and development experience included positions as Deputy Commander for Satellite Programs in the Space and Missile Systems Organization, and Chief of Staff for Air Force Systems Command, again declined to authorize major organizational changes in the area of space operations. He cited the divergent views that emerged from the various studies and symposia, as well as among senior leaders during high-level discussions and conferences.⁶⁴

At the end of the decade, the space community appeared sharply divided over how best to proceed toward more effective space organization. Three positions claimed the broadest support. One favored the status quo and found its strongest supporters among the research and development community centered in Air Force Systems Command and its subordinate organizations. Space Division commander Lieutenant General Richard C. Henry, for example, argued that the organizational changes involving Space Division and the Shuttle were sufficient to insure proper

operational space leadership. He stressed the close relationship in the space community between research and development and operations.

{S}pace is different. Certain functions have to be kept together, specifically the development and building of a spacecraft, the integration of that spacecraft onto its launch vehicle, whether...an Orbiter, or a Titan, or an upper stage of some kind—its launch or orbit, and its on-orbit support. We have...the teamwork within Space Division...that gets the job done. I would be sad to see us forced into, for organizational reasons, the customer-developer relationship that we have today on the airplanes.⁶⁵

Another group, often including the Air Force Chief of Staff, seemed to favor a more centralized operational focus, including establishment of a major Air Force space command, but that group preferred to take a more deliberate, evolutionary approach. A third group, represented by General O'Malley, Hans Mark, and other missionaries for space operations, thought an operational space command long overdue and favored immediate action. At various times General Allen seemed to favor the views of the first or second group but, under considerable pressure, he eventually would come to support General O'Malley's position.⁶⁶

The question by decade's end seemed to center less on whether change should occur than on the proper pace of change. Although the series of organizational changes in 1979, 1980, and 1981 heartened space advocates, momentum for change had yet to achieve a level that promised immediate success. The "organizational prelude" had moved space further along the path toward normalization, but much work remained for General O'Malley and his supporters before they could expect to achieve broad agreement on space policy, doctrine, organization, and operations. Nevertheless, space proponents from the operational side of the house were closer to success than many realized. By the end of the Carter administration, the Air Force and the nation were much farther along the road to achieving consensus on policy and requirements for the nation's space program than surface changes might have suggested. Presidential Directive 37 established declaratory national policy, and Air Force leaders had made substantial progress on policy and doctrinal issues, as well as on determining requirements for future actions with respect to satellite survivability and antisatellite development. The Air Force had moved far toward what Colonel Moorman had termed "socialization for the issues." It remained for the incoming Reagan administration to provide the necessary final momentum. Given the new president's defense agenda, an overly cautious Air Force reaction to change might have found important decisions for space dictated by outsiders.

The Reagan Administration's Plan for Space in 1981

The new president took office in 1981 determined to upgrade the nation's military posture. His Strategic Modernization Plan, which called for major improvements in

all offensive and defensive areas, would provide important focus and momentum for change in the Air Force space community. For its part, the Reagan administration initiated the now traditional White House policy review for space, and the Defense Department followed suit.

Meanwhile, General O'Malley spearheaded yet another study to investigate means of broadening Air Force space policy to emphasize operational support. Shortly after the new administration took office, O'Malley assembled thirty people from four major commands and five Air Staff organizations for an intense four-month assessment of the advantages of, and requirements for, using space as a warfighting support medium. Building on the issues raised in the Scientific Advisory Board's 1980 *Summer Study*, General O'Malley's approach stressed the broad operational needs of user commands and the means of providing the necessary capabilities. When published in May 1981, the *Space Policy and Requirements Study* represented the most comprehensive analysis of the Air Force space program to date.⁶⁷ The influence of the *Space Policy and Requirements Study* on future organizational and doctrinal developments surprised many who worked on it, particularly since General Allen initially chose not to endorse its recommendations, which asserted Air Force space leadership and advocated a space-based "military" capability. By the end of the year, however, events would compel him to change his mind.⁶⁸

Already by the fall of 1981, General O'Malley had his Directorate of Space functioning under Brigadier General John H. Storrie as the Air Staff focal point for space and space-related plans and operations. By the end of 1981, the directorate was hard at work on an Air Force Space Master Plan and a detailed space surveillance architecture report that would set the stage for the ambitious *Space Systems Architecture 2000* study published in 1983. The influence of the *Space Policy and Requirements Study* also would be seen in the Air Force doctrinal publications issued in 1982 and, even earlier, in the administration's assessment of space policy and programs that commenced in the summer of 1981.⁶⁹

Within the Air Force, the events of late 1981 took on a momentum that threatened to outpace the desire or ability of Air Force leaders to control them. Organizationally, they resulted in agreement to form the Air Force's Space Command as the operational and management focus for Air Force space interests. Clearly, the Defense Department and White House policy reviews, together with the Air Force *Space Policy and Requirements Study*, created widespread support for major policy and organizational changes. Moreover, President Reagan's Strategic Modernization Plan, issued in October 1981, included provisions which called attention to space systems. Throughout the final weeks of 1981, Air Force leaders would seldom refer to President Reagan's October 1981 Strategic Modernization Plan in terms of its importance for or impact on space. Yet, the plan served as a call to action for the Air Force to get its house in order by agreeing on a reorganizational roadmap for future space activities.

From that point momentum increased for an Air Force decision on military space reorganization. Along with the interplay of several important events, the actions of a number of key individuals compelled General Allen to take action leading to creation of an Air Force major command for space operations. For one, Under Secretary of the Air Force Edward C. "Pete" Aldridge, who also served as Director of the National Reconnaissance Office, raised the strong possibility of creating a space command within the Air Force in a speech to the National Space Club in November 1981. Referring to the need for better coordination of space activities, he declared, "I believe the right answer may be some form of a 'space command' for the operation of our satellites and launch services." He proceeded to add that "the Air Force is moving in that direction now." For another, Congress now entered the scene more directly. Not only did Senator John Warner's subcommittee on strategic and theater nuclear forces express more interest in space organizational alternatives, but Representative Ken Kramer from Colorado Springs made Air Force leaders extremely uncomfortable by introducing a resolution calling for the Air Force to rename itself the "Aerospace Force." His House Resolution 5130 proposed that such a force "be trained and equipped for prompt and sustained offensive and defensive operations in air and space, including coordination with ground and naval forces and the preservation of free access to space for U.S. spacecraft." He also called on the Air Force to create a separate space command.⁷⁰

At the same time, the Defense Department policy review committee completed its initial draft space study, which raised the question of an Air Force response on organizational issues affecting space. Could the Air Force continue to remain on the sidelines? Taken together, these events of late 1981 prompted General Allen to act, but General O'Malley took the key step. In December O'Malley called together Generals Jasper Welch, Howard Leaf, Bernard Randolph, and John Storrie, along with four action officers, to discuss a course of action. Acting on their recommendation, General Allen directed the Air Staff to develop a "Space Policy Overview" paper as a "think piece" in preparation for the final Defense Department study results. Air Staff planners responded with a matrix, termed the "Navajo Blanket" because of its color-coded format, which outlined the complete range of space programs, costs, functional responsibilities, the impact of the Shuttle, future implications, and various organizational options. Significantly, the organizational alternatives centered on the five proposed in the 1979 *Space Mission Organization Planning Study*, including an ADCOM initiative to "dual-hat" Space Division's Deputy Commander for Space Operations as Vice CINCAD for Space. The Air Staff had its report ready for General Allen's review in early January 1982.⁷¹

The Air Force Forms a Space Command

As the President's Strategic Modernization Plan went before Congress in the spring of 1982, Air Force leaders continued to wrestle with the difficult management and

policy decisions for the future Air Force role in space. A cautious General Allen steadfastly determined to control the process of centralizing space efforts as much as possible. At the same time, it had always been imperative that key commanders, as well as a broad spectrum of the Air Force community, agree on the course ahead. By early 1982, although the reformers could rely on widespread support for the establishment of an Air Force operational space command, outside pressures made it difficult for Air Force leaders to control events.

In January a General Accounting Office report, produced at the behest of Senator and former astronaut Harrison Schmitt (R-New Mexico), brought additional pressure to bear by castigating the Defense Department for poor management of military space systems. Referring to space as a mission rather than a medium, it called on the Defense Department to create a single manager for space activities and to develop a comprehensive plan for the military exploitation of space. The report specifically suggested that funding be withheld from the CSOC project until the Defense Department presented a logical, effective organizational plan for military space operations. Understandably, Senator Schmitt favored Kirtland Air Force Base in his own state as the permanent site of the CSOC. The Air Staff responded by criticizing the report for considering space a mission, which might require special "space forces," rather than a place where the Air Force could carry out missions and special activities. Although Air Force officials had consistently viewed space as a medium for operations, it had become increasingly difficult to maintain a clear distinction between medium and mission. One might even argue that the establishment of a centralized command for space operations would blur the separation further.⁷²

In February 1982, a crucial event occurred that opened the door permanently for operational space advocates. At the Corona South commanders' meeting that month, General Robert T. Marsh, commander of Air Force Systems Command, proposed an evolutionary reorganization concept centered around his Space Division. According to his scheme, which stopped short of a new major command for space, the Space Division commander, General Henry, would also serve under NORAD/ADCOM Commander in Chief General James V. Hartinger as ADCOM's deputy commander for space and would maintain direct links to the Under Secretary of the Air Force by means of a special assistant on the Air Staff. If supporters of a greater operational focus for space disagreed with the proposal for a greater Air Force Systems Command role in space operations, they welcomed the new prominence of the issue in high-level discussions. In the months ahead, the move to establish an operational space command would also benefit from the good personal relations among West Point classmates Generals Hartinger, Marsh, and Henry.⁷³

General Allen, fortified with the conclusions of the comprehensive report prepared by General O'Malley's study group, directed Generals Marsh and Hartinger to work together to develop reorganization proposals. Soon thereafter an ad hoc

working group composed of representatives from Air Force Systems Command, Aerospace Defense Center, Space Division, and the Office of the Secretary of the Air Force began a two-month effort to reach agreement on potential management initiatives. ADC officers strongly favored a space command that would centralize space management, which at that time was spread among twenty-six major organizations, and would provide a focus for advocacy and wartime use of space systems. With representatives from the research and development community unwilling to sanction a space command, working group discussions proved difficult. Meanwhile, in testimony before Congress, Strategic Air Command commander General Bennie Davis declared that, "Unless the emphasis regarding operational systems is reoriented, the future prospects for coordinated and meaningful space systems development do not appear favorable. Operational requirements must begin to drive the direction of our technology efforts." In December 1981 General Davis had initiated discussions with ADCOM, the specified command, with the objective of returning defensive space systems to ADCOM's control. Then, in March, Under Secretary of the Air Force Aldridge became directly involved when Air Force Secretary Verne Orr charged him to examine the options for reorganization. In a letter to Vice Chief of Staff General Robert C. Mathis, Aldridge warned of "outside pressures" to establish a space command. In order to control the process, he declared, the Air Force should develop its own alternatives leading to an Air Force space organization.⁷⁴

In mid-April, with the momentum intensifying for an operational management focus, General Allen and senior Air Staff officers received the briefing from the working group. The Air Force Systems Command representatives presented a more elaborate version of their original plan, which had been outlined at the Corona South meeting. Senior Air Staff officers, notably General O'Malley, objected. During a lull in the discussion, General Hartinger offered the alternative of an Air Force major command for space, at which point General Allen decided that further planning efforts should be directed toward a separate space command. The plans for establishing the new organization would be handled by the Air Staff's Space Operations Steering Committee, then chaired by General Chain, who had succeeded General O'Malley as Deputy Chief of Staff for Plans and Operations when the latter was selected as Air Force Vice Chief of Staff.⁷⁵

By early May 1982, although general understanding existed on centralizing space functions, Air Force leaders had yet to reach formal agreement. In a sense, time seemed to be running out for General Allen if he were to retain control of the decision-making process. As he noted later,

I concluded...that [a Space Command should be formed] before I left office...since I did have a fairly conservative view of this, that it might be appropriate for me to go ahead and then have as much influence as I could in having the command structure not be overblown but get it underway.⁷⁶

In mid-May Air Force Secretary Orr appeared before Congress to reject Representative Kramer's proposal to rename the Air Force the Aerospace Force. He mentioned that a space command study was underway and nearing completion. Moreover, given the growing congressional and Defense Department consensus for consolidation of space activities, the Joint Chiefs of Staff might become involved and take over the issue. As long as Air Force General Jones remained chairman this would be unlikely, but current planning called for him to retire on 1 June. Then, the more aggressive Navy could very well mount a strong campaign for it to receive the space defense assignment. Furthermore, defense observers expected both Secretary Weinberger and the President to announce the findings of their respective space policy review groups in late June or early July. President Reagan planned to make a major policy address on space, and speculation suggested he might even announce the creation of a separate space service equal to the existing three.⁷⁷

On 21 June 1982, the day before the Defense Department announced the results of its space study, and a few days before his own retirement, General Allen appeared publicly with Under Secretary of the Air Force Aldridge to announce the formation of an Air Force space command that would become effective on 1 September 1982. General Hartinger would become commander of the new Space Command, while retaining his responsibilities as commander of the specified ADCOM and binational NORAD. The Space Division commander would serve as the vice commander of Space Command. As General Hartinger explained, the command would provide

a focus for centralized planning, consolidated requirements and an operational advocate and honest broker for USAF space systems. We will provide the operational pull to go along with the technology push which has been the dominate factor in the space world since its inception.

At the same time, the Air Force established a Space Technology Center at Kirtland Air Force Base, New Mexico, which consolidated the functions of three key Air Force Systems Command laboratories dealing with space-related research on geophysics, rocket propulsion, and weapons.⁷⁸

The official news release concluded with the intriguing statement, "It is the Air Force's hope and belief that Space Command will develop quickly into a unified command." Why, in view of consistent Air Force opposition to such a move for more than twenty years, did the service suddenly reverse itself? Clearly, in the early 1980s, the argument made by Admiral Arleigh Burke in 1959 and 1960 appeared more valid. At the same time, the price for the Navy's acceptance of an Air Force space command apparently was Air Force agreement to form a unified command. General O'Malley's Space Operations Steering Committee had provided what most observers assumed would be the alternative to ensure Air Force dominance in military space operations while satisfying Army and Navy concerns. The plan for an Air Force space command developed by General Chain's Space Operations Steering Committee called for a joint command, but it purposely left open the question of

whether the new organization should be a specified or a unified command. The committee assumed that General O'Malley would understand that a specified command would permit representation from the other services, similar to Aerospace Defense Command in its role as a specified command, while preserving Air Force management and command prerogatives. According to committee members, the proposed public announcement of the new Space Command first went to General O'Malley for approval without any mention of a unified command. They assumed that he understood a specified command would be the logical choice. After a meeting between General O'Malley and Vice Admiral Gordon R. Nagler, Director of Command and Control in the Office of the Chief of Naval Operations, however, the announcement included the final sentence calling for the prompt formation of a unified command. Afterward, committee members lamented that they had not been more specific about the need to select the specified command option. On the other hand, it is equally likely that General O'Malley found that Admiral Nagler's price for cooperation was the unified command alternative.⁷⁹

President Reagan used the occasion of July 4th to announce his new national space policy, which appeared in his administration's National Security Council Decision Directive 42. According to the White House policy statement, the basic defense objectives would embrace strengthening the nation's security, creating a Defense Department-NASA cooperative effort to ensure the Shuttle's use for national security and accord such missions launch priority, and deploying an operational antisatellite weapon. The latter received special mention as a specific program. The president also stressed the importance of satellite survivability and durability, once again highlighting his oft-repeated concern for command, control, communications, and intelligence (C3I) effectiveness. The new policy initiative also created a senior interagency group to implement space policy and "to provide a forum...for orderly and rapid referral" of policy matters to the president. The president's space policy clearly gave more attention to the national space program and the military significance of space.⁸⁰

The new Defense Department space policy complemented the President's national policy by stressing the need for a warfighting capability in space, and it had as its major theme the view of space as a theater of operations rather than a mission. General Charles A. Gabriel, the new Air Force Chief of Staff, incorporated this long-held viewpoint of many space advocates into the Air Force's manual on basic doctrine, AFM 1-1, published in March 1984 and, perhaps more importantly, in the first manual on space doctrine, AFM 1-6, issued in October 1982. Begun as early as 1977, the new doctrinal statement for space seemed to solve, once and for all, the issue of whether space should be considered a medium or a mission. As General Gabriel proclaimed, "space is the ultimate high ground...the outer reaches of the Air Force's operational medium—the aerospace, which is the total expanse beyond the earth's surface. Space, then, is an operational environment that can be used for conducting

Air Force missions.” Reflecting the increased emphasis on military space operations, he declared that “the nation’s highest defense priority—deterrence—requires a credible warfighting capability across the spectrum of conflict. From the battlefield to the highest orbit, airpower will provide that capability.” He then proceeded to outline military interests in space, along with Air Force functions and missions. The latter included various means of performing warfighting missions by way of ground- or space-based weapon systems “consistent with national policy and national security requirements.” Emphasis throughout centered on space as a medium that contributed to all Air Force mission areas. Although General Gabriel did not accompany the doctrinal publication with a formal Air Force policy statement to update General Jones’ July 1977 letter, Air Staff officers expected one to appear the following year.⁸¹

At the time the new Air Force space doctrine appeared, Air Staff planners were working with Defense Department officials on several comprehensive plans for space requirements and systems, using as a basis the *Space Policy and Requirements Study* of the previous year. In the spring of 1982, for example, General O’Malley had charged the Air Staff’s Space Directorate to chair a study of space surveillance systems, termed *Space Surveillance Architecture Study 2000*, which they expected to complete the following spring. More important, however, proved to be General O’Malley’s initiative of December 1982, a comprehensive approach to space policy, the space threat, and systems and technologies titled *Space Systems Architecture 2000*. Chaired by the new Space Command and including participants from the Air Staff, Air Force major commands, the Joint Chiefs of Staff and the Defense Communications Agency, this effort focused on preparation of a plan that would provide the basis for the administration’s entire defense modernization initiative.⁸²

The Air Force had reached a milestone on the space issue by the end of 1982. On the eve of President Reagan’s announcement of the Strategic Defense Initiative in March 1983, which would center on space capabilities, Air Force leaders could rely on doctrine as developed in AFM 1-6, a new Space Command to centralize operational space activities, and broad-based planning efforts then underway to chart the nation’s future course in space. At long last, the Air Force had committed itself to an operational space future.

An Ending and a Point of Departure

The creation of an operational space command represented the victory of the “space cadets,” those intrepid believers in the central importance of space to the Air Force future. A decade earlier they could not be considered in the mainstream of Air Force policy, plans, and operations. Space, declared its supporters, constituted a medium, a place for enhancing established mission elements, rather than a mission in itself. While this approach proved important for preserving the Air Force claim on space, it failed to attract strong advocacy for space programs or loyalty through-

out the Air Force to space as an Force element equal to aeronautics. Indeed, the “aerospace” concept contributed to the fragmentation of a military space community that seemed more comfortable within the world of research and development than in an operational environment.

Over the course of the 1970s the forces for change propelled space into the operational arena. Pressure came from many areas, both in and outside the Air Force. The altered perception of the Soviet military threat compelled even reluctant leaders, like President Jimmy Carter, to focus on space in order to make the nation’s defensive posture credible. When political leaders encountered a space community in disarray, they moved to promote strong policy and organizational reforms. The Air Force could not but respond to this kind of outside pressure, but building consensus internally for space required time, patience, and far greater understanding among senior leaders than was forthcoming in the 1970s. By the end of the decade, the studies, the conferences, the committee deliberations, the space symposia, all contributed to the necessary “socialization” process that created an appreciation for space previously absent in the Air Force. While these forces were at work, the space systems themselves demonstrated that they no longer should be considered experimental and part of the research and development side of the Air Force. Above all, the imminent arrival of the Space Shuttle made space operations a leading issue, and the various organizational initiatives of the research and development community could not halt the momentum toward centralized space operations. Pushed from without and buffeted from within, Air Force leaders acted as much to avoid external dictation as they did to direct the elements for change within the service.

If the creation of the Air Force’s Space Command served as an end point to the long struggle of the space reformers, it also represented a point of departure, a major step on the road to making space an integral part of the service. The challenges ahead appeared formidable. Possessing few resources, the new command would have to acquire space systems scattered among various Air Force commands, not all of which would gladly relinquish their forces. Effective command relationships would have to be established between Space Command and the research and development organizations, the other services, and most likely in the near future, a new unified space command. Above all, the new Air Force command would have to prove itself worthy of the space enthusiasts who saw in its formation the best means of institutionalizing space within the Air Force.