

CHAPTER 2

From Eisenhower to Kennedy: The National Space Program and the Air Force's Quest for the Military Space Mission, 1958–1961

The period from late 1957 to the spring of 1961 represents the watershed years of the national space program and the Air Force's place within it. In the wake of the Sputnik crisis, the Eisenhower administration implemented organizational and policy measures that provided the foundation of the nation's space program. Buffeted by pressure and counsel from an alarmed public and congressional and military spokesmen, President Eisenhower found himself fighting a rearguard action to hold to his view of civilian, military, and budget priorities for space activities. His dual military and civilian space program reflected his "space for peace" focus, one that fostered "open skies" for the free passage of future military reconnaissance satellites. Given the sensitivity of overflying the Soviet Union, during the formative years of his administration the civilian space program held center stage, while administration officials consciously downplayed the military space role and service initiatives.

Space advocates in all three military services and their supporters chafed at the government's refusal to sanction a broadly-based military space initiative in response to the Soviet menace. With visions of leading the nation into the space era, Air Force leaders found the situation especially frustrating. Relying on its "aerospace" rationale, they initially argued that the Air Force represented the logical service to head a unified, Defense Department-oriented national space program that would serve both military and civilian requirements. When it became clear that national policy preferred two programs, one a civilian-led effort dependent

on military support, the Air Force sought to become the “executive agent” for military space.

The challenge proved formidable. Shortly after Sputnik, concerns with inter-service rivalry and duplication, among other reasons, compelled administration officials to create the Advanced Research Projects Agency (ARPA) for all Defense Department space research and development activities. Although the services retained their missile programs, they temporarily lost their independent space programs to the new agency. Moreover, the creation of the National Aeronautics and Space Administration (NASA) in the fall of 1958 further divided the space mission and raised thorny issues of civil-military authority that persisted well beyond Sputnik. Despite repeated government statements to the contrary, for many, a civilian NASA conducted “peaceful” space ventures, while the Defense Department and the military services, by implication, engaged in warlike or non-peaceful space activities. Air Force leaders found “space for peaceful purposes” an albatross that prevented them from pursuing a space program they believed necessary to provide the nation with the security it required. The latter involved not only recognized defense support functions such as satellite communications, reconnaissance, and navigation activities, but potentially offensive functions in space through space-borne antisatellite and antimissile defense measures. The Eisenhower administration believed otherwise, and permitted nothing more than studies of weapons in space.

Constrained by administration policy and the prerogatives of NASA and ARPA, and without a space “mission” to call its own, the Air Force also faced stiff competition from its service counterparts. Indeed, by early 1958, the Army and Navy had far more experience in space than the Air Force. Their success in orbiting the nation’s first satellites (Explorer and Vanguard) seemed destined to propel one of them to victory in the quest for future space missions. Yet, by the spring of 1961, NASA had its sights on manned flight to the moon, ARPA had been relegated to obscurity, and the Army and Navy had been removed from any major role in space. The Air Force found itself effectively designated the executive agent for all military space development programs and projects. If Air Force leaders considered the victory incomplete, it nonetheless represented an impressive achievement that established the Air Force as the nation’s primary military service for space.

Sputnik Creates a “National Crisis”

The administration’s efforts prior to the Sputnik launches to downplay the American space program through a deliberately-paced civil and military research and development effort came to an abrupt halt following the electrifying news on the morning of 4 October 1957 that the Soviets had launched a 184-pound instrumented satellite into orbit atop a rocket booster weighing nearly 4 tons. By contrast, America’s yet-to-be launched Vanguard weighed only 3.5 pounds.¹ *Sputnik I* dramatically demonstrated that the Soviets possessed both a highly advanced

satellite program and booster technology sufficient to field an intercontinental ballistic missile force. For the first time, America seemed at risk of an intercontinental attack. Despite warnings of the psychological shock value of satellites repeated through various Rand studies and affirmed by the National Security Council a few years earlier, the administration found itself unprepared for Sputnik's "Pearl Harbor" effect on public opinion.²

President Eisenhower sought to reassure the American public and quell the press furor at home and abroad in his first news conference held five days after the Russian launch. On 9 October he downplayed the impact of Sputnik by declaring that, "so far as the satellite itself is concerned, that does not raise my apprehensions, not one iota." People had no reason to panic, and he would not involve the country in a needless space race or accelerate the launch schedule of the civilian Vanguard satellite. But neither the President's soothing words nor unfortunate public comments belittling the importance of the Russian effort by high-ranking administration officials proved able to silence a growing national debate over space and defense policies. They had a national crisis on their hands.³

At the same time, Eisenhower and his staff quickly perceived one important benefit from the Sputnik launch. Meeting with the President the day before his post-Sputnik press conference, Deputy Secretary of Defense Donald Quarles observed that "the Russians might have done us a good turn, unintentionally, in establishing the concept of freedom of international space." Eisenhower then requested that his advisors look five years into the future and provide an update of the Air Force's effort to develop a reconnaissance satellite. Clearly, the President intended to continue his public focus on civilian spaceflight and unrestricted satellite overflight to protect the viability of future military satellite operations.⁴

Throughout October administration officials reevaluated the entire missile program and discussed various courses of action. Then, nearly a month later, on 3 November, the Soviets successfully launched the 1,120-pound *Sputnik II* with its passenger, the dog "Laika." Although once again officials tried to calm troubled waters by claiming that the Soviet feat came as "no surprise to the President," the administration rapidly moved to gain control of the debate and reestablish confidence and prestige. On 7 November the President took one of his most important steps, appointing Dr. James R. Killian, his close confidant and chairman of the earlier Killian Committee, as Special Assistant to the President for Science and Technology and Chairman of the President's Science Advisory Committee. He immediately became the administration's "point man" for planning future space organization and policy.⁵

The day after Killian's appointment, the Defense Department authorized the Army Ballistic Missile Agency (ABMA) to proceed with preparations to launch its scientific Explorer satellite during the IGY under Project Orbiter as backup to Project Vanguard. Conveniently, incoming Secretary of Defense Neil McElroy had

been visiting the Huntsville, Alabama, complex when the Soviets launched *Sputnik I*. Project director Brigadier General John B. Medaris and Wernher von Braun seized the opportunity to promise a successful Jupiter launch within ninety days. When they received official approval on 8 November, Medaris' team had been hard at work on the Orbiter booster since 5 October. Their hard work would pay off on 31 January 1958, when *Explorer 1* became the first U.S. satellite to achieve successful orbit. Although its miniaturized electronics relayed important scientific data, including discovery of the Van Allen radiation belts surrounding the earth, its 10 ½-pound payload seemed less impressive to the American public than the far larger and heavier, if less scientifically valuable, Sputniks.⁶

Secretary of Defense McElroy followed the Project Orbiter decision by announcing on 20 November his intention to create a new defense agency to control and direct "all our effort in the satellite and space research field." Representing the first step in reorganizing the government for space, Secretary McElroy planned to establish the Advanced Research Projects Agency (ARPA) in early February 1958 at a level above the three military services.⁷

The Air Force Seizes the Initiative

Meanwhile, the Air Force had been far from idle in the aftermath of *Sputnik I*. While Army and Navy teams continued preparations for Projects Orbiter and Vanguard, respectively, Air Force leaders in late 1957 initiated their own sweeping assessment of the nation's space activities and prospects. They hoped to develop a program of action with the Air Force playing the central role. The wide-ranging post-Sputnik debate on the national space course ahead seemed to present Air Force leaders with a golden opportunity to claim for their service the nation's space mission.

On 21 October 1957, Secretary of the Air Force James H. Douglas convened a committee of distinguished scientists and senior Air Force officers chaired by Dr. Edward Teller to evaluate the nation's missile and space programs. Completed in just two days, the Teller Report chastised the government for administrative and management practices that, it said, prevented either civilian or armed services agencies from achieving a stable and imaginative research and development program. It recommended a unified, closely integrated national space program—under Air Force leadership. A centralized program, the committee argued, would provide focus for an expanded national space program and avoid the divided effort likely to result from a fragmented program. Although the report received attention at high levels of the government, in the unsettled post-Sputnik period it failed to convince government officials to adopt a unified program either under military or civilian direction. Ultimately, the President would commit the nation to a dual program with separate military and civilian elements.⁸

On 7 November 1957, the Air Force's legislative liaison team, alarmed by what seemed to be a preference among congressmen for the Army's space initiatives, de-

scribed the challenge confronting the Air Force. To avoid defeat in the race for the space mission, the Air Force must base its legitimate case on the position staked out in 1948 by General Vandenberg, that flight in the upper atmosphere and space represent logical extensions of the traditional Air Force realm of operations and the natural evolution of its responsibilities. The officers urged Air Force spokesmen to “emphasize and re-emphasize the logic of this evolution until no doubt exists in the minds of Congress or the public that the Air Force mission lies in space as the mission of the Army is on the ground and the mission of the Navy is on the seas.”⁹

On 29 November 1957, Chief of Staff General Thomas D. White made this theme the focus of an important address to the National Press Club. As airpower had provided the means to control operations on land and sea, so in future “whoever has the capability to control space will likewise possess the capability to exert control of the surface of the earth.” For the Air Force, he said, “I want to stress that there is no division, per se, between air and space. Air and space are an indivisible field of operations.” By implication, an Air Force role in space must embrace offensive operations to provide proper national security. Publicly, Air Force leaders would seldom admit that the atmosphere and space represented fundamentally different mediums. In his talk, General White also addressed another basic institutional theme, affirming the service’s traditional research and development focus. The Air Force still depended, he said, on the “skills, talent, ingenuity and cooperativeness of...science and industry to provide us the technological lead we need in the future.” This future would be in space.¹⁰

In public addresses and Congressional testimony, General White and other Air Force spokesmen, including Under Secretary of the Air Force Malcolm A. MacIntyre, Lieutenant General Donald Putt, Deputy Chief of Staff for Development (DCS/D), and Major General Bernard A. Schriever, commander of the Air Force Ballistic Missile Division (AFBMD), would focus on the concept of space as a continuum of the atmosphere, a place for potential military-related operations rather than a function or mission in itself, and the logical arena for Air Force activities. Early in the new year, Air Force leaders coined a new term, “aerospace,” to describe their service’s legitimate role in space, and the following year “aerospace” officially entered the Air Force lexicon when it appeared in the revised Air Force Manual 1-2, *United States Air Force Basic Doctrine*, issued on 1 December 1959. According to the manual,

aerospace is an operationally indivisible medium consisting of the total expanse beyond the earth’s surface. The forces of the Air Force comprise a family of operating systems—air systems, ballistic missiles, and space vehicle systems. These are the fundamental aerospace forces of the nation.¹¹

Along with policy and planning issues, the Air Force also addressed internal organizational concerns for space. To provide better focus for future Air Force space

activities, on 10 December General Putt revealed the formation within his office of a Directorate of Astronautics, headed by Brigadier General Homer A. Boushey, whose long career in the “space” field included early rocket-assisted flight experiments with the von Kármán team during World War II. However, having created the new office without consulting Defense Department officials, General Putt and other Air Force leaders were chagrined by the vehement opposition from senior defense officials like William Holaday, newly-appointed Defense Director of Guided Missiles, who accused the Air Force of wanting “to grab the limelight and establish a position.” This, of course, is precisely what the Air Force intended to do. When Defense Secretary McElroy objected to the term “astronautics” and criticized the Air Force for seeking public support, Air Force leaders realized they had overstepped military boundaries. The firestorm of protest convinced General Putt to rescind his memorandum three days later. Although Air Staff leaders remained committed to strong centralized headquarters direction of space projects, they continued to face roadblocks from administration officials.¹²

Unable to establish the Air Staff directorate in late 1957, the service’s space supporters during the first six months of the new year followed the temporary expedient of coordinating USAF space activities through the Assistant Chief of Staff for Guided Missiles. Only in late July 1958, after the proposed civilian space agency received congressional approval and the National Security Council revised space policy, could the Air Force create a central Air Staff office for space. Even then, the term “astronautics” could not be used, and General Boushey’s new office under the DCS/Development became the Directorate of Advanced Technology. Sharing space responsibilities with the Assistant Chief of Staff for Guided Missiles, General Boushey would have to wait another year before his office could be upgraded to assume direction of all headquarters space activities.¹³

In retrospect, given the administration’s emphasis on strategic reconnaissance, of which he was well aware, General Putt should have been sensitive to any suggestion of an expanded military role in space. Four days after Sputnik, he and Vice Chief of Staff General Curtis E. LeMay met with Deputy Secretary of Defense Quarles to apprise him of the state of the military reconnaissance program and potential for satellite offensive operations. Quarles readily supported the Advanced Reconnaissance Program, which would become the government’s most important space project. Yet, when the two officers advocated an offensive space role to forestall potential Soviet satellite weapon carriers, Quarles in no uncertain terms directed the Air Force not to consider satellites as weapon platforms and to entirely eliminate satellite offensive applications from future Air Force space planning. Air Force leaders would continue to find that the policy of “peaceful uses of outer space” embraced the development of reconnaissance systems but never offensive weapon systems. Weapons in space threatened the reconnaissance assets judged vital to national security.¹⁴

By the end of the year, the Air Force's initial foray into the space contest had produced mixed results. Its leaders had established the service's policy position for a legitimate space role, yet the lack of a Defense Department response to an Air Force-led space plan for the nation and Air Staff's rebuff suggested the need for a more cautious strategy to achieve Air Force space objectives. In future efforts, the Air Force would develop policy, planning, and organizational proposals as part of a well-organized quest for the military space mission.

The Government Organizes for Space

Beginning in early 1958, the administration took action to create a national space program. Its focus centered first on organizational measures, then embraced policy issues. By late summer, the National Space Act confirmed a dual civilian-military program designed to pursue a policy of space for peaceful development and exploration. Along the way, the administration and Congress considered various options in their attempt to create the optimum civilian-military balance. Although their decisions would prove enduring, they left unclear the precise relationship between military and civilian space responsibilities.

During the first week of the new year, the Defense Department requested a list of proposed space projects from each of the three services. Air Force leaders viewed this request as an open door for approval of a USAF space program. It had devoted considerable thought to the future space needs of the country ever since the first Sputnik flight and the Teller Committee's deliberations. In early December 1957, the Scientific Advisory Board reported on the subject of space technology. Pointing out that Sputnik and Soviet ICBM capability had produced "a national emergency," the board focused on the rocket field as the area which provided the Air Force the best means of contributing to "a proper national response." Its six-point program also included an accelerated reconnaissance satellite effort and a "vigorous" space initiative with an "immediate goal of landings on the moon." Both military manned space-flight and the WS-117L Advanced Reconnaissance System would remain centerpieces of future Air Force space proposals, while Air Force leaders would quickly realize that the relationship between missiles and space systems would prove the most effective key to achieving Air Force preeminence in military space.¹⁵

The result of the Air Force's post-Sputnik deliberations appeared on 24 January 1958, when the Air Staff submitted to the Director of Guided Missiles its "Air Force Astronautics Development Program." It comprised five major space systems: Ballistic Test and Related Systems, a lunar military base system, manned hypersonic (Mach 5 and above) research, the Dyna-Soar orbital glider, and the WS-117L Satellite System. Planners further divided the five proposals into twenty-one major projects that embraced a variety of military missions deemed "essential to the maintenance of our national position and prestige." The planners urged that special emphasis be

accorded getting man into space at the earliest time.* Testifying before Congress in early January, Major General Bernard A. Schriever, Commander of the Air Force Ballistic Missile Division, emphasized that the Air Force possessed the means of developing an astronautics program with no detriment to ballistic missile programs. Much to its disappointment, the Air Staff received no reply from Mr. Holaday's office, and Air Force efforts to lead a national space effort proved fruitless. Statements by General Putt and his deputy, General Boushey, advocating missile-firing bases on the moon and eventually militarizing the planets alarmed rather than reassured their audience of civilian leaders in Congress and the Defense Department. By late February, the Air Force initiative had been "overtaken by events," and the Assistant Secretary of Defense assumed responsibility for coordinating military inputs for a national policy on outer space. When the Secretary of Defense created the Advanced Research Projects Agency on 7 February, frustrated Air Force officials realized that the Defense Department's request to the services represented little more than an effort to gain information that would assist the new Defense Department agency in assigning space development responsibilities among the Army, Navy, and Air Force.¹⁶

The comments by Generals Putt and Boushey reflected the uncertainty of the period and the great unknowns of space in the aftermath of Sputnik. After the demise of the Air Force initiative, Air Force leaders responded to the Defense Department's attempt to coordinate a policy input for the administration by calling for more basic knowledge to determine the potential and limitations of manned and unmanned spaceflight before formulating a national policy covering all available and contemplated space programs. Air Force thinking in the months ahead would be characterized by an emphasis on a "building blocks" approach to space development rather than on advancing fanciful ideas for military bases on the moon and planets from which to attack countries on Earth.¹⁷

ARPA Takes Control

ARPA began operations amid a flurry of great expectations from its admirers and dire warnings from its detractors. Secretary of Defense McElroy declared that the new agency would provide a "single control...of our most advanced development projects," while the services would continue with research and development of weapon systems that clearly fell within the "missions of any one of the military departments." ARPA, in fact, gained control over all U.S. space projects, military and civilian, until the National Aeronautics and Space Administration (NASA) commenced operations in the fall of 1958. For another year thereafter, the Defense Department agency retained control, including funding, of all military space

* See Appendix 2-1.

projects. The initial delineation of responsibilities between ARPA and the services proved difficult to maintain. Yet ARPA fulfilled two important administration objectives. For one, it ended the low military priorities heretofore accorded space technology in the absence of clearly defined military applications. For another, it offered the laudable prospect of avoiding interservice rivalry and wasteful duplication by transferring service decision-making power on space projects to the Defense Department agency.¹⁸

The congressional committees charged with military oversight viewed with suspicion any increase in the powers of the Secretary of Defense at the expense of the military services. In early January 1958, General Schriever and other military spokesmen testified against the creation of any agency with authorization to go beyond policy formulation and program approval to perform development and contractual responsibilities. Research and development, they argued, should be left to the services. Secretary McElroy promised Congress that ARPA's initiative would "be developed in coordination with the military departments to the point of operational use, so that... [weapon systems]... may be phased into the operation of one or more of the military services with a minimum loss of time or interruption of development and production."

The Air Force was not entirely reassured. Roy Johnson, ARPA's aggressive director, seemed too independent of service wishes and possessed too much authority over service space programs. Moreover, the President made ARPA responsible for civilian space projects as well until the proposed civilian space agency became operational. Nevertheless, until ARPA assumed control of most Air Force programs in late June, Air Staff planners, perhaps guilty of wishful thinking, continued to advocate an independent Air Force space program. As the historian of the Air Research and Development Command pointed out, the "classic and foreboding example of things to come... proved to be the reconnaissance satellite program, perhaps the most important single Air Force space program to light upon ARPA." Initially the Air Force applauded ARPA's focus on accelerating the WS-117L program on "the highest national priority basis." In response to Sputnik, by September 1958 ARPA had reprogrammed the Advanced Reconnaissance System into separate component projects with revised designations. The reconnaissance element received the name, Sentry, while MIDAS referred to the infrared sensing system. Under the designation "Discoverer," a cover for the covert CORONA project, ARPA grouped "vehicle tests, biomedical flights, and recovery experiments." In the fall of 1958, ARPA assigned all three projects to different Air Force organizations.

Operating on a project basis, ARPA direction signaled the end of "concurrency," the centralized systems management practice that had proven so successful in the crash ICBM program. In October 1958 ARPA also terminated the Weapon System (WS) designation altogether, declaring that the "system approach employed by the Air Force would be altered in such a way that all other items of the former 117L

system would be budgeted as subsystems or components...for reasons of budget justification and program management.” Omitting the weapon system designation contributed to the administration’s low-profile approach to military space activities.

The other Air Force space programs received similar treatment from ARPA following their transfer in late spring.* The Defense Department agency organized its newly-acquired space activities into four broad programs: Military Reconnaissance Satellites, Missile Defense Against ICBM, Advanced Research for Scientific Purposes, and Developments for Application to Space Technology. Although ARPA redistributed most programs back to the Air Force and the other services, it did so under contract, thereby retaining technical and fiscal control and receiving credit for “its” programs. The Air Staff might set requirements, but ARPA made the decisions, directed the efforts, and dealt directly with other agencies and with private industry.

Air Force leaders also found ARPA’s operating procedures highly unsettling. In late March Johnson informed the service secretaries that he intended to “cut red tape” and deal directly with subordinate agencies like the ARDC, AFBMD and other space and missile centers, bypassing established chains of command. At the Air Research and Development Command, for example, ARPA personnel frequently approached individuals and offices directly, which led ARDC commander Lieutenant General Samuel E. Anderson to establish a “focal point” to coordinate ARPA-ARDC activities. Even so, the “focal point” officer and his small staff faced considerable opposition from within the command and criticism from General Boushey’s Directorate of Advanced Technology before they succeeded in keeping all parties informed on a consistent basis.

Yet, if the novel Defense Department agency acted high-handedly and pursued management practices that alarmed the services, the intrusion of ARPA could have been far more disruptive. In fact, dire warnings that ARPA might evolve into a “fourth service” proved false. Roy Johnson, much to the dismay of his staff, proved unwilling either to create and operate his own facilities and laboratories or to establish an in-house contracting capability with the armed services functioning as ARPA’s contracting agents. In fact, for its expanded space program, ARPA remained dependent on the services for qualified personnel, necessary experience, and resources that included laboratories, launch complexes, rocket boosters, test facilities, and tracking networks. As a result, ARPA designated the military services its executive agents for most projects, with the Air Force receiving the lion’s share of eighty percent. Along with the former Advanced Reconnaissance System, these represented the Air Force’s most cherished space programs, including lunar probes, the 1.5 million-pound rocket booster, and a variety of measures designed to launch a

* See Appendix 2-2.

military man in space. ARPA, in fact, consistently supported the need for a military manned space mission, and already in late February 1958 had awarded the Air Force development responsibility for military manned spaceflight. Although the Air Force remained unhappy with its subordination to ARPA on space matters, Air Force leaders quickly realized that cooperation with ARPA would prove the best means of gaining development responsibility for space projects and, later, operational responsibility as well.

ARPA's rise to prominence reflected the country's alarm following Sputnik and the need to act rapidly to counter the Soviet advantage. As a result, ARPA became a prime mover for a variety of space projects, some of which, such as the lunar probe program, had no direct military requirement. Specifically authorized by the President, this effort would use available military resources, most notably the Army's Jupiter and the Air Force's Thor IRBMs as boosters. In short, ARPA served as the national space agency through much of 1958. Yet it remained clear from the spring of 1958, when the President submitted his proposal for a National Aeronautics and Space Administration (NASA), that the new civilian space agency would directly challenge ARPA's broad jurisdiction in the space arena and become an additional competitor for traditional Air Force space interests.

NASA Joins the Competition

Like ARPA, NASA represented an intervening space agency that challenged the Air Force for space responsibilities and program funding. NASA's civilian focus also raised the contentious issue of civilian-military space relationships. Despite the apparent logic in assuming that NASA would be responsible for civilian space activities and the Defense Department would handle military interests, the demarcation line between civilian and military space concerns often proved artificial and unattainable. On the other hand, if the Air Force found NASA an unwanted competitor for the space mission, it quickly perceived the benefits to be gained by cooperating with the civilian agency. For the foreseeable future, NASA would depend heavily on Air Force assistance, while its absorption of Army and Navy space assets would help propel the Air Force toward the military space mission.¹⁹

The "Sputnik crisis" produced demands by congressmen, scientists, and other civilian leaders for a more sweeping national organizational space effort than ARPA seemed to promise. The hearings begun in late November 1957 by Senate Majority Leader Lyndon Johnson's Preparedness Investigating Subcommittee of the Senate Committee on Armed Services focused on long-term space research and development requirements "from a broad national point of view." This could best be done, the committee's final report suggested, by either improved control and administration within the Defense Department or the establishment of an independent agency.

An independent space agency for long-term research and development outside the Defense Department gained increasing support in early 1958 from scientists

concerned that centering space research in the Defense Department would likely alter and reduce the scale of scientific programs. While various individuals and groups proposed organizational alternatives, the National Advisory Committee for Aeronautics (NACA), which had considerably expanded its missile research under Chairman Jimmy H. Doolittle and Director Hugh L. Dryden, took an increasingly active role in the space debate.²⁰ In late 1957 it convened a special committee on space technology under MIT's D. G. Stever to examine space-age research and development requirements and determine the best role for the NACA to play. On 14 January 1958 the committee's report proposed an interagency cooperative space program that would involve the NACA, the Defense Department and the military services, the National Science Foundation, and the National Academy of Sciences. But just two days later the NACA's main committee passed a strong resolution on spaceflight proposing that fundamental scientific research in the upper atmosphere and space be conducted by the NACA rather than the military.²¹

Meanwhile, in early February 1958, the congressional leadership called for the formation of an independent civilian space agency, and, to address the "national crisis," Congress created two important committees: a Senate Special Committee on Space and Astronautics under Majority Leader Lyndon B. Johnson, and a House Select Committee on Astronautics and Space Exploration chaired by Speaker John W. McCormack. Yet, congressional hearings on the space agency itself began only after the administration submitted its own bill on 2 April 1958. The administration's delay in submitting its proposal is explained by the last ditch disarmament discussions Eisenhower carried out in January and the deliberations over the place of the military in the space program.²²

In early February, the President charged his science advisor James Killian to proceed with specific recommendations for government organization for space activities. Recalling this early formative period, Killian admitted that he took on the assignment with a clear idea about what should be done.

From the beginning, it has been my view that the Federal Government had...only two acceptable alternatives in creating its organization for space research, development, and operation. One was to concentrate the entire responsibility, military and nonmilitary, in a single civilian agency. The other was to have dual programs.... A possible third alternative, that of putting our entire space program under the management of the Defense Department always seemed to me to have so many defects as to be practically excluded as a solution.²³

Because of his concerns for national security, in which strategic reconnaissance loomed large, Eisenhower did not share Killian's views. In fact, shortly after the new year, he thought simply of having the military direct the entire space research and development effort under ARPA's direction. He soon abandoned this idea because of congressional and scientific opposition, and because of the arguments of Killian.²⁴

Nevertheless, the President always opposed creating an entirely civilian national space program or of diluting the Defense Department's overall responsibility for space research and applications. During the drafting of the bill, the administration's dilemma involved how much and what kind of military participation to authorize rather than choosing between military and civilian alternatives.

Once the administration accepted a civilian agency based on the NACA, it solicited comments from the Defense Department. Initially, defense officials thought little would change because of the traditionally cooperative military arrangement with the NACA. Commenting on the draft bill prior to its submission to Congress, Deputy Secretary of Defense Quarles reminded budget chief Maurice H. Stans that "it is assumed the operation of the new agency would bear the same relationship to the Defense Department in the field of space and aeronautics as the NACA now does in the aeronautics field." As it was, Quarles objected to a number of passages in the legislation, including one that he perceived as preventing the services from carrying out basic scientific research that had military mission applications. This issue would continue to cause tension long after passage of the Space Act.²⁵

The administration's bill, drafted by the NACA general counsel Paul Dembling and sent to Congress on 2 April 1958, proposed that the nation's aeronautical and space science activities be directed by a civilian agency "except insofar as such activities may be peculiar to or primarily associated with weapons systems or military operations, in which case the agency may act in cooperation with, or on behalf of, the Department of Defense." Referred to as the "exception clause," this passage suggested a variety of interpretations. Would the new agency be the prime mover in government space activities, with the military playing a minor role? Did acting on behalf of the Defense Department mean that NASA would undertake military projects? Above all, as Donald Quarles suggested, did the narrowly constructed military mission preclude the Defense Department from performing basic space research closely related to defense missions?²⁶

In congressional hearings, witnesses and committee members attempted to determine precise organizational relationships and functions. Defense Department witnesses strongly objected to the "exception clause." ARPA director Roy Johnson also criticized any implication that the law would give NASA veto power over military activities and restrict the Defense Department to operating space systems. His chief scientist, Herbert F. York, agreed and presented the Air Force's argument that space is not a program to be administered by a single civilian agency, but a place of civilian and military applications. From his reading of the bill, it seemed that the Bureau of the Budget and NASA would be responsible for programs either entirely civilian or jointly civilian, leaving the military with only the narrowly defined military agenda. The problem, declared military officials, centered on space requirements that could not be precisely known in advance, but often required identifying and refining during the course of development or research. Therefore, the Defense

Department must be permitted to conduct fundamental exploration of space technology in order to determine if particular defense tasks could be done more effectively in space. The administration's bill pointedly did not provide a clear, fixed division of labor between the military and the new civilian agency. But as an early House of Representatives staff paper concluded, "practically every peaceful use of outer space appears to have a military application."²⁷ In the bill's final language, Congress approved giving the Defense Department and NASA wide-ranging prerogatives in the space field, yet agreed that the Defense Department had authority both to develop systems and conduct any kind of space research and development "necessary to make effective provision for the defense of the United States." Even so, the gray area would remain.

To overcome the jurisdictional problem and permit basically separate activities without expensive duplication, Congress created two coordinating bodies: a cabinet-level National Aeronautics and Space Council (NASC) and a sub-cabinet-level Civilian-Military Liaison Committee (CMLC). During the remainder of the Eisenhower administration, neither would function effectively. The CMLC met often but had insufficient authority to resolve issues, while the NASC, which possessed the requisite decision-making capability, seldom met. The President refused to be constrained in his management of the space program.²⁸

The establishment of NASA reflected the administration's determination to give the space program a civilian focus through a policy of "space for peaceful purposes" that encompassed scientific exploration as well as a less-publicized but far more important national security element. President Eisenhower signed the National Aeronautics and Space Act on 29 July 1958. Along with prescribing organizational and functional responsibilities of the National Aeronautics and Space Administration, the space act addressed policy in unmistakable terms. "The Congress hereby declares that it is the policy of the United States that activities in space should be devoted to peaceful purposes for the benefit of all mankind." [Sec 102(a)] Although the statement reflected Eisenhower's policy statements prior to Sputnik, before inclusion in the space bill James Killian and the Presidential Scientific Advisory Committee (PSAC) conducted a comprehensive examination of broad policy objectives as part of their assessment of organizational requirements.

At the request of the President back in early February 1958, Killian established a panel under the auspices of the PSAC to develop a national space program. Chaired by Nobel laureate Edward Purcell, the panel's deliberations focused on nonmilitary space programs and activities. Arguing that "even the more sober proposals...about space as a future theater of war...do not hold up well on close examination or appear to be achievable at an early date," the Purcell Panel strongly recommended passive military support applications while rejecting any use of military weapons in space. With the President's blessing, Purcell and panel member Herbert York briefed the Cabinet and other groups within the administration, and in late March

issued a public version of their report. The brochure, "Introduction to Outer Space," stressed the peaceful, scientific objectives of spaceflight and the administration's cautious approach to the space age. The PSAC report would provide the basic guidelines for the military role in space. Despite strong objections from Air Force officers in the months ahead, the administration would confine offensive military space applications to studies only.²⁹

With military satellite launches on the horizon, Eisenhower refined national space policy with two National Security Council directives that closely bracketed the signing of the Space Act. In June NSC Directive 5814, "U.S. Policy on Outer Space," advocated a "political framework which will place the uses of U.S. reconnaissance satellites in a political and psychological context most favorable to the United States." The NSC followed this on 18 August 1958 with a more definitive directive, NSC 5814/1, "Preliminary U.S. Policy on Outer Space," a broad statement which emphasized denying Soviet space superiority. Echoing the early Rand Corporation studies on satellite feasibility, the administration would seek to achieve this objective by "opening up' the Soviet Bloc through improved intelligence and programs of scientific cooperation." This would be accomplished by the military reconnaissance satellites, whose mission, the directive asserted, fell squarely within the "peaceful purposes" guidelines and represented an asset of "critical importance to U.S. national security."³⁰ In effect, although NSC 5814/1 advocated an open, cooperative scientific exploration program, it also established the foundation for a national security reconnaissance space capability immune from international inspection or control. The latter received the highest priority from an administration that saw no contradiction in space for peace combined with space for national security.

With the 1958 Space Act, the government formally established a dual space program comprising separate civilian scientific and military applications projects. Both were directed to "peaceful," or scientific, defensive, and nonaggressive purposes. This accorded precisely with Eisenhower's commitment to insure unrestricted overflight in outer space of military reconnaissance satellites that the President so eagerly awaited to replace the increasingly vulnerable U-2 surveillance aircraft that violated national sovereignty in airspace overflight.

Although the framers of the Space Act did not equate "peaceful" with civilian or nonmilitary activities, government officials in the future often found themselves required to explain that both NASA and the Defense Department conducted peaceful space work, one primarily engaged in space exploration and the other in various military support activities devoted to keeping the peace. Air Force space leaders like General Schriever repeatedly criticized this policy which many interpreted as implying that NASA engaged in "peaceful" work while the military, pursued "non-peaceful" activities. Such inaccuracies, he believed, along with policy restrictions limiting offensive space weapons to the drawing board, prevented the military from providing necessary security through an expanded space program. Air Force ad-

vocates of a dynamic, military-oriented national space endeavor remained frustrated by national space policy and organizational constraints that seemed to rule out anything except passive military space applications.³¹

NASA Takes Shape

With an organization in place by midsummer that provided for dual military and civilian programs, officials turned to the complex mission and project assignments remaining before NASA could commence operations on 1 October 1958. Lines of demarcation remained vague, while competition for prestige and funding promised to be severe. The initial question centered on facilities and infrastructure. During the congressional debate it became clear that the new agency would absorb NACA's existing aeronautical research facilities and personnel. These included nearly 7,000 personnel and the Langley and Ames Aeronautical Laboratories, the Lewis Flight Propulsion Laboratory, the High-Speed Flight Station at Edwards Air Force Base, and the Pilotless Aircraft Research Station at Wallops Island, Virginia.

To achieve space capability quickly, NASA needed an infusion of space programs, facilities, and funding from the military services. In the NASA raid on service assets, the Air Force emerged the clear victor. With little objection from the Navy, NASA received Project Vanguard's personnel and facilities, including its Minitrack satellite tracking network, and more than 400 scientists and engineers from the Naval Research Laboratory. Potential Army losses, however, proved far more sweeping and contentious. Newly-appointed NASA administrator, Keith Glennan, considered the Army space program most important for providing the agency credible space design, engineering, and in-house resources. He initially requested transfer of Cal Tech's contracted Jet Propulsion Laboratory (JPL), whose sympathetic director had visions of turning it into the "national space laboratory," and a portion of the Army Ballistic Missile Agency that included the von Braun team and its giant Saturn booster project. General Medaris, however, strongly objected and waged a public campaign to stall the process and reverse the decision. His effort produced a compromise. The JPL would be transferred to NASA by 3 December 1958, while the Huntsville complex would remain under the Army's jurisdiction and support NASA on a contractual basis. Medaris might postpone but he could not prevent a transfer. A year later the Army would lose to NASA its entire space operation at Huntsville, which would be renamed the Marshall Space Flight Center.³²

As for the Advanced Research Projects Agency and its Air Force-related programs, the Defense Department agency intended to transfer only elements of its Advanced Research for Scientific Purposes program. In mid-August, however, Eisenhower awarded NASA overall responsibility for human spaceflight. As a result, ARPA relinquished all of its "man in space" projects, which NASA combined under the designation, Project Mercury. ARPA also relinquished its special engine research project, as well as satellite tracking and satellite communications, meteorological,

and navigation satellite programs.* Air Force reaction proved mixed. While giving up what amounted to five space probes, three satellite projects, and some propulsion research represented largely scientific projects in early stages of research, the loss of the manned spaceflight mission created apprehension about the future of a military manned role in space. While \$800 million for space in the fiscal year 1959 budget represented eight times the space portion before Sputnik, NASA's share outpaced ARPA's by more than \$50 million and included \$117 million transferred from ARPA. Of the latter, the Air Force gave up \$58.8 million. In short order, NASA had acquired the missions of scientific space exploration, including the moon, as well as manned spaceflight and all civil applications satellites. To fund its new programs, NASA received a generous budget, which raised the specter of tough competition between civil and military sectors for space funds in future years.³³

On the other hand, NASA's absorption of Army and Navy space programs had left the Air Force the front-runner for the military space mission. Air Force leaders quickly perceived the advantage of cooperating with the new agency and making the service indispensable to the national space program. An essential element involved the Air Force's dominance in available space boosters. In a 17 September 1958 memorandum, Under Secretary of the Air Force Malcolm A. MacIntyre offered guidelines for the Secretary of Defense to follow in his discussions with NASA over civil and military program jurisdiction. Under Secretary MacIntyre argued for continuing the Air Force man-in-space program in cooperation with NASA, and reminded the defense secretary that the Air Force possessed the booster engine capability to support manned spaceflight. Responding on 31 October 1958, ARPA Director Roy Johnson noted that the Defense Department and NASA were following the guidelines suggested, and the Space Council would decide jurisdiction in unclear cases. Moreover, he concluded, "the Air Force's foresight in anticipating the requirements of both agencies for booster vehicles is to be commended. The present outlook is that all that have been provided for will be greatly needed and well utilized." In the months ahead the Air Force would continue to work to gain approval of exclusive responsibility for space booster development.³⁴

When NASA commenced operations on 1 October 1958, a year after Sputnik initiated the space age, its leaders recognized that it would remain in the Defense Department's shadow for the foreseeable future. The Defense Department continued to focus on system work and big projects. The Air Force, through ARPA, not only pursued space-related missile work on solid propulsion, launch facilities, and test ranges, it also combined space and missile activity through projects like MIDAS, Samos, and antisatellite identification. Its impressive list of projects involved work on a manned orbital glider/bomber, new boosters, a variety of satellites, studies for

* See Appendix 2-3.

developing manned satellites and space stations, and support for Project CORONA, the covert reconnaissance satellite program publicly known as “Discoverer,” which planners readied for launch in January 1959. Meanwhile, NASA focused on scientific applications through its existing NACA laboratories, and depended on the Defense Department and the Air Force for assistance with a variety of responsibilities. Of its first eight space probe launches, for example, the Defense Department accepted responsibility for the initial five, with the Air Force launching the first two Pioneer lunar probes.³⁵

By the end of 1958 the foundation to support American superiority in space had been laid. Policy prescribed space activities for peaceful, that is nonaggressive, purposes, while organizational arrangements promoted a dual effort with civilian scientific aspects centered in NASA and military research and applications directed by ARPA. Yet much remained unresolved, not only between the Defense Department and NASA, but within the military arena. While the Air Force continued to face challenges with ARPA over program development and operational responsibility, a new Defense Department office appeared in late 1958 to add to the confusion. In August, Congress passed the Defense Reorganization Act which, among other measures to centralize and clarify defense operations, created the office of Director for Defense Research and Engineering (DDR&E), whose chief reported directly to the Secretary of Defense. Subsuming the old responsibilities of the Assistant Secretary of Defense for Research and Development, the new office became the focal point for all defense research and development activities. However, it would be a number of months before the new agency would be able to build its staff, sort out jurisdictional arrangements, and exercise its authority. Meanwhile, ARPA would continue to function as the nation’s centralized military space agency. Nevertheless, the fact that the new office received explicit recognition in Public Law, while ARPA had been established only by authority of the Secretary of Defense signaled the ultimate demise of Roy Johnson’s space agency. Air Force leaders hoped that the new Defense Department office would allow the service more autonomy in the space arena.³⁶

As NASA prepared to begin its operations on 1 October, the Air Force had clearly left the Army and Navy behind in the quest for sole control of the military space mission. Even so, the chief of the Air Force’s Legislative Liaison Office perceptively described an Air Staff divided on whether the service should assert itself more directly. Some officers preferred a “wait and see” approach, because the Air Force had received from ARPA a share of the space mission. Others argued for a more active role given the Army’s retention of its 1.5 million-pound Saturn booster project as well as signs the Army would be authorized to develop communication satellites and the Navy would proceed with its navigational satellite. By the end of the year, Air Force leaders decided that they could not stand on the sidelines and let events take their course.³⁷

Renewing the Quest for the Military Space Mission

The Air Force decision to promote itself for the military space mission in early 1959 precipitated a wide-ranging review of its current space posture and available courses of action. In early February the Deputy Chief of Staff for Plans described the Air Force's weaknesses in space organization, operations, and research and development that resulted, he said, from its failure to develop a coordinated space program. Rather than formally requesting operating responsibility for space roles and missions, the Air Force should demonstrate successful stewardship, rely on available hardware [boosters], and establish "squatters rights." Despite the presence of ARPA, the Air Force should establish its own integrated space program while working to improve relationships with both ARPA and NASA. The Air Force, he said, "must assume the role of opportunist, aggressively taking advantage of each situation as it arises to assure that the Air Force is always predominate [sic] in any action that has a space connotation."³⁸

The Air Force campaign focused on congressional hearings in the winter and spring. Beginning in February 1959 Air Force spokesmen repeatedly elaborated on the Air Force "aerospace" policy that viewed space as...an extension of the medium in which we are now operating in the accomplishment of assigned roles and missions." As General White testified before the House Armed Services Committee, "The missions that we foresee [in space] are largely an extension of the missions that are required in the atmosphere." He went on to argue for funding and program support in terms of three general requirements: first, to improve current forces; second, to develop new systems in areas with recognized military applications; and third, to study and develop systems in areas without clear military applications but with excellent potential for possible future military use. The Air Force's manned space program ranked high among the latter requirements. Unlike NASA, whose mandate encompassed manned spaceflight and exploration of the unknown in outer space, the military would find programs without known applications particularly difficult to justify to congressional budget overseers.³⁹

The Air Force's campaign intensified with the convening in late March of Senator Stewart Symington's Subcommittee on Governmental Organization for Space Activities. Scheduled witnesses Under Secretary of the Air Force Malcolm A. MacIntyre and Major General Bernard A. Schriever could expect a sympathetic response to a strong Air Force argument from Senator Symington, who continued to criticize the administration's budgetary frugality in the area of space defense.⁴⁰ Aware that the Air Force witnesses appearing before Congress required well-coordinated statements, the Air Staff's Directorate of Technology (DAT) and Schriever's Ballistic Missile Division staff developed position papers that provided a comprehensive assessment of current service strengths and weaknesses as well as a strong case for an increased Air Force role in space.

The Air Staff analysis demonstrated that the Air Force had successfully identified thirteen major military uses of space, nine of which had been included in the important NSC directive, "Preliminary Outer Space Policy."⁴¹ Five of these missions—photographic/visual reconnaissance, electronic reconnaissance, infrared reconnaissance, mapping and charting, and space environmental forecasting and observing—had received approval as Air Force General Operational Requirements (GOR) and represented missions previously identified and analyzed by Rand. At the same time, Air Force headquarters had underway seven important studies with industry or in-house agencies and offices. Moreover, the analysis asserted, Lieutenant General Roscoe C. Wilson's DCS/D had produced an important paper outlining "Priority Listings of Military Space Missions."^{*} In every document cited by the Directorate of Technology's officers, satellites received top billing, with Samos and MIDAS heading the list, followed closely by a variety of manned spaceflight requirements. Despite NASA's human spaceflight mission responsibilities, Air Force space leaders clearly had not relinquished interest in military manned spaceflight.

The Air Staff's analysis focused on constraints that prohibited the Air Force from implementing its aerospace "policy" of performing the space missions formally identified in Air Staff documents and approved as General Operational Requirements. It noted that the Air Force retained authority for planning, budgeting, and development only in non-space areas because NASA's responsibility embraced the scientific space area and ARPA's the military space arena. In effect, the Air Force had no responsibilities for a space program of its own. Echoing long-held criticism of the Defense Department agency, the Air Staff paper faulted ARPA for its practice of assigning system development responsibility to a service on the basis of existing capability but without regard for "existing or likely [space] mission and support roles." ARPA, rather, should focus on policy decisions and forego the "project engineering" detail normally found only at the lowest Air Force operating levels.⁴² As for NASA, the Air Staff critique noted that the Air Force, if prohibited from pursuing its own scientific space exploration and research might very well face dependence on the "fall-out and by-products" of the civilian, scientific agency. To avoid this, the Air Force rather than NASA should develop programs of common interest, such as space boosters and satellites, in order to meet the more stringent military specifications and priorities. This would leave NASA to apply its budget to "really scientific projects" like unmanned space probes. Ultimately, concluded the Air Staff directorate, Air Force leaders should lobby Congress for a greater role for the Air Force in space.

General Schriever's staff also agreed that "it is axiomatic that the Air Force has the prime military responsibility for operating in space. Yet the means for developing

* See Appendix 2-4.

this capability are denied by present NASA/ARPA policies and actions.”⁴³ Given the command’s responsibilities, the BMD analysts criticized NASA for assuming a major portion of the nation’s booster development program, indicating interest in taking over guidance, control, and ground tracking communications programs, and showing signs of building up “a development, production, management and ‘operational’ capability which will duplicate that presently existing in the AF Ballistic Missile Program.” ARPA appeared to acquiesce in NASA’s objectives while continuing to pursue its own development activities without regard to the future military operational user. Both agencies appeared oblivious to the “systems” concept of development, leaving the Air Force unable to establish an “integrated Air Force space program with a logical stepwise progression towards stated goals.”

General Schriever also found his command becoming overburdened with increased management responsibility for ARPA programs and NASA’s requirements for boosters and launch support. In a letter to the chief of staff on 11 February 1959, the general described the critical shortage for the next eighteen months of six Atlas boosters and limited launch pad availability at both Atlantic and Pacific Missile Ranges. Without immediate Air Staff action, he predicted delays in either the ICBM or booster operational schedules. The booster issue proved especially sensitive in view of the new emphasis on using Air Force Thor IRBM and Atlas ICBM requirements as the wedge into an enlarged space arena. As Schriever’s staff explained, the close connection between missiles and space vehicles represented the best means of achieving Air Force space objectives because “future booster development as well as subsystem development can be initiated against bona fide ballistic missile requirements.” The Air Staff responded by programming for additional boosters and launchers.⁴⁴

In their testimony before the Symington Committee in late April 1959, Under Secretary MacIntyre and General Schriever presented a strong defense of Air Force space projects and the case for a greater Air Force space role. General Schriever, in particular, argued that by 1970 the Air Force’s responsibilities for strategic offense and strategic defense would be accomplished by an arsenal of space weapons consisting of “ballistic missiles, satellites and space craft.” To help the Air Force move forward with its space missions, he recommended that ARPA be dissolved by 30 June 1959, DDR&E assume the role of providing policy guidance and assigning service operating responsibilities, and space research and development be returned to the military services.⁴⁵

The testimony of General Schriever and other Air Force spokesmen before congressional committees in the spring of 1959 proved especially effective in light of the Air Force’s growing involvement in space. They could cite an impressive array of their “own” projects as well as important support the Air Force provided ARPA and NASA on others.⁴⁶

Heading the list of major Air Force projects appeared the three elements of the former WS-117L Advanced Reconnaissance System. Samos, formerly known as Sentry, represented the reconnaissance element. Consisting of the Atlas booster and Lockheed's second-stage spacecraft vehicle Agena, Samos involved collecting photographic and electromagnetic reconnaissance data and transmitting the information by means of a "readout" system or actual "recovery" of data packages by aircraft. In contrast to Project CORONA, which pursued the capsule recovery technique, the Air Force initially had elected the "readout" method, but eventually would attempt both methods of data retrieval. MIDAS (for Missile Defense Alarm System) also relied on the Atlas-Agena booster satellite combination. The MIDAS payload consisted of infrared sensors designed to detect missile exhaust plumes and be able to provide command centers a thirty-minute warning of an ICBM attack.⁴⁷

Both Samos and MIDAS projects experienced technical and management problems not uncommon to projects on the leading edge of technology. For example, civilian and military officials continually differed over technical requirements and capabilities, funding, and operational arrangements. While the Air Force proposed assigning operational control of Samos and MIDAS to the Strategic Air Command (SAC) and the North American Air Defense Command (NORAD), respectively, the Army and Navy argued for a joint command that would operate all military space systems. Air Force officials also favored implementing a systems development approach that would achieve desired performance goals while development and testing proceeded. Solving problems "concurrently," they hoped, would result in achieving early operational capability. The Office of the Secretary of Defense, however, preferred a "fly before buy" arrangement, and focused on component subsystem performance and capabilities. As a result, MIDAS and Samos remained in flux with the Air Staff repeatedly defending and revising development plans, while looking ahead to initial test flights in 1961.

Although publicly Project Discoverer represented a third Air Force project of the former WS-117L program, it actually served as a cover for the covert Project CORONA. After President Eisenhower in February 1958 authorized a secret reconnaissance satellite as a joint CIA-ARPA-Air Force effort, it became known as Project CORONA, an experimental activity within the WS-117L program. However, alarmed by publicity identifying CORONA as a military reconnaissance system, administration officials in the late summer of 1958 decided to sever CORONA's public connection with WS-117L by creating two photo reconnaissance efforts. While the Air Force pursued its Sentry/Samos project using the Atlas booster, CORONA would continue as Project Discoverer and rely on the Thor booster. The Discoverer project embraced tests on satellite stabilization equipment, satellite internal environment, ground support equipment, and biomedical experiments using mice and primates and, most importantly, capsule recovery techniques. Officials had scheduled thirty-two polar orbit launches from Vandenberg Air Force Base using the Thor-Agena

combination. Of the four launches attempted by the end of June 1959, the first two achieved orbit for brief periods and passed back useful experimental data despite loss of the capsules. The remaining two failed to achieve orbit.⁴⁸ Despite difficulties with the satellite systems during this early developmental phase, the Air Force could claim that it managed or supported the nation's most important satellite programs, and expected to be awarded greater operational responsibility in the near future.

In addition to its own Samos and MIDAS satellite projects, under ARPA's direction the Air Force provided launch support to the Navy's Transit navigational satellite, designed to support Polaris submarines, and the Army's Notus communications satellite effort.⁴⁹ The most important, however, proved to be the growing detection, tracking and satellite cataloguing project known as the Space Detection and Tracking System (SPADATS). Begun hurriedly under the name Project Shepherd by ARPA in response to Sputnik, all three services were to participate. The Air Force, under Project Harvest Moon (later Spacetrack), would provide the Interim National Space Surveillance and Control Center (INSSCC) data filtering and cataloguing center at its Cambridge Research Center in Massachusetts. Early efforts brought together radar data from MIT's Lincoln Laboratory's Millstone Hill radar at Westford, the Stanford Research Institute in Palo Alto, California, and an ARDC test radar at Laredo, Texas. Sensors included the new Smithsonian Astrophysical Observatory's Baker-Nunn satellite tracking cameras that it procured for tracking the IGY satellites and available observatory telescopes. The Air Force would also devise the development plan for the future operational system.⁵⁰

ARPA assigned the Navy responsibility for developing and operating its east-west Minitrack radar fence and its data processing facility in Dahlgren, Virginia. Originally designed to support Project Vanguard, the Navy redesignated its sensor and control operation Spasur (Space Surveillance). The Army portion, termed Doploc, envisioned a doppler radar network to augment Spasur and, together, feed data to the INSSCC for cataloguing, trajectory prediction, and dissemination. ARPA and the three services realized the system's limited capability, but agreement on funding necessary improvements proved difficult to achieve. After the Army dropped out of the picture, the Air Force and Navy contested for operational control of the system. The Navy seemed to prefer operating a separate system, while the Air Force wanted its Air Defense Command (ADC) to acquire management responsibility and NORAD to possess operational control. By mid-1959, the controversy had reached the Joint Chiefs of Staff, where it became embroiled in a major roles and missions contest among the services.

As for NASA's requirements, the Air Force agreed to construct infrastructure facilities at Patrick Air Force Base for NASA's space probes and then provide booster support for the Pioneer lunar probes (Thor-Able) and Tiros cloud-cover satellite (Thor-Delta/Able). The Air Force also supported the Centaur high-energy upper stage based on hydrogen and oxygen as fuels, which it hoped to use in support of

the Advent communications satellite project. Most importantly, the Air Force supported Project Mercury, NASA's man-in-space project, by furnishing Atlas boosters and launching services, along with considerable technical, biomedical, and personnel assistance. The issue of military manned spaceflight had always been a most sensitive subject for Air Force space enthusiasts. Like their German counterparts, early Air Force space pioneers looked to space as more than an arena for scientific exploration or simply a venue in which to pursue exciting new challenges. They considered a military man in space mission the logical extension and eventual goal of Air Force space operations. Not only did this objective correspond to Air Force thinking on "aerospace," but manned spaceflight seemed the next "logical" step in the chain of operational development from aviation medicine to space medicine. Indeed, by the time of Sputnik, Air Force medical personnel could look back on a wealth of aeromedical experience that put the service at the forefront of knowledge on conditions of flight in the upper atmosphere and near space. Space presented scientists the daunting challenge of mastering the complexity and weight problems in a space environment.⁵¹

At the close of the Second World War, the Air Force gained the services of a number of German scientists who had performed path-breaking medical research for the Luftwaffe. Although most joined the growing Aeromedical Laboratory at Wright-Patterson Air Force Base in Ohio, six received assignment as research physicians to the Air Force School of Aviation Medicine at Randolph Air Force Base near San Antonio, Texas. In February 1949, the latter established the world's first Department of Space Medicine, under the direction of Dr. Hubertus Strughold, who had coined the term "space medicine" at an important symposium the previous year. In November 1951 the Randolph school held another symposium, entitled "Physics and Medicine of the Upper Atmosphere," to avoid criticism of "Buck Rogers" projects within the Air Force. Nevertheless, at this meeting Strughold advanced the concept of the "aeropause," an area of "space-equivalent conditions" such as anoxia that begins much lower, about 50,000 feet, rather than at the 600-mile barrier normally cited by authorities as the boundary between the atmosphere and space. "What we call upper atmosphere in the physical sense," Strughold said, "must be considered—in terms of biology—as space in its total form." In effect, manned ballistic or orbital flight at the 100-mile altitude would be spaceflight. Strughold would come to be known as the "the father of space medicine" and go on to lead the Air Force's School of Aviation Medicine in exploring the space environment. Together with researchers at the Wright Air Development Center (Aeromedical Laboratory) and the Aeromedical Field Laboratory at Holloman Air Force Base, New Mexico, Air Force space medicine teams from San Antonio pursued a variety of experiments dealing with conditions of "zero g" or weightlessness in space, "g loads," or the effects of heavy acceleration and deceleration primarily through the upper atmosphere rocket plane flights and sounding rockets with animal passengers. Although the crash ICBM

program in the 1950s interrupted animal flight research for a six-year period, other human factors experiments continued. By the time of the Sputnik launch, Air Force medical research specialists had accumulated a wealth of data on conditions of manned spaceflight and determined that the basic problems of weightless flight could be solved.⁵²

While Air Force medical personnel continued their quest for data on conditions of manned spaceflight, scientists and engineers conducted research and development on space hardware systems that could eventually be powered through the upper atmosphere into earth orbit. Manned space vehicle concepts proceeded along two lines of thought based on the reentry technique used. One involved ballistic reentry using blunt-body capsules, the other aerodynamic reentry with winged vehicles. Although Air Force planners pursued both methods of spaceflight, initial interest centered on the winged suborbital vehicle later known as Dyna-Soar (from dynamic soaring).

Dyna-Soar evolved from the rocket plane studies and experiments of the early 1950s. By May 1955 hypersonic (Mach 5 and above) glide vehicle development had led to three related Air Force projects: Bomi, an acronym for Bomber Missile, but soon redesignated Robo, for Rocket Bomber; Brass Bell, a high altitude reconnaissance system; and Hywards, the actual boost-glide vehicle. Although designed for suborbital flight, the three could be launched into low earth orbits with adequate propulsion. After it became apparent that weapons in space would not proceed, on 30 April 1957 the Air Force merged the three programs under the name Dyna-Soar, and considered it the manned flight successor to turbojet bombers and reconnaissance aircraft. To reflect the requirements of the Air Force's first "aerospace" vehicle, engineers designed the Dyna-Soar as a manned, delta-wing aeronautical vehicle capable of being boosted into orbit while retaining reentry and controlled landing maneuverability. As such it filled a variety of accepted mission functions and could be supported by the vast network of existing ground facilities.

As early as the spring of 1956, the Air Force had discussed with several industrial firms its manned ballistic rocket research program. When the Air Force prepared its ambitious five-year astronautics plan in the heady weeks following the launch of Sputnik, it included projects for a manned capsule test system, manned space stations, and ultimately a manned lunar base. Although critics scoffed at such "fanciful" projects, ARPA director Roy Johnson did not. Shortly after his appointment in February 1958, he declared that "the Air Force has a long term development responsibility for manned space flight." With his blessing, Air Force leaders requested ARPA funds and directed Air Research and Development Command to prepare a development plan, called "Man-in-Space-Soonest" (MISS). It called for a four-phase capsule orbital process, which would first use instruments, to be followed by primates, then a man, with the final objective of landing men on the moon and returning them to earth.

The Army and Navy did not relinquish the field of manned spaceflight to NASA or the Air Force uncontested. In the spring of 1959 the Army unveiled its “Man Very High” proposal, later termed Project Adam, which called for lofting a man in a Jupiter nose-cone capsule on a steep ballistic trajectory that would produce a splashdown about 150 miles downrange from Cape Canaveral, Florida. Project Adam received no support from informed critics like NACA’s Hugh Dryden, who explained that “tossing a man up in the air and letting him come back... is about the same technical value as the circus stunt of shooting a young lady from a cannon.” The Defense Department rejected the Army plan from the start. The Navy’s intriguing alternative, MER I (Manned Earth Reconnaissance), proposed orbiting a cylindrical vehicle with spherical ends. After achieving orbit, the ends would expand laterally to produce a delta-winged inflated glider. Although ARPA conducted studies on the proposal’s feasibility, NASA’s Project Mercury soon got underway and relegated the Navy plan to an interesting concept too bold for its day.

Although the Air Force MISS proposal came closest to “approval,” ARPA balked at the high cost of \$1.5 billion and the uncertainties surrounding the future direction of the civilian space agency. When NASA began operations on 1 October 1958, the Air Force had prepared seven Man-In-Space-Soonest development plans, each one dismissed by ARPA for cost, technical, or utility concerns. Fittingly, the last one omitted the word “soonest.” When President Eisenhower assigned NASA the human spaceflight mission in August 1958, ARPA transferred its manned space programs and funds to the new civilian agency. Hampered by insufficient funding, the President’s “space for peace” policy, and the inability to justify a military man in space, the Air Force had to abandon—at least for the time being—serious plans for a distinct and separate military man-in-space program.

NASA’s assumption of the manned space mission left the Air Force with Dyna-Soar, a single-place vehicle, which the Air Force had protected from ARPA’s grasp by stressing its suborbital, aeronautics phase of development. Although Dyna-Soar had received approval for development in 1958, by the spring of 1959 the Air Force still had not identified an adequate booster to fulfill the as yet undetermined aeronautical, missile and, especially, space requirements of Dyna-Soar. An initial proposal called for using a cluster of the yet-to-be-developed Minuteman solid-propellant rockets, but the problem of separating the rockets as they would be expended proved too challenging and costly. This opened the door to possible encroachment from the Army and NASA.

The Army’s Saturn appeared as a logical candidate, and Wernher von Braun made several attempts to convince the Air Force to accept the Saturn–Dyna-Soar combination. But the Air Force demurred, preferring to continue with its own 1,500,000 lb-thrust engine project it had underway. Given NASA’s interest in Saturn, however, the Air Force might very well lose Dyna-Soar to NASA if the civilian space agency acquired the Army’s big booster. In the spring of 1959, the Air Force contin-

ued to move forward with the Dyna-Soar project and hoped that it could keep alive a military manned spaceflight mission. Meanwhile, it would continue its strong support of NASA's Project Mercury.

By the spring of 1959, the Air Force's expanding role in space led Air Staff leaders on 13 April 1959 to enhance the headquarters focus on space by providing General Boushey's year-old Directorate of Advanced Technology the authority to coordinate within Air Force headquarters all space issues. The new arrangement eliminated the space responsibilities of the Assistant Chief of Staff for Guided Missiles except for coordination activities involving boosters, test facilities, and range and launch complexes. Gone at last was the divided authority within the Air Staff for space requirements.⁵³

The Air Force's 1959 campaign for the military space mission did not go unnoticed by the Army and Navy. They closely followed the Air Staff realignment, the growing Air Force responsibilities for space systems, and the coordinated testimony of its spokesmen before Congress. In fact, General Medaris seized his opportunity before Senator Symington's committee to accuse the Air Force of a long history of noncooperation with his Army Ballistic Missile Agency. Although General Schriever provided a lengthy, detailed rebuttal, Medaris refused to withdraw his charges. The dispute only served to reinforce the views of legislators already critical of interservice rivalry.⁵⁴

In a move more threatening to Air Force interests, Admiral Arleigh Burke, Chief of Naval Operations, in late April 1959, made "a bold bid for a major share" of the space mission, by proposing to his Joint Chiefs of Staff colleagues the creation of a joint military space agency. In effect, he advocated a unified command for space based on the "very indivisibility of space," projected large-scale space operations in the near future, and the interests in space of all three services. Army Chief of Staff General Maxwell D. Taylor agreed, arguing that space activities transcended the particular interests of any one service. But Air Force Chief of Staff General White opposed the proposal because, he said, it violated the practice of treating space systems on a functional basis and integrating weapons within unified commands. He argued that space systems represent only a better means of performing existing missions and should be assigned to the appropriate unified or specified command.⁵⁵

The Navy-Army initiative to gain a greater military space role by working through the Joint Chiefs of Staff to realize a joint command compelled General Schriever in mid-May to argue for an Air Force counter-campaign to acquire all or part of the military space mission "as soon as possible." In a letter to Lieutenant General Roscoe C. Wilson, DCS/D, the ARDC commander described his concerns and provided a draft letter for either Air Force Secretary James H. Douglas or Chief of Staff General White to forward to Secretary of Defense McElroy. His suggested letter asserted that "since its inception" the Air Force had been operating in aerospace through the

mission areas of strategic attack, defense against attack, and supporting systems that enhanced both the strategic retaliatory and active defense forces. The Air Force had important requirements for earth satellites, which represent aerospace vehicles of the foreseeable future. Characteristically, Schriever criticized existing fragmented satellite program management and advocated a unified, systems development approach that would “achieve the most effective deterrent posture” by coordinating and integrating satellite systems within the broad Air Force strategic and air defense force. Moreover, Army and Navy requirements, the general asserted, would be best achieved by the Air Force acting as “prime operating agency of the military [national] satellite force.”⁵⁶

While the services argued over roles and missions, ARPA director Roy Johnson stoked the fire in June by recommending a tri-service Mercury Task Force to support NASA, while Defense Secretary McElroy requested advice from the Joint Chiefs of Staff on assigning the services operational responsibility for several important space projects, including MIDAS and Samos. Service views reflected the division over the unified command issue. While the Navy and Army favored a Mercury Task Force as well as a Defense Astronautical Agency to direct and control all military space systems, the Air Force opposed both for the reasons General White explained earlier in response to Admiral Burke’s proposal.⁵⁷

With no resolution of the differences by the fall of 1959, Secretary McElroy in September made three decisions that propelled the Air Force further forward in its quest for exclusive responsibility for military space activities. Differing with Admiral Burke’s prediction, DDR&E director Herbert York had argued that the country could expect relatively few satellites in orbit in the foreseeable future, and thus the nation did not need a unified space command. The Secretary of Defense agreed, and sided with the Air Force position by declaring that “establishment of a joint military organization with control over operational space systems does not appear desirable at this time.” He too disapproved both the proposed Defense Astronautical Agency and Mercury Task Force. In place of the latter, he designated Air Force Major General Donald N. Yates, Atlantic Missile Range commander, to “direct military support” for NASA’s manned space project. Most significantly for the Air Force, the Defense Secretary assigned to it responsibility for “the development, production and launching of space boosters” as well as payload integration. Satellite operational responsibility, however, would continue to be assigned to the services on a case-by-case basis. Initially, the Air Force would receive Samos and MIDAS (in November) and, in a separate action, Discoverer (in December). The Navy acquired the Transit navigation satellite, and the Army four Notus communications satellites. In short, Secretary McElroy agreed with Dr. York and Air Force critics by reversing his established policy that favored ARPA and reassigning space projects among the three services. The Air Force received the major share. Admiral Burke’s proposal for a unified command for space would prove twenty-five years too early.⁵⁸

Secretary McElroy's directive in September represented the first fruits of the Air Force campaign of 1959 for the military space mission. Legitimately hailed as a landmark decision on the Air Force's road to space, it nevertheless provided the Air Force an incomplete victory over its protagonists. Pessimists pointed out that civilian control over development of military space systems remained unchanged at the secretarial level, and ARPA retained its authority to conduct project engineering supervision. Moreover, the Air Force received responsibility for space boosters but not for all space satellite systems. On the other hand, the Air Force had warded off a joint operational agency for space and received designation as the nation's "military space booster service"—a major objective of the spring campaign, and a further blow to the Army's space fortunes. The Air Force now found itself poised to assume command and control of operational space systems, while receiving operational control of Samos, MIDAS, and Dyna-Soar—all space systems with growth potential.

On balance, in the fall of 1959, Air Force leaders could express optimism about the space future, fully aware that much needed to be done to consolidate the September gains. At the Air Force major commanders' conference on 1 October 1959, the audience heard that "the Army and Navy can be expected to continue their efforts to neutralize this interim Air Force victory" by showing that missile range and tracking facilities as well as satellite payloads deserved unified command direction and control. Now that the Air Force had gained its first chance to issue plans for development and operation of particular space systems, it would need to make good use of this opportunity. "Future steps toward gaining the assignment of space responsibilities will be determined...by the manner in which the Air Force handles the responsibilities it has just been assigned."⁵⁹

Before it discharged any of these responsibilities, however, the Air Force began lobbying for the Army's Saturn heavy-lift booster project. As Vice Chief of Staff General Curtis E. LeMay explained to the Secretary of the Air Force on 29 September 1959, "in view of this directive [18 September 1959] it appears that the in-house capability of the Department of the Army for the development of space boosters and systems, which is represented by the Army Ballistic Missile Agency at Huntsville, Alabama may now be available for transfer to the Air Force."⁶⁰ But Saturn was not a weapon system, and NASA, with funds available and manned spaceflight on the horizon, could make a far better case for the big booster than could the Defense Department. Try as they did, Air Force planners could not specifically justify the need for a 1,500,000-pound thrust engine. Apparently, Secretary of Defense McElroy offered the Saturn to NASA's Director Glennan, who contacted General Medaris. After DDR&E York publicly confirmed that the Air Force would develop all space boosters needed by the Defense Department, integrate space payloads and launch the combination, Medaris preferred to transfer to NASA the entire von Braun team and missile operation, rather than have the Redstone complex and personnel separated and parceled out to various agencies. Despite objections from

the Joint Chiefs of Staff, President Eisenhower approved Saturn's transfer to NASA on 2 November 1959. The Air Force would have to await more favorable circumstances to gain authority to develop military superboosters.⁶¹

With the President's decision underscoring NASA's claim to human spaceflight, Air Force leaders realized that the Dyna-Soar project had become endangered. At the end of October 1959, General Boushey, chief of the Directorate of Advanced Technology, declared that the Saturn decision suggested that "the loss of the Dyna-Soar project to NASA appears imminent." He predicted such an action would effectively remove the Air Force from super booster development and nullify the 18 September 1959 memorandum assigning the Air Force space booster responsibilities. Events proved General Boushey's pessimism misplaced. York reaffirmed the Air Force's Dyna-Soar project and the service selected Boeing as contractor in November 1959. Yet Air Force leaders remained aware of the fragile state of the project's future.⁶²

The end of the year also brought the official demise of ARPA as the central Defense Department agency for space activities. Following the transfer of most of its space projects to the services in the fall, a 30 December 1959 directive from Secretary McElroy designated ARPA as "an operating research and development agency of the DoD under the direction and supervision of the DDR&E." In the future, ARPA would manage only a limited number of advanced research programs. General Schriever and other Air Force leaders rejoiced at ARPA's demise and the return of development responsibilities to the user agencies. Yet it meant removing a high profile centralized space management agency close to the Defense Secretary. With the military spotlight on space now reduced, space projects faced competition from other worthy service requirements in the battle for funding, while greater service rivalry over space systems without clear service roles became a distinct possibility.⁶³

DDR&E now became the dominant Defense Department reviewing office with far more authority over Air Force research and development proposals than ARPA possessed. In late 1959 Lieutenant General Roscoe C. Wilson, Deputy Chief of Staff for Development, expressed his concerns about the civilian technical influence that resulted in considerable wasted time and effort before decisions from "on-high" reached the Air Force. He also complained about civil-military relationships within the Air Force community. One involved Secretary of the Air Force James H. Douglas' initiative, in October 1959, to have all space decisions taken by the civilian-led Air Force Ballistic Missile Committee in the Office of the Secretary of the Air Force without significant Air Staff participation. Although Douglas' successor, Dudley C. Sharp, agreed to allow prior review of space issues by the Air Staff and increase its role in space development planning, the final decisions remained with his Ballistic Missile Committee.⁶⁴

Despite these concerns, by end of the year the Air Force clearly had become recognized as the dominant military service in space. Lacking the boosters, facilities,

and space experience of the Air Force, the Army and Navy found themselves on the periphery of the space picture, while ARPA had been reduced to insignificance. The changes in late 1959 affected the “space budget,” too. The Air Force benefited the most from ARPA’s loss of 80% of its funding. While NASA succeeded in nearly doubling its fiscal year 1961 budget from \$535,6000,000 to \$915,000,000, Air Force funding multiplied by nearly 120 times, from \$2,200,000 to \$249,700,000. Air Force leaders now could argue that the service had regained control of much of its “own” space program. Moreover, NASA remained dependent on the Air Force for launch boosters and range support and, Project Mercury notwithstanding, the Air Force’s Dyna-Soar manned space program continued on the drawing board. If the Air Force had not achieved the complete victory sought by its leaders, it nonetheless seemed well on its way to gaining management responsibility for all service requirements as the Defense Department’s executive agent for space.⁶⁵

The Air Force Seeks to Consolidate Its Position

As the Eisenhower administration entered its final year, the President could take pride in the country’s space program. In the spring of 1960, the number of American scientific and space probe launches totaled 24, of which 14 had achieved successful orbit. The Soviets had succeeded only in launching three such spacecraft, although they continued to garner world prestige from their spectacular “feat” of hitting the moon and photographing its far side. On the international front, the United Nations (UN) prepared to establish a permanent 24-nation Committee on Peaceful Uses of Outer Space, ten European nations discussed formation of a joint agency for scientific space exploration, and the administration continued its nuclear test ban and disarmament efforts by offering the Soviets use of America’s global tracking network for its manned space experiments.⁶⁶

Nevertheless, Air Force leaders continued to chafe at what they considered a policy that produced too modest a defense-support space program and prevented offensive space weapon system development altogether. They centered their criticism on the administration’s National Security Council 18 August 1958 national space policy, “Preliminary Policy on Outer Space.” If this directive represented a preliminary statement of policy, hopefully a more conclusive formulation of policy would provide specific recognition of military requirements. Back on 30 June 1959, President Eisenhower had charged the National Aeronautics and Space Council to review the preliminary policy. It took the group a full six months to prepare their report. Approved by the NSC as Directive 5918 on 26 January 1960, the “U.S. Policy on Outer Space” continued to emphasize a policy of civilian “peaceful” scientific exploration and development activity. It lauded the UN’s approval of the “launching and flight of space vehicles. . . regardless of what territory they passed over”—as long as they involved the “peaceful uses of outer space.” Although the directive accorded the military mission better recognition, it restricted military space functions to

defense support and, once again, specifically limited offensive space weapon systems to study only.⁶⁷

Although the revised space policy disappointed military leaders, Eisenhower's attempt to have the Space Act amended in early 1960 provided another opportunity to promote greater recognition of the military space role. The President believed that the single national space program implied in the act was impractical and undesirable. Dual civilian and military programs represented reality and should be formally recognized. Because NASA and the Defense Department cooperated effectively without what he considered inappropriate congressional mandates, the National Aeronautics and Space Council and Civilian-Military Liaison Committee should be abolished. Furthermore, he desired presidential relief from direct program planning responsibility but, to avoid duplication, sought specific authority to "assign responsibility for the development of each new launch vehicle, regardless of its intended use, to either NASA or the Department of Defense."⁶⁸

The President sent his proposed amendments to Congress on 14 January 1960, where they received considerable scrutiny in hearings that winter and spring. Not only did many legislators remain unhappy that the country seemed to trail the Soviet Union in space progress despite administration statements to the contrary, the fact that 1960 was a presidential election year assured a lively and contentious debate on space in the months ahead. Overton Brooks, Democrat from Louisiana and Chairman of the House Committee on Science and Astronautics, predicted as much in late fall of 1959 when he warned that Congress early in the new year would "probe every facet of the [space] program." Brooks, in fact, had been trying since the spring of 1958 to convince the administration that the country should have an integrated space program.⁶⁹

Representative Brooks and other congressional leaders convened a number of committees to examine the President's request and review the merits of whether the country had or should have one or two space programs under civilian and/or military control. Since there appeared no ready solution to the issue, the Eisenhower administration's preference of separate programs continued. As for the President's recommendations, the House agreed to eliminate both oversight bodies, but in so doing convinced the administration to accept a substitute, the Aeronautics and Astronautics Coordinating Board (AACB). Cochaired by the Defense Department's Director for Defense Research and Engineering (DDR&E) and NASA's Deputy Administrator, the new coordinating body, unlike the CMLC, possessed the authority to make binding decisions. The Senate, however, chose not to act on the President's request until a new administration could review the issue. As a result, the NASC and CMLC continued in law yet ceased to function, while the AACB began operating in September 1960.⁷⁰

The hearings provided an opportunity for Defense Department witnesses to lobby for a wider military role in space. At the same time, pointed questions about

space planning revealed the weaker side of the Defense Department and Air Force approach to space. NASA impressed committee members by presenting a “10-year plan” with funding milestones for research, development and exploratory space activities in pursuit of peaceful objectives. The NASA initiative placed the Defense Department on the defensive. The Defense Department had no such plan and, as DDR&E Herbert York explained, it saw no reason to prepare one. Testifying on 30 March 1960 before Senator John Stennis’ NASA Authorization Subcommittee of the Committee on Aeronautical and Space Sciences, his argument reflected the logic of the Air Force concept for space planning and operations. Unlike NASA, he said, the Defense Department did not view space as a mission, with spaceflight and exploration as ends in themselves, but rather as a means for achieving better military space applications to improve existing terrestrial military mission capabilities. “Considering the nature of our space objectives, it is not logical to formulate a long-range military space program which is separate and distinct from the overall defense program.” The Defense Department’s planning process also served the administration’s political agenda by highlighting the civilian program rather than the military.⁷¹

While DDR&E York presented a sound argument, the Defense Department’s unwillingness to produce a space plan left it open to criticism from a Congress sensitive to duplication and effective development and coordination between NASA and the Defense Department. While NASA seemed to know where it wanted its space program to go in future, the Defense Department appeared less certain. Especially in the field of space exploration, which demanded initial funding for programs without definite military mission applications, the military found it difficult to convince Congress without benefit of an effective long-range plan. For the Air Force, this meant that its budget reflected space not as a program in itself, but as part of traditional mission areas. The Samos reconnaissance satellite, for example, appeared under strategic elements, while the MIDAS early warning system supported air defense mission requirements. Even after ARPA had transferred space projects to the Air Force, the scattering of space projects throughout the budget prevented a strong focus for advocacy of a military space program during the budget process.

At the same time, Air Force planners encountered difficulty in development and operational planning for space systems. While the so-called indivisibility of “aero-space” provided a conceptual approach to space that supported the service’s quest for military space missions, it did not contribute effectively to a planning process that required consideration of space as a separate medium. Not only did space systems, in fact, involve different technical challenges, determined by orbital dynamics in a hard vacuum, but the lack of basic knowledge about many aspects of space contributed to the complexities of the planning process.

Nevertheless, the Defense Department’s lack of a space plan per se did not mean that the Air Force conducted no long-range space planning. Air Staff planners had

attempted since early 1958 to develop conceptual plans for space by means of an Air Force Objective Series (AFOS) paper. An agreed-upon AFOS paper would be complemented by a Required Operational Capability (ROC) document, which would identify the forces necessary to achieve the objectives (AFOS). Only by September 1959 could planners agree on a ten-year plan for peacetime and wartime operations that seemed to meet Air Force requirements without conflicting with national policy. Yet critics claimed that the draft document treated space as a separate “entity” in violation of the “aerospace” concept, and subsequent AFOS drafts failed to gain approval throughout the spring. Meanwhile, Air Staff officers working on the ROC also encountered roadblocks when they presented their “revolutionary” developmental program. Looking ahead to an operational date of 1975, they proposed a high-profile program with major funding increases to achieve innovations in propulsion, structural materials, and guidance, as well as “human factors development” as part of a future military man-in-space program. The ROC clearly treated space as a mission by calling for development of space weapons regardless of whether earth-based aeronautical systems might provide a more efficient and cost-effective alternative. Air Staff critics dismissed the plan as too “utopian” and risky. Without approval of these two planning documents, the 120-page qualitative force structure analysis that would logically follow in the form of a Research and Development Objectives (RDO) paper, remained a “dead letter.”⁷²

Not until the fall of 1960 could Air Force planners agree among themselves and gain the necessary approval for their ROC and RDO proposals. Another nine months would pass before the Air Force issued its first Objective Series statement depicting long-range concepts and its vision of military space activities. By then, Air Force leaders dealt with another administration that appeared to be far more sympathetic to their objectives. Much of the planning dilemma resulted from the unwillingness of General White and other Air Force leaders to issue official guidance for meeting national space policy and engage in an Air Force-wide educational campaign on space. The administration’s “space for peace” policy tended to inhibit independent, high-profile Air Force military initiatives, while any official Air Force statement on space would prove of marginal value as long as space remained the preserve of ARPA or NASA for funding, management, and overall technical direction.⁷³

While Air Force leaders might very well ballyhoo the concept of “aerospace” in public forums and argue that “aerospace power is peace power,” current political and organizational constraints called for a more cautious approach to Air Force pronouncements on space. Back in July 1959 Air Staff planners initiated a formal space policy study, which received greater attention following ARPA’s demise in the fall. By the end of the year, the Chief of Staff’s “policy book” contained a number of statements for use in the 1960 congressional hearings. General White, however, desired a comprehensive space policy statement he could issue officially. After numerous reviewers on the Air Staff and in the Office of the Secretary of the Air

Force had their say, a final version seemed ready for publication in mid-March. Yet General White considered the timing “inappropriate.” As the Air Force headquarters historian concluded, the chief of staff worried that “publication of an official [space] policy statement at a time when so many facets of the space program were still undecided would have unfavorable reverberations in Congress, the Office of the Secretary of Defense, and the other military services.”⁷⁴

General White’s caution was not misplaced. In early May 1960, shortly after the Air Force had submitted its operational plans for MIDAS and Samos, Admiral Arleigh Burke, the Chief of Naval Operations, again challenged the Air Force position on space operations. He reaffirmed the need for a joint [unified] military space agency based on major technological developments of the last year and a half that propelled several systems to the “operational threshold.” He also referred to the substantial interservice support for NASA’s Project Mercury, and the joint agencies soon to be established for command, control, and communications functions. After dividing along the lines of the previous summer, the Joint Chiefs of Staff forwarded its divergent views to Secretary of Defense Thomas Gates, who had held the post since December 1959. On 16 June 1960, he reaffirmed the decision earlier taken by his predecessor on 18 September 1959.⁷⁵

For a second time, the Air Force had deflected an Army-Navy challenge to its growing military role in space. Its prudent, cautious approach to asserting its prominence in the military space picture seemed vindicated. By late summer, however, the Air Force would lose control of one of its largest and most important space missions.

The downing of the U-2 reconnaissance aircraft piloted by Francis Gary Powers on 1 May 1960 destroyed plans for an East-West Summit Conference and limited reconnaissance flights exclusively to the periphery of the USSR. It also brought the troubled Samos and MIDAS satellite programs more funding from the administration and Congress, while compelling officials to reassess the reconnaissance satellite program at the highest government levels.⁷⁶

Eisenhower’s “peaceful purposes” space policy covered CIA as well as military involvement in a reconnaissance satellite program. Back in February 1958 the President authorized the CIA to develop a reconnaissance satellite, assisted by elements of the Air Force, after being told by his Board of Consultants on Foreign Intelligence Activities that Samos could not meet near-term requirements, because it used film readout and relied on the Atlas booster. While the Atlas would not be operational for several years, by using the Thor IRBM, the CIA might have a film recovery satellite launched by the spring of 1959. Using as a cover the Air Force’s Discoverer project, the CIA designated its highly sensitive operation Project CORONA.

Satellites had to fill the intelligence gap created by the loss of the U-2. On 10 June 1960 Eisenhower directed Secretary of Defense Gates to reassess intelligence requirements and the prospects for fulfilling them using the Air Force Samos readout

system. In turn, he appointed a three-man panel made up of the President's science advisor, George B. Kistiakowsky, John H. Rubel, Deputy Director for Defense Research and Engineering, and Joseph V. Charyk, Under Secretary of the Air Force. Apparently, over the summer Kistiakowski and the President's Scientific Advisory Committee performed most of the work, assisted by Richard Bissell and his CIA science advisory panel. CORONA, meanwhile, achieved its second success in fourteen attempts on 20 August, recovering the first film capsule. Kistiakowsky presented the Samos findings to the President in a NSC meeting on 25 August. The report concluded that the Samos satellites, like CORONA and the U-2, represented a national asset. As such, the project should not be directed by a military service, but by a civilian agency in the Defense Department. The President agreed and authorized an accelerated program directed by the Secretary of the Air Force and reporting to the Secretary of Defense.⁷⁷

The new program arrangements took shape quickly. On 31 August Secretary of the Air Force Dudley Sharp created within his department the Office of Missile and Satellite Systems under the Assistant Secretary of the Air Force, who would be responsible for coordinating Air Force, CIA, and later Navy and National Security Agency (NSA) intelligence reconnaissance activities. Secretary Sharp named Brigadier General Robert E. Greer director of the Samos west coast development field office. At the same time, the Secretary established two advisory bodies: a Satellite Reconnaissance Advisory Group made up of four civilian technical specialists, and a Satellite Reconnaissance Advisory Council. Chaired by the Under Secretary of the Air Force, the council included General Greer, the three Air Force assistant secretaries, the vice chief of staff of the Air Force and two senior Air Staff officers. Within months, the Office of Missile and Satellite Systems became the secret National Reconnaissance Office (NRO), directed by the Under Secretary of the Air Force, and responsible for all reconnaissance satellite projects, including CORONA. The Samos effort disappeared from public view as surely as it did from Air Force control.⁷⁸

Although the new reconnaissance satellite offices remained within the Office of the Secretary of the Air Force and employed serving Air Force officers, Air Force headquarters was essentially excluded from the operations of this highly sensitive national project. As a result, the military satellite reconnaissance program would operate outside the Air Force area of responsibility. Moreover, when continued funding and technical problems led to cancellation of Samos in the early 1960s, only the equally troubled MIDAS missile early warning satellite and the Vela nuclear detection spacecraft remained in the Air Force satellite inventory.

While the Air Force lost control of the Samos satellite program, it took action to create The Aerospace Corporation to insure that it would have the technical competence to meet current and future space age challenges.⁷⁹ Although the new systems approach had proven successful during the crash missile program, the

systems engineering role played by Ramo-Wooldridge Corporation generated criticism from aerospace firms and Congress about its privileged position. When, on 31 October 1958, it merged with Thompson Products, Inc., to become Thompson-Ramo-Wooldridge (TRW), Inc., its Space Technology Laboratory (STL) became an “independent” subsidiary of TRW. Nevertheless, conflict-of-interest charges and congressional scrutiny compelled General Schriever to seek an alternative based on a nonprofit, noncompetitive arrangement.

Secretary of the Air Force James H. Douglas and other Air Force leaders agreed. A special committee confirmed the nonprofit corporation approach, and in the spring of 1960 General Schriever and Under Secretary Joseph Charyk worked with an organizing committee to form a new corporation. By 3 June they had established The Aerospace Corporation on El Segundo Boulevard in Inglewood, California, adjacent to the Ballistic Missile Division headquarters. At a news conference on 25 June, Chairman of the Board Roswell L. Gilpatrick declared that his organization represented “a new approach on the part of the Air Force in the management of its missile and space programs.” By the end of the year, the new corporation had acquired more than 1700 employees and responsibility for twelve major Air Force programs. Eventually, the Aerospace Corporation would provide general systems engineering and technical direction (GSE/TD) for every missile and space program undertaken by the Air Force.

Air Force leaders had good reason for optimism in the fall of 1960. They had beaten back space challenges from the Navy and Army and had created the Aerospace Corporation. Despite losing control of the Samos program, the Air Force continued to expand its space role in the Space Detection and Tracking System, in booster development, and in development of infrastructure to support national space policy. The Air Staff’s Brigadier General Homer A. Boushey forecast in the fall of 1960: “We can go into space with our feet firmly planted on the ground.” Yet, Air Force leaders soon threw caution to the wind. With the prospect of a new and potentially more space-oriented administration on the horizon after the November 1960 election, Air Force leaders decided to embark on a campaign to influence the thinking of the new administration on space issues.⁸⁰

The Military Space Mission Goes to the Air Force

Senator John F. Kennedy made space an issue in the 1960 presidential election campaign. Referring to Soviet “firsts,” he cautioned that “if the Soviets control space they can control the earth, as in past centuries the nation that controlled the seas dominated the continents.... We cannot run second in this vital race. To insure peace and freedom, we must be first.” He called for an accelerated space program.⁸¹

Shortly after his narrow victory over Vice President Richard M. Nixon, Kennedy appointed a committee to review the country’s space program. Chaired by MIT’s Jerome B. Wiesner, the “Wiesner Committee” included among its nine distin-

guished members Trevor Gardner, prime mover of the Air Force Atlas missile program. While serving on the Wiesner Committee, Gardner also accepted an invitation from General Schriever to chair a committee that would examine the status of Air Force space activities. Schriever hoped that Gardner would be able to produce a von Neumann Committee type of report that would lead to a “comprehensive, dynamic Air Force space development program” along the lines of the crash ICBM program.⁸²

The Wiesner Report appeared on 10 January 1961.⁸³ It began by severely criticizing the organization and management of NASA and what it termed a “fractionated military space program.” It recommended that one agency or military service be made responsible for all military space development and cited the Air Force as the logical choice. Already providing ninety percent of the support and resources for other military agencies, the Air Force, said the report’s authors, represented the nation’s “principal resource for the development and operation of future space systems, except those of a purely scientific nature assigned by law to NASA.” Their recommendations also included more emphasis on booster development, manned space activities, and military applications in space. The Air Force could not have been happier with the Committee’s report.

Meanwhile, early in 1961 the Air Force had to confront the unwanted fruits of its assertive late-fall campaign for a greater space role. Back in late November 1960, the Air Staff’s Deputy Director of War Plans, Brigadier General J. D. Page, prepared a paper describing the Air Force position on space for use in briefing the new administration’s officials. The paper restated the Air Force view of “aerospace,” stressed the importance of space applications, and described seven such projects: Samos, MIDAS, a space-based antisatellite or missile system, a satellite inspector known as Saint, the Space Detection and Tracking System (SPADATS), the Advent communications satellite, and the Transit navigation satellite. Additionally, four more projects, Discoverer, Dyna-Soar, the Aerospace Plane, and HETS, a so-called hyper-environmental test system, were identified as “learning type” projects designed to determine the feasibility of new technology for space. General Page’s rationale also assessed relations with NASA, suggesting that the Air Force work to have the Space Act be amended to provide clear recognition of the military’s role in developing space systems.⁸⁴

The Page paper seemed at variance with General White’s efforts to promote a good relationship with the civilian space agency. In late 1959, for example, the chief of staff had circulated a letter to the Air Staff directing the fullest possible cooperation with NASA and had continued to foster good relations between NASA and the Air Force. General Page’s paper of late 1960, however, suggested that less harmony existed between the two organizations than publicly admitted, and a more forceful effort might be needed to right the balance. The Page paper coincided with an intense public and internal information campaign to express Air Force views on

space to congressmen, journalists, businessmen, and other influential people. The self-promotion effort immediately raised a storm of protest in the press over what it termed the Air Force's "political offensive to bring about changes in national space policy and law." Critics predicted an approaching contest with NASA for the country's major role in space.⁸⁵

The outcry came to the attention of Congressman Overton Brooks, whose House Committee on Science and Astronautics planned to meet in February 1961 to examine the possible Air Force-industry "plot to undercut the space agency." Brooks' intentions prompted General White to write the congressman a letter, in which the Chief of Staff declared that "any action or statements by any Air Force individual or groups which tend to create such impressions [of unhealthy competition between the service and NASA] are in direct contradiction to the established beliefs and policies of the Air Force." General White requested Congressman Brooks to identify the "'pressure groups within the USAF' ... and the specific actions taken by these groups toward 'degrading the position of NASA.'" Despite General White's assurances, the chairman reiterated his concerns in a 14 February 1961 letter to NASA director Glennan, who passed the letter on to General White. The Air Force Chief of Staff responded by assuring Glennan he was sending his key officers to meet with the new NASA leadership to determine how they could lay to rest the "ghost of this alleged NASA-Air Force dissension and duplication" once and for all.⁸⁶

General White also appeared before the Brooks Committee in March to deny that his service had a plan "to take over NASA." During the congressional hearings in 1960, he had reassured his questioners that all was well between the two agencies, and that Air Force support to NASA had been extensive. This included providing the space agency sixteen Atlas D boosters modified for Mercury capsules and adapters, launch facilities at the Atlantic Missile Range Complex 14, and one-half of Hanger J with adaptations to accommodate telemetry, communications, and data transfer equipment. Along with normal base support and office space and equipment, Air Force infrastructure support also encompassed guidance sites and computers used for the Atlas, along with more than 400 Air Force military and civilian personnel. General White specifically referred to good working relations in evaluating requirements and preparing schedules, reaching agreements to share facilities on a priority basis, and cooperating on a demarcation of missions. As for the latter, he declared that the Air Force had no conflict with NASA handling space exploration and civilian uses and the Defense Department pursuing military applications. General White did, however, suggest the need for a single point of contact for Defense Department-NASA affairs and argued that the Air Force represented the logical Defense Department representative.⁸⁷

Nevertheless, Congressman Brooks in March 1961 called on the new president to clarify the civilian and military roles and explain what seemed to be a tilt toward the military by the Wiesner Committee. In reply, President Kennedy declared that,

while he never intended NASA to be subordinated to the Defense Department, there remained “legitimate missions in space for which the military services should assume responsibility.”⁸⁸

In fact, the President had already agreed to a new military directive that assigned remaining military space efforts and effectively awarded the Air Force the bulk of the military space “mission.” Shortly after taking office, Secretary of Defense Robert McNamara directed his staff to review the military space program in light of the Wiesner Report’s criticism of the “fractionated military space program.” After studying the issue and soliciting comments from important Defense Department officials, the Defense Secretary decided to centralize space system development within the Defense Department by assigning the Air Force responsibility for “research, development, test, and engineering of Department of Defense space development programs or projects.” Air Force enthusiasm remained tempered by other parts of the directive which authorized each service to conduct preliminary research and asserted that operational assignment of space systems would be done on a project-by-project basis. Nevertheless, by effectively making the service the executive agent for military space development projects and, thereby, the lead military service in space, the directive represented a major step in the Air Force’s quest for the military space mission.⁸⁹

On 17 March General White announced a major reorganization to better manage the missile and space programs. Although the timing suggests that the Defense Department directive precipitated the Air Force action, actually the reverse describes the course of events more accurately.⁹⁰ Apparently in early January 1961, Roswell Gilpatrick, the new Deputy Secretary of Defense, bolstered by the Wiesner Report’s findings, contacted General White and offered the Air Force major responsibility for the military space mission if it “put its house in order.” Gilpatrick and General Schriever had discussed the fragmented state of Air Force research and development activities when they worked together in forming the Aerospace Corporation the previous year. At that time, the main split in weapons systems responsibilities was between research and development, and procurement, the former function being assigned to Air Research and Development Command and the latter to Air Materiel Command. General Schriever had argued that the Air Force could not handle the military space mission unless one Air Force command held responsibility for research and development, system testing, and acquisition of space systems. The ARDC commander had advocated such a reorganization for a number of years. The problem had become more urgent by 1960. While the ARDC’s Ballistic Missile Division in Los Angeles had retained research and development responsibility for space projects, its most important mission in 1960 involved close coordination with Air Materiel Command’s collocated Ballistic Missiles Center to activate the new intercontinental ballistic missile (ICBM) force. As a result, two major, national programs—missiles and space—competed for resources and management

focus within a single research and development organization. General Schriever expressed his concerns to General White in September 1960 and received authority to begin dividing the west coast space and missile functions by moving the latter to Norton Air Force Base, California, and retaining all space responsibilities at the Los Angeles site. Yet the ARDC commander remained convinced that the Air Force required more sweeping organizational reform. Deputy Secretary of Defense Gilpatrick agreed.

Following Gilpatrick's offer, General White asked Schriever to form a small task force to prepare an acceptable plan for centralizing weapon system development and procurement. Only Secretary of the Air Force Eugene Zuckert, Under Secretary of the Air Force Joseph V. Charyk, and Generals White and Schriever had been informed of Gilpatrick's offer, and General White preferred to keep the knowledge to a minimum. Although the Air Staff's Major General Howell M. Estes, Jr., Assistant Deputy Chief of Staff for Operations, chaired the small group, Schriever's chief appointee, Colonel Otto Glasser, actually formulated the plan and briefed it to senior officers and officials in the Air Force and to Defense Secretary McNamara. Afterward, General White informed the Air Council of what had transpired.

The centerpiece of the Air Force reorganization of the spring of 1961 involved creation of the Air Force Systems Command (AFSC), with responsibility for all research, development and acquisition of aerospace and missile systems. With the inactivation of the Air Materiel Command, a new Logistics Command was established to handle maintenance and supply only. To carry out this challenging assignment, AFSC received four subordinate divisions: an Electronics Division, an Aeronautical Systems Division, a Ballistic Missile Division, and a Space Systems Division. The new arrangement reflected the separation of missile and space management functions that General Schriever had favored for the past two years. The new Space Systems Division would be formed at the Los Angeles site from elements of ARDC's Ballistic Missile Division and AMC's Ballistic Missiles Center. The Ballistic Missile Division, also comprised of elements from ARDC's Ballistic Missile Division and AMC's Ballistic Missiles Center as well as the Army Corps of Engineers' Ballistic Missile Construction Office, would relocate to Norton Air Force Base. An additional measure involved establishment of an Office of Aerospace Research (OAR) on the Air Staff for basic research elements.

The Air Force reorganization represented a fitting complement to the Defense Department's directive assigning to the service future military space development responsibilities. With its own house in order, space activities promised to receive the management and research and development they would need in the years ahead. Fittingly, General Schriever received a promotion to four-star rank and became the first commander of Air Force Systems Command.

The Defense Department directive awarding the military space development mission to the Air Force could not be expected to please Army and Navy leaders.

Their grumblings reached the ears of Congressman Brooks, who held hearings beginning on 17 March, the day the Air Force announced its organizational changes. Before the committee, however, Army General Lyman Lemnitzer, Chairman of the Joint Chiefs of Staff, and other Army and Navy representatives denied opposing the directive. At the same time, Deputy Defense Secretary Gilpatrick assured the committee that centralization of space research and development would prevent duplication and prevent “misuse of resources,” while General White declared that the Air Force would “bend over backward to meet the requirements of the Army and Navy as prescribed by the directive.” The Chief of Staff also stressed that the new arrangement would improve cooperative relationships with NASA. The committee took no action, but promised “continuing close scrutiny” of the new directive’s implementation.

Meanwhile, on 20 March 1961, three days after the public announcement of the Air Force reorganization, Trevor Gardner submitted his committee’s report to General Schriever.⁹¹ Although General Schriever had hoped to have Gardner’s report by mid-January 1961, the former Assistant Secretary of the Air Force found it necessary to establish two study groups to provide the managerial and technical information needed. The report’s conclusions proved alarming. The United States, it claimed, could not overtake the Soviet Union in space achievements for another three to five years without a major increase in the Defense Department’s space effort. The report reserved particular criticism for the Eisenhower administration’s emphasis on separate “military” and “peaceful” space programs, which had relegated the military program to a “stepchild” status with little participation in the scientific exploration of space, which was reserved to NASA. Above all, the report recommended that planners avoid prescribing detailed space requirements and operational systems in favor of first developing a firm technological basis, with the Defense Department and NASA focusing on fundamentals or “building blocks.” Finally, like the Wiesner Report, the Gardner Report called for military participation in a comprehensive, lunar landing program that would land and return astronauts sometime between 1967 and 1970. The broad technological capabilities resulting from such a major national effort, the report predicted, would provide important “fallout” for both military and civilian space purposes.

While the Gardner Report underwent high-level review, on 12 April 1961, Soviet cosmonaut Yuri Gagarin became the first man to orbit the earth. Motivated in part by this Soviet space “spectacular,” Secretary of Defense McNamara directed Herbert York, DDR&E, and Secretary of the Air Force Zuckert to assess the national space program in terms of defense interests and the Gardner Report’s conclusions. The Defense Secretary’s initiative led to an intense two-week study effort that centered on a special task force at the Space Systems Division led by Major General Joseph R. Holzapple, Air Force Systems Command’s Assistant Deputy Commander for Aerospace Systems. On 1 May 1961, in forwarding the report to Secretary McNamara,

Secretary Zuckert reiterated the Air Force's concerns about "the inadequacy of our current National Space Program." Not surprisingly, the Air Force's "Holzapple Report" confirmed the conclusions reached by Trevor Gardner's committee. Following an analysis of military space objectives and current development efforts designed to meet them, the report focused on the large booster program as the most pressing problem and reason for Soviet supremacy. Like the Gardner Report, the Air Force proposal also called for a national lunar landing initiative, whose framework would provide an urgently needed comprehensive research and development "effort." Although the Air Force recognized that NASA would head the expedition, it looked forward to a close, cooperative effort that would enable it to reenter the field of superbooster research that had been a NASA preserve since it acquired the Army rocket team in October 1959.⁹²

The Air Force recommendations ultimately were incorporated into the National Space Program announced by President Kennedy in May. Shortly after receiving the Air Force proposal, Secretary McNamara and newly-appointed NASA Administrator James E. Webb met to propose major initiatives and budget increases necessary "to establish and to direct an 'Integrated National Space Program.'" Although the lunar landing objective topped their list of essential projects, they also called for developing global space communications and meteorological networks and large boosters for both civilian and military programs.

After receiving public and congressional support for an expanded space program, President Kennedy on 25 May 1961 appeared before a joint session of Congress to challenge the nation to overtake the Russians in space.

If we are to win the battle that is now going on around the world between freedom and tyranny, the dramatic achievements in space... should have made clear to us all...the impact of this adventure on the minds of men everywhere who are attempting to make a determination of which road they should take...It is time to take larger strides—time for a great new American enterprise—time for this nation to take a clearly leading role in space achievements."⁹³

Echoing the agreement between McNamara and Webb on the nation's future course, the President listed the moon expedition as the first space goal, followed by development of nuclear rockets [big boosters] for interplanetary space exploration, and creation of global communication and meteorological satellite systems as soon as possible. Congress had already raised the funding of the Defense Department's large solid-fuel booster project from \$3 to \$15 million. As a result of the Kennedy-proposed space program, the Air Force, as the "space booster service," would receive \$77 million to begin development of both an upper stage and a large solid-fuel booster to compete with NASA's liquid-fueled Nova engine.⁹⁴

By May of 1961 President Kennedy realized the importance to national security of reconnaissance satellites. Although he did not alter the Eisenhower policy of "space

for peaceful purposes,” he clearly believed that the nation found itself in a race for space supremacy with the Soviets and should accept the challenge. The Air Force fully expected to play a central part in the ambitious space program that lay ahead and to benefit from the technological achievements along the way.

The Air Force Rise to Military Space Preeminence

The Eisenhower administration’s space policy never wavered from its central objective of permitting the launch and operation of military reconnaissance satellites. The “spy satellites” would enable the country to guard against the President’s old nemesis of surprise attack, while reinforcing the moral high ground of “space for peace” by providing the means to verify future arms agreements and nuclear test ban treaties. Relying on the “Sputnik precedent,” he preferred to avoid direct confrontation with the Soviets by stressing civilian spaceflight and limiting military operations to defense support activities. This would best insure the success of clandestine satellite operations for the nation’s defense.

Throughout the late 1950s Air Force leaders often failed to appreciate the subtleties of the Eisenhower space policy. For them, the policy of “space for peaceful purposes” served only to restrict military space activities to modest defense support projects and no offensive initiatives beyond the study phase. As military planners, they preferred defense preparations to combat potential enemy capabilities rather than prepare for operating in an “outer space sanctuary.” Given their focus on space as the ultimate “high ground” and the extension of traditional Air Force operations, Air Force leaders believed that the country should achieve space “supremacy” in order to deny offensive space operations to the enemy. Because such activity might jeopardize space reconnaissance assets, the Eisenhower regime categorically refused to permit it.

Given these circumstances, the Air Force remained unable to conduct an independent space program. Prevented after Sputnik from leading a nationwide space effort to overtake the Soviets, it found itself forced to respond to ARPA’s direction, then compete with NASA for funds and projects. Only with the demise of ARPA in late 1959 did the Air Force regain control of its “own” space program. Even then the future course with NASA and DDR&E seemed unclear, while key projects continued to experience growing pains. Moreover, much of the Air Force space responsibility involved supporting other agencies with booster and infrastructure assistance. Operational direction remained the responsibility of other services and agencies. This did not always seem to reflect the aspirations of the service that had been assigned, in the words of General Schriever, the “prime responsibility for the military space mission.”

By the end of the Eisenhower presidency, the program had in place the five functional areas of defense support operations that would characterize Air Force space operations from then until the Reagan administration reopened the issue of

weapons in space.* Of the five areas, only the missile detection and space defense functions remained largely under Air Force control. At this time, the Air Force supported others who had responsibility for communications, navigational, and meteorological satellites, while “observation of the earth” now encompassed highly sensitive “black” systems outside the Air Force’s control. Looking back on the McNamara directive’s impact on the Air Force following loss of reconnaissance assets to the National Reconnaissance Office, Air Force Secretary Eugene Zuckert declared, “It was like getting a franchise to run a bus line in the Sahara Desert.” Yet, Secretary Zuckert’s comment did not express pique at the service not getting what it wanted. The March 1961 decision, he explained, was jurisdictional and provided the Air Force all the jurisdiction it needed in the space field. How much support the service would get remained in doubt. In effect, the Air Force received the research and development franchise for space systems, including offensive space-based systems, but it awaited customers and support from the Defense Department in the course ahead.⁹⁵

If the Air Force did not acquire all the military space missions it desired, it had much to celebrate in the spring of 1961. Of its space programs, the MIDAS early warning infrared satellite remained a high national priority, and the Air Force continued to develop its Samos reconnaissance project. At the same time, it provided important launch and infrastructure support to the national reconnaissance effort under Project Discoverer. By the end of June 1961, the Air Force had launched twenty-six Discoverer satellites in support of various projected space systems, and the program had been expanded from an original thirty-five planned vehicles to forty-four. The Air Force also played a major part in the Space Detection and Tracking System with overall planning responsibilities and development of its Spacetrack network, and it moved forward with an elaborate air and missile defense system that would provide collateral support for Spacetrack. Already, the Air Force programmed the Thor and Atlas boosters as standard launch vehicles of the future, with an improved Titan to follow. Boosters had been the foundation of the Air Force dominance in space and represented the best means to perpetuate that dominance. At the same time, despite Project Mercury, in these, the Dyna-Soar years, the military man-in-space mission remained a viable option.

In the aftermath of Secretary McNamara’s directive and President Kennedy’s lunar challenge, the Air Force could look back on the years since Sputnik with satisfaction. Its cautious, well-orchestrated, opportunistic three-and-one-half-year quest for the military space mission had succeeded. The losses of rival service assets to NASA had resulted in Air Force gains, and efforts to create a unified space command for space had been successfully thwarted. Along the way the Air Force

* See Appendix 2-5.

prepared itself for the space mission by demonstrating the flexibility to establish its own in-house technical expertise with the Aerospace Corporation, and implement a major reorganization to better handle the research and development challenges ahead. The Air Force had staked its claim to space through the “logic of aerospace,” and it had been accepted. Most importantly, despite the difficulties with space program advocacy this often presented, Air Force leaders remained convinced that space must be approached in terms of its utility for traditional operations. This would be an important legacy for the future. In the years to come, space would become an increasingly important medium in support of both strategic and tactical military operations. That, in turn, would serve to institutionalize space within the Air Force. In 1961, the Air Force had garnered the bulk of the military space “mission.” The challenge now would be to strengthen its position by developing a military space program vital to the nation’s defense.