
THE AIR FORCE'S STRUGGLE FOR SPACE

The idea that space is a natural extension of the third dimension has endured for so long in Air Force folklore that this mission area has been accepted by most airmen as an Air Force birthright almost from the start. Yet nothing could be farther from the truth. On the contrary, even a cursory overview of Air Force involvement in space since the end of World War II makes it clear that that involvement has been one of constant and relentless struggle with the other services, with competing civilian entities, and with the ruling political establishment for control of the nation's military space effort.

Indeed, until 1958, when Air Force chief of staff General Thomas D. White first introduced the term "aerospace" into the defense lexicon to portray air and space as a single continuum (see Chapter Three), the Air Force lacked not only a unifying theme for systematic planning with respect to space but also much interest in space as a domain of future operations warranting significant capital investment. Faced with parsimonious funding in the wake of the nation's postwar demobilization and preoccupied with the overarching need to build a nuclear deterrent force composed of modern jet bombers, the Air Force opted instead to concentrate its research and development (R&D) and procurement efforts almost entirely on the development and fielding of new aircraft. Its primary interest in space during those formative years was entirely bureaucratic, centered on a determination to defend the service's "exclusive rights" to space against perceived encroachments by the Army and Navy.

Indeed, rather than being in any way preplanned, the Air Force's initial approach to space was, in the words of air power historian Walter

Boyne, “both curious and coincidental,” in that the need to develop the intercontinental ballistic missile (ICBM) thrust the Air Force into space-related activity almost willy-nilly, before it had either the resources or the inclination to develop any seriously considered concepts for the military exploitation of space.¹ In the years that followed the Air Force’s eventual commitment to the practical business of developing satellites for reconnaissance and ballistic missiles for nuclear retaliation, Air Force involvement in space came to reflect a dual-track effort, neither track of which had much to do with any far-reaching “vision” of space as representing the organization’s ultimate destiny. The first track, pragmatic in the extreme, sought to convince the nation’s civilian and military leaders that the Air Force should be formally designated the “executive agent” for all U.S. military space activity. The second, once Air Force space programs had become sufficiently developed by the early 1980s to have practical relevance to the warfighting community, aimed at removing those programs from the control of the service’s R&D and acquisition sector and reconstituting them in a new organizational arrangement in direct support of Air Force operators. Throughout it all, the Air Force had to fight mightily every step of the way to earn its dominant role in the U.S. military space effort. The history of that fight is well worth recalling by today’s Air Force planners for the cautionary note it offers against presuming that space has in any way been a natural Air Force inheritance.

EARLY INTERSERVICE CONFLICTS

Ironically, the first manifestation of service interest in military space exploitation after World War II came not from forward-looking Army Air Force (AAF) planners, as one might have expected, but from the Navy. In early 1946, a group of U.S. naval officers who had been conducting a satellite feasibility study sought to carve out a leading role for the Navy in pursuing military satellite development. The Army

¹Walter J. Boyne, *Beyond the Wild Blue: A History of the U.S. Air Force, 1947–1997*, New York: St. Martin’s Press, 1997, p. 267. To be sure, on March 16, 1955, the Air Force did initiate procurement of the WS-117L satellite system, the precursor to the Corona film-recovery reconnaissance satellite and the SAMOS electro-optical reconnaissance and MIDAS infrared launch-detection satellites—even before the Atlas ICBM was given the highest national development priority later in September of that year.

also positioned itself ahead of its AAF component during the initial postwar years in seeking a niche for itself in space exploitation. Through its Operation Paperclip, it had brought some 130 German rocket scientists to White Sands, New Mexico, along with nearly 100 V-2 rockets and reams of technical data from the German missile development and launch facility at Peenemunde. Not long thereafter, Army spokesmen began characterizing their rockets as a natural extension of artillery and therefore a legitimate Army preserve.

In the face of these perceived encroachments by the Army and Navy on what they considered to be the AAF's rightful domain, AAF leaders moved with dispatch to challenge the space pretensions of the other services, even though the AAF itself at the time had no comparable satellite or missile plans of its own. Not only did the AAF's deputy chief of staff for research and development, then-Major General Curtis LeMay, decline the Navy's request for AAF participation in its satellite initiative, he insisted that satellite development should be an AAF preserve, on the ground that satellites represented an extension of strategic air power. Rather than sign up with the Navy and thus relinquish the initiative, LeMay instead turned to the AAF's newly established Project RAND to tap the latter's then unmatched scientific and engineering talent for a crash inquiry into the prospects of successfully orbiting an earth satellite. Within three weeks, that initiative led to the renowned RAND study of a "world-circling spaceship," which eventually became widely recognized as the world's first comprehensive satellite feasibility assessment. Armed with the RAND report, LeMay and other AAF principals argued strenuously for AAF primacy in satellite R&D and sought control over any future U.S. military effort to develop a satellite by claiming that their thinking was "as advanced as anyone's" and that any such satellite was "a matter of strategic aviation, their natural responsibility."²

As for the Army's missile ambitions, LeMay similarly argued in a September 1946 memorandum to the AAF's chief of staff, General Carl Spaatz, that the AAF must protect its increasingly acknowledged "strategic role," adding that the future of the AAF plainly lay "in the field of guided missiles." LeMay further cautioned that any Army

²Walter A. McDougall, *The Heavens and the Earth: A Political History of the Space Age*, Baltimore, Maryland: The Johns Hopkins University Press, 1997, p. 102.

success in gaining an inside track in developing missiles would encourage its leadership to seek control not only of the close air support mission, an AAF preserve, but of the AAF's long-range bombers as well.³ For its part, the Navy elected to shelve its satellite initiative, at least for the time being, after LeMay declined its request for AAF support. At the same time, in response to what it judged to be an unambiguous AAF effort to annex space as a military mission area, the Navy joined hands with the Army in arguing that each service should retain the right to develop missiles in support of its service-specific needs.

After the Air Force gained its independence from the Army in 1947, its leading generals pressed ever harder to be assigned control of any future U.S. satellite and missile development. In September of the following year, DoD engineered a temporary truce between the two services. The newly independent Air Force was persuaded to relinquish the AAF's previous responsibility for conducting missile R&D on behalf of the Army in return for an arrangement—in effect a payback for that concession—whereby the Air Force was given approval to develop both surface-to-surface pilotless aircraft and “strategic,” or intercontinental-range, missiles and the Army received authority only to develop “tactical,” or battlefield-use, missiles. Yet the Air Force was unwilling to take the next step of actually pursuing the development of missiles and satellites for strategic use.⁴ On the contrary, whatever interest AAF airmen may have had in satellites, rockets, and space launch capabilities in the immediate aftermath of World War II was soon displaced by the new service's greater commitment to a force development strategy focused on long-range bombers and air-breathing missiles.

In effect, the Air Force wanted the bonus without the onus. It showed far greater interest in securing what it saw as its rightful prerogatives in the space mission area than in actually getting a funded commitment to develop strategic missiles. Instead, it followed the recommendations of its newly established Scientific Advisory Board and hewed all but exclusively to the development of intra-atmospheric

³David N. Spires, *Beyond Horizons: A Half-Century of Air Force Space Leadership*, Washington, D.C.: U.S. Government Printing Office, 1997, pp. 18–19.

⁴*Ibid.*, p. 13.

aircraft and jet propulsion systems that promised greater near-term combat potential than space systems.

Yet even as it declined to support satellite development with hard funding, the Air Force vigorously campaigned for “exclusive rights in space,” as attested by the declaration of its chief of staff, General Hoyt Vandenberg, in January 1948 that as the service dealing with air weapons, “especially strategic,” the Air Force had “logical responsibility” for satellites.⁵ “Paradoxically,” as space historian David Spires noted, “as the Air Force’s commitment to develop an ICBM diminished, its determination to be designated sole authority responsible for long-range missiles increased. . . . The Air Force remained ever vigilant in protecting its authority over satellite and missile development. If it neglected its space programs, it nevertheless kept a wary eye on Army and Navy efforts to weaken the Air Force’s claim to exclusive rights to these programs.”⁶

A pivotal decision two years later in March 1950 gave the Air Force formal responsibility for developing both long-range strategic missiles and shorter-range theater missiles. Thanks in large measure to that decision, by the end of the Truman administration the Air Force had successfully outmaneuvered the Army in the latter’s effort to extend its Redstone battlefield missile’s range beyond 200 miles. Henceforth, the development of land-based “strategic” missiles would be an exclusive Air Force preserve.⁷ Moreover, a succession of RAND studies that followed the initial satellite report had identified for the Air Force a new mission of space-based strategic reconnaissance. All the same, the remainder of the Truman years saw both satellite and ballistic missile development succumb to doubts about their military worth and to an economic downturn that persisted until the end of the 1940s and beyond. Faced with the hard choice of focusing either on manned aircraft or on satellites and missiles, the Air Force, not surprisingly, elected to concentrate on improving its existing forces rather than investing in a less certain future capability.

⁵Ibid., p. 26.

⁶Ibid., pp. 19, 49.

⁷As the subsequent design and development of the Polaris submarine-launched ballistic missile began to unfold several years later, it was clear from the outset that that would be a Navy program.

MORE FRUSTRATIONS FOR AIR FORCE AMBITIONS

In a policy approach characterized by Spires as “far more sophisticated, secretive, and complex . . . than many at the time appreciated,” the Eisenhower administration professed a determination to forestall the militarization of space as long as possible and instead to stress peaceful applications.⁸ This approach, however, was a clever ploy, its altruistic declarations masking the administration’s real underlying intent to develop secret satellite reconnaissance systems. In keeping with that stratagem, National Security Council (NSC) Directive 5520, issued in May 1955, proved to be pivotal in setting the subsequent direction and tone of national space policy. It affirmed that the ongoing civilian International Geophysical Year satellite launch effort must not be permitted to hamper the high-priority ICBM and intermediate-range ballistic missile (IRBM) development efforts that were under way by that time. It also decreed, however, that a civilian scientific satellite *had* to precede a military one into space in order to establish the legitimate right of unmolested overflight in space. With a view toward ensuring the success of this stratagem, the Eisenhower administration adamantly opposed any discussion by the services of military space operations that might possibly prompt a public debate over the legitimacy of military space flight.

By that time, the Air Force had become heavily committed to the development of reconnaissance satellites and ballistic missiles. Yet without an agreed and accepted space “mission,” it still found itself beset by powerful Army and Navy efforts to dominate the nation’s military space programs. The Naval Research Laboratory, having initiated a satellite development effort as early as 1945, was managing the official U.S. Vanguard civilian satellite program. Concurrently, the Army Ballistic Missile Agency (ABMA) in Huntsville, Alabama, was insisting that the Army possessed the greatest wherewithal for pursuing military space applications and that space was merely “the high ground,” the taking of which was a traditional Army mission.

Indeed, during the early 1950s both the Army and Navy could claim more practical experience with space launch activities than could the Air Force. The Army’s V-2 and related launch experiments shortly af-

⁸Spires, p. 30.

ter World War II were but precursors to the subsequent Redstone, Juno, and Jupiter rockets developed by Wernher von Braun and his team after 1950, when the latter moved from White Sands to Huntsville to establish the Redstone Arsenal. It also was the Army that succeeded in putting the first man-made object in space, when its WAC Corporal rocket attained a ballistic apogee of some 250 miles in early 1949.

In the wake of the successful launching of Sputnik in October 1957, Deputy Secretary of Defense Donald Quarles had no trouble supporting the Air Force's advanced reconnaissance program for developing satellites, which was not only consistent with but integral to the administration's determination to develop a satellite reconnaissance capability. Yet he bridled at the Air Force's parallel efforts to carve out an offensive space role for itself and insisted that the Air Force cease thinking of satellites as weapon platforms with offensive applications, on the reasonable premise that any talk of weapons in space would threaten to undermine the nation's continuing stress on legitimate passage for reconnaissance satellites, a more important concern. Later comments by Air Force generals calling for missile bases on the moon and militarizing the planets raised both Pentagon and congressional hackles and did little to engender civilian support for the Air Force's nascent space ambitions.

On January 31, 1958, the Army's Explorer 1 finally became the first U.S. satellite to achieve orbit. That and the Navy's eventual success in launching Vanguard gave those services both an operational and a bureaucratic advantage in the space arena, with the Navy claiming legitimate rights of ownership of all military space missions involving weather, navigation, and fleet communications.⁹ Soon thereafter, congressional hearings gave all three services an opportunity to state their case, along with the Defense Department, the National Advisory Committee on Aeronautics (NACA), and the Atomic Energy Commission. Each proponent sought to persuade the Eisenhower admin-

⁹McDougall, p. 166.

istration and Congress “of its own special capability in space by calling loudly for recognition of its skills and resources.”¹⁰

By the end of 1958, the Air Force had decided to launch a full-court press for control of the American military space effort. As Spires explained, the Air Staff’s directorate of plans candidly itemized the Air Force’s weaknesses in space organization, operations, and R&D and suggested that “rather than formally requesting operating responsibility for space roles and missions, the Air Force should demonstrate successful stewardship, rely on available hardware, and establish ‘squatters rights.’” The director of plans added that the Air Force “must assume the role of opportunity, aggressively taking advantage of each situation as it arises to assure that the Air Force is always pre-dominate [sic] in any action that has a space connotation.”¹¹

On November 7, 1959, the Air Force’s office of legislative liaison voiced concern over apparent congressional preferences for Army space initiatives. Taking its cue from General White’s recently enunciated “aerospace” formula, that office called for an Air Force strategy emphasizing that the upper atmosphere and space were extensions of the Air Force’s traditional operating arena and thus represented a natural extension of Air Force responsibility. It further encouraged 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.”¹²

At the same time, however, the Air Force failed to indicate any immediate military space applications that would require it to fund basic research for space. Instead, it spoke expansively of sending pilots up in “aerospace planes” to “orbital bases.” That prompted the budget-conscious Eisenhower administration to put the Air Force on an

¹⁰Enid Curtis Bok Schoettle, “The Establishment of NASA,” in Sanford Lakoff, ed., *Knowledge and Power: Essays on Science and Government*, New York: Free Press, 1966, p. 187.

¹¹Spires, p. 68.

¹²Memorandum by Colonel V. L. Adduci, assistant director, legislative liaison to the Assistant Deputy Chief of Staff for Plans and Programs, November 7, 1957, quoted in Spires, p. 54.

ever shorter leash.¹³ Such efforts to propound grandiose schemes for eventual space force application soon led the Air Force into political trouble when a “director of astronautics” was established within the Air Staff without any prior Air Force consultation with senior civilian officials. That move drove several senior civilian defense principals to charge the Air Force with seeking to “grab the limelight and establish a position” in the ongoing interservice jousting for bureaucratic dominance over military space. Secretary of Defense Neil McElroy personally bridled at the Air Force’s use of the term “astronautics” and at its having made an end run around the civilian leadership to pursue public support for its space ambitions. By direction of the Office of the Secretary of Defense, the use of the term “astronautics” by the Air Force was formally proscribed and the new Air Staff office was redesignated the Directorate of Advanced Technology.¹⁴

Thus chastened, the Air Force backed away from its effort to lay the groundwork for force employment applications in space and instead adopted a strategy more consistent with administration programs and goals and aimed principally at getting the Air Force formally designated the executive agent for all U.S. military space activities. Toward that end, General Bernard Schriever played a pivotal role by arguing that the Air Force’s near-monopoly in managing and operating the nation’s military space systems by that time had naturally come to warrant its acquiring greater responsibility for military space in future years. That effort, however, scarcely deterred the other services from continuing to jockey for a larger share of the action with respect to military space. The Army, in particular, clung tenaciously to its residual space programs in the face of the Air Force’s accelerated push for controlling the nation’s military space effort. That push eventually drove Army General John B. Medaris, the commander of ABMA, to complain to Congress that the Air Force had evinced a long record of noncooperation with Army space launch programs.¹⁵

¹³McDougall, p. 200.

¹⁴Bruno W. Augenstein, *Evolution of the U.S. Military Space Program, 1945–1960: Some Key Events in Study, Planning, and Program Management*, Santa Monica, Calif.: RAND, P-6814, September 1982, p. 11.

¹⁵For example, in early 1959, the Army revealed its Man Very High proposal, which envisaged firing a man riding in a Jupiter reentry vehicle on a ballistic trajectory 150 miles downrange. This proposal was ridiculed by Dr. Hugh Dryden, the director of

The Army and Navy also countered the Air Force's push for dominance in the space arena by calling for the establishment of a joint military command that would operate and manage all U.S. military space systems. The lead role in that effort was played by the chief of naval operations, Admiral Arleigh Burke, who argued in April 1959 for the creation of a joint military space agency based on what he called "the very indivisibility of space." The Army's chief, General Maxwell Taylor, agreed with Burke, insisting that the possibilities held out by space transcended the interests of any single service. The Air Force chief, General White, however, opposed that idea, insisting that it violated the time-honored practices of treating space systems on a functional basis and of integrating weapon systems within unified commands. Since space systems merely enabled a more effective execution of existing missions, White countered, they rightfully belonged within the appropriate unified or specified command.¹⁶

In adjudicating these opposing arguments, Defense Secretary McElroy made three decisions in 1959 that substantially bolstered the Air Force's bureaucratic position with respect to space. First, he rejected Admiral Burke's proposal for the establishment of a joint military space command. Second, he disapproved the proposed creation of a Defense Astronautical Agency and instead picked the Air Force to be the assigned military supporter of the newly created National Aeronautics and Space Administration (NASA).¹⁷ Finally, he gave the Air Force responsibility for the development, production, and launching of military space boosters and for military space payload integration, thereby stripping the Army and Navy of any significant space responsibilities and leaving only the Air Force and NASA as significant players in space systems development. Congress ratified that decision on June 1, 1960.¹⁸

NACA, as having "about the same technical value as the circus stunt of shooting a young lady from a cannon" (Spires, p. 75). The Office of the Secretary of Defense rejected it forthwith. Once NASA got the civilian space portfolio, however, it did exactly that with Project Mercury.

¹⁶Spires, p. 76.

¹⁷NASA, an evolutionary development of the previous NACA, was established by the National Space Act of 1958 to manage the nation's civilian space effort.

¹⁸As consolation prizes, the Navy was granted control of the Transit navigation satellite and the Army received four communications satellites. (Transit's purpose was to help U.S. Navy ballistic-missile submarine crews determine their position before launching.)

Ultimately, the Air Force emerged from the post-Sputnik interservice struggle over space with the lion's share of oversight authority in that domain. Spires called the rejection of the Navy's proposal for a joint military space agency and Secretary McElroy's designation of the Air Force as the nation's military space booster service "a landmark decision on the Air Force's road to space."¹⁹ Historian Walter McDougall likewise observed that it "solidified the USAF hold on military spaceflight."²⁰ Not long after these decisions were made, Congress increased the Air Force's space funding by a factor of almost 120, from \$2.2 million to \$249.7 million. Shortly thereafter, General Medaris retired from the Army in bureaucratic defeat and his Huntsville facility was transferred to NASA. In Spires' assessment, "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."²¹

SUBSEQUENT AIR FORCE GAINS

Throughout much of the 1950s, the Air Force did not sufficiently appreciate the important nuances of the Eisenhower administration's strategy to legitimize space reconnaissance. Air Force leaders instead regarded that strategy merely as a politically imposed stranglehold whose principal effect was to inhibit a more energetic military exploitation of space. By the early 1960s, however, the Air Force's pursuit of institutional dominance over military space had finally begun to show signs of real progress—once its leadership acknowledged, for the first time, the usefulness of space in enabling and supporting traditional military functions. In one of the first clear manifestations of that progress, the Defense Department moved in May 1960 to integrate the strategic communications systems of the three services under the newly established Defense Communications Agency (DCA). As a result, neither the Army nor any other service would exercise exclusive control over the military satellite communications system (MILSATCOM). Instead, the Air Force was granted the

¹⁹Spires, p. 78.

²⁰McDougall, p. 198.

²¹Spires, p. 80.

spacecraft development and launch charter for MILSATCOM. The Army received only the ground communications portion and DCA assumed responsibility for coordinating Air Force and Army activities to ensure commonality and consistency.²²

The advent of the Kennedy administration in January 1961 marked another important milestone for the Air Force. A report issued that same month by presidential science adviser Jerome Wiesner faulted the nation's "fractionated military space program" and maintained that the Air Force was the logical choice to become the sole agency for managing that program's diverse systems and activities, considering that it was already providing 90 percent of the space-related resources and support for the other services and defense agencies in any case. Two months later, President Kennedy approved a Pentagon directive assigning the Air Force responsibility for the overwhelming majority of the nation's military space effort, making it the lead space service and, as such, the de facto executive agent for military space. In that directive, Secretary of Defense Robert McNamara formally designated the Air Force as the military service for space R&D, mandating that any exceptions to that rule had to be authorized by him personally. That directive largely foreclosed the interservice tugging and hauling over space that had predominated throughout so much of the Eisenhower era. Later, in 1963, in a punctuation of his earlier directive, McNamara transferred the Pacific Missile Range from the Navy to the Air Force and also assigned the global satellite tracking system to the Air Force.

In the meantime, the highly classified Corona satellite reconnaissance program was finally vindicated when a film capsule containing overhead imagery of the Soviet Union was returned from low earth orbit after 14 failed attempts. Despite efforts from some quarters to assign the Corona program, the U-2, and the Satellite and Missile Observation System (SAMOS) to a civilian defense agency, the Air Force's Office of Missile and Satellite Systems was redesignated the secret National Reconnaissance Office (NRO), headed by the Under Secretary of the Air Force. Thanks to that move, the Air Force was able to retain nominal ownership of the Corona program, although that program's assignment to the civilian Air Force secretariat and its

²²Ibid., pp. 138-139.

direct subordination to the Director of Central Intelligence with respect to tasking effectively cut the uniformed Air Force out of Corona's day-to-day operations and management.²³

What continually got the Air Force into hot water in its campaign to gain civilian endorsement of its space ambitions during the Eisenhower and Kennedy years were those instances when it reached beyond its pursuit of executive-agent status with respect to the management and operation of the nation's military space effort and pursued more ambitious goals having to do with force application—goals which ran directly counter to the “peaceful uses” proclivities of those administrations. The Air Force also encountered an unresponsive and occasionally even hostile civilian audience whenever it sought to claim exclusive corporate ownership of a seamless vertical dimension that included both air and space. As just one illustration in point, the deputy director of war plans on the Air Staff in 1960 issued a paper advocating an aggressive Air Force effort to seize control of all new U.S. military space programs. That paper's issuance was accompanied by a major public-relations push to promote Air Force interests to congressmen, business leaders, opinion makers, and other civilian elites. It triggered a major protest by the media against what was portrayed as a transparent Air Force political effort to force a change in national policy with respect to the peaceful uses of space. Seemingly undaunted, however, the first commander of the newly established Air Force Systems Command (AFSC), General Schriever, complained pointedly in congressional testimony in July 1961 that the nation had been “inhibited in the space business through the ‘space for peace’ slogan.”²⁴

In much the same spirit, the Air Force continued to press hard for a more combat-oriented military space program, to include the development and testing of antiballistic missile and space-based anti-satellite systems. It also continued to develop future space plans in an Air Force Objectives Series paper that would be complemented by a requirement for operational capability (ROC) statement to identify

²³The Air Force's loss of control of Corona and SAMOS led it to establish the Aerospace Corporation to ensure that it would, in the future, possess the on-call engineering skills needed to meet future space challenges. (Spires, p. 85.)

²⁴Ibid., p. 101.

specific fielded capabilities needed to achieve Air Force objectives. In direct connection with that approach, the Air Staff's chief of R&D argued forcefully in 1962 that the best way to ensure the peaceful use of space was through the pursuit of what he called "space superiority," to include an offensive capability to inspect satellites by rendezvousing with noncooperative targets.²⁵

Such clamoring by the Air Force for offensive capabilities in space severely tried the patience of McNamara and his senior subordinates, to say nothing of their disposition to lend the Air Force a receptive ear. In response to the Air Force's advocacy of such programs, the director of defense research and engineering, John Rubel, responded tersely that the Defense Department's space spending was already as high as it would be permitted to go, given the "uncertainties" of the nation's military space effort, and that any new Air Force space program proposals would receive more than the usual exacting scrutiny for what they promised to contribute to traditional military mission fulfillment. More to the point, Rubel added that many such recently submitted proposals by the Air Force had not met the high technical standards of his office but instead, as Spires noted, merely "served abstract doctrines about the military space role." Rubel went out of his way to disparage the Air Force's "aerospace" formula, finding no use in vague theories suggesting that space would be the next battleground or that "control" of space, whatever that meant, promised control of the earth.²⁶ Similarly, McNamara saw the Air Force as fixating excessively on alternative hardware means for getting into and out of orbit rather than on the more strategically important question of what the Air Force really wanted to do in space and why. He was plainly dissatisfied with the Air Force's answers to the latter question, particularly with respect to offering persuasive military functions for its proposed Dyna-Soar and, later, for Manned Orbiting Laboratory (MOL) astronauts to perform while in space.

In the end, the Dyna-Soar and MOL programs were both terminated in close succession and, with them, the Air Force's near-term hope of making manned spaceflight the main focus of its space plans. Im-

²⁵Ibid., pp. 104–105.

²⁶Ibid., p. 115.

PLICITLY referring to those cancellations, the Secretary of the Air Force at the time, Robert Seamans, observed that the costs of putting airmen into space were prohibitively high for the payoff offered and that the Air Force would be better served by concentrating on modernizing its fighters and bombers rather than getting diverted by space technology ventures that promised little, if any, combat leverage of significant note.²⁷ Moreover, as evidence that the Air Force was divided regarding its R&D and procurement priorities, Spires observed that for many of the service's leaders, space represented "abstract goals and assets that drained scarce operational funding from terrestrial needs." As if to reinforce that more traditional school of thought, the retirement of General Schriever in 1966 had the effect of depriving the Air Force of its most vocal and influential space advocate and of accelerating a shift in Air Force emphasis, already set in motion by the emerging exigencies of Vietnam, from ambitious force-application schemes to a more low-key and incremental approach to military space.

In the early 1970s, the interservice competition that had loomed so large during the Eisenhower years surfaced anew as the Navy again challenged the Air Force's exclusive claim to military space, arguing that the 1961 Pentagon directive against a joint military space command had been superseded by new military requirements. Worse yet for Air Force fortunes, Secretary of Defense Melvin Laird declared in 1970, against express Air Force preferences, that the acquisition of military space systems would henceforth be undertaken in the same manner as all other defense procurement programs and in accordance with the same guidelines. Laird further decreed that the three services would compete on an equal footing for future space programs in such areas as communications, navigation, surveillance, and weather.

Rightly assessing any outright attempt by the Air Force to get Laird's directive reversed as a recipe for failure, Secretary of the Air Force John McLucas instead cleverly highlighted that directive's potential for fostering interservice rivalry and, using that argument, convinced Laird to amend it to require all military space developments to be coordinated with the Air Force before being funded and set in mo-

²⁷Ibid., p. 133.

tion. That tactic had the effect of undoing the most potentially harmful implications of Laird's ruling for Air Force interests. On September 1, 1970, Defense Department Directive 5160.22 stipulated that "the Air Force will have the responsibility of development, production, and deployment of space systems for warning and surveillance of enemy nuclear capabilities, and all launch vehicles, including launch and orbital support operations."²⁸ Despite that good news, however, the Nixon administration's consuming preoccupation with Vietnam had led to a growing parsimony when it came to funding new R&D initiatives, especially with respect to space. The handwriting on the wall indicated that if the Air Force wished to secure for itself a predominant role in military space once and for all, it would have to begin thinking less about pursuing new systems and programs per se and more about acquiring and refining the technical expertise, management skills, and organizational wherewithal not only to make such systems and programs work most effectively but also to justify the Air Force's claim to overseeing them.

THE CONSOLIDATION OF AIR FORCE SPACE ACTIVITIES

For the first 10–15 years of American military space involvement, those who created U.S. space systems devoted themselves almost exclusively to supporting the nation's highest-level security needs and imperatives (such as intelligence, C3, and missile launch warning). The mission of nuclear deterrence predominated. Their early interests were focused mainly on gaining a position of strategic advantage for the United States through the deployment of advanced space capabilities. For that reason, their training and career development were not in the art of operational flying but rather, for the most part, in applied science, engineering, and systems management. As the Air Force's most senior space officer, then-Lieutenant General Thomas S. Moorman, Jr., observed in 1992 of that formative era, ". . . because the new medium [of space] had uncertain operational applications, the research and development community took the lead in acquiring and operating our space systems."²⁹ That

²⁸Boyne, *Beyond the Wild Blue*, p. 268.

²⁹Lieutenant General Thomas S. Moorman, Jr., USAF, "Space: A New Strategic Frontier," *Airpower Journal*, Spring 1992, p. 14.

made for an almost preordained divide between the air and space components of the Air Force—a divide that became ever more apparent as military space systems increasingly emerged from the black world of secrecy into the light of day.

Indeed, one could go further yet by observing that, in fact, there were *three* schisms in the Air Force with respect to space during the early formative years of the service's space involvement: (1) the separation between blue Air Force flight operations and black space noted immediately above; (2) the separation between Air Force Systems Command's R&D and acquisition establishment and the Aerospace Defense Command (later Air Force Space Command) space combat operations community; and (3) the entire Air Force space community's near-exclusive focus on supporting strategic nuclear deterrence and warfare, which produced yet a third divide separating Air Force space concerns from the conventional warfare orientation that eventually came to dominate the rest of the Air Force.

That reality was to change dramatically, however, as it became increasingly clear by the mid-1970s that the nation's fielded military space assets offered great potential not only for the most senior civilian leadership with respect to nuclear crisis management, but also for the uniformed conventional warfighting community. Indeed, the first glimmer of an effort to bring space more closely into the organizational fold of the mainstream Air Force had occurred fully a decade earlier, when then-Colonel Robert T. Marsh suggested that a space directorate be established within the Air Staff. In what Boyne called "a non-turf-conscious manner that was typical of his leadership," Marsh further suggested the need for a separate space directorate within AFSC.³⁰ Marsh briefed these suggestions in 1965 to the Air Force's chief of staff, General John P. McConnell, who quickly approved them.³¹

For the most part, however, the Air Force's space activities remained more a focus of R&D and acquisition activity than a day-to-day concern of Air Force operators. As a result, the Air Force showed little

³⁰Boyne, *Beyond the Wild Blue*, p. 270.

³¹Later, as the four-star commander of AFSC, Marsh, in another non-turf-conscious move, was among the first to advocate the creation of a separate Air Force Space Command.

interest in seriously committing itself to taking on space operations as a core institutional goal. Because of that neglect at the higher command levels, the service's most devoted space professionals were left to find allies primarily within the middle ranks of the officer corps rather than among the senior Air Force leadership.³²

In 1977, however, chief of staff General David C. Jones issued a watershed letter on Air Force space policy that portrayed the development of space weapons and operational concepts as among the Air Force's uppermost responsibilities.³³ Later during Jones' tenure as chief, the Air Staff's directorate of plans and operations issued a study of future Air Force space objectives that repeated General White's 1958 "aerospace" mantra that space was but a continuation of the third dimension. That study further maintained that the Air Force deserved to manage all U.S. military space activities because it possessed both a rich history of working in space and a near-monopoly on space technology expertise. The latter rationale came close to offering the most compelling argument yet for the Air Force's long-standing pursuit of stewardship over the nation's military space effort. The prominent use of the term "aerospace," however, bore witness to a continued belief in some senior quarters that air and space should, in the Air Force's best interest, be treated as a single medium and mission area.

In yet another indication that space was no longer solely a concern of the Air Force's R&D and acquisition communities, the 1979 Air Force Manual 1-1 on basic doctrine identified space operations, for the first time, as one of the nine basic Air Force operational missions. The following year, the Air Force Scientific Advisory Board (SAB) conducted a summer study that concluded that although the Air Force had successfully performed military space operations throughout the preceding 15 years, it remained "inadequately organized for operational exploitation of space and [had] placed insufficient emphasis on inclusion of space systems in an integrated force

³²Spires, p. 175.

³³Walter J. Boyne, "A Great Tradition in the Making: The United States Air Force," *Aviation Week and Space Technology*, April 16, 1997, p. 126.

study.”³⁴ In a determined step toward correcting that assessed shortcoming, the Air Staff in 1981 established a directorate for space operations under the then-serving deputy chief of staff for plans and operations, Lieutenant General Jerome O'Malley, who previously had emerged as a forceful advocate of making space operations a normal Air Force activity. That move was intended, at least in part, to honor the SAB's finding that space technology did not adequately support operational commanders, that the Air Force's operational space goals were not clearly defined, that space systems were not well integrated into the larger force structure, and that Air Force space objectives were both poorly understood and financially unattainable.

Even before these developments occurred, the initial groundwork had been laid by a group of like-minded operators on the Air Staff and elsewhere in senior Air Force circles for the creation of a separate Air Force Space Command (AFSPC). One of those officers, then-Major General John T. Chain, Jr., worked for O'Malley as director of operations on the Air Staff. In 1981, Chain called for getting the operational Air Force “more involved in space” and for developing and nurturing “more space-qualified blue-suiters,” calling that “one of the most important issues facing the Air Force.” He stressed that those in key operational positions needed to become more knowledgeable about space issues and to weigh in more heavily in shaping the Air Force's space strategy.³⁵ In October 1982, the first Air Force manual on space doctrine, AFM 1-6, resolved clearly, at least for the time being, the question of whether space was a distinct Air Force mission or merely a place by calling space “the ultimate high ground,” as chief of staff General Charles Gabriel put it. Space was portrayed in that manual as a medium whose exploitation served *all* Air Force operational missions.

Of crucial importance to this process of giving space its full due within the Air Force, those in the most senior leadership positions who had been most determined to develop a separate space com-

³⁴Quoted in Brigadier General Earl S. Van Inwegen, USAF (Ret.), “The Air Force Develops an Operational Organization for Space,” in Cargill Hall and Jacob Neufeld, eds., *The U.S. Air Force in Space: 1945 to the 21st Century*, Washington, D.C.: USAF History and Museums Program, 1995.

³⁵Major General John T. Chain, Jr., USAF, AF/XOO, remarks at the Air University Air Power Symposium, Maxwell AFB, Alabama, February 23, 1981, pp. 11–14.

mand as an entity in its own right clearly understood air and space to be separate and distinct operating mediums and recognized that the Air Force's increasingly routinized space and space-related operational functions warranted an organizational home of their own. For example, the commander of Tactical Air Command (TAC) at the time, General W. L. Creech, freely attested that the Air Force's embryonic F-15-launched antisatellite (ASAT) demonstrator weapon entailed a space-specific mission application that did not properly belong in TAC, even though the ASAT was carried by a TAC-operated fighter. Creech was more than willing to have TAC unburdened of that capability, since he had for years been involved in the Air Force's quest to give space operations a proper institutional home.³⁶

Indeed, General Creech and by then General Robert T. Marsh, the commander of AFSC, were working with their fellow four-star Air Force major-command (MAJCOM) commanders to inculcate the idea that the time had come to have a dedicated operational command for space and that it should be a separate Air Force command standing on its own, in lieu of continuing to have the operational space mission assigned to an existing MAJCOM—or spread among several of them. As Creech later recalled, General Marsh's total lack of concern for "turf protection" of the space authority then vested in AFSC played a key role in convincing the other four-star MAJCOM commanders of the idea's worth. Creech helped Marsh round up the other MAJCOM commanders and get them behind the idea. All readily came on board, including the commander in chief of Strategic Air Command (SAC) after some initial reservations within SAC over the possible infringement of a new Air Force Space Command on SAC's recently acquired prerogatives with respect to space systems and warning.³⁷

To be sure, one of the reasons for General Marsh's lack of concern for turf protection was almost certainly that AFSC lost almost no turf in the initial transaction. The three major installations, 20 smaller sites, and almost 4000 personnel that became the eventual nucleus of AFSPC in 1982 were not carved out of AFSC's R&D and acquisition community. Rather, they represented the missile warning and space

³⁶Telephone conversation with General W. L. Creech, USAF (Ret.), November 23, 2001.

³⁷Ibid.

surveillance networks that the Aerospace Defense Command (ADC) operated until its demise in December 1979. At that time, the warning and attack assessment functions were turned over to SAC until AFSPC's creation nearly three years later.

With all of the MAJCOM commanders thus solidly united on the point that a separate Air Force Space Command was urgently needed, Air Force chief of staff General Lew Allen encountered not just unanimous consent but powerful encouragement when it came time for him to introduce the subject at a scheduled meeting of all the Air Force four-stars. In the end, that initiative from the major field commanders, along with O'Malley's and Chain's urgings from within the Air Staff, carried the day. General Allen, after some initial hesitation, elected to approve the creation of a new and independent MAJCOM for space in one of his last official acts as Air Force chief of staff.

In an important step toward that end, construction of a Consolidated Space Operations Center (CSOC) was begun in FY 1982 at Falcon Air Force Station near Colorado Springs, Colorado, to provide a centralized facility for operating all Air Force satellites on orbit. (At the time, however, those satellites made up only a small number of the nation's total on-orbit military resources, and AFSC's control center in Sunnyvale, California, continued operating most of the rest.) On September 1, 1982, just two months after Allen's retirement, AFSPC itself was moved to Colorado Springs. Its first commander, General James V. Hartinger, was assigned the responsibility of managing and operating all Air Force on-orbit space assets, including controlling operational spacecraft and managing DoD-sponsored shuttle flights. Hartinger had served previously in a number of operational command positions, including as commander of both 9th and 12th Air Forces in TAC. Accordingly, he had the credentials to be a credible commander of the new AFSPC, where he was expected to exercise operationally related cognizance over the separate space medium and mission area. It further bears noting that although this seminal phase of Air Force space history indeed saw an eventual transfer of operational responsibility for Air Force space systems from AFSC to AFSPC, AFSPC itself was largely *not* a child of AFSC's R&D and ac-

quisition community. Rather, it inherited the space combat operations community that previously had resided in ADC.³⁸

Several years later, in his post-retirement oral history interview, General Allen recalled that although the Air Force had been responsible for a long time for an extremely active space program that was working well, “there were many within the Air Force, and some without, who felt strongly that the Air Force was not organizing itself appropriately for what they foresaw as a much different and increased set of activities in space.”³⁹ In light of that, he added, “the pressure to do something about a Space Command [had] built during all of the four years of [his] term as chief. . . . The advantage [of creating AFSPC] was that one had a [space] commander who would advocate and have access to [Air Force] headquarters and . . . a structure on which one could build as other matters evolved. Those were probably good things.”⁴⁰

Once AFSPC was up and running, it was only a matter of time before a unified U.S. Space Command would also be activated, since that joint-service entity was an unavoidable concession by the Air Force to the Navy and Army to secure the blessing of its sister services for the creation of AFSPC.⁴¹ That finally occurred three years later, on September 23, 1985. On this issue, the Air Force was obliged to reverse its former position of staunchly opposing such a joint command that went back to the initial proposal put forward for such a move in 1959 by Admiral Burke. However, the Air Force did not in any way resist the creation of that command. On the contrary, both General Gabriel and Secretary of the Air Force Verne Orr had previously come to espouse the establishment of a unified command for

³⁸Then-Lieutenant General Creech, at the time the Air Force’s assistant vice chief of staff, chaired a closely held study that ultimately led to a recommendation to disestablish ADC. For an authoritative account of this history, see Van Inwegen, “The Air Force Develops an Operational Organization for Space.”

³⁹General Lew Allen, Jr., USAF (Ret.), U.S. Air Force oral history interview, Maxwell AFB, Alabama, Air Force Historical Research Agency, January 1986, p. 164.

⁴⁰*Ibid.*, pp. 164–165. Allen also later recalled (p. 193) that his deputy for plans and operations, General O’Malley, “was convinced that we should have a Space Command; and furthermore, he was the individual who convinced me that it was better to have me do it before I left than have it done by my successor for various reasons. Therefore, he did take the leadership in making that move out quickly.”

⁴¹Spires, p. 217.

space, declaring that no single military entity had an exclusive claim on or sole authority over the nation's military space systems. Once U.S. Space Command was on the verge of opening for business, General Hartinger proposed that AFSPC become the core component of the new unified command, since that was where the nation's military space activity and expertise were ultimately destined to be most heavily concentrated—even though they were still, at the time, largely lodged in AFSC and the NRO.

On November 19, 1983, AFSPC assumed formal stewardship of the Space Plan, the first such plan endorsed by the Air Staff since the early 1960s. The genesis of that plan lay in the continued organizational tension between AFSPC and AFSC over which command held the principal responsibility for Air Force space activities. Among other things, the Space Plan for the first time defined and articulated the four now-familiar military space mission areas of space support, force enhancement, space control, and force application—mission areas which were by no means universally accepted throughout the Air Force. The increasingly contentious issue of where stewardship for space belonged within the Air Force was finally forced into the open in 1987 when the Secretary of the Air Force released a white paper on space policy and leadership. Among other things, that white paper noted that General Gabriel's statement as chief four years before that the Air Force had assumed responsibility for most military space missions had in fact *not* been vindicated and that the rest of the defense establishment was increasingly coming to believe that the Air Force "only grudgingly supported space activities." The white paper further charged that the Air Force had failed to "exhibit a sense of institutional purpose or responsibility toward space" and had relegated space to a distant fourth priority behind its bomber, fighter, and airlift activities.⁴²

Not surprisingly in the wake of this document's release, the other services were quick to take advantage of the Air Force's seemingly lackluster interest in space, and outside challenges to Air Force stewardship of space, as well as hard questions concerning whether the Air Force was properly fulfilling its role as *de facto* executive agent for military space, began to arise again. In a clear bid to exploit this ap-

⁴²Ibid., p. 229.

pearance of an emergent Air Force window of vulnerability in the roles and missions arena, the Army and Navy turned to writing their own space “master plans.” As Spires put it, “the white paper’s authors [had] posed a central question: did the Air Force wish to act as the lead service for space? They declared that the answer should be ‘yes’ because of the service’s space expertise. At the same time, however, the Air Force had neither a mission statement for space nor a current space operations doctrine, and its operational space command could not play a strong advocacy role throughout the corporate Air Force and Defense Department because its leader [at that time] was only a two-star commander.”⁴³ In prescribing a strategy for redressing these deficiencies, the white paper laid out some explicit measures the Air Force needed to undertake—starting with articulating a new declaratory policy reasserting the Air Force’s claim to being the “lead” service for space but conceding that this did not imply an “exclusive” Air Force role.

That task was taken up in the single most important Air Force document on space to have appeared up to that time: the report of the Blue Ribbon Panel on Space Roles and Missions, which was commissioned by chief of staff General Larry Welch in 1988 to address the full spectrum of military space concerns. The panel’s executive steering group was chaired by the Air Force vice chief of staff and included the AFSPC commander, Lieutenant General Don Kutyna, and the vice commanders of the other major commands. The panel’s study group zeroed in on the Air Force’s alleged ambivalence toward space, notwithstanding the facts that the institution had been at the forefront of military space activity for some 30 years and already commanded half of the national space budget and three-quarters of the Defense Department’s space budget. In the process, it discovered that the Air Force leadership’s declared commitment to the institutionalization of space was in no way universally shared among the Air Force rank and file, thanks to persistent confusion about what space actually promised to the warfighter, a multiuser approach to systems that placed space at a disadvantage in the budget process, and the historically closed nature of the space community.⁴⁴

⁴³Ibid., p. 230.

⁴⁴Ibid., p. 235.

In its final report, the Blue Ribbon Panel called for a principal but not exclusive role for the Air Force as the Defense Department's agent for military space exploitation. It also advocated a deliberate Air Force pursuit of capabilities for performing warfighting functions in and from space. As for the ownership and control of the nation's military space equities, it recommended that AFSPC continue to be the central advocate, operator, and manager for military space support (that is, the launching and operating of satellites) and that the unified U.S. Space Command refine its relationship with its AFSPC component by returning operational control of Air Force space assets to the latter during peacetime, in light of AFSPCs "organize, train, and equip" functions as mandated by Title X of the U.S. Code.

The Blue Ribbon report's findings and recommendations encountered an uphill struggle for acceptance within the Air Force because of a persistent absence of broad corporate Air Force involvement in the space effort; the overwhelming concentration of space expertise within AFSPC and a conspicuous absence of it elsewhere throughout the Air Force, notably in the major commands; and a general lack of sufficiently developed Air Force-wide space awareness and appreciation. The implementation plan for the report's recommendations, issued by the Air Staff in February 1989, stated prominently that "the Air Force is and will be responsible for the global employment of military power above the earth's surface." It directed AFSPC to develop a "space roadmap" to update the Space Plan by integrating all Air Force space activities and tying the latter to warfighter needs, national strategy, and the four specified mission areas of space support, force enhancement, space control, and force application. The plan further anticipated that "space power" would eventually become as important as air power in future warfare and declared that the Air Force must accordingly orient its thinking and activities toward preparing "for the evolution of space power from combat support to the full spectrum of military capabilities." It also called for the development and aggressive pursuit of a "coherent Air Force role in space."⁴⁵ An important step in that direction was taken two years later in October 1990, when AFSC finally relinquished to AFSPC its launch centers, ranges, bases, and the Delta II and Atlas E launch missions, with provision for the remaining Atlas II, Titan II, and Titan

⁴⁵Ibid., p. 236.

IV missions to be handed over in due course. Ratifying that transfer of ownership, Secretary of the Air Force Donald Rice stated that “the change in assignment of roles and missions further normalizes space operations and pursues our corporate commitment to integrate space power throughout the full spectrum of Air Force operational capabilities.”⁴⁶

SOME IMPLICATIONS FOR TODAY’S PLANNERS

The preceding overview of the Air Force’s history of involvement with space, cursory as it has necessarily been, offers some instructive insights for those who are currently concerned with charting the institution’s next steps with regard to space. The first impression from this history is that the Air Force in its earliest years was far more interested in space as a domain of organizational turf to be defended than as a prospective new medium within which to conduct combat and combat-support activities. Although the Air Force was slow to embrace space as a mission area warranting significant investment for technology development, it lost no time claiming “exclusive rights” to space in the face of perceived threats of encroachment into that domain by the Army and Navy. When it came to hard resource apportionment, however, the Air Force until well into the 1950s focused almost solely on building a modern inventory of jet bombers and fighters. That was, of course, entirely reasonable at the time, considering that advanced aircraft development was what the newly independent Air Force was all about. Indeed, it had been the successful application of strategic bombardment in both the European and Pacific theaters during World War II that had represented the service’s principal claim to separation from the Army to begin with. Nevertheless, it remains a fact of Air Force life that the institution became the nation’s custodian of military space activity more by organizational and bureaucratic determination than by any natural selection or mission evolution.

Second, so long as the Air Force leadership was content to argue for—and to position itself to earn—custodial status with respect to the nation’s military space effort, it was largely successful in captur-

⁴⁶Ibid., p. 240.

ing and retaining the civilian leadership's attention and support, even if it had to fight with the Army and Navy along the way. Whenever the Air Force went beyond its bounded goals of acquiring a credible space launch capability to support the nation's growing military satellite requirements and sought to pursue a more aggressive effort to acquire space force-application capabilities, however, it ran directly against the prevailing national stress on "peaceful uses" of space and gained nothing but the disapprobation—and sometimes outright animosity—of the Eisenhower and Kennedy administrations. That experience, one might add, has continued with all subsequent administrations, with the singular exception of President Reagan's, right up to the present. It suggests that the Air Force has been predestined to failure whenever it has called forcefully for the pursuit of space force-application measures, since neither the civilian policy establishment nor, for that matter, American public opinion or even objective need has yet indicated a serious readiness to countenance crossing the "weapons in space" threshold. It also suggests, more importantly, that charges from various quarters that the Air Force has failed to honor its responsibilities of space stewardship by not plumping hard enough for "space warfare" capabilities have been badly misdirected. Any fault here has lain not, at least in the first instance, with the Air Force but rather with America's elected leaders—including many in Congress. Whether or not the Air Force has evinced adequate determination over the years to pursue such mission applications is a subject over which reasonable people can differ. But it has been well beyond the bureaucratic power of the Air Force leadership, as a practical matter, to do much on its own with respect to bringing such applications to fruition.

Third, and perhaps most notable, as the following chapter will explain in further detail, the Air Force entered the 21st century with a five-decade history of space involvement that not only was bereft of a coherent concept of operations with respect to the military uses of space but also left the institution fundamentally divided over the issue of whether air and space should be treated as two separate and distinct mediums or as a single and seamless continuum. Clearly, those Air Force leaders who worked so hard during the 1970s to find a suitable home for Air Force space activity within a separate command tasked with supporting regional warfighters around the world

believed that space was, and deserved to be, approached as an arena distinct from the realm of Air Force aerodynamic operations. Yet General White's "aerospace" formula, first enunciated in 1958, that defined—seemingly by fiat—the vertical dimension as indivisible has persisted in many Air Force circles as the preferred intellectual organizing concept for space. As a result, the Air Force in its day-to-day operations has routinely treated air and space as separate mediums because those mediums have involved fundamentally different technologies and skill sets. Yet in its formal doctrine and its sloganeering in the roles and missions arena, at least until recently, the Air Force has tended to speak of "aerospace" not just as a unitary environment, but as one that naturally belongs to the Air Force and to the Air Force alone. An unfortunate consequence of this ambivalence is that, at the same time as the Air Force has achieved great success in acquiring a preeminent military space capability, it has made scant progress toward developing and promulgating an agreed frame of reference for thinking systematically about the military potential of space.