Chapter Six

THE ROAD AHEAD

As this study has documented in detail, there have been two distinguishable schools of thought throughout most of the Air Force's history with respect to whether air and space should be treated as two separate operating mediums and mission areas or as a single and seamless "aerospace" continuum. The introduction of the "aerospace" construct by Air Force chief of staff General Thomas D. White in 1958 was principally the outgrowth of a perceived need to help ensure the Air Force's institutional survival. As such, it was a product of artful sloganeering that was never really backed up by any deep thought or systematic, operationally focused analysis. Instead, it was, for the most part, merely an inspired catchword for an Air Force roles and missions claim that caught on and persisted in Air Force declaratory pronouncements for years thereafter. Rampant uncertainty and confusion actually marked the Air Force's groping attempt to make sense of space during its first formative decade, when it had far more immediate and pressing preoccupations. Recalling that time, former Air Force chief of staff General Lew Allen, under whose watch Air Force Space Command was finally created in 1982, said that in 1958, "the Air Force clearly was determined to get involved in space but didn't know yet what it wanted to do. . . . Everybody was enthusiastic about space, but no one had yet defined what it was all about."[1]

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[1]General Lew Allen, Jr., USAF (Ret.), U.S. Air Force oral history interview, Maxwell AFB, Alabama, Air Force Historical Research Agency, January 1986, p. 28. On the point about institutional survival, General Allen further recalled (p. 192) that the Navy was anxious to organize its own space activities and create a space structure, which "contributed to the Air Force looking a little backward in not doing so."

Although the ensuing "aerospace" idea tended to predominate in Air Force doctrinal rhetoric and expressed positions in the roles and resources battles, at the operational level the fielded Air Force almost from the outset saw and treated space instead as a distinct and unique mission area in its own right. During the early years of the 1960s and 1970s, space was a domain of Air Force activity clearly apart from the air environment. That activity was highly compartmented and heavily shrouded in secrecy, with a predominant focus on systems development and national leadership support in connection with the missions of nuclear deterrence and retaliation.

By the early 1980s, however, a recognition had gradually arisen throughout the operational Air Force that the nation's growing military space communications, surveillance, and sensor capabilities had an important contingency-support contribution to offer not only to the president and the Secretary of Defense to ensure against the most grave national crises, but also more routinely to joint-force commanders in regional theaters around the world. Numerous Air Force leaders, uninhibited by "aerospace" thinking, accordingly came to regard space as a medium and mission area in and of itself. Because space was understood as being separate and distinct from the air medium, it naturally followed, in the judgment of those leaders, that the Air Force needed a separate and dedicated operational command for space in order to develop and grow the special competence required to build and operate space systems.

Simply put, Air Force Systems Command came to be viewed as doing things of an operational nature in space which it had no business doing. Such activity, according to this growing perception of the Air Force's leading commanders, made no more sense than having the Aeronautical Systems Division in Dayton, Ohio, running Air Force fighter wings or the Electronic Systems Division at Hanscom Field, Massachusetts, developing concepts of operations for and flying the E-3 airborne warning and control system (AWACS).[2] The establishment of Air Force Space Command (AFSPC) in 1982 and, three years later, the unified U.S. Space Command was directly traceable to that logic. As AFSPC's first commander, General James V. Hartinger, re-

[2]General W. L. Creech, USAF (Ret.), presentation to the commander and senior headquarters staff, Air Force Space Command, Peterson AFB, Colorado, April 15, 1999.

marked several years later in hindsight, "we thought we were looking at space with a different perspective. Space is a place, like the land, the sea, or the air. It's a theater of operations, and it was just a matter of time until we treated it as such."[3]

In 1996, however, a major move occurred at the behest of the incumbent Air Force chief of staff, General Ronald R. Fogleman, to redefine air and space as a single medium and mission area and to commit future Air Force planning and programming toward that end, with the idea that space would eventually replace the atmosphere as the Air Force's main operating arena. The 1996 Corona conference of senior Air Force leaders which ratified that move all but expressly promised that spacemen would eventually inherit the Air Force—and most of the Air Force's space officers believed it. General Michael E. Ryan, who succeeded General Fogleman as chief, regarded the Corona formulation as excessively divisive of the service's air and space communities because of its clear implication that the latter would eventually supplant the former. Yet his closely related stress on "aerospace integration" served to entrench ever further the idea of air and space as constituting a single and seamless continuum.

In 2000, the Space Commission heard the Air Force's argument on behalf of the "aerospace" construct and did not buy into its premises and assumptions. The idea that space is simply an extension of the vertical dimension did not prevail with the commissioners. Instead, they concluded that space is a separate medium and mission area, just like the air, land, and naval operating environments. Secretary of Defense Donald Rumsfeld, who had chaired the Space Commission until his selection to head the George W. Bush administration's Pentagon, issued appropriate directives to the Department of Defense and to the Air Force alike to implement most of the commission's recommendations. Not long thereafter, on succeeding General Ryan as Air Force chief of staff, General John P. Jumper moved with both conviction and dispatch to disavow the "aerospace" construct and to portray space as separate and unique, warranting its own organizational infrastructure and career track. That ended decisively, at least for the moment, the long-running intra–Air Force to-ing and fro-ing

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[3]General James V. Hartinger, USAF (Ret.), U.S. Air Force oral history interview, Washington, D.C., USAF Historical Research Center, Office of History, Headquarters USAF, September 1985, p. 167.

over whether the preferred mantra of the day was "air *and* space" or "aerospace."

That recent change in mindset on the proper understanding of space is overwhelmingly in the Air Force's interest and should be made a permanent fixture of Air Force thinking and rhetoric. To be sure, the now-discredited aerospace construct had never been a unanimous preference of the Air Force leadership. As noted above, a number of senior Air Force leaders who helped to sire AFSPC understood explicitly that air and space were separate mediums and mission areas warranting separate organizational support and funding treatment. This became increasingly apparent as the Air Force began putting ever more of its investment dollars into space in the absence of a commensurate increase in the Air Force's overall budget limit, making intra–Air Force budget trades ever more obvious and painful.

Yet the Air Force's continuing insistence on the notion that no conceptual boundary existed between air and space, notwithstanding its understandable intent to ensure the Air Force's long-term institutional livelihood, had a perverse effect: It worked against that service's interests by threatening to increase funding for space at the expense of the Air Force's no less important *air* responsibilities, all other things remaining equal. As far back as the 1970s, the Air Force had acquired a wholly new mission set in space that fully warranted separate and dedicated funding. Indeed, as AFSPC was being established, there was serious discussion among the four-stars as to whether the Air Force should seek an arrangement in which all the services would contribute their fair share for the percentage of the nation's military space product they consumed. "User pays" arguments began to be aired among the Air Force leadership, along with discussion of a common DoD stock fund for space into which all of the services would pay, as appropriate, to support the overall national military space effort.[4]

However, the Air Force leadership never actively pursued such an arrangement. Nor did it ever make a serious effort actually to petition the Office of the Secretary of Defense (OSD) to be formally designated the nation's executive agent for military space. Had its leaders

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[4]Telephone conversation with General W. L. Creech, USAF (Ret.), January 20, 2001.

been so inclined, the Air Force might have reached out during the early 1980s to get space formally defined as a separate and independent mission area under its corporate purview. Instead, it simply asserted a *claim* to both air and space while never being officially given the space mission area as a separate tasking. As a result, military space continued to be paid for solely out of the Air Force's preexisting budget allocation, and Air Force space, both predictably and of necessity, ended up facing the eventual prospect of being underwritten at the expense of other Air Force accounts, notably the service's force-projection air accounts—at the same time as "must-pay" space investments in the interests of all the services and other users grew at a rate greater than that of the Air Force's overall annual budget dispensation.[5] As just one straw in the wind in this respect, the Air Force laboratories at Wright-Patterson AFB, Ohio, were not long ago put on notice by the Air Staff that the air portion of their R&D charter would experience significant cuts in the next budget cycle and that they would need to step up their space-related research activities with the resultant funds that will flow from future Program Objectives Memoranda (POMs) and budget apportionments.[6]

Fortunately for the Air Force, in rejecting the aerospace construct, the Space Commission in effect gave the Air Force something no other service had ever before been granted, namely, *two* formally mandated mission areas—air *and* space. The commission also acknowledged, in its recommendation of a Major Force Program (MFP) budget category for space, that the space mission rightly demanded dedicated organizational oversight and funding. Finally, it provided what the Air Force had yearned for without fulfillment for more than 40 years, namely, formal designation as the nation's executive agent for military space. With the Space Commission's findings now published and Secretary Rumsfeld committed to implementing the bulk of its recommendations, the Air Force has lately found itself with respect to space somewhat in the unexpected position of the

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[5]In contrast, by way of suggesting what might have been a feasible alternative approach, the National Aeronautics and Space Administration (NASA), from its inception, made a successful division of air and space into two mediums and mission areas in its organization and budgeting.

[6]Telephone conversation with General W. L. Creech, USAF (Ret.), April 26, 2002.

proverbial dog that chased a truck for years to no avail and finally caught it. Now it must decide what to do with it.

Already, the Air Force leadership has taken the first steps toward realizing the promise held out by the Space Commission. That leadership has not only willingly but enthusiastically accepted its assigned role as executive agent for military space, thanks to what Under Secretary of the Air Force Teets recently described as "some remarkable changes made in the last year to refine and improve the way we organize space capabilities and execute space activities for national security purposes."[7] As a result, it has gained the formal recognition as the nation's military space steward that accompanies that role. With most of the bureaucratic and structural concerns described in Chapter Four now resolved, at least for the near term, the Air Force faces a clear horizon with respect to next steps in implementation. Five pressing space-related issues remain outstanding and in need of focused attention. They entail continuing with the operational integration of space with the three terrestrial warfighting mediums while ensuring the organizational differentiation of space from Air Force air; effectively wielding the Air Force's newly granted military space executive-agent status; realizing a DoD-wide budget category for space which imparts transparency to how much money and manpower are going into space each year and for what; achieving signal progress toward fielding a meaningful space control capability, while decoupling that progress cleanly from any perceived taint of force-application involvement; and making further progress toward developing and nurturing a cadre of skilled space professionals within the Air Force ready and able to meet the nation's military space needs in the coming decade and beyond.

OPERATIONAL AND INSTITUTIONAL IMPERATIVES

To begin with, considering that *all* the uniformed services and *all* force elements benefit equally from what space has to offer, it would behoove the Air Force to make peace once and for all with the fact that "air and space integration," narrowly construed, was and re-

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[7]Statement by the Honorable Peter B. Teets, Under Secretary of the Air Force, to the Commission on the Future of the U.S. Aerospace Industry, Washington, D.C., May 14, 2002, p. 1.

mains an inappropriate peg on which to hang its future role in space. To be sure, a closer meshing of the Air Force's air and space capabilities was not only desirable but absolutely essential during the initial years following Operation Desert Storm. During the Gulf War, the remarkable space support that was provided to the coalition's terrestrial force elements, notably including coalition air power, was made possible only by what one Air Force space officer later characterized as "ingenious adaptation, resourcefulness, and ad hoc procedures."[8] Recognizing that such jury-rigged arrangements would hardly suffice to meet the needs of a future joint force commander faced with a no-notice contingency, in the decade after Desert Storm AFSPC took numerous steps to make the contribution of the nation's military space assets more routinely accessible to air warfighters at all levels, from the Joint Force Air Component Commander (JFACC) all the way down to individual operators working within tactical confines.

To cite two examples, the establishment of Space Warfare Center (SWC) Detachment 1 at Nellis AFB, Nevada in 1996 offered a means of providing space-derived imagery, communications, weather, and navigation support to aircrews in Weapons School training and at Red Flag, a quarterly large-force training exercise, much like that which has increasingly become available to aircrews in actual global contingency operations. Funneled through the new Nellis Combined Air Operations Center (CAOC), this new space-derived information flow has included the delivery of target imagery and threat location information directly into the cockpits of airborne aircraft in the advanced training environment. As just one illustration, a data burst from assets in space to a Block 50 F-16CJ equipped with the Improved Data Modem can cue the pilot in real time to a threatening radar-guided surface-to-air missile site.[9] Similarly, SWC's Detachment 2 at Langley AFB, Virginia has begun to support the recently established CAOC-X there, to teach CAOC staffs how to employ on-

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[8]Lieutenant Colonel Steven J. Bruger, USAF, "Not Ready for the First Space War: What About the Second?" *Naval War College Review*, Winter 1995, p. 7.

[9]I had an occasion to observe this capability in operation at first hand during an F-16CJ sortie flown in support of the mission employment phase of the USAF Weapons School's Class 98A at Nellis AFB, Nevada, on June 12, 1998. During this high-intensity and highly realistic large-force graduation exercise, we successfully engaged and negated a simulated SA-3 site entirely through off-board cueing from a national asset on orbit.

orbit space assets during peacetime, in much the way as Red Flag has long sought to provide participating aircrews with the functional equivalent of their first ten combat missions through peacetime training.[10]

Moreover, whereas the Air Force in years past was slow to insert space expertise and a space exploitation capability into its Air Operations Centers (AOCs), that erstwhile deficiency has since been significantly redressed. During the tenure of General Howell M. Estes III as CINCSPACE in 1997, space support teams were permanently assigned to regional joint-force headquarters worldwide, where career space officers (often space weapons officers) routinely served a full tour of duty on the regional CINC's staff.[11] Previously, those with such expertise stayed at Air Force Space Command in Colorado Springs and only ventured into regional theaters as needed for training exercises or actual contingencies. Today, the Air Force has disbanded its space support teams, opting instead to imbed space weapons officers as appropriate in various planning and execution cells throughout its AOCs worldwide. In a similar spirit, at Vandenberg AFB, California, a new Space Operations Center analogous to the familiar and proven AOC opened in 2000 at 14th Air Force to monitor the status of on-orbit satellites, missile warning assets, and launch system plans and schedules. Directives to 14th Air Force wings are now routinely communicated by the new daily Space Tasking Order (STO), analogous to the familiar Air Tasking Order, as part of an ongoing effort to normalize and align space units more closely with air operations.[12]

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[10]William B. Scott, "Detachment Brings 'Space' to Nellis Air Operations," *Aviation Week and Space Technology,* January 15, 2001, pp. 453–454.

[11]Beginning with its first space division class in 1996, the USAF Weapons School at Nellis AFB has routinely been graduating some 24 space weapons officers a year. These space-division graduates learn how to integrate existing space capabilities into air combat operations and to translate the potential of those capabilities into a language planners and aircrews can readily understand. (William B. Scott, "USAF Space Weapons Officers Find Unique Niche in Air Warfare," *Aviation Week and Space Technology*, January 15, 2001, pp. 454–455.)

[12]William B. Scott, "Air Force Opens New Space Center," *Aviation Week and Space Technology*, November 24, 1997, p. 71. For more on SWC and its pivotal role in extending the offerings of space to terrestrial warfighters in all services, see Benjamin S. Lambeth, *The Transformation of American Air Power*, Ithaca, N.Y.: Cornell University Press, 2000, pp. 238–242.

Yet despite the significant progress borne out by these examples toward making the contributions of space more routinely accessible by terrestrial warfighters, the Air Force's narrow focus on "aerospace integration" toward the end of the 1990s remained overly parochial and inward-looking—and was so perceived by the other services in the joint arena. Accordingly, the time has come to start thinking in terms of integrating space more fully with *all* the services in a joint context. Since the potential offerings of space promise to redound ultimately to the benefit of all terrestrial force elements, not just to that of Air Force air power, it seems incontestable in hindsight that merely "air and space" (or "aerospace") integration was a paradigm that precluded the kind of evolutionary change actually called for. Not only was the Air Force's insistence that air and space constituted a seamless continuum increasingly self-destructive over time, its stress on "aerospace integration" was also misfocused on integrating space solely with Air Force air functions when what was needed was a conceptual framework aimed at permitting better integration of U.S. military space capabilities with all the force employment functions of all the U.S. services.[13]

Toward that end, what seems most indicated today for managing the seams between space and the air, land, and maritime environments is a perspective focused on *operational integration* accompanied by *organizational differentiation*. Through such a bifurcated approach, space can be harnessed to serve the needs of all warfighting components in the joint arena while, at the same time, being rightly treated as its own domain in the areas of program and infrastructure management, funding, cadre-building, and career development. After all, AFSPC was established to give the Air Force's space professionals a proper home in which to develop the required special competence in

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[13]It would be ideal if the Air Force could approach what needs to be done by way of conceptual, doctrinal, and organizational improvements with a clean slate, designing an approach to becoming a bona fide space power much as Douhet and Mitchell freely theorized about air power. But too much bureaucratic and organizational turf has already been claimed, which unfortunately will limit the Air Force leadership to suboptimal action at the margins. As Barry Watts has pointed out, although the United States currently enjoys a considerable head start over any other potential military competitors in space, "it also is encumbered by powerful stakeholders with limited interest in organizational or conceptual transformation." (Barry D. Watts, *The Military Use of Space: A Diagnostic Assessment*, Washington, D.C.: Center for Strategic and Budgetary Assessments, February 2001, p. 72.)

space mission execution. That rationale needs to be sustained and further entrenched, not lost in a vain effort to meld Air Force air and space professionals in a manner that risks making dilettantes of all. It is well enough in principle for the Air Force to strive to give its air and space communities a more common language and vocabulary, as well as a better mutual appreciation of what each community does. But beyond a point, as General Jumper has observed on numerous occasions, the military space career field is a unique culture that needs cultivating in its own right both in the Air Force's and the nation's best interest.[14]

To be sure, in working toward the further refinement and maturation of a distinctive and duly backstopped space career field within the Air Force, air and space professionals at all levels must understand that while the organizational differentiation of space from air will be crucial for the promise of space to be most fully realized for joint warfighters, any emergent "space culture" that may ensue from it must *not* be isolated from the mainstream Air Force, as it was during the long years when it was in the clutches of the systems and acquisition communities, but rather must be rooted from the start in an unerring focus on the operational level of war. Toward that end, such post–Desert Storm initiatives as the establishment of a space division within the USAF Weapons School at Nellis and the subsequent inclusion of a Space Warfare School at AFSPC's Space Warfare Center at Schriever AFB, Colorado represent important steps in the right direction. They should be further nurtured and substantially broadened because both aim expressly to produce operationally literate space warfare professionals and to proliferate operationally minded space expertise where it is most needed throughout the Air Force and in key joint warfighting centers worldwide. Beyond that, as Air Force

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[14]A recent article roundly scored the Air Force's experiment with a career management approach called Developing Aerospace Leaders (DAL) and its associated stress on "broadening" assignments across the air and space career fields, on the ground that such "broadening" will inevitably come at the cost of a loss of critical officer technical skills in both fields at precisely the time the service needs those skills the most. (See Lieutenant Colonel Steven C. Suddarth, USAF, "Solving the Great Air Force Systems Irony," *Aerospace Power Journal*, Spring 2002.) Since that article's publication, in keeping with the Air Force's shift away from aerospace thinking to a renewed emphasis on air *and* space, there have been signs that the Air Force leadership was having second thoughts about the merits of the DAL approach, which was very much a product of the aerospace mindset prevalent at the time of its creation.

space professionals become ever more conversant with the operational imperatives of joint warfighting, they have a collective obligation to bend every effort to rise above the fault lines and fragmented subcultures that unfortunately still persist within their *own* community (the National Reconnaissance Office, the nascent information-operations guild, and the myriad niches of the C4/ISR world, for instance). Only then can they form a more coherent and interconnected center of space excellence able to speak credibly about what space brings to joint-force employment—not just across the chasm that still separates them from Air Force airmen but also between and among themselves as they develop and mature in their own right.[15] The initiative for following through on such needed and overdue measures, which typify the essence of what is meant by the operational integration of space with other warfighting elements, lies squarely at the feet of today's Air Force space community and its senior leaders.

By the same token, those on the more traditional side of the Air Force with career roots in the fighter, bomber, and other flying communities also have a solemn obligation to understand and internalize the fact that the Air Force is now fully in the space business as much as it ever was in the force-projection air business. If the Air Force is to vindicate the generous charter it was given by the Space Commission, it must press for needed space systems modernization with every bit the same energy and passion that it shows for such centerpiece programs as the F-22 air dominance fighter (recently redesignated F/A-22 to capture the aircraft's significant ground-attack potential and intended all-weather day and night deep-strike mission portfolio). The Secretary of the Air Force, the Honorable James Roche, could not have been more emphatic on this point when he recently declared that the Air Force "is entering a new era of air and space power" and that as the service continues to evolve to meet the requirements of this new era, "we must ensure [that] our space forces and equipment and concepts of operations remain as innovative and capabilities-based as those we are now developing for our air-breathing systems." Continuing in the same vein, Secretary Roche

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[15]I am grateful to Major General Michael A. Hamel, USAF, commander, 14th Air Force, Vandenberg AFB, Calif., for calling my attention to these latter points during a conversation in his office at Vandenberg on July 29, 2002.

added that "space capabilities in today's world are no longer [just] nice to have. They are becoming indispensable at the strategic, operational, and tactical levels of war."[16]

CEMENTING THE EXECUTIVE-AGENT MANDATE

The assignment of executive-agent status to the Air Force for military space by Secretary Rumsfeld in May 2001 was not only appropriate, it was arguably a generation late in coming. Ever since the 1970s, if not before, the Air Force has had a legitimate claim to stewardship of military space. By virtue of years of unquestioned institutional dominance in the space mission area, it commands a monopoly on space resources, infrastructure, equipment, and expertise that no other service comes close to matching. The Air Force owns 90 percent of the nation's military space personnel, manages 85 percent of the nation's military space budget, wields 86 percent of the nation's military space assets, and operates 90 percent of its military space infrastructure. It is on *that* basis, not as the result of any self-arrogated "birthright" to space or its long-asserted claim that space is merely a linear extension of its mandated air domain, that the Air Force has earned such stewardship.[17] Indeed, as Chapter Two detailed, space has been anything *but* an Air Force "birthright." On the contrary, ever since the late 1940s, the Air Force had to claw its way aggressively, and often against significant Army, Navy, and civilian bureaucratic resistance, toward its newly acquired status as the nation's formally designated executive agent for military space.

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[16]The Honorable James G. Roche, Secretary of the Air Force, "Transforming Our Air and Space Capabilities," remarks to the Air Force Association National Convention luncheon, Washington, D.C., September 18, 2002. This comment seemed unmistakably to reflect the Space Commission's observation that, for all its talk in the recent past about "air and space integration," the Air Force had not been generally perceived by many as treating its air and space mission taskings with equal commitment. It also seemed to be a reminder that in recommending that the Air Force be formally assigned responsibility for two operating arenas (air *and* space), the commissioners had intended to send a signal that the Air Force was duty-bound to show equal devotion to both mission taskings—not just in its own interest but also in the national interest.

[17]Nor, it should be noted, did the Air Force's claim to the space mission area draw strength from any intimation that space is somehow a greater servant of Air Force air power than of other force elements, since all services and force elements benefit from the offerings of space—land and maritime forces arguably even more, in relative terms, than the Air Force.

Now that it has been granted such status, the Air Force should have every incentive to vindicate its designation as the nation's military space steward by moving proactively to fulfill its new role. In that regard, how the executive-agent role, now vested in Under Secretary of the Air Force Teets, is understood and played out by the civilian and uniformed Air Force leadership will be crucial. A key initial question concerns what executive-agent status for military space entails in principle and how the Air Force can best fulfill it in practice. Simply put, there is no government manual, at least yet, that explains what an executive agent for military space is and does. The absence of any agreed and formalized baseline for the charter would appear to give the Air Force great latitude to interpret and test the charter's boundaries. It seems almost axiomatic that the better the Air Force understands, articulates, and executes its new executive-agent role, the longer it will succeed in postponing the eventuality of an independent U.S. space service.

Because the Air Force, as the nation's designated executive agent for military space, must maintain oversight of all military space activity even if other services assume an increased space mission burden, a particular challenge will be for it to both be and *appear* to be even-handed and effective in exercising such oversight. An important part of that challenge will entail accepting individual service control of service-specific space systems rather than further splintering the execution of operational functions through needless duplication of effort. Because the executive agent is authorized to track all U.S. military space activities (not to wield *cognizance* over them, but certainly to maintain awareness and recognition of them), it should have a compelling interest in understanding Army and Navy space systems and programs in every significant technical and fiscal detail. To help ensure such informed awareness, the Air Force might do well to invite formal Army and Navy input to ensure that it is performing the executive-agent role to the satisfaction of those services. One way to do that might be to elicit senior Army and Navy space representation at AFSPC on a permanent basis.

Beyond that, it bears noting that the Department of Defense, having designated the Air Force the executive agent for military space, has an obligation to delimit the boundaries of the executive agent charter by setting forth the Air Force's various powers and responsibilities and ensuring that the charter is clearly understood by all concerned

elements throughout the department. It goes without saying that an "executive agent" without an adequately broad and clearly defined mandate can hardly function effectively as DoD's designated clearinghouse for military space matters. At a minimum, the space executive agent should be able to claim coordinating and monitoring responsibility for all space-related activities to be included in the space MFP (see the next section), since the MFP budget category for space will rise to its potential and fulfill its promise only if *all* space-related funding is included therein.

Fortunately, since the release of the Space Commission's report, OSD has moved on three important fronts to develop and promulgate initial guidelines for the definition and implementation of space executive-agent authority throughout DoD. First, following up on his earlier letter of May 8, 2001 to the chairman of the Senate Armed Services Committee indicating his planned responses to the Space Commission's recommendations, Secretary Rumsfeld issued an all-hands memorandum to the most senior principals in the defense establishment (including the service secretaries, the chairman of the Joint Chiefs of Staff, the under secretaries of defense, and a few others) on October 18, 2001. It announced his decisions with respect to military space management and organization and his guidance as to "how best to ensure [that] the Department of Defense is arranged and focused" toward effective implementation of those decisions.[18] Heading his guidance list was a directive to the Under Secretary of Defense for Acquisition, Technology, and Logistics, Pete Aldridge, to develop a plan for delegating milestone decision authority for all DoD space acquisition programs to the Secretary of the Air Force, along with approval to redelegate that authority to the Under Secretary of the Air Force. Under Secretary Aldridge followed through on that directive not long thereafter in a memorandum dated February 14, 2002, which delegated milestone acquisition decision authority to the Secretary of the Air Force. Although Aldridge's memorandum expressly ruled out any applicability to "highly sensitive classified programs" as defined by Title X of the U.S. Code (namely, those satellite programs conducted and operated under the

[18]The Honorable Donald H. Rumsfeld, "Memorandum on National Security Space Management and Organization," Washington, D.C.: Office of the Secretary of Defense, October 18, 2001.

NRO's auspices), it empowered the Secretary of the Air Force, "in coordination with the Secretaries of the Army and the Navy," to "implement further actions with regard to space acquisition streamlining."[19] In so doing, it gave the Air Force an unprecedentedly powerful tool, at least in principle, for exercising its executive-agent status. For that reason alone, in conjunction with the long-overdue hard-wiring of the Air Force's Space and Missile Systems Center (SMC) to AFSPC (finally consummated the year before), Aldridge's empowering memorandum represented a momentous step in the maturation of America's military space capability.

Second, the OSD director of space policy in late February 2002 circulated a draft DoD directive on executive-agent implementation for review and comment by the senior working-level principals in OSD's acquisition and C3I secretariats, the Office of the General Counsel in OSD, the Army, Navy, and Air Force, and the Directorate of Plans (J-5) on the Joint Staff, with courtesy copies also provided to the National Security Space Architect and the office of the Deputy Director of Central Intelligence. As explained in the cover memorandum, the draft directive was meant to clarify "the lines of authority, specific responsibilities, and coordination requirements between the executive agent for space and DoD components."[20]

Among other things, this detailed document (important enough to have been included as an appendix to this study for further reference) outlined the Air Force's upcoming roles in the space policy and planning arena. It stipulated in particular that the Air Force "shall establish appropriate DoD-wide processes for the development, coordination, integration, review, and implementation of space system plans, budgets and acquisition programs in conjunction with other military departments and defense agencies."[21] The directive further

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[19]The Honorable E. C. Aldridge, Jr., "Memorandum on Delegation of Milestone Decision Authority for DoD Space Systems," Washington, D.C.: Office of the Under Secretary of Defense, February 14, 2002.

[20]Marc J. Berkowitz, Director, Space Policy, "Action Memorandum on the DoD Directive 'Executive Agent for Space,'" Washington, D.C.: Office of the Under Secretary of Defense for Policy, February 26, 2002.

[21]"Department of Defense Directive 'Executive Agent for Space,'" Washington, D.C.: Department of Defense, February 25, 2002, p. 2.

empowered the Secretary of the Air Force, as the principal repositor of DoD's space executive-agent authority, to ensure that all executive-agent responsibilities are assigned and carried out, to "strongly represent DoD-wide space interests" in the planning, programming, budgeting, and acquisition processes; to harmonize all requirements for space programs generated by the other services through the Joint Requirements Oversight Council; and to recommend proposed space-related planning and programming guidance to the DoD Comptroller and Under Secretary of Defense for Policy.[22]

At bottom, the draft directive gave the Air Force what one account rightly called "sweeping new authority in the planning, programming, and acquisition of military space systems."[23] As of the end of November 2002, unlike the earlier signed implementation tasking outlined above, it remained in the grips of intradepartmental coordination and accordingly had not yet been formalized as DoD policy. All the same, it represents a crucially important step forward within DoD that should be warmly welcomed by the Air Force because it gives the service all appropriate authority in principle to act effectively on its recent empowerment as DoD's executive agent for military space. Indeed, about the only major area of Air Force concern left unspecified in the implementation directive—and it is a significant one—entails the relationship of Air Force Space Command to the Air Force secretariat and the breadth of AFSPC's authority within the executive-agent context. The Under Secretary of the Air Force, as DoD's newly designated executive agent for space, may wish to inquire into this subject as an early order of business in pursuit of greater specificity and clarity.

Third, with respect to the pivotally important issue of DoD space funds management, the above-cited draft directive authorized the Air Force to "periodically review the space program, budget, and accounting mechanism" recently established by the DoD Comptroller, which the directive described as a "virtual" MFP, and to recommend to the DoD Comptroller suggested changes to the content of that "virtual" MFP. The directive as currently written leaves room for

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[22]Ibid., pp. 3–4.

[23]Anne Plummer, "Draft Memo Outlines Air Force Role as Executive Agent for Space," *Inside the Pentagon,* March 7, 2002, p. 1.

much ambiguity and uncertainty in its cryptic allusion to a "virtual" MFP for space, offering little specificity as to what such a "virtual" MFP might entail in practice. Unless it amounts to a de facto MFP in all but name, any such "virtual" budget category will surely be destined to fail as an identifying and controlling mechanism for cross-service military space programs.

Encouragingly, in what may be indicative of things to come, a subsequent DoD report to Congress on the department's implementation of the Space Commission's recommendations expressly defined the "virtual" MFP as consisting of some "180 program elements grouped into space control, space force application, space force enhancement, space support, and other space. Included in the 'virtual' [MFP] for space are research, development, test and evaluation, systems, user equipment, people, organizations, and infrastructure whose primary [or] dedicated mission is space or a space-related ground system. The 'virtual' [MFP] for space identifies program elements from the Air Force, Army, Navy, Defense Information Systems Agency, and Defense Advanced Research Projects Agency."[24]

Although these program elements remain, as before, service-specific, their aggregation in this new and unprecedented manner for all to comprehend in a single look should give the space executive agent an unprecedented ability to identify cross-service program overlap and redundancies. That in itself represents a major step in the right direction toward a more rational management of DoD spending on military space. That said, however, irrespective of how right-minded and informative it may sound in and of itself, a DoD report to Congress does not constitute guidance with binding authority over DoD. That report most definitely offered at least the beginnings of a good and workable definition of what a space MFP, whether called "virtual" or something else, should include by way of programs and related space activity. However, it must be promulgated as formal, top-down OSD guidance to the services with all due specificity if it is to be on point with respect to needed improvements in DoD-wide space funds management. One can only hope that the terms of refer-

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[24]"Commission to Assess United States National Security Space Management and Organization (Space Commission) Implementation," Washington, D.C.: Department of Defense, interim report to the Committees on Armed Services of the U.S. Senate and House of Representatives, May 2002, pp. 5–6.

ence in DoD's report to Congress describing the "virtual" space MFP will survive the internal DoD coordination and staffing process. For as now written, they offer real promise of putting teeth into the Space Commission's recommendations with respect to military space budget accounting. This too may be a topic that the Under Secretary of the Air Force may wish to pursue further as a matter of special priority in the course of testing his newly assigned executive-agent authority.[25]

UNSETTLED FUNDING ISSUES

Of all the uncertainties that currently affect the Air Force's prospects for realizing the near-term promise of military space, none is more critical than the most basic question of how and at what opportunity cost those prospects will be financed. Echoing an argument voiced for years by many airmen (and not just those in the space career field), the Space Commission categorically concluded in January 2001 that America's military space capabilities are "not funded at a level commensurate with their relative importance."[26] This predicament is traceable largely to the fact that military space funding comes almost entirely out of the Air Force's budget, even though all of the uniformed services benefit from the space products ultimately provided.

Not surprisingly, the Air Force has thus become increasingly hard-pressed to uphold both its air and its space mission responsibilities with only a constant one-third share or so of overall annual defense

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[25]One might note in passing that the executive agent for military space also has an important educational responsibility—to groom tomorrow's Air Force executives for military space. Another important responsibility entails measured advocacy of all four of the DoD's space mission areas (space support, force enhancement, space control, and force application), with predominant emphasis today on the first three. Yet another involves providing reasoned explanations of the increasing risk faced by the nation's most vital on-orbit assets as a result of present and potential threats.

[26]*Report of the Commission to Assess United States National Security Space Management and Organization*, Washington, D.C., January 11, 2001, p. 97, referred to hereinafter as *Space Commission Report*. Areas noted as underfunded included space situation awareness; enhanced protection and defensive measures for on-orbit assets; modernized launch; and a more robust science and technology program, including space-based radar, space-based laser, hyperspectral sensors, and reusable launch technology.

total obligational authority (TOA). One reason why the other services have been so readily acquiescent in the Air Force's dominance of military space is almost surely that the Air Force's shouldering of virtually the entire military space funding burden has essentially allowed them a free ride. One should hardly be surprised that the other services would have such an unlimited appetite for space support and such an unbounded roster of space "requirements" when they do not have to pay for those costly force-enhancement benefits.

As General Estes pointed out in 1997, the Air Force will never make good on its various long-term planning statements if it does not begin investing greater sums in space.[27] However, Estes also acknowledged that in an era of unusually tight budgets, the nation's space priorities must be balanced against equally vital nearer-term air-related mission support needs. He further acknowledged that few Air Force leaders would suggest that the Air Force can afford to abandon its existing core air mission responsibilities simply to free up more money for space.[28]

Given the current zero-sum competition between military space priorities and the Air Force's other spending requirements, it is inescapable that should DoD continue its current resource apportionment practices with respect to space, the Air Force will, in the words of one former senior space officer, find itself faced with "the untenable option of capitalizing space with its increasingly limited resources."[29] This is not to say that the space and air mission areas are in direct competition with one another for Air Force funding support and that every additional dollar invested in space somehow automatically implies a loss for the USAF's air force-projection capability. To the contrary, investments in military space programs over the past two decades have contributed materially to a greatly disproportionate expansion of the overall leverage of the Air Force's

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[27]William B. Scott, "'Space' Competing for USAF Funds," *Aviation Week and Space Technology,* December 1, 1997, p. 69.

[28]Conversation with the author at Headquarters U.S. Space Command, Peterson AFB, Colorado, June 18, 1998.

[29]Major General William E. Jones, USAF (Ret.), former deputy chief of staff for operations, Air Force Space Command, white paper on the creation of an air and space force within the Air Force, prepared at the request of Major General David McIlvoy, AF/XPX. December 22, 1997, p. 11.

numerically smaller combat-aircraft inventory—in terms of such key attributes as flexibility, survivability, situation awareness, responsiveness, target-attack accuracy, and lethality, among others. Nevertheless, while it would be wrong for this reason to portray space and air as involving stark either/or choices for the Air Force leadership, it remains a fact that, unless current DoD budget-balancing priorities for R&D and procurement are changed, it will become increasingly difficult to do proper justice to both mission areas as each assumes ever greater importance over time.

A particularly aggravating factor in this respect is that space applications have become increasingly expensive as the defense establishment has become increasingly dependent on them and ever more invested in them.[30] One seemingly intractable cause of this is the persistently high cost of space launch, which has imposed an inherent limit on the sustainable rate of expansion of U.S. military assets on orbit. The constant-dollar price of getting a satellite to low earth orbit (LEO) has not changed much over the past two decades. The average cost per pound to LEO for most commercial satellites now on orbit is between $3,600 and $4,900, depending on the altitude and character of the orbit. The cost per pound for getting a payload all the way out to geostationary earth orbit (GEO) is considerably higher than that, averaging $9,200 to $11,200.[31] Furthermore, the prospect for any substantial diminution in launch costs over the next 10 to 15 years remains dim because of the unalterable physics of chemically fueled, rocket-based launch. There is little new technology now on the near-term horizon that offers any promise of circumventing this constraint.

To be sure, offsetting the low likelihood of even a marginal reduction in the cost per pound for putting payloads on orbit, miniaturization has slowly but inexorably increased the functionality of each payload pound on orbit, making possible the development and launching of smaller satellites. As one Air Force officer recently noted, "These

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[30]For example, the first MILSTAR satellite, launched in 1995 nearly five years after the cold war's end, cost roughly the same as the entire operating revenue of Intelsat, the commercial provider, and five times the entire Defense Department outlay for commercial satellite time in 1997. ("New Space Race," *Jane's Defence Weekly*, August 26, 1998.)

[31]Watts, *The Military Use of Space: A Diagnostic Assessment*, p. 7.

things aren't the size of a school bus any more, they're the size of a bread box."[32] A decade ago, military satellites typically weighed between 5,000 and 20,000 lb. Now those going to LEO increasingly weigh between 500 and 2000 lb. This means that the cost-per-pound issue may turn out to be less pressing in the future than it has been hitherto. The ever-decreasing size and weight of satellites further portends the ability to put more fuel aboard them, since they cannot be refueled in space. This will enable larger orbit changes as needed during contingencies and crises.[33]

Compounding the continued high cost of space launch is the fact that the Air Force is facing an impending acquisition and funding problem of the first order, created by the block obsolescence of many on-orbit systems now in service and the imminent emergence of a new generation of systems now at the threshold of being fielded as replacements. Virtually every major U.S. military space system is facing a planned upgrade or replacement over the coming decade, at an estimated cost of some $60 billion. These include the next-generation Global Positioning System (GPS), all military communications satellites, a space-based infrared system (SBIRS) to replace the Defense Support Program (DSP) constellation of missile-launch sensors, and a space-based laser technology demonstrator.[34] There also is the looming prospect of space capabilities within the grasp of potential adversaries that could threaten some U.S. satellite functions and accordingly beg for defensive and counteroffensive space control measures—as well as the tantalizing potential of such new capabilities as space-based radar, laser communications, and hyperspectral sensing, all of which can significantly enhance overall terrestrial force combat effectiveness. The problem is that these technology opportunities have arisen at a time when the Air Force is also facing an unprecedentedly expensive replenishment cycle in its fielded *air* assets. All of these options are competing for scarce re-

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[32]"SAB Releases Its Space Surveillance Recommendations," *Inside the Air Force,* December 12, 1997, p. 12.

[33]There is a practical limit, however, to how small many categories of military satellites can be made, since solar panels require a large surface, necessitating size and weight, in order to produce sufficient electrical power.

[34]*Space Commission Report*, p. 15.

sources within the Air Force budget, and hard choices will have to be made and impediments removed if those options are to be realized.

A core challenge here entails devising an equitable funding arrangement that will adequately underwrite the nation's military space needs in the interest of all services, but not at the unacceptable expense of the Air Force's Title X–mandated air responsibilities. To correct this aberration, military space funding must somehow be drawn from the totality of the U.S. defense budget—including not only Air Force air programs but also Army helicopters, Navy carrier aviation, and Marine aviation, along with offset decrements to submarines, surface ships, tanks, howitzers, and all other military procurement programs across the board. The reason is that military space is not just another Air Force service-specific function such as airlift and close air support, which serve other categories of military operations and other services. Rather, it constitutes a separate and distinct mission arena in its own right that promises over time to become as costly to underwrite to its fullest potential as the land, maritime, and air arenas are today.[35]

As long as U.S. military space funds are provided for as they are now—that is, almost entirely within the Air Force's R&D and procurement budget—those in the Office of Management and Budget and in Congress will retain every inclination to continue their familiar and historic "service budget balancing" practices, and the other services will be more than content to go along. Unless and until there is a change in the way military space capitalization is paid for, it will continue to come almost exclusively out of the Air Force's annual resource allocations. Valiant attempts to "persuade" the other services to pony up their fair share for the benefit they accrue from the nation's on-orbit systems, something the Space Commission clearly concluded was overdue for attention, will go nowhere.

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[35]With respect to this important and still-unresolved issue, a position paper written by the Air Staff as the Space Commission was hearing testimony from the services declared candidly that "the Air Force recommends consideration of budget mechanisms that would more equitably distribute the costs of space services throughout the Department of Defense" and that such an arrangement might better "help DoD space users focus on their requirements and establish priorities in their respective uses of space services." ("Air Force Position Paper on Space Commission Issues," Washington, D.C.: Headquarters USAF, August 14, 2000, p. 5.)

In one sense, the Air Force has no one but itself to blame for this predicament owing to its recurrent insistence in the annual budget wars since the 1950s that a seamless "aerospace" continuum was its exclusive operating domain. But it has nonetheless been both unfair to the Air Force and irrational from a broader defense planning perspective that funding for national military space systems should come almost exclusively out of the Air Force's procurement accounts at the expense of Air Force air power and other investment needs. In contrast, the nation's land and sea systems (including the air components of those systems) have been much less burdened by such draconian trades. On reflection—especially given the growing centrality of space to every service's operating repertoire—it is simply unreasonable for a single service to be expected to bear the burden of the nation's military space costs alone. As matters stand, said former CINCSPACE General Charles Horner, "space is sick, and the only way it's going to get well is at the expense of air programs."[36] Earlier, Horner maintained that if the Air Force continued to cling to its "aerospace" fixation, "then trade-offs [would] be made between air and space, when in fact the trade-off should be made elsewhere."[37] Horner stressed that next-generation space investment needs and the F/A-22 "are too important to trade off against each other" and that the "fundamental problem" is to "expand air power *and* expand space power, obviously at the cost of the surface forces."[38]

This naturally raises the hot-button issue of whose program interests across service lines should be forced to suffer in order to finance an accelerated migration of American military capabilities into space. It

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[36]"Will the Air Force Lose Its Space Program?" *Air Force Times*, February 8, 1999, p. 7.

[37]"Air Force Space System Control Questioned," *Space News*, September 8, 1997, p. 2.

[38]Brendan Sobie, "Former SPACECOM Chief Advocates Creation of Separate Space Force," *Inside Missile Defense*, November 19, 1997, p. 24. As a possible way to ease the pain at least at the margins, Air Force General Richard B. Myers, then–vice chairman of the Joint Chiefs of Staff and former CINCSPACE, suggested that military space exploitation needed to rely increasingly on the commercial sector. As that sector expands, the Air Force could consider divesting some of its infrastructure in launch and surveillance in order to concentrate on more pressing concerns. "If industry can do it," said Myers, "we probably shouldn't. Let industry do it, help industry to do it, buy products from industry, and focus on things that only people with a big R&D budget can do." (Linda de France, "Myers: Future of Military Space Requires Use of Civilian Capabilities," *Aerospace Daily*, May 8, 2001.)

is all but axiomatic that the four uniformed services, let alone the Air Force by itself, are incapable of reapportioning the defense budget in favor of more equitable support to Air Force air and space interests at the expense of competing service R&D and procurement accounts, since doing so would require the services to set aside, with inconceivable magnanimity, the overarching imperative of maximizing their own program equities in the roles and resources arena. Trade-off decisions of that magnitude are what the most senior U.S. civilian defense leaders are paid to make, based on prior determinations of national need that lie well beyond the purview of the uniformed services.[39]

Until the space MFP budget category recommended by the Space Commission and directed by Secretary Rumsfeld is better defined and more fully in place, there will be a need for greater top-down discipline by OSD in controlling the space requirements of the other services and more closely adjudicating those requirements by the JROC, so that identifying and budgeting for new space needs will reflect fiscal reality. Toward that end, the evolving MFP-12 mechanism should prove salutary in that it will enable the Defense Comptroller, as well as other supervising entities, to view the entire space funding scene. The specific purpose of this action is to size the space-related budget and scrub excess service requirements that may have worked their way into that budget by singling out and deleting those that represent overlap or redundancy, as well as capabilities that might be desirable in a perfect world but do not emanate from any clear and compelling operational need. Such DoD oversight, in part through the MFP-12 mechanism, should provide a means for putting senior officials in all the services on notice that everything they ask for in space will henceforth, in effect, entail a trade-off against everything else they ask for in the other MFPs. That provision alone should help bring greater rigor to the space requirements process, since with it, OSD will command far better visibility and awareness of the trade-

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[39]There is nothing preordained or permanent about the manner in which American defense TOA is currently divided. That is strictly a matter of senior civilian leadership choice and congressional consent. At one point during the early 1960s, because declared national strategy demanded it, the Air Force's share of the overall U.S. defense budget was 43 percent. (Major General John T. Chain, Jr., USAF, AF/XOO, remarks at the Air University Air Power Symposium, Maxwell AFB, Alabama, February 23, 1981, p. 3.)

offs between MFP-12 (or the space "virtual" MFP) and MFP-1 through MFP-11.

As a first step toward coming to better grips with the funding conundrum outlined above, it was absolutely crucial to have space ratified by the Secretary of Defense as a separate and distinct military mission area in its own right. What is now needed is a funding arrangement that promises to remove national and multiservice space systems from the Air Force's budget and relocate them in a DoD-wide budget category, which MFP-12 essentially will be, so that the other services will henceforth have to make due contributions for their service-specific space ambitions and requirements. Such an arrangement would help ensure that the air operations portion of the Air Force's Title X responsibilities can compete on more reasonable terms with the programs of the other services. The Air Force executive agent for space will thus set the direction of the national military space effort, and AFSPC and the Air Staff will facilitate rather than dictate its execution. In due course, through MFP-12, space should become a more joint domain of activity, and all the services should be able to develop space expertise and work on joint problems, with the net result that no service should get crowded out at budget allocation time for sought-after space equities that serve its specific needs.

As for implementation, the Space Commission recommended that Congress be asked to amend Title X of the U.S. Code to give the Air Force statutory authority over the space mission as well as air mission areas. Upon reflection, OSD chose not to follow up on that recommendation out of understandable concern over the legal Pandora's box it might open.[40] As a result, the air mission area is now assigned to the Air Force by Title X, whereas the space mission is assigned by executive authority. Nevertheless, the Air Force's space executive-agent role has a Title X context, even if it lacks Title X authority. By the same token, the planned MFP for space has a Title X flavor, even if it is set in an executive-agent context. As this budget-tracking mechanism becomes more institutionalized and better understood, it will make space increasingly joint, thus allowing all

[40]General Ralph E. Eberhart, USAF, commander in chief, U.S. Space Command, comments to a gathering of RAND staff, Santa Monica, Calif., May 9, 2001.

services to develop space expertise and to work on their service-specific space problems as they deem appropriate. Since service-specific programs will, at least for the time being, remain within the various service budgets, those programs may not invariably show up in MFP-12 as a matter of routine practice. That is why the Air Force executive agent for space must maintain a detailed and thorough awareness of them, given his responsibilities for monitoring and tracking military space activities across service lines.

Although this arrangement will be insufficient, in and of itself, to unburden the Air Force of its current budget-trade dilemma, it may offer at least the initial building blocks for a more permissive funding solution. Ultimately, if U.S. military space involvement is to be properly funded over the coming decade and beyond without unduly compromising the Air Force's continuing Title X air responsibilities, DoD will need to settle on a more equitable arrangement. "Fee for service," one option sometimes suggested, is, by most expert opinion, not the right answer for multiple reasons. That said, this issue warrants creative and solutions-oriented thought by the Air Force's space executive agent and by OSD's concerned principals, along with determined and energetic action by both, as appropriate, to realize the full promise of MFP-12. On this point, Under Secretary Teets sounded a clear note of optimism when he recently spoke of a new "receptivity to change [among senior Pentagon leaders] and an environment where, perhaps, additional resources can be brought to bear to achieve some great objectives."[41]

NEXT STEPS IN SPACE MISSION DEVELOPMENT

With the most important organizational and management hurdles now either successfully negotiated or at least identified, the next round of the military space debate should concern investment priorities and program sequencing. The Defense Science Board (DSB) concluded in February 2000 that the United States currently enjoys undisputed space dominance, thanks in large part to what the Air Force has done over the past four decades to build a thriving Ameri-

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[41]William B. Scott, "Milspace Comes of Age in Fighting Terror," *Aviation Week and Space Technology*, April 8, 2002, p. 78.

can military space infrastructure.[42] Air Force contributions toward that end expressly cited by the DSB included a robust space launch and support infrastructure, an effective indications and warning and attack-assessment capability, a unique ground-based space surveillance capability, global near–real time surveillance of denied areas, the ability to disseminate the products of that capability rapidly, and a strong C3 infrastructure for exploiting space systems. For all the criticism the Air Force has endured from some quarters in recent years for not having done more to underwrite the nation's military destiny in space, the fact is that in space, as in life itself, one must develop good crawling skills before walking. That the Air Force has progressively made space such an effective enhancer of terrestrial military operations by all services should be roundly applauded, not faulted.

Furthermore, the Air Force's alleged failures to proceed more aggressively with military space programs and associated space spending have not invariably been the result of its own choices. First, as noted earlier, more than a few Air Force space initiatives, notably including space control-related initiatives, have been terminated in recent years by executive or congressional action. As noted in the previous chapter, it was not the Air Force but the Clinton White House that used the line-item veto in 1997 to kill both the spaceplane and Clementine II, a spacecraft intended to be launched in 1999 into an asteroid in a test of technologies aimed at exploring the feasibility of diverting errant asteroids that might someday threaten to collide catastrophically with the earth. (The reason given for the latter's cancellation was that the project could be perceived as a violation of the Anti-Ballistic Missile Treaty and might also have been a thinly disguised precursor to a space weapons project.)[43]

One may further recall that as one part of Congress was publicly berating the Air Force for its alleged failures of space stewardship, another part canceled its plan to demonstrate a space-based radar capability. The Discoverer II program sought to explore the feasibility

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[42]Cited in E. C. Aldridge, Jr., "Thoughts on the Management of National Security Space Activities of the Department of Defense," unpublished paper, July 6, 2000, p. 3.

[43]Leon Jaroff, "Dreadful Sorry, Clementine: Washington Brushes Off the Asteroid Threat," *Time*, October 27, 1997.

of a cost-effective approach to fielding a high-range-resolution space-based radar analogous to Joint STARS and capable of providing both a ground moving target indicator (GMTI) and synthetic aperture radar (SAR) capability. The proposal was to orbit two satellites to show the practicality in principle of migrating the Joint STARS mission to space. It was terminated not by the Air Force but by Congress.

On top of that, as explained in the preceding chapter, there has been for years a pronounced and continuing national disinclination to tamper with the status quo concerning space force-application initiatives and "weaponization." There also remains a persistent absence of national agreement over present and emerging threats to U.S. space-based assets. On this point, in a forceful call for bolder U.S. measures toward acquiring a serious space control capability, space-power advocate Steven Lambakis cited the "awkward absence of a collective, politically sanctioned vision for space," adding that "while space control is viewed as a logical outgrowth of a commitment to freedom of space, it has been neither a mission area that the citizens of the U.S. truly believe in nor one that energizes present U.S. strategic thinking."[44] The resultant "debate" over U.S. military space policy, he concluded, has been entirely predictable and has turned on decades-old arguments about preserving space as a sanctuary and not generating new instabilities. It has been further aggravated, one might note, by a natural media tendency to sensationalize and to assume the worst, as was evident in the press agitation over the presumed hidden agenda for national missile defense (described in Chapter Four) occasioned by Secretary Rumsfeld's perfunctory announcement in May 2001 of his planned organizational reforms for military space.

These facts have invariably made all calls for space force application initiatives and, by association, for even more relatively benign space control measures, both provocative and polarizing. So long as such a disinclination to grapple with the nation's rock-bottom security needs in space persists and the nation continues to adhere to an ambivalent military space strategy, space will remain only a support-

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[44]Steven Lambakis, *On the Edge of Earth: The Future of American Space Power*, Lexington, Ky.: University of Kentucky Press, 2001, p. 38.

ing enabler of terrestrial operations. Worse yet, as long as steps toward acquiring effective defensive and offensive space control capabilities continue to be held in check by political irresolution and popular indifference, the nation will run an increasing risk of being caught by surprise someday as a result of its space vulnerabilities being exploited by a hostile party—whether or not in a notional "space Pearl Harbor."

In light of that, a prime imperative for the Air Force should be to continue leading from the front by advocating a disciplined space control mission-development road map and investment strategy. Such an approach might usefully start out by describing, in a clear and convincing way, the growing vulnerability of existing and planned U.S. space assets to present and potential threats. It might also emphasize, in the words of two RAND colleagues, that preparing to defend critical space capabilities and to attack those of opponents "is not a call for space fleets, although some such forces may be needed eventually," but rather "is a prescription for [enhanced] situational awareness incorporating space and theater perspectives coupled with responses employing the full range of means currently available in joint military operations."[45]

To help preempt potential domestic opposition to such prudent initiatives, the Air Force might accentuate the substantial divide that separates space control from space force application and stress that the *latter* mission area, not the former, chiefly entails the dreaded specter of offensive "space weaponization." In contrast, not only does the former not envisage the use of force from space against terrestrial targets, and hence any prospect of U.S. global "space hegemony," it has become increasingly indispensable if the nation is to protect its on-orbit assets *merely in order to remain secure in the space enabling game*. It bears stressing that unlike the controversial and provocative force-application mission, space control has been consistently approved as a legitimate venue for U.S. military space activity by every high-level guidance document since the first U.S. national space policy was enunciated by the Eisenhower administration in 1958. It remains poorly understood even in high circles to

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[45]Bob Preston and John Baker, "Space Challenges," in Zalmay Khalilzad and Jeremy Shapiro, eds., *Strategic Appraisal: United States Air and Space Power in the 21st Century*, Santa Monica, Calif.: RAND, MR-1314-AF, 2002, p. 178.

what extent the services have all become so heavily dependent on space-based force enhancement assets, not only for providing routine C4/ISR support, but also for a growing number of critically important terrestrial target attack functions, including the operation of unmanned aerial vehicles (UAVs) such as Predator and Global Hawk, the real-time provision of space sensor target data directly into the cockpits of engaged combat aircraft, and the accuracy of near-precision satellite-guided munitions, to note only three among many.[46] In practice, this already deep and steadily growing national dependence on key space-based enabling equities warrants arguing ever more insistently for effective space control measures, including offensive measures that do not include kinetic kill, with its associated hypervelocity space debris problem.

Beyond the need to move more vigorously into the space-control mission area, the Air Force also faces much unfinished business in the less contentious force-enhancement arena which, as discussed earlier in this chapter, has been prompted by the aging of many on-orbit systems now in service and the imminent emergence of a new generation of systems now at the threshold of being fielded. In the years ahead, space-based radars may take over much of the battlefield surveillance role currently performed by such aircraft as the E-8 Joint STARS, although there are reasons to believe that it may be 2020 or beyond before fielding a militarily effective constellation of GMTI and SAR satellites will be feasible.[47] These options will soon be competing for resources within the Air Force R&D budget, and hard

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[46]Not only do satellites enable the remote piloting of Predator and Global Hawk, they support an increasingly broad array of data-intensive U.S. systems in various weapons employment modes. Just one Global Hawk reportedly consumes about 500 megabits per second of satellite-provided bandwidth, nearly five times the total bandwidth consumed by the entire U.S. military during Operation Desert Storm. The vulnerability and, hence, attractiveness of this growing U.S. space-based dependence to hostile attack should be readily evident. For more on this, see Greg Jaffe, "Military Feels Bandwidth Squeeze as the Satellite Industry Sputters," *Wall Street Journal*, April 10, 2002.

[47]AWACS will take even longer because that mission is substantially more demanding technologically than GMTI/SAR. For a detailed treatment of the magnitude of these challenges, see Lieutenant General Roger G. DeKok, USAF, and Bob Preston, "Acquisition of Space Power for a New Millennium," in Peter L. Hays et al, eds., *Spacepower for a New Millennium: Space and U.S. National Security,* New York: McGraw Hill, 2000, pp. 80–84.

choices will have to be made and impediments removed if they are ultimately to be realized.

In considering an orderly transfer of C4/ISR functions from air to space, one must bear in mind the inherent and natural conservatism of military organizations. Such organizations are characteristically inclined to implement change only slowly and incrementally, since to do otherwise would risk compromising their ability to execute decisively at a moment's notice. Accordingly, an instructive lesson from the study of organizational history is that one should not try to change too much at once. This time-honored adage has a direct bearing on how the Air Force should approach the migration of its surveillance and battle-management capabilities from air to space. Legacy air-breathing systems such as Joint STARS and AWACS, which have been acquired through multiple billions of dollars of investment, cannot be summarily written off if they have substantial service life remaining—however well-intended the various arguments for mission migration to space may be. It may make better sense to think of space not as a venue within which to replace existing surveillance functions wholesale, but rather as a medium offering the potential for expanding the Air Force's existing surveillance envelope by more fully exploiting both the air *and* space environments.

It also may help to think in terms of "windows" in which to commence the migration of surveillance missions to space. For example, at certain predictable points in their life cycles (called Service Life Extension Program phases), airframes face the need for major investment for recapitalization. The same holds true for engine replacement, aircraft reskinning, structural integrity upgrades, and so on. The point, as one former Air Force senior space manager observed, is that "a system-wide planning process injected into resource allocation deliberations offers the opportunity to transition from large airframe dependency to legitimate space alternatives as space demonstrates the potential to achieve greater operational utility with fewer expended resources."[48]

Until a more equitable cross-service military space funding arrangement is put into place, the Air Force will continue to confront a

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[48]Jones, memo to McIlvoy, p. 12.

mission-development dilemma. Should it move *too* fast toward expanding its percentage of funding support for space, it will run the danger of further undercutting its support to its equally important air obligations. Alternatively, should the Air Force be perceived as dragging its heels with respect to funding the nation's military space needs out of a determination to do right by its mandated *air* force-projection obligations, it will risk appearing to have willfully violated the Space Commission's trust and thereby run the danger of eventually being asked to turn over its stewardship of space to a separate Space Corps or Space Force.

In light of this mission-development dilemma, it would seem that the next round of Air Force investment in space-based enabling applications should entail an orderly evolution. A question of particular importance in this regard entails which existing air-based ISR missions (notably Joint STARS and AWACS) should be migrated to space and in what order. A preeminent challenge the Air Force faces in this respect is to determine how to divest itself of existing legacy programs in a measured way to generate the funds needed for taking on tomorrow's challenges one manageable step at a time. That will require careful trade-off assessments to determine the most appropriate technology and medium—air or space—toward which its resources should be directed for any mission at any given time.

Stated differently, just because a C4/ISR mission *can* be performed from space does not necessarily mean that it *should* be. Functions should not be migrated to space just because it is technologically possible. Any transition to space should also be paced by a prior determination that the mission or function in question can be performed more cost-effectively from space than from the air.[49] That, in

[49]For example, in the case of supplanting AWACS with a space system, as former AFSPC commander and later Air Force vice chief of staff General Thomas Moorman explained some years ago, "you must develop a global system to have sufficient revisit rates to be useful. Additionally, if you are putting a radar capability in space, it has to be at low altitude because of a power aperture problem. You can't get the resolution at geosynchronous [orbit] or something like that. As a consequence, the combination of having to have a global capability with a high revisit rate and power for resolution means that you have to buy a large number of satellites. Depending on the altitude, it could be between 25 and 40 satellites. That may be a very expensive way to do the AWACS job." (General Thomas S. Moorman, Jr., "The Challenges of Space Beyond 2000," in Alan Stephens, ed., *New Era Security: The RAAF in the Next Twenty-Five Years*, Proceedings of a Conference held by the Royal Australian Air Force, Canberra,

turn, will mean laying down a firm technology base first, and then identifying reasonable transition points at which a migration of effort can be rationally justified. In this, the nation does not need a crusade so much as a careful and studied phasing of migration. Some space advocates within the Air Force go so far as to insist that if one does not support moving the Joint STARS mission capability to space forthwith, one has not taken due heed of the Space Commission's recommendations. Yet however much some may deem the migration of existing air force-enhancement capabilities to space to be a command duty for ensuring the Air Force's future in space, not every investment area need entail a crash effort like the Manhattan Project, which developed the first American atomic bomb. Space proponents in the civilian defense leadership and in Congress, as well as within the Air Force itself, can best help this process by *enabling* Air Force change rather than trying to force it. For the nearer term, it may make more sense—and may be far more cost-effective—to pursue a seemly blend of air- and space-based ISR capabilities, linking the digital information gathered and processed by aerodynamic systems through space rather than moving the platforms themselves to space, at least as a first order of business.

Most important of all, it will be essential for the survivability of any new C4/ISR assets migrated to space to be protected by appropriate measures beforehand. This means that attention to potential system vulnerabilities must be paramount in any migration planning. If we move to migrate new assets to space before first ensuring that a credible space control enforcement regime is in place to protect them and to hold any possible enemy threat systems at risk, we will simply compound our existing vulnerabilities—all the more so if those assets supplant rather than merely supplement existing air-breathing capabilities. It would make no sense whatever to migrate Joint STARS and AWACS to space if the resultant on-orbit capabilities were any less survivable than Joint STARS and AWACS are today. It follows that getting more serious about space control is not an issue apart from force-enhancement migration but rather represents a sine qua non for such migration. Otherwise, in transferring our

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Australia, June 1996, p. 174.) A more recent Air Force assessment has concluded that, quite apart from the vulnerability issue, it may take as many as 48 to 60 satellites on orbit to accomplish the space-based radar mission. (Conversation with General W. L. Creech, USAF [Ret.], July 15, 2002.)

asymmetric technological advantages to space, we will also run the risk of burdening ourselves with new asymmetric vulnerabilities. This is yet another reason why seeking the beginnings of a credible space control capability should represent the next U.S. military space mission-development priority.

SOME UNRESOLVED ORGANIZATIONAL QUESTIONS

Finally, we come to two notable organizational and management concerns with respect to military space that have yet to be fully accommodated. The first of these involves reconciling the theater needs of a joint force commander and his subordinate component commanders with the global focus and coverage of the nation's military space assets while still retaining unity of command of the nation's air and space forces. One proposed solution is to centralize military space tasking at the unified level so that all force elements would receive all of their combat tasking from CINCSPACE (now the commander of U.S. Strategic Command since the disestablishment of USSPACECOM on October 1, 2002).[50] This would mean, in effect, a joint force space component commander (or JFSCC), most likely either in the person of the USSTRATCOM commander or else his senior designee reporting directly to the joint force commander. A problem with this proposal is that it cuts against the grain of further air and space integration. It also raises some troublesome coordination questions between air and space, much as those that exist today between air and land. Alternatively, the existing JFACC could be designated the supported commander for space operations within his specific theater, in effect making him a joint force air *and* space component commander, or JFASCC. He would thus be the point of contact for space concerns for a joint-force commander (JFC). One might imagine other solutions as well, including ad hoc arrangements tailored to meet a JFC's specific space support needs for any given contingency. In all events, the organizational integration of space in joint-force operations at the most senior command level remains an area of joint doctrine and practice in need of further thought.

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[50]Briefing by then–Major General William R. Looney III, USAF, commander, 14th Air Force, at the Air Force Doctrine Symposium, Maxwell AFB, Alabama, April 6, 2001.

A second organizational interface that could benefit from further remedy is the long-standing relationship between the Air Force and the National Reconnaissance Office (NRO), as well as between the Air Force and the ultimate consumer of NRO's product, the national intelligence establishment. A promising step toward that end was Secretary Rumsfeld's acceptance in May 2001 of the Space Commission's recommendation that the Under Secretary of the Air Force be designated not only the nation's executive agent for military space, but also the director of the NRO. Yet the fact remains that although the Air Force largely staffs the NRO and provides the launch and support services for its various reconnaissance assets on orbit, it is only an agent in the service of the intelligence community when it comes to the control and exploitation of those assets.

On this delicate point, the Space Commission went out of its way to emphasize that the nation's security-related space capabilities are controlled jointly by the Secretary of Defense and the Director of Central Intelligence (DCI), that the DCI necessarily provides much of the intelligence required by the services for the conduct of military operations, and that "neither [of these individuals] can accomplish the tasks assigned without the [support of the] other."[51] How such enhanced mutual support between the NRO and its principal patron might be achieved in practice will obviously be up to those directly involved. The overarching goal, however, must be to shorten the ties between the NRO's assets and all other U.S. C4/ISR systems in the interest of providing more timely support to joint-force commanders. Everything the Space Commission concluded with respect to the need for better integration of all military space assets with terrestrial force elements in all services was intended to apply equally to those assets launched by the Air Force under NRO auspices.

As for what specific arrangements might work best toward better harmonizing that relationship, the commissioners gently reminded both the Secretary of Defense and the DCI that "there is no systemic organizational impediment to such [improved] alignment or to meeting the need for increased attention to critical issues," and that it was simply a matter of the priorities of both and "how they choose to delegate and oversee responsibilities for space-related con-

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[51] *Space Commission Report,* p. 64.

cerns."[52] Toward that end, it seems reasonable to suggest that the Under Secretary of the Air Force, in light of his dual-hatted status as executive agent for space and NRO director, would be entirely within his assigned charter to identify such integration opportunities, bring them about on his own when they lie within his breadth of authority, and seek the approval of the DCI as appropriate when they do not—or when an ambiguous situation might obtain. In all events, whenever the product of NRO assets is likely to be of immediate use to joint-force commanders and their subordinate component commanders, making that product readily accessible to those warfighting principals should be a goal of the Under Secretary under the new arrangement endorsed and supported by both the Secretary of Defense and the DCI.

From an operator's perspective, the core issue concerns getting *all* the nation's security-related space assets working more harmoniously in the interest of joint-force commanders worldwide. Toward that end, the current Air Force chief, General Jumper, is deeply committed to bringing about what he calls the "horizontal integration" of all warfighting instruments, including not just the overhead enabling systems operated by the Air Force but ideally those under the purview of the other services and the DCI as well. He envisions, among other things, linking together the entire spectrum of available ISR sensors so they might provide, through better information-sharing and significantly reduced data cycle time, a richer situation picture to senior commanders faced with immediate contingency-response demands. Without singling out the NRO's assets in particular, he has identified as a part of the generic problem what he has labeled "proprietary systems," whose data are first interpreted by "tribal representatives sitting in front of their tribal work stations" before being provided to operators who might most immediately and usefully benefit from them.[53] This impacted process invariably makes both the sharing of time-sensitive information and sensor-to-shooter links needlessly slow and cumbersome.

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[52]Ibid., p. 65.

[53]Ron Laurenzo, "Jumper: Talking Is Key to Transforming," *Defense Week*, March 25, 2002, p. 16.

On this point, Jumper recently commented in testimony before the defense subcommittee of the House Appropriations Committee that if such institutional roadblocks were eliminated or at least minimized, "the result would be a cursor over a target, not a conversation between two tribal representatives."[54] After all, when it comes to making the most of the nation's space-based force-enhancement capabilities in accommodating the exacting demands of time-sensitive targeting, both DoD-owned space assets and those operated by other government agencies need to be synergistically linked on the input side with the full spectrum of the joint-force commander's force-employment infrastructure—without bureaucratic firewalls obstructing the expeditious sharing of time-sensitive information. Shorn of pleasantries, the real need is to ensure that the information gathered by NRO assets—acquired and launched by the Air Force yet controlled by the DCI—continues to accrue primarily but not solely to the intelligence agencies in the interest of shortening the sensor-to-shooter connection.[55]

As the Air Force continues to grapple with such organizational issues, it should be on guard against pressing for premature moves in a

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[54]George C. Wilson, "Air Force's Jumper Catches a Tailwind: The Revolution in Aerospace Jumps Forward with a New Air Force Chief," *National Journal*, March 16, 2002. Elsewhere, Jumper has noted how bureaucrats of all varieties have long been taught as a first order of business to defend their institutional prerogatives, when what is more urgently needed is to get the nation's combat and combat-support assets all working from a common script with a view toward "the integration of space, standoff precision . . . and information." (Ibid.) As if to underscore this point, he recently stressed at an Air Force Association–sponsored gathering of some 800 government, military, and industry officials: "For this decade, the buzz word is integration. . . . I've talked about it before and I will talk about it again. We will get it right." (David Hughes, "USAF Aims to Forge C2ISR into a 'Weapon,'" *Aviation Week and Space Technology*, May 6, 2002, p. 54.)

[55]As an Air Staff paper written at the height of the Space Commission's hearing of service testimony carefully expressed this important point, "as a direct result of the Air Force–NRO partnership, the resources of the intelligence community space systems play an increasingly important role in the direct support of military operations. Though the 'cultural' gaps are narrowing, differences in military and intelligence community user priorities, security constraints, and separate resource processes continue to result in more of a 'cooperative coexistence' than a truly integrated space architecture. Specific challenges remain in . . . operational integration into joint warfighting." ("Air Force Position Paper on Space Commission Issues," p. 2.) For more on this serious and still-unresolved concern, see Preston and Baker, "Space Challenges," in Khalilzad and Shapiro, eds., *Strategic Appraisal: United States Air and Space Power in the 21st Century*, pp. 158–159, 176.

spirit of appearing to be "doing something" before the time is ripe. A potentially divisive issue of this sort within the joint arena emerged in 1997 concerning whether space should be formally designated an Area of Responsibility (AOR), with CINCSPACE as its commander. Early that year, U.S. Space Command issued what it called an "informational" proposal suggesting Joint Chiefs of Staff consideration of space as a possible sixth AOR, on a par with the extant five unified commands (Central, European, Atlantic, Southern, and Pacific).[56] USSPACECOM officials were quick to insist that they were not calling at that point to have space established as an AOR but were merely suggesting that the time had come to give it serious and systematic thought. Nor was there any hint of interest at USSPACECOM in new definitions that would artificially separate air and space. Instead, USSPACECOM sought to have space declared CINCSPACE's AOR in principle so that the command could proceed with the kind of war planning and doctrinal development needed for preparing to conduct military operations in space once the time for them came. All the same, the Air Staff in the end rightly rebuffed that initiative, in part because it would have required a prior agreed definition within the joint arena of the border between the space AOR and the regional AORs, which would have been difficult to achieve even in the best scenario, since space is, by definition, global in coverage, embracing all the regional AORs.[57]

TOWARD THE AIR FORCE'S FUTURE IN SPACE

Today, there is no question that the Air Force is the nation's dedicated and acknowledged military space service. Vice Admiral Herbert A. Browne, a recent deputy commander in chief of the unified U.S. Space Command, attested to that when he commented not long ago that "we already have a Space Force—it is the Air Force."[58] For its part, the Space Commission was emphatic in its judgment that the argument for a separate space service had not yet been convincingly

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[56]William B. Scott, "Pentagon Considers Space As New Area of Responsibility," *Aviation Week and Space Technology*, March 24, 1997, p. 54.

[57]"Command Plan Revision Will Not Declare Space a CINC's Regional Area," *Inside the Pentagon*, November 27, 1997, p. 1.

[58]Quoted in Ralph Millsap and D. B. Posey, "Organizational Options for the Future Aerospace Force," *Aerospace Power Journal*, Summer 2000, p. 48.

made. On the contrary, after careful deliberation, it concluded that the Air Force continues to serve responsibly as the nation's military space custodian. As an Air Force space officer incisively observed several years before the commissioners reached that conclusion, those who would wrest space from the Air Force and invest it in a separate institution must first prove at least one of two hypotheses: First, that the requirements for developing unique space-related expertise are not being adequately met by current arrangements (or that that expertise is not being properly utilized), and second, that *only* a separate and independent U.S. space service would be capable of providing the military space leverage the nation requires. Proving the first and more controversial hypothesis, he added, would require "proving that the United States Air Force has not served as a satisfactory steward for our nation's military space power."[59] That would be a tall order, not least because the DoD and Congress never assigned the Air Force any formal responsibility for space stewardship until the spring of 2001.

With the Space Commission's recommendations and OSD's resultant empowerment of the Air Force now formally promulgated, the charter for the Air Force to move ahead in space seems firmly in hand. To fulfill that charter, the Air Force needs to continue embracing the endowment it was so generously given by the Space Commission. This means, first and foremost, accepting and internalizing the important, indeed fundamental, contrasts between air and space, as well as the need for clear organizational differentiation between the two mediums, along with their continued operational integration. As noted earlier, it is all well and good for Air Force air and space professionals at all levels to be encouraged by their leadership to think like a fellowship of like-minded airmen up to a point. Yet those professionals should not be treated as though they were interchangeable. On the contrary, they live in separate cultures, have separate job responsibilities, and thrive on separate skill sets. Some distinctive "tribes" within the Air Force are not only unavoidable but desirable—and even essential.

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[59]Major Shawn P. Rife, USAF, "On Space-Power Separatism," *Airpower Journal,* Spring 1999, p. 25.

Indeed, the Space Commission's recommendations and Secretary Rumsfeld's determination to act on them may prove, in the long run, to have been crucial pivots for resolving at least a portion of the nation's military space funding predicament. Those recommendations led to a number of important—even game-changing—breakthrough developments in the Air Force's interest. For one thing, they provided the Air Force with executive-agent authority over all U.S. military space activities, as well as the improved budget-tracking mechanism for space that went along with that authority—two hitherto elusive goals the Air Force had coveted for decades. They also gave the Air Force a new mission responsibility: That service now has *two* assigned mission areas, air *and* space, an outcome far preferable to the single "aerospace" mission area that not only hindered the development of a robust space doctrine but also needlessly compounded the Air Force's space funding dilemma.

Yet at the same time, the Space Commission also telegraphed a clear message to the Air Force that it had about five to ten years to get the space mission right or else risk being asked to relinquish it to a separate entity charged with that responsibility.[60] In so doing, the commissioners concluded that needed efforts in the realm of military space exploitation "are not being pursued with the vision and attention needed," adding that if such efforts are not satisfactorily pursued by the Air Force in the near future, "U.S. interests in space may well ultimately call for the creation of a Space Corps or a Space Department" to carry out the "organize, train, and equip" functions associated with military space. In an unmistakable shot across the Air Force's bow, the commissioners further noted that giving the Air Force MFP budget authority for space and granting formal designation as the nation's executive agent for military space were "recommended to lay the foundation for such future steps" should they be deemed necessary—with the timetable to be "dictated by circumstances over the next five to ten years."[61]

Viewed in hindsight, the since-superseded vision promulgated at the 1996 Corona conference that characterized the Air Force as an insti-

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[60]See William B. Scott, "USAF Warned to Bolster or Lose 'Space Force' Franchise," *Aviation Week and Space Technology*, January 29, 2001, p. 55.

[61]*Space Commission Report*, pp. 93–94.

tution rapidly becoming an "air and space force" on an evolutionary path to becoming a "space and air force" may be said to have been exactly half right: Today, the Air Force is well beyond the initial stages of not only becoming but actually *being* a bona fide "air and space force." Yet the time the nation finds itself at the brink of possessing a true "space and air force" (probably somewhere nearer to the midpoint of the 21st century) may also be the time when a separate U.S. space service will have finally earned its right to independence. After that, the Air Force may retain niche space equities to support its continued *air* force-application responsibilities, much as the Army, Navy, and Marine Corps retained niche air equities to support their *surface* warfighting responsibilities after the Air Force gained its independence from the Army.

In arguing the case for the evolution of a full-fledged "space and air force" within the confines of the existing Air Force, one thoughtful Air Force space professional visualized such a notional force as follows: "If space-based force application approaches the full potential of its technological capabilities (i.e., the ability to find, fix, track, and destroy virtually anything in the terrestrial environment), the debate over a separate space service will become obsolete because air power, as we understand it today, will become obsolete. Space power will be able to do virtually everything that air power does today—and do it faster and with less risk. Predominantly space forces (with air in an auxiliary role) will subsume the roles and missions of air forces, and the reins of power within the U.S. aerospace force will, by rights, transfer from the combat pilot of today to the space operator of tomorrow."[62] Similarly, former CINCSPACE General Estes has predicted that "over time, the projection air mission will continue to migrate to space, and the Air Force will become heavier on space and lighter on projection air"—a forecast that precisely reflects the logic of the 1996 Corona formulation.[63] The one drawback to this otherwise bold vision, and it is an important one, is that even if space-based forces eventually acquire combat capabilities of such caliber by the mid-21st century, there will still be mobility and lift functions, as well as surveillance and attack functions, that can only be performed by air assets. That being the most plausible prospect for at

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[62]Rife, "On Space-Power Separatism," p. 28.

[63]Letter to the author by General Howell M. Estes III, USAF (Ret.), October 1, 2002.

least the midrange future, although one can readily imagine the Air Force evolving naturally into a transitional "air and space force," a more fully developed "space and air force" seems counterintuitive—almost analogous to the tail wagging the dog.

So long as space continues to perform primarily in a supporting force-enhancement role, one can imagine defensive and offensive space-control operations drawing on the established expertise in intelligence, targeting, battle-damage assessment, and other familiar air-related operational techniques and procedures already well-developed and extant within the Air Force. But if space is expected to eventually assume additional and unique mission burdens, such as space-to-earth force application, then the space operations and management structure will need to evolve to accommodate those new functions. Once the current space-support role transitions into space missions that address national objectives but are independent of terrestrial forces (including terrestrial air forces), such as space-based missile defense and force application against terrestrial targets from space, there will be increasingly strong pressures for the establishment of a semiautonomous Space Corps within the Air Force or even a separate space service altogether. As a former Air Force space general presciently commented in late 1997, "at the point when political consensus is reached to weaponize space, either based on the emergence of a compelling military threat or to counter the impact of adversary space forces on U.S. and allied security interests, the same debate that resulted in establishing a separate [U.S. Air Force] air component is inevitable. At this point, the Air Force is totally unprepared for this dialogue."[64]

It is perhaps not too soon, even now, for today's Air Force leaders to devote some thought to how their successors a generation or more downstream might best anticipate that challenge and how the service might best divest itself of the bulk of its space equities when that day of reckoning eventually comes. The alternative would be for tomorrow's Air Force to feel somehow cheated by that inexorable development, much as the Army felt wrongly cheated by the Air Force's attainment of independence in 1947, rather than instead feeling thankfully freed to continue fulfilling its historic role as the

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[64]Jones, memo to McIlvoy, p. 2.

nation's full-service air arm as space rightly goes its own hard-earned way. Yet whatever the longer-term inevitability of offensive space-to-ground weaponization and the consequent emergence of a separate U.S. space service may be, the prevailing worldwide consensus today against such weaponization, the countervailing Air Force investment priorities of greater near-term importance, and the lack of technically feasible and cost-effective weapon options will all but surely foreclose any realistic chance of the Air Force's acquiring a significant space force-application capability for at least the next 15 years.

As for the nearer-term future, the Air Force now has a clear path marked out for it, thanks to the many ripple effects that were set in motion by the Space Commission's recommendations of 2001. As noted at the beginning of this chapter, it now faces five challenges with respect to space:

- Continuing the operational integration of space with the three terrestrial warfighting mediums while ensuring the organizational differentiation of space from Air Force air.
- Making good on defining and realizing the Air Force's newly granted military space executive-agent status.
- Dealing with what the Space Commission characterized as an inadequate DoD-wide space funding situation.
- Prioritizing next steps in space mission development, most notably including the need to start moving more briskly toward developing and deploying a serious space control capability before the nation's growing space vulnerabilities are tested, perhaps severely, by hostile forces.
- Making progress toward honoring a key recommendation of the Space Commission by taking more aggressive steps to develop and nurture a cadre of skilled space professionals ready and able, in the words of Under Secretary Teets, "to create the required space doctrine; to engineer, acquire, and operate [increasingly] complex space systems; and to execute the necessary warfighting

> operations to meet the national security space challenges of the future."[65]

Mastering these challenges should not only ensure the Air Force a satisfactory near-term future for itself and the nation in space. It also should help enable it over time to shore up its end-strength and the intensity of its day-to-day training (both eroded since Desert Storm) to fulfill its abiding and no less important mission responsibilities in the *air* arena.

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[65]Statement by the Honorable Peter B. Teets, p. 1.