

Mastering the Ultimate High Ground

Next Steps in the Military Uses of Space

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PREFACE

This study assesses the military space challenges facing the Air Force and the nation in light of the watershed findings and recommendations of the congressionally mandated Space Commission that were released in January 2001. It seeks to capture the best thinking among those both in and out of uniform who have paid especially close attention to military space matters in recent years. After a review of the main milestones in the Air Force's ever-growing involvement in space since its creation as an independent service in 1947, the study examines the circumstances that occasioned the commission's creation by Congress in 1999, as well as some conceptual and organizational roadblocks both within and outside the Air Force that have long impeded a more rapid growth of U.S. military space capability. It concludes by exploring the most urgent space-related concerns now in need of Air Force attention. Although the study offers a number of suggestions for shifts in emphasis in U.S. military space policy, it is primarily analytical rather than prescriptive. As such, it aims more to promote a better understanding of the issues than to advocate specific policy recommendations.

The research documented herein represents one set of findings of a broader Project AIR FORCE effort entitled "Thinking Strategically About Space," which was carried out under the joint sponsorship of the Director of Space Operations and Integration (AF/XOS), Headquarters United States Air Force, and the Director of Requirements, Headquarters Air Force Space Command (AFSPC/DR). It was conducted in Project AIR FORCE's Strategy and Doctrine Program. The study should interest Air Force officers and other members of the national security community concerned with air and space doctrine,

organizational and investment issues related to the national military space effort, the overall weight of effort that should be directed to space mission support, and the appropriate trade-offs between space and other mission needs in all mediums across service lines. Research in support of the study was completed in November 2002.

Project AIR FORCE

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SUMMARY

Mounting concerns in some quarters toward the end of the 1990s that the Air Force was failing to exercise proper stewardship of the nation's military space effort led to the establishment by Congress in 1999 of a Space Commission to assess the adequacy of existing arrangements for military space. In its final report, released in January 2001, the commission concluded unanimously that the creation of a separate space service was not warranted—at least yet. It also determined, however, that the nation is not developing the military space cadre it requires and that military space is underfunded for its growing importance to the nation's security. It further found that the other services are not paying their fair share for the space product they consume and that the nation's on-orbit assets are becoming increasingly vulnerable to a potential "space Pearl Harbor."

As first steps toward addressing these concerns, the commission recommended that the Air Force be designated the executive agent for space within the Department of Defense (DoD), that a separate DoD budget category for space be created to ensure greater transparency of space spending by all services, and that a serious effort be pursued in the realm of space control to ensure protection of the nation's increasingly vital space capabilities. The Secretary of Defense promptly accepted these recommendations, assigned executive-agent authority for all DoD space programs to the Air Force, and directed the creation of a new Major Force Program (MFP) budget category that would allow for unprecedented accountability in the way the nation's defense dollars are spent on space.

Thanks to these and related moves, the Air Force entered the 21st century with much of the preceding debate over military space essentially resolved by leadership decree. Against that background, this study offers a framework for understanding the most pressing military space needs and challenges now facing the Air Force and the nation. The study begins by reviewing the highlights of the Air Force's effort since the end of World War II to become accepted as the nation's military space custodian. In the process, it shows how space has been anything but an Air Force birthright. On the contrary, the Air Force had to fight hard at every step of the way, often in the face of heavy resistance from the other services and the civilian leadership, to earn its now dominant role in the U.S. military space program. The history of that fight is well worth recalling by today's Air Force planners for the cautionary note it offers against presuming that space is somehow a natural Air Force inheritance.

The study next explores the often deep differences of opinion that, until recently, had fundamentally divided the Air Force over the important question of whether air and space should be treated as a unitary extension of the vertical dimension or as two separate and distinct operating mediums and mission areas. Starting in 1958, a portrayal of air and space as a seamless continuum from the earth's surface to infinity was advanced by the service's leadership in an effort to define an expanded "aerospace" operating arena for future Air Force assets. Once it became clear, however, that space had much to offer not only to the nation's top leadership in connection with nuclear deterrence but also to theater commanders in support of conventional operations, many of the Air Force's most senior leaders at the major command level came to realize that space deserved to be treated as separate from the realm of aerodynamic operations. Such thinking eventually led to the creation of Air Force Space Command. Yet the single-medium outlook persisted in many Air Force circles. It received renewed emphasis by the Air Force leadership in 1996 and for a time thereafter. A key chapter in this study points out some of the opportunity costs that were incurred over time by that outlook and considers the greater benefits that should accrue to the Air Force by treating air and space as separate and distinct mediums and mission areas.

The most consequential opportunity cost of the Air Force's single-medium outlook is that the service has lately found itself in the

discomfiting position of having to make increasingly hard choices between competing air and space systems in its resource allocations. This predicament has forced it, ever more so in recent years, to short-change its air responsibilities as a necessary condition for retaining its increasingly costly stewardship of space. As long as the Air Force had so little invested in space by way of hard resource commitments, it could easily nurture a vision that proclaimed both air and space as a single medium and mission area. Once it began buying into space-based equities in a serious way, however, it soon learned that a downside of having staked out a mission claim on both air *and* space was that it now had to pay for both its air and its space obligations out of its relatively constant percentage of annual defense funding. The Air Force now faces the challenge of working out an arrangement that will underwrite the nation's military space needs yet not at the unacceptable expense of the service's mandated air responsibilities. The recently established DoD budget category for space should help provide some relief toward that end by allowing senior officials to examine military space spending across the board, with a view toward better sizing the military space budget and scrubbing excessive service requirements that may be desirable in principle but that do not emanate from any compelling operational need.

With the Space Commission's recommendations now promulgated and accepted by DoD, the Air Force's charter to proceed with next steps is clear. To make good on that charter, the service will need to accept and honor both the important physical and mission-area differences between air and space and the need for continued operational integration along with a clear organizational differentiation of the two mediums. Through such a bifurcated approach, space can be effectively harnessed to serve the needs of all warfighting components in the joint arena. At the same time, it can be approached, as it richly deserves to be, as its own domain within the Air Force in the areas of program and infrastructure management, funding, cadre-building, and career development.

As for strategy and mission-development implications, a number of space-related concerns, both institutional and operational, are explored in detail in this study. Two are of special importance to U.S. national security:

Acquiring a credible space control capability. Although the space control mission has been consistently endorsed as a legitimate U.S. military activity by every high-level guidance document since the first national space policy was enunciated in 1958, such declarations have hitherto paid only lip service to the goal of ensuring freedom of U.S. operations in space. They also have been belied by a sustained record of U.S. inaction when it comes to actual hard spending on space-control mission development. Yet the United States is now more heavily invested in space than ever before, and the importance of space control as a real-world mission area has finally begun to be taken seriously at the highest echelons of the U.S. government. In light of the well-documented potential for the early emergence of hostile threats, this deep and growing national dependence on space-based capabilities warrants the Air Force's working ever more intently toward acquiring effective space control measures. For this important effort to enjoy the greatest likelihood of successfully transiting the shoals of domestic politics, the Air Force should cleanly separate it from the more contentious and, at least for now, premature goal of force application through weaponization aimed at attacking terrestrial targets from space.

Exercising due caution in migrating intelligence, surveillance, and reconnaissance (ISR) capabilities to space. Just because an ISR mission *can* be performed from space does not necessarily mean that it *should* be. However much some may deem such migration to be an absolute must 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. Any transfer of operational functions from the atmosphere to space should be preceded by a determination that the function in question can be performed more cost-effectively from space than from the air. Moreover, the survivability of follow-on ISR systems migrated to space must be ensured beforehand by appropriate space control measures. Otherwise, in transferring our asymmetric technological advantages to space, we may also risk creating for ourselves new asymmetric vulnerabilities. This means that attention to potential system vulnerabilities must be paramount in any ISR mission migration planning. Should the nation move to migrate critical capabilities to space before first ensuring that a credible enforcement regime is in place to hold any possible threat systems at risk, we may simply compound

our existing vulnerabilities—all the more so if those moves supplant rather than merely supplement existing air-breathing capabilities. This constitutes yet another reason why seeking the essential foundations of a credible space control capability should represent the next U.S. military space mission development priority.

All things considered, the assignment of executive-agent status to the Air Force for military space by the Secretary of Defense in May 2001 was not only appropriate but arguably a generation late in coming. Now that the Air Force has been granted this authority, it should have every incentive to vindicate its designation as the nation's military space steward by proactively starting to fulfill its newly assigned role. Fortunately in this respect, the Office of the Secretary of Defense (OSD) recently moved to develop and promulgate initial guidelines for the definition and implementation of space executive-agent authority throughout DoD. In late February 2002, it circulated a detailed draft directive on executive-agent implementation for review and comment by the senior working-level principals throughout the military space community. That directive's intent was to clarify the lines of authority, specific responsibilities, and coordination requirements between the executive agent for space and all concerned DoD components.

Although that draft directive (included herein as an appendix for further reference) as of late November 2002 remained caught up in the intra-DoD coordination process and had not yet been formally implemented, it nonetheless represents a significant step forward that should be warmly welcomed by the Air Force, considering that it gives the service, at least in principle, all the needed tools and all appropriate authority to act on its recent empowerment as DoD's executive agent for military space. About the only major areas of concern left unspecified in the implementation directive—and they are important ones—entail the role, responsibilities, and authority of Air Force Space Command within the executive-agent context and the degree to which the new MFP for space (called a “virtual” MFP in the directive) will provide the executive agent real clout by way of an identifying and controlling mechanism for managing cross-service military space programs. Those considerations aside, the Space Commission and DoD accomplished much useful and pioneering work toward putting the American military space effort on the improved institutional and fiscal footing it properly deserves. At the

same time, however, the unfinished business alluded to above attests that both the Air Force and DoD need to do additional work to fully define and implement the Air Force's newly acquired status as DoD's executive agent for military space.

The Air Force faces five basic 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.
- Effectively wielding its newly granted military space executive-agent status.
- Realizing a DoD-wide budget category for space that imparts transparency to how much money and manpower are going into space each year and for what.
- Showing real progress toward fielding a meaningful space control capability while decoupling that progress from any perceived taint of force-application involvement.
- 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.

Mastery of 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 no less important mission responsibilities in the *air* arena.

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I wish to dedicate this work to the memory of George K. Tanham, a distinguished member of the RAND family from 1955 until his passing as this study was nearing publication in March 2003. George led Project AIR FORCE (then called Project RAND) from 1970 to 1975 and served as vice president in charge of RAND's Washington Office from 1970 to 1982. Throughout my own many years with RAND going back to 1975, he was an abiding source of valued insight and counsel, as well as a good colleague, a kindred spirit, and a special friend of rare warmth.

ACRONYMS

AAF	Army Air Force
ABM	Antiballistic Missile
ABMA	Army Ballistic Missile Agency
ADC	Aerospace Defense Command
AFM	Air Force Manual
AFMC	Air Force Materiel Command
AFSC	Air Force Systems Command
AFSPC	Air Force Space Command
AGF	Army Ground Forces
AITF	Aerospace Integration Task Force
AOC	Air Operations Center
AOR	Area of Responsibility
ASAT	Antisatellite
AWACS	Airborne Warning and Control System
C3	Command, Control and Communications
C3I	C3 and Intelligence
C4	C3 and Computers
CAOC	Combined Air Operations Center

CINC	Commander in Chief
CINCNORAD	CINC North American Aerospace Defense Command
CINCSpace	CINC U.S. Space Command
CSOC	Consolidated Space Operations Center
DAL	Developing Aerospace Leaders
DARPA	Defense Advanced Research Projects Agency
DCA	Defense Communications Agency
DCI	Director of Central Intelligence
DCINC	Deputy CINC
DoD	Department of Defense
DSB	Defense Science Board
DSP	Defense Support Program
EELV	Evolved Expendable Launch Vehicle
EMP	Electromagnetic Pulse
FY	Fiscal Year
GBU	Guided Bomb Unit
GEO	Geostationary Earth Orbit
GMTI	Ground Moving Target Indicator
GPS	Global Positioning System
ICBM	Intercontinental Ballistic Missile
IRBM	Intermediate-Range Ballistic Missile
ISR	Intelligence, Surveillance and Reconnaissance
JDAM	Joint Direct Attack Munition
JFACC	Joint Force Air Component Commander
JFASCC	Joint Force Air and Space Component Commander

JFC	Joint Force Commander
JFSCC	Joint Force Space Component Commander
JROC	Joint Requirements Oversight Council
LEO	Low Earth Orbit
MAJCOM	Major Command
MFP	Major Force Program
MILSATCOM	Military Satellite Communications
MIRACL	Mid-Infrared Advanced Chemical Laser
MOL	Manned Orbiting Laboratory
MSTI	Miniature Sensor Technology Integration
NACA	National Advisory Committee on Aeronautics
NAF	Numbered Air Force
NASA	National Aeronautics and Space Administration
NORAD	North American Aerospace Defense Command
NRO	National Reconnaissance Office
NSC	National Security Council
OSD	Office of the Secretary of Defense
POM	Program Objectives Memorandum
QDR	Quadrennial Defense Review
R&D	Research and Development
ROC	Requirement for Operational Capability
SAB	Scientific Advisory Board
SAC	Strategic Air Command
SAMOS	Satellite and Missile Observation System
SAR	Synthetic Aperture Radar
SBIRS	Space-Based Infrared System

SBR	Space-Based Radar
SMC	Space and Missile Systems Center
SOC	Space Operations Center
STARS	Surveillance Target Attack Radar System
STO	Space Tasking Order
SWC	Space Warfare Center
TAC	Tactical Air Command
TOA	Total Obligational Authority
TWA	Trans World Airlines
UAV	Unmanned Aerial Vehicle
USAF	United States Air Force
USSOCOM	U.S. Special Operations Command
USSPACECOM	U.S. Space Command
USSTRATCOM	U.S. Strategic Command