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The Air Force and Future Space Directions

Are We Good Stewards?

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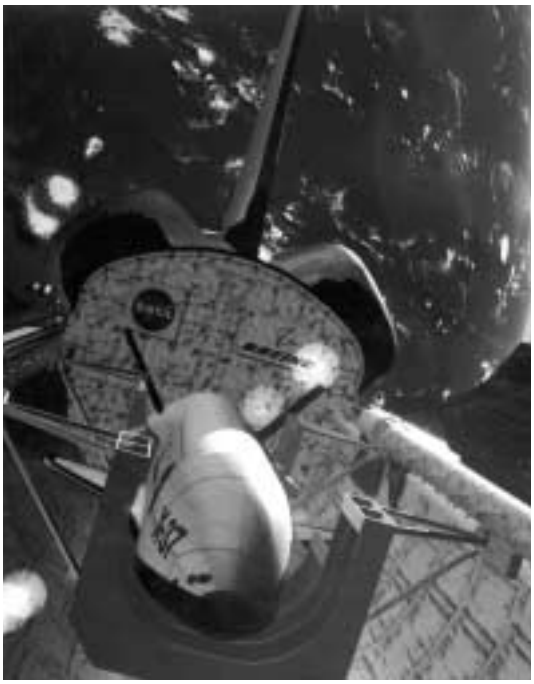
Editorial Abstract: The space-power debate continues. In this response, General Worden argues that the aerospace integration approach to space power is not only consistent with time-tested Air Force doctrine, NCA priorities, and commercial realities, but it also makes the most sense, given that the Air Force has not been given the "space stewardship" mission. In General Worden's view, if the Air Force deserves criticism in its approach to space, it is for its slowness to demonstrate and test sortie-type systems for space access and space control.

THE MOUNTING DIALOGUE over the future space role of the Air Force is very interesting and important. The article by Lt Col Peter Hays and Dr. Karl Mueller ("Going Boldly—Where? Aerospace Integration, the Space Commission, and the Air Force's Vision for Space") in this issue certainly contributes to the aerospace conversation, but it also needs further comment. Their article discusses, and in some cases criticizes, some of the space approaches outlined in previous issues of this journal: Lt Col Cynthia McKinley's proposal for a space "Coast Guard" ("The Guardians of Space: Organizing America's Space Assets for the Twenty-First Century," Spring 2000); Maj Gen John Barry and Col Darrell Herriges's treatise on today's aerospace integration (AI) approach ("Aerospace Integration, Not Separation," Summer 2000); and Lt Gen Bruce Carlson's discussion of future options for space control to protect commercial activities in space ("Protecting Global Utilities: Safeguarding the Next Millennium's Space-Based Public Services," Summer 2000). In particular, they suggest that the AI approach is not persuasive and should not represent the Air Force approach toward space in the years ahead. While many of Hays's and Mueller's points are valid, their criticisms are mostly "straw men" set up and knocked down.

Much of the problem is a failure to separate strategy and mission from basic doctrine, operational doctrine, and tactical doctrine. Strategy and mission are not fundamentally Air Force corporate concerns. These are set by the National Command Authorities (NCA) and by the Joint Chiefs of Staff.[1] Conversely, basic aerospace doctrine is concerned with

how we organize for and use the aerospace environment. Operational doctrine guides the proper employment of aerospace forces to achieve objectives. Tactical doctrine details specifics of using individual aerospace systems.[2] The various articles cited above involve different aspects of the doctrinal confusion about air and space. This response to them argues the following points: (1) we currently have a basic aerospace strategy and mission—to rapidly deter or defeat two nearly simultaneous, large-scale acts of aggression in different theaters (the "two major theater war" [or 2MTW] strategy that has been issued to us by the NCA and joint community); (2) current aerospace basic doctrine, which stresses centralized control and decentralized execution, is as sound for space and information capabilities as it is for traditional air capabilities; (3) operational doctrine for space and information systems needs to be developed as these capabilities are integrated into our forces (the premise of the Barry-Herriges AI article); and (4) we must develop new aerospace capabilities to do "space sorties" before we can truly take proper advantage of space.

Any discussion of the Air Force's approach to developing and using space capabilities must begin with the admonition that the Air Force doesn't operate in a vacuum (space excepted). Yet, there seems to be an attitude afoot that the current national security space debate is largely internal to the Air Force. Some believe that senior Air Force leadership has close to one hundred billion dollars per year to spend and could choose simply to redirect it, based on internal strategic decisions. Anyone working for a few minutes on the Air Staff knows that senior Air Force leadership's flexibility extends not much further than lunch money. In fact, the job of the Air Force is to train, organize, and equip forces to meet the nation's security needs as defined by the joint war-fighting community, senior defense officials, and, ultimately, the NCA. As Air Force leadership has repeatedly stated to Congress, we are woefully underfunded to accomplish *assigned* missions, let alone prepare for new ones. However, it *is* very much within



our "job jar" to provide aerospace options for current and future national security needs. One of our nation's very great strengths lies in having multiple services with differing doctrines and capabilities providing national leadership with a range of options and approaches for meeting these needs.

As Hays and Mueller point out, much of the increased attention to space is in response to the congressionally mandated Space Commission, whose report was due out in January 2001. While some would say that the Air Force has not been a good steward of space, we must all understand the Air Force position on this issue.[3] In short, the Air Force does not have an assigned responsibility to be the "steward" for space, and Air Force leadership has been quite reasonable in its approach to the situation. They have told the commission that the Air Force would eagerly become the "space steward," but it must have that mission assigned along with the resources to accomplish it. That new responsibility would be consistent with the current approach to missions the Air Force already is assigned—which is

the main point General Barry and Colonel Herriges were stating in their AI article.

The core USAF assigned mission is to provide the necessary trained personnel, organizations, and equipment to conduct two near-simultaneous MTWs and several small-scale contingencies. The Barry-Herriges article points out that the USAF sees an increased role for space capabilities, primarily intelligence, surveillance, and reconnaissance (ISR) for this basic theater-warfare mission. In this respect, their article represents a coherent and compelling case for using space ISR as part of our evolving operational doctrine.

Hays and Mueller criticize the article on the grounds that it lacks a coherent doctrine. In so doing, they fail to recognize the applicability of the USAF's well-defined basic doctrine, constructed from almost a century of experience. The AI concept supports this basic doctrine as part of our evolving operational doctrine specified in Air Force Doctrine Document 2 (AFDD 2), *Organization and Employment of Aerospace Power,* and its space section, AFDD 2-2, *Space Operations.*[4] In short, the doctrine states that flexible and rapid forces such as aircraft must be commanded and controlled as a single, integrated whole over the entire theater of operations. We in the Air Force had been rightly criticized in the past for not having a crisp statement of our doctrine. But that is being remedied by the creation of the Air Force Doctrine Center and its series of products, beginning with AFDD 1, *Air Force Basic Doctrine,* dated 1 September 1997.

But again, doctrine must not be confused with missions or strategies. This is the mistake many space advocates have made. Basic doctrine is a concept for organizing and commanding forces, not specifying missions.

Basic and operational USAF doctrine is well suited for the current theater warfare mission. The challenge, however, has been to truly integrate forces to match that doctrine and to present them appropriately to the joint force commander (JFC). This is fundamental to the whole focus on organizing an Aerospace Expeditionary Force concept around a joint aerospace operation center (JAOC), including all aerospace capabilities like new elements of space and cyberspace support, as specified in AFDD 2. The Air Force might be justly criticized in its past treatment of space for not integrating space into the JAOCs, but this is being remedied. The AI concept simply states that we have convinced ourselves that the ratio of airborne to spaceborne elements—particularly in ISR—will shift toward space in the decades ahead. Ironically, the Air Force chose to put about a sixth of its scientific and technology (S&T)

dollars (almost the entirety of our leadership's flexibility) into the next major step in this evolution—developing space-based radar. But as one element of Congress criticized the Air Force for insufficient attention to new space capabilities, another element of the same Congress zeroed the effort to demonstrate space-based radar capability.[5]

USAF basic doctrine is also well suited for important future missions such as protecting US economic power as linked to space. This is the point of General Carlson's article. Systems based in space (and cyberspace for that matter) are already crucial parts of our economic infrastructure, a point lost on Hays and Mueller. They ignore the devastating disruption that losing just one pager satellite two years ago had on our economy.[6] They also seem to doubt the immediate need to address the issue of protecting the global commons of outer and cyberspace. Yet, this past decade there were at least five documented attacks on space systems and hundreds of malicious cyberspace attacks.[7] Thus, recent history proves the point: The strategic mission to protect and prevent hostile use of these capabilities will likely be a critical new national security dimension.

Effective space and cyberspace control is the central dimension of this strategy, and, once again, USAF doctrine is the answer. The basic doctrinal approach of centralized control and decentralized execution (master tenet of aerospace power) is key to an effective future strategy and mission in this economic sphere. Our operational doctrine can and must evolve if we are assigned this mission.

The Air Force's basic and operational doctrine covers current strategic deterrent missions involving nuclear weapons. This, too, is an enduring truth developed over the last half century. Here is where space and information might enable a new strategic approach, relying not on nuclear weapons but on control of information and conventional precision strikes from and through space—albeit with evolutions of our tried and true doctrine.

A strategic objective in the future will be to deter adversaries from any aggressive move without the necessity of massive deployments or risky moves with weapons of

mass destruction—either of which risks major loss of life to American personnel and property. To be effective, a deterrent must be rapid and credible, convincing an adversary that his move would both fail in its objective and result in long-term, unacceptable loss of military and economic stature. A conventional precision-strike deterrent relying heavily on space capabilities, coupled to comprehensive information operations and warfare capabilities and supplemented with long-range, standoff conventional missile strike assets based in the United States, on submarines and on aircraft could provide an effective deterrent.

While considerable additional analysis is needed, the basic approach to a nonnuclear deterrent appears feasible. The keys to this deterrent revolve around new space capabilities: launch-on-demand capability (likely a "spaceplane" system), deployable targeting sensors (probably space-based radar), and precision-weapons delivery vehicles. These technologies are maturing today, with National Aeronautics and Space Administration (NASA) or the Department of Defense (DOD) expecting demonstration flights within five years.[8] All of these capabilities, including the launch-on-demand space plane (probably consisting of a two-stage-to-orbit vehicle based on the concepts NASA is currently experimenting with in its X-33 and X-37 programs) and microsatellite efforts for space control are part of the Air Force's long-range plan.[9]

The current AI approach, as well as potential new strategic mission approaches in economic protection and nonnuclear strategic deterrence, will use space power as an extension of current Air Force basic doctrine. Our operational doctrine is already evolving to incorporate these new capabilities. Of course, we have not yet developed the necessary tactical doctrine for systems we have not developed and flown. However, one thing is clear. The new systems most consistent with our current doctrine and approach are those capable of doing "sorties" into and from space, vice those that are permanent "utilities" on orbit. If the Air Force is to bear any criticism of its approach to space, it would be due to its slowness to demonstrate and test sortie-type systems for space access and space control.[10]

In summary, many of the criticisms of the Air Force in its approach to developing true aerospace power and incorporating emerging space and information capabilities are unjustified. The Air Force has to accommodate established national strategy and strategic missions. It applies aerospace capabilities and aerospace doctrine to the strategies the national leadership assigns. The space capabilities the USAF is pursuing and including in long-range plans are well suited to long-standing basic and operational doctrine. Tactical doctrine will follow the development and deployment of new capabilities. The hallmarks of basic USAF doctrine—unity of control and flexibility—are well suited to new missions and strategies that may be assigned and new space and information capabilities which are now emerging. □

Notes

1. National military strategy is contained in a variety of sources. However, the most concise statements appear in William S. Cohen, secretary of defense, "Report of the Quadrennial Defense Review" (Washington, D.C.: Department of Defense, May 1997).

2. For a concise discussion of Air Force doctrine, see Air Force Doctrine Document 1 (AFDD 1), *Air Force Basic Doctrine*, 1 September 1997.

3. The Space Commission was established by the FY 1999 Defense Authorization Act with additional tasking given in the FY 2000 Defense Authorization Act. The key impetus behind the commission has been Sen. Robert Smith (R-N.H.). Its members and work are discussed in the Hays and Mueller article and in John A. Tirpak, "The Fight for Space," *Air Force Magazine* 83 (August 2000): 61. The commission has been meeting through the fall of 2000, and its report was released in January 2001. Its most controversial charge has been to consider the advisability of a separate "United States Space Force" military service or a "Space Corps" within the United States Air Force. Gen Michael Ryan, Air Force chief of staff, briefed the USAF position to the Space Commission on 19 September 2000. Based on Air Staff summary notes from that briefing and the briefing itself, several points emerged. In the briefing, General Ryan emphasized the current fiscal limi-

tations on the USAF and its current operational problem with an aging aircraft fleet that limits the amount of money that can be spent. But he also stressed the view that we are evolving to more use of space for military and economic purposes and that consequent defensive aspects of space are increasingly important. At the same time, however, he suggested we are evolving to more offensive use of space. In the ensuing discussion, it was clear that the key issue is where to find the necessary money to develop and use space to its full potential vice organizational and structural problems.

4. Air Force operational doctrine is outlined in AFDD 2, *Organization and Employment of Aerospace*, 17 February 2000. Space operational doctrine is contained in AFDD 2-2, *Space Operations*, 23 August 1998.

5. In 1998 the USAF Defense Advanced Research Projects Agency (DARPA) and the National Reconnaissance Office (NRO) began the Discoverer II space-based radar research and demonstration program. The $600 million-plus program was designed to demonstrate the feasibility of putting between 18–27 small satellites into a low earth orbit to detect and track moving targets on Earth. Two demonstration satellites were to be placed into space by the middle decade. A space radar deployment of this type is at the core of the AI effort proposed by Barry and Herriges. Whereas critics of the Air Force such as Senator Smith make statements such as "I do not see the Air Force building the material, cultural, and organizational foundations of a service dedicated to space power" (Sen. Bob Smith, "The Future of Space in the Military," remarks given at the American Institute of Aeronautics and Astronautics [AIAA] Global Air and Space Conference, 15 May 2000), the Discoverer II program was cancelled by Senator Smith's colleagues on the House and Senate Defense Appropriations Committees (House Report 106-754 on the Defense Appropriations Bill for FY 2001). Reports on this largely congressional controversy can be found in *Space News* 11, no. 27 (24 July 2000): 7 and no. 28 (31 July 2000): 8. Despite this controversy, the Air Force and its partners remain committed to pursuing space-radar capability as part of an AI strategy (see comments by NRO director and assistant secretary for space Keith Hall in "NRO Chief Presses for System Similar to Cancelled Discoverer II," *Aerospace Daily*, 7 September 2000).

6. On 19 May 1998, the PanAmSat Corporation's Galaxy 4 spacecraft experienced a failure in its altitude-control system. Unfortunately, the backup system also failed, either at that same time or earlier, so that the operators were unable to maintain stable Earth-link (*Space News*, 25–31 May 1998, 3). The Galaxy 4 spacecraft is a heavily used communication satellite at geostationary orbit; its sudden failure caused the loss of pager service to some 45 million customers as well as numerous other communications outages (*USA Today*, 21 May 1998, 1).

7. There were a handful of satellite-jamming reports in the 1990s. For example, reported in Paris AFP (North European Service) in English, 1006 GMT, 24 November 1999, the Russian government admitted jamming commercial-satellite phone communications in its breakaway province of Chechnya. A Russian Defense Ministry spokesman was quoted as saying, "There is special equipment for radio-electrical jamming." Even more than attacks on space-system capabilities, worries grow about real incidents of computer-network attack against economic and national security. For example, a major "denial of service" attack occurred against a variety of cyberbusinesses on 9 February 2000 (CNN Report, 9 February 2000, 1456 GMT). Attacks against military targets have also been documented (see, for example, CNN Report, 6 April 1990, 1829 GMT).

8. There are a variety of "space plane" and conventional strike concepts discussed. The feasibility and maturity of these concepts are controversial. Nonetheless, a brief summary of the technologies is in order. These systems are discussed in the context of force applications in the United States Space Command's "Long-Range Plan: Implementing USSPACECOM vision for 2020," 1998. The basic space-access system would consist of a reusable suborbital space operations vehicle (SOV) that would operate solely within the United States. It could carry a reusable orbital "mini-space plane" or space maneuver vehicle (SMV) capable of carrying a payload into low earth orbit. It could also carry an expendable upper stage or "modular insertion stage" (MIS), for access to higher orbits. Finally, it could carry weapons capable of being delivered over intercontinental ranges. The weapon's carrier is called a "common aero vehicle" (CAV). However, the Air Force would need to move smartly to develop and test these components this decade. Each of these components is now being pursued by either commercial space-launch developers, NASA, or the Air Force. By leveraging these diverse efforts, the Air Force can integrate a comprehensive space-operations-vehicle architecture at considerably less cost than if it had to develop all components itself. All of these systems would require the USAF to develop new tactical doctrine.

9. The elements of a space plane and associated microsatellite system are included in Air Force long-range plans supporting the AI concept. These long-range plans have identified microsatellites—self-contained, highly maneuverable vehicles weighing about 100 kilograms each and costing less than a few million dollars each—as a key basis for future space-control capabilities. Several are planned for near-term demonstration by the Air Force Research Laboratory (AFRL). These systems would be able to rendezvous, inspect, and, if necessary, interfere with suspect or hostile space systems. In addition, they could include robotic capabilities for servicing or moving fixed, expendable space assets. The SMV appears to be an ideal means to place these microsatellite systems into position and to retrieve them when no longer needed. Under the direction of senior Air Force leadership ("Corona"), Headquarters USAF, Plans and Programs, was directed to prepare a "Vision Force" to meet its 2020 vision. This Vision Force was preliminarily approved in fall 2000 by Air Force leadership.

10. Despite being a central part of Air Force long-range plans, only a modest amount of money added by Congress for specific purposes, such as the SMV or microsatellites during the past few fiscal years, has actually been spent to demonstrate the new capabilities.