

September 2002

# MILITARY SPACE OPERATIONS

## Planning, Funding, and Acquisition Challenges Facing Efforts to Strengthen Space Control



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## Abbreviations

DOD	Department of Defense
GPS	Global Positioning System
NSSA	National Security Space Architect
NSSI	National Security Space Integration
POM	Program Objective Memorandum
SBIRS	Space-Based Infrared System



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United States General Accounting Office  
Washington, DC 20548

September 23, 2002

The Honorable Donald H. Rumsfeld  
The Secretary of Defense

Dear Mr. Secretary:

The United States is increasingly dependent on space for its security and well being. The Department of Defense's (DOD) space systems collect information on capabilities and intentions of potential adversaries. They enable military forces to be warned of a missile attack and to communicate and navigate while avoiding hostile action. And they provide information that allows forces to precisely attack targets in ways to minimize collateral damage and loss of life. DOD's satellites also enable global communications, television broadcasts, weather forecasting; navigation of ships, planes, trucks, and cars; and synchronization of computers, communications, and electric power grids.

This growing dependence, however, is also making commercial and military space systems attractive targets for adversarial attacks. According to DOD, our adversaries are exploring such capabilities as directed energy weapons, space object tracking systems, physical attacks on satellite ground stations, and signals jamming. Moreover, our adversaries are gaining access to space-based information as well as acquiring new space-based capabilities. In view of this growing threat, DOD is taking on efforts to strengthen its ability to protect and defend space-based assets, also known as "space control."<sup>1</sup> Given the importance and potential costs of its acquisitions related to space, we identified DOD's efforts to strengthen its ability to protect and defend its space assets and the challenges facing DOD in making those space control efforts successful.

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## Results in Brief

DOD's efforts to strengthen space control are targeted at seeking to promote better coordination among DOD components, prioritization of projects, visibility and accountability over funding, and interoperability

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<sup>1</sup> DOD Directive 3100.10, Space Policy, July 9, 1999, defines *space control* as ensuring freedom of action in space for the United States and its allies and, when directed, deny an adversary freedom of action in space. This is accomplished through surveillance, protection, prevention, and negation.

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among systems. Among other things, DOD is drafting a space control strategy that is to outline objectives, tasks, and capabilities for the next 20 years. It has also aggregated funding for space programs so that it can compare space funding, including space control funding, to its total budget, make decisions about priorities, and conduct future trend analyses. In addition, DOD has changed its acquisition policy to include separating technology development from product development and encouraging an evolutionary, or phased, approach to development. These changes are based on practices that have been proven in the commercial sector to curb incentives to overpromise the capabilities of a new system and to rely on immature technologies.

Nevertheless, there are substantial challenges to making DOD's space control efforts successful. One challenge is putting needed plans in place to provide direction and hold the services accountable for implementing departmentwide priorities for space control. DOD's draft space control strategy has not been completed and does not yet define roles and responsibilities among the services, departmentwide priorities and end states,<sup>2</sup> and concrete milestones. Also, DOD's aggregation of space funding is not a plan that targets investments at priority areas for DOD overall. Achieving agreement on a strategy and investment plan for space control will be difficult given the varying interests of the services. Another challenge is implementing knowledge-based practices that characterize successful acquisition programs. Unless DOD adopts knowledge-based practices, space control acquisitions, such as the Space-Based Surveillance System, may well face higher cost and schedule risks.

We are making recommendations that are intended to enhance the planning of space control efforts. In commenting on a draft of this report, DOD concurred with our findings and recommendations.

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## Background

DOD's current space network is comprised of constellations of satellites, ground-based systems, and associated terminals and receivers. Among other things, these assets are used to perform surveillance and intelligence functions; detect and warn of attacks; provide communication services to DOD and other government users; provide positioning and precise timing data to U.S. forces as well as other national security, civil, and commercial

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<sup>2</sup> DOD defines *end state* as the set of required conditions that defines achievement of objectives.

users; and counter elements of an adversary’s space system. DOD categorizes these assets into four space mission areas—each with specific operational functions. (See table 1 for a description of space mission areas, operational functions, and related examples of systems and activities.)

**Table 1: Space Missions, Operational Functions, and Examples of Related Assets/Programs**

<b>Missions</b>	<b>Operational functions</b>	<b>Examples of assets/programs</b>	<b>Description</b>
Space control	Space surveillance, protection, prevention, and negation	Space surveillance network	This space control asset is a network that provides space object cataloging and identification, satellite attack warning, timely notification to U.S. forces of satellite flyover, space treaty monitoring, and scientific and technical intelligence gathering.
Force enhancement	Navigation, satellite communications, environmental monitoring, surveillance and threat warning, command and control, and information operations	Global Positioning System (GPS)	This network of satellites and supporting ground stations provides all-weather, day/night, three-dimensional positioning information and precise timing data to land-based, seaborne, and airborne U.S. and allied forces, as well as other national security, civil, and commercial users. GPS enhances force coordination, command and control, target mapping, target acquisition, flexible routing, and weapon accuracy, especially at night and in adverse weather.
Space support	Launch operations, satellite operations, modeling, simulation, and analysis/force development evaluation	Air Force satellite control network	This is the primary command, control, and communications support capability for DOD space systems. As a network of systems, it performs a multitude of functions, including data processing, tracking, telemetry, satellite commanding, communications, and scheduling. The network has 15 worldwide fixed antennas, one transportable system, and two mission critical nodes.
Force applications	Intercontinental ballistic missile sustainment, conventional strike	Minuteman III Sustainment	This program sustains the U.S. strategic ballistic missile system.

Source: GAO analysis.

The Air Force is the primary procurer and operator of space systems. For fiscal years 2002 through 2007, the Air Force is expected to spend about 86 percent of total programmed space funding of about \$165 billion, whereas the Navy, the Army, and other Defense agencies are expected to spend about 8 percent, 3 percent, and 3 percent, respectively.

The space surveillance network and other space control systems, some of which are classified, are currently helping to protect and defend space assets or are under development. For example, the Space-Based Surveillance System is being developed to provide a constellation of satellites and other initiatives that will improve the timeliness and

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fidelity of space situational awareness information. The Rapid Attack Identification and Reporting System, also under development, is expected to ultimately provide notification to Air Force Space Command of threats (radio frequency and laser) impinging upon the right of friendly forces to use space.

DOD's space control mission, which endeavors to protect and defend U.S. space assets, is becoming increasingly important. This importance was recognized by the Space Commission that was established by Congress in the National Defense Authorization Act for Fiscal Year 2000<sup>3</sup> to assess a variety of management and organizational issues relating to space activities in support of U.S. national security.<sup>4</sup> Principally:

- While the commission recognized that organization and management are important, the critical need is national leadership to elevate U.S. national security space interests on the national security agenda.
- A number of disparate space activities should be merged, organizations realigned, lines of communication opened, and policies modified to achieve greater responsibility and accountability.
- The relationship between the officials primarily responsible for national security space programs is critical to the development and deployment of space capabilities. Therefore, they should work closely and effectively together to set and maintain the course for national security space programs.
- Finally, the United States will require superior space capabilities and a cadre of military and civilian talent in science, engineering, and systems operations to remain the world's leading space-faring nation.

Among other things, the Space Commission emphasized the importance of increasing the visibility and accountability of space funding. It also recommended that DOD pursue modernization of aging space systems, enhance its command and control structure, and evolve the surveillance system from cataloging and tracking to a system that could provide space situational awareness.

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<sup>3</sup> Report of the Commission to Assess United States National Security Space Management and Organization, Pursuant to Public Law 106-65, January 11, 2001.

<sup>4</sup> Similar challenges were also recognized in the 2001 Quadrennial Defense Review that serves as the overall strategic planning document of DOD.

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We recently reported on the status of implementation of the Space Commission recommendations.<sup>5</sup> We found that DOD has decided to take actions related to 10 of the commission's 13 recommendations, including organizational changes aimed at consolidating some activities, changing chains of command, and modifying policies to achieve greater responsibility and accountability. In addition, we have reported that

- Over the years, DOD's space acquisition management approach has resulted in each of the services pursuing its own needs and priorities for space. This, in turn, has increased the risk that acquisitions will be redundant and not interoperable. Also, under this approach, there has also been no assurance that the services as a whole are satisfying the requirements of the U.S. Space Command<sup>6</sup> to the maximum extent practicable.<sup>7</sup>
- DOD continues to face cost and schedule growth for some of its larger, more complex space system acquisitions primarily as a result of not having knowledge on the maturity of necessary technology before entering product development.<sup>8</sup>

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## DOD Is Undertaking Efforts to Strengthen Space Control

DOD is now undertaking a wide range of efforts to strengthen its ability to protect and defend space-based assets. Some of these are focused solely on the space control mission while others are broader efforts aimed at strengthening space-related capabilities. The changes are intended to elevate the importance of space within the department; promote greater coordination on space-related activities both within and outside the department, particularly within the intelligence community; reduce redundant systems and capabilities while promoting interoperability; and enable the department to better prioritize space-related activities. At the

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<sup>5</sup> U.S. General Accounting Office, *Defense Space Activities: Status of Reorganization*, [GAO-02-772R](#) (Washington, D.C.: June 26, 2002).

<sup>6</sup> The U.S. Space Command is responsible for establishing operational requirements and the services are responsible for satisfying these requirements to the maximum extent practicable through their planning, programming, and budgeting system.

<sup>7</sup> U.S. General Accounting Office, *National Space Issues: Observations on Defense Space Programs and Activities*, [GAO/NSIAD-94-253](#) (Washington, D.C.: Aug. 1994) and *Defense Acquisitions: Improvements Needed in Military Space Systems' Planning and Education*, [GAO/NSIAD-00-81](#) (Washington, D.C.: May 2000).

<sup>8</sup> U.S. General Accounting Office, *Defense Acquisitions: Space-Based Infrared System-low at Risk of Missing Initial Deployment Date*, [GAO-01-6](#) (Washington, D.C.: Feb. 2001).

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same time, DOD is making changes to its acquisition and oversight policies that will affect how space programs are developed and managed.

Specifically, the U.S. Space Command is developing a space control strategy that is to outline objectives for space control over the next 20 years. Concurrently, DOD is developing a national security space plan that will lay down broader objectives and priorities for space-based programs. As the future executive agent<sup>9</sup> for space, the Air Force created an office to develop and implement the national security space plan and has yet to finalize plans for the organizational realignment of the office of the National Security Space Architect. The National Security Space Architect is responsible for developing architectures—frameworks that identify sets of capabilities—across the full range of DOD and intelligence community space mission areas.

In addition, DOD is making changes to its budgeting process to gain greater visibility over space-related spending and has created a “virtual” space major force program for the purpose of identifying what funding is specifically directed toward space efforts. The virtual major force program identifies spending on space activities within other major force programs. This does not change the current process that the military services use to fund their own space programs, but it does aggregate space funding so that the department will be able to compare space funding to DOD’s total budget and conduct future trend analyses. Moreover, DOD will be able to identify space control funding from other space-related activities.

Lastly, DOD has made changes to its acquisition policy that will affect how space systems are acquired and managed. These changes focus on making sure technologies are demonstrated at a high level of maturity before beginning product development as well as taking an evolutionary, or phased, approach for producing a system. The Air Force is also implementing a new acquisition oversight mechanism for space intended to streamline the time it takes to review and approve a program before moving onto a subsequent stage of development. Table 2 describes some of DOD’s efforts related to strengthening space control in more detail.

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<sup>9</sup> The Secretary of Defense has not yet officially designated the Air Force as executive agent for space. An *executive agent* is a term used to indicate a delegation of authority by the Secretary of Defense to a subordinate to act on the Secretary’s behalf.



**Table 2: DOD Actions Related to Improving Space Control**

<b>Action policy/directives</b>	<b>Status</b>	<b>Description</b>
DOD Instruction on Space Control	Issued in Jan. 2001	This instruction, developed by the Assistant Secretary of Defense for Command, Control, Communications and Intelligence, directed that an integrated space control strategy be developed and implemented to meet the needs of decisionmakers across the entire chain of command. The instruction specified that capabilities necessary to conduct the space control mission be integrated into an operational force structure that is sufficiently robust, ready, secure, survivable, resilient, and interoperable to meet the needs of decisionmakers.
<b>Planning</b>		
National Security Space Plan	In process	This is to set overall objectives related to space and provide a high-level 10- to 15-year road map for the direction of space programs. It is intended to drive more detailed program objective memorandums (POM) and budget estimate submission processes for national security space programs across DOD. The plan is not expected to be completed until sometime in fiscal year 2003.
Space Control Strategy	In process	In response to the 2001 DOD instruction, the U.S. Space Command drafted a space control strategy, with a 20-year time frame, which outlines objectives, tasks, and capabilities of the four space control components: surveillance, protection, prevention, and negation. The strategy is aligned with the U.S. Space Command's March 1998 Long Range Plan for pursuing space activities. The draft outlines threats to space systems and describes the importance of shaping a space environment that strengthens national security.
<b>Organizational</b>		
Air Force as Executive Agent for Space	Draft Directive March 2002— not yet approved	In response to the Space Commission's recommendation, the Secretary of Defense issued a memorandum directing that the Air Force be designated as the executive agent for space within DOD, with departmentwide responsibility for planning, programming, and acquiring space systems. Formal designation and corresponding DOD Directive outlining roles and responsibilities have yet to be finalized.
Milestone Decision Authority	February 2002	The Under Secretary of Defense for Acquisition, Technology, and Logistics gave the Secretary of the Air Force milestone decision authority for acquiring DOD space systems. The Secretary redelegated this authority to the Under Secretary of the Air Force/Director, National Reconnaissance Office.
National Security Space Integration (NSSI)	April 2002	The office was established to guide and coordinate implementation of the Space Commission's recommendations. It is charged with providing program, plans, policy integration, and acquisition support among other activities. It will also be responsible for leading, developing, maintaining, and coordinating the national

Action policy/directives	Status	Description
National Security Space Architect (NSSA)	In process	<p>security space plan. NSSI is located within the Air Force, reporting to the Under Secretary of the Air Force/Director, National Reconnaissance Office.</p> <p>A plan to relocate this office, previously under the Office of Secretary of Defense, has yet to be finalized. The office is responsible for developing architectures to guide new systems acquisitions and ensure that they can work effectively together. It will also be responsible for ensuring that Air Force and National Reconnaissance Office funding for space is consistent with policy, planning guidance, and architectural decisions and preparing an annual National Security Space Program Assessment.</p>
<b>Funding</b>		
Funding request for promising space control initiatives	Requested	<p>DOD's fiscal year 2003 funding request includes about \$300 million strictly for space control. The request includes about \$40 million for continuing what DOD has termed as promising space control initiatives: about \$24 million for the Counter Surveillance Reconnaissance System, \$9 million for the Counter Satellite Communications System, and \$7 million for the Rapid Attack Identification and Reporting System. Other than the space surveillance program, the fiscal year 2003 budget is the first time that DOD funded a multiyear acquisition program for space control, which continued work that began in the space control technology program.</p>
Space is designated as a "virtual" major force program.	October 2001	<p>The Space Commission recommended that a "major force program" for space be established to improve management and oversight of space programs. A major force program is a DOD budgeting mechanism that aggregates related budget items into a single program in order to track program resources independent of the appropriation process and contains the resources needed to achieve an objective or plan. Instead of creating a separate major force program for space, DOD established a "virtual" major force program to increase visibility of resources allocated for space activities. The virtual major force program identifies spending on space activities within the other major force programs and provides information by functional area, including space control.</p>
<b>Acquisition Management and Oversight</b>		
Best practices incorporated into DOD acquisition policy	2000 and 2001	<p>DOD changed its acquisition policy (DOD 5000 series for acquisition) to embrace acquisition practices that characterize successful programs for acquiring and developing systems. These focused primarily on (1) making sure technologies are demonstrated to a high level of maturity before beginning product development and (2) taking an evolutionary, or phased, approach for producing a system.</p>

Action policy/directives	Status	Description
Defense Space Acquisition Board	In process	<p>The changes represent substantially different ways of doing business for DOD in that they would essentially separate technology development from a weapon system or space system development program and deliver capabilities in phases versus one “big bang.” This was done in order to curb incentives to overpromise the capabilities of a new system and to rely on immature technologies and also to make sure that technologies and funds are available to make good on promises.</p> <p>In an attempt to reduce oversight time for space programs, DOD plans to set up a special Defense Space Acquisition Board modeled after one employed by the National Reconnaissance Office, which will have one layer of review at each major milestone throughout the acquisition process. Under this new oversight process, the team would spend about 8 weeks, or more if required, on-site working full-time with program officials and would conclude this work with recommendations to the board on whether or not to allow the program to proceed. DOD anticipates that the new process will decrease milestone decision cycle time from about 8 to 12 months to about 8 to 12 weeks. The latest generation of Global Positioning System satellite vehicles is the initial system going through this process. Other programs being recommended for the Defense Space Acquisition Board process are the Space-Based Radar and the National Polar-orbiting Operational Environmental Satellite System.</p> <p>In contrast, under DOD’s current oversight process, the Defense Acquisition Board holds formal meetings at each milestone to review accomplishments and assess readiness for proceeding to the next phase. There are two oversight teams that advise the Under Secretary of Defense for Acquisition, Technology, and Logistics on whether or not programs should proceed. One is an overarching integrated product team and the other is a working level integrated product team. Sometimes, a third team comprised of membership from both may be involved.</p>
Other practices being considered for improving space program acquisition	In process	<p>The DOD is also looking to apply other practices considered by the Air Force and Army as best practices for inclusion on space program acquisitions. For example, the National Reconnaissance Office will be evaluating the possibility of using a best commercial practice for project selection, approval, and funding, referred to as the Warfighter Rapid Acquisition Process, that is to facilitate rapid deployment of new technology and capabilities. The Warfighter Rapid Acquisition Process is currently evolving from a new program start process to a technology insertion program.</p>

Action policy/directives	Status	Description
		Another practice under study is strategic supplier alliances that would establish long-term comprehensive supplier partnerships to leverage the purchases of material, products, and services in a more effective and efficient manner.

Source: GAO analysis.

## Substantial Challenges Still Face DOD in Strengthening Space Control

DOD's efforts to strengthen its management and organization of space activities, including space control, are a good step forward, particularly because they seek to promote better coordination among the services involved in space, prioritization of space-related projects, visibility over funding, and interoperability. But there are substantial planning and acquisition challenges involved in making DOD's current space control efforts successful.

## Preparation of Plans to Provide Overall Direction and Hold Services Accountable

The Space Commission recognized that stronger DOD-wide leadership and increased accountability were essential to developing a coherent space program. As noted above, one effort to provide stronger leadership and accountability is the development of a space control strategy. Completion of this strategy is a considerable challenge for DOD because it has not yet been aligned with other strategies still being revised and because agreement among the military services on specific roles, responsibilities, priorities, milestones, and end states may prove difficult to achieve.

In February 2001, a draft of the space control strategy, prepared by U.S. Space Command, was submitted to the Chairman of the Joint Chiefs of Staff for review, refinement, and submission to the Secretary of Defense. In June 2001, the Chairman stated that it was important that the space control strategy be put on hold until it could be aligned with the national security and national military strategies that were being updated before official submission to the Secretary of Defense. Also, the space control strategy was drafted initially without the benefit of the broader national security space plan to use as a foundation for setting priorities, objectives, and goals. The National Security Space Integration Office expects to complete the space plan in the summer of 2002; however, there are indications that the plan may not be completed until 2003. Whenever the plan is completed, DOD would then have to reexamine the draft space control strategy to ensure alignment with the broader plan.

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Currently, the services are not satisfied with the draft strategy. Army, Navy, and Air Force officials told us that the draft was not specific enough in terms of what their own responsibilities are going to be and what DOD's priorities are going to be. They also pointed out that there were no specific milestones, only a rough 20-year time frame for achieving a "robust and wholly integrated suite of capabilities in space." Without more specifics in this area, DOD would not be able to measure its progress in achieving goals. According to a U.S. Space Command official, although a final date for issuing the strategy is unknown, comments from the services have been incorporated where appropriate and additional detail has been added to reflect changes in DOD terminology.

Without knowing more details, service officials said that they would continue pursuing their own space control programs as they have been. In fact, two services—the Air Force and the Army—have already set their own priorities for space control. For example, Air Force Space Command, in its Strategic Master Plan, lists its first priority under space control as improving space surveillance capability to achieve real-time space situational awareness and provide this information to the warfighter. The Army's Space Master Plan recognized shortfalls in the space control area and identified future operational capabilities for space control that include space-based laser, airborne laser and the congressionally-directed Kinetic Energy Anti-Satellite capability.

Another issue that could affect accountability for space control is the lack of a DOD-wide investment plan for space control to guide the development of the services' budget submissions. The Space Commission recognized that increasing funding visibility and accountability is essential to developing a coherent space program. According to the commission, for example, the current decentralized approach of funding satellites from one service's budget and terminals from another's can result in program disconnects and duplication. The newly implemented virtual major force program for space addresses the need for visibility into space funding across the services by aggregating most space funding by service and function. DOD officials stated that the first iteration of the virtual major force program captured a high percentage of space funding and it will be fine tuned in the future years. The virtual major force program for space was designed to include program elements that represent space activities only. Funding for non-space-weapon systems that may have some space related components (such as a Global Positioning System receiver in the bomb hardware of the Joint Direct Attack Munition bombs) are not included in the virtual major force program.

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Although the virtual major force program provides greater visibility into space funding, it is not intended to provide an investment plan for space. However, the space control systems and funding identified in the virtual major force program, along with priorities outlined in the space control strategy, could be used as a basis for developing an investment plan that would prioritize space control capabilities that DOD needs to develop. Such a plan would benefit DOD by

- setting DOD-wide priorities and helping the services make decisions on meeting those priorities;
- including short-, mid-, and long-range time frames to make sure space control activities were carried out as envisioned in DOD's overall goals and the national security space plan;
- establishing accountability mechanisms to make sure funding is targeted at priority areas;<sup>10</sup> and
- providing the level of detail needed to avoid program disconnects and duplications.

Developing such an investment plan for space control will be a considerable challenge because it will require the services to forgo some of their authority to set priorities. Secondly, DOD will need to identify space capabilities that are scattered across programs and services, and in many instances, are even embedded in non-space-weapon systems. Finally, development of an investment plan for space control will require leadership on the part of the Air Force, as the executive agent for space, because such a plan will have to balance the needs and priorities of all of the services.

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## Implementation of Best Acquisition Practices to Reduce Risks

The changes DOD has made to its acquisition policy embracing practices that characterize successful programs are a positive step that could be applied to the acquisition of space control systems. By separating technology development from product development (system integration and system demonstration) and encouraging an evolutionary approach, for example, the new policy would help to curb incentives to over promise the capabilities of a new system and to rely on immature technologies. Moreover, decisionmakers would also have the means for deciding not to

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<sup>10</sup> According to the Space Commission report, some priority areas might include improved space situational awareness and attack warning capabilities, a more robust science and technology program for developing and deploying space-based radar, space-based laser, and hyper-spectral sensors and reusable launch vehicle technology.

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initiate a program if a match between requirements and available resources (time, technology, and funding) was not made.

But, so far, DOD has been challenged in terms of successfully implementing acquisition practices that would reduce risks and result in better outcomes—particularly in some of its larger and more complex programs. For example, in 1996, DOD designated the Space-Based Infrared System (SBIRS), consisting of a Low and High program, a Flagship program for incorporating a key acquisition reform initiative aimed at adopting successful practices that would develop systems that are generally simpler, easier to build, and more reliable, and that meet DOD needs. In 2001, we reported that the SBIRS Low program, in an attempt to deploy the system starting in fiscal year 2006 to support a missile defense capability for protecting the United States, was at high-risk of not delivering the system on time or at cost or with expected performance.<sup>11</sup> In particular, we reported that five of six critical satellite technologies had been judged to be immature and would not be available when needed. As stressed in previous GAO reports, failure to make sure technologies are sufficiently mature before product development often results in increases in both product and long-term ownership costs, schedules delays, and compromised performance. The SBIRS Low program has recently undergone restructuring in an attempt to control escalating costs and get back on schedule.

In 2001, we reported that the SBIRS High program was in jeopardy because (1) ground processing software might not be developed in time to support the first SBIRS High satellite, and (2) sensors and satellites might not be ready for launch as scheduled due to technical development problems.<sup>12</sup> These difficulties increased the risk that the first launches of SBIRS High sensors and satellites would not occur on time and that mission requirements would not be met. The Under Secretary of the Air Force recently acknowledged that the SBIRS High program was allowed to move through programmatic milestones before the technology was ready. In addition, the Under Secretary of Defense for Acquisition, Technology

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<sup>11</sup> U.S. General Accounting Office, *Defense Acquisitions: Space-Based Infrared System-low at Risk of Missing Initial Deployment Date*, GAO-01-6 (Washington D.C.: Feb. 28, 2001).

<sup>12</sup> Although the information provided here is unclassified, our SBIRS-High report is classified.

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and Logistics recommended modifications to the SBIRS High requirements to meet realistic cost and performance goals.<sup>13</sup>

As we recently testified, there are actions DOD can take to make sure that new acquisition policies produce better outcomes for acquisitions of space control systems (or any other space systems).<sup>14</sup> These include

- structuring programs so that requirements will not outstrip available resources,
- establishing measures for success for each stage of the development process so that decisionmakers can be assured that sufficient knowledge exists about critical facets of a product before investing more time and money, and
- placing responsibility for making decisions squarely in those with authority to adhere to best practices and to make informed trade-off decisions.

Our prior reports have recommended actions that DOD could take in these and other areas.<sup>15</sup>

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## Conclusions

DOD recognizes that space systems are playing an increasingly important role in DOD's overall warfighting capability as well as the economy and the nation's critical infrastructure. Its recent actions are intended to help elevate the importance of space within the Department, and also improve coordination, priority setting, and interoperability. But there are

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<sup>13</sup> In May 2002, after experiencing unit cost increases exceeding 25 percent, the Under Secretary of Defense for Acquisition, Technology and Logistics certified to Congress, as required by the legislative provision known as Nunn-McCurdy, 10 U.S.C. 2433, that the program is essential to national security, in order to permit the program to continue. The Under Secretary of Defense for Acquisition, Technology and Logistics was required to make this written certification before appropriated funds could be obligated for the program.

<sup>14</sup> U.S. General Accounting Office, *Defense Acquisitions: DOD Faces Challenges in Implementing Best Practices*, [GAO-02-469T](#) (Washington, D.C.: Feb. 27, 2002).

<sup>15</sup> U.S. General Accounting Office, *Best Practices: Better Matching of Needs and Resources Will Lead to Better Weapon System Outcomes*, [GAO-01-288](#) (Washington, D.C.: Mar. 8, 2001); U.S. General Accounting Office, *Best Practices: DOD Teaming Practices Not Achieving Potential Results*, [GAO-01-510](#) (Washington, D.C.: Apr. 10, 2001); and U.S. General Accounting Office, *Best Practices: Capturing Design and Manufacturing Knowledge Early Improves Acquisition Outcomes*, [GAO-02-701](#) (Washington, D.C.: July 15, 2002).



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substantial challenges facing DOD's efforts to achieve its objectives for space control. Principally, the services and the U.S. Space Command have not agreed to the specifics of a strategy, especially in terms of roles and responsibilities. DOD still lacks an investment plan that reflects DOD-wide space control priorities and can guide the development of the services budget submissions for space control systems and operations. Moreover, it is still questionable whether DOD can successfully apply best practices to its space control acquisitions. Clearly, success for space control will depend largely on the support of top leaders to set goals and priorities, ensure an overall investment plan meets those goals and priorities, as well as encourage implementation of best practices.

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## Recommendations for Executive Action

To better meet the challenges facing efforts to strengthen DOD's space control mission, we recommend that the Secretary of Defense align the development of an integrated strategy with the overall goals and objectives of the National Security Space Strategy, when issued. The Secretary should also ensure that the following factors are considered in finalizing the integrated space control strategy:

- roles and responsibilities of the military services and other DOD organizations for conducting space control activities,
- priorities for meeting those space control requirements that are most essential for the warfighter,
- milestones for meeting established priorities, and
- end states necessary for meeting future military goals in space control.

We further recommend that the Secretary of Defense develop an overall investment plan that:

- supports future key goals, objectives, and capabilities that are needed to meet space control priorities, and
- supports the end states identified in the integrated space control strategy, and is aligned with the overall goals and objectives of the national security space strategy.

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## Agency Comments and Our Evaluation

We received written comments on a draft of this report from the Secretary of Defense. DOD concurred with our findings and recommendations. It also offered additional technical comments and suggestions to clarify our draft report, which we incorporated as appropriate. DOD's comments appear in appendix I.

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## Scope and Methodology

To identify DOD's efforts to strengthen its ability to protect and defend its space assets and the challenges facing DOD in making those space control efforts successful, we reviewed the DOD Instruction for Space Control, U.S. Space Command's draft Space Control Strategy, U.S. Space Command's Long Range Plan, military service space master plans, DOD's 1999 Space Policy, the Report of the Commission to Assess United States National Security Space Management and Organization, and the 2001 Quadrennial Defense Review. We also reviewed national and DOD space policies and DOD's Future Years Defense program from fiscal year 2002 through 2007.

To understand DOD's efforts and challenges, we reviewed the draft space control strategy and held discussions with officials at the U.S. Space Command, Colorado Springs, Colorado. To gain a better understanding of how the services regarded the draft space control strategy and development of a corresponding investment plan, we held discussions with and obtained documentation from officials at the Air Force Space Command, Peterson Air Force Base, Colorado Springs, Colorado; Air Force Headquarters, Washington, D.C.; the Army Space and Missile Defense Command, Arlington, Virginia; the Naval Space Command Detachment, Peterson Air Force Base, Colorado Springs, Colorado; the Office of the Assistant Secretary of Defense for Command, Control, Communications and Intelligence; the Joint Staff; Under Secretary of Defense Comptroller/Chief Financial Officer and Director, Program, Analysis and Evaluation; the Office of the National Security Space Architect, Fairfax, Virginia; and the RAND's National Security and Research Division, Washington, D.C. To identify the acquisition challenges, we reviewed prior GAO reports on practices characterizing successful acquisition program and held discussions with DOD officials. Specifically, we held discussions with and obtained documentation from representatives of the Under Secretary of Defense for Acquisition, Technology, and Logistics and officials with the Air Force/National Reconnaissance Office Integration Planning Group.

We performed our work from July 2001 through July 2002 in accordance with generally accepted government auditing standards.

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We are sending copies of this report to the Secretaries of the Army, the Navy, and the Air Force; the Director of the Office of Management and Budget; and interested congressional committees. We will also make copies available to others on request.

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The head of a federal agency is required under 31 U.S.C. 720 to submit a written statement of actions taken on our recommendations to the Senate Committee on Governmental Affairs and the House Committee on Government Reform no later than 60 days after the date of the report and to the Senate and House Committee on Appropriations with the agency's first request for appropriations made more than 60 days after the date of the report. In addition, the report will be available at no charge at the GAO Web site at <http://www.gao.gov>.

If you or your staff have any questions, please contact me at (202) 512-4841 or Jim Solomon at (303) 572-7315. The key contributors to this report are acknowledged in appendix II.

Sincerely yours,

A handwritten signature in black ink that reads "R E Levin". The letters are written in a cursive, slightly slanted style.

R. E. Levin  
Director  
Acquisition and Sourcing Management

# Appendix I: Comments from the Department of Defense



COMMAND, CONTROL,  
COMMUNICATIONS, AND  
INTELLIGENCE

OFFICE OF THE ASSISTANT SECRETARY OF DEFENSE  
6000 DEFENSE PENTAGON  
WASHINGTON, DC 20301-6000

SEP 12 2002

Mr. Robert E. Levin  
Director,  
Acquisition and Sourcing Management  
U.S. General Accounting Office  
441 G Street, N.W.  
Washington, D.C. 20548

Dear Mr. Levin,

This is the Department of Defense (DoD) response to the GAO draft report, 'MILITARY SPACE OPERATIONS: Planning, Funding, and Acquisition Challenges Facing Efforts to Strengthen Space Control', dated August 2, 2002, (GAO Code 120078/GAO-02-738).

The detailed DoD comments in response to the GAO recommendations are provided in the enclosure. Suggested technical changes for clarification and accuracy have also been included.

The Department appreciates the opportunity to comment on the draft report.

Sincerely,

Roger E. Robb, Col, USAF  
Director, Space Programs  
ODASD(C3ISR, Space & IT Programs)

Enclosure: As Stated



GAO DRAFT REPORT - DATED AUGUST 2, 2002  
GAO CODE 120078/GAO-02-738

**“MILITARY SPACE OPERATIONS: Planning, Funding,  
and Acquisition Challenges Facing Efforts  
to Strengthen Space Control”**

**Department of Defense Comments**

**RECOMMENDATION 1:** The GAO recommended that the Secretary of Defense ensure that following factors are considered in finalizing the integrated space control strategy:

- roles and responsibilities of the military services and other DOD organizations for conducting space control activities,
  - priorities for meeting those space control requirements that are most essential for the warfighter,
  - milestones for meeting established priorities, and
  - end states necessary for meeting future military goals in space control.
- Furthermore, the development of an integrated strategy should be aligned with the overall goals and objectives of the National Security Space Strategy, when issued.

**DOD RESPONSE:** Concur.

**RECOMMENDATION 2:** The GAO recommended that the Secretary of Defense develop an overall investment plan that:

- supports future key goals, objectives and capabilities that are needed to meet space control priorities,
- supports the end states identified in the integrated space control strategy, and is aligned with the overall goals and objectives of the national security space strategy.

**DOD RESPONSE:** Concur.

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# Appendix II: Staff Acknowledgments

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## Acknowledgments

Key contributors to this report were Cristina Chaplain, Maricela Cherveney, Jean Harker, Art Gallegos, and Sonja Ware.

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