

From Satellites to Space Shuttle and Beyond: GAO Evaluates the Military's Role in Space

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Ed. note: During the last 3 years GAO has devoted an increasing amount of resources to evaluating Department of Defense (DOD) space-related activities and programs. In 1984 staff from the National Security and International Affairs Division (NSIAD), Information Management and Technology Division (IMTEC), and several regional offices engaged in an agency-wide planning assignment that resulted in a 5-year plan showing how GAO should address the rapidly emerging issue of the military's use of space. The Los Angeles Regional Office has participated in the planning efforts and assignments in this area, capitalizing upon its proximity to the Air Force Space Division of the Air Force Systems Command, which oversees U.S. space technology efforts and develops, buys, and operates all DOD satellite systems. Mr. Herrera expresses his appreciation to the site staff—particularly Dan Bullock, Robert Mikami, Theophilus Yu, and Winston Weiser—for their contributions.

Communication satellites, killer satellites, space lasers, and space stations—once the props of science fiction movies—are now a reality. So are the implications of the military's role in space, a subject that has fueled major concern in the American public, the Congress, and the administration. Over time, U.S. military forces have become increasingly dependent on "passive" command, control, communications, and intelligence (also known as "C³I") space systems to accomplish their missions. Although the cost of these systems has already grown rapidly, past investments may be insignificant compared with potential expenditures for developing future space systems, including space weapons. GAO, as always, will play a major role in helping

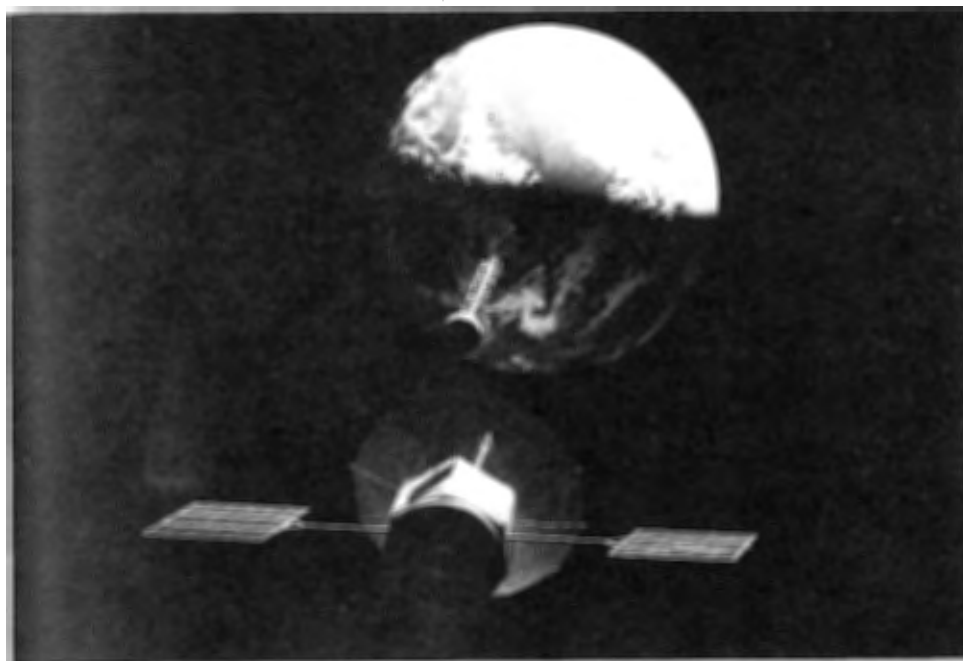
the Congress carry out its oversight responsibilities concerning the effectiveness and efficiency with which these expenditures are made.

DOD's presence in space has created important, controversial issues that have received much congressional attention and an increasing amount of GAO's resources. As DOD's role in space expands and its space-related budget grows, we can expect GAO's involvement in evaluating military space programs and activities to increase further. Already, a 5-year issue-area plan has been prepared to direct GAO's work.

DOD's Emerging Presence in Space

Military strategists throughout history have known the importance of taking and holding the high ground. Space, termed the ultimate high ground, offers an immensely strategic vantage point from which the U.S. political and military leadership can command, control, and communicate with the military forces that will deter or wage war in the future. Parallels are being drawn between the development of combat missions for the aircraft of the past and the spacecraft of today. In World War I, for example, aircraft were used first to reconnoiter, then to prevent reconnaissance (by shooting aircraft down), then to protect reconnaissance aircraft, and, finally, to deliver bombs. The development and use of space systems seem headed down the same path.

The nation's increasing dependence on space systems and their attendant ground support systems has led DOD to steadily increase its investment in them. From fiscal year 1980 through 1986, for example, DOD's space-related budget grew from \$5.0 billion to \$12.0 billion. The fiscal year 1986



(U.S. Air Force photo)

The Fleet Satellite Communications System provides global communications for the U.S. Navy and Air Force as well as the Department of Defense.

amount includes \$3.7 billion sought by the administration for the President's Strategic Defense Initiative, commonly known as the "Star Wars" program.

DOD's expanding role in space is directly linked to two major shifts in U.S. nuclear deterrence policy. First, in 1980, then-President Carter revised the nation's nuclear war strategy to include a flexible response to foreign aggression and the possibility of fighting a prolonged nuclear war, including the capability to absorb a series of nuclear strikes. This policy required that the nation's C³I space assets—particularly those considered vital to strategic nuclear forces—have the capability of surviving a nuclear conflict and accomplishing planned missions.

The second shift in policy occurred in 1983 when President Reagan announced the "Star Wars" program. This research and development program is intended to identify and develop technologies and systems capable of defending against ballistic missiles. Space systems are essential for such an effort, particularly for detecting missiles, communicating with the various elements of the defense system, and destroying enemy missiles.

Although all the military services are involved, primary responsibility for developing and operating DOD's space programs currently rests with the Air Force. The Air Force Systems Command is responsible

for researching and developing, acquiring, and operating military space assets. The Air Force established the Space Command in 1982 to oversee all space operations, and the Navy subsequently created its own Space Command. More recently, the President authorized a new, unified Space Command to manage all future military space operations; plan for joint, wartime use of space assets; and serve as the focal point for identifying future requirements.

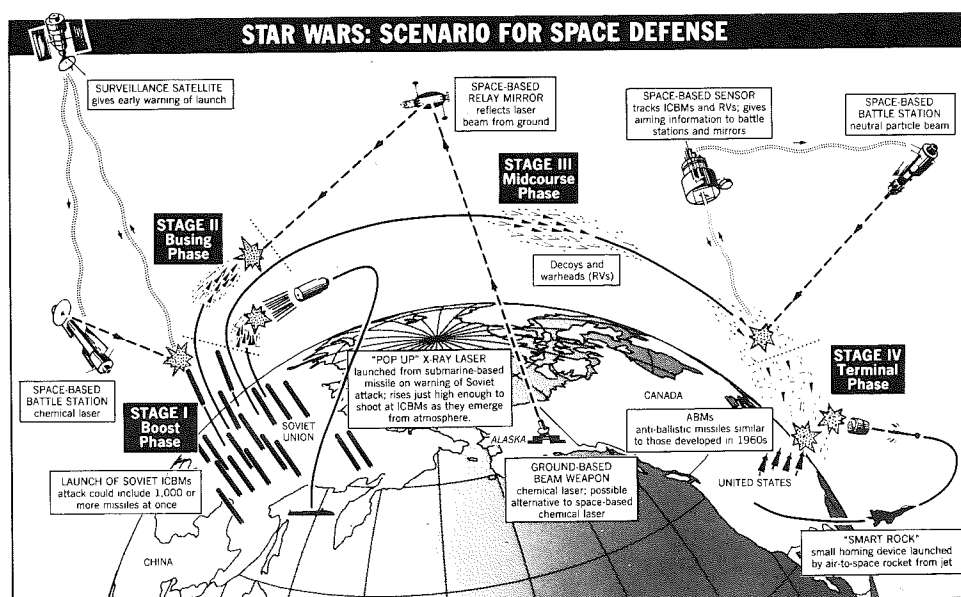
DOD's space assets consist of space-based passive systems, active systems, and launch and support systems. Passive satel-

lite systems that gather and transmit data and other information are used to accomplish critical communications, navigation, surveillance, and reconnaissance missions. Given a threat of nuclear war, the National Command Authorities (i.e., the President, Secretary of Defense, and their authorized alternates) will use these systems to receive information, deliver instructions, and control the escalation of conflict. Active space systems are weapons designed to attack and destroy objects operating in or traveling through space. These active systems include the U.S. antisatellite (ASAT) weapon, which is intended to destroy the operational capability of satellites, and the weapons technologies of the "Star Wars" program.

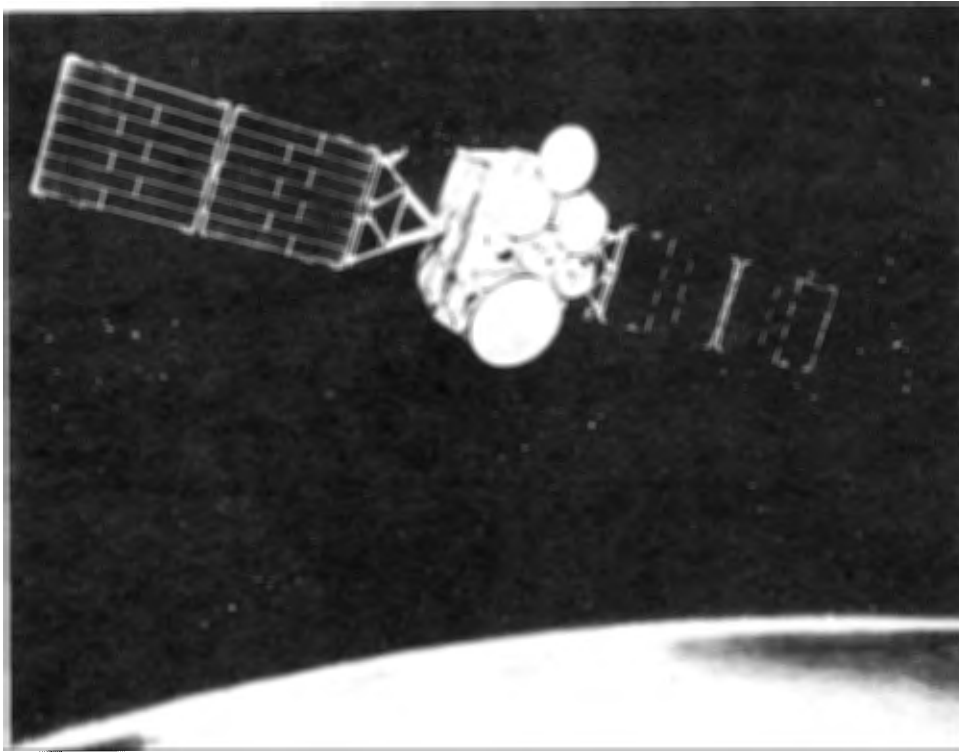
GAO's Current Role

The National Security and International Affairs Division's (NSIAD's) Air Force and C³I subdivisions and the Information Management and Technology Division (IMTEC) are primarily responsible for GAO's work in this area. Several regional offices—including Atlanta, Boston, Denver, Los Angeles, and New York—also play major roles in planning and performing assignments, since key DOD units and contractors are geographically located within their regional boundaries.

These divisions and offices have performed a large variety of assignments that have approached the space militarization issue from different perspectives. The focus of work has included evaluating



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(U.S. Air Force photo)

The Defense Satellite Communications System provides communications support to systems that are operationally controlled by the Defense Communications Agency.

- DOD's organizational structure and ability to manage the multiservice space program,
- efforts to develop space C³ systems to improve strategic and tactical force effectiveness,
- the impact on national military policy of deploying weapons in space,
- launch and satellite control capabilities and needs, and
- requirements for space-related data processing and transmission capabilities.

GAO's divisions and offices have used a three-pronged approach—i.e., evaluating an individual program, a space mission, or a space-related functional area—that has been generally effective in addressing the major areas identified above. By evaluating individual programs, GAO has provided the Congress with a relatively quick status report on the development of systems in which there is much interest.

A prime example would be the MILSTAR satellite program, a multibillion dollar system that is considered DOD's highest priority C³I system. By looking into a mission area such as communications, GAO has provided the Congress with an overall assessment of whether a particular mission

can be accomplished. Finally, by reviewing functional areas, such as the survivability of space assets, GAO can inform the Congress on whether space policy goals that

cut across systems and missions are being met. GAO has routinely performed simultaneous assignments in this issue area.

The following ongoing assignments illustrate GAO's involvement in and approach to this fast-emerging issue area.

• **Review of the U.S. Antisatellite (ASAT) Program.** The ASAT is a two-stage rocket, launched from an F-15 fighter, that destroys a satellite by colliding with it. The controversy surrounding the ASAT has affected many aspects of the program, including the system's cost. The objectives of GAO's review are to assess the program's current costs, schedule, and performance data; the ASAT test and evaluation program; and the ASAT support system's cost and operational capabilities. The review will also assess how an extended moratorium on ASAT testing could affect the cost and schedule.

• **Review of Military Space Environmental Monitoring System.** The Defense Meteorological Satellite Program (DMSP) consists of a system of satellites that provides worldwide weather information to the U.S. military. Three replacement satellites are being produced and 12 more are planned for delivery through the 1990's. GAO's review is focusing on several operational problems DMSP has experienced



(U.S. Air Force photo)

The NAVSTAR Global Positioning System provides global navigation and positioning requirements of the U.S. military, federal civil agencies, and NATO.

and on the steps DOD has taken to correct problems and control costs and schedule changes. In addition, GAO will assess the acquisition strategy and the measures required to enhance the survivability of DMSP as well as possible duplication of information by civilian weather satellites.

● **Review of DOD's Efforts To Improve Space Systems' Survivability.** In July 1982 President Reagan, recognizing the importance of space systems to the national security and the threat of Soviet antisatellite capabilities, directed DOD to improve the survivability and endurance of space systems. Currently, GAO is examining satellite systems, satellite architectures, and space technology to determine the (1) adequacy and management of current survivability directives and efforts, (2) need for and development of different survivability options and technologies, (3) extent to which available options have or have not been implemented, and (4) shortfalls and problems—both experienced and anticipated—in achieving adequate survivability.

● **Review of the Tactical Warning/Attack Assessment System's Obsolescence Problems and Modernization Efforts.** At the request of the chairman, House Committee on Government Operations, GAO is evaluating the capabilities of the Tactical Warning/Attack Assessment System as well as the current efforts to modernize it. Several regions are performing joint reviews that focus on various aspects of the system, including (1) current technical capabilities, (2) upgrades to the space-based parts, (3) communications links among the system components, (4) upgrades to the ground-based parts, and (5) various specific systems and upgrades.

GAO staff members working on issues related to the militarization of space are faced with challenging and rewarding assignments. In many cases, they have been on the cutting edge of major events and developments, such as the planning for the "Star Wars" program, establishment of the Space Command, and controversy over the future use of the space shuttle. Early involvement has afforded GAO staff the opportunity to provide useful information that has contributed to the ongoing congressional and public debate over the military's future use of space.

The difficulties inherent in working with the military establishment on highly technical, mostly classified, programs present a

constant challenge to GAO staff members assigned to this area. Too, the fact that the issues and programs constitute highly visible, fast-moving concerns of national significance practically ensures that the work is interesting and exciting. For example, GAO staff members have observed a satellite launch and a space shuttle landing, toured the Cheyenne Mountain Complex in Colorado (a ground station where satellite data are analyzed and processed), and witnessed a laser demonstration at the Space Technology Center in New Mexico.

What the Future Holds

The United States' emphasis and reliance on space, particularly by the military, will continue to expand. Developments have shown that some military missions can only be performed from space, some can be performed better from space, and some can be performed more economically from space. For these reasons, the administration is supporting several significant initiatives to expand and improve the nation's space-related capabilities, including

- a new national space policy that establishes comprehensive civil and defense space programs,
- a joint DOD and National Aeronautics and Space Administration assessment of the need for new launch capabilities and related advanced technologies,
- upgraded and improved strategic C³I systems and links for the National Command Authorities, and
- continued development and testing of the "Star Wars" research and development program.

These initiatives, taken as a whole, carry expensive price tags, attract controversy, and have international implications. The "Star Wars" program alone could cost \$25 billion for research and technology demonstration through 1989, according to DOD estimates. Daily newspaper accounts frequently chronicle the cost concerns and possible repercussions of the nuclear arms race. GAO has already received requests from the Congress to evaluate aspects of the program.

Congressional interest probably will continue to grow, as will GAO's involvement, as issues evolve from and funding requirements increase related to the militarization of space.

However, cost and controversy are not the only factors that will influence GAO's work. Many questions exist about the effectiveness of DOD activities and efforts to improve DOD's space programs. In addition, revolutionary developments (e.g., the space station and a space plane) now hover on the horizon and could shape future U.S. space programs in many areas. All of these factors will influence how much and what kind of work GAO does in this area.

In 1984, GAO's "brain trust" on space issues laid out a plan that defined the work GAO should be doing in that area. The task was not easy, especially considering the broad spectrum of players, programs, and problems. However, a focus for GAO's work did emerge and important questions were developed.

The central issue facing the nation, particularly the Congress and DOD, is whether adequate plans are being developed for the military use of space and if these plans are being adequately implemented and coordinated. In addressing this issue, GAO will emphasize such major areas as investment strategies, planned C³I improvements, launch and spacecraft control capabilities, and ADP and communications resources. Because DOD has placed a high priority on improving C³I systems, GAO will expend considerable effort in evaluating those programs. The work will concentrate on the cost effectiveness of existing and planned C³I systems, the adequacy of efforts to improve C³I survivability and interoperability, and the effectiveness of efforts to develop electronic combat capabilities.

Whichever question is addressed in the military space issue area, the work offers unique opportunities for GAO staff. All of GAO's issue areas, whether health, environment, law enforcement, or information technology, offer complex problems, challenging responsibilities, and significant personal rewards. However, the development of outer space for national security carries a certain excitement beyond the usual issue area.

The sheer other-worldliness of this issue area, filled with concepts and gadgets that seem better suited to science fiction than a GAO audit, prompted one staff member to call it "*Star Trek* come to life." Grappling with the ultimate in technology fires one's imagination and analytical skills to a degree quite consistent with the serious implications of an issue area so obviously crucial to future survival.