

GAO Highlights

Highlights of [GAO-15-366](#), a report to the Committee on Armed Services, U.S. Senate

Why GAO Did This Study

SBIRS is a key part of DOD's missile warning and defense systems. To replace the first two satellites currently on orbit, the Air Force plans to build two more with the same design as previous satellites. The basic SBIRS design is years old and some of its technology has become obsolete. To address obsolescence issues in the next satellites, the program must replace old technologies with new ones, a process that may be referred to as technology insertion or refresh. A Senate Armed Services Committee report included a provision for GAO to review an Air Force assessment of the feasibility of inserting newer technologies into the planned replacement satellites, SBIRS GEO satellites 5 and 6, and how it intends to address technology insertion issues for future satellite systems.

This report examines (1) the extent to which the Air Force assessed the feasibility of inserting newer technologies into SBIRS GEO satellites 5 and 6 and (2) plans to address obsolescence issues and risk associated with technology insertion for future satellites or systems. GAO identified technology insertion planning guidance and practices, reviewed the Air Force's assessment and plans, and met with DOD and contractor offices.

What GAO Recommends

To improve technology planning, GAO recommends that the Secretary of the Air Force establish a plan as part of the SBIRS follow-on acquisition strategy that identifies obsolescence needs, specific potential technologies, and insertion points. DOD concurred with the recommendation.

View [GAO-15-366](#). For more information, contact Cristina T. Chaplain at (202) 512-4841 or chaplainc@gao.gov.

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SPACE ACQUISITIONS

Space Based Infrared System Could Benefit from Technology Insertion Planning

What GAO Found

The Air Force assessed options for replacing older technologies with newer ones—called technology insertion—in the Space Based Infrared System (SBIRS) geosynchronous earth orbit (GEO) satellites 5 and 6. However, the assessment was limited in the number of options it could practically consider because of timing and minimal early investment in technology planning. The Air Force assessed the feasibility and cost of inserting new digital infrared focal plane technology—used to provide surveillance, tracking, and targeting information for national missile defense and other missions—in place of the current analog focal plane, either with or without changing the related electronics. While technically feasible, neither option was deemed affordable or deliverable when needed. The Air Force estimated that inserting new focal plane technology would result in cost increases and schedule delays ranging from \$424 million and 23 months to \$859 million and 44 months. The assessment came too late to be useful for SBIRS GEO satellites 5 and 6. It occurred after the Air Force had approved the acquisition strategy and while negotiations were ongoing to procure production of the two satellites. According to the Air Force, implementing changes at that stage would require contract modifications and renegotiations and incur additional cost and schedule growth. Limited prior investment in technology development and planning for insertion also limited the number of feasible options for adding new technology into SBIRS GEO satellites 5 and 6. Department of Defense (DOD) acquisition policy and guidance indicate that such planning is important throughout a system's life cycle, and GAO has reported on leading commercial companies' practice of planning for technology insertion prior to the start of a program. Air Force officials said early technology insertion planning was hampered in part by development challenges, test failures, and technical issues with the satellites, which took priority over research and development efforts.

The current approach to technology insertion for the system or satellites after SBIRS GEO satellites 5 and 6 could leave the program with similar challenges in the future. GAO's work on best practices has found that leading companies conduct strategic planning before technology development begins to help identify needs and technologies. Similarly, the MITRE Corporation—a not-for-profit research and development organization—has highlighted the importance of technology planning to provide guidance for evolving and maturing technologies to address future mission needs. Technology insertion decisions for the future system or satellites are not guided by such planning. Instead, decisions are largely driven by the need to replace obsolete parts as issues arise. Current efforts—such as individual science and technology projects, including those in the Space Modernization Initiative—are limited by lack of direction, focusing on isolated technologies, and therefore are not set up to identify specific insertion points for a desired future system. In addition, the SBIRS program has had little time to develop and demonstrate new technologies that could be inserted into a SBIRS follow-on system. The Air Force is working to develop a technology road map for the next system, according to officials. Given the lack of a clear vision for the path forward and the road map's early development status, it is too soon to determine whether it will be able to identify specific technology and obsolescence needs and insertion points in time for the next system.