

Space-Based Infrared System (SBIRS)

Executive Summary

- The Air Force Operational Test and Evaluation Center (AFOTEC) conducted an Operational Utility Evaluation (OUE) of the Space-Based Infrared System (SBIRS) Effectivity 5 from September 27, 2012, through October 11, 2012. Testing included the SBIRS ground architecture, the first SBIRS satellite in geosynchronous orbit (GEO-1), two hosted infrared payloads in Highly Elliptical Orbit (HEO), and legacy Defense Support Program (DSP) assets. DOT&E published a classified test report in December 2012.
- Along with two Air Force Space Command (AFSPC) operational trial periods, the OUE informed Air Force operational acceptance of Effectivity 5 in May 2013, and the National Geospatial Intelligence Agency's acceptance of GEO-1 data for technical intelligence.
- SBIRS Effectivity 5 is operationally effective and suitable since the Air Force resolved an open deficiency identified in the December 2012 classified DOT&E report.

System

- The SBIRS program provides infrared sensing from space to support DoD and other user organizations. SBIRS will replace the legacy DSP ground station and satellites and improve upon DSP timeliness, accuracy, and detectable threats. The SBIRS program is being developed in two system increments.
 - Increment 1 uses the SBIRS Control Segment and User Segment, operating with DSP satellites, to provide current military capability. Initial Operational Capability for Increment 1 was attained December 18, 2001, consolidating the operations of the DSP and Attack and Launch Early Reporting to Theater missions.
 - Increment 2 includes a space segment consisting of two hosted payloads in HEO and four satellites in geosynchronous orbit. Increment 2 also provides new ground system software and hardware for consolidated data processing across all sensor families.
 - The contractor is delivering Increment 2 capabilities in phases, with both ground system software and on-orbit



assets, which require several dedicated test and evaluation activities. Two HEO payloads and two SBIRS GEO satellites are now on-orbit. Additional GEO satellites will continue to launch to complete the constellation over the next few years. Concurrently, the ground system replacement will proceed in blocks, completing in 2018.

Mission

The Joint Functional Component Command for Space, a component of U.S. Strategic Command (USSTRATCOM), employs SBIRS to provide reliable, unambiguous, timely, and accurate missile warning and missile defense information to the President of the United States, the Secretary of Defense, Unified Commanders, and other users, as well as to provide technical intelligence and battlespace awareness to those same users.

Major Contractors

- Lockheed Martin Space Systems – Sunnyvale, California
- Northrop Grumman Electronic Systems – Azusa, California
- Lockheed Martin Information Systems and Global Solutions – Denver, Colorado

Activity

- AFOTEC conducted a dedicated OUE from September 27, 2012, through October 11, 2012. AFOTEC conducted the testing in accordance with the DOT&E-approved Test and Evaluation Master Plan and test plan. The OUE was executed in conjunction with AFSPC's initial operational trial period. AFSPC conducted an additional trial period from April 15, 2013, through May 17, 2013.
 - AFOTEC tested Effectivity 5, which includes the SBIRS ground architecture, GEO-1, two hosted infrared payloads in HEO, and legacy DSP assets.
 - DOT&E published a classified OUE test report in December 2012. The report informed the Air Force decision to hold an additional trial period and the subsequent Air Force operational acceptance

of Effectivity 5 on May 17, 2013. The National Geospatial-Intelligence Agency also utilized the operational test results for its acceptance of GEO-1 data for technical intelligence on April 12, 2013. On August 23, 2013, USSTRATCOM certified the GEO-1 space and ground systems for Integrated Theater Warning/Attack Assessment.

- The Air Force successfully launched SBIRS GEO-2 on March 19, 2013, completed on-orbit check-out, tuning, and trial periods, and operationally accepted the satellite on November 25, 2013.
- An update to the Enterprise Test and Evaluation Master Plan is in coordination to address future testing of Increment 2. Finalizing this document has been contingent upon a ground architecture definition, a concept of operations, and operational requirements for each key SBIRS Increment 2 delivery.

Assessment

- SBIRS Effectivity 5 is operationally effective. Integration of GEO-1 into the operational constellation improved accuracy of both strategic and theater missile warning mission data and did not degrade overall mission performance. SBIRS also demonstrated improved performance against the missile defense mission. SBIRS support to the technical intelligence and battlespace awareness missions was functional and effective.
- There were no major problems observed during the integrated and operational test periods. The SBIRS enterprise system accomplished its strategic and theater missile warning missions, successfully detecting and reporting all missile events during both real-world and simulation scenarios during these test periods.

- The SBIRS GEO-1 scanning sensor payload is meeting accuracy and sensitivity requirements, based on developmental and integrated test activities. It is at least as capable as legacy DSP sensors, while providing detection over a given location twice as frequently. This increased revisit rate is operationally significant as it enables the ability to determine target missile type with higher confidence by providing more data points for analysis during the target missile's powered flight.
- SBIRS Effectivity 5 is operationally suitable since the Air Force resolved the open deficiency identified in the classified DOT&E OUE report. The Air Force continues to address problems identified during the OUE with the overall system, technical intelligence missions, and specific Information Assurance postures.
- The classified OUE test report includes more information on additional observations, detailed findings, and recommendations.

Recommendations

- Status of Previous Recommendations. Of nine previous recommendations contained in the FY12 Annual Report and the December 2012 classified DOT&E OUE report, the Air Force satisfactorily addressed one, is in the process of addressing five, and made insufficient progress with three. The Air Force should still:
 1. Clarify and revalidate the intended use case for SBIRS support to missile defense operations.
 2. Confirm user format requirements for intelligence products and develop SBIRS to deliver to that need.
 3. Verify that operational unit procedural changes have remedied configuration-related reliability concerns.
- FY13 Recommendations. None.