

Space-Based Infrared System (SBIRS) Effectivity 5

Executive Summary

- The Air Force Operational Test and Evaluation Center (AFOTEC) conducted an Operational Utility Evaluation (OUE) of the Space-Based Infrared System (SBIRS) from September 27 to October 11, 2012. The capability tested was Effectivity 5, which includes 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.
- The OUE will inform Air Force operational acceptance of Effectivity 5. U.S. Strategic Command will use operational test results for its Integrated Tactical Warning/Attack Assessment system certification. The National Geospatial-Intelligence Agency (NGA) will utilize operational test results for its certification of GEO-1 data for technical intelligence.
- SBIRS Effectivity 5 is operationally effective and will be operationally suitable upon resolution of an open deficiency identified in the classified DOT&E report.

System

The SBIRS program provides infrared sensing from space to support Department of Defense and other user organizations. The SBIRS program is being developed in two system increments to replace the DSP satellites:

- 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 in December 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 software and hardware to process data from both the DSP and the SBIRS space segment.
- Increment 2 capabilities are being delivered in phases, both with ground system software and on-orbit assets, and therefore require several dedicated test and evaluation activities. The

Activity

- AFOTEC conducted a dedicated OUE from September 27 through October 11, 2012. AFOTEC conducted the testing in accordance with the DOT&E-approved Test and Evaluation Master Plan (TEMP) and test plan. The OUE was executed in conjunction with Air Force Space Command's operational trial period. An initial period occurred from September 27 through November 27, 2012. An additional trial period is projected to



current phase tested, Effectivity 5, adds capabilities into the operational SBIRS system to support GEO-1, which was launched on May 7, 2011. New capabilities include GEO-1 command and control functions and use of GEO-1 scanner sensor data in mission processing and reporting functions.

Mission

Combatant Commanders, deployed U.S. military forces, and allies intend to use SBIRS to conduct missions that require improved space sensors and operational launch detection capabilities. Commanders will use SBIRS to enhance support to joint combat forces in four key areas:

- Timely and responsive space-based missile warning and detection
- Launch detection and characterization for missile defense operations
- Technical intelligence
- Battlespace awareness

Major Contractor

Lockheed Martin Space Systems – Sunnyvale, California

occur following resolution of a deficiency affecting suitability, which is discussed in the classified report.

- The capability tested was Effectivity 5, which includes the SBIRS ground architecture, GEO-1, two hosted infrared payloads in HEO, and legacy DSP assets.
- DOT&E published a final test report in December 2012. The report will inform Air Force operational acceptance

of Effectivity 5. U.S. Strategic Command will also use operational test results for its Integrated Tactical Warning/Attack Assessment system certification. NGA will utilize operational test results for its certification of GEO-1 data for technical intelligence.

- The Air Force successfully launched SBIRS GEO-1 on May 7, 2011, and conducted planned checkout and sensor tuning activities through May 2012 for the strategic and theater missile warning missions. Additional checkout activities are planned to continue throughout FY13, including testing and calibration of the staring sensor.
- DOT&E approved an updated Enterprise TEMP on March 7, 2012. Another update to the TEMP is in coordination for future testing of Increment 2. Finalizing this document is contingent upon a ground architecture definition, a concept of operations, and operational requirements for each key SBIRS Increment 2 delivery.
- AFOTEC and the SBIRS Program Office led an Integrated Test and Evaluation period between June and August 2012. The Air Force made modeling and simulation requirements a priority, working with the Program Office and contractor to ensure required capabilities were sustained and available for Integrated Test.

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 will be operationally suitable upon resolution of an open deficiency identified in the classified DOT&E OUE report. The Air Force is addressing problems identified during the OUE with the overall system, technical intelligence missions, and specific Information Assurance postures.
- The classified test report includes more information on additional observations, detailed findings, and recommendations

Recommendations

- Status of Previous Recommendations. The Air Force satisfactorily addressed previous recommendations from FY05, FY07, FY08, and FY09.
- FY12 Recommendations. The Air Force should
 1. Specify the ground architecture, concept of operations, and operational requirements for each key SBIRS Increment 2 delivery due to recent SBIRS restructuring to support a timely update of the TEMP.
 2. Address the eight recommendations identified in the December 2012 classified DOT&E OUE report.