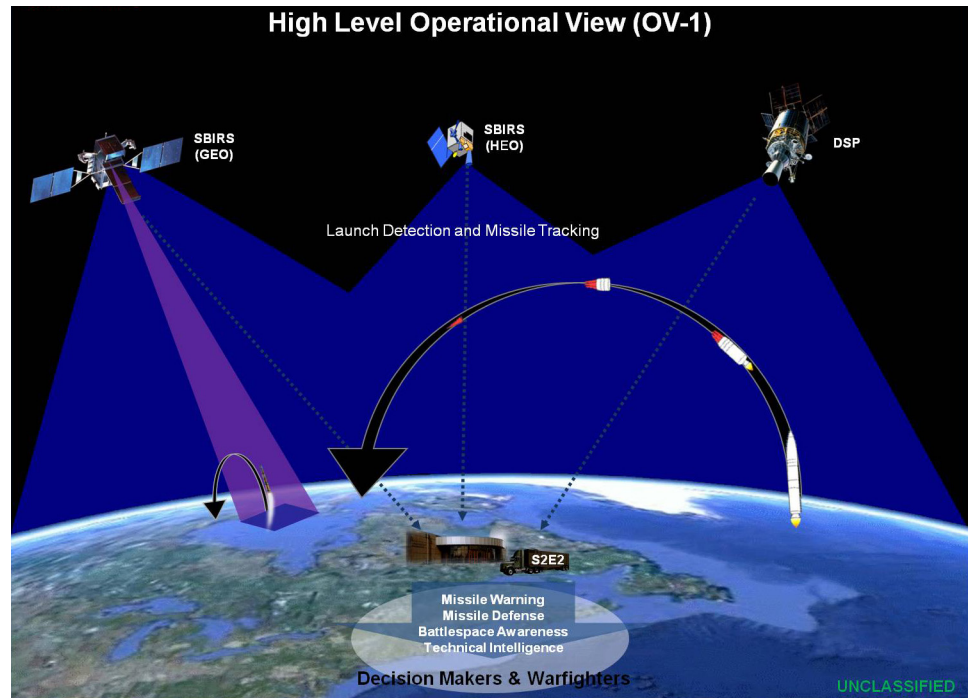


Space-Based Infrared System Program, High Component (SBIRS HIGH)

Executive Summary

- The Air Force Operational Test and Evaluation Center (AFOTEC) conducted an Operational Utility Evaluation (OUE) of the Space-Based Infrared System (SBIRS) Increment 2, Block 10 from June 12 through August 30, 2016, in accordance with a DOT&E-approved test plan. Testing focused on the SBIRS ground architecture, and included two SBIRS geosynchronous Earth orbit (GEO) satellites, two hosted infrared payloads in highly elliptical orbit (HEO), and legacy Defense Support Program (DSP) satellites.
- DOT&E sent classified memoranda regarding cybersecurity issues discovered in OT&E to Air Force leaders.
- DOT&E is planning to publish a classified report on the OUE to inform Air Force employment and follow-on development decisions.



System

- SBIRS is an integrated system of systems consisting of both survivable and non-survivable space and ground elements, designed to provide infrared sensing from space to support the DOD and other customers. SBIRS replaces or incorporates legacy DSP ground stations and satellites and is intended to improve upon DSP timeliness, accuracy, and threat detection sensitivity. SBIRS is being developed in two system increments.
 - Increment 1 used the SBIRS fixed-site ground Control Segment, operating with DSP satellites, to sustain legacy DSP military capability. The Air Force attained Initial Operational Capability for Increment 1 on December 18, 2001, consolidating the operations of the DSP and Attack and Launch Early Reporting to Theater systems.
 - At full capability delivery, Increment 2 will include a space segment consisting of two hosted payloads in HEO and four satellites in GEO, new Mission Control Station (MCS) fixed-site ground system software and hardware for consolidated data processing across all sensor families, and a new SBIRS Survivable Endurable Evolution (S2E2) mobile ground capability to replace the legacy Mobile Ground System (MGS). These Increment 2 capabilities are being delivered in multiple, discrete blocks, which each require dedicated test and evaluation.
 - SBIRS Increment 2, Block 10 has been delivered. Block 10 introduces new ground station software and

DSP - Defense Support Program
 GEO - Space Based Infrared System (SBIRS) Geosynchronous Earth Orbiting Satellite
 HEO - SBIRS Highly-Elliptical Orbit Payload
 S2E2 - SBIRS Survivable/Endurable Evolution Program

- hardware, enabling for the first time the integrated processing of DSP, GEO, and HEO sensor data at the MCS and MCS Backup (MCSB), and allowing the integration of GEO Starer sensor data.
- SBIRS Increment 2, Block 20 and S2E2 remain in development.
 - Block 20 is scheduled for delivery in late 2018, and is intended to further improve ground station software at the MCS and MCSB. The software is intended to enable optimized sensor data clutter and background suppression to detect dimmer targets, and auto-cueing of GEO Starer sensors to provide better threat tracking and impact point prediction accuracy.
 - S2E2 is scheduled for delivery in late 2019.
- The Air Force is currently operating two HEO payloads and two SBIRS GEO satellites on-orbit, and is preparing a third GEO satellite for launch. The Air Force will continue to launch additional GEO satellites to complete and sustain the SBIRS constellation over the next few years, and will use SBIRS Increment 2 to operate legacy DSP satellites until each is decommissioned, and to interoperate with MGS until S2E2 is delivered.

FY16 AIR FORCE PROGRAMS

Mission

The Joint Functional Component Command for Space, a component of U.S. Strategic Command, employs SBIRS to provide reliable, unambiguous, timely, and accurate missile warning and missile defense information, as well as technical intelligence and battlespace awareness to the President of the United States, the SECDEF, Combatant Commanders, and other 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 SBIRS Block 10 dedicated OUE from June 12 through August 30, 2016, at Buckley and Schriever AFBs, Colorado, in accordance with the DOT&E-approved Enterprise Test and Evaluation Master Plan (ETEMP) and OUE test plan. Preceding the OUE and with DOT&E approval, AFOTEC collected operationally relevant effectiveness and suitability data for its OUE evaluation during the integrated test and evaluation conducted by the contractor and Air Force Program Office from January 30 through May 17, 2016.
 - AFOTEC conducted the OUE concurrently with an AFSPC Trial Period of operational use, in parallel with continued operation of the legacy SBIRS ground system. The OUE included both observed real-world mission performance against actual events, and use of accredited high-fidelity simulations of satellite sensor data and playbacks of previously recorded events to represent real-world scenarios.
 - AFOTEC has prepared a classified OUE report.
- DOT&E is planning to publish a classified test report on the OUE to inform Air Force employment and follow-on development decisions.
- The Air Force is drafting an update to the ETEMP for coordination in early 2017, which must incorporate test design refinements for a design of experiments-based OT&E for SBIRS Increment 2, Block 20 and SBIRS S2E2, including adequate threat representation and cybersecurity measures to complete a SBIRS survivability evaluation.

Assessment

- DOT&E sent classified memoranda regarding SBIRS cybersecurity issues discovered in OT&E to the Commanders

of AFSPC, the Air Force Space and Missile Systems Center, and AFOTEC on May 19, 2016, and to the Secretary of the Air Force on June 27, 2016.

- DOT&E's classified OUE test report will include detailed effectiveness, suitability, and survivability assessments, as well as observations, detailed findings, and recommendations.

Recommendations

- Status of Previous Recommendations. The Air Force made significant progress on or satisfactorily addressed all nine previous recommendations contained in the FY12 Annual Report and the December 2012 classified DOT&E OUE report.
- FY16 Recommendations. The Air Force should:
 1. Fully resource dedicated cybersecurity personnel and tools to ensure active defense of SBIRS.
 2. Plan and execute Cooperative Vulnerability and Penetration Assessments (CVPAs) for cybersecurity in accordance with published DOT&E guidance. The Air Force should conduct the CVPAs with sufficient time prior to dedicated OT&E and the associated cybersecurity Adversarial Assessment to ensure the Air Force has the opportunity to correct or mitigate deficiencies identified during the CVPAs.
 3. Plan for adequate OT&E of SBIRS Block 20 and S2E2, including comprehensive threat representation and a thorough, rigorous design of experiments-based test design in accordance with published DOT&E guidance, to inform the operational acceptance and Full Operational Capability decisions for SBIRS Increment 2.