

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

### Executive Summary

- A September 2008 Acquisition Decision Memorandum (ADM) approved the Air Force's acquisition of a third and fourth Space-based Infrared System (SBIRS) Geostationary Earth Orbit (GEO) satellite, as well as sensor payloads for the third and fourth Highly Elliptical Orbit (HEO) systems.
- HEO-1 is undergoing operational testing, and is on schedule for message certification in 1QFY09. Early data indicate better than expected sensor performance; yet, overall system performance may be restricted initially by ground software limitations.
- The Air Force launched the HEO-2 payload in 2008, and it is undergoing early on-orbit testing. The test team intends to include HEO-2 in the current operational test plan with HEO-1.
- The ground architecture and operational requirements for subsequent HEO and GEO deliveries, including mobile survivable and endurable elements, need further definition.

### System

The SBIRS program is being developed to replace the Defense Support Program (DSP) satellites and 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 in December 2001, consolidating the operations of the DSP and Attack and Launch Early Reporting to Theater missions.
- Increment 2 will include a space segment consisting of two hosted payloads in HEO and four satellites in GEO. Currently, only the two HEO payloads have been launched. Increment 2 also provides new software and hardware to process data from both the DSP and the SBIRS space segment.

### Activity

- A September 2008 ADM approved the Air Force's acquisition of a third and fourth SBIRS GEO satellite and sensor payloads for the third and fourth HEO systems. HEO-1 and the ground segment are currently undergoing an Operational Utility Evaluation (OUE) and U.S. Strategic Command expects certification of messages from fused DSP and HEO-1 data in late 2008. The OUE Report is due in 3QFY09.
- The Air Force launched the HEO-2 payload in 2008. It is currently undergoing early on-orbit testing and will be transferred to operations in 2QFY09. The Air Force



### 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 for missile defense operations
  - Technical intelligence
  - Battlespace awareness

### Prime Contractor

- Lockheed Martin

- Operational Test and Evaluation Center (AFOTEC) is planning to include HEO-2 in the current operational test plan with HEO-1. AFOTEC's aggressive integrated test and reporting efforts combined to accelerate operational acceptance and fielding of HEO-1 by approximately six weeks.
- Deficiencies in the GEO Flight Software Subsystem (FSS) were identified during GEO-1 developmental testing and required redesign to meet spacecraft control and telemetry functionality. The redesigned FSS is currently undergoing test. GEO-1 has a projected launch date of December 2009.

# AIR FORCE PROGRAMS

- Progress continues toward development of modeling and simulation software required to support SBIRS operational testing.

## Assessment

- The SBIRS Increment 1 system, operating with the current DSP satellites, continues to demonstrate improved performance over the legacy DSP system.
- Early data from HEO-1 operational testing indicates good sensor sensitivity and acceptable end-to-end performance, but overall system performance appears to be limited by the capabilities of the current ground software. Individual measures are yet to be analyzed and reported.
- The ground architecture and operational requirements for subsequent Increment 2 deliveries need better definition to support development of an integrated test strategy that can meet the program schedule and mission needs. Specifically, the ground architecture for full HEO and GEO message processing, and the survivable and endurable mobile elements, lack sufficient definition.
- The Program Office is pursuing an initiative to accelerate the schedule from launch to testing and operations for the GEO-1 satellite. DOT&E supports testing at the earliest

opportunity; however, a GEO operational test strategy and Test and Evaluation Master Plan (TEMP) need to be developed. Testing must include a combination of live targets and validated scenarios that include operationally-representative earth backgrounds.

- Compressed schedules for accredited SBIRS operational test scenarios and simulations increase program risk.

## Recommendations

- Status of Previous Recommendations. The Air Force continues to make progress on the FY05 DOT&E recommendations, yet two of the original four recommendations remain valid as the Air Force continues to refine Concepts of Operation and operational requirements for each SBIRS increment. Both FY07 recommendations also remain valid.
- FY08 Recommendations.
  1. The Air Force should specify the ground architecture and operational requirements for each key SBIRS Increment 2 delivery.
  2. The Air Force should begin GEO TEMP development, and identify operational scenario needs early in order to provide sufficient development time with minimal risk.