

## Global Broadcast Service (GBS)

The Global Broadcast Service (GBS) will augment and interface with other communications systems and provide a continuous, high-speed, one-way flow of high-volume data, audio, imagery, and video information streams at multiple classification levels to deployed and garrisoned forces across the globe. GBS consists of a space segment, fixed and transportable transmit suites, and fixed and transportable receive suites. The space segment of the current phase of GBS consists of four GBS transponders on each of three Ultra High Frequency Follow-On (UFO) satellites and leased commercial satellite transponders as required to meet demand.

GBS acquisition Phase I, conducted from FY96 to FY98, was used to develop the user requirements and concepts of operations. GBS Phase II, scheduled for completion in FY06, will develop near-worldwide GBS core operational capability and further refine operational requirements and employment concepts. GBS Phase III, scheduled to begin in FY06, is being addressed as part of the Transformational Communications Military Satellite Communications (TCM) program.

Technical problems and subsequent program delays led to a Joint Requirements Oversight Council decision to defer a small subset of capabilities, field the system with non-deferred capabilities, and then incrementally field upgrades until all the Operational Requirements Document (ORD) thresholds are met.

Three rounds of combined developmental test/operational test (DT/OT) were conducted between January 2001 and December 2002 at contractor and government developmental facilities on the East Coast, and in the Pacific Theater at operational locations. DT/OT #3 performed in November 2002 consisted of three major activities: Navy DT and an operational assessment (OA) of Shipboard Receive Suites (SRS) and Subsurface Receive Suites (SSRS); Air Force-led joint testing of fixed and transportable receive suites; and Army DT and an OA of the Theater Injection Point (TIP). Results indicated that the system would be ready for the multi-Service operational test and evaluation (MOT&E).

In late 2002, the GBS program was directed to shift their architecture from commercial Asynchronous Transfer Mode (ATM) equipment, with customized government application software, to an Internet Protocol (IP)-based approach. Production representative IP suites will be available for initial testing by the Services before the end of 2003.

The shift to IP occurs, however, as the Services are gearing up for their production buys starting in 2004. The Combined Test Force is working with the Program Office to support an aggressive combined DT/OT program leading up to a MOT&E in 2005, in time to support a 2005 beyond low-rate initial production acquisition decision. Because of the aggressive schedule, the MOT&E will not be able to test all terminal types and demonstrate all the deferred ORD capabilities. Therefore, a second MOT&E is projected for the beginning of 2006 to support the Initial Operational Capability (IOC) 2/IOC 3 declaration.

### TEST & EVALUATION ACTIVITY

DT/OT with the TIP took place in three phases:

- Ku-band testing (May 6-17, 2002)
- Logistics Maintainability Demonstration (May 20-22, 2002)
- Ka-band testing (June 10-21, 2002)

The Air Force Operational Test and Evaluation Center (AFOTEC) and the 46<sup>th</sup> Test Squadron conducted the third round of DT/OT and pre-certification testing of the ATM-based GBS near the end of 2002.



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# AIR FORCE PROGRAMS

MOT&E was postponed until FY05 due to ATM-based system limitations and GBS architecture transition to IP.

Operational test of the Navy SRS was conducted by the Operational Test and Evaluation Force in late 2003.

The Program Office and test community rewrote the Test and Evaluation Master Plan to reflect the IP-based strategy and it is currently in the signature process.

## TEST & EVALUATION ASSESSMENT

Pre-certification testing indicated that most of the ATM-based system was ready to enter MOT&E. However, there were still a number of effectiveness and suitability issues with both the TIP and SRS. Given the limitations on the TIP and SRS, along with the projected phase-out of the ATM equipment, DOT&E supported an AFOTEC recommendation to defer the MOT&E for the IP-based system. AFOTEC wrote an OA using the pre-certification test data to support the declaring IOC 1 declaration. The Air Force Space Command has delayed declaring IOC 1, originally scheduled for September 2003. The incremental combined DT/OT strategy has worked in concert with the incremental fielding and evolutionary release of software builds to effectively bring the system to its present condition.

**Broadcast software and overall system performance.** The most recent testing indicates that product reception rates were 96 percent for unclassified data, 93 percent for classified data, and 100 percent for video products – both classified and unclassified. Spot beam control was successful for 100 percent of the requested moves within an average of six minutes. Some problems still exist with dynamic tuning and the loss of permanent virtual circuits with cryptography equipment. In addition, dynamic bandwidth allocation will not be possible until implementation of the IP architecture. Overall, reliability, availability, and maintainability are good.

**Navy Receive Suites.** The Navy 2002 OA determined that the SRS and SSRS are potentially effective and suitable. Product reception rates for the SRS were 77 percent for unclassified products and 82 percent for classified products, below the ORD threshold of 90 percent. Results from the Navy OT during August – September 2003 are still pending. Antenna blockage due to superstructure and other antennas is a Navy-unique problem. When a ship holds a course for a lengthy period such as during flight operations, this could pose a serious operational problem.

**Theater Injection Point.** TIP test results are fair, with an overall product reception rate of 44 percent for unclassified data and 28 percent for classified data. Generally, testing went well with the Ku-band broadcast, but significant problems occurred during the Ka-band broadcast. Hardware issues persist and there is no trained crew capable of operating the TIP without extensive support from a Raytheon contractor. Due to these deficiencies, the Joint Forces Command stated the TIP should not be deployed until corrective actions are implemented. Receive sites also lack adequate operating procedures with respect to reception of the TIP broadcast.

**Other Considerations.** AFOTEC found that the GBS system is in good condition with respect to interoperability and information assurance, but identified the following concerns of particular note:

- **Slow connectivity and large data products.** The GBS system delivers data to the Receive Suites at a rate of up to 23.5 megabits per second. In forward locations, the local area tactical networks are not always capable of disseminating this information rapidly enough to the end users.
- **Beam Movements.** Current operational security procedures call for three different beam movements to support a single submarine reception – two fictitious locations and one true location, so as not to compromise submarine locations. Since GBS operations support multiple submarines in theater and there is up to ten-minute programming delay in conjunction with each beam move, this could eventually result in a significant loss in broadcast time.