Wideband Gapfiller Satellite (WGS)

The Wideband Gapfiller Satellite (WGS) communications system will provide communications to the U.S. warfighters, allies, and coalition partners during all levels of conflict short of nuclear war. It is the next generation wideband component in the DoD's future Military Satellite Communications (MILSATCOM) architecture.

WGS will satisfy military communications needs by providing communications in both the X-band and military Ka-band frequencies. It will combine capabilities onto a single satellite for tactical X-band communications, augment the Global Broadcast Service (GBS) Phase II system, and provide new two-way Ka-band services. The Air Force is introducing this new service to alleviate the spectrum saturation of X-band, and it should greatly increase both the available single-user data rate and total satellite capacity over today's Defense Satellite Communications System (DSCS) III satellites.

The WGS consists of two segments. The Air Force is acquiring the satellite segment under the Federal Acquisition Regulation Part 12 rules for commercial item acquisition. First launch is projected for 2QFY05 with the second and third launches following at approximately six-month intervals. The Army is acquiring the ground control segment and the MILSATCOM Joint Program Office is integrating the WGS and GBS space and ground segments.

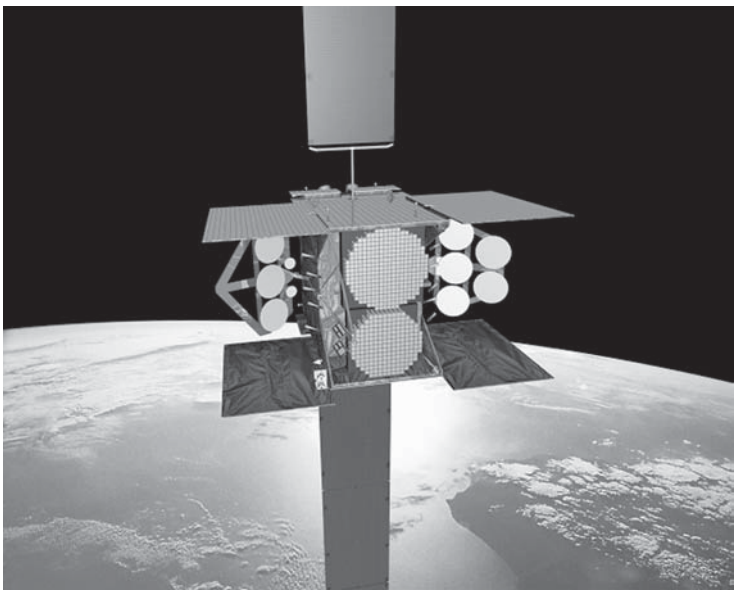
The 2001 Defense Appropriations Act, signed on August 9, 2000, limited funding to two satellites. Subsequently, the Office of the Secretary of Defense issued a Program Decision Memorandum on August 22, 2000, supplementing WGS funding by $272.9M to ensure funding of the complete constellation of three satellites. In December 2003, the OSD directed the acquisition of two additional WGS satellites. The Program Office projects launch of Satellites 4 and 5 in FY09 and FY10, respectively.

The 2001 WGS early operational assessment (EOA) highlighted risk areas posed by complexity of X-band and Ka-band satellite cross-banding; and interoperability and compatibility requirements during the concurrent development of the Gapfiller Satellite Configuration Control Element and the automation upgrades of the Satellite Operations Center and DSCS Operations Center (DSCSOC) networks.

WGS and the Global Broadcast Service (GBS) must also be interoperable and compatible. GBS will structure broadcasts and control the payloads on the ultra-high frequency follow-on satellites. Modified DSCSOCs will control WGS payloads (at X-band and Ka-band), currently only capable of controlling X-band payloads. Interoperability between these two systems must be synergistic and not compete to ensure high-speed access for broadcast users.

The test results and analysis presented at the Critical Design Review (CDR) indicate the design is progressing with no major problems. In addition to the risk areas identified during the EOA, the CDR identified frequency reuse, satellite orbital placement, and launch service availability as additional risk areas.

WGS is projected to provide added capacity using the same bandwidths presently allocated to DSCS and GBS. The added capacity comes through same-frequency reuse over geographically separated beams. This requires a Concept of Operations to ensure that beam allocations for concentrated troop positions do not cause overlap of beams on the same frequency. It also requires that the WGS and



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DSCS satellites be separated sufficiently in their orbits so that the least capable X-band antenna can discriminate between the two satellites.

The Program Office plan for WGS satellite launch is to integrate them on both Delta and Atlas Evolved Expendable Launch Vehicles (EELVs). The first launch will be on Delta and the second on Atlas. Boeing added extra solar panels to their original design, which added weight and changed the class of EELV. The availability of the launch vehicle and an aggressive integration schedule, less than the normal 24 months, are sources of schedule risk.

TEST & EVALUATION ACTIVITY

Test and evaluation planning continued in FY03 for the WGS system.

- The Test and Evaluation Master Plan was updated after the CDR and was approved by DOT&E on March 3, 2003.
- The Air Force Operational Test and Evaluation Center (AFOTEC) completed an EOA of the WGS system September 2000 in support of a combined Milestone II/III review.
- AFOTEC performed an operational assessment based primarily on the CDR data package and briefed DOT&E on May 21, 2003.
- Government developmental and operational test members started observing contractor developmental testing and inter-segment testing in FY03.

TEST & EVALUATION ASSESSMENT

The operational assessment conducted in May 2003 highlighted the following issues:

- Link availability at a five-degree elevation angle is slightly lower than the 99.5 percent Operational Requirements Document requisite, but users say this can be managed through power level management and, therefore, will not be a problem.
- Ka-band reach-back into the Defense Information Systems Network will not be available until this capability is fielded in the DoD Teleports in 2006.
- The new satellite increases operator workload. The Air Force has allocated additional manning, but the Army has not. This will limit system effectiveness until Army staffing issues are resolved.