

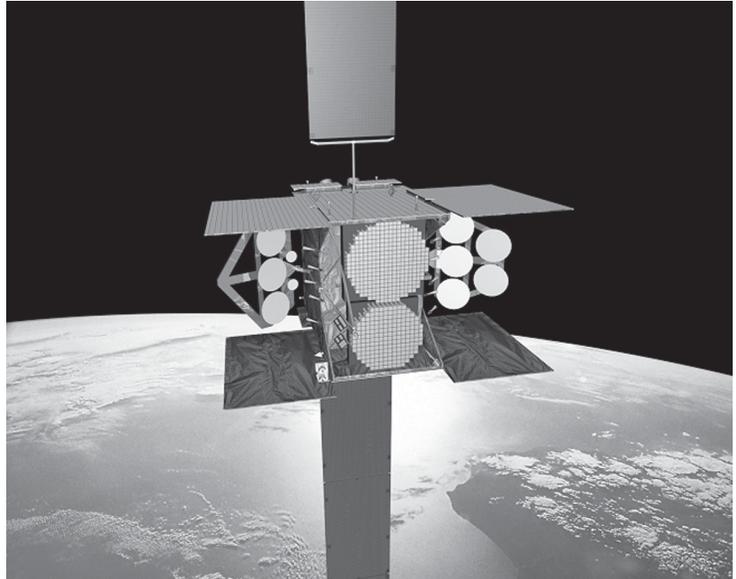
## Wideband Gapfiller Satellite (WGS)

### SUMMARY

- The system test planning process continues through the Air Force Operational Test and Evaluation Center and Army-sponsored working groups.
- The test “insight” process following a commercial approach is not currently yielding adequate test information 15 months prior to launch of the first satellite.
- Areas of continued interest include platform and payload control, evaluation of satellite capacity, and anti-jam survivability.

### SYSTEM DESCRIPTION AND MISSION

The Wideband Gapfiller Satellite (WGS) system will provide communications to 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 architecture.



*The test results and analysis presented at the Critical Design Review indicate the design is progressing with no major problems.*

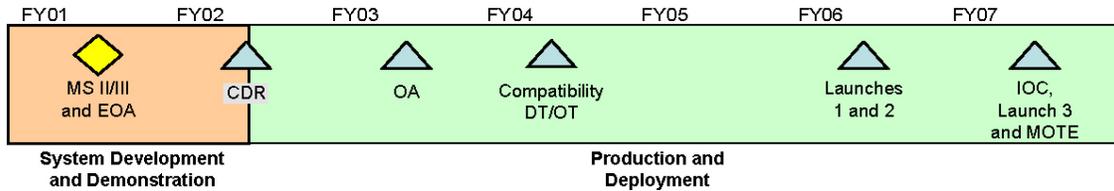
WGS will satisfy military needs by providing communications in both the X-band and military Ka-band frequencies. It will combine capabilities onto a single satellite for tactical X-band communications, augment the Global Broadcast Service (GBS) Phase II system, and provide new two-way Ka-band services. 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 2QFY06 with the second and third launches following at approximately six-month intervals. The Army is acquiring the ground control segment, and the Military Satellite Communications 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 (OSD) 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, OSD directed the acquisition of two additional WGS satellites. The System Program Office projects launch of Satellites 4 and 5 in FY09 and FY10, respectively.

The Program Office plan for WGS satellite launch is to integrate them on both Delta and Atlas Evolved Expendable Launch Vehicles. 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 the Evolved Expendable Launch Vehicle. The availability of the launch vehicle and an aggressive integration schedule, less than the normal 24 months, are sources of schedule risk.

# AIR FORCE PROGRAMS

## TEST AND EVALUATION ACTIVITY



Test and evaluation planning continued in FY04 for the WGS system. The Air Force Operational Test and Evaluation Center completed an early operational assessment of the WGS system in September 2000 to support a combined Milestone II/III review. The Air Force Operational Test and Evaluation Center performed an operational assessment based primarily on the Critical Design Review data package and briefed DOT&E in May 2003. Government developmental and operational test members started observing contractor developmental testing and inter-segment testing in FY03. Following the Federal Acquisition Regulation Part 12 commercial model, government testing has been limited to “insight” of the contractor test process. To date, DOT&E has received very limited feedback from that insight process.

## TEST AND EVALUATION ASSESSMENT

The 2000 WGS early operational assessment 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 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 indicate the design is progressing with no major problems. In addition to the risk areas identified during the early operational assessment, the Critical Design Review identified frequency reuse, satellite orbital placement, and launch service availability as additional risk areas.

WGS should 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 more detailed 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 the DSCS satellite be separated sufficiently in their orbits so that the less capable X-band antenna can discriminate between the two satellites.