

Advanced Extremely High Frequency (AEHF) Satellite Communications System

The Advanced Extremely High Frequency (AEHF) satellite communications system is designed to provide secure, survivable communications to the U.S. warfighters during all levels of conflict. It will follow Milstar as the protected backbone of DoD's Military Satellite Communications architecture.

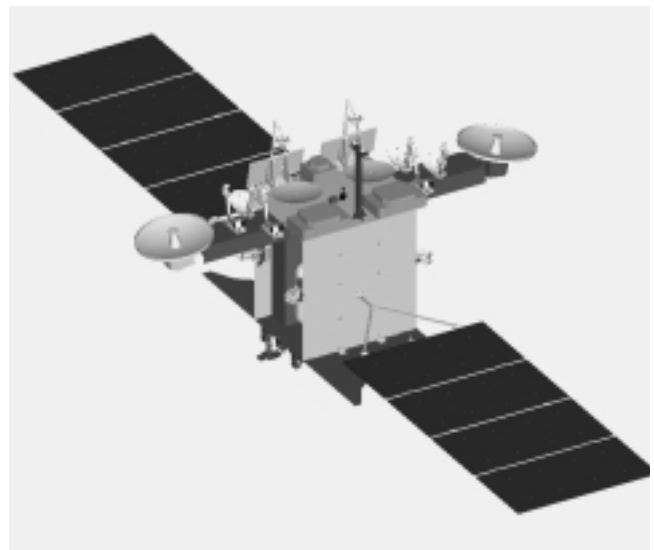
In lieu of an additional Milstar satellite to replace Flight 3 (which placed the satellite in a nonoperational orbit), the first flight of the AEHF satellite program, named Pathfinder, will be programmed to operate initially as a Milstar II satellite. The second flight will then be launched as a fully capable AEHF satellite. After it is operational, Pathfinder will be reprogrammed on-orbit as an AEHF satellite.

The first three program phases, AEHF Technology, Engineering Models, and System Definition, have been completed. At Milestone B, the Defense Acquisition Board authorized fabrication and assembly of the first two satellites (SV1, SV2), development and deployment of the ground command and control segment, and advanced procurement for three additional satellites (SV3, SV4, SV5) within the Future Years Defense Program. A separate tailored Milestone C was anticipated, following completion of the system-level Critical Design Review, to provide final authorization for production of SV3, SV4, and SV5. The first launch is scheduled for 1QFY07 and the second launch for 1QFY08.

The approved Milestone B acquisition strategy, had provided for a three-year delay before the third launch, but on December 28, 2001, the Deputy Secretary of Defense issued guidance to accelerate procurement of SV3 from FY06-FY07 to FY03-FY04. The guidance also directed a comprehensive study to look at alternate architectures. The Transformational Communications Study is addressing alternative approaches to satisfy the AEHF full operational capability. It is anticipated that the study will either recommend going back to a five satellite AEHF program or a three satellite AEHF program with a new start representing a revised architecture.

TEST & EVALUATION ACTIVITY

- The Air Force Operational Test and Evaluation Center (AFOTEC) performed an Early Operational Assessment (EOA) and Operational Impact Assessment (OIA) in support of the Milestone B decision in 4QFY01.
- An Operational Assessment will look at the results of the Developmental Test/Operational Test performed on the Pathfinder satellite to verify its full capability to function as a Milstar II Low Data Rate/Medium Data Rate satellite.
- Multi-Service Operational Test and Evaluation (MOT&E) will evaluate whether the entire system, including equipment, personnel, procedures, training, and logistics support, is effective and suitable based on the operational requirements.
 - The test will exercise satellite-to-satellite cross-links to evaluate theater-to-theater communications, network control, satellite control, and interoperability.



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AIR FORCE PROGRAMS

TEST & EVALUATION ASSESSMENT

The AFOTEC performed an EOA and OIA based on results of the engineering model tests, the contractor system design review presentation, modeling and simulation, and a review of program documents. Satisfactory progress is being made on the four major technology risk areas: nuclear hardening and shielding, performance of the nuller spot beam, performance of the phased array antenna, and electric propulsion. The contractor should minimize the use of turbo coding because of its susceptibility to nuclear fading.

The lack of terminal synchronization is both a void in the program and a risk to successful MOT&E. The following risks to the test program were identified: pressure to reduce the minimum developmental testing as defined in the Test and Evaluation Master Plan, insufficient software testing, the need for a payload simulator that is common for all the terminal development programs, and availability of Pathfinder for MOT&E after it has become an operational asset. It is imperative to monitor the fidelity of the AUST-T terminal simulator and the payload simulators. If their configurations do not remain standardized and consistent with the true payload, the new terminals will not be compatible with the payload or with each other.

In addition to those items identified by the AFOTEC, the program office has identified a high program risk associated with the development of the cryptographic capability to support the AEHF data rate. This includes the manufacture of a highly complex Application Specific Integrated Circuit (ASIC). To reduce the probability of a first-pass manufacturing failure of this ASIC, the foundry process is being exercised initially with a test chip that represents 90 percent of the final ASIC design.