

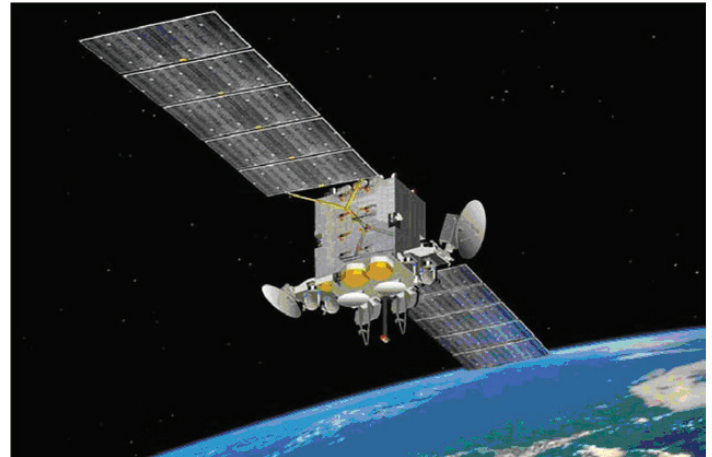
Advanced Extremely High Frequency (AEHF) Satellite Communications System

Executive Summary

- Advanced Extremely High Frequency (AEHF) satellites 1 and 2 are on orbit. The Air Force launched AEHF satellite 3 on September 18, 2013. The Air Force anticipates the satellite will reach its initial orbital position by January 2014.
- Air Force Space Command accepted the Mission Control Segment (MCS) Increment 5 for operational use as the Milstar and AEHF ground segment on August 1, 2013.
- MCS Increment 5 provides a capability that is an improvement over the previous MCS Increment 4. MCS Increment 5 can support Low Data Rate and Medium Data Rate communications over a combined constellation of Milstar and AEHF satellites. MCS Increment 5 can support Extended Data Rate (XDR) for command and control and limited XDR tactical communications support.
- DOT&E requires a robust Multi-Service Operational Test and Evaluation (MOT&E) planned for 2014 to verify that the AEHF system provides the Initial Operational Capability required by the strategic and tactical users.

System

- The AEHF system represents the second generation of Extremely High Frequency Satellite Communications capability protected from nuclear effects and jamming activities.
- The AEHF system will follow the Milstar program as the protected backbone of the DoD's integrated military satellite communications architecture. AEHF is expected to increase system throughput capacity by a factor of 10.
- The overall AEHF system has three segments:
 - Space segment – comprised of an integrated constellation of Milstar and AEHF satellites
 - Mission Control segment – includes fixed and mobile telemetry, tracking, and commanding sites; fixed and transportable communication planning elements; the Test



- and Training Simulation Element; and the Operational Support and Sustainment Element
- Terminal (or User) segment – includes ground-fixed, ground-mobile, man-portable, transportable, airborne, submarine, and shipboard configurations
- The AEHF Operational Requirements Document, dated October 2, 2000, defines the operational AEHF constellation as four interconnected satellites.

Mission

Combatant Commanders and operational forces worldwide will use the AEHF system to provide secure, responsive, and survivable space-based, strategic, and tactical military communications.

Major Contractors

- Lockheed Martin Space Systems – Sunnyvale, California
- Northrop Grumman – Redondo Beach, California

Activity

- The Air Force Operational Test and Evaluation Center (AFOTEC) conducted an Operational Utility Evaluation of the MCS Increment 5 with an integrated test period from September 24, 2012, through November 16, 2012, and a dedicated test period from February 19, 2013, through April 5, 2013.
- The Air Force launched AEHF satellite 3 on September 18, 2013. Orbit-raising is progressing as anticipated and the satellite is expected to reach its initial orbit in January 2014.
- Air Force Space Command accepted the MCS Increment 5 for operational use as the Milstar and AEHF ground segment on August 1, 2013, replacing the MCS Increment 4 as the system of record.
- AFOTEC has successfully demonstrated pre-test execution events to support the test of AEHF anti-jamming capability during preparations for the 2014 MOT&E.
- AFOTEC and the Arnold Engineering Center have successfully conducted pre-test activities that demonstrated

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their ability to conduct scintillation testing in preparation for the 2014 MOT&E. Scintillation is a rapid fluctuation in radio wave signals that can result from atmospheric effects or from a nuclear detonation.

- AFOTEC conducted all testing in accordance with a DOT&E-approved Test and Evaluation Master Plan and test plan.

Assessment

- AFOTEC's Operational Utility Evaluation of MCS Increment 5 was limited in scope because the Air Force has not deployed the full AEHF MCS capability; therefore, DOT&E cannot provide conclusions about operational effectiveness and suitability. DOT&E requires a robust MOT&E, planned for 2014, to verify that the AEHF system is operationally effective and suitable and provides the Initial Operational Capability required by the strategic and tactical users.
- The AEHF MCS Increment 5 provides a capability that is an improvement over the previous MCS Increment 4. MCS Increment 5 can support Low Data Rate and Medium Data

Rate communications over a combined constellation of Milstar and AEHF satellites. MCS Increment 5 can support XDR for command and control and limited XDR tactical communications support.

- The AEHF MCS Increment 5 can command and control the constellation in a timely and accurate manner. Increment 5 met the system requirements for communication management: five of six requirements for timeliness and three of six requirements for accuracy in communications planning.
- The MCS Increment 5 demonstrated a significantly improved Information Assurance posture relative to the previous MCS Increment 4.
- The MCS Increment 5 demonstrated improved reliability, dependability, and maintainability relative to the previous MCS Increment 4.

Recommendations

- Status of Previous Recommendations. The Air Force has made satisfactory progress on all previous recommendations.
- FY13 Recommendations. None