

## Milstar Satellite System

The Milstar satellite system supports strategic and tactical missions through global communications that are secure, jam-resistant, survivable, and have a low probability of intercept. Milstar provides worldwide coverage for multi-Service ground, airborne, submarine, and ship-borne terminal communications connectivity. There are three Milstar segments: space, terminal, and mission control.

The Air Force has launched six Milstar satellites between 1994 and 2003. The third Milstar launch placed the first low-data rate/medium-data rate (LDR/MDR) satellite (Flight 3) in a non-operational orbit. In lieu of an additional Milstar satellite to replace Flight 3, the Air Force Space Command (AFSPC) and the United States Strategic Command elected to wait for the first flight of the Advanced Extremely High Frequency (AEHF) satellite program (Pathfinder), currently scheduled for launch in December 2006.

AFSPC declared Initial Operational Capability (IOC)-1 for Milstar on July 21, 1997. The Milstar LDR system currently supports IOC-1 missions. Multi-Service operational test and evaluation (MOT&E) of the LDR/MDR satellites began in late FY01. The program office, the user community, and the operational test community are working toward an IOC-2 decision in December 2003. AFSPC is considering whether to declare IOC-2 in December 2003 despite the fact the communications resource planning and monitoring software will not have completed testing.

The Air Force Operational Test and Evaluation Center (AFOTEC), the lead operational test agency for the Milstar program, completed LDR IOT&E in March 1997. The Milstar IOT&E Final Report (August 1998) stated that the Milstar LDR system was effective and suitable with limitations. DOT&E and AFSPC directed AFOTEC to retest six measures of performance (MOPs). Of these, AFOTEC retested three connectivity MOPs during the period of September 1999 to February 2000. AFOTEC also conducted tests from June 2000 to May 2001 to re-evaluate two suitability MOPs. The final MOP, system endurance, has not yet been tested and is discussed in more detail below.

### TEST & EVALUATION ACTIVITY

Most of the test activity this year involved developmental and combined developmental/operational testing of the mission planning element and Flight 6.

The Automated Communications Management System (ACMS) continued a series of test events to show that the mission planning element meets IOC-2 requirements to support MOT&E and a fielding decision. However, deficiencies discovered during testing have required additional software releases, with the next release planned for December 2003. Testing is currently scheduled to continue through March 2004, after the IOC-2 decision.

Flight 6 on-orbit tests focused on regression tests of Flight 5 issues: completion of the Milstar “ring” constellation, performance of multi-satellite MDR communications, inter-satellite timing resolution, and evolving ACMS capabilities.

### TEST & EVALUATION ASSESSMENT

The Milstar Space Segment, as currently fielded with LDR and MDR capability, continues to perform well. Ongoing on-orbit testing and operational use of the LDR/MDR



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satellites indicate that the space segment is performing as expected. Formal assessment of MDR operational effectiveness and suitability will be made after the completion of MOT&E.

The loss of Flight 3 degrades operational utility. Worldwide coverage from 65 degrees South to 65 degrees North latitude will not be available for the Milstar MDR terminals until the launch of the AEHF Pathfinder satellite in FY07. The lack of a fourth MDR satellite will limit the ability to provide two-satellite coverage to some contingency operations and, therefore, limit the throughput of protected communications. Another impact of the loss of Flight 3 is that approximately 25 degrees of longitude will have no MDR coverage (based on current plan for satellite placement).

The Milstar Terminal Segment has mixed results. The Navy's LDR terminals have been successfully fielded for five years, while its MDR-capable version is currently experiencing reliability problems. The Air Force airborne terminal demonstrated the required reliability and maintainability. The Army ground terminals demonstrated reliability and maintainability shortfalls. The Army Test and Evaluation Command assessment of these shortfalls did not result in a critical mission impact based on current employment plans. Further discussion of the Navy's Extremely High Frequency Satellite Program terminals is provided separately in this annual report.

The LDR Mission Control Segment performed its mission successfully. During LDR IOT&E, however, the mobile constellation control station's endurance capability was not tested adequately. DOT&E directed a full test of the endurance requirement during follow-on testing. AFOTEC is working toward conducting the endurance retest in 2QFY04 and has identified their requirements to the United States Strategic Command to plan an appropriate test event.

Delays in development of ACMS are of concern. Because of the existing shortfalls of ACMS, the Army and Navy fielded their terminals with interim planning software (the Milstar Communications Planning Tool – integrated (MCPT-i)) as their primary planning tool, and do not plan to use ACMS. The Army has not yet tested nuller visibility, and interoperability between ACMS and MCPT-i should be verified.

There is currently no concept of operations for the Joint Task Force mission. Testing of the Joint Task Force mission is critical to evaluate interoperability of the Milstar system and terminals in an operational context. Some interoperability demonstrations have been conducted during developmental testing, including the Joint Interoperability Test Command MDR interoperability test. Informal results from these tests show coding, encryption, and modulation equipment incompatibility issues between Army and Navy terminals. Until the concept of operations is specified, it is not known if the limited equipment used in these tests is operationally representative.