Navy Multiband Terminal (NMT)

Executive Summary
- DOT&E completed an Early Fielding Report in April 2011. The Navy deployed an operational Navy Multiband Terminal (NMT) on the USS *Roosevelt* (DDG 80) prior to IOT&E.
- The Navy completed integrated testing in June 2011 and operational testing in August 2011 to inform the full-rate production decision.
- Preliminary tests results indicate that the NMT is capable of providing multi-band satellite communications, but is not reliable.

System
- The NMT system is the next-generation maritime military satellite communications terminal for the Navy and its coalition partners; it is used for enhancing protected and survivable satellite communications.
- The NMT is interoperable with the legacy service satellite communications terminals, including the Follow-on Terminal and Navy Extremely High Frequency (EHF) Satellite Program.
- The NMT has variants for surface ships, submarines, and shore sites. The NMT system variants have two major component groups: the Communications Group and the Antenna Group.
- The Communications Group includes the following:
    - Operator User Interface
    - Power Distribution Unit
    - Keyboard
    - EHF and Wideband drawers
    - Prime Power Interface
- The Antenna Group varies across different platforms and includes new, reused, and modified antennas to support the required Q-, Ka-, and X-band with Global Broadcasting System.
- The key features of the NMT system are:
    - Open system architecture
    - Full compatibility with legacy terminal components
    - High commonality, reliability, and effective fault isolation
    - Mission Planning capability

Mission
The Navy Component Commander uses the NMT to provide secure, protected, and survivable connectivity across the spectrum of mission areas including land, air, and naval warfare; special operations; strategic nuclear operations; strategic defense; theater missile defense; and space operations and intelligence.

Major Contractor
Raytheon Net-Centric Systems – Marlboro, Massachusetts

Activity
- The Commander, Operational Test and Evaluation Force conducted an operational assessment in FY10 to support a low-rate initial production decision. DOT&E completed an Early Fielding Report in April 2011 since the Navy deployed an operational NMT on the USS *Roosevelt* (DDG 80) prior to the IOT&E.
- The NMT program manager planned for an IOT&E with Milstar, Wideband Global Satellite (WGS), and Advanced Extremely High Frequency (AEHF) satellites.
- The 14-month delay in the AEHF-1 satellite reaching its orbital position and the need to maintain schedule required the NMT program manager to alter the T&E strategy.
- The revised plan called for an IOT&E using Milstar II satellites instead of the planned AEHF satellites to inform the full-rate production decision planned in 1QFY12. The program manager added an FOT&E in FY12 with on-orbit AEHF satellites to support fielding of NMT's AEHF capability. DOT&E approved the updated Test and Evaluation

Master Plan (TEMP) describing the new test strategy in 4QFY11.

- The program manager planned for 10,000 cumulative test hours for the Reliability Growth Test (RGT) at the contractor facility. The program office conducted the RGT from March 23 to May 26, 2011. The program office terminated the test after 4,461 hours.
- The Navy commenced integrated testing of the NMT on May 1 and concluded testing on June 30, 2011. The testing included two surface ships, one submarine, and one shore site, operating under realistic conditions. The Navy executed the test in preparation for the IOT&E and in accordance with the DOT&E-approved TEMP.
- The Navy conducted the NMT IOT&E from July 20 to August 19, 2011, on two surface ships: one submarine, a shore site, and various supporting sites. The Commander, Operational Test and Evaluation Force, executed the test in accordance with the DOT&E-approved TEMP and test plan.

Assessment

Although analysis of the operational test data is ongoing, integrated developmental testing and preliminary analysis of operational testing suggest the following:

- NMT can meet requirements to provide legacy EHF communications over Milstar and Ultra High Frequency Follow-On EHF Enhanced payloads, X-band over the legacy Defense Satellite Communication System and WGS, and Ka-Band over WGS. NMT also demonstrated the capability to receive Global Broadcast System broadcasts over WGS.
- The antenna handover problem experienced during the previous operational test has been resolved.
- Although the program manager knew during the RGT that NMT was not going to meet the reliability requirement, he elected to stop testing and forgo thorough failure analysis and corrective action before starting the integrated test and IOT&E in order to meet the schedule.
- During the RGT, the NMT demonstrated a Mean Time Between Critical Failure (MTBCF) of 892 hours against a 1,400-hour requirement; during the integrated testing, NMT demonstrated a MTBCF of 338 hours. The NMT system may have performed better in the RGT because the NMTs being tested did not include the full suite of antenna subsystems and they operated in single band mode rather than multiband mode.
- The IOT&E confirmed the NMT is not reliable. While the full failure analysis is ongoing, current results from the operational test have revealed that the MTBCF is comparable to that of the integrated test.
- If the program manager does not conduct failure mode analysis and perform corrective actions, the NMT will not meet its reliability requirement by the FY13 FOT&E.
- Additional risks, other than those observed during the IOT&E, may not become apparent until FOT&E when AEHF modes of operation, including Extended Data Rate and the new Mission Planning System, will be tested. These capabilities were not evaluated during the IOT&E because they depend on capabilities being delivered to the AEHF program on a different timeline.

Recommendations

- Status of Previous Recommendations. The Navy has made satisfactory progress on all previous recommendations.
- FY11 Recommendation.
  1. The Navy should perform reliability failure analysis on the NMT and develop a plan of action to correct the deficiencies prior to verification in a future test event.