

Navy Multiband Terminal (NMT)

Executive Summary

- The Navy's Operational Test and Evaluation Force (OPTEVFOR) planned an FOT&E from May 9 through June 8, 2016, but was unable to execute the test due to the Navy's conflicting operational requirements.
- In November 2016, the Navy Multiband Terminal (NMT) program manager and OPTEVFOR proposed a modified T&E approach to use available data from previous operational tests and conduct smaller, targeted test events as Navy shore, ship, and submarine assets became available.
- The Navy's FY16 and FY17 operational testing was adequate to determine the NMT is operationally effective and suitable in providing Advanced Extremely High Frequency (AEHF) satellite communications (SATCOM) to Navy shore sites, ships, and submarines in a non-contested-threat environment. The Navy Anti-Jam (AJ) and Low Probability of Intercept (LPI) testing was inadequate and the Navy still needs to perform threat testing to understand the NMT's performance in a contested environment.
- Based on the cyber-testing, the NMT is secure and isolated, limiting an adversary's attack options to gain access to the system.

System

- The NMT system is the next-generation maritime military SATCOM terminal for the Navy and its coalition partners; the Navy uses it for accessing protected and survivable SATCOM over the AEHF SATCOM constellation. In addition, NMT provides access to wideband communications through the Defense Satellite Communications System (DSCS) and Wideband Global SATCOM (WGS) constellations.
- The NMT is interoperable with the current and legacy service SATCOM terminals, including the Family of Advanced Beyond-line-of-sight Terminals, Secure Mobile Anti-jam Reliable Tactical Terminal, and the Follow-on Terminal.
- The program manager developed NMT variants for surface ships, submarines, and shore sites. The NMT system variants have two major component groups: the Communications Group and the Antenna Group.



Antenna Group

Communications Group

- The Communications Group provides the interface for all input/output devices, signal processing, timing, frequency generation, and antenna pointing control. The Communications Group consists of the following components:
 - 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- and Ka-Bands, as well as X-band with the Global Broadcast Service. The shore and ship Antenna Group provides antenna pointing, stabilization, and tracking.

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 Johns Hopkins Applied Physics Laboratory conducted an assessment of the NMT AJ and LPI capability primarily through modeling and simulation with supporting live test results using the USS *Cole* (DDG 67) in December 2013.
- DOT&E and OPTEVFOR determined the AJ and LPI modeling and simulation could not be accredited for OT&E use. The Navy deferred retesting the NMT's AJ and LPI capability until it can get funds in place to improve the model and simulation.
- The Navy program manager and OPTEVFOR conducted developmental and integrated testing aboard the USS *Wasp* (LHD 1), the USS *Mason* (DDG 87), USS *Helena* (SSN 725), and the Navy Computer and Telecommunications Area Master Station – Atlantic (NCTAMS LANT) from February 8 through March 4, 2016.
- OPTEVFOR planned an FOT&E from May 9 through June 8, 2016, but was unable to execute the test in accordance

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with the DOT&E-approved test plan due to the Navy's conflicting operational requirements.

- The OPTEVFOR cybersecurity team supported by the Navy Information Operations Command conducted an NMT cybersecurity assessment in June 2016 at NCTAMS LANT in Norfolk, Virginia. The Navy cyber-team collected all DOT&E-required data.
- OPTEVFOR replanned the FOT&E for 4QFY16, but was again unable to obtain the necessary shore and ship types for a single test event, as originally planned.
- In November 2016, the NMT program manager and OPTEVFOR proposed a modified T&E approach to use available data from previous operational tests and conduct smaller, targeted test events as Navy shore, ship, and submarine assets became available.
- In February 2017, OPTEVFOR and the Joint Terminal Engineering Office jointly conducted NMT surface ship testing aboard the USS *Jason Dunham* (DDG 109) and the USS *Forrest Sherman* (DDG 98) passing mission data updates and tactical chat messaging.
- OPTEVFOR conducted NMT sub-surface testing in June 2017 by performing mission communications between the Commander, Submarine Force U. S. Pacific Fleet and the USS *Columbia* (SSN 771).
- OPTEVFOR performed further operational testing aboard the USS *Chung-Hoon* (DDG 93) from August 14-25, 2017, to collect data communication completion and latency metrics.

Assessment

- The Navy's operational testing was adequate to determine the NMT is operationally effective and suitable in providing

AEHF communications to Navy shore sites, ships, and submarines in a non-contested-threat environment.

- The Navy AJ and LPI testing was inadequate and threat testing still needs to be performed to understand the NMT's performance in a contested environment.
- DOT&E and OPTEVFOR determined the AJ and LPI modeling and simulation could not be accredited for OT&E use. The Navy provided insufficient evidence that the Johns Hopkins Applied Physics Laboratory threat surrogate is sufficiently representative of valid threats and the comparison of live data to the model's predictions lacked credible statistical analysis.
- Based on the cyber-testing, the NMT is secure and isolated, limiting an adversary's attack options to gain access to the system
- The Air Force Operational Test and Evaluation Center with OPTEVFOR are planning to test NMT in the Air Force-led Enhanced Polar System Multi-Service Operational Test and Evaluation (MOT&E) in 3QFY18.

Recommendations

- Status of Previous Recommendations. The Navy has made satisfactory progress on all previous recommendations.
- FY17 Recommendation.
 1. The Navy should adequately test the NMT AJ and LPI capability in a future operational test event.