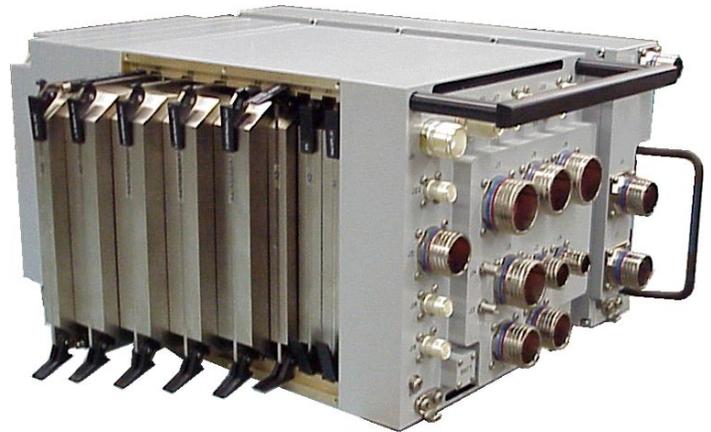


# Multi-functional Information Distribution System (MIDS) (includes Low Volume Terminal (LVT) and Joint Tactical Radio System (JTRS))

## Executive Summary

- The Multi-functional Information Distribution System – Low Volume Terminal (MIDS-LVT) continues to mature and is still being integrated into host platforms such as the B-1B bomber aircraft. Tests have indicated host platform integration complexities and schedule impacts are often underestimated.
- The MIDS-Joint Tactical Radio System (MIDS-JTRS) is in development and Commander, Operational Test and Evaluation Force (COTF) completed an operational assessment. The Tactical Air Navigation (TACAN) and Link 16 voice and data capability appears improved; however, Link 16 message exchange anomalies remain. Sufficient testing on the final software version to confidently calculate reliability will be required prior to entry into IOT&E.



Link 16 digital voice provides host platforms a secure anti-jam voice line-of-sight communications capability.

## System

- MIDS-LVT is a communications and navigation terminal in full-rate production, that when integrated into a host platform provides Link 16 digital data link, Link 16 digital voice communications, and TACAN capabilities. Since production started, the MIDS-LVT has evolved with hardware, firmware, and software updates to resolve performance and stability deficiencies and to provide new Link 16 capabilities.
- MIDS-JTRS is a pre-planned product improvement of the MIDS-LVT system. When integrated into a host platform, MIDS-JTRS provides MIDS-LVT capabilities, plus three additional programmable channels capable of hosting JTRS Software Communications Architecture compliant waveforms in the 2 to 2,000 megahertz radio frequency bandwidth.
- The system under test includes the MIDS terminals and the host platform interfaces such as controls, displays, antenna, high power amplifiers, and any radio frequency notch filters.
- TACAN has an air-to-air mode and air-to-ground mode and is a primary means of air navigation by military aircraft. Link 16 data link is a joint and allied secure anti-jam high speed data link that uses standard messages to exchange information among flight or battle-group host platforms or between combat platforms and command and control systems.

## Mission

- U.S. Services and many allied nations will deploy MIDS-LVT and MIDS-JTRS-equipped aircraft, ships, and ground units in order to provide military commanders with the ability to communicate with their forces by voice, video, and data during all aspects of military operations. MIDS-JTRS networking capability and multiple waveforms (including new waveforms such as the Wideband Networking Waveform (WNW)) are intended to allow collaboration despite geographical and organizational boundaries.
- MIDS-JTRS-equipped units should be able to exchange information including air and surface tracks, identification, host platform fuel, weapons, mission status, engagement orders, and engagement results.

## Prime Contractors

- ViaSat, Carlsbad, California
- Data Link Solutions, Wayne, New Jersey, and Cedar Rapids, Iowa

## Activity

### MIDS-LVT (MIDS on Ship)

- COTF completed the operational test of the MIDS-LVT on Ship (MOS) integration for guided missile cruisers and

destroyers during 2009 onboard the USS *Stockdale*. COTF issued their Operational Test Report on November 23, 2009.

## **MIDS-LVT (AC-130 Integration)**

- The 18th Flight Test Squadron (an Air Force Special Operations Command) completed the Operational Test Report for the integration of MIDS-LVT into the AC-130U aircraft.
- The 18th Flight Test Squadron conducted the operational test of the MIDS-LVT version 6 into the AC-130H aircraft during 2009 flying from Hurlburt Field AFB, Florida.

## **MIDS-JTRS**

- COTF completed the operational assessment of the MIDS-JTRS during 2009 with ground and flight tests from Naval Air Station (NAS) Patuxent River, Maryland, and NAS China Lake, California.
- All testing was conducted in accordance with DOT&E-approved Test and Evaluation Master Plans and operational test plans.

## **Assessment**

### **MIDS-LVT (MIDS on Ship)**

- DOT&E assessed the integration of MIDS-LVT into Model 5 Aegis-equipped ships as operationally effective and suitable. All performance thresholds were met, and the system demonstrated improved capability over currently fielded systems. The MOS system operated correctly and was stable while operating with up to 26 units in the USS *Nimitz* Carrier Strike Group. The major deficiency observed was the MOS Interference Protection Feature (IPF) generated false misleading indications which affected the reliability of the system. On several occasions during the test, the IPF status box turned red indicating a failure, and at other times the IPF status box remained unlit, indicating no failure. The true operational status of Link 16 operations was not accurately represented by these fault indications. Other IPF faults could not be cleared by the Link 16 console operators and required MOS maintenance personnel to clear the faults at the electronic cabinet assembly.

### **MIDS-LVT (AC-130 Integration)**

- AC-130U Model: DOT&E assessed the integration of MIDS-LVT into the AC-130U as operationally effective, but not operationally suitable. Although operationally effective, one primary deficiency was the reported ground target positional variance between Link 16 and truth data; the AC-130U displayed targets with up to 200 yards positional error while the acceptable range of error is 30 yards. The integration was evaluated as not operationally suitable due to unmet criteria for operational availability, mean time between operational mission failure, and inadequate training and technical documentation.
- AC-130H Model: DOT&E assessed the integration of MIDS-LVT into the AC-130H as operationally effective and suitable. The test successfully demonstrated the interoperability and operational utility of MIDS-LVT Link 16 to support the AC-130 Close Air Support mission. Position accuracy issues identified during AC-130U MIDS-LVT integration testing have been resolved and improved training and technical documentation were provided. The test revealed

compatibility problems with other onboard information systems as well as the need to update AC-130 Link 16 tactics, techniques, and procedures. The test attempted but was unable to verify the ability to exchange imagery via Link 16 between the AC-130 and the Air Operations Center. Finally, mean time between operational mission failure was 13 hours. The reliability threshold is 25 hours. This however, represents a point estimate since the insufficient test hours did not provide adequate data to predict reliability with statistical confidence.

## **MIDS-JTRS**

- DOT&E observed the MIDS-JTRS Operational Assessment and assessed that risk to successful completion of IOT&E is low to moderate. The test data indicate that the initial phase of discovery uncovered problems with the MIDS-JTRS Tactical Air Navigation (TACAN) and Link 16 digital voice functions. These problems included primarily TACAN bearing needle deviations and unintelligible Link 16 voice communications. During the course of the operational assessment, the program developed modifications to firmware and software that fixed these two problems. Testing conducted after making these modifications demonstrated that the MIDS-JTRS provided adequate navigation bearing information and understandable voice communications. The Link 16 data link function is fairly mature with some residual message anomalies such as always indicating that the F/A-18E/F is conducting aerial refueling. There were also issues related to automatic cryptographic code rollover and terminal initialization and startup before flight. These, along with the Link 16 message anomalies, require additional test data and analysis to resolve prior to IOT&E. The high tempo of MIDS-JTRS software releases to resolve problems discovered during testing prevented the collection of sufficient data to support reporting of reliability with any statistical confidence. DOT&E expects to collect enough performance and reliability test data during integrated testing and IOT&E to report results with statistical confidence.

## **Recommendations**

- Status of Previous Recommendations. The Navy made satisfactory progress on the previous recommendations.
- FY09 Recommendations.
  1. To preserve some of the anti-jamming broadcast capabilities of Link 16, the Navy should develop and test a solution to support the interface of MIDS terminals with the 1,000 watt High Power Amplifier.
  2. The Navy should investigate and determine the cause of the MOS Interference Protection Feature alerts experienced during operational testing as well as the unexpected terminal reactions to the alerts. The solution should be tested in the guided missile cruiser and destroyer operational environment.
  3. The Air Force Special Operations Command should resolve the AC-130 MIDS-LVT and other information system onboard compatibility deficiencies, and verify that the AC-130 and Air Operations Center are able to exchange imagery via Link 16.

## DOD PROGRAMS

4. The Navy should assure that developmental and operational testing of MIDS-JTRS is completed as planned so that sufficient data are collected to assess system effectiveness and suitability with confidence. Additional MIDS-JTRS

testing opportunities should be exploited as available to increase the number of hours of operational system employment.

# DOD PROGRAMS