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

Executive Summary
- The Multifunctional Information Distribution System – Joint Tactical Radio System (MIDS-JTRS) core terminal completed development and entered into IOT&E of the MIDS-JTRS integrated into the F/A-18E/F aircraft during July 2010. IOT&E is scheduled to complete in November 2010.
- Open issues at the transition from developmental test to independent operational test included Tactical Air Navigation (TACAN) range accuracy and excessive Built-In Test (BIT) False Alarms. Commander Operational Test Force (COTF) will examine these issues more closely, as well as the approved Critical Operational Issues, during the operational test.
- During the MIDS-JTRS IOT&E, the program successfully completed a multi-channel demonstration in which MIDS-JTRS simultaneously exercised Link 16, TACAN, and Single Channel Ground and Airborne Radio System (SINCGARS) functionalities.
- Not all MIDS-JTRS core terminal capabilities, such as Link 16 enhanced data throughput and instantiation of JTRS Software Communications Architecture waveforms, will be operationally tested due to limited current F/A-18E/F aircraft requirements and funding availability.

System
- Multifunctional Information Distribution System – Low Volume Terminal (MIDS-LVT) is a communications and navigation terminal in full-rate production. When integrated into a host platform, MIDS-LVT 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. In addition, MIDS-JTRS will provide the capability for enhanced throughput and Link 16 frequency re-mapping.
- The system under test includes the MIDS terminals and the host platform interfaces such as controls, displays, antennas, high power amplifiers, and any radio frequency notch filters.
- TACAN has an air-to-air mode and an air-to-ground mode and is a primary means of air navigation by military aircraft.
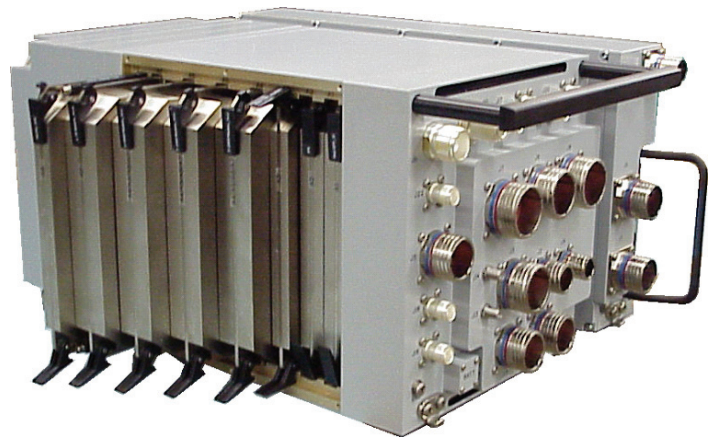
Link 16 data link is a joint and allied secure anti-jam high speed data link that uses standard messages to exchange information among flight or battle-group host platforms or between combat platforms and command and control systems. Link 16 digital voice provides host platforms a secure anti-jam voice line-of-sight communications capability.

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 Joint Airborne Networking – Tactical Edge (JAN-TE)) 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.

Major Contractors
- United States:
    - ViaSat – Carlsbad, California
    - Data Link Solutions – Wayne, New Jersey, and Cedar Rapids, Iowa
- Europe:
    - EuroMIDS – Paris, France

Activity

MIDS-LVT (B-1B Integration)
- Detachment 5, Air Force Operational Test and Evaluation Center (AFOTEC) conducted an Operational Assessment of the integration of the MIDS-LVT into the B-1B Bomber aircraft at Edwards AFB, California, from February to June 2010. The Common Link Information Processor (CLIP) facilitated the integration of MIDS-LVT into the B-1B aircraft. The Operational Assessment included three operational test flight sorties by the B-1B aircraft.

MIDS-JTRS
- The Naval Air Warfare Center completed the ground and flight Developmental Test and Evaluation of the MIDS-JTRS as integrated on the F/A-18E/F operating from the Naval Air Station (NAS) Patuxent River, Maryland, and NAS China Lake, California.
- The Naval Air Warfare Center, with participation by the Air Test and Evaluation Squadron Nine, conducted integrated aircraft carrier suitability flight testing of the F/A-18E/F with the integrated MIDS-JTRS core terminal.
- COTF started the F/A-18E/F MIDS-JTRS IOT&E in July 2010 at NAS China Lake, California, and participated in a large joint force training exercise conducted at Nellis AFB, Nevada to collect Link 16 interoperability test data.
- All testing was conducted in accordance with a DOT&E-approved Test and Evaluation Master Plan (TEMP) and operational test plans.

Assessment

MIDS-LVT (B-1B Integration)
- Results from the B-1B MIDS-LVT and CLIP integration Operational Assessment indicate that the transfer of MIDS-LVT Link 16 data via CLIP to the B-1B host computer was problematic. Specifically, inaccurate information transferred for some of the Link 16 message types, and CLIP could not completely and accurately process information from near simultaneous beyond-line-of-sight and line-of-sight transmissions of Link 16 messages. CLIP software was not yet mature, as indicated by the quantity of unresolved software discrepancies and a constant (not yet decreasing) rate of discovery of software discrepancies.

MIDS-JTRS
- The aircraft carrier suitability integrated test results indicate compatible operation of the F/A-18E/F MIDS-JTRS during approach, take-off, and landing on the aircraft carrier.

- The MIDS-JTRS IOT&E data collection and analysis effort is ongoing. There are emerging concerns related to MIDS-JTRS TACAN air-to-air range errors. There are emerging concerns regarding the ability to achieve the reliability requirement of 220 hours for the MIDS-JTRS terminal, as evidenced by ten MIDS-JTRS terminal (hardware) failures during IOT&E.
- Data show the BIT false alarm rate associated with the integration of the MIDS-JTRS into the F/A-18E/F is excessive, potentially affecting maintainability ratings for the system.
- The operational test squadron, Air Test and Evaluation Squadron Nine, based at NAS China Lake, California, identified aircraft integration discrepancies during the MIDS-JTRS installation and pre-operational flight checks conducted prior to the start of the IOT&E. Aircraft maintenance personnel resolved the issues by conducting significant levels of minor maintenance to correct aircraft electronic systems discrepancies or developing workarounds to permit IOT&E to begin as scheduled.

Recommendations
- The Air Force and Navy made satisfactory progress on the previous recommendations primarily related to the fielded MIDS-LVT.
- FY10 Recommendations.
  1. The Air Force B-1B and CLIP program offices should review the findings from the CLIP (B-1B/MIDS-LVT) integration Developmental Test and Operational Assessment and correct all major deficiencies prior to entry into the B-1B CLIP integration OT&E.
  2. The MIDS-JTRS and F/A-18 program offices should continue to characterize the TACAN discrepancies and develop a solution for test prior to fielding.
  3. The Navy should modify the MIDS-JTRS F/A-18 installation checklist for fielding to ensure appropriate maintenance personnel adequately prepare all antenna and cabling connections for installation of the terminal.
  4. The MIDS program office should focus industry efforts on achieving improved terminal manufacturing processes in order to elevate the overall reliability of the MIDS-JTRS system.
  5. The Navy, MIDS program office and industry should develop a solution to the excessive BIT false alarm rate for the MIDS-JTRS system as integrated into the F/A-18 E/F.