

## Multifunctional Information Distribution System - Low Volume Terminal (MIDS-LVT)

The MIDS-LVT is a communications terminal that provides Link 16 digital data link, digital voice and, for fighter aircraft, Tactical Air Navigation (TACAN) capabilities when integrated into the host platform. Link 16 is a Joint and Allied digital data link that operates on an anti-jam waveform and uses standardized message sets to exchange theater tactical information such as air tracks, engagement orders, targeting information, and platform status. MIDS-LVT provides host platform interoperability with legacy Class 2 Joint Tactical Information Distribution System equipped host platforms.

There are two MIDS-LVT variants: MIDS-LVT 1 for aircraft and shipboard integration and the MIDS-LVT 2 for Army land-based host platform integration. MIDS-LVT 1 has two competing production contractors: Data Link Solutions, Incorporated (Inc.) (DLS) and Via Sat, Inc. The Army has designated Via Sat, Inc. as the sole manufacturer of MIDS-LVT 2.

The MIDS-LVT 1 and MIDS-LVT 2 are planned for integration into 13 separate host platform types. The F/A-18 is the lead host platform for MIDS-LVT 1 integration and requires 53 percent of the total planned MIDS-LVT 1 acquisition of 1,880 terminals. The integration of the MIDS-LVT 1 into the F/A-18 will serve as the primary basis for the MIDS-LVT 1 Initial Operational Test and Evaluation (IOT&E). The F-16 (Blocks 40 and 50) requires 35 percent of planned MIDS-LVT 1 terminals and is approximately one year behind the F/A-18 in terms of integration and test schedule.

The MIDS-LVT 1 replaces the analog AN/ARN-118 TACAN to provide a digital TACAN function for the F/A-18 and F-16 fighter aircraft. This installation is reversible in the F/A-18 allowing reinstallation of the AN/ARN-118 TACAN should the need arise. The installation of MIDS in the F-16 is permanent. The TACAN function provides air-to-ground and air-to-air modes of navigation information.

The Patriot Information Coordination Central (ICC) is the lead host platform for integration of the MIDS-LVT 2; however, the Patriot Battery Command Post (BCP) will require the majority of MIDS-LVT 2 terminals. Since Link 16 integration into the BCP is phased, the integration of MIDS-LVT 2 into the Patriot ICC and BCP Phase One (Link 16 not integrated into host sensors and Link 16 receive only) served as the basis for the MIDS-LVT 2 IOT&E.

### TEST & EVALUATION ACTIVITIES

- DOT&E conducted an independent evaluation of F/A-18 MIDS-LVT maturity in support of the Defense Acquisition Board's (DAB) Low-Rate Initial Production (LRIP) Lot 2, Order 2 authorization deliberations.
- DOT&E conducted an independent assessment of the maturity of the integration of the MIDS-LVT TACAN function into the F-16 in support of DAB LRIP 3 authorization deliberations. DOT&E also provided an updated assessment of the resolution of the 13 major issues identified in the June 2001 Operational Assessment (OA) Report.
- The Army completed MIDS-LVT 2 IOT&E during June 2002. This testing supported the full-rate production and fielding decision for MIDS-LVT 2.
- DOT&E completed an independent OA of F/A-18 MIDS-LVT 1 integration maturity during September 2002.



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# NAVY PROGRAMS

## TEST & EVALUATION ASSESSMENT

DOT&E and the Navy's operational test squadron, Air Test and Evaluation Squadron Nine (VX-9), agree that the F/A-18 MIDS-LVT 1 air-to-ground TACAN function performance is not stable and is unacceptable for aircraft carrier approach operations. Deficiencies include frequent loss of magnetic bearing and range information while in marshal and approach patterns. VX-9 assessed the instability as a Category I deficiency. VX-9 evaluated corrective actions by the vendor and found that the deficiency was sufficiently mitigated to allow commencement of operational testing, October 18, 2002.

DOT&E, the United States Air Force's F-16 MIDS-LVT Developmental Test squadron, and the Air Force Operational Test and Evaluation Center agree that the F-16 MIDS-LVT 1 integration test data indicates occasional range extrapolation errors while operating the air-to-air TACAN mode. This indicates false range separation information to the pilot and is assessed as a Category I (safety of flight) deficiency. The F-16 MIDS-LVT air-to-ground TACAN mode operates correctly with the DLS, Inc. MIDS-LVT 1. Flight test data has yet to be provided for Via Sat, Inc. MIDS-LVT 1 TACAN performance in the F-16.

DOT&E concluded that 4 of the 13 major F/A-18 MIDS-LVT integration issues identified in the June 2001 OA report had been fully or partially resolved by the Navy. Major issues that remain and additional issues that pose risk to a successful IOT&E outcome include:

- Navigation, including TACAN and relative navigation, instability.
- Deficiencies with Multi-Sensor Integration and non-correlation of Link 16 data with on- and off-board sensor data and track reports and identification.
- Excessive Interference Protection Feature alerts and the inability to reset some of them.
- Intra-Navy and Joint Link 16 interoperability. Inability to demonstrate the exchange of all required mission assignment information between the E-2C Hawkeye Airborne Early Warning system and the F/A-18 using Link 16 messages. F/A-18 MIDS-LVT 1 inability to exchange ground target information between the E-8 Joint Surveillance Target Attack Radar System and accurate ground target coordinates with F-15E Strike Eagle.
- Adverse mission and aircrew task loading impacts due to persistent problems related to F/A-18 MIDS-LVT initialization and network entry by aircrew in preparation for flight.
- Difficulties of mission planning of MIDS-LVT Link 16 with the Navy's Tactical Aircrew Mission Planning System.
- Excessive Built-In Test (BIT) False Alarms. Nearly every F/A-18 and F-16 MIDS-LVT test flight has one or more BIT false alarms.

The Army IOT&E and preceding Developmental Tests (DT) indicated MIDS-LVT 2 and Patriot ICC host platform integration issues that could lead to loss of Link 16 data exchange. The Army Program Manager demonstrated software fixes during IOT&E that indicate the issue has been resolved. The IOT&E scenario was, however, not as robust as the Large Force Exercise (LFE) venue used by DT to identify this issue. The Army's fielding plans for MIDS-LVT 2 do not include the ICC platform. Nevertheless, installation and integration of the MIDS-LVT 2 into the ICC host has been demonstrated and could, if the Army desires, be fielded to the ICC. Unless further testing of the ICC host is conducted there will remain some level of uncertainty regarding the MIDS-LVT 2 and ICC compatibility.

The F-16 MIDS-LVT 1 integration should not proceed to IOT&E until the critical issue of air-to-air TACAN range extrapolation errors has been addressed.

The Army should employ the Patriot ICC MIDS-LVT 2 in a LFE to determine if, during periods of high data throughput, the data exchange halts have been resolved.