

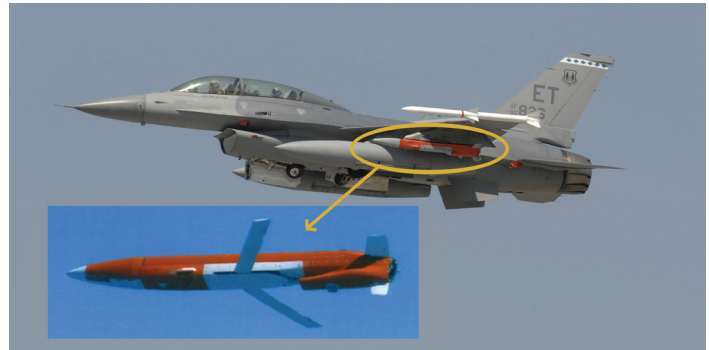
Miniature Air-Launched Decoy (MALD) and MALD-Jammer (MALD-J)

Executive Summary

- The Air Force's primary open-air electronic warfare range, the Nevada Test and Training Range (NTTR), requires continued Air Force attention to ensure sufficient resources are available to support Miniature Air Launched Decoy – Jammer (MALD-J) test requirements. Limited available range time will likely extend the planned FY12 MALD-J IOT&E up to six months.
- The Air Force MALD/MALD-J Concept of Operations (CONOPS) states that the vehicles are limited and expendable, and not meant to be used during exercises or training. To ensure aircrew weapon system proficiency and adequate combat readiness, the CONOPS needs to enable F-16 and B-52 aircrews to plan and launch vehicles during training exercises to ensure the full capability can be employed during combat.

MALD

- In April 2011, DOT&E completed the MALD IOT&E Report to inform an Air Force acquisition decision for the low-rate initial production contract (LRIP Lot 4), which completes the planned MALD procurement.
- DOT&E assessed the MALD performance as operationally effective for combat, but not operationally suitable, due to poor demonstrated materiel reliability in the intended operational environment.
- In June 2011, the Air Force completed developmental tests to confirm fixes to the failures identified in the 2010 IOT&E. The Air Force subsequently recertified MALD for operational testing after decertifying the weapon following the 2010 failures.
- The Air Force Operational Test and Evaluation Center (AFOTEC) resumed IOT&E in July 2011. The IOT&E included B-52 long-endurance MALD carriage flights designed to replicate the likely operational employment environment and provide confidence that the corrective actions were sufficient.
- In August 2011, AFOTEC concluded IOT&E with the free-flight launch of two MALD vehicles flown during the long-endurance carriage flights in July. However, one of the MALD vehicles failed to initiate the engine start sequence after release from the B-52 and fell unpowered into the ocean. The Air Force subsequently initiated a failure review board (FRB) to investigate the failure and determine any necessary corrective action.
- The August 2011 IOT&E mission failure supports the DOT&E assessment of poor MALD materiel reliability. The testing failed to demonstrate the resolution of deficiencies when MALD is employed in an



operationally-realistic manner. The ongoing Air Force FRB will likely result in additional developmental testing to confirm hardware upgrades are adequate before conducting the MALD-J IOT&E.

MALD-J

- In June 2011, the Air Force completed the MALD-J engineering, manufacturing, and development (EMD) phase. The EMD phase included an AFOTEC Operational Assessment of MALD-J's operational performance and readiness for IOT&E.
- In August 2011, DOT&E completed an operational assessment report to assess MALD-J's progress towards achieving operational effectiveness, suitability, and survivability.
- DOT&E concluded that the MALD-J payload demonstrates adequate jammer performance to support mission accomplishment, but that mission planning performance (though adequate for open-air flight tests) was limited in its ability to support employment of numerous MALD-Js in major combat operations. DOT&E conclusions regarding MALD-J suitability, particularly its reliability, depend in part upon data from the MALD testing, which will be used to evaluate whether vehicle reliability problems have been resolved.
- MALD-J EMD testing revealed no significant reliability deficiencies with the jammer payload. However, a MALD-J vehicle flown during the 2011 MALD IOT&E long carriage flights experienced a BIT failure that was subsequently investigated by the program office. Early results from the investigation show the fault was isolated to improper manufacturing processes on the jammer payload module. As a result, all MALD-J vehicles will be returned to the contractor for jammer payload removal and rework.
- DOT&E approved the MALD-J Milestone C Test and Evaluation Master Plan (TEMP) in September 2011.

System

- MALD is a small, low-cost, expendable, air-launched vehicle that replicates how fighter, attack, and bomber aircraft appear to enemy radar operators.
- MALD-J is an expendable, close-in jammer designed to degrade and deny an early warning or acquisition radar's ability to establish a track on strike aircraft, while maintaining the ability to fulfill the MALD decoy mission.
- The F-16 C/D and B-52 are the lead aircraft to employ MALD and MALD-J.

Mission

- Combatant commanders will use the MALD to allow an airborne strike force to accomplish its mission by forcing

enemy radars and air defense systems to treat MALD as a viable target.

- Combatant commanders will use the MALD-J to allow an airborne strike force to accomplish its mission by jamming enemy radars and air defense systems to degrade or deny detection of friendly aircraft or munitions.
- MALD and MALD-J-equipped forces should have improved battlespace access for airborne strike forces by deceiving, distracting, or saturating enemy radar operators and Integrated Air Defense Systems.

Major Contractor

Raytheon Missile Systems – Tucson, Arizona

Activity

MALD

- In January 2011, the Air Force completed a developmental return to flight test mission that evaluated the hardware, software, and firmware upgrades that resulted from the 2010 IOT&E failures. These failures resulted in the Air Force decertifying the weapon for operational test and suspension of IOT&E.
- In April 2011, DOT&E completed a MALD IOT&E report to inform the Air Force acquisition decision for the MALD LRIP Lot 4 contract.
- In June 2011, the Air Force recertified MALD for operational testing after completing necessary developmental tests and concluding all failure review boards.
- AFOTEC resumed IOT&E in July 2011 with a B-52 long-endurance flight from Barksdale AFB, Louisiana, to Anderson AFB, Guam; a local Guam flight crossing the international dateline and equator; and a return long-endurance flight back to Barksdale AFB, Louisiana. The B-52 carried eight MALDs (along with eight MALD-Js) for a total carriage time exceeding 40 hours for each vehicle. The long-endurance mission and resultant vehicle carriage time was executed to replicate the likely MALD operational employment environment and provide confidence that recent corrective actions for reliability were sufficient.
- In August 2011, AFOTEC concluded IOT&E with the free-flight launch of two MALD vehicles that were carried on the long-endurance B-52 missions. However, one of the MALD vehicles failed to initiate the engine start sequence after release from the B-52 and fell unpowered into the ocean. The Air Force subsequently initiated an FRB to investigate the failure.
- AFOTEC conducted the IOT&E in accordance with the DOT&E-approved TEMP and test plan.

MALD-J

- In June 2011, the Air Force completed the MALD-J EMD phase that included an AFOTEC Operational Assessment.
- The EMD phase culminated in an operationally realistic open-air flight test with two MALD-J vehicles flying in a synchronized orbit while two Sabreliner aircraft configured with captive MALD-J test vehicles flew in coordinated orbits.
- The Nevada Test and Training Range (NTTR) provided processed test data to the integrated test team 10 days after the MALD-J flight test occurred, which supported the program's overall evaluation and schedule.
- In June 2011, the Air Force established an integrated product team to manage the development of the many-on-many mission level simulation (i.e., multiple MALD-J versus multiple threat radars) planned to be conducted during IOT&E.
- The July 2011 long-endurance B-52 MALD IOT&E missions included the carriage of eight MALD-Js. The Air Force plans to launch the vehicles during the IOT&E planned for FY12 to further assess vehicle material reliability.
- DOT&E approved the MALD-J Milestone C TEMP in September 2011.
- The Air Force conducted MALD-J testing in accordance with the DOT&E-approved TEMP and test plans.

Assessment

- The Air Force's primary open-air electronic warfare range, the NTTR, requires continued Air Force attention to ensure sufficient resources are available to support MALD-J test requirements. Limited available range time will likely extend the planned FY12 MALD-J IOT&E up to six months. In addition, the normal time of 45 work days to process and disseminate test data does not support timely MALD-J

AIR FORCE PROGRAMS

analysis and reporting. The NTTR efforts to support the last EMD flight test with test data 10 days after the test mission should be the standard support for the rest of the MALD-J test program.

- The Air Force MALD/MALD-J CONOPS states that the vehicles are limited and expendable, and not meant to be used during exercises or training. To ensure aircrew weapon system proficiency and adequate combat readiness, the CONOPS needs to enable F-16 and B-52 aircrews to plan and launch vehicles during training exercises to ensure the full capability can be employed during combat.

MALD

- The April 2011 DOT&E report concluded MALD performance as operationally effective for combat, but not operationally suitable due to poor demonstrated materiel reliability in the intended operational environment.
- During the 2010 IOT&E, the MALD reliability point estimate that combines free-flight and aircraft carriage time was 77 percent, which fell short of the threshold requirement of 93 percent. This shortfall would have an operational impact by increasing the number of MALDs required to accomplish each mission by 22 percent.
- MALD carriage life during the 2010 IOT&E failed to meet the required threshold of a minimum of 60 hours. All MALDs that accumulated over 14 hours of carriage time, and were subsequently launched by the Air Force, failed during free-flight test. This is significant for long-endurance B-52 missions, which are likely to accumulate 14 or more hours of carriage time before operational employment.
- The August 2011 IOT&E mission failure further validates the DOT&E assessment of poor MALD material reliability. The testing failed to demonstrate the resolution of deficiencies when MALD is employed in an operationally realistic manner. The ongoing Air Force FRB will likely result in additional developmental testing to confirm any hardware upgrades are adequate before conducting MALD-J IOT&E in FY12.

MALD-J

- The August 2011 DOT&E Operational Assessment report concluded the MALD-J payload demonstrates adequate jammer performance to support mission accomplishment, but that mission planning performance (though adequate for open-air flight tests) was limited in its ability to support employment of numerous MALD-Js in major combat operations.
- DOT&E conclusions regarding MALD-J suitability, particularly its reliability, depend in part upon data from MALD testing, which will be used by DOT&E to evaluate

whether vehicle reliability problems have been resolved. In the interim, outstanding MALD reliability deficiencies pose some risk to the planned FY12 MALD-J IOT&E due to the vehicle commonality between the two variants.

- MALD-J EMD testing revealed no significant reliability deficiencies with the jammer payload. However, a MALD-J vehicle flown during the 2011 MALD IOT&E long carriage flights experienced a BIT failure that was subsequently investigated by the program office. Early results from the investigation show the fault was isolated to improper manufacturing processes on the jammer payload module. As a result, all MALD-J vehicles will be returned to the contractor for jammer payload removal and rework.
- The planned mission-level simulation (i.e., multiple MALD-J versus multiple threat radars) is required to assess both MALD-J's and the protected aircraft survivability. Delivering this capability in time to support IOT&E is a program risk due to technical challenges; however, the Air Force's creation of an integrated product team with key stakeholders and leadership oversight may provide an opportunity to deliver the capability in time to meet the MALD-J schedule.
- During developmental testing, the Air Force did not assess MALD-J's performance in a joint environment, or with Fifth Generation aircraft flying within the threats' area of responsibility; the Air Force will need to address both areas during IOT&E.

Recommendations

- Status of Previous Recommendations. The Air Force is satisfactorily addressing all of the five FY10 recommendations.
- FY11 Recommendations. The Air Force should:
 1. Continue to provide sufficient resources to the NTTR to enable personnel to process and distribute test data in a timely manner.
 2. Include Fifth Generation aircraft flying within the MALD-J protected coverage area along with other joint aircraft during MALD-J IOT&E.
 3. Evaluate a mission planning exercise using a relevant Combatant Command Air Operations Center planning cell to plan an operationally-representative mission for a B-52 tasked unit during MALD-J IOT&E.
 4. Evaluate MALD-J in a GPS denied/degraded environment while the payload is operating in both the decoy and jammer modes.
 5. Continue efforts to develop a mature modeling and simulation many-on-many capability to support MALD-J IOT&E and the follow-on MALD-J Increment II.

AIR FORCE PROGRAMS