

MH-60R Multi-Mission Helicopter

Executive Summary

- Commander, Operational Test and Evaluation Force (COTF) completed testing in FY13 on corrections made to resolve previously identified deficiencies with AGM-114 HELLFIRE missiles and the Multi-spectral Targeting System (MTS). DOT&E issued a classified report in April 2014 and noted that while some deficiencies with MTS were resolved, it still does not adequately meet its tracking requirement.
- COTF completed IOT&E of MH-60R with the Automatic Radar Periscope Detection and Discrimination (ARPDD) upgrade in 1QFY14. In April 2014, DOT&E issued a classified IOT&E report and concluded that ARPDD was operationally effective but performance was significantly affected by environmental conditions. DOT&E did not resolve ARPDD suitability due to uncertainty in system reliability that requires further monitoring.
- The January 2014 FOT&E for the Mk 54 lightweight torpedo with Block Upgrade (BUG) tactical software identified shortfalls with the MH-60R tactics and tactical documentation, and interoperability problems with the helicopter's fire control systems.

System

- The MH-60R is a ship-based helicopter designed to operate from cruisers, destroyers, frigates, littoral combat ships, and aircraft carriers.
- It incorporates dipping sonar and sonobuoy acoustic sensors, multi-mode radar, electronic warfare sensors, a forward-looking infrared sensor with laser designator, and an advanced mission data processing system.
- It employs Mk 46 and Mk 54 torpedoes, HELLFIRE air-to-ground missiles, 2.75-inch family of rockets, and crew-served mounted machine guns.
- It has a three-man crew: two pilots and one sensor operator.

Activity

- COTF executed FOT&E on the MH-60R helicopter employing AGM-114 HELLFIRE missiles with the MTS from 4QFY12 to 2QFY13. This testing focused on corrections made to resolve previously identified MTS deficiencies. DOT&E issued a classified report on the completed FOT&E on April 28, 2014.
- COTF conducted ARPDD testing between August 2012 and September 2013 that included three different locations: the Narragansett Bay Operating Area near Cape Cod, Massachusetts; the Patuxent River Operating Area off the Maryland coast; and the Southern California Offshore



Mission

The Maritime Component Commander employs the MH-60R from ships or shore stations to accomplish the following:

- Surface Warfare, Under Sea Warfare, Area Surveillance, Combat Identification, and Naval Surface Fire Support missions previously provided by two different helicopters (SH-60B and SH-60F)
- Support missions such as Search and Rescue at-sea and, when outfitted with necessary armament, maritime force protection duties

Major Contractors

- Sikorsky Aircraft Corporation – Stratford, Connecticut
- Lockheed Martin Mission System and Sensors – Owego, New York

- Range off the coast of San Diego, California. This testing focused on determining ARPDD capability to detect and classify threat-representative scope exposures across a range of distance, environmental, and exposure duration conditions. DOT&E issued a classified report on completed IOT&E of MH-60R with the ARPDD upgrade on April 3, 2014.
- The Navy completed FOT&E for the Mk 54 lightweight torpedo with BUG tactical software in January 2014. The MH-60R served as the launch platform for 14 weapon drops.
- COTF conducted all testing in accordance with a DOT&E-approved test plan.

Assessment

- The upgraded MTS software showed some improved performance compared to prior operational testing, but the MTS still did not adequately meet its requirement for tracking. The Navy conducted a demonstration of the Surface Warfare mission capability of the MH-60R helicopter equipped with the HELLFIRE missile and MTS; however, testing throughout the operational mission environment is not complete.
- IOT&E demonstrated that ARPDD was operationally effective, but environmental conditions significantly affected performance. Periscope detection and classification performance were demonstrated at ranges that should support effective Anti-Submarine Warfare in low, sea-clutter conditions that are routinely experienced in the defense of a battlegroup in open-ocean. Periscope detection and classification were degraded by significant numbers of non-periscope detections in high-clutter environments that may be observed in littoral waters, an area of interest due to the prevalence of threat submarines in these regions. Overall, ARPDD provided MH-60R helicopters with a submarine identification capability that exceeds radar systems used on other Anti-Submarine Warfare air platforms. As with all radar systems, ARPDD requires a periscope exposure and has no detection capability against submarines that remain submerged below periscope depth.
- During dedicated operational testing, the AN/APS-153 radar system with ARPDD demonstrated a Mean Time Between Failure of 60 hours, well below the fleet operational reported Mean Time Between Failure of nearly 1,000 hours. The cause of the significant discrepancy is unknown and did not support resolution of ARPDD suitability. However, the much more extensive set of fleet data is likely a better indicator of the radar's reliability than the more limited set of data from ARPDD test events.
- Operational testing of the Mk 54 BUG torpedo identified shortfalls with MH-60R tactics and tactical documentation

and interoperability problems with the helicopter's fire control systems. Navy testers discovered that MH-60R crews could not access some weapon presets. These problems could prevent fleet operators from effectively employing the Mk 54 BUG torpedo. The Navy initiated immediate actions to address this shortfall.

Recommendations

- Status of Previous Recommendations. The Navy has partially addressed the FY12 recommendation to assess corrections made to resolve previously identified MTS deficiencies by conducting FOT&E. The Navy has not acted on the FY13 recommendations to conduct comprehensive live fire lethality testing of the HELLFIRE missile against a complete set of threat-representative small boat targets and to test the Surface Warfare mission capability of MH-60R equipped with HELLFIRE missiles.
- FY14 Recommendations. The Navy should:
 1. Continue to correct the remaining deficiencies with the MTS tracker.
 2. Demonstrate the Surface Warfare mission capability of the MH-60R helicopter equipped with the HELLFIRE missile and MTS throughout the operational mission environment in FOT&E and LFT&E.
 3. Conduct further evaluation of ARPDD employment in high-clutter, high-contact density littoral environments.
 4. Collect additional radar reliability data, particularly during periods of operations that employ the ARPDD mode.
 5. Address the additional six recommendations in the classified IOT&E report on MH-60R with the ARPDD system.
 6. Investigate and correct interoperability deficiencies of the Mk 54 with MH-60R weapons control systems.