

## MH-60S Multi-Mission Combat Support 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.
- DOT&E provided an analysis of the results of the Quick Reaction Assessment (QRA) of the LAU-61G/A Digital Rocket Launcher using Advanced Precision Kill Weapon System II (APKWS) rockets in June 2014. The analysis showed that the Digital Rocket Launcher with APKWS rockets provides additional Surface Warfare capability to the MH-60S, but noted technical and operational risks that should be addressed for improved performance.
- COTF completed Phase A (shore-based and training phase) of the planned operational assessment of the MH-60S Block 2 Airborne Mine Neutralization System (AMNS) in 3QFY14. Failures of the host MH-60 aircraft's systems and its associated Airborne Mine Countermeasures (AMCM) kit severely limited AMNS availability. Frequent loss of fiber-optic communications between the aircraft and the neutralizer was the primary cause of unsuccessful attack runs. Both problems increase the time needed to conduct Littoral Combat Ship (LCS)-based AMNS operations and reduce the ship's sustained area coverage rate. COTF completed an operational assessment of the Airborne Laser Mine Detection System (ALMDS) and AMNS by conducting Phase B (LCS)-based phase) of the test in 1QFY15 aboard LCS 2 during Increment 1 MCM mission package developmental testing. DOT&E assessed the detection and localization capabilities provided by ALMDS and the identification and neutralization capabilities provided by AMNS to be consistent with the findings from earlier shore-based operational assessments of the systems. Neither system demonstrated the performance necessary for an LCS equipped with an Increment 1 MCM mission package to meet its required sustained area coverage rate.

### System

- The MH-60S is a helicopter modified into three variants (blocks) from the Army UH-60L Blackhawk for operation in the shipboard/maritime environment.
- The blocks share common cockpit avionics and flight instrumentation with the MH-60R.
- Installed systems differ by block based on mission:
  - Block 1, Fleet Logistics – precision navigation and communications, maximum cargo or passenger capacity.
  - Block 2A/B, AMCM System – AMCM system operator workstation; a tether/towing system and the two MCM



systems currently under development; ALMDS for detection and classification of near-surface mines; and the AMNS for neutralization of in-volume and bottom mines. In FY12, the Chief of Naval Operations concluded that the MH-60S helicopter is significantly underpowered for the safe performance of the AMCM tow mission and provides limited tactical utility relative to the risk to aircrew, and cancelled that MH-60S mission. The decision to cancel the AMCM tow mission affects employment of both the AQS-20A sonar and Organic Airborne and Surface Influence Sweep. Both systems are no longer being developed for use in the AMCM system. Any Block 2 or subsequent aircraft (e.g., Block 3 A/B aircraft) can be an AMCM aircraft.

- Block 3A, Armed Helicopter – 20 mm Gun System, forward-looking infrared with laser designator, crew-served side machine guns, dual-sided HELLFIRE air-to-ground missiles, and defensive electronic countermeasures.
- Block 3B, Armed Helicopter – Block 3A with addition of tactical datalink (Link 16) and tie-beam to the External Weapon System Pylon to support the required weight of the loaded LAU-61s.

### Mission

The Maritime Component Commander can employ variants of MH-60S from ships or shore stations to accomplish the following missions:

- Block 1 – Vertical replenishment, internal cargo and personnel transport, medical evacuation, Search and Rescue, and Aircraft Carrier Plane Guard
- Block 2 – Detection, classification, identification and/or neutralization of sea mines, depending on which AMCM systems are employed on the aircraft

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- Block 3 – Combat Search and Rescue, Surface Warfare, Aircraft Carrier Plane Guard, Maritime Interdiction Operations, and Special Warfare Support
- Raytheon Company, Integrated Defense Systems – Tewksbury, Massachusetts
- Northrop Grumman – Melbourne, Florida

## Major Contractors

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

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## Activity

- COTF executed FOT&E on the MH-60S helicopter equipped with AGM-114 HELLFIRE missiles and 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 completed FOT&E of MH-60R/S helicopters equipped with AGM-114 HELLFIRE missiles and the MTS on April 28, 2014.
  - COTF conducted a QRA of MH-60S with the LAU-61G/A Digital Rocket Launcher armed with APKWS II rockets in 1QFY14. DOT&E issued the QRA report in June 2014.
  - COTF completed Phase A (shore-based and training phase) of the planned operational assessment of the MH-60S Block 2 AMNS in 3QFY14. The test included the use of explosive neutralizers and inert training neutralizers against inert moored and bottom mine targets, in the lower current environment only.
  - COTF completed an operational assessment of the ALMDS and AMNS by conducting Phase B (LCS-based phase) of the test in 1QFY15 aboard USS *Independence* (LCS 2) during Increment 1 MCM mission package developmental testing. The test examined the shipboard compatibility of the MH-60S helicopter and the ALMDS and the AMNS, and other aspects of operational suitability necessary to support and sustain LCS MCM effectiveness.
  - COTF conducted all testing in accordance with a DOT&E-approved test plan.
- requirement for mine neutralization success except under limited conditions not generally expected during combat. Failures of the host MH-60S aircraft's systems and its associated AMCM Mission Kit limited AMNS mission availability. Frequent loss of fiber-optic communications between the aircraft and the neutralizer was the primary cause of unsuccessful attack runs. Although the Navy attributed the failures to the bottom composition (sand and shells), the root cause of these failures has not yet been determined, and the bottom compositions used in testing are representative of realistic operating areas. Both problems negatively affect the timeliness of LCS-based AMNS operations and will likely reduce the ship's sustained area coverage rate.
- The results of the Navy's 1QFY15 operational assessment of the ALMDS and AMNS were consistent with the findings from earlier shore-based operational assessments of the systems:
    - DOT&E assessed the MH-60S helicopter equipped with the AMNS and determined the identification and neutralization capabilities were not demonstrated for an LCS equipped with an Increment 1 MCM mission package to meet its required sustained area coverage rate. No data were collected to assess AMNS performance in the medium or higher current regimes.
    - DOT&E assessed the MH-60S helicopter equipped with the ALMDS and determined the detection and localization capabilities were not demonstrated for an LCS equipped with an Increment 1 MCM mission package to meet its required sustained area coverage rate. Shore-based testing of the ALMDS completed in 4QFY12 showed that the system does not meet Navy detection requirements. ALMDS generates a large number of false classifications (objects erroneously classified as mine-like). Unless eliminated from the contact list, these false classifications require identification and neutralization effort, result in the expenditure of limited neutralizer assets, and drastically reduce the LCS sustained area coverage rate. As an alternative, the Navy has implemented tactics that require multiple search passes over the same area to minimize the number of false classifications passed on for identification/neutralization. Although multiple passes also reduce the LCS sustained area coverage rate relative to single pass systems, Navy modeling suggests this approach is less detrimental to MCM timelines. Whether LCS can

## 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. Additionally, the Surface Warfare mission capability of the MH-60S helicopter equipped with MTS and the HELLFIRE missile was not tested throughout the operational mission environment. MTS tracking risks should be addressed as soon as possible.
- The QRA of the MH-60S equipped with the Digital Rocket Launcher and APKWS rockets demonstrated additional Surface Warfare capability for the MH-60S, but identified technical and operational risks that should be addressed for improved mission performance.
- During the shore-based operational assessment of the AMNS in FY14, AMNS was unable to achieve the Navy's

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meet the already-reduced low area clearance requirement for the Increment 1 mission package remains in question.

## Recommendations

- Status of Previous Recommendations. The Navy still needs to address the FY11 recommendation to investigate solutions and correct the ALMDS False Classification Density and reliability deficiencies prior to IOT&E. 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:
  1. Complete comprehensive survivability studies for MH-60S employing the 20 mm Gun System and the Unguided Rocket Launcher.
  2. Conduct comprehensive live fire lethality testing of the HELLFIRE missile against a complete set of threat-representative small boat targets.
  3. Correct the tracking deficiencies in the MTS and conduct appropriate FOT&E in order to satisfactorily resolve the Surface Warfare Critical Operational Issue.
  4. Complete comprehensive IOT&E on the 2.75" Unguided Rocket and APKWS II to resolve the Surface Warfare Critical Operational Issue not resolved in limited assessments of system performance provided in QRAs against small boat threats.
- FY14 Recommendations. The Navy should:
  1. Continue to correct the deficiencies with the MTS tracker identified in testing.
  2. Test the Surface Warfare mission capability of MH-60S Helicopter equipped with MTS and the HELLFIRE missile throughout the operational mission environment in FOT&E and LFT&E.
  3. Complete vulnerability studies for MH-60S employing the LAU-61G/A Digital Rocket Launcher armed with APKWS II rockets.
  4. Conduct comprehensive lethality testing of the LAU-61G/A Digital Rocket Launcher armed with APKWS II rockets against a complete set of threat-representative small boat targets.
  5. Correct AMCM mission kit reliability issues that limit AMNS mission availability identified during the operational assessment.
  6. Develop corrective actions to eliminate early termination fiber-optic communications losses observed in the AMNS operational assessment.
  7. Conduct AMNS medium current testing from MH-60S. This testing must be completed prior to the completion of IOT&E.

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