MH-60S Fleet Combat Helicopter

Executive Summary

- The Navy's operational test agency, Commander, Operational Test and Evaluation Force (COTF), reported results of the MH-60S Armed Helicopter (Block 3A) variant IOT&E in October 2007. Those results, supplemented by a Navy Verification of Correction of Deficiencies (VCD) phase and a DOT&E-requested follow-up phase were adequate to determine operational effectiveness and suitability in all Armed Helicopter missions except for operational effectiveness in the Surface Warfare (SUW) mission.
- DOT&E released the Beyond Low-Rate Initial Production (BLRIP) report in October 2008 and found the Armed Helicopter operationally effective and suitable for the Combat Search and Rescue (CSAR), Aircraft Carrier Plane Guard/Search and Rescue (CVPG/SAR), Special Warfare Support (SWS) (Overland) missions, and the newly added Maritime Interdiction Operations (MIO) mission. For the Surface Warfare (SUW) mission, the Armed Helicopter is not suitable and operational effectiveness is yet to be determined. The Armed Helicopter is operationally survivable in all missions.
- IOT&E for the Block 2A Airborne Mine Countermeasures (AMCM) variant commenced in 2QFY08. Testing of the AN/AQS-20 Sonar Mine Detection Set, the first of five major AMCM systems planned for operation from the MH-60S, encountered significant reliability issues so the Program Office decertified the system and suspended testing until resolution of the problems.
- The Navy began combined MH-60R/S FOT&E of a group of newly installed systems called Pre-Planned Product Improvements (P3I) designed to enhance mission capability.

System

- The MH-60S is a helicopter modified into three variants (Blocks) from the Army UH-60L Blackhawk. It is optimized for operation in the shipboard/marine environment.
- The Blocks share common cockpit avionics and flight instrumentation with the MH-60R.
- Installed systems differ by Block based on mission:
  - Block 1 – Vertical Replenishment: Precision navigation and communications, maximum cargo, or passenger capacity
  - Block 2 – Airborne Mine Countermeasures (AMCM): AMCM systems operator workstation, tether/towing system, any one of five available mine countermeasure Systems
  - Block 3 – Armed Helicopter: Tactical moving map display, forward looking infrared with laser designator, crew-served side machine guns, Hellfire air-to-surface missiles, and defensive electronic countermeasures
- P3I components add tactical data link (Link 16) and various communication, navigation, and command and control upgrades.

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, and/or neutralization of sea mines depending on which AMCM systems are installed on the aircraft
- Block 3: Combat Search and Rescue, Anti-Surface Warfare, Aircraft Carrier Plane Guard, Maritime Interdiction Operations, and Special Warfare Support

Prime Contractor

- Sikorsky

Activity

- The Navy completed IOT&E for the MH-60S Armed Helicopter in June 2007 and released its report in October 2007. Despite the limitation of not conducting operations from a ship at sea, testing was in accordance with

the DOT&E-approved Test and Evaluation Master Plan and test plan.
- COTF conducted an initial Verification of Correction of Deficiencies (VCD) period from January to March 2008 and recommended full fleet introduction of the Armed Helicopter.
- DOT&E requested a follow-up phase to clarify VCD results to include additional testing, data collection, and confirmation of analyses. The Navy reported those findings in a VCD Addendum Message issued in July 2008.
- The Navy began IOT&E of the Block 2A Airborne Mine Countermeasures (AMCM) variant in March 2008 but, due to reoccurring problems associated with the deployment and retrieval of the primary sensor (AN/AQS-20A), the Program Office de-certified the system in April 2008, suspending the IOT&E for investigation of reliability issues.
- In September 2008, the Navy began FOT&E on P3I components designed to enhance aircraft mission capability, and on the Armed Helicopter to specifically address deficient Hellfire engagements and determine SUW effectiveness.
- The execution of the MH-60S LFT&E program was in accordance with the approved Alternative LFT&E Strategy contained in the Test and Evaluation Master Plan. The available data were adequate to assess the survivability of the MH-60S in its baseline configuration missions.

Assessment
- The Navy's initial evaluation of the Block 3A Armed Helicopter in October 2007 found it operationally not effective in CSAR and SWS (Overland) missions. Additionally, the Navy found the Armed Helicopter not suitable in CSAR, SWS, and SUW missions. For effectiveness, the IOT&E report noted problems meeting mission radii and multiple mission planning deficiencies. Regarding suitability, the Navy noted various safety, compatibility, and human factor deficiencies.
- Although the Armed Helicopter testing did not include ship-based helicopter operations at sea, the IOT&E, supplemented by a VCD phase and a DOT&E-requested follow-up phase, was adequate to determine operational effectiveness and suitability in all missions except for operational effectiveness in the SUW mission.
- Due to the unavailability of an aircraft carrier at sea, the Navy was unable to demonstrate the Armed Helicopter variant's operational compatibility at sea with a full airwing complement.
- For SUW, Hellfire testing was inadequate. Only three missiles were fired, all against non-evasive targets and well short of the four nautical mile engagement range. Additionally, there were no nighttime or rapid rate-of-fire shots.
- Armed Helicopter cabin overcrowding hampered crew mobility in all missions. Troop seats were inadequate and the position of the M-240D gunner's seat, only seven inches from the cockpit wall, prevents the gunner from assuming a proper position in the event of a crash.
- DOT&E finds that the Armed Helicopter is survivable in most expected threat environments. The overall susceptibility to surface-to-air threats is lower when compared to the legacy HH-60H aircraft; however, the quantity of expendables (chaff and flares) available are considered insufficient and the radar warning receiver demonstrated problems with bearing ambiguities, false alarms, spatial coverage, and warning voice clarity.
- The vulnerability assessment from the live fire test established that, with few exceptions, the Armed Helicopter is robust and ballistically tolerant. The aircraft also meets its force protection requirements, which include crashworthiness features (qualified by similarity to the UH-60L) and armor for personnel protection qualified by test against modest small arms.
- The Block 2 Airborne Mine Countermeasures (AMCM) variant, designed primarily to support systems that are part of the new Littoral Combat Ship (LCS) Mine Countermeasures Mission Package, could not reliably deploy and retrieve its primary sensor using its carriage, stream, tow, and recovery system.
- P3I FOT&E will determine operational effectiveness and suitability of Link 16 integration (delineated as the Block 3B variant) and 12 additional components primarily addressing command and control, navigation, and situational awareness designed to enhance the ability of the aircraft to more efficiently complete its missions.

Recommendations
- Status of Previous Recommendations. The Navy has addressed one of the two FY07 recommendations.
- FY08 Recommendations. The Navy should:
  1. Determine CV(N) shipboard compatibility of the MH-60S Armed Helicopter under operationally-realistic conditions. Testing should include underway flight operations with a representative complement of all air wing aircraft embarked.
  2. Determine operational effectiveness of the Armed Helicopter variant in the SUW mission to include sufficient day and night overwater Hellfire missile firings to fully demonstrate the aircraft's ability to conduct attacks against threat-representative, evasively maneuvering, seaborne targets from all weapon stations at tactical ranges.
  3. Correct the safety, compatibility, human factor, and mission planning deficiencies recorded during the Armed Helicopter variant IOT&E.
  4. Improve the APR-39A(V)2 Radar Warning Receiver effectiveness and consider increasing the number of ALE-47 Chaff/Flare dispensers.
  5. Improve aircrew seats that are survivable and allow for sufficient space to provide a means for safe and effective aircraft egress.
  6. Develop a plan to execute the Airborne Mine Countermeasure (Block 2) variant IOT&E such that it will be ready to support Mine Countermeasure mission module testing on LCS.