H-1 Upgrades – U.S. Marine Corps Upgrade to AH-1W Attack Helicopter and UH-1N Utility Helicopter

Executive Summary

- FOT&E for the UH-1Y was conducted from July to October 2009, and focused on the evaluation of satellite communications, Bright Star Block II multi-sensor imaging system, System Configuration Set 5.2, the Optimized Top Owl (OTO) 2.0B Helmet-Mounted Sight Display, and previously identified deficiencies.
- A second deployment of UH-1Y aircraft is scheduled for the 1QFY10.
- Phase 3 of IOT&E for the AH-1Z is scheduled to begin in March 2010.
- The H-1 Upgrades program is a covered program for LFT&E. All scheduled LFT&E on both aircraft has been completed. The UH-1Y was found to be survivable with the exception of the main rotor gearbox, which does not meet its required endurance with loss of lubrication.

System

- This program upgrades two Marine Corps H-1 aircraft:
  - The AH-1W attack helicopter becomes the AH-1Z
  - The UH-1N utility helicopter becomes the UH-1Y
- The aircraft have identical twin engines, drive trains, four-bladed rotors, tail sections, digital cockpits, and helmet-mounted sight displays. They are 84 percent common.
- The AH-1Z has a new high-fidelity targeting sensor for delivery of air-to-ground and air-to-air missiles, rockets, and guns.
- The UH-1Y has twice the payload and range of legacy UH-1N aircraft and it can deliver eight combat-ready Marines 118 nautical miles and return without refueling.

Mission

- Marine light/attack helicopter squadron detachments are deployed with a mixture of UH-1 and AH-1 helicopters.
- Detachments equipped with the AH-1Z attack helicopter conduct rotary-wing close air support, anti-armor, armed escort, armed and visual reconnaissance, and fire support coordination missions.
- Detachments equipped with the UH-1Y utility helicopter conduct command, control, assault support, escort, air reconnaissance, and aeromedical evacuation missions.

Prime Contractor

- Bell Helicopter, Amarillo, Texas

Activity

- In FY09 Commander, Operational Test and Evaluation Force conducted FOT&E for the UH-1Y at White Sands Missile Range, New Mexico, and at China Lake, Camp Pendleton, and Twentynine Palms, California. FOT&E for the UH-1Y took place from July through October 2009 and was conducted in accordance with a DOT&E-approved Test and Evaluation Master Plan and test plan.
- Test operations consisted of both day and night land-based missions and test articles consisted of two production representative UH-1Y aircraft with AV-8B, AH-1W, and AH-1Z providing additional resource support. The Command and Control mission area was evaluated during exercise Enhanced Mojave Viper.
- Focus for the UH-1Y FOT&E was to evaluate the Bright Star Block II, satellite communications (SATCOM), System Configuration Set 5.2, OTO 2.0B Helmet-Mounted Sight Display, and the deficiencies previously identified during IOT&E Phase 2 conducted in FY08.
- The second deployment of UH-1Y aircraft is scheduled to occur during 1QFY10.
- The 2008 IOT&E of the AH-1Z was stopped because of performance deficiencies. The program has completed development and is scheduled to begin IOT&E Phase 3 in 2QFY10.

Assessment

- Evaluation of the UH-1Y in FOT&E is underway with testing expected to be completed in 1QFY10. Twenty-six sorties have been flown and so far nothing precluding aircraft employment has been identified with regard to the introduction of the

SATCOM, OTO 2.0B, Bright Star Block II, and System Configuration Set 5.2.

- A redesign effort to increase the structural integrity and service life for the cuff and yoke is planned for FY10 with initial aircraft testing being planned for FY12. Additionally, a heads-up display of "g" rate change is planned to be introduced with System Configuration Set 6.0. This is designed to provide pilots with increased awareness of aircraft maneuverability during high gross weight and high density altitude operations. Deficiencies associated with the helmet performance and the OTO Helmet-Mounted Sight Display during IOT&E Phase 2 have been mitigated with the introduction of OTO 2.0B.
- Deficiencies noted during IOT&E and unique to the AH-1Z have shown significant improvement during developmental test and are being readied for evaluation during IOT&E Phase 3. They include Target Sight System reliability and performance deficiencies and rocket and AGM-114 Hellfire missile delivery effectiveness.
- The UH-1Y was found to be survivable, with the significant exception of the main rotor gearbox, which does not meet its required endurance after a loss of lubrication following ballistic penetration. The AH-1Z report has not been published, but it has the same main rotor gearbox vulnerability.

Recommendations

- Status of Previous Recommendations. The program is addressing all previous recommendations.
- FY09 Recommendations. The Navy should:
  1. Continue efforts to redesign the cuff and rotor thereby increasing its structural integrity and service life and eliminating maneuvering restrictions at high gross weights and high density altitudes.
  2. For the UH-1Y, increase the load capacity of the Improved Defensive Armament System and address the gun depression angle limitation which restricts defensive fields of fire.
  3. Fund and conduct LFT&E of the main rotor gearbox.
  4. Address water intrusion into the tail rotor for both AH-1Z and UH-1Y identified during IOT&E because of its negative impact on aircraft availability and increased maintenance burden.