

## USMC H-1 UPGRADES



This program combines upgrades of two USMC H-1 aircraft: the AH-1W Cobra attack helicopter and the UH-1N light utility helicopter. The common elements of the two will be identical twin engines, drive trains, a new four-bladed rotor, tail sections, and integrated digital cockpits. In addition, the AH-1 attack helicopter will gain an upgraded targeting system and the UH-1 will have an upgraded night navigation system. The upgrade will extend the lives of the two H-1 models well into the 21st century.

The upgrade of the AH-1W is referred to as the AH-1Z, and the upgrade of the UH-1N is referred to as the UH-1Y. Collectively, the AH-1Z/UH-1Y effort constitutes the USMC H-1 Upgrades Program.

### **BACKGROUND INFORMATION**

The Marine Corps instituted the H-1 Upgrades program in 1996 by combining several lesser planned upgrades to their UH-1 utility and AH-1 attack helicopters. Prior to entry into EMD in September 1996, DOT&E approved the program's TEMP and alternative LFT&E plan, and USD(A&T) approved a waiver from full-up, system-level LFT&E. The AH-1Z will be tested full-up, system-level; the UH-1Y received a waiver from full-up, system-level testing.

The alternative LFT&E plan calls for component and sub-system level testing of critical components for each helicopter. Common components tested as part of the AH-1Z Live Fire tests will not be re-tested as part of the UH-1Y Live Fire testing. The H-1 Upgrades Operational Requirements Documents require that both helicopters be tolerant to impacts by 12.7mm rounds and have crashworthy enhancements. Additionally, the drive components of the AH-1Z should be damage-tolerant to 23mm rounds.

### **TEST & EVALUATION ACTIVITY**

The only OT&E activity during the year was test planning. The approved TEMP calls for the T&E program to be conducted in two phases: integrated contractor/government developmental testing called IT and Operational Testing. Each aircraft model (AH-1Z and UH-1Y) will undergo its own individual OT&E and LFT&E.

To provide feedback early in development, the operational testers have formed a team to monitor IT and to provide Marine maintainers to assist with aircraft maintenance and to validate maintenance documents and procedures. Concurrent with IT, the operational testers will conduct two operational assessments that will provide data to support two LRIP decisions. OT&E for both aircraft will be conducted prior to MS III.

Live Fire testing of critical components and sub-systems continued, with five of the 17 scheduled tests now completed. During this past year, ballistic firings were conducted against the main rotor drive shaft and the 42° gearbox that drives the tail rotor. FY01 tests included dynamic ballistic tests of the 90° gearbox located directly next to the tail rotor.

### **TEST & EVALUATION ASSESSMENT**

An Integrated Test Team (ITT) consisting of government and contractor flight test engineers and pilots is conducting the IT program. The contractor demonstrates safety of flight of the EMD aircraft prior to participation of government personnel in flight testing. Funding constraints continue to threaten the overall scope of testing; recent program upheaval caused by increased costs and poor performance by the avionics integration subcontractor triggered an ongoing review of the program baseline, the outcome of which is not final at this writing. The program Test Integration Working Group (TIWG), in which DOT&E participates, is actively seeking to develop an integrated T&E program that should resolve all critical technical and operational issues before production.

An LFT&E Integrated Product Team (IPT), which includes representatives from DOT&E, the program management activity, the Naval Air Systems Command, and the prime contractor, has been formally established under the TIWG. This group has implemented changes in the component test procedure to ensure that an adequate get-home capability is demonstrated following hits to critical components and is identifying opportunities for a battle damage repair team to participate in the component-level tests as well as the full-up and full-up, system-level live fire testing.

The H-1 Upgrade Program has a comprehensive, robust LFT&E plan that is showing satisfactory progress. The LFT&E program is fully integrated into the systems engineering effort and should yield a reasonable opportunity to incorporate improvements as deficiencies are identified.