

AH-64D LONGBOW APACHE & LONGBOW HELLFIRE MISSILE



The AH-64D Longbow Apache is a remanufactured and upgraded version of the AH-64A Apache attack helicopter. The primary modifications to the basic Apache are the addition of a millimeter-wave Fire Control Radar (FCR) target acquisition system, the fire-and-forget Longbow Hellfire air-to-ground missile, updated T700-GE-701C engines, and a fully integrated cockpit. In addition, the aircraft has improved survivability, communications, and navigation capabilities. Most existing capabilities of the AH-64A Apache are retained.

The AH-64D is being fielded in two configurations. The full-up AH-64D includes all of the improvements listed above. The other version of the AH-64D does not have the FCR, Radar Frequency Interferometer, or the improved engines. The AH-64D without FCR is more affordable, yet remains capable of employing Longbow Hellfire missiles autonomously or in cooperation with the FCR-equipped AH-64. Present plans call for 501 AH-64A Apaches in the fleet to be upgraded to the AH-64D configuration. Approximately half (227) will be equipped with the FCR. This is an ACAT IC program.

Managed by the Army as a separate program, the Longbow Hellfire missile is a radar-guided version of the laser-guided Hellfire anti-tank, air-to-ground missile. The Longbow Hellfire features an active millimeter wave seeker and a dual tandem warhead designed to defeat reactive armor. Either the Fire Control Radar or the Target Acquisition and Designation Sight can be used to provide target location data to the missile prior to launch. The Longbow Hellfire can engage both moving and stationary vehicles.

The mission of the attack helicopter is to conduct rear, close, and deep operations; deep precision strikes; and armed reconnaissance and security when required in day, night, or adverse weather conditions.

BACKGROUND INFORMATION

The 1995 combined Longbow Apache and Longbow Hellfire IOT&E compared the AH-64D Longbow Apache with the baseline AH-64A Apache aircraft. Both the Longbow Apache and baseline Apache units conducted missions against a battalion-sized enemy ground force augmented with formidable air defenses while a real-time casualty assessment system imposed realistic friendly and enemy losses. The AH-64D force was significantly more lethal and survivable than the AH-64A force,

primarily as a result of major improvements in situational awareness, reduced exposure to enemy air defenses, and increased engagement ranges.

One issue uncovered during IOT&E that required follow-on testing involved a method of employment for the Longbow Hellfire missile. During IOT&E, Longbow Apache crews preferred to override the automatic firing mode selection and fire missiles from a masked position using the Lock-On Before Launch Inhibit (LOBL-I) firing mode. This technique significantly increased the helicopter's survivability during IOT&E, but had not been validated with live missile firings during preceding DT/OT.

DOT&E worked with the Army to develop a plan for a Follow-On Test of the LOBL-I engagement to confirm system performance using this firing technique. The test program included digital simulations, Hardware-in-the-Loop testing of the guidance section, low-speed captive flight test (LSCFT) of the missile seeker, and live missile firings at moving armored vehicles. The simulations, LSCFT, and four of the planned eight missile firings were completed in FY99. The Army successfully completed the remaining four of the eight target engagements with the Longbow Hellfire missile in FY00.

As the ongoing procurement of the Longbow Apache continues, the configuration of the aircraft will change to improve system reliability and survivability. The changes of particular interest to DOT&E include the aircraft's new portable fire extinguisher (located in one of the outer storage bays), the possible integration of the Suite of Integrated Infrared Countermeasures (with a focus on the advanced flare dispenser and the advanced flares), and the integration of the internal auxiliary fuel system (IAFS) (a new crashworthy and ballistically tolerant fuel tank and ammunition magazine located internal to the aircraft). The Army is working to develop a sub-system level ballistic vulnerability test plan for the IAFS to ensure that it will not adversely affect the survivability or vulnerability of the system. DOT&E will continue to monitor development and testing of these configuration changes.

TEST & EVALUATION ACTIVITY

No operational or live fire test events occurred in FY01. However, an incident during live fire training exercises with the Hellfire missile has implications for future testing. In October 2000, 19 Apache (AH-64A) Helicopters were damaged by debris from Hellfire Missiles manufactured with Alliant Tech/Hercules rocket motors. The debris poses an unacceptable safety risk to the tail rotor system. Therefore, the Army has suspended use of the Longbow Hellfire missile inventory and half of the Laser Hellfire missile inventory except for emergency or wartime use. In the near term, live fire training will continue with missiles with Thiokol rocket motors. For the long term, rocket motor design is underway and qualification testing will be complete by the end of FY02. DOT&E will closely monitor this testing to ensure adequacy of the new design before retrofitting begins. A total of 4,784 Longbow Hellfire missiles and 5,169 Laser Hellfire missiles are to be retrofitted.

TEST & EVALUATION ASSESSMENT

Preliminary results from the simulation and test firing of LOBL-I missiles indicate the issues raised during IOT&E have been resolved. Ultimately, the Hellfire missiles hit their intended targets in all eight of the planned test scenarios and the missile firings were consistent with the simulation results. The simulations suggest that the Longbow Hellfire missile can successfully engage moving targets using the LOBL-I firing mode, provided that the time between target detection and missile launch is not

excessive. Unfortunately due to resource constraints, the Army has not been able to complete their analysis of the simulations and FY00 missile firings. DOT&E expects the Army's report in 2QFY02 addressing the success and resulting tactics, techniques and procedures recommendations.

The LFT&E IPT reviewed all of the changes to the Apache helicopter since Full-up, System Level LFT&E in 1995, and has determined that they do not effectively change the vulnerability of the aircraft. The only outstanding LFT&E requirement is the completion of the engine fire detection and suppression system test and the ballistic vulnerability sub-system test of the IAFS.

The Army is committed to conducting the engine fire detection and suppression system test required by the Apache Longbow Test and Evaluation Master Plan. This test was deferred so that it could be conducted with the Army Aviation Halon replacement.

A suitable replacement (i.e., drop-in replacement) is currently not identified. As a result, the PMO has agreed to conduct this test with Halon, or the Halon Replacement agent if reasonably integrated on the airframe in time for test completion in FY03. The Army is working to complete the testing by that timeframe.

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