Apache Program Modernization Provides Combat Overmatch

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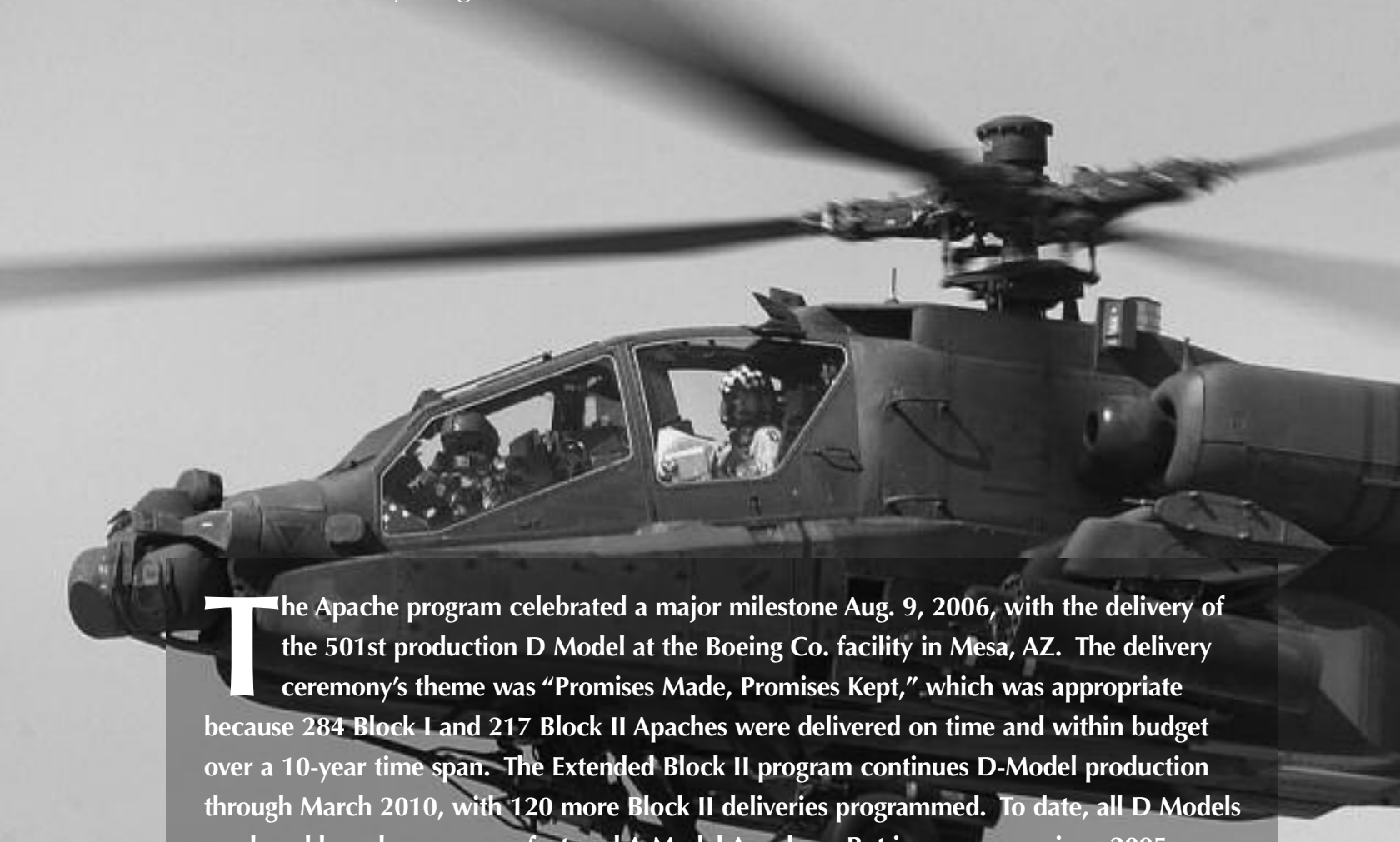

The Apache program celebrated a major milestone Aug. 9, 2006, with the delivery of the 501st production D Model at the Boeing Co. facility in Mesa, AZ. The delivery ceremony's theme was "Promises Made, Promises Kept," which was appropriate because 284 Block I and 217 Block II Apaches were delivered on time and within budget over a 10-year time span. The Extended Block II program continues D-Model production through March 2010, with 120 more Block II deliveries programmed. To date, all D Models produced have been remanufactured A Model Apaches. But in every year since 2005, Congress has appropriated and authorized the procurement of "new build" wartime replacement aircraft. In July 2007, the Army accepted the first-ever new-build D Model Apache, and 45 replacement aircraft have been approved through supplemental funding. Those aircraft will be delivered concurrently with remanufactured aircraft over the next 2½ years.

AH-64D Longbow Apache helicopter manufacturing upgrades include Fire Control Radar, enhanced Hellfire air-to-ground missile capacity, updated T700- GE 701D engines, M-TADS/PNVS system and overall improved survivability, communications and navigation capabilities. Here, U.S. Army Soldiers from Bravo Co., 1st Battalion, 101st Aviation Regiment, provide security from an AH-64D during an air assault mission near the Syrian border in Iraq, March 6, 2006. (U.S. Air Force photo by SSGT Aaron Allmon, 1st Combat Camera Squadron.)

Throughout the production run, improvements to the Apache fleet were incorporated. In the last 4 years alone, a digital map, a high-frequency (non-line-of-sight) radio, Blue Force Tracker radio/display, GE 701D engines, Internal Auxiliary Fuel System and the Modernized Target Acquisition Designation Sight (M-TADS) have been cut into the production line. The software has been updated to stay in communication on the digital battlefield in accordance with the Army's Software Blocking program. Other important software enhancements have also been incorporated with lessons learned from the global war on terrorism (GWOT). Critical wartime enhancements, such as the Common Missile Warning System, have been retrofit to Apaches in the field. The Modernized Signal Processing Unit is reducing the workload on the Soldier and is the "black box" to enable Condition-Based Maintenance on the Apache. The Aircraft Survivability Product Improvement has incorporated passive measures to significantly reduce the aircraft's vulnerability to threat systems.

To keep the Apache the most lethal attack helicopter in the world, additional enhancements are programmed for the Extended Block II program. The most significant enhancement planned is the integration of all aircraft survivability equipment information into a single display that will allow for the immediate targeting of threat systems. Another enhancement planned for post-production modification is the incorporation of the ARC-231 satellite radio. Plans to receive video from unmanned aircraft systems (UAS) (Level II UAS control) and send M-TADS video to ground stations are also underway.

The Longbow Crew Trainer (LCT) continues to serve as the only aircrew simulator deployed to combat. The LCT provides Apache commanders a unique capability to rehearse an actual mission in a cockpit or to review critical emergency procedures that cannot be conducted in the aircraft. Just like the aircraft, enhancements to the LCTs are taking place on a continuous basis. A new threat server, M-TADS functionality and an integrated Iraq geographical database have been incorporated in the past few years.

New 'Eyes' for Apache

Since the mid-1980s, Apache helicopter crews have completed their missions using the Targeting and Designation Sight[ing], Pilot Night Vision Sensor (TADS/PNVS). This technology serves as the platform's "eyes," enabling its aircrews the ability to fly the aircraft and detect and destroy enemy targets in night and adverse weather conditions. Over the years, this technology has clearly proven to be a combat multiplier but has not kept pace with advancements in sensors technology. Senior Army leadership, in response to warfighting lessons learned, field commanders' input and Army logisticians' input, responded by prioritizing and resourcing an effort to modernize the legacy TADS/PNVS Apache system.

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The acquisition process responded and — in a little more than 7 years — created, produced and is now fielding a brand new set of "eyes" for the Apache known as the M-TADS/PNVS system. Based on Standard Advanced Dewar Assembly I detector technology, the M-TADS/PNVS is the most technologically advanced and capable sensor in any helicopter worldwide. To date, the Army has fielded two M-TADS-equipped battalions and is in the process of fielding two additional battalions to operate in *Operations Enduring* and *Iraqi Freedom (OEF/OIF)* by November 2007. At the current production rate, the Army expects to have its entire Longbow fleet retrofitted with M-TADS by the end of 2010.

The M-TADS/PNVS modification program is the Army's initiative to:

- Provide our Apache aircrews 2nd generation forward looking infrared technology.
- Reduce fleetwide operations and support costs.
- Reduce the maintenance burden on our Apache maintainers.

The Army achieved its M-TADS First Unit Equipped in June 2005. The first unit has amassed well over 15,000 operational flight hours, and the pilots and maintainers are thrilled with the system's performance. A second equipped unit is now outfitted and is preparing for an upcoming deployment. Aviation commanders have reported that the effect of this modernization is so great that new tactics, techniques and procedures are under evaluation to better exploit this tremendous capability. Commanders on the ground are equally impressed and are learning that the Apache can now support them at significantly greater standoff distances.

Maintenance of the M-TADS/PNVS system is enhanced and made easier by an improved built-in test (BIT) and a 2-level maintenance concept. By contract and by design, the BIT is required to identify the failed component — Line

The LCT provides Apache pilots a unique capability to rehearse actual missions from the cockpit of their helicopters. This aircrew simulation trainer is currently deployed to Iraq and Afghanistan. (U.S. Army file photo.)

Replaceable Unit (LRU) — in the first callout 90 percent of the time. The 2-level maintenance concept is a significant paradigm shift wherein a unit will no longer have to stock a significant number of LRUs. M-TADS is supported under an "it takes one (a turned-in component) to get one (new component) system." This support concept also recently became a contractual agreement between the Apache Project Management Office and Lockheed Martin, the M-TADS manufacturer. The contract is a performance-based logistics (PBL) agreement and includes the entire M-TADS product line as well as all legacy system components. PBL will greatly enhance the logistical system's responsiveness and coverage. Soldiers will turn in failed sensor components at their designated Supply Support Activity (SSA) and receive a replacement within an incentive-based performance goal. For example, an 01 to 03 priority must be filled (part available at the SSA) within 48 hours.

Clearly, M-TADS/PNVS provides our Apaches of today with a new set of "eyes." This system, along with many other planned/programmed upgrades, postures the aircraft for many more years of success in providing our aircrews with the technological supremacy they need to survive and win the GWOT.

Apache Block III (AB3)

AB3 is the Apache's next generation aircraft and is in development now. AB3 will address obsolescence issues and add capability, thereby ensuring that the aircraft is a viable combat multiplier within the Army's Future Combat Force through 2030. The cornerstone to the AB3 program is the insertion of mature technologies into a proven weapon system platform. Consequently, AB3 is primarily an integration effort and not a new technology development. AB3 will address current and future system shortfalls by integrating:

- Level IV UAS control with targeting and data transfer capability.
- Improved situational awareness.
- An upgraded communications suite.
- Improved drive and propulsion systems.
- Improved targeting capability.
- An electronic system re-architecture with enhanced computer processing capability.
- Improved navigation systems.
- Improved diagnostics and maintainability.

Because the AB3 effort is not specifically developing new technologies, the DOD Acquisition Executive allowed the program to bypass Milestone A and enter System Development and Demonstration (SDD) at Milestone B. This critical milestone was achieved with a successful Defense Acquisition Board on June 28, 2006. Subsequently, SDD contracts were awarded to the Boeing Co. on July 14, 2006, and the Longbow Limited (LBL) Liability Corp. (a joint venture between Lockheed Martin and Northrop Grumman) on Sept. 29, 2006.

As the aircraft manufacturer, Boeing is the lead systems integrator, whereas LBL will specifically address obsolescence and system improvements associated with the Fire Control Radar (FCR). Additionally, LBL will develop the UAS

To date, the Army has successfully fielded two M-TADS-equipped battalions and will field two more by November 2007 to support *OEF/OIF* combat operations in Afghanistan and Iraq. Here, a 10th Combat Aviation Brigade, 10th Mountain Division (Light) AH-64 Apache helicopter refuels in Jalalabad, Afghanistan, last January. (U.S. Army photo by SSG Marcus J. Quarterman, 982nd Signal Co. (Combat Camera).)

M-TADS, AB3 and other technological advancements ensure that the AH-64D Longbow Apache helicopter remains the world's preeminent attack helicopter. Here, SPC Kevin Jones talks to a 1st Battalion, 101st Aviation Regiment aircrew before they take off from Forward Operating Base Speicher, Iraq. (U.S. Air Force photo by TSGT Andy Dunaway, 1st Combat Camera Squadron.)

control capability and integrate it within the FCR Electronics Unit and the associated Mast Mounted Assembly.

Limited computer processing capability is the primary factor preventing electronic improvements or enhancements within the current Block I and Block II Apache fleets. AB3 will design the onboard mission computing network to an open system standard and replace six technologically obsolete computers with two powerful new mission processors. This single improvement will save weight and address equipment obsolescence, opening the door for other major electronic enhancements that would otherwise be impossible to implement in older Apaches. The AB3 improvements not dependent on aircraft computer upgrades are new composite main rotor blades, a new main transmission system and the 701D engine for commonality with the UH-60M Black Hawk. The combination of these three improvements will be the primary factors enabling AB3 to meet its Key Performance Parameter mandating increased aircraft performance.

The primary AB3 enhancement actually allowing warfighters the flexibility to change how Apache fights is Level IV control of UAS. The benefits of UAS capabilities are being proven on a daily basis in real-world combat operations. With actual UAS imagery displayed in the AB3 cockpit, a Hellfire missile can be launched as soon as an enemy target is verified by the Apache crew. Consequently, a complete level of communication coordination and the associated timelines are eliminated. The potential benefits of an AB3 with Level IV UAS control are tremendous and may not be fully realized until the system is actually fielded.

The Apache team continues to strive to modernize the aircraft by continuing to provide aircrews the combat overmatch for which the Apache is famous. M-TADS, AB3 and a host of other technological development efforts are either being fielded or are on the way to ensure the Apache retains its place as the world's preeminent attack helicopter today and well into the 21st century.

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