

## Aviation Modernization

### DISCUSSION

The Marine Corps has several significant aviation modernization programs underway to restore and enhance the capabilities of its existing aviation platforms. This modernization effort is significant to the Marine Corps' overall transformation effort. It has allowed the use of current and enhanced capabilities to sustain the Corps' combat edge while it develops the next generation of aircraft, weapon systems, and munitions.

Central to the effort is the initiative to remanufacture our fleet of aging AV-8B attack aircraft. Other key aviation modernization initiatives include the F/A-18A upgrade, EA-6B upgrade, CH-53E upgrade, CH-46E Engine Reliability Improvement Program (ERIP), AH-1/UH-1 upgrade, the Advanced Tactical Airborne Reconnaissance System (ATARS), and Aviation Command and Control Modernization.

The **AV-8B Remanufacture Program** upgrades this day-attack aircraft into a more capable radar and night-attack variant. The program retains the Harrier's wing and many other original items, while adding a new fuselage, a night attack avionics suite (a navigation forward-looking infrared (FLIR) set, a digital moving map, color displays, night vision goggle lighting), and a surplus APG-65 multi-mode radar from the F/A-18. The aircraft also receives the more powerful and reliable Pegasus-408 engine and an additional 6,000 hours of airframe life for 80% of the cost of a new aircraft.

To further improve the aircraft's capability and survivability, the AV-8B will receive the Litening II targeting pod. The third-generation FLIR, dual field-of-view TV seeker, and an infrared marker will provide improved target recognition and identification, while

the laser designator and laser spot tracker will provide precision-targeting capability. The Litening II will enable the AV-8B to engage targets at substantially increased ranges while employing current and future generations of precision munitions, thus improving the aircraft's survivability over the modern battlefield. This enhanced precision will also reduce the risk of collateral damage and fratricide.

The **F/A-18A Upgrade** consists primarily of avionics and hardware upgrades that allow the F/A-18A to process and utilize the updated versions of the F/A-18C software and accessories. The modified "A" aircraft will be compatible with Lot XVII F/A-18C aircraft, an aircraft eight years younger. This upgrade program will enable the "A" aircraft to employ all current and programmed future weapons. A large portion of this modification increases the commonality between the "A" and "C" aircraft, which reduces the logistics support footprint – and pilot and maintenance training – and mitigates obsolescence problems. The Marine Corps expects the "A" model aircraft to remain in the active inventory until the 2015 timeframe.

**EA-6B Upgrades** maintain Marine Prowlers as an essential combat-proven member of the MAGTF and the joint force. The cornerstone of the modification, repair, and upgrade plan





is the Block 89A weapon system upgrade. Block 89A includes ARC-210 radios (SINGARS/Have quick capable), Embedded Global Positioning System/ Inertial Navigation System (EGI), and an enhanced AYK-14 mission computer.

Block 89A is the baseline aircraft configuration for the next and last expected major weapon system upgrade for the Prowler, the ICAP 3. The ICAP 3 weapon system will be a major warfighting modification that improves the receiver suite for the first time in 30 years. The improved receivers will enable more precise jamming while also increasing aircrew situational awareness and reducing lifecycle costs.

As the EA-6B fleet begins to reach the end of its airframe service life, re-winging and upgrades are critical to extending the aircraft's viability through 2015. The Marine Corps received 10 Block 89A aircraft in FY 2001 and FY 2002 for a total of 20 aircraft. ICAP 3 is scheduled for introduction in FY 2005.

The **CH-53E Upgrade Program** is a cost-effective solution to maintaining the Super Stallion as the premier heavy-lift aircraft through the year 2025, when a Joint Common Lift aircraft will enter service. The current fleet of CH-53E aircraft begins to reach the end of its service life in this decade.



Beyond service life extension needs, these aircraft also need this comprehensive upgrade to effectively and economically meet MAGTF and joint warfighting requirements during the next 25 years.

The CH-53E Upgrade Program will address issues such as increased range and payload, operation and support cost reductions, commonality with other assault support platforms, and digital connectivity and interoperability. It includes engine enhancements, improved main rotor blades and external cargo hook system, and a common cockpit, as well as service life extension. The CH-53E SLEP operational requirements document is in work at MCCDC and the analysis of alternatives is under contract.

The **CH-46E Engine Reliability Improvement Program (ERIP)** is essential to keep the CH-46E a viable and supportable airframe until its full replacement by the

MV-22 Osprey. By replacing the CH-46's T58-GE-16 engine core and accessories, ERIP will arrest an observed downward trend in engine health, increase engine reliability, and restore operational power margins while providing a significant reduction in fleet labor and support costs.

The **AH-1 and UH-1 Upgrade** will ensure that the MAGTF possesses credible rotary-wing air support and utility support platforms in the coming decades. In 1995, the Secretary of the Navy approved the Marine Corps program to upgrade both utility and attack helicopters. Known as the H-1 upgrade, this program modernizes the entire fleet, including 100 UH-1Y and 180 AH-1Z aircraft.

The H-1 remanufacture program builds on the existing aircraft capabilities, and takes advantage of planned improvement programs in communication, navigation, electronic warfare, and night thermal imaging, and

other systems to provide the Marine Corps with an advanced fleet of utility and light attack helicopters. At the center of the upgrade is the installation of a four-bladed rotor system, a newly developed drive train, and a more powerful T700 engine. The addition of an integrated glass cockpit with modern avionics systems will provide a more lethal platform, as will the enhanced joint interoperability achieved through the use of digital architecture and the installation of DCS 2000 radios.

Operational enhancements will lead to a dramatic increase in range, speed, payload, and lethality of both aircraft, while their logistic footprints decrease significantly. The utility variant will operate at twice the current range with double the payload. The attack variant will realize similar performance increases and gain the ability to carry twice its current load of precision-guided munitions. Both aircraft will achieve cruise speeds of over 150 knots.

The H-1 upgrade program uses components that are 85% common between the AH-1 and UH-1 aircraft. Use of the same major components — drive train, cockpit, and software — greatly simplifies logistical support requirements. In turn, this will result in more space available on already space-constrained amphibious and MPF ships. Moreover, these improvements will align the Marine Corps' attack and utility helicopter capabilities with the performance demands of our warfighting concepts.

**The Advanced Tactical Airborne Reconnaissance System (ATARS)** is designed for the F/A-18D to maintain a manned airborne reconnaissance capability within the MAGTF. The ATARS incorporates multiple sensor

capabilities, including electro-optical, infra-red, and synthetic aperture radar, which ATARS-equipped aircraft will carry simultaneously. The system also retains a critical man-in-the-loop capability, with sensor usage being selected by the crew.

Another important ATARS feature is its ability to digitally transmit collected data in near-real time to ground receiving stations. This information can be provided to various information/intelligence systems for national exploitation via the Joint Service Imagery Processing System-Tactical Exploitation Group (JSIPS-TEG). Consequently, ATARS is poised to become a major contributor in the national imagery arsenal.

**Unmanned aerial vehicles (UAVs)** will grow in importance as their capability continues to be demonstrated on the battlefield. The Pioneer System Product Improvement Program (PIP) will remain the Marine Corps' backbone UAV until the acquisition of a replacement system. In addition to Pioneer PIP, the Marine Corps Warfighting Laboratory has developed the "Dragon Eye," a small, portable UAV designed for small-unit reconnaissance. Dragon Eye is a component of the Small Unit Remote Scouting System (SURSS) program.

The Tactical Control Station (TCS) remains central to UAV developmental efforts. TCS will give the Corps a ground control station (GCS) with tremendous growth potential as well as connectivity with the whole family of UAVs, from tactical unmanned aircraft to High-Altitude Endurance UAVs. Additionally, TCS will provide the UAV GCS interoperability with a variety of intelligence nodes.





The **Marine Air Command and Control System (MACCS)** modernization effort to improve air command-and-control capabilities involves the fielding of seven developmental systems in the FY 2005-FY 2008 timeframe. These new systems will provide the ACE commander with the necessary hardware, software, equipment, and facilities to effectively orchestrate all Marine Aviation C2, sensors, weapons, and aircraft. The key thrusts in this modernization effort include: (1) expeditionary packaging, (2) modern information technology, (3) joint interoperability, and (4) exclusive operation by Marines.

The following systems will enhance Marine Aviation's contribution to Expeditionary Maneuver Warfare:

>> The **Common Aviation Command and Control System (CAC2S)** will provide a suite of common equipment usable in air, land, and sea-based configurations. It will enable the migration of aviation command-and-control activities away from single-function, "stove-pipes" and toward multi-functional nodes that may be task-organized for a variety of mission requirements. CAC2S will provide situational awareness by incorporating intuitive displays, information management functions, embedded training and simulation, self-test and diagnostic capabilities, and command dissemination to the MAGTF C4I Command Information Architecture for real-time combat direction of aviation missions. The information provided

by CAC2S will be interoperable with MAGTF C4I, naval, and joint command information systems

- >> The **Multi-Role Radar System (MRRS)** is a highly mobile, HMMWV-mounted, multi-role, modular, medium-range air surveillance radar designed to provide an early entry air surveillance capability ashore. MRRS also provides weapon cueing for short-range air defense weapon systems such as CLAWS and Avenger.
- >> The **Complementary Low Altitude Weapons System (CLAWS)** will marry the capability of the Advanced Medium-Range Air-to-Air Missile (AMRAAM) capability with the mobility of the HMMWV. CLAWS will provide the MAGTF with a rapidly and easily deployed, highly mobile, maneuverable, high firepower, air defense asset that complements existing Stinger-based systems
- >> The **Air Surveillance and Precision Approach Radar Control System (ASPARCS)** is a next-generation, highly mobile, HMMWV-mounted expeditionary air traffic control facility.
- >> The **AN/TPS-59 Radar** provides long-range, three-dimensional, land-based air surveillance for the MAGTF optimized for theater ballistic missile and conventional air-breathing target detection and tracking. The AN/TPS-59 Radar will undergo a service life extension program to improve expeditionary relevance and to enhance operational readiness

- >> The **Composite Tracking Network (CTN)** is an adaptation of the U.S. Navy's CEC Cooperative Engagement Transmission Processing Set (CETPS) designed to meet the USMC's requirements. CTN will provide a sensor netting capability that will allow the Marine Corps to participate in a cooperative engagement environment. The system will be employed by the MACCS and use network information that is derived from both organic sensors and those of other joint forces, exponentially improving real-time situational awareness.

## MARINE CORPS POSITION

The Marine Corps continues to pursue new and innovative weapon system improvements and modernization efforts such as the AV-8B remanufacture, F/A-18A upgrade, EA-6B Upgrades, CH-53E Upgrade, CH-46E ERIP, AH-1/UH-1 Upgrade, ATARS, Pioneer UAV PIP, and Aviation Command and Control Modernization to maintain its combat superiority and tactical relevance in the changing world.