

## AIRCRAFT

### Rotary Wing

The **AH-64A Apache Helicopter** provides day, night and adverse weather attack helicopter capability. The Apache is the Army's primary attack helicopter. It is a quick-reacting, airborne weapon system that can fight both close and deep to destroy, disrupt or delay enemy forces.

The Apache first entered service inventories in 1984. The aircraft is designed to fight and survive throughout the world. It is equipped with a target acquisition designation sight and a pilot night-vision sensor that permits its two-person crew to navigate and attack in darkness and adverse weather. The Apache's principal mission is to destroy high-value targets with the Hellfire missile. It also is capable of employing a 30 mm M230 chin-mounted automatic cannon and Hydra 70 rockets that are lethal against a variety of targets.

The Apache has a maximum speed of 145 knots. It has a maximum gross weight range of 240 nautical miles (A model) and 230 nautical miles (D model) with range extension capability using internal and external tanks. The Apache has a full range of aircraft survivability equipment and the ability to withstand hits from rounds up to 23 mm in critical areas. Apache ordnance consists of the Hellfire Missile (RF/SAL



versions), 2.75-inch rockets (all versions) and 30 mm HEI rounds.

The **AH-64D Longbow** is being fielded through a combination of new production and remanufacture of AH-64A aircraft. The AH-64D incorporates the Longbow fire-control radar (FCR), capable of being used day or night, in adverse weather and through battlefield obscurants. The AH-64D consists primarily of the integration of a mast-mounted millimeter-wave fire-control radar, a radar frequency interferome-

ter and a radar frequency fire-and-forget Hellfire missile.

The Longbow's digitized target acquisition system provides automatic detection, location, classification, prioritizing and target handover. The AH-64D cockpit is redesigned to digitize and multiplex all systems. The manpower and personnel integration program (MANPRINT) crew stations have multifunction displays to reduce crew workload and increase effectiveness. The AH-64D provides a truly coordinated rapid-fire (16 separate targets within one minute) capability to the maneuver force commander on a 24-hour basis and in any conditions.

July 2008 saw the first flight of the **Apache Longbow Block III** prototype aircraft, ahead of schedule. A successful limited user test was completed in November 2009 as a critical requirement needed for awarding an initial production contract before the end of 2010.

Slated for fielding beginning in 2011, the Block III will feature: Future Modular Force connectivity—seamless global information grid communications; Level IV unmanned aircraft system control; increased survivability—extended range sensors and weapons; a cognitive decision aiding system; improved aircraft performance; and reduced operations and support cost and logistics footprint.

The **OH-58D Kiowa Warrior** fills the Army's armed reconnaissance role for air cavalry units. The Kiowa Warrior fleet continues to exceed readiness goals, while executing at an operational tempo five times the normal rate. It is a two-seat, single-engine, observation, scout/attack helicopter with four main rotor blades.

The **Kiowa Warrior** utilizes a thermal-imaging system, a low-light television, and a laser rangefinder/designator in a mast-mounted sight situated above the main rotor. The aircraft is equipped with a variety of weapon systems including: Hellfire, 2.75-inch rockets and a .50-caliber machine gun. The aircraft operates autonomously at standoff ranges providing armed reconnaissance, command and control, and target acquisition/designation for Apache helicopters and other airborne weapons platforms in day, night and adverse-weather conditions. The active Army and the National Guard fly Kiowa Warriors.

The **Kiowa Warrior Cockpit and Sensor Upgrade Program (CASUP)** was approved to ensure that the warfighter has the latest mission equipment technology and to guarantee that it remains a viable asset in the nation's arsenal through 2025. The most significant aircraft and system upgrades focus on eliminating obsolescence, reducing aircraft weight, and including major upgrades to sensors, aircraft



*Kiowa Warrior*

avionics, survivability equipment, electrical system, software, cockpit displays and master processor hardware.

The **UH-60 Black Hawk Helicopter** is the workhorse of Army Aviation, flying more than 49 percent of the Army's annual flying hours. The UH-60 Black Hawk mission is to protect and sustain the force by providing air assault, general support, command and control, and medevac capabilities. It has enhanced the overall mobility of the Army through its dramatic improvements in troop capacity and cargo-lift capability. An entire fully equipped, 11-man infantry squad can be lifted in one aircraft faster and in inclement weather conditions, allowing ground commanders to quickly shift forces to increase battlefield operational tempo to overmatch the enemy's. The Black Hawk can also reposition a 105

mm howitzer, its crew of six and up to 30 rounds of ammunition in a single lift, allowing the rapid massing of overwhelming combat power.

The **HH-60 (Medevac)** configuration meets the need for an improved evacuation platform for tactical, en route patient care and evacuation. The **UH/HH-60M Black Hawk** is presently in production and serves as the Army's utility helicopter for the current and future force and is in line with the Army's modernization strategy, the National Military Strategy and National Defense Strategy.

The **UH-60M** enhances the commander's ability to conduct nonlinear, simultaneous, fully integrated operations in order to decisively mass the effects of the Army's warfighting assets. The UH/HH-60M configuration provides digital connectivity for

UH-72A Lakota



Jodie Whittington/American Eurocopter

enhanced situational awareness and improved lift, range, deployability and survivability to further increase the commander's ability to conduct air assault, general support, command and control, and aeromedical evacuation. The **MH** version supports unique Special Forces roles and missions, including a gunship variant identified as the MH-60 Direct Action Penetrator (DAP).

The **UH-72A Lakota** is the Army's newest helicopter. It is being deployed to the active Army for use at the test and training centers as well as by the Army National

Guard (ARNG). Since the first UH-72A was delivered in November 2006, more than 100 have been produced. The Lakota provides general support and medevac missions at the test and training centers and performs security and support and medevac missions for the ARNG. Ultimately, 345 UH-72A will be delivered to the Army, replacing aging UH-1 and OH-58A/C aircraft and freeing up UH-60 Black Hawk aircraft for use in Iraq and Afghanistan.

In the last three-and-a-half years of production, the Lakota has been deployed to

Fort Irwin, Calif.; Fort Polk, La.; Fort Rucker, Ala.; Fort Eustis, Va.; U.S. Army Europe; and the U.S. Military Academy as well as ARNG units in Louisiana, Mississippi, Florida, North Carolina, South Carolina, Texas, Alabama, Pennsylvania, Vermont, Puerto Rico and the District of Columbia. The aircraft will also be deployed to the Kwajalein Atoll in the Central Pacific. The UH-72A fleet has already flown more than 30,000 flight hours with operational availability rates of more than 90 percent. In the next two years, the aircraft will see maximum production and fielding with more than 90 aircraft entering service.

The UH-72A is also unique in that it uses contractor logistics support (CLS) for its maintenance. Active Army units receive full CLS, while the ARNG has implemented a hybrid form that allows Guard members to conduct field-level maintenance. The program also utilizes contractor-provided new equipment training (NET). The UH-72A program has benefited from this construct in that it has allowed the aircraft to quickly enter service. The UH-72A program has been a major success, meeting all its cost, schedule and performance goals.

The **CH-47F Improved Cargo Helicopter (ICH)** is being procured through both new-build and remanufactured processes. The

Boeing Company's CH-47F helicopter features a newly designed, modernized airframe, a Rockwell Collins common avionics architecture system cockpit and a BAE digital advanced flight control system. The advanced avionics provide improved situational awareness for flight crews with an advanced digital map display and a data transfer system that allows storing of pre-flight and mission data. Improved survivability features include common missile warning and improved countermeasure dispenser systems.

Powered by two 4,868-hp Honeywell engines, the new CH-47F can reach speeds greater than 175 mph and transport payloads weighing more than 21,000 pounds. The CH-47F with the Robertson Aviation extended-range fuel system has a mission radius greater than 400 miles.

First unit fielding of the CH-47F began in July 2007. To date, the project office has fielded six units equipped.

The **MH-47G** is the latest special operations variant, building on the capabilities of the MH-47E and adding a digital common avionics architecture system (CAAS) cockpit as well as enhanced aircraft survivability equipment. The first MH-47G aircraft were deployed to Afghanistan in February 2007.

## Aviation Systems

Army air traffic services provide Army Aviation the assets required to ensure safety and survivability on the modern battlefield. Tactical **Air Traffic Control (ATC)** supports air and land component commanders' automated airspace command-and-control requirements and ATC for aircraft operating in terminal and rear operation areas. In turn, air traffic services support is critical to fixed-base force projection platforms, a function that mitigates risks to Army aircraft operating from Army airfields worldwide.

To meet these needs, the Office of the Product Manager for Air Traffic Control Systems (PM ATC)—assigned to the Aviation and Missile Command at Redstone Arsenal, Ala.—manages the modernization of the tactical and nontactical ATC equipment.

Major tactical ATC programs include the air traffic navigation, integration and control system, tactical airspace integration system and the mobile tower system.

The **AN/TPN-31 Air Traffic Navigation, Integration, Coordination System (ATNAVICS)** is a Humvee-mounted, survivable radar system that supports a highly mobile tactical area surveillance and precision-approach air traffic control system. It is replacing the technologically obsolete and unsupportable landing control central (AN/TSQ-71B). The system provides expeditious air traffic flow, permitting continuous unimpeded operations, and provides

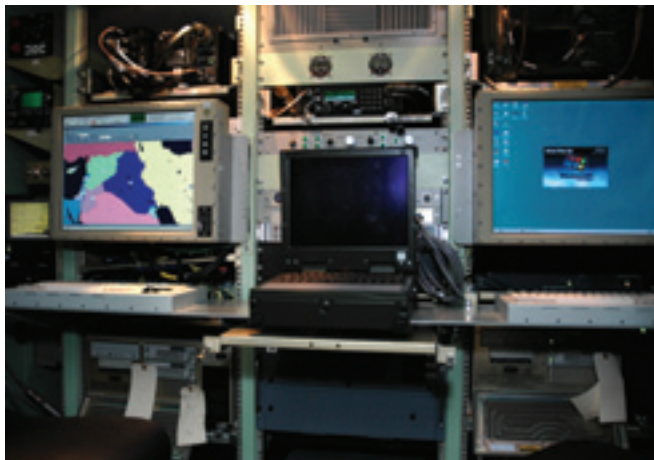


*AN/TPN-31 Air traffic navigation, integration, coordination system (ATNAVICS)*

area navigational assistance, integrates air traffic during joint/combined operations and coordinates air movement within selected terminal controlled airspace areas.

The ATNAVICS facilitates the safe handling of terminal air traffic, providing precision approach capabilities. All components of the system can be loaded onto a

*AN/TSQ-221  
Tactical airspace  
integration system*



General Dynamics

single C-130 aircraft for deployment to any location. In addition, the system can be slingloaded by a CH-47.

The **AN/TSQ-221 Tactical Airspace Integration System (TAIS)** is a tactically mobile and strategically deployable system incorporating a Humvee prime mover with a standard Army rigid-walled shelter containing the mission equipment and radio suite. The **AN/FSQ-211 TAIS Airspace Workstation (AWS)** is a transportable small form-fit factor computer running Microsoft Windows, Microsoft Office suite and the TAIS mission application. The TAIS software in both variants provides a

digitized warfighting application within the Army battle command system (ABCS) system of systems (SoS). TAIS and TAIS AWS are utilized in all theaters, across the range of military operations, and compose the U.S. Army's program of record for both airspace command and control (AC<sup>2</sup>) and tactical en route air traffic services (ATS) requirements. Either variant can develop Army requests for airspace, deconflict combat airspace and airspace users, and interface with joint airspace management systems through the theater air ground system (TAGS). This provides a direct interface to the joint force air compo-

nent commander (JFACC)/airspace control authority (ACA) through the joint theater battle management core system (TBMCS). TAIS and TAIS AWS provide automated AC<sup>2</sup> and coordinated use of battlefield airspace for the purpose of supporting force operations, enhancing force projection and facilitating better freedom of maneuver in the airspace, while minimizing fratricide through precise battle command synchronization and deconfliction capabilities in four dimensions. The AN/TSQ-221 TAIS also supports nonautomated airspace users and aircraft through voice and manual interfaces.

The latest version of TAIS software resident in both the TAIS and TAIS AWS also provides a web-based, netcentric, thin client application called the dynamic airspace collaboration tool (DACT), which provides AC<sup>2</sup> collaboration and 3-D visualization capability for non-TAIS users via a JAVA web applet. This extends key elements of TAIS functionality to other Army users, joint and coalition partners on shared mission networks without the need for these other users to have a TAIS AWS. The DACT allows all airspace stakeholders to rapidly and accurately collaborate on airspace requests in real time. For example, an Army brigade combat team can use its TAIS AWS to collaborate with a U.S. Marine Corps airspace agency using the

DACT and a U.S. Air Force airspace agency using the DACT to expedite dynamic re-tasking of assets across service boundaries.

The **AN/MSQ-135 Mobile Tower System (MOTS)** will be a highly mobile tactical air traffic control system designed to be rapidly set up and to quickly establish air traffic services during the initial phases of deployment and sustain those services throughout operations and redeployment. The system replaces the AN/TSW-7A and AN/TSQ-70A.

The AN/MSQ-135 MOTS system will be mounted on a Humvee and be C-130-deployable and helicopter slingloadable, with digital jam-resistant communications. The MOTS will provide air traffic services in airspace designed for air traffic movement at terminal areas of the division, corps and echelons above corps during wartime and stability and support operations.

MOTS will provide numerous services, including sequencing and separating arriving and departing aircraft, coordinating instrument meteorological condition recovery of aircraft, coordinating in-flight emergencies, and search and rescue (including combat missions). In peacetime, the MOTS will support Army air traffic services training requirements and aviation units during tactical field training exercises, along with supporting other agencies, host nations, joint services and other Army missions. The tactical ATC systems are derivatives of commercial off-the-shelf technologies or derivatives of other military systems. By using this approach, the PM ATC has maximized the effectiveness and efficiency of funding allocated to the air traffic equipment inventory modernization.

The **AN/TSQ-198 Tactical Terminal Control System (TTCS)** enhances aircrew safety by providing initial air traffic services at remote landing sites and drop zones. The system includes secure communications equipment for aircraft separation and ground control, a meteorological measuring system for basic weather information and a precision location capability. It is a retrofit to the ARC-220.

### Fixed-Base Programs

The major fixed-base ATC programs include the National Airspace System (NAS) modernization programs: the digital airspace surveillance radar, the DoD advanced automation system, the voice communications switching system and the fixed-base precision approach radar.

The **Digital Airspace Surveillance Radar (DASR)**, or AN/GPN-30, is a new terminal air traffic control radar system that replaces current analog systems with new digital technology. DASR will replace the Army's AN/FPN-66A on a one-for-one basis, and it is also being considered for use at other locations where airport surveillance radar capability will be lost when

the AN/FPN-40s are decommissioned. These older radars, some as old as 20 years, are being replaced to improve reliability, provide additional weather data, reduce maintenance cost, improve performance and provide digital data to new digital automation systems for presentation on air traffic controller displays.

Also under the DoD NAS procurement effort is the **DoD Digital Advanced Automation System (DAAS)**. AN/FSQ-204 DAAS is DoD's version of the FAA's standard terminal automation replacement system (STARS). DAAS/STARS replaces the automated radar terminal system and other capacity constrained, older terminal automation systems in approach control faci-

ties and associated towers. Controllers providing ATC services to aircraft in the terminal areas will use DAAS. Typical terminal ATC services include separating and sequencing air traffic, disseminating traffic alerts and weather advisories, and radar vectoring arriving and departing air traffic. Product Manager for Air Traffic Control plans to acquire 38 systems for installation at Army airfields worldwide.

The **Voice Communications Switching System (VCSS)** is an integrated voice switching system designed for installation at 48 Army sites under the NAS acquisition program. VCSS is being procured to replace existing analog voice systems that are approaching the end of their economic and

technical life cycles. VCSS is designed to provide highly reliable, state-of-the-art, air-to-ground, ground-to-ground and intercom communications for controllers of military and civil air traffic. The VCSS is capable of interfacing with legal voice recorders for recording controller-pilot communications. The interface with voice recorders provides a way to chronicle the voice communications into and out of the VCSS for analysis, training, and accident and incident investigation. VCSS has four configurations to accommodate a range of facility sizes.

The Army AN/FPN-67 **Fixed-Base Precision Approach Radar (FBPAR) System** provides capabilities for air traffic separation, final approach course monitoring, precision and non-precision approach guidance, and instrument meteorological conditions recovery operations for aircraft operating in Army-controlled airspace and/or at Army terminal airfields. The FBPAR replaces the AN/FPN-40 fixed-base radar being used by fixed-base ATC facilities worldwide. This radar is a modification of the precision-approach radar portion of the ATNAVICS (AN/TPN-31) tactical radar system. Once installed, FBPAR will become a permanent component of nontactical Army airfields throughout the world. For the past several years, PM ATC has made significant contri-



*RC-12 Guardrail*

butions toward the modernization of Army air traffic control systems and air traffic control equipment. Nevertheless, there continues to be a significant amount of aging air traffic services and ATC equipment in the inventory.

### **Fixed Wing**

The Army uses a variety of fixed-wing assets, including utility, intelligence, surveillance and reconnaissance (ISR)/special electronic mission aircraft (SEMA), VIP/SAM (special airlift mission), and cargo.

The utility aircraft include the **C-12**, **C-26**, and **UC-35** aircraft.

The **C-12 King Air** serves as the service's current short-range utility aircraft designed to fill air transportation requirements out to 800 nautical miles (NM). The nondevelopmental aircraft platform pro-

vides an efficient all-weather transport for commanders, staff, and low-volume, high-priority parts and equipment.

The **C-26 Fairchild Metro Liner** aircraft provides a cost-effective carrier for high-volume travel routes. The aircraft has a range of 2,040 NM (with 19 passengers) and can also be used for cargo movement or medical evacuation. The entire C-26 fleet has recently been upgraded with a modernized digital cockpit, terrain avoidance warning system, traffic collision avoidance system, and other upgraded systems to enhance safety and ensure compliance with next-generation requirements.

The **UC-35A Cessna Citation Ultra/UC-35B Encore** is an efficient, medium-range (800 to 1,800 NM), all-weather airplane that transports commanders and staffs so that they can perform command, liaison, administration and inspection duties. This aircraft is also used for the movement of high-priority personnel and cargo. Eight UC-35s are authorized per theater aviation company.

The Army's ISR/SEMA aircraft include the **RC-12**, **ARMS**, **EO-5**, **MARSS**, and future **EMARSS** aircraft.

The **RC-12 Guardrail** configuration carries the Guardrail common sensor system and provides standoff communications intelligence (COMINT), electronics intelligence (ELINT), and intercept and location targeting to enhance corps commanders' warfighting capabilities. In addition, the RC-12 provides national-level targeting information. Sixteen RC-12 aircraft were recently converted to an RC-12X modernized cockpit configuration, and a number of these aircraft are in the process of receiving the improved Guardrail common sensor prime mission equipment.

The **C-12 King Air Airborne Reconnaissance Multi-Sensor System (ARMS)** configuration provides commanders with real-time, low-altitude airborne reconnaissance and imagery analysis and is supporting the Army's Task Force ODIN (Observe, Detect, Identify and Neutralize).

The **EO-5 Airborne Reconnaissance Low (ARL)** is based on a modified DeHavilland-7 aircraft. The system carries a package that combines both COMINT and imagery capability.

The **Medium Altitude Reconnaissance and Surveillance System (MARSS)** is based on the **King Air 300** aircraft. The sensor package is designed to counter the improvised explosive device (IED) threat chain with the use of onboard imagery and COMINT capabilities.

The Army is also developing a new intelligence, surveillance and reconnaissance (ISR) aircraft system known as **EMARSS** (enhanced medium altitude reconnaissance and surveillance system). This pro-

gram is pre-Milestone B and is expected to enter into the engineering and manufacturing development phase shortly.

The Army's **C-20** and **C-37 Gulfstream Executive Transport Jets** belong to the U.S. Army Priority Air Transport Command. These jets provide global transport, along with secure command-and-control systems, to senior leaders from the Department of Defense and Department of the Army, commanders and other high-ranking government officials for flights up to 5,000 NM.

The last element of Army fixed-wing aircraft is the cargo fleet. The **C-23 Sherpa** aircraft provide troop and equipment transport, airdrop and medical evacuation capabilities. The C-23 serves as the service's short-range cargo aircraft designed to fill air transportation requirements of 30 passengers or 7,280 pounds of cargo. A portion of the fleet is equipped for deployment with the ballistic armor protection system (BAPS), night-vision goggle (NVG) capability, common missile warning system (CMWS), Blue Force Tracking (BFT) and a microclimate cooling system (MCS). In addition, selected C-23 aircraft are receiving the safety avionics modification (SAM), which provides a digital cockpit, terrain avoidance warning system (TAWS), traffic collision avoidance system (TCAS), and other modernized systems to enhance



safety and ensure compliance with next-generation requirements.

The **Joint Cargo Aircraft (JCA)** was a joint Army and Air Force program. The JCA C27J program is currently procuring a commercial off-the-shelf aircraft that is designed to support direct-support, time-sensitive/mission-critical requirements. Peculiar mission equipment is added to the aircraft to meet military requirements. The estimated total procurement is 38 aircraft. In April 2009, Resource Management Decision 802 directed the Army to transfer the JCA program and the direct-support airlift mission the program supports to the Air Force. The transition to the Air Force as the single service manager was completed in September 2010.

### **Unmanned Aircraft Systems (UAS)**

#### **Army Unmanned Aircraft Systems**

**(UAS)** support land warfare operations across the spectrum of conflict. Infantry, scout, intelligence, aviation, artillery, maneuver and even medical units benefit from the availability of UAS. Typical missions include intelligence, surveillance and reconnaissance (ISR), battle damage assessment, targeting, persistent stare for continued operations, convoy protection and antiambush (improvised explosive device [IED]).

The **RQ-5A Hunter UAS**, manufactured by Northrop Grumman, is the Army's longest-serving UAS, having seen action in Operation Iraqi Freedom (OIF) and in Kosovo. The Army has installed, demonstrated or tested 23 different payloads on the Hunter, making it one of the most versatile UAS in the world. The Hunter air vehicle is a fixed-wing, twin-tail boom aircraft with a dual rudder. The Hunter is capable of 18-hour flight duration with an electro-optic/infrared (EO/IR) sensor or eight hours with a 250-pound payload.

The EO/IR—the main payload for the Hunter—is available in both 280 mm and 770 mm focal lengths. Hunter is the only DoD UAS to use a dual-engine system. The MotoGuzzi gasoline engines are being replaced with three-cylinder commercial JP-8 fuel engines.

A wet center-wing capability has been added to the Hunter air vehicle, extending



Sky Warrior



the base Hunter wingspan by approximately 60 inches, thus increasing lift, rate of climb and service ceiling from 15,000 feet to 18,000 feet mean sea level. The wet wing is equipped with hard points with the capability to carry 130 pounds each, facilitating Hunter weaponization. When the wet wing is not used to carry weapons, it can be loaded with 110 liters of fuel to increase air vehicle endurance by six hours.

The **RQ-7A Shadow Tactical UAS** is a DoD acquisition success story. The Army reduced the period for system design and development to full-rate production decision, including a successful initial operational test and evaluation, Office of the Secretary of Defense test and evaluation report, and joint interoperability certification of the communications in the "one system" ground control station, to just 33 months. The Army's Deputy Chief of Staff, G-3, has directed that every maneuver brigade in Operation Iraqi Freedom and Operation Enduring Freedom (OEF) will be equipped with the tactical UAS (TUAS) system. The Shadow is manufactured by AAI Inc.

The Shadow system consists of four air vehicles (AV) with day/night payloads, two ground control stations (GCS) with ground data terminals (GDT), one portable ground control station (PGCS) with portable ground data terminal (PGDT), two tactical automated landing systems, launcher, air vehicle

transport (AVT), and additional ground support equipment and vehicles for personnel transport. The TUAS platoon consists of 22 personnel with the ability to sustain flight operations on a 24-hour basis. The AV takes off from a launcher and lands autonomously in an area slightly longer than a soccer field. Annotated imagery can be transmitted in near-real time to support the commander's missions. The system is transported in three Humvees with shelters, one AVT, two troop-carrying Humvees and three trailers, and can be deployed in three C-130s. A contractor logistics support team, transported in a mobile maintenance facility within a sheltered Humvee and trailer, supports the system.

The **RQ-11B Raven Small UAS** is another example of rapid acquisition in support of OIF and OEF forces. In just 20 weeks from funding, the first of these battery-operated, 4.5-pound UAS was deployed to forces in Afghanistan. Each combat battalion in OIF and OEF will have small UAS.

The Raven system consists of three aircraft, one ground control station, batteries and three sets of sensors: high-resolution day camera, high-resolution night imager and a side-view thermal imager. The aircraft are hand-launched and use autoland recovery.

The system is transported in two suitcase-size carrying cases. The system pro-

vides company- and platoon-level reconnaissance, surveillance, target acquisition and battle damage assessment.

The **Improved-GNAT Extended Range (I-GNAT-ER)** is a General Atomics Aeronautical Systems product that the Army procured in 2003. The Army I-GNAT system consists of three modified I-GNAT aerial vehicles (AVs), one modified I-GNAT shelter, two portable ground data terminals (PGDTs) and associated ground support equipment. The system can provide up to 25 hours of operations, can carry up to 450 pounds of payload, has a service ceiling of 25,000 feet mean sea level and is controlled by a C-band data link. The Army I-GNAT was deployed to OIF just 10 months after contract award.

The **Sky Warrior Extended Range/Multi-Purpose (ER/MP) UAS** will replace and improve upon the Hunter. Sky Warrior, a derivative of the combat-proven Predator, will be a mainstay of the division/corps commander's battleset for land warfare operations. Although the program is still in system development and demonstration phase, the first two Sky Warrior "Block 0" UAVs became operational in Iraq in late spring 2008.