

AVIATION

Rotary Wing

The **AH-64 Apache Longbow 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 three versions of the Apache aircraft in today's Army inventory are the AH-64D Longbow Block I and Block II and the newest, the AH-64E Apache.

The Apache has a maximum speed of 145 knots. It has a maximum gross weight range of 230 nautical miles 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 high explosive incendiary (HEI) rounds. The **AH-64E** also has the capability of level of interoperability (LOI) 4 for manned/unmanned teaming. LOI 4 allows the AH-64E to receive unmanned aerial system (UAS) video, control the payload of a UAS, and control the UAS' flight path.

The original **AH-64A** Apache, which first entered service in 1984, was removed from the Army inventory. All remaining AH-64A aircraft were inducted into the AH-64D Block II production line.

The **AH-64D Longbow Block II** 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 interferometer and a radar frequency fire-and-forget Hellfire missile. Block II production ended in September.

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 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.

The newest version of the Apache fleet is the **AH-64E Apache**. The AH-64E program had its first aircraft delivery in November 2011. The AH-64E program, similar to the previous Apache sustainment programs, will update, or remanufacture, existing air-



AH-64D Apache Longbow

craft in the fleet to this more capable version of the Apache Longbow. One major difference in the AH-64E remanufacture line is that new airframes will be added to the production line, which will "zero time" the airframes, greatly reducing maintenance and sustainment costs.

The AH-64E 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 first unit to be equipped is the 1st Battalion, 229th Airborne Brigade, Joint Base Lewis-McChord, Wash.

The **OH-58 Kiowa Warrior (KW)** 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 missiles, 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 **OH-58D KW** was developed in the late 1980s and fielded in 1990. In May 2009, the Army authorized the Armed Scout Helicopter Project Office to begin examining methods to upgrade the aging aircraft.

The **OH-58F Kiowa Warrior Cockpit and Sensor Upgrade Program (CASUP)** is the first designation change since 1990 and updates 1980s equipment with the most current technology available. The CASUP is a platform capable of meeting the Army's armed scout requirement through fiscal year (FY) 2025. The F model Kiowa Warrior

capitalizes on nondevelopmental items and systems fielded on other aviation platforms to rapidly install, modify or provide: an advanced nose-mounted sensor, improved cockpit control hardware and software for enhanced situational awareness, three full-color multifunction displays, a dual-redundant digital engine controller for enhanced engine safety, digital inter-cockpit communications, digital Hellfire future upgrades, aircraft survivability equipment upgrades and a redesigned aircraft wiring harness. The OH-58F also weighs significantly less than the OH-58D, allowing commanders more flexibility in adding capabilities such as firepower, endurance and load. Ultimately, pilots and crew members will be able to perform their missions more effectively, more efficiently and more safely.

The Army marked the first flight of the OH-58F in April. Milestone C is scheduled for March 2015, and the first unit equipped is scheduled for 2016.

Utility Helicopters

The **UH-60 Black Hawk** helicopter is the workhorse of Army Aviation with more than 6.5 million hours flown. This platform accounts for more than 49 percent of the Army's annual flying hours. The UH-60 Black Hawk provides the Army with 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 a medical evacuation platform for tactical, en route patient care and evacuation. The **HH-60M Black Hawk** is in production and serves as the Army's medevac helicopter for the current and future force. It 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 to decisively mass the effects of the Army's warfighting assets. The UH/HH-60M configuration provides digital connectivity for 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.

The **UH-72A Lakota** is the newest helicopter to enter service with the Army. In 2006, the Light Utility Program competition selected the UH-72A Lakota as the winner. It is the primary replacement aircraft for the OH-58A/C and UH-1H in the active Army and the Army National Guard. The fielding of the UH-72A also enabled a number of UH-60 Black Hawks to return to the warfight. Currently, more than 260 aircraft have been produced, delivered and fielded to the Army. In fiscal year (FY) 2014, the last aircraft will be placed on contract for delivery in FY 2015.

The UH-72A Lakota supports a wide variety of missions across the Army, such as air movement, aerial sustainment, support to test activities, support to training centers and medical evacuation. It supports federal and state domestic operations including homeland security, command and

control, disaster relief, counterdrug and medevac. Besides the standard configuration, there are four mission equipment packages (MEPs) to enhance the capabilities of the Lakota. These are the Security and Support (S&S) MEP for the Army National Guard, the Combat Training Center (CTC) MEP, VIP MEP, and Medevac MEP.

The UH-72A Lakota will be fielded in 42 states supporting the active Army and Army National Guard. The aircraft is now widely distributed across the globe, in Kwajalein, Puerto Rico, the Virgin Islands, Germany and, soon, Guam. The fleet has already flown more than 155,000 flight hours with operational availability rates higher than 90 percent. The UH-72A Lakota has supported operations including the Deepwater Horizon spill cleanup, the Haiti earthquake response, the Oklahoma tornado relief efforts and the Hurricane Sandy cleanup as well as U.S. Customs and Border Protection on the Southwest U.S. border.

The UH-72A Lakota is unique in that it is built and maintained in accordance with Federal Aviation Administration (FAA) standards and uses contractor logistics support for its maintenance. Active Army units receive full contractor logistics support, while the Army National Guard has implemented a hybrid system that allows soldiers to conduct field-level maintenance. The program also utilizes contractor-provided new equipment training, allowing the aircraft to enter service quickly. The UH-72A program has met all its cost, schedule and performance goals.

The **CH-47F Improved Cargo Helicopter (ICH)** is in full rate production. The CH-47F ICH is procured through both new-build and remanufactured processes. Boeing'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 preflight and mission data. Improved survivability features include common missile warning and improved countermeasure dispenser systems.

Powered by two 4,868-horsepower 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 and equipped 12 active units and four National Guard units.

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 through tactical communications, radars, towers, and airspace systems. In turn, air traffic services support enables fixed-base facilities and 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) manages the modernization of tactical and nontactical ATC equipment. Major tactical ATC programs include the air traffic navigation, integration and control system (ATNAVICS), the tactical airspace integration system (TAIS), the tactical terminal control system and the mobile tower system (MOTS).

The **AN/TPN-31 Air Traffic Navigation, Integration and Coordination System (ATNAVICS)** is a Humvee-mounted, survivable radar system that contains a highly mobile tactical area surveillance and precision-approach air traffic control system. It has replaced the technologically obsolete and unsupportable landing control central (AN/TSQ-71B). The new system provides expeditious air traffic flow, permitting continuous unimpeded operations, and provides area navigational assistance. It also 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 in visual flight rules (VFR) and instrument flight rules (IFR) conditions, providing precision approach capabilities, and can now interrogate all identification friend or foe (IFF) modes and mode 5. All components of the system can be loaded onto a single C-130



UH-72A Lakota



AN/TPN-31 Air Traffic Navigation, Integration and Coordination System

aircraft or sling-loaded by a CH-47 for deployment to any location.

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 factor computer running Microsoft Windows, the Microsoft Office suite and the TAIS mission application. The TAIS software in both variants provides a digitized warfighting appli-

cation within the Army Mission Command system (AMCS) system of systems. TAIS and TAIS AWS are utilized in all theaters across the range of military operations and make up the U.S. Army's program of record for both airspace command and control (AC2) 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 component commander/airspace control authority through the joint theater battle management core system. TAIS and TAIS AWS provide automated AC2 and coordinated use of battlefield airspace for the purpose of supporting force operations, enhancing force projection and facilitating freedom of maneuver in the airspace, while minimizing fratricide through precise Mission Command synchronization and deconfliction capabilities in four dimensions. The AN/TSQ-221 TAIS also supports non-automated 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, network-centric, thin-client application—called the dynamic airspace collaboration tool (DACT)—that provides AC2 collaboration and 3-D visualization capability for non-TAIS users via a Java Web applet. This extends elements of TAIS functionality to other Army users, and 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 Marine Corps airspace agency and an Air Force airspace agency using the DACT to expedite dynamic re-

tasking of assets across service boundaries.

TAIS is evolving as part of the Army's common operating environment (COE), an approved set of computing technologies and standards that enable secure and interoperable applications to be developed and executed across a variety of computing environments. TAIS DACT and AC2 capabilities reside in the command post computing environment (CPCE) of COE. New functionality will include Web applications, or widgets, for the DACT and AC2 services that can reside on a server stack such as the Mission Command server. This capability will enable the continuous ability to access, manipulate, manage and share airspace information across the operational environment without the need for unique hardware dedicated to this role.

The **AN/MSQ-135 Mobile Tower System (MOTS)** is a mobile air traffic control tower designed to quickly establish air traffic services during the initial phases of deployment and sustain those services throughout operations and redeployment. It will provide terminal ATC services for selected high-traffic landing areas in the echelon above corps and division areas. It will replace existing AN/TSQ-70A and AN/TSW-7A. The MOTS will be self-deployable or can be airlifted by C-17 aircraft.

The MOTS uses three vehicles with trailers. The prime mover, an up-armored M1083A1P2 medium tactical vehicle cargo truck, will transport the MOTS shelter and serve as the shelter's platform. It will also tow the generators required to provide organic power to the MOTS. Two M1165 Humvees will tow the MOTS organic airfield lighting system (ALS), including the ALS cables and generator. The ALS light internal batteries can be powered via solar or

*AN/TSQ-198
Tactical Terminal
Control System*



generator power, although use of generator power requires the cables to be connected to the lights. The prime mover and secondary vehicles will be deployed with the MOTS, and none will be modified for integration as part of the MOTS.

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)** is a rapid-deployable tactical air traffic control communication system that provides enhanced ATS communications support to aviation assets conducting reconnaissance, maneuver, medical evacuation, logistics and intelligence operations across the battlefield. The AN/TSQ 198A capability consists of an M998 Humvee and M1101 high mobility trailer (HMT) with the following communication capabilities: satellite communication (SATCOM), ultra high frequency (UHF) and very high frequency (VHF) amplitude modulation (AM), high frequency (HF), single-channel ground and airborne radio system (SINCGARS), the defense advanced global positioning system (GPS) receiver (DAGR), and the precision lightweight GPS receiver (PLGR). The AN/TSQ 198B capability includes an M1097 Humvee/M1165A1 with B3 armor kit and an M1101/M1102 HMT with UHF/AM, VHF/AM, SINCGARS, SATCOM, HF, DAGR and PLGR communication systems.

Aviation Networks and Mission Planning

The **Product Director for Aviation Networks and Mission Planning (ANMP)** provides the Army aviation community with state-of-the-art interoperability and mission planning tools that enhance aviators' situational awareness, command and control, and safety. These products are developed, deployed, sustained and refreshed to keep current with changing technologies and advances in hardware and software to ensure mission success.

The **Improved Data Modem (IDM)** is the common solution for digitizing Army Aviation. The IDM performs as an Internet controller and gateway to the tactical Inter-



AN/MSQ-135 Mobile Tower System

net and fire support Internet for aviation platforms. The IDM remains a dynamically evolving product to facilitate a digital transmission network for the sharing of situational awareness and tactical data among our digitized Army, joint and coalition aviation partners. The IDM serves as the crucial interface between platform mission computers and radios, supporting legacy very high frequency (VHF) and ultra high frequency (UHF) radios and Blue Force Tracker, with efforts under way to enable future interface with Blue Force Tracker 2. As a single line-replaceable unit (LRU) that performs communication modulation/demodulation, database processing and message processing functions for digitized Army Aviation, the IDM presents a multi-path approach to command and control in the tactical environment.

The **Aviation Mission Planning System (AMPS)** is a mission planning and battle synchronization tool that automates aviation mission planning tasks, including tactical command and control, rehearsal, and flight planning. Interoperable with Army Mission Command systems (AMCS) and associated networks, AMPS furnishes the aviation commander with continuous situational awareness, allowing for rapid adjustment and dissemination of mission plans. AMPS products enable communication, navigation, pilot situational aware-

ness and weapons systems on Army aircraft, including the AH-64D/E, CH-47D/F, OH-58D, UH-60A/L/M/Q, HH-60L/M and unmanned aircraft systems.

AMPS hosts the portable flight planning software (PFPS), which allows the warfighter to consolidate and load an aircraft with navigation, environmental, performance and threat data. A significantly updated version of PFPS named Execution Planner, or X-Plan, is in the final stages of development and expected to be released in FY 2014. A joint developmental effort between PEO Aviation, Special Operations Command and the U.S. Air Force A2U, X-Plan provides enhanced capabilities, improved workflow and integration, and a Microsoft Office 10 look and feel.

The **Centralized Aviation Flight Records System (CAFRS)** provides management of aviation flight records through a centralized, fully automated, globally accessible and secure system. CAFRS provides commanders easy access to essential aviation information for training assessments and risk management, while records are stored in a safe and secure digital environment. In addition, senior level leadership can access aviation flight records information to assist in resource, readiness and personnel management decisions.

Composed of three tiers, CAFRS provides seamless and redundant flight records stor-

age. The first tier, called the CAFRS enterprise server, stores and consolidates all Army aviation personnel, flight and training record data provided through the lower tiers. CAFRS data collection points (CDCPs) make up the second tier and operate as CAFRS clients to support aviation flight and training records management. CDCPs also perform the critical task of synchronizing data with the central database. The third and lowest tier of the CAFRS system, known as the CAFRS client, operates mostly at platoon, company and battalion levels, or any level at which Army aviation personnel and their flight record data need to be managed.

Aviation Ground Support Equipment

The **Aviation Ground Support Equipment (AGSE)** Product Management Office (PMO) is the life-cycle manager for all common AGSE utilized within Army Aviation. The AGSE team enables soldiers to conduct aviation maintenance in the field and improve aviation readiness. Its mission includes the development and fielding of new equipment, sustaining and modernizing legacy equipment, and the reset and repair of equipment from units returning from combat. This cycle of fielding, modernizing and repair is supported by a continuous dialogue with users and a partnership with combat developers in the U.S. Army Train-

ing and Doctrine Command Program Office-Aviation Brigades, Fort Rucker, Ala., to ensure the program meets soldiers' needs.

The AGSE Product Office supports nearly 20 acquisition category (ACAT) III programs consisting of 52 line-item numbers and more than 33,000 separate components used to support every level of aviation maintenance, from the crew chief on the flight line to depot-level repairs. Its mission is to provide reliable and maintainable AGSE that enables and improves operational readiness. Its goal is to provide the right tools at the right time in the right place to support soldiers.

In the fourth quarter of FY 2012, the office completed fielding more than 600 **Standard Aircraft Towing Systems (SATS)** to active Army, National Guard and Army Reserve aviation units. The fielding, including new equipment training for both operators and maintainers, was completed a year ahead of schedule. SATS components are provisions and available, via funded requisition, through the military supply system. SATS began as an Army-only program and made the transition to a joint service program when the U.S. Coast Guard purchased 95 units in 2012.

The **SATS Crew Protection System (CPS)**, a rigid, rollover-protected enclosure providing environmental protection, windshield wipers, dome light, adjustable fan and heater, was integrated into the production line after unit 274; all 274 will have the CPS by the end of this calendar year.

The **Shop Equipment Contract Maintenance (SECM)** vehicle can transport a crew of three with mission-essential equipment, expendable supplies, spares and repair parts to repair or recover downed rotary-wing aircraft whenever required on the battlefield. The team is then able to return the aircraft to flight, allow a one-time flight to a repair facility, or right the aircraft for recovery, avoiding destruction or capture. The aviation SECM provides this fix-forward maintenance capability by using a light/medium tactical vehicle with modified storage racks, added power inverter, portable lighting and an air compressor to support maintenance tasks using power and pneumatic tools during day and night operations. The SECM, produced at Red River Army Depot, Ark., is in fielding. All active Army combat aviation brigades are scheduled to receive their SECM by the end of the current calendar year.

The **Common Aviation Tool Systems (CATS)** is a tool set and container modernization of the existing new aviation tool system. AGSE initiated the CATS program to capitalize on technological advancements and enhancements within tool kits, ensuring aviation maintainers are provided



with the most modern tools. To that end, CATS will include aerospace standard- and industrial-quality tools. Designed to support the Army's two-level maintenance concept, CATS is scheduled to begin fielding in the first quarter of FY 2014.

The **Aviation Ground Power Unit (AGPU)** supports all Army rotary-wing aircraft in forward-deployed areas where commercial sources of electrical, hydraulic or pneumatic power are not available. In March 2012, the Army approved the requirement for the AGPU Increment II. As the acquisition strategy for the more modular and maneuverable AGPU of the future, the AGSE has partnered with Letterkenny Army Depot, Pa., to build 200 E-model AGPUs. These AGPUs will fill critical shortages

across Army Aviation; 73 have completed fielding.

The **Aviation Light Utility Mobile Maintenance Cart (ALUMMC)** is scheduled to begin fielding in the second quarter of FY 2015. The ALUMMC will provide Army aviation units with a standardized, logistically sustainable, lightweight, all-terrain maintenance cart capable of transporting personnel, tools, test equipment and small cargo across the flight line expeditiously and safely.

The **Unit Maintenance Aerial Recovery Kit (UMARK)** is a set of slings, shackles, fixtures and ancillary equipment that provides the aviation support company and the aviation maintenance company the ability to quickly rig disabled aircraft for evacuation. The current UMARK works only when the main rotor hub, transmission and structural integrity of the attachment and lifting points are not compromised. Understanding that on today's battlefield many downed aircraft sustain damage to critical systems, and the traditional lifting points are often compromised during a hard landing, the AGSE team is upgrading the UMARK to include the capability to rig and recover the more severely damaged aircraft as well as select unmanned aerial systems.

The **Battle Damage Assessment and Repair (BDAR) System** is a transportable and expeditious means to assess combat damage, defer repair or repair Army helicopters in a battlefield environment. The BDAR System provides a capability for temporary or permanent repairs to combat-damaged helicopters. Quick-fix materials and equipment include repair kits for the electrical systems, fuel cells and fluid lines. The composite repair kit is being integrated with the existing BDAR and provides additional capability to repair secondary, and some pri-



Unit Maintenance Aerial Recovery Kit

mary, composite structures. As of May, 295 of 354 BDAR composite repair kits were fielded.

The **Aviation Intermediate Maintenance Shop Set (AVIM SS) Modernized** complex is composed of 10 Class VII specialized shop sets in new or refurbished one-sided expandable (OSE) International Standardization Organization (ISO) 20-foot shelters. The complex provides an easily transportable and modular maintenance capability in aviation support companies. The modernization effort adds improved aerospace standard tools that allow units to provide logistic and maintenance support operations across the full spectrum of military operations and Army aviation platforms. Especially noteworthy is the composite shop set modernization effort. The composite shop set added specialized tools to make composite material repairs. These tools include hot-bonders and heat blankets for elevated temperature cures, thermocouples, a thermocouple welder, vacuum tools, a downdraft table, and carbon fiber and fiberglass repair materiel. Eight of the 45 shop set complexes are modernized; the remainder of the fleet will be completed by early FY 2015.

The **Modernized Maintenance Platform** will provide the same stable work platform as the B1 and B4 maintenance stands in use, while elevating to a height of 12 feet to facilitate Army rotorcraft maintenance activities. The modernized platform will be transportable on a 463L pallet inside a CH-47 or a C-130, more maneuverable than the B1 and B4 versions and more stable on unimproved surfaces. The schedule is to begin fielding in FY 2014.

In January 2012, AGSE received approval to assign several critical assets permanently in Afghanistan to support units. This **AGSE Theater Provided Equipment (TPE)** includes SATS, APGUs, generic aircraft nitrogen generators, aviation unit maintenance No. 2 shop sets and the AVIM shop sets. This TPE serves two primary purposes: alleviate time and effort associated with units packing and shipping critical systems, and significantly reduce inter- and intratheater shipping costs, loss, and damage during ground transportation. As of January, all target quantities were on hand, and the equipment is now maintained by CAB and Theater Aviation Sustainment Maintenance Group personnel. This TPE strategy is expected to save the U.S. Army more than \$22 million.

Aviation Mission Equipment—Communications, Navigation and Surveillance

All Army aircraft require communications, navigation and surveillance (CNS) equipment to effectively and safely operate in both civil and military airspace. The Product Manager for Aviation Mission

Equipment (PM AME) is responsible for providing the common CNS equipment that meets the full range of Army aviation requirements, from FAA and International Civil Aviation Organization (ICAO) mandates required to fly in commercial airspace to tactical, secure CNS capabilities that enable Army Aviation to be effective in combat operations.

PM AME product lines include the AN/ARC-231 and AN/ARC-220 radio communications systems, the AN/ASN-128D and embedded global positioning system (GPS) inertial (EGI) navigation systems, and the AN/APX-118 and AN/APX-123 transponder surveillance systems. Blue Force Tracker-Aviation (BFT-A), a recent

addition to AME responsibilities, is a suite of systems that work in concert to provide near-real-time situational awareness and command-and-control (C2) information. PM AME also has the responsibility for integrating joint tactical radio systems (JTRS) into all aviation manned and unmanned platforms.

Communication Systems

The **ARC-231** provides multiband, multi-mode, secure antijam voice and satellite communications capability, enabling long-range and beyond-line-of-sight communications in extreme terrain conditions. It replaces legacy ARC-164 and ARC-186 radios. The ARC-231 also satisfies a global air

ARC-201D Tactical
Airborne Radio



traffic management requirement for voice radios to operate at 8.33 kilohertz (kHz) channel spacing, driven by VHF amplitude modulation frequency congestion in Europe. Efforts are under way to integrate the next-generation military satellite communications system, the mobile user objective system capability, into the radio.

The **AN/ARC-220 High Frequency (HF) radio** and its AN/VRC-100 ground counterpart provide non-line-of-sight communications for Army aircraft and are installed on the majority of aviation rotary-wing platforms. It provides communications while operating at nap-of-the-earth (NOE) altitudes and at ranges beyond the tactical UHF and VHF radios. HF is the only aviation alternative for NLOS operations if satellite communication is compromised or lost.

The **ARC-201D Tactical Airborne Radio** subsystem provides secure, anti-jam voice and data communications. The single-channel ground and airborne radio system (SINCGARS) uses 25 kHz channels in the VHF FM band, from 30 to 88 megahertz. It has single-frequency and frequency hopping modes.

The **Joint Tactical Radio System (JTRS)** integration program installs and qualifies JTRS radios into both manned and unmanned platforms. Efforts are under way to integrate two-channel radio being developed by Program Manager Airborne Maritime and Fixed Radio Systems (PM AMF) into the AH-64E Apache, Black Hawk, Chinook, OH-58F, Special Operations and Gray Eagle unmanned aircraft. The Apache aircraft will be integrated with the Link 16 tactical data link, wideband networking waveform (WNW), soldier radio waveform (SRW) and SINCGARS, while the Black Hawk, Chinook, OH-58F, Special Operations and Gray Eagle unmanned aircraft will be integrated with only WNW, SRW and SINCGARS. In addition, the Shadow unmanned aircraft system is being integrated with a small form-factor B radio set

being developed by Program Manager Handheld, Manpack and Small Form Factor (PM HMS).

Navigation Systems

The **AN/ASN-128D Doppler GPS Navigation System (DGNS)** provides a combined GPS and doppler navigation capability and protects the GPS signal through the selective availability anti-spoofing module. The AN/ASN-128D is Instrument Flight Rules (IFR)-compliant and is certified for use of GPS as a supplementary means of navigation for en route, terminal and non-precision approaches. PM AME is working on an upgrade to the AN/ASN-128D to obtain certification for use of GPS as a primary means of navigation and automated dependent surveillance broadcast (ADS-B) position sensor support.

The **Embedded GPS Inertial (EGI) Navigation System** is an Air Force-led, tri-service program that provides an integrated IFR-compliant position and attitude solution for aircraft equipped with a MIL-STD 1553 digital data bus. The EGI provides precise location to the aircraft fire-control computer or integrated system processor for processing targeting information/sensor pre-pointing. The EGI is currently being upgraded for GPS as a primary means of navigation, wide-area augmentation system, and ADS-B out position sensor support.

Surveillance

The **Common Transponder Program (CXP)** is a family of transponders that includes the AN/APX-118 and AN/APX-123 transponders, incorporating the advanced features required in today's global military and civil air traffic environments.

The **APX-118 Identification Friend or Foe (IFF) Transponder** provides commercial modes 1, 2, 3/A, C, military mode 4 and mode S. The incorporation of mode S supports the GATM requirement for flight

in European airspace. It has embedded communication security, eliminating the need for the external KIT-1C crypto device.

The **APX-123 Next-Generation Army Aviation Transponder** performs all the modes of the APX-118 and adds the new mode 5 IFF capability. It has improved encryption, National Security Agency anti-tamper provisions and M5L2 squitter capability; it enables identification of closely spaced aircraft; and it is designed for noninterference with civilian air traffic control. Efforts are under way to upgrade the APX-123 to meet the FAA-mandated automated dependent surveillance broadcast capability, which provides a cooperative position, direction and velocity squitter report for airspace managers.

In addition, an SFF transponder is being developed for the Shadow unmanned aircraft system. The SFF will perform all of the modes performed by the APX-123 and will use an external cryptographic computer.

Blue Force Tracker-Aviation

Blue Force Tracker-Aviation (BFT-A) became part of PEO Aviation, PM Aviation Systems, Aviation Mission Equipment in October 2012. The system includes the integration of onboard computers, global positioning equipment and communication systems that work in concert to provide near-real-time situational awareness and command-and-control information from aircraft directly to tactical-level forces. BFT-A is part of the L-band satellite network and operates beyond line of sight. This system is used extensively in Army, Navy and Marine Corps helicopters, including the MV-22, and is used by several U.S. federal agencies and international partners. BFT-A is evolving to BFT2 with type 1 encryption, keeping pace with ground forces. BFT2 will reduce latency over BFT1, providing greater situational awareness and common operating picture resolution at full duplex rates and 10 times improved bandwidth.

Fixed-Base Programs

The major fixed-base air traffic control (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 (FBPAR).

The **AN/GPN-30 Digital Airspace Surveillance Radar (DASR)** 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. 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 **AN/FSQ-204 DoD Digital Advanced Automation System (DAAS) Pre-planned Product Improvement**. This 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 facilities 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 retrofit the currently fielded DAAS with new processors and data communications equipment that will enable Army ATC to participate in the FAA's next-generation ATC efforts.

The **Radio Replacement Program** consists of more than 3,000 CM300 radios that comply with new frequency spectrum requirements in Europe and the United States. These radios will be installed at Army airfields to replace aging analog radios.

The **Army Airfield Automation Systems (AAAS)** is another DoD NAS procurement effort to incorporate weather information and other air traffic control information into Army ATC facilities. This program upgrades existing ATIS capabilities and consolidates numerous airfield information terminals into a single display monitor.

The Army **AN/FPN-67 Fixed-Base Precision Approach Radar (FBPAR) System** provides capabilities for air traffic separation, final approach course monitoring, precision and nonprecision approach guidance, and instrument meteorological conditions recovery operations for aircraft operating in Army-controlled airspace or at



C-26 Fairchild Metroliner

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 AT-NAVICS (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 contributions toward the modernization of Army air traffic control systems and air traffic control equipment. Nevertheless, a significant amount of aging air traffic services and ATC equipment remain in the inventory.

Fixed Wing

The Army uses a variety of fixed-wing assets to support multiple mission sets, including transport (operational support airlift); VIP/special air mission; intelligence, surveillance and reconnaissance (ISR); and training and test; and it is currently assessing and integrating quick reaction capability (QRC) aircraft.

The transport aircraft fleet includes the **C-12, C-26, UC-35, C-20, C-37 and C-23** aircraft.

The **C-12 Beechcraft King Air** serves as the Army's short-range utility aircraft designed to fill air transportation requirements out to 1,800 nautical miles (NM). The nondevelopmental aircraft platform provides an efficient, all-weather transport for commanders, staff, and low-volume, high-priority parts and equipment.

The **C-26 Fairchild Metroliner** provides a cost-effective carrier for high-volume travel routes. The aircraft has a range of 2,040 NM 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 they can perform command, liaison, administra-



C-23 Sherpa

tion and inspection duties. This aircraft is also used for the movement of high-priority personnel and cargo.

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

The **C-23 Sherpa** provides troop and equipment transport, airdrop, and medical evacuation capability. It is designed for up to 30 passengers or 7,280 pounds of cargo, and it has range capability of up to 1,030 NM. The C-23 is tentatively scheduled for divestment in FY 2014.

The Army's **aerial ISR/special electronic mission aircraft (SEMA)** fleet is configured to provide timely, accurate and actionable tactical intelligence across the operational spectrum. The SEMA fleet includes the **RC-12 GR/CS**, **EO-5 Airborne Reconnaissance Low (ARL)**, and **Enhanced Medium Altitude Reconnaissance and Surveillance System (EMARSS)** programs, as well as the following QRC programs: **Highlighter**, **Saturn Arch**, **Desert Owl**, **Vehicle and Dismount Exploitation Radar (VADER)**, **Medium Altitude Reconnaissance and Surveillance System (MARSS)**, **Constant Hawk**, and **Tactical Operations (TACOP)**. In March, the Vice Chief of Staff of the Army validated the RC-12 GR/CS, the EO-5 ARL, and the MC-125 EMARSS systems as enduring, long-term capability requirements to remain within the Army's aerial ISR base force structure.

The **RC-12 Beechcraft King Air Guard-rail/Common Sensor (GR/CS)** system provides standoff communications intelligence, electronics intelligence and actionable signals intelligence support to ground maneuver commanders. The enduring GR/CS plat-

form will be configured as the RC-12X.

The **EO-5 DeHavilland Dash 7 ARL** system carries an effective mission equipment package combining both communications intelligence and electro-optical/infrared (EO/IR), full motion video (FMV) imagery capability. The ARL's program requirements are being updated by U.S. Army Training and Doctrine Command (TRADOC) in a capabilities production document that solidifies the baseline configuration and outlines future increments that leverage advances in sensor technologies.

The **MC-125 Beechcraft King Air 350ER EMARSS** is a multi-intelligence platform with EO/IR, FMV and other special purpose sensors. This enduring ISR capability is an ACAT II acquisition program of record that combines new production aircraft with existing multi-intelligence configured platforms. The multi-intelligence platforms are QRC programs that have demonstrated intelligence gathering capabilities in direct support of deployed ground maneuver commanders. The program is in the engineering manufacturing development phase and scheduled for a Milestone C decision in late FY 2014.

In October 2011, the Army Acquisition Executive directed PEO Aviation to assume lead responsibility for the management of all Army fixed-wing aircraft. As a result, the Fixed Wing Project Office (FW PO) assumed the task of transitioning multiple QRC fixed-wing ISR systems from multiple organizations and agencies to the FW PO. The following programs were QRC capabilities developed to provide ground maneuver commanders with intelligence gathering assets using various state-of-the-art capabilities throughout the Iraq and Afghanistan theaters. They are now operating under airworthiness cognizance and under the management of the Product Manager Fixed Wing SEMA.

This set of SEMA QRC programs pro-

vides counter-improvised explosive device capabilities: the **Highlighter Beechcraft King Air**, the **Saturn Arch DHC-8** and the **Desert Owl DHC-8**.

This set of SEMA QRC programs provides advanced multi-intelligence capabilities: the **MARSS Beechcraft King Air** and **DeHavilland Dash 7**, the **Constant Hawk Beechcraft King Air**, the **TACOP Beechcraft King Air**, the **VADER Beechcraft King Air 350ER** and **DHC-6 Twin Otter**.

Most recently, in response to Department of the Army (DA) direction for centralized management of all manned Army fixed-wing aircraft, the Mission Support Aircraft Directorate now oversees C-12 and B-200 King Air, SA 227 Metroliner (SA 227), C-23A, C-41A, UV-20A, T-34, UV-18A/C, C-31A and Gulfstream III aircraft.

C-12 Beechcraft King Air, C-23A Shorts Brothers Sherpa, C-208 Cessna Caravan, T-34 Beechcraft Mentor and UV-18A DeHavilland DHC-6 aircraft support Army research and development activities, most notably in the test and evaluation and sensor development arenas. C-12 Beechcraft King Air aircraft support TRADOC's Aviation Center of Excellence multi-engine aircraft qualification course at Fort Rucker, Ala.

Other Aircraft Support

The **SA 227 Metroliner** and the **C-20A Gulfstream III** aircraft support the U.S. Army Corps of Engineers, providing expeditious and reliable transportation for the supervision and inspection of construction areas and facilities, flood control, and navigation operations; and rapid response to emergency situations such as floods, hurricanes, tornadoes, earthquakes and other natural disasters. The SA 227 is also used for personnel transport services at the Reagan Test Center on Kwajalein Atoll in support of Space and Missile Defense Command.

Two **Cessna 182** aircraft are used by the U.S. Military Academy as educational tools for mechanical engineering cadets with an aerospace subdiscipline. The aircraft are part of a mandatory flight laboratory program, providing students firsthand experience in the concepts of aeronautics flight envelopes.

The **UV-18 DeHavilland DHC-6 Twin Otter** is a twin-engine turboprop, short takeoff and landing, light utility aircraft primarily used for local and off-site tandem and competition team parachute mission support for the Army parachute team. The UV-18 Twin Otter aircraft supports the Golden Knights mission as the Army's aerial ambassadors to the American public, as well as DoD and DA strategic-level off-site missions.

C-31A Fokker F-27-400 Friendship passenger aircraft, modified to support paratroop operations, serve as the parachute team's primary vehicle to support two

demonstration teams at air shows nationwide. The C-31A is a pressurized aircraft powered by two Rolls-Royce turboprop engines and is sometimes used for tandem jumps in conjunction with demonstrations.

The **C-41A**, **CASA C-212 Aviocar** and **UV-20A Pilatus PC-6 Porter** aircraft are the primary aircraft used for special operations training. These aircraft provide continental U.S. special operations forces (SOF) with the institutional training base support for required aviation and airborne skill sets, including the U.S. Army John F. Kennedy Special Warfare Center and School Special Forces qualification course and military free-fall school. They also support airborne training sustainment (static line, free fall, aerial and air land resupply, and unimproved airfield operations) for all Army SOF and multiple joint SOF organizations on the Eastern Seaboard.

The **Diamond Aircraft Industries DA-40** and **Learjet model 35/36A** aircraft support PEO Simulation, Training and Instrumentation (PEO STRI), providing threat aircraft systems and towed target support. The DA-40 provides representative UAS-based threat systems, supporting development of a programmable threat UAS ground control station. The Learjet aircraft provide live towed-target prototypes and production hardware that closely emulates the signature level and performance of typical threat

aircraft or cruise missiles supporting air defense system development.

The following QRC aircraft are still undergoing assessment and airworthiness adjudication and fall under the responsibility of the Fixed Wing Assistant Project Manager:

The **BuckEye Beechcraft King Air** provides point target mapping capabilities. BuckEye is an approved acquisition program candidate poised to become a program of record.

The **Night Eagle Beechcraft King Air** provides change detection capabilities.

The **Tactical Reconnaissance and Counter-Concealment Enabled Radar (TRACER) Beechcraft King Air** provides foliage-penetrating capabilities.

The **FALCON-I DeHavilland DHC-8** is a joint capabilities technology demonstration effort to improve the existing C-12 TRACER with foliage-penetration capabilities.

The **High Altitude Light Detection and Ranging (LIDAR) Operating Experiment Bombardier Global Express** program provides wide-area mapping capabilities.

The **Communication Electronic Attack with Surveillance and Reconnaissance Beechcraft King Air** program provides electronic warfare capabilities.

The **Joint Airborne LIDAR Bathymetry Technical Center of Expertise Beechcraft King Air** program provides mapping capabilities of littoral waters.

Unmanned Aircraft Systems

The Army's unmanned aircraft systems (UAS) fleet consists of four programs of record, directly supporting overseas contingency operations. The addition of UAS capabilities bolsters combatant commander and soldier capabilities, resulting in a more flexible, adaptable and lethal combined fighting force. Infantry, scout, intelligence, aviation, artillery, maneuver and medical units benefit from the availability and overall effectiveness of UAS. UAS missions include, but are not limited to, reconnaissance, surveillance and target acquisition (RSTA); battle damage assessment; targeting; persistent stare for around-the-clock lethal and nonlethal operations; convoy protection; route clearance; and antiambush (improvised explosive device). As the Army becomes leaner and more agile, the UAS fleet will be shaped with commensurate capabilities and versatility.

The **MQ-1C Gray Eagle** UAS provides real-time responsive capability to conduct long-dwell, wide-area RSTA; communications relay; signals intelligence; and attack missions (up to four Hellfire missiles). It will be the mainstay of the division/corps commander's battle set for land warfare operations. The program is in the production and deployment phase, with two QRC units deployed in support of operations in Afghanistan.



MQ-5B Hunter Unmanned Aircraft System

The approved company configuration allows three platoons to operate from separate locations, increasing operational flexibility and survivability. The most notable attributes of the Gray Eagle UAS are: 3,600-pound maximum gross weight, electro-optical/infrared, laser range finder/designator, synthetic aperture radar/ground moving target indicator, dual automatic takeoff and landing systems, triple redundant flight processors, redundant flight controls, near-all-weather capability, and a heavy fuel engine. Gray Eagle has successfully demonstrated up to level of interoperability (LOI) 4 with the AH-64 Apache Block III during recent training scenarios and evaluations at National Training Center, Calif.; Dugway Proving Ground, Utah; and El Mirage, Calif. Gray Eagle has also executed numerous Hellfire missions in Afghanistan either autonomously or collaboratively, by launching a missile for remote designation or providing target designation for another shooter.

The **MQ-5B Hunter UAS** is the Army's longest-serving UAS and was used in Kosovo, Operation Iraqi Freedom and Operation Enduring Freedom. In conjunction with operations in multiple theaters, Hunter has been the workhorse for integration and demonstration efforts. The Army has installed, demonstrated or tested more than 23 different payloads on the Hunter, making it one of the most versatile UAS in the inventory. The Hunter air vehicle is a fixed-wing, twin-tail boom aircraft with a dual rudder and is capable of an 18-hour flight duration with an EO/IR sensor or eight hours with a

250-pound payload. The EO/IR—the main payload for the Hunter—provides eyes on target and laser designation to support manned/unmanned teaming operations.

Hunter is a system of many firsts: first to provide a heavy fuel engine to the commander in support of a common fuel on the battlefield; first Army weaponized UAS platform; and first to provide communication relay payloads and signals intelligence to the fight, making it one of the most sought after aircraft on the battlefield. This flexibility comes from a center-wing section with

hard points that support 130 pounds each, facilitating weapons or additional payloads. When not utilized for payload, the center wing can be loaded with 110 liters of fuel to increase endurance.

The **Sky Warrior A** and **Gray Eagle Block 0** aircraft are preproduction systems to the Army Gray Eagle program of record. The initial Sky Warrior A systems were produced in 2003 and fielded within six months after contract award. The Gray Eagle Block 0 systems became operational in Iraq in late spring 2008. The systems consist of two unmanned aircraft, a single ground control station, and associated ground support and data-link equipment. The systems provide the commanders up to 22 hours a day of operations, can carry more than 450 pounds of payload and have a service ceiling of 25,000 feet mean sea level. Since initial deployment, these aircraft have seen a number of upgrades, including beyond line of sight (BLOS), weaponization and reliability modifications. The systems carry a number of different payloads and are used daily for rest reduction efforts for the programs of record.

The **RQ-7B Shadow Tactical UAS** is the Army brigade commander's UAS. The Army's Deputy Chief of Staff, G-3, has directed that every maneuver brigade in Afghanistan be equipped with the tactical UAS system.

The Shadow system consists of four unmanned aircraft with day/night EO/IR, laser range finder/designator and communications relay payload capabilities, two ground control stations mounted on Humvees with ground data terminals, one portable ground control station with portable ground data terminal, two tactical



*RQ-20A Puma All Environment
Capable Variant SUAS*

automated landing systems, two launchers and two unmanned aircraft transports mounted on Humvees. Personnel and additional ground support equipment are transported in four additional Humvees and three trailers. The tactical UAS platoon consists of 22 personnel with the ability to sustain flight operations on a 24-hour basis. The unmanned aircraft (UA) 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 can be deployed via 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 (SUAS)** is an important reconnaissance and surveillance asset for U.S. combat forces. Raven, a battery-operated, hand-launched, 4.5-pound aircraft fielded throughout the U.S. Army, provides organic company- and platoon-level RSTA. The systems are widely deployed with U.S. forces in Iraq and Afghanistan. The Raven system consists of three aircraft, two control stations, modular payloads (high-resolution color day camera and infrared (IR) night sensors with IR laser illuminator), batteries, RSTA kit, and spare parts. The system is rucksack-portable by dismounted soldiers. Raven uses two rugged cases for storage and transport. The system is interoperable with the One System Remote Video Terminal and with receivers in manned aircraft. An FY 2012 upgrade provided a single fully gimballed payload incorporating day and night sensors and the IR illuminator.

The **RQ-20A Puma All Environment Capable Variant (AECV) SUAS** is a 13-pound, 9-foot-wingspan aircraft supporting forward deployed BCTs. The Puma employs a fully gimballed payload carrying a high-resolution camera, an IR sensor and an IR laser illuminator. The Puma is hand-launched and provides lower-echelon units with an organic RSTA asset capable of up to two hours' endurance and a 15-kilometer range. The Puma AECV system includes three aircraft, three payloads, batteries, two control stations, an RSTA kit, spare parts and rugged transport cases. The rapid equipping force originally procured Puma in response to an urgent requirement. Subsequent requirements led to procurement for route clearance patrols and each maneuver company within BCTs supporting OEF.

The **One System Remote Video Terminal (OSRVT)** provides commanders and soldiers at all echelons a tool for gaining and maintaining dominant situational understanding continuously throughout an operation. It enables the user to achieve battlefield visualization and situational understanding through full-motion video (FMV) and at standoff ranges never before available.



L-3 Communications

*One System
Remote Video
Terminal*

OSRVT collects and processes live video sources in real time. These video streams can be viewed immediately, recorded for quick playback and analysis, or exported to another storage device for extended recording and video archiving or to another user on the network to enhance situational awareness.

The OSRVT program uses commercial and government off-the-shelf (COTS and GOTS) technologies. Specific applications are acquired, integrated onto test models and evaluated, first in a test facility and then in an operational setting. COTS/GOTS technology and a flexible test bed are program approaches to minimize research and development, use proven technologies, and field iterative capabilities in the short term.

The **Universal Ground Control Station (UGCS)** provides a common set of hardware and software functionality to support UAS interoperability with Army, joint and allied forces. The UGCS performs UAS mission planning, UA launch, mission execution, UA recovery and post-UAS mission support. A UGCS consists of two S-788 configuration or three S-280 configuration crew stations, with each crew station able to perform all UGCS functions. The UGCS operators will each be able to perform either UA control functions or mission payload functions, or both.

In support of the operational and communication functions, the UGCS will perform data processing functions (including the ground-based portions of guidance, control, navigation functions, and Army Mission Command network and systems) and will include electric power backup and distribution equipment. An environmental control function will support the crew and equipment inside the UGCS. The UGCS

will be capable of operating and interfacing with other UAs within the Army UAS family and with other intelligence gathering and support systems without causing mutual interference or operational degradation. The GCS subsystem also consists of a shelter and/or portable transit cases, and environmental conditioning capability to protect the GCS subsystem's functionality from the physical environment.