ARMY AL&T

October–December 2010

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From the Army Acquisition Executive

The Importance of a Highly Skilled Army Acquisition Workforce

The Army has acquired weapon systems, equipment, goods, and services by working in partnership with private contractors and commercial industry since the Revolutionary War. While this issue of *Army AL&T* Magazine does not take us back to the beginning of our Nation's history, it focuses on several decades of Army acquisition and even includes an article on the U.S. Army Signal Corps, which was created in 1860. It was the Signal Corps that awarded the first Army contract on December 23, 1907, to Wilbur and Orville Wright for the "purchase of one heavier-than-air flying machine." In 1909, the Wright Military Flyer became the world's first military airplane.

With our entry into World War I and World War II and the introduction of new and major weapon systems such as the tank and long-range, heavy-payload bombers, the need for massive manufacturing capability gave rise to a domestic defense industry. No longer could the government rely on its own shipyards and arsenals to meet our warfighting needs. To manage the weapon systems and equipment being built by industry, the government required a highly skilled civilian and military procurement workforce. These efforts extended to space as the Army Ballistic Missile Agency launched the first U.S. satellite, Explorer I, into orbit on Jan. 31, 1958. This workforce grew in strength and complexity during our involvement in Korea and Vietnam and ebbed only as the Cold War ended. Our acquisition workforce, which now totals roughly 43,000 professionals, is down from a Cold War high of more than 100,000 members.

Several studies and commissions during this period recognized the need for a smaller, well-trained, well-educated, highly motivated workforce for efficiency and innovation. In particular, I am reminded of the Blue Ribbon Commission on Defense Management, which was led by David Packard. The commission's findings influenced the passage by Congress of major workforce reform legislation, including the *Goldwater-Nichols DOD Reorganization Act of 1986* and the *Defense Acquisition Workforce Improvement Act of 1990*.

It is clear that the dramatic reduction in workforce numbers, along with the loss of acquisition knowledge and expertise acquired over a lifetime of work, contributed significantly to the problems we have witnessed in the past 15 years.

At present, we are working with Congress, DOD, and others to strengthen and rebuild a skilled acquisition workforce. The candid and comprehensive report by Dr. Jacques Gansler and the members of his Commission on Army Acquisition and Program Management in Expeditionary Operations has given us insights for the way ahead. By the end of this year, we will have hired and in-sourced 1,791 civilian acquisition workforce members. Our goal is to hire 1,885 people and in-source 4,041 professionals, for a total of 5,926 new members. We are also addressing the need to expand, train, structure, and empower our acquisition experts to better support joint expeditionary operations. We are changing our culture to recognize the essential nature of contracting. We are also improving professional development, certification, education, and acquisition experience opportunities at all workforce levels.

Our efforts are aimed at improving our ability to attract and retain the best possible people to perform our vital mission—to provide our Soldiers a decisive advantage in any mission by developing, acquiring, fielding, and sustaining the world's best equipment and services and by leveraging technologies and capabilities to meet current and future Army needs. Our acquisition workforce is dedicated to meeting the needs of our Soldiers around the clock and around the world, and I am dedicated to ensuring that they have the right skills and training to successfully perform their jobs.

From the Army Acquisition Executive

The Army is committed to continually improving the process of developing, procuring, and sustaining our weapon systems. Likewise, we are committed to investing in cutting-edge technologies that provide our Soldiers with the decisive edge in battle.

The Army compiled a list of my predecessors within the Research, Development, and Acquisition community—now Acquisition, Logistics, and Technology—and I want to share their names with you. Their leadership and the achievements of their acquisition teams contributed significantly to our Army, the world's most capable, powerful, and respected force. Now, it is our time.

The Army is committed to continually improving the process of developing, procuring, and sustaining our weapon systems. Likewise, we are committed to investing in cutting-edge technologies that provide our Soldiers with the decisive edge in battle. The Army's decision in 1999 to combine logistics, the largest portion of total life-cycle costs for weapon systems and equipment, with acquisition and technology reflects the importance of all communities working together for our warfighters.

We are also fully committed to delivering better value to the taxpayer and the warfighter by improving the way we do business. Next to supporting our forces at war on an urgent basis, this is President Barack Obama's and Secretary Robert Gates' highest priority for our acquisition professionals. As Secretary Gates has said, one dollar of waste in our defense budget is a dollar we can't spend to support our troops, to prepare for future threats, or to protect the American people. While we have a continuing responsibility to procure the critical goods and services our forces will need in the coming years, we will not have ever-increasing budgets to pay for them. We must do more without more. Since June, the senior leadership of the acquisition community—the Component Acquisition Executives, senior logisticians and systems command leaders, Office of the Secretary of Defense officials, program executive officers, and program managers—have met regularly with Dr. Ashton B. Carter, the Under Secretary of Defense for Acquisition, Technology, and Logistics, to inform and craft the guidance for realizing greater efficiency. The Army has been fully engaged in the entire process. We agree that a capable, qualified, and appropriately sized acquisition workforce will be the key to its success.

I recall reading testimony by Norman R. Augustine, a former Assistant Secretary of the Army for Research, Development, and Acquisition, Under Secretary of the Army, and defense industry leader, to the House of Representatives' Armed Services Committee earlier this year on the Defense Department's acquisition challenges. He stated, "The bottom line for the acquisition enterprise is to recognize and reconstitute a professional acquisition workforce working side-by-side with its contractor support—and, most importantly, its operational counterparts."

Army Acquisition Leaders

Willis M. Hawkins	1963–1966
Russell D. O'Neal	1966–1968
Robert L. Johnson	1969–1973
Norman R. Augustine	1973–1975
Edward A. Miller	1975–1977
Percy A. Pierre	1977–1981
Jay R. Sculley	1981–1989
Stephen K. Conver	1990–1993
Gilbert F. Decker	1994–1997
Paul J. Hoeper*	1998–2001
Claude M. Bolton Jr.	2002–2008
Dr. Malcolm Ross O'Neill	2010–

* Title Change: Assistant Secretary of the Army for Research, Development, and Acquisition was redesignated as Assistant Secretary of the Army for Acquisition, Logistics, and Technology effective Feb. 16, 1999.

Dr. Malcolm Ross O'Neill
Army Acquisition Executive

ARMY AL&T

ACQUISITION, LOGISTICS & TECHNOLOGY

October–December 2010

PB 70-10-04

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ARMY AL&T
October–December 2010

Acquisition, Logistics & Technology

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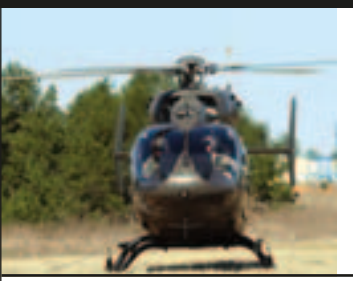

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Call (703) 805-1034/1038 or DSN 655-1034/1038

Articles should be submitted to:
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E-mail: **USAASCWEB-Ar@conus.army.mil** or **USAASCWEBArmyALTMagazineLettertoEditor@conus.army.mil**

Army AL&T Magazine (ISSN 0892-8657) is published quarterly by the ASAALT. Articles reflect views of the authors and not necessarily official opinion of the Department of the Army. Articles may be reprinted if credit is given to *Army AL&T* Magazine and the author.

Private subscriptions and rates are available from:
SUPERINTENDENT OF DOCUMENTS
U.S. GOVERNMENT PRINTING OFFICE
WASHINGTON, DC 20402
(202) 512-1800

Periodicals official postage paid at Fort Belvoir, VA, and additional post offices.

POSTMASTER: Send address changes to:
DEPARTMENT OF THE ARMY
ARMY AL&T
9900 BELVOIR RD SUITE 101
FORT BELVOIR, VA 22060-5567

Integrating Brigade Combat Team Modernization

Paul D. Mehney and Kathryn Cain

As outlined in the recently released Brigade Combat Team (BCT) Modernization strategy, the Army has adopted new acquisition strategies to support the incremental modernization of its BCTs. Integrated capabilities will now be developed and fielded according to the Army Force Generation (ARFORGEN) Model, with the intent to support those BCTs that are deploying and need the capabilities the most. The BCT Modernization Plan, which is informed by the comprehensive lessons learned from 9 years of war, focuses on the evolving needs of our warfighters in a rapidly changing security environment and exploits the knowledge and technologies developed under the former Future Combat Systems (FCS) program.

A Soldier with the U.S. Army Evaluation Task Force prepares to investigate a tunnel with a Small Unmanned Ground Vehicle at White Sands Missile Range, NM. The tunnel is one element of a vast, operationally relevant test area constructed at the range to test the sensor and unmanned assets that make up Increment 1 of the Army Modernization strategy. (U.S. Army photo.)

Historically, the Army has made one modernization decision and then applied it across the force, often taking two decades or longer to implement it. In part, the FCS program followed this model, but incorporated systems engineering, initiated total system integration to ensure functionality across the BCT, and ensured that Soldiers were included in the test process. Today, the BCT Modernization Plan recognizes that decisions must be made incrementally to stay ahead of the demands of the security environment and meet warfighters' needs.

The Army's new plan allows flexibility to adapt while embracing lessons learned from the FCS program, including continuing the role of battle-tested Soldiers in the development of new equipment, and retaining systems engineering and integration as key components to ensure systems' interoperability. The strategy also will incorporate Mine Resistant Ambush Protected vehicles into BCT formations, accelerate the fielding of new Capability Packages across all BCTs, and initiate a combat vehicle modernization strategy with the Ground Combat Vehicle as a key element.

Incremental Capability Packages, developed and fielded on a 2-year cycle, are at the core of modernizing BCTs. The packages will support incremental fielding of the best technology available from the research and development base to meet the challenges of the current fight, while reflecting the continually evolving combat environment and leveraging knowledge gained during 9 years of war to develop future capabilities. Capability Packages will include doctrine, organization, and training in conjunction with materiel to fill the highest-priority shortfalls and mitigate risk for Soldiers. The incremental deliveries will build upon one another as the Army continually adapts and modernizes.

Emerging from systems engineering, test integration, and product development during more than a decade of FCS program management, Program Executive Office (PEO) Integration is now a key BCT Modernization organization charged with ensuring integration across the PEOs and their associated portfolios that support the Capability Package materiel solutions. System-of-systems engineering, integration, and testing will remain the responsibility of PEO Integration to support the Capability Package construct. As requirements are formulated, PEO Integration will fully integrate and test Capability Packages composed of vehicles, equipment, network elements, and supporting infrastructure to modernize BCTs in conjunction with the ARFORGEN model.

A Soldier equipped with a Common Controller conducts a pre-launch check of a Class 1 Unmanned Aerial Vehicle (UAV). The Common Controller consolidates control of numerous sensor nodes and unmanned systems, including the Class 1 UAV and the Small Unmanned Ground Vehicle, into a single integrated networked controller. (U.S. Army photo.)

Capabilities for Infantry First

Increment 1, managed by PEO Integration's Project Manager Infantry BCT (PM IBCT), will form the backbone of the first Capability Package, significantly improving the IBCT Soldier's knowledge of the battlefield and ability to communicate key situational awareness data across the BCT echelon. Increment 1 consists of the Small Unmanned Ground Vehicle, Class 1 Block 0 Unmanned Air Vehicle, Tactical and Urban Unattended Ground Sensors, and the Network Integration Kit (NIK), which receives and passes sensor data from the unmanned systems to the Soldier and provides a common operating picture of the battlefield.

"All the Increment 1 systems are networked to support sharing of detailed tactical and visual data across the entire IBCT," said COL John Wendel, PM IBCT, during recent Increment 1 test exercises. "They are able to leverage and improve existing current force networks."

The Army is in Year 3 of a 4-year test and evaluation process for Increment 1. This increment has successfully passed Preliminary Design Review and Critical Design Review. The current technologies have been certified as mature enough to begin low rate initial production (LRIP). The Increment 1 program is executing a robust Reliability Growth Program of the systems being tested. The rigorous testing focuses on evaluating hardware and software updates to the production representative systems; evaluating secure aspects of the network and connectivity in operationally relevant environments;

continuing the development of tactics, techniques, and procedures for hardware and network capabilities; and continuing to add to the reliability, availability, and maintainability test hours to support directed Increment 1 confidence levels.

The iterative "test-fix-test" strategy has allowed the program to continuously mature hardware models and software as it progresses through the development process, while leveraging valuable feedback from U.S. Army Evaluation Task Force (AETF) Soldiers to continue improving the systems. "By utilizing an integrate-test-fix strategy, the Army is not only addressing incident reports and enhancing capability; it is ensuring that fixes are made before the Soldier is issued the equipment in the field. So far, we've seen encouraging results in the 2010 test cycle," Wendel said.

In June 2010, the program conducted a series of high-tech network and equipment verification evaluations called technical tests. Data gathered from these tests will factor into network and product development improvements as the Army moves toward the final stages of evaluation. In September, Soldiers of the AETF completed a full-scale military exercise to test and evaluate Increment 1 during the Force Development Test and Experimentation and the limited user test (LUT). The LUT is a Soldier-driven independent review of maturity, readiness, and functionality. A successful LUT will pave the way for additional low-rate production of Increment 1 equipment after a Defense Acquisition Board review, which is scheduled for December 2010.

The 2010 Increment 1 testing focuses on network enhancements and hardware fixes to increase connectivity between Soldiers, ultimately providing increased intelligence, surveillance, and reconnaissance capabilities, as well as increased survivability and lethality. Many of the reliability, maintainability, and durability issues identified during the 2009 LUT have been addressed, and the testing and evaluation methods have been updated. By LUT 2010, the Army is expected to have rectified all of the fixes identified the previous year.

This year's testing also incorporates enhanced data collection methods, production representative equipment, and improved and expanded operationally relevant test ranges. "The tests continue to grow in complexity and density," Wendel explained. "Our systems are covering vastly expanded terrain as a result of significantly enhanced range performance of the Joint Tactical Radio Systems Ground Mobile Radios."

Additional evaluations are also taking place using Increment 1 capabilities to provide the backbone of the BCT network. In July 2010, the Army conducted a BCT Network Integration Exercise at White Sands Missile Range, NM. It was designed to help the Army formulate its tactical network strategy by seeking to prove the concept of an integrated tactical network available to Soldiers at all echelons of the BCT. Additionally, the exercise leveraged the Army's development of the NIK, as well as past integration initiatives to illustrate the ability to connect the Soldier to the company and, through the Warfighter Information Network-Tactical and Command Post of the Future, to the battalion and brigade network architectures.

Although the exercise was not a formal test, it was the first time the U.S. Army Acquisition Corps was able to bring all tactical network pieces together in an integrated fashion in an operationally relevant environment. Army leadership will use data from the exercise as a baseline for how the Army envisions communicating on the battlefield throughout the next 7 years and for the shape of the mature network in 2017.

Future Steps

LRIP for Increment 1 is underway, with one brigade combat set of equipment being produced and readied to support the initial operational test and evaluation (IOT&E) in 2011. The 3rd IBCT, 1st Armored Division (AD) will be the first Army BCT to receive the Increment 1 networked systems, starting in 2011. Using the Increment 1 equipment, the 3-1 AD will conduct the IOT&E in late FY11 to provide a valid assessment of system operational effectiveness and suitability, which will inform the decision to move to full-rate production of the capabilities.

Already, leaders of the 3rd IBCT are familiarizing themselves with the key capabilities that Increment 1 of Capability Package 11-12 will provide. "There's a very sophisticated digital network that will be fielded to this brigade, and it will represent the first time that the Army has fielded an integrated, digital network to an operational unit," said COL Chris Cavoli, Commander of the 3-1 AD, during recent field tests. "This is a pretty powerful responsibility for [the IBCT], and it's probably going to change a number of ways that we do business. It is going to be the job of this brigade to figure out how we are going to use this in a fight."

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Integrated Waveforms Will Bring Battle Command to the Soldier Level

Joshua Davidson

In the deep jungles of mid-1960s Vietnam, Soldiers such as Mike Ruane became innovators as they struggled to submit reports and timely intelligence to higher headquarters. As radio signals weakened, they used other units or waited for helicopters that passed their positions periodically to relay the information to battalion headquarters.

A Soldier helps another limp to a Mine Resistant Ambush Protected All-Terrain Vehicle during a training exercise at the Hal Cox Ranch, White Sands Missile Range, NM. The scenario required the Soldiers to use the network to contact their command and request a helicopter to evacuate the "injured" Soldier. (U.S. Army photo.)

"It worked; it really did," said the retired Army colonel. "Like everything else, it was something that almost all of the units did on the fly."

Almost 50 years later, at White Sands Missile Range (WSMR), NM, engineers conducted multiple launches of the Shadow unmanned aircraft system with a Rifleman Radio attached to each of its wingtips. During this Brigade Combat Team (BCT) Integration Exercise from July 12 to 16, 2010, Soldiers could pass information to the radios on the Shadow. That information was relayed to a Soldier in a separate company positioned beyond line-of-sight. In addition to the Shadow, AH-64D Apache and UH-60 Black Hawk helicopters maneuvered across the WSMR skies, serving as aerial communications nodes.

"We took a hard look at how we could get physics to work for us by getting an aerial layer in place," said LTC James McNulty, an exercise trail boss.

The exercise brought together engineers from the Army acquisition community, Soldiers from the Army Evaluation Task Force (AETF), and Army senior leaders, who experienced firsthand the Army's future tactical network from their vantage points at WSMR and Aberdeen Proving Ground (APG), MD.

During raids as an infantry company commander in Iraq, MAJ Bill Venable experienced frequent 45-minute drives to receive detailed mission orders from battalion headquarters.

Through the unprecedented combination of three separate waveforms, Soldiers at WSMR received similar information instantaneously with the click of a button.

A Shadow unmanned aerial vehicle is launched from Condron Field, WSMR, NM. The Shadow is equipped with various camera systems to provide tactical intelligence and a set of radios to help extend the wireless network's range in rough terrain. (U.S. Army photo.)

"Within a minute, we were already talking about the mission," said Venable, Assistant Project Manager Infantry BCT, Program Executive Office (PEO) Integration.

Laying the Groundwork

The exercise was designed to help the Army continue to formulate its tactical network strategy by seeking to prove the concept of an integrated tactical network available to Soldiers at all echelons of the BCT. Three separate waveforms were integrated to provide connectivity from the lowest to highest echelons.

Lessons learned during the exercise will yield decisions in the Warfighter Information Network-Tactical (WIN-T) Increment 2 program, said Pat DeGroodt, its Deputy Product Manager.

"The exercise was very powerful," he said. "I think it has a lot of potential to change the warfighter's tactics and techniques."

> We took a hard look at how we could get physics to work for us by getting an aerial layer in place.

The AETF maneuvered through WSMR along improvised explosive device (IED) routes, performed air assault missions, conducted raids of explosive-making facilities, and used PEO Integration's Small Unmanned Ground Vehicle robot to identify and remove simulated IEDs from a cave. The mountainous terrain of White Sands closely mirrors that of Afghanistan, where Soldiers perform similar missions.

Many radios used in this exercise, such as the Rifleman Radio, were surrogates for radios that will be used in the final, deployable waveform solution starting in 2017. In future months, the Army will examine each of the capabilities demonstrated and determine which will be included in the 2017 network.

The exercise was a "team sport," involving PEO Integration; PEO Command, Control, and Communications Tactical (C3T); PEO Aviation; PEO Soldier; Joint PEO Joint Tactical Radio System (JTRS); PEO Intelligence, Electronic Warfare, and Sensors; U.S. Army Test and Evaluation Command; U.S. Army Operational Test Command; U.S. Army Training and Doctrine Command (TRADOC); AETF, headquartered at Fort Bliss, TX; the Central

SENIOR ARMY LEADERS PRAISE SUCCESSFUL NETWORK INTEGRATION EXERCISE

Kris Osborn

The Army's Brigade Combat Team (BCT) Integration Exercise at White Sands Missile Range, NM, successfully connected Soldiers, sensors, unmanned aircraft systems, networked vehicles on-the-move, command posts, and other nodes over long distances using satellite and software-programmable radios, allowing the Army to evaluate the progress of the battlefield network, senior Army officials said.

"The Army's battlefield network is showing itself to be extremely relevant to today's operational environment. The ability to connect the dismounted Soldier to networked vehicles on-the-move at the battalion level and above to higher headquarters provides an enormous advantage to the warfighting effort," said Under Secretary of the Army Dr. Joseph Westphal, who observed portions of the exercise from Aberdeen Proving Ground (APG), MD. "The BCT Integration Exercise showed that moving more combat-relevant information faster, farther, and more efficiently across the force will greatly enhance our Soldiers' ability to prevail in current and future conflicts."

The exercise, designed to help validate the concept of the objective network planned for 2017, used satellite links to connect units and extended line-of-sight radio systems through an aerial tier. With the aerial tier, units did not have to place a relay team on the top of a mountain ridge or reposition a command post to ensure communication between ground units over extended distances.

"We are building an Army that is a versatile mix of tailorable and networked organizations; the network is critical to this Army, and I am encouraged by the significant progress we have made in developing it," said Army Chief of Staff GEN George W. Casey Jr., who also observed the exercise from APG.

The idea was to connect multiple echelons and to move information from the dismounted Soldier on the tactical edge up to the platoon and company level, and all the way up to higher headquarters, said COL Michael Williamson, Deputy Program Executive Officer Networks, Program Executive Office Integration.

"This is designed not just to highlight technology, but to identify the gaps that we need to fill as we mature the network through 2017. This will help us shape how we bring networking capability to the field," said Williamson.

The exercise was aimed at informing the developmental cycle of the Army's network. The goal was to connect nodes through one seamless network wherein Soldiers, commanders, and sensors could share voice, video, data, and images across the force in real time.

"This is about the ability to move data and imagery down to the point where it is needed in a timely manner," said Williamson.

A terrestrial network of sensors sent voice, images, and data through Joint Tactical Radio System (JTRS) software-programmable radios using high-bandwidth waveforms such as Soldier Radio Waveform (SRW) and Wideband Networking Waveform. The information sent and received by the terrestrial layer was connected to Warfighter Information Network-Tactical (WIN-T), a satellite network able to send information over long distances.

Vehicles with Network Integration Kits (NIKs) served as key hubs connecting the terrestrial and satellite layers of the network. The NIKs consist of an Integrated Computer System, JTRS Ground Mobile Radio, and Blue Force Tracker display.

By connecting the echelons, with dismounted Soldiers carrying either a JTRS Rifleman Radio or JTRS Handheld, Manpack, Small Form Fit radio, the Soldiers shared information instantly across the squad, platoon, company, and battalion levels and, if needed, all the way up to commanders at higher headquarters or command posts.

"What allows this [network connectivity] to integrate is the fact that we have stable hardware and stable software," said MG John Bartley, Program Executive Officer Integration. "This is about platoons that are isolated reaching back for their support such as MEDEVAC [medical evacuation], food, water, logistics, ammunition, and resupply. How do you enable those folks so that they have assured communications moving forward?"

The BCT Integration Exercise showed that moving more combat-relevant information faster, farther, and more efficiently across the force will greatly enhance our Soldiers' ability to prevail in current and future conflicts.

Sending voice, video, and images via the SRW, sensors such as Unattended Ground Sensors, Small Unmanned Ground Vehicle robots, and Class 1 unmanned aircraft instantaneously disseminated information across the force. In addition, the NIKs showed an ability to view and share the sensor information in real time on Blue Force Tracking display screens in vehicles on-the-move. WIN-T then beamed the images over longer distances.

The data were shown on a Command Post of the Future display screen, a battle command application that organizes and displays a wealth of relevant battlefield information.

The U.S. Army Test and Evaluation Command (ATEC) assigned a 32-person team with 21 data collectors and observers to the exercise; the command is preparing an executive summary of its findings.

"We will continue to learn from this type of exercise. This is not an isolated event, and our success here provides tremendous momentum moving forward. We are going to continue this. ATEC has been a key contributor to this process," said LTG William N. Phillips, Principal Military Deputy to the Assistant Secretary of the Army for Acquisition, Logistics, and Technology (ASAALT). "This is a real Army Team effort!"

KRIS OSBORN is a Highly Qualified Expert for the ASAALT Office of Strategic Communications. He holds a B.A. in English and political science from Kenyon College and an M.A. in comparative literature from Columbia University.

Technical Support Facility, Fort Hood, TX; the Future Force Integration Directorate; and personnel from the WSMR and APG installations.

Stressing the Network

At WSMR, Soldiers maneuvered various platforms at vast distances away from one another to see if they could maintain network connectivity. The network was stressed during the numerous operational vignettes and in the diverse temperatures, environments, and altitudes of White Sands.

The Army's three network waveforms were established based on the amount of information passed across each, said Rick Cozby, PEO Integration's Associate Director for Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance Testing. Smaller echelons share less information, which reduces bandwidth requirements. This allows Soldiers to operate successfully with smaller, more portable radios than those needed at higher echelons.

MG John Bartley, Program Executive Officer Integration, concludes a VIP tour during the BCT Integration Exercise on July 15, 2010, at APG. (U.S. Army photo by Joshua Davidson.)

In today's tactical environment, the Soldier Radio Waveform (SRW) operates at the lowest level, providing information to individual Soldiers or teams within a company.

As echelon levels increase, more tactical data are shared, and the large communications pipe of Wideband Networking Waveform (WNW) is required. Connectivity is achieved through an aerial layer using JTRS attached to unmanned aircraft systems and other components such as airships and Rapid Aerostat Initial Deployment towers.

The Network Centric Waveform (NCW) is the satellite layer. It allows warfighters to access the Internet and share voice, video, and data around the globe.

Today, WIN-T Increment 1 provides warfighters at battalion level and above with the ability to connect to the Army's digitized systems, voice, data, and video via satellite. WIN-T Increment 2 will build upon these capabilities by extending satellite communications down to the company level and providing

A U.S. Army Evaluation Task Force (AETF) Soldier waits for exercises to begin during the limited user test (LUT) Media Day Sept. 1, 2009, at WSMR, NM. In September 2010, Soldiers of the AETF completed a full-scale military exercise to test and evaluate Increment 1 during the Force Development Test and Experimentation and the LUT. (U.S. Army photo.)

increased bandwidth while on-the-move. An aerial tier will be fielded in WIN-T Increment 3, bringing a network backbone that can maintain connectivity at all times, regardless of whether a platform is moving or stationary.

Cozby noted that acquisition Programs of Record (PORs) exist to build the various waveforms and the associated radios, but that there is no POR designed to integrate them with one another. This will be accomplished by the Army's new PEO Integration, which was created in connection with an acquisition decision memorandum in December 2009 laying out the networks for 2011 and 2017. In conjunction with that memorandum, GEN Peter Chiarelli, Vice Chief of Staff of the Army, required a demonstration of the Army network.

"These emerging technologies will provide vital capability to our deployed forces and ensure that we keep our Soldiers equipped with the best kit available," said BG N. Lee S. Price, Program Executive Officer C3T.

Although the future WIN-T network will use either commercial KU-Band or military Wideband Global Satellite Communications satellites, only commercial satellites were used in the exercise, DeGroodt said.

Connecting the Company with the World

As units in Afghanistan and Iraq maneuver in a dispersed fashion, the exercise at WSMR demonstrated that the Army will be able to connect higher echelons to the rifleman and vice versa. Doing so will empower the company commander, McNulty said.

"Providing the company commander with situational awareness and real-time actionable intelligence is critical to allowing the rifleman to conduct the mission," he said.

This marked the first time that the waveform technologies of SRW, WNW, and NCW operated together, said Robert Wilson, Director of Tactical Radios for PEO C3T. It also was the first of many exercises that will build upon the established network thread, so that this solution can be incorporated in the future. The network thread means taking separate communications capabilities and networking them together as one to establish communications among separate units or echelons.

McNulty cited the example of how a battle captain at APG was able to use WIN-T Increment 2 to send an operations order of nearly six megabytes to a company commander at WSMR. This company commander was able to share information with adjacent companies and their platoon leaders via WNW and SRW. This capability will increase the speed of operations and prevent casualties, McNulty explained, noting that a Soldier today might have to drive 50 miles to deliver this information.

In the triple-canopy jungle of Vietnam, Ruane used a method known as triangulation to achieve what Global Positioning System technology does today. Ruane began by firing an artillery round at a 200-meter height-of-burst at different grid locations. Then, he would use

those sounds as a reference point to obtain a back azimuth on his compass. By triangulating the sound of the artillery, he was able to check the accuracy of his location on his topographical map, which was covered with grid squares.

"Most times, we were close enough," said Ruane, Fort Monmouth, NJ, Force Protection Representative. "It wasn't always totally accurate because the sound would be distorted through the jungle, but it was better than going 200 meters or a mile through the brush and not knowing where you were."

At White Sands, the Soldiers within a company could communicate with their own platoon and even with the battalion. Inside their command posts, company commanders exchanged text messages and e-mails, tracked simulated IEDs, and collaborated on the battle using the Command Post of the Future system. They planned fires with the Advanced Field Artillery Tactical Data System. They tracked automatically populated friendly forces' movements and manually added enemy and hazard locations with Force XXI Battle Command Brigade-and-Below/Blue Force Tracking. They also used WIN-T Increment 2; the Network Integration Kit; other Army Battle Command System Suite 6.4 applications; JTRS Handheld, Manpack, Small Form Fit radios; and shared intelligence through the Distributed Common Ground System-Army.

Today, most of this information is accessible only at the brigade and battalion levels, said LTC John Matthews, also a trail boss for the exercise. Pushing these data to lower echelons allows the company commander to share the information with platoon and team leaders and to coordinate the battle during direct enemy contact. During the exercise, information was also exchanged digitally using aviation platforms, a critical tactical advantage for rapid and accurate close air support.

Video feeds are received in a command post at APG from WSMR on July 15, 2010, during the BCT Integration Exercise. (U.S. Army photo.)

One Soldier used the Land Warrior system to request a medical evacuation (MEDEVAC) to the company command post. Using the Shadow-connected system, which allows Soldiers to see battlefield information through an eyepiece attached to a helmet, Soldiers initiated calls for a medic and pushed information almost instantaneously to medical evacuation crews.

"That 9-line request for a MEDEVAC … was sent back to the battalion and then to the brigade at APG," McNulty said.

Developing the Future Battlefield Network

Throughout the exercise, engineers from the separate PEOs and TRADOC met in working groups to determine how to integrate the terrestrial waveforms with the satellite communications capabilities of WIN-T Increment 2, said Clifton Basnight, a system-of-systems engineer with Project Manager WIN-T. In just a few days, they carefully developed a "straw-man architecture," laying out how each would operate in conjunction with the others, he said. The group held technical interchange meetings once a week to discuss and develop solutions for routing challenges. Decisions were made as a team.

"Before we went down a path, we had some level of consensus," Basnight said.

Engineers such as Basnight forged new relationships with those from sister PEOs. Many traveled to separate regions, providing their expertise at each stop.

"We put into play things that, even though they might not have been the total solution, were vetted and had engineering rigor to them," Basnight said. "It wasn't done in a vacuum."

"It was really a fantastic exercise of teamwork," DeGroodt said. "Everybody was out to make the exercise successful."

This integrative effort demonstrated the importance of reducing stand-alone developmental efforts, Basnight said. "We left with a sense that we made the impossible possible," he said. "But this is just the beginning."

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Operation Enduring Freedom Camouflage Pattern: A Rapid Response to a Complex Need

COL William E. Cole and LTC Michael E. Sloane

The evolution of uniforms for America's fighting men and women has a vast and storied past. Each uniform is indelibly marked by the era in which it clothed our warriors. From the rich and lustrous blue, scarlet, and yellow coats of the Revolutionary War to the subdued, earthy patches of modern-day camouflage, the Army has continued through the years to provide clothing as a means of protecting Soldiers on the battlefield.

Wearing MultiCam, PFC Joshua E. Tomblin, SSG Kevin J. Imholt, and 1LT Thomas J. Goodman, with 3rd Platoon, Chosen Company, 12th Infantry Regiment, 4th Brigade Combat Team, patrol through the Wata Poor district, Afghanistan, Feb. 7, 2010. (U.S. Army photo by SPC Albert L. Kelley, 300th Mobile Public Affairs Detachment.)

Woven deep into the history of our warfighting uniforms is Army acquisition, which over the past 50 years has been steadfast in enabling the most effective equipping of the Nation's forces while maintaining an internal culture of constant organizational improvement. The Army acquisition system has successfully developed and rapidly fielded state-of-the-art improvements in Soldier uniforms and equipment, most recently under the auspices of Program Executive Office (PEO) Soldier.

Now another chapter in the history of uniforms is being written with the introduction of a new uniform for U.S. forces fighting in *Operation Enduring Freedom* (*OEF*). On Sept. 16, 2009, the Army unveiled a 4-phase plan to evaluate and decide which camouflage pattern or patterns would best serve the concealment needs of Soldiers serving in *OEF*. Ten and a half months later, the Army fielded the first unit with a suite of uniforms and accessories in the new *OEF* Camouflage Pattern (OCP), in a rapid yet rigorous process of study, analysis, planning, and procurement.

This expedited but well-researched action to purchase and field Fire Resistant Army Combat Uniforms (FR ACUs) and associated equipment in a new camouflage pattern grew out of the Army's continuing commitment to provide Soldiers with the equipment they need to be as lethal and survivable as possible in any operating environment. Effective concealment has been of particular concern in Afghanistan, with its diverse environments of mountains, woodland, and high desert. In *OEF*, Soldiers often travel through multiple environments in a single mission.

The 4-phase plan included both immediate action, to provide concealment capability to two battalion-size elements in *OEF*, and a deliberate, thorough evaluation of camouflage alternatives for Soldiers in all regions and terrain types of Afghanistan. The end result was that in late July 2010, the Army began providing Soldiers in *OEF* with a camouflage pattern specifically chosen for the multiple operating environments of Afghanistan. The fielding began with a small headquarters detachment preparing to deploy to *OEF* and ramped up in August with two deploying brigade-size elements. In December 2010, fielding will move to Soldiers who are deployed to *OEF* with more than 120 days remaining in theater.

The fielding of uniforms and equipment in the OCP, known commercially as MultiCam, involves providing 23 different uniform and equipment items, including body armor, rucksacks, helmet covers, and even knee and elbow pads, for about 10,200 Soldiers in FY10 and an anticipated 74,500 Soldiers in FY11, not including spares and sustainment quantities. The cost is approximately $174 per uniform, with a basis of issue of four per Soldier, plus an estimated $4,208 per Soldier for associated equipment.

A process that ordinarily would take at least 12 months—to develop, purchase, and field one item—was compressed into less than 8 months for an entire suite of items, so that the Army could be responsive to what Soldiers saw as a pressing need, and also be responsible for the science underpinning the decision and its fiscal impacts.

Phase I (Immediate Action)

In fall 2009, two battalion-size units serving in *OEF* received the FR ACU in a pattern other than the standard Universal Camouflage Pattern (UCP) that was chosen when the ACU was introduced in June 2004. They also received Organizational Clothing and Individual Equipment (OCIE) that blended with each pattern.

One unit (2nd Battalion, 12th Infantry Regiment) received uniforms and OCIE in the MultiCam pattern, while the other (3rd Squadron, 61st Cavalry Regiment) received uniforms in UCP-Delta (UCP-D), a variant of UCP that adds the Coyote Tan color and uses less of the lighter sand and gray colors than in the UCP.

These uniforms in alternate camouflage patterns were in addition to the Soldiers' standard-issue FR ACUs in UCP. Unit commanders were responsible for deciding which uniform would be best suited to a given mission.

The Soldiers in the two battalions would provide essential feedback on their experiences with the MultiCam,

Members of the Army's camouflage assessment team wear the six different camouflage patterns they evaluated. From left, the patterns are: AOR-2, UCP, MultiCam, Desert Brush, UCP-Delta, and Mirage. The photo was taken in Khost province, Afghanistan, close to the Pakistan border, in late October 2009. (Photo courtesy of Naval Research Laboratory, PEO Soldier, and NSRDEC.)

UCP-D, and UCP uniforms and how each blended into Afghanistan's various operational environments. But that was just one set of data that the Army planned to gather. While Soldiers already liked the MultiCam pattern, the choice of camouflage for Afghanistan could not be based on anecdotal reports of Soldiers' preferences. It had to be grounded in a carefully planned and executed process of gathering information and evaluating alternatives in theater. This action satisfied a requirement from Congress that DOD move immediately to provide Soldiers deployed to *OEF* with a camouflage pattern suited to the environments of Afghanistan.

U.S. Army Soldiers with 2nd Platoon, Company D, 2nd Battalion, 12th Infantry Regiment, 4th Brigade Combat Team, 4th Infantry Division, move from cover to search an area near Sundray village, Afghanistan, Feb. 18, 2010. (U.S. Army photo by SSG Gary Witte.)

Phase II (Building the Science)

At the same time as the Soldiers in the two battalions were testing the two alternate camouflage patterns, an Army camouflage assessment team went to Afghanistan in October 2009 to gather photos and information with maximum operational realism.

The team included representatives from PEO Soldier; Army G-4; U.S. Army Maneuver Center of Excellence; U.S. Army Special Operations Command; the Asymmetric Warfare Group; U.S. Naval Research Laboratory; and the U.S. Army Natick Soldier Research, Development, and Engineering Center (NSRDEC).

The team went outside the wire to conduct its assessment, providing its own security so as not to distract from the warfighting mission. The assessment, which encompassed eight different environments of Afghanistan, focused on six different camouflage patterns with OCIE that blended with each pattern. The patterns were:

- UCP with UCP
- MultiCam with MultiCam
- UCP-D with UCP
- Mirage with Mirage
- Desert Brush with Coyote
- AOR-2 with Ranger Green

NSRDEC used the information and more than 1,000 color-calibrated photos to develop a photosimulation study comparing the six patterns' performance in providing concealment in various environments at various distances. The colors and distances in the photos were painstakingly calibrated against scientific standards in developing the study.

The photosimulation study was administered to about 750 Soldiers who had recently served in Afghanistan. The Soldiers' input was both objective and subjective, comparing detectability (at what range could the Soldiers detect the uniform), blendability, and rank-order blending.

The bottom line: MultiCam was never found to be unsuited to any terrain or environment and ranked highest in the photosimulation detection and blending results. UCP-D, which ranked second in the same analyses, was unsuited to certain terrains or environments.

The results of the photosimulation study, along with the surveys of Soldiers in the two Phase I battalions, provided a body of knowledge, from a wide range of experienced Soldiers viewing objective scenarios, that helped the Army empirically measure how the various camouflage patterns in the study blended with the various environments.

Phase III (*Operation Enduring Freedom* Camouflage)

Based on an analysis of the Phase I and II data, the Army evaluated whether to produce and field alternate uniforms and OCIE to selected units in specific regions of *OEF*, or to all units in *OEF*. Senior Army leaders were briefed on possible alternatives in early 2010.

In February 2010, Secretary of the Army (SecArmy) John McHugh announced that the Army would provide combat uniforms in the MultiCam pattern to all Soldiers deploying to *OEF*. The industrial capacity already existed to manufacture the uniforms; now the procurement process could begin.

More than 30 industry partners were involved in transitioning more than 30 different types of uniforms and equipment from the UCP style to the OCP style. PEO Soldier used various contract

vehicles including the Materials and Development contract, mandatory sources on the Federal Procurement List, and Full and Open Competition contracts to source and meet requirements, until Defense Logistics Agency Troop Support (DLA TS) can effectively transition existing contracts or award new contracts for sustained production of OCP items.

To manage and meet the requirements and timelines under the SecArmy's directive regarding the fielding of OCP, the PEO Soldier team conducted weekly internal Integrated Product Team meetings to synchronize technical development and procurement actions. Additionally, PEO Soldier met biweekly with DLA TS to review transition of technical packages, supply request packages, and DLA TS contracting strategies.

The first unit fielded with OCP uniforms received them by the end of July 2010, one month ahead of schedule. This effort continued through the remainder of FY10 and into FY11, with more than 10,000 Soldiers fielded through the end of the fiscal year and more than 72,000 Soldiers expected to receive the new uniforms and gear through FY11. Fielding will take place both in theater and in CONUS, further demonstrating the team's commitment to ensuring that our Soldiers have the best equipment for today's fight.

Phase IV (Long-Term Plan)

The Army is now implementing Phase IV of its plan for camouflage, the evaluation of long-term ACU camouflage options for all Soldiers. The U.S. Army Training and Doctrine Command has the lead to develop a performance-based requirement for future uniform and OCIE camouflage. That requirement could result in multiple camouflage patterns for the FR ACU, or a universal pattern.

On June 29, 2010, the Army released a Sources Sought notice inviting industry to submit candidates for a family of three different camouflage patterns (woodland, desert, and transitional) and one pattern for OCIE that blends with all three patterns. "Family" is defined as being "of the same or similar geometry with coordinating color palettes to cross the global operating environments."

PFC John D. Macintosh, a gunner with 3rd Platoon, Chosen Company, 12th Infantry Regiment, 4th Brigade Combat Team, talks with a young resident of the Wata Poor district, Afghanistan, while on patrol Feb. 7, 2010. (U.S. Army photo by SPC Albert L. Kelley, 300th Mobile Public Affairs Detachment.)

This family of patterns could enable the Army, as one option, to issue the transitional (also thought of as universal) pattern to all Soldiers while issuing the woodland and desert patterns to Soldiers operating in those environments.

The evaluation methods used earlier, both photosimulation and field testing, will be applied to the candidate patterns as well, underscoring the validity and utility of the Phase II effort. The objective is to develop a new family of patterns, again based on rigorous testing and evaluation, for issuance to Soldiers within 2 years.

Camouflage alternatives represent one facet of the Army's efforts to improve the ACU, based in large part on feedback from Soldiers. The Army has made more than 26 improvements to the ACU since it was first fielded in 2004. PEO Soldier will continue to evaluate the form, fit, and function of our Soldiers' uniforms and make improvements as needed, with invaluable feedback from Soldiers who are speaking from experience on the battlefield.

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Project Management Office Aviation Systems Realizes Success, Achieves Milestones

COL Anthony W. Potts, LTC Jong H. Lee, and LTC William R. Wygal

The Project Management Office Aviation Systems (PMO AS), in existence since 1999, is charged with the responsibility to manage six product offices and oversee nearly 60 separate and distinct products across all aspects of the acquisition life cycle, from drawing board to retirement. These products are critical to Army aviation to conduct successful peacetime and wartime operations effectively and efficiently throughout the world. PMO AS is responsible for managing these supporting systems and products in an integrated and well-planned manner for the U.S. Army aviation platforms across Program Executive Office Aviation.

Two U.S. Army AH-64D Longbow Apache attack helicopters, assigned to 1st Battalion, 101st Aviation Regiment, return to Forward Operating Base Speicher, Iraq, from a combat mission. (U.S. Air Force photo by TSgt Andy Dunaway.)

The fixed-wing C-12 King Air undergoes contractor maintenance. (Photo courtesy of Product Manager Fixed Wing.)

This article highlights some of the major milestones of three PM AS Product Offices: Joint Cargo Aircraft (JCA), Fixed Wing (FW), and Aviation Ground Support Equipment (AGSE). The next two articles (see Pages 20 and 24) address achievements in the Aviation Mission Equipment and Aviation Networks and Mission Planning offices, and in the Air Traffic Control office.

Joint Cargo Aircraft Transfer

Although we traditionally think of large transport aircraft in connection with the U.S. Air Force (USAF), the Army has a requirement to move Time Sensitive/Mission Critical (TS/MC) personnel and equipment to points around the globe. The JCA program began in 2004 as the Future Cargo Aircraft (FCA), a project designed to meet the Army's TS/MC mission. In 2005, the Defense Acquisition Executive directed that the separate FCA and the USAF Light Cargo Aircraft programs merge into one JCA program, managed by the Army. The JCA Product Office transitioned known requirements into a contract requirements package and selected the C-27J Spartan as the platform of choice for the JCA after a detailed source selection process.

In April 2009, Resource Management Decision (RMD) 802 dramatically changed the management of the JCA program by directing the USAF to take over sole management. The Army was directed to transfer both the program and the direct-support airlift mission to the USAF. In addition, RMD 802 also reduced the aircraft procurement quantity from 78 to 38.

The Army maintains the lead and was set to complete the transfer of the program to the USAF by Oct. 1, 2010. In spite of this drastic change in course, the program remains on cost, schedule, and performance.

Fixed-Wing Aircraft Evolution

Although JCA is a fixed-wing aircraft platform, the scope of the program necessitated that it be a stand-alone PM outside the purview of the Army's FW Product Management Office (PMO). The bulk of the remaining fixed-wing aircraft in the Army's arsenal are centrally managed by the FW PMO. During the 1980s, Congress directed that the centralized management and funding of some of the Army's fixed-wing aircraft be managed under one office. Thus, the Army FW PMO was established in 1983. Although some fixed-wing aircraft still are not managed by the FW PMO, a recent HQDA directive mandated that all Army fixed-wing aircraft be managed at some level by that office.

In January 1957, BG William B. Bunker wrote a paper titled "The Problems of Supply Management in Aircraft Logistics." Assigned to the Transportation Corps, Bunker was responsible for providing logistical support to the Army's dispersed aircraft. Comparing the aircraft and the support and management approaches discussed by Bunker to those of today reveals that, although the major mission sets remain the same (cargo, utility/VIP, and observation), the fleet sustainment and program management have morphed to best meet the needs of the warfighter.

Bunker's 1957 article explained that Army aircraft are of a "standard commercial design which, with or without modification, are usually procured from the normal manufacturers of similar civil items. … While we usually supply a statement of our requirements and … spend many hours in a meticulous review of details of design on the part of the manufacturer, it is highly debatable … that we … add anything to the technical assemblage that goes to make a complete aircraft. As a consequence … it is in the final analysis, … [the manufacturer's] airplane and we have merely decided that the assemblage which they have designed is as near satisfactory for our purpose as we can expect to get."

The Army continues to purchase commercial aircraft in accordance with the concept explained in Bunker's article, and the fixed-wing aircraft fleet of today is composed exclusively of commercial and commercial derivative aircraft. When selected, the Future Utility Aircraft is also expected to be a commercial or commercial derivative aircraft.

Although more than 50 years have passed since Bunker's paper was first published, fundamental logistics principles and goals remain the same. Army fixed-wing aircraft were supported initially by a military maintenance structure, but in the late 1970s, the Army began a transition from organic maintenance support to contractor logistic support when it stopped training fixed-wing fleet maintainers because the fleet size was too small to provide a hierarchy for advancement. This change continued through the 1980s, when all the Army's military occupational specialties for fixed-wing mechanics were eliminated. Since that time, all Army fixed-wing maintenance has been performed exclusively by commercial sources. What has not changed over the years, however, is the logisticians' ability to recognize the importance and benefits of basic logistics concepts such as standardization and maintainability. Although we remain limited in our ability to influence the design of commercial aircraft, the Army benefits tremendously from standardization with larger commercial markets.

The operational and tactical management of Army fixed-wing aircraft has also changed over the past 50 years. When Bunker's article was published, cargo aircraft belonged to Aviation Classification Repair Activity Depots, observation aircraft belonged to maneuver units, and utility aircraft belonged to major commands. Referring to the Army Fixed Wing Force in 1957, Bunker indicated that the "high command has repeatedly emphasized that we have no desire nor necessity to reestablish a separate Army Air Corps to handle our … aviation program but can fit it into our existing structures." That viewpoint was completely reversed on April 12, 1983, when Army aviation was consolidated and became a separate branch of the Army, in recognition of the demonstrated and ever-increasing importance of aviation in Army doctrine and operations.

The Aviation Ground Power Unit provides AC/DC electrical, hydraulic, and pneumatic service for all Army rotary-wing aircraft. (Photo courtesy of PM AGSE.)

Aviation Ground Support Equipment Portfolio

Ground support of all Army aircraft, whether it is fixed-wing or rotary-wing, is accomplished by the AGSE PMO. Before it was established, AGSE was a weapon system management directorate tasked with a sustainment mission. In December 2003, the Army formally recognized the need for total life-cycle management of the ground support equipment that was used for aviation platforms fleetwide, and the AGSE PMO was chartered. The PMO's maintenance mission continues to mature as the aircraft it supports are modernized.

The Aviation Ground Power Unit (AGPU) is an example of the maturing technology in use today. This gas-turbine, engine-powered, enclosed auxiliary unit is wheel-mounted and self-propelled. It provides AC/DC electrical, hydraulic, and pneumatic service for all Army rotary-wing aircraft. The current AGPU includes enhanced electrical service for the AH-64D Apache Longbow helicopter and has a zero-time overhauled gas-turbine engine and hydraulic module, larger fork wells to allow for handling by rough terrain forklifts, and new hydraulic hoses.

The Aviation Intermediate Maintenance (AVIM) Shop Set (SS) Plus program provides an easily transportable and modular maintenance capability

that allows units to provide logistic and maintenance support across the spectrum of military operations and platforms. The AVIM SS Plus complex includes nine 20-foot shelters providing specialized maintenance areas for Soldiers. A tenth SS will soon be added, providing a specific area for armament and electrical (A&E) work. This A&E SS will replace three existing shop sets.

The latest addition to the AGSE portfolio is the Standard Aircraft Towing System (SATS). The SATS will provide units with a standardized towing system to reposition both fixed- and rotary-wing Army aircraft and their AGSE in aircraft hangars and maintenance areas. Capable of navigating on both improved and unimproved surfaces, the SATS is highly anticipated in the U.S. Central Command area of operation. The program received approval to enter into full-rate production in June 2010, with the first unit slated to receive its systems in September 2010.

The future of AGSE includes programs such as the Aviation Sets, Kits, Outfits, and Tools (A-SKOT), which will modernize seven separate tool kits for aviation maintenance company and aviation support company mechanics. A-SKOT provides warranted, aerospace standard tools and an instant tool inventory capability. It will also provide an enhanced Aviation Foot Locker to support preventive maintenance and servicing of aircraft at the Aviation Unit Maintenance (AVUM) level. Further down the line, it is anticipated that the AVUM Alpha 92 will be modernized with an electrically powered, air-transportable shelter set mounted on a 5-ton truck and a trailer-mounted 20-foot International Organization for Standardization shelter. Additional modernization of the AVIM SS is also anticipated to provide commanders with the maintenance capability to operate in nonlinear, split-based operations.

In December 2003, the Army formally recognized the need for total life-cycle management of the ground support equipment that was used for aviation platforms fleetwide, and the AGSE PMO was chartered.

Connecting Past and Present

Looking back at the Army of Bunker's era, we can clearly see that the old adage is true: The more things change, the more they stay the same. Army aviation of today is a dynamic community on the cutting edge of technology development and maintenance operations and concepts. The U.S. Army fleet is the most modern in the world, using technology that was, at best, only discussed in science fiction books of Bunker's era. That technology is used to integrate ground and air forces with other services and with civil and international forces. But in spite of our state-of-the art ways, today's aviation is easily recognizable to the aviators of yesterday. The fixed-wing fleet remains a collaboration with our industry partners; we still rely heavily on fixed- and rotary-wing aircraft and the aviation support systems that enable them to conduct successful military missions; and we have continual logistics challenges to solve as our personnel and fleet are spread across the globe. We in PM AS continue to take advantage of maturing technologies to provide world-class aviation aircraft and flight support products for today's warfighters in the field.

The UC-35 is an example of an Army-managed commercial design. (Photo courtesy of Product Manager Fixed Wing.)

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For Army Aviation, Dramatic Developments in Mission Planning and Network Communications

LTC James Bamburg and Michael Chandler

Army aviation tactics evolved dramatically in the 1960s, as the use of helicopters in the Vietnam conflict forever changed the American doctrine of tactical warfare. But for all the advances of the decade, there was no concept of digitization or interoperability. Army aviation conducted missions quite differently from today's aviators. American combat units were able to conduct tactical airmobile missions, including insertions and extraction of ground forces, aerial reconnaissance, downed aviator recovery, and support with aerial weapons. Units planned with pencil and paper in their tactical operations centers and carried graphics hand-drawn on clear plastic overlays to the company command posts. Aviators talked over unsecure radios using "Hollywood" call signs. Frequency Modulation (FM), Very High Frequency (VHF), and Ultra HF (UHF) radios were in use with no ability to speak securely or to frequency hop. Secure HF radios were only daydreams.

An Army CH-47 Chinook departs from Kandahar Airfield, Afghanistan, Dec. 27, 2009. (U.S. Air Force photo by TSgt Francisco V. Govea II.)

Maturation of Army Aviation Technology

By the 1970s, military aircraft were morphing into flying sensor platforms; making large amounts of electronic equipment work together was the new challenge. Integrating the steady stream of improved instruments, radios, radar, fuel systems, engine controls, and radio navigation aids brought the term "avionics" to the military lexicon.

Post-Vietnam Army aviation faced threats from the Cold War and North Korea. While mission planning remained largely unchanged from a technical standpoint, aviation mission equipment began to mature significantly. Aircraft radios began to "go secure" as electronic encryption, electronic countermeasures, and transponders became commonplace on all Army rotary-wing aircraft. Aircrews were taught how to fill the secure radio with a variety of keying devices. In-air coordination relied on voice communication; passing of information was done by aircrews trained in use of the brevity codes and Signal Operating Instruction authentication techniques.

The fielding of the UH-60A Black Hawk and AH-64A Apache during the 1980s brought giant technological steps forward, including UHF radios with have-quick (anti-jam) capabilities. Battalions were streamlined into leaner organizations with smaller company units. Aviation Intermediate Maintenance units stood up to provide back-shop support that was not organic to the smaller battalions. Along with the Apache and Black Hawk, the first truly digitized aviation platform, the OH-58D (later renamed the Kiowa Warrior) Scout Helicopter, was coming online. The Kiowa Warrior's ability to precisely locate distant targets and digitally conduct call-for-fire missions was something new to Army aviation.

The introduction of the Single Channel Ground to Air Radio System in the early 1990s ushered in more sophisticated FM communications, including the ability to frequency hop and transmit securely. The widespread use of Global Positioning System (GPS) technology for navigation in the late 1990s led the Army to integrate GPS capability into

The fielding of the UH-60A Black Hawk and AH-64A Apache during the 1980s brought giant technological steps forward. Here, an Apache AH-64 helicopter conducts a mission in Iraq in April 2007. (U.S. Army photo.)

new systems and to configure GPS updates to many legacy platforms. The 1990s also saw the first-generation Aviation Mission Planning System (AMPS), which allowed aircrews to plan routes digitally on a dedicated computer system and transfer that information to an aircraft via a data transfer cartridge. The AMPS represented a huge capability leap in mission planning, which previously was done with pencil, plotter, maps, and acetate.

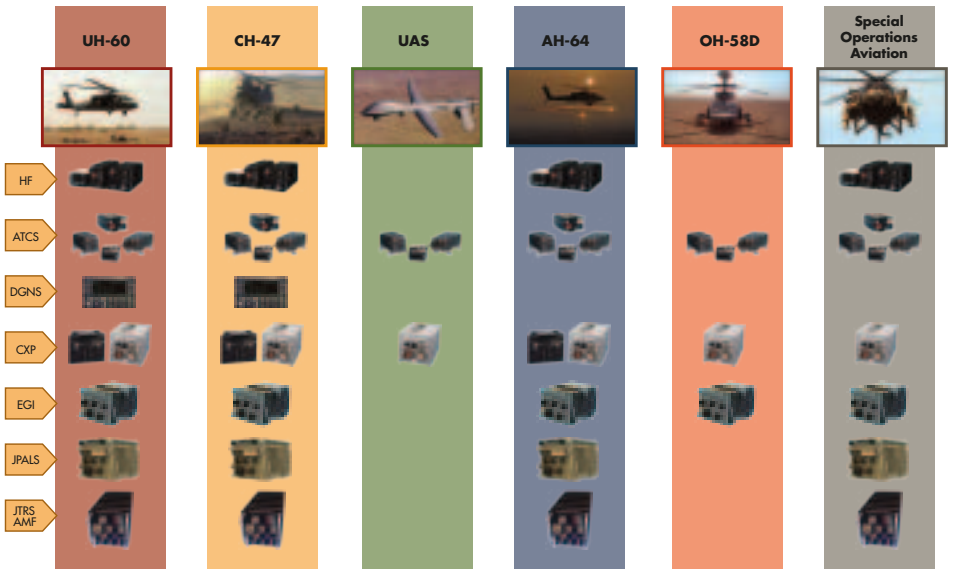
Interoperability Efforts

The 21st century has seen the interoperability of Army aviation systems improve dramatically in the first decade. Emerging from the vision of then-Army Chief of Staff GEN Gordon R. Sullivan in 1994, today's complex battlefields integrate elements from all branches of service with civil elements and require interoperability never dreamed of during the Vietnam conflict.

Interoperability was formally defined by the Chairman of the Joint Chiefs of Staff ADM Michael Mullen in December 2008 as "the ability of systems, units, or forces to provide data, information, materiel, and service to and accept the same from other systems, units, or forces and to use … them to operate effectively together. Information technology and National Security System interoperability includes both the technical exchange of information and the operational

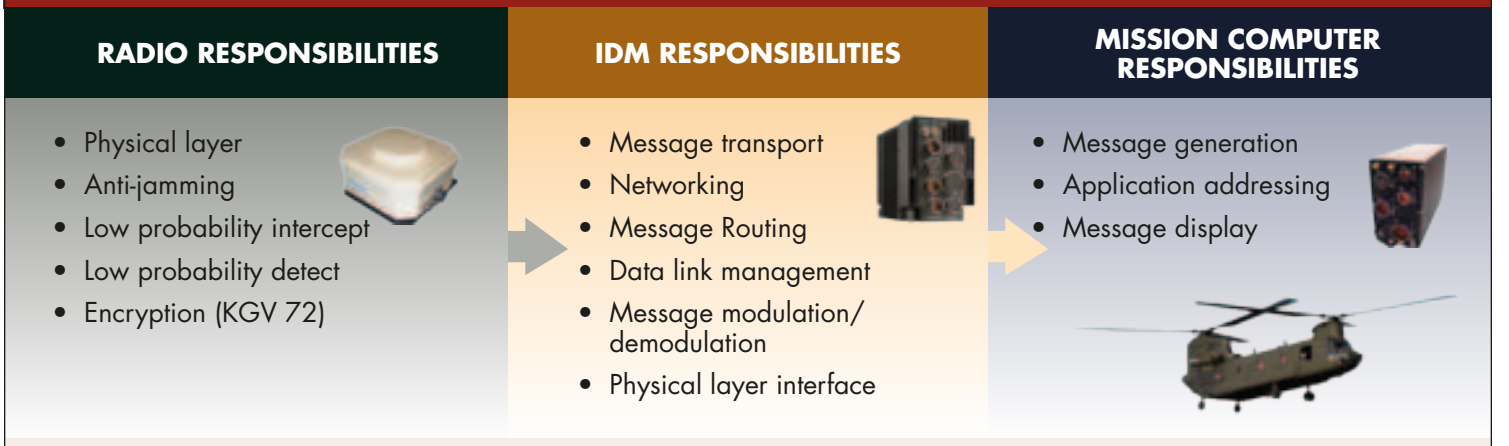
FIGURE 1. AVIATION MISSION EQUIPMENT

Improving Aircraft Performance through Avionics Acquisition



HF: High Frequency
ATCS: Aviation Tactical Communication System
DGNS: Doppler Global Positioning System (GPS) Navigation System
CXP: Common Transponder
EGI: Embedded GPS Inertial Navigation
JPALS: Joint Precision Approach and Landing System
JTRS AMF: Joint Tactical Radio System Airborne Maritime Fixed

FIGURE 2. IMPROVED DATA MODEM INTEROPERABILITY



effectiveness of that exchanged information as required for mission accomplishment. Interoperability is more than just information exchange. It includes systems, processes, organizations, and missions over the life cycle and must be balanced with Information Assurance."

The Project Management Office Aviation Systems (PMO AS) includes two product management organizations that support successful interoperability of Army Aviation systems: the Product Manager for Aviation Mission Equipment (PM AME) and the Product Directorate for Aviation Networks and Mission Planning (PD ANMP).

The PM AME was established as a centralized management office to develop and field common avionics enablers, ensuring that shared solutions are used across the Army aviation fleet (see Figure 1). This commonality allows the Army aviation community to reduce risks and costs in researching and developing minimal solutions and to realize substantial cost savings by leveraging purchase quantities.

PM AME, which is responsible for managing all communications, navigation, and surveillance capabilities required by Army aviation, currently procures, fields, and supports the following major systems:

- Doppler GPS Navigation System, a navigation capability with a 6-channel GPS receiver embedded in the signal data converter of the currently fielded Doppler navigation system.
- Embedded GPS Inertial Navigation, a tri-service, U.S. Air Force-led effort to provide extremely precise location information to the aircraft fire control computer or integrated system processor responsible for targeting information and sensor pre-pointing.
- Joint Precision Approach and Landing System, a joint operational capability for U.S. forces to perform assigned missions from fixed-base, tactical, shipboard, and special operations environments under a wide range of meteorological conditions.
- Common Transponders, which incorporate all the advanced features required in today's global military and civil air traffic control environments by using an open system architecture design and high-density circuit technology to ensure ongoing versatility and future utility through software-only upgrades.
- Single Channel Ground and Airborne Radio System, a tactical airborne radio subsystem that provides secure, anti-jam voice and data communications with single-frequency and frequency-hopping modes.
- Aviation Tactical Communication System, an airborne VHF/UHF line-of-sight and tactical satellite system that supports DOD requirements for airborne, multiband, multimission, secure anti-jam voice, data, and imagery network-capable communications in a compact radio set.
- HF Radio, an easy-to-operate, multifunctional, fully digital signal processing HF radio intended to provide reliable digital connectivity for airborne applications.
- Joint Tactical Radio System Airborne Maritime Fixed, the transformational 2-channel radio system and common ancillaries that support platform integration and joint service interoperability.

Communications and Mission Planning

In 2009, PD ANMP stood up with the mission of providing the warfighting aviation community with materiel solutions necessary to maintain, integrate, and improve communications and mission planning. The primary products used to accomplish this mission are the Improved Data Modem (IDM) and AMPS.

The IDM, developed as a fully digital replacement for the Airborne Target Handover System (ATHS) of the 1980s, was designed by the U.S. Navy in 1991 for U.S. Air Force short-range, close-air support data communication. It was subsequently adopted by the Army to satisfy the unique Army aviation requirements to connect the Tactical Internet for Command and Control (C2) with the Aviation Tactical Operations Center.

FIGURE 3. THE AVIATION MISSION PLANNING SYSTEM

The requirements for the exchange of C2 and situational awareness (SA) data have evolved considerably since the days of ATHS, and the IDM remains a dynamically evolving product, facilitating a digital transmission network for the sharing of SA, sensor information, 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 VHF and UHF radios and Blue Force Tracker (BFT), with efforts underway to ensure future support of the BFT 2 and Joint Tactical Radio System (see Figure 2 on Page 22). As a single line-replaceable unit performing communication modulation and demodulation, database processing, and message processing functions for the aforementioned aviation team members, the IDM presents a multipath approach to C2 in the tactical environment.

As Army aviation's digitized, integrated C2 and SA solution, the IDM hosts Force XXI Battle Command, Brigade-and-Below-Air, processes Air Force Applications Program Development, and enables Joint Variable Message Format for use with Advanced Field Artillery Tactical Data System messages. These capabilities further enhance aviation's combat multiplier effect and help prevent fratricide on the battlefield by providing timely target data to warfighters, and control measures and SA to battlefield commanders.

The AMPS is a mission-planning and battle synchronization tool that automates aviation mission-planning tasks and generates mission data for use in hard copy or electronic format. At the brigade and battalion echelons, AMPS acts as a conduit for a flow of common-operating-picture information from Army Battle Command Systems (ABCS) to an environment where mission planning can occur (see Figure 3). As a complementary system to ABCS, the AMPS at the brigade and battalion echelons is used to set routine mission parameters that fit in the ground commander's scheme of maneuver. The company-level mission planner is used to conduct rehearsals and select attack-by-fire positions, routes from the release point, routes to rally points, and other company details to complete the plan. The company also uses the mission planner to load data cartridges that push mission parameters to each aircraft mission computer. The AMPS transmits these plans into the Tactical Airspace Integration System, which is managed by another PM AS Product Office, to de-conflict airspace.

Successfully managing systems that help the warfighter meet interoperability requirements will continue to be a high priority for PM AS. Working in a resource-constrained environment will require smarter processes and technologies to ensure that capabilities required across the Army satisfy similar requirements for both ground and aviation systems. As we move forward in integrating Army air and ground forces with other services and other nations, PM AS will continue to provide the best support possible to our warfighters.

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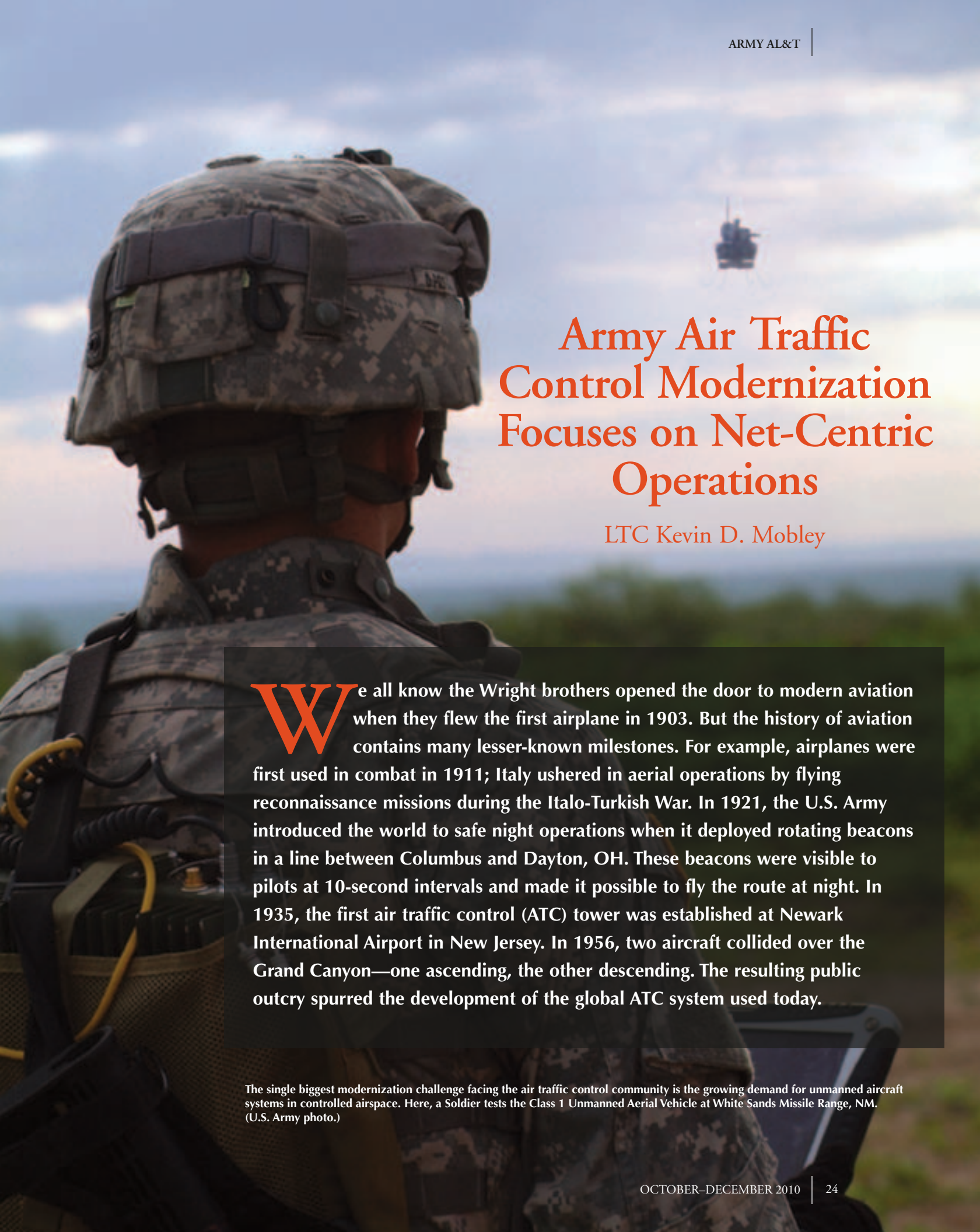

Army Air Traffic Control Modernization Focuses on Net-Centric Operations

LTC Kevin D. Mobley

We all know the Wright brothers opened the door to modern aviation when they flew the first airplane in 1903. But the history of aviation contains many lesser-known milestones. For example, airplanes were first used in combat in 1911; Italy ushered in aerial operations by flying reconnaissance missions during the Italo-Turkish War. In 1921, the U.S. Army introduced the world to safe night operations when it deployed rotating beacons in a line between Columbus and Dayton, OH. These beacons were visible to pilots at 10-second intervals and made it possible to fly the route at night. In 1935, the first air traffic control (ATC) tower was established at Newark International Airport in New Jersey. In 1956, two aircraft collided over the Grand Canyon—one ascending, the other descending. The resulting public outcry spurred the development of the global ATC system used today.

The single biggest modernization challenge facing the air traffic control community is the growing demand for unmanned aircraft systems in controlled airspace. Here, a Soldier tests the Class 1 Unmanned Aerial Vehicle at White Sands Missile Range, NM. (U.S. Army photo.)

Throughout the 60-year history of Army ATC, one thing has remained both constant and consistent: the systems that support the ATC mission. Although software is updated as it is modernized, the Army air traffic systems of today largely perform the same tasks as their predecessors, and they remain physically similar. The primary reason for the static nature of ATC's physical evolution is that the basic designs simply have not required change. ATC systems are iconic and instantly recognizable in both civilian and military versions at airports, airfields, and heliports worldwide. Like Howitzers and battle tanks, they have withstood the test of time and require little more than updating the technology to remain relevant.

The tactical ATC systems of today's Army are much more diverse and provide capabilities well beyond those of the traditional ATC separation and control functions.

Army Tactical Air Traffic Control

The four primary Army ATC facilities and mission areas are tower, ground controlled approach and surveillance radar, flight following and airspace management, and expeditionary terminal control. These missions are the same in peacetime and wartime environments.

The organization charged with developing and supporting the Army fixed-base and tactical systems necessary to support the ATC mission is Product Manager ATC Systems (PM ATC). PM ATC is a chartered acquisition organization under Program Executive Office Aviation and Project Manager Aviation Systems. It supports Army airfields worldwide with tactical ATC systems that enable safe operations of Army, joint, and civil aircraft.

The tactical ATC systems of today's Army are much more diverse and provide capabilities well beyond those of the traditional ATC separation and control functions. Recent combat operations generated the need for more diverse mission sets and an expanded set of ATC requirements. One of the primary issues facing the Army's ATC community today is the complexity of the airspace and continued safe operation over combat zones. In concert with the Army's modular redesign efforts, Airspace Command and Control (C2) nodes within the Army Air-Ground System received significant attention regarding the improvement of airspace management over tactical areas of operation.

Key DOD and Army initiatives, directives, and elements driving today's modernization and development include "net-centric" operations, interoperability, information assurance (IA), and information enterprise architecture. The introduction of unmanned aircraft systems (UAS) into controlled airspace has required that software and process upgrades move forward rapidly. The DOD Information Enterprise Architecture provides a common foundation to support accelerated transformation to net-centric operations.

The Product Manager Air Traffic Control Systems (PM ATC)-managed Digital Airport Surveillance Radar is a common sight at both military and civilian airports. (Photo courtesy of PM ATC.)

The Mobile Tower System uses the latest in air traffic control digital technologies to better support U.S. Army tactical aviation. (Photo courtesy of PM ATC.)

A System of Subsystems

Modern ATC systems are responsive not only to DOD but also to Federal Aviation Administration (FAA) standards, mandates, and requirements. To better understand ATC modernization efforts, it is vitally important to realize that while the Army has a "system-of-systems" approach to battlefield C2 architecture, the key to ATC programs and platforms is a "system of subsystems." Each ATC platform consists of multiple subsystems, the most important being radios, automation, and sensors.

Given that communication between controllers and aviators is a principal task for ATC, it is easy to identify radio communications as the most critical capability; ATC band radios are the foundation of all Army ATC platforms. The move from analog to digital communications and the transition to software-defined radios marked a giant step forward in the controller's ability to make all necessary contacts. The future of ATC involves modernizing radio capability by migrating to the Joint Tactical Radio System on all ATC platforms.

Interoperability is the cornerstone modernization requirement for all military programs. ATC is a nondenominational service, provided to civil and military users alike worldwide. ATC facilities, systems, and support must be provided both at traditional airfields and at forward-deployed battlefields worldwide. This single requirement comes with a level of complexity not found with most other systems. Simply stated, each ATC platform must be able to communicate and interact with all aircraft, regardless of where that platform is located, while interfacing with other ATC and battle command systems. The magnitude of complexity comes into focus when we remember that all military, civilian, domestic, and international requirements and mandates must be met. Failure to adapt a platform to emerging requirements can result in a system being denied entry into an airspace.

Net-centric can be defined as enabling connectivity in the system-of-systems network architecture, wherein one system interacts or shares information with another system or platform.

These systems are typically connected through a wireless or direct physical connection. Net-centric connectivity is possible only by incorporating mandated information assurance regulations and requirements.

Future Technology

The DOD ATC community works hand-in-hand with the FAA. Consequently, the FAA's Next Gen program is being closely monitored. Next Gen is shifting the focus from uncooperative surveillance ground-based platforms to cooperative surveillance emanating from the aircraft. Aircraft self-reporting their positions will not only facilitate the transition from ATC to air traffic management but will also allow for a reduction in ground-based legacy sensors, including radar and secondary surveillance radars.

The AN/FPN-67 Fixed-Base Precision Approach Radar serves as the U.S. Army's primary aid to recover aircraft to fixed-base airfields during adverse weather. (Photo courtesy of PM ATC.)

Another key component of the Next Gen is a transition to space-based navigation. In addition to aircraft self-reporting position data, they will have the capability to conduct precision approaches using horizontal and vertical guidance provided by Global Positioning System satellites and refined by ground stations. This technology will integrate into Army ATC once the combat developer requirement is approved, the joint services come to agreement on common implementation, and adequate resources are designated for integration, testing, training, and support.

Advances in automation have added capabilities to platforms far beyond those imagined at inception. One example is the Tactical Airspace Integration System (TAIS). TAIS provides airspace managers with a powerful tool for accomplishing the Army C2 mission, a mission that can no longer be accomplished using traditional tactics—fixed altitudes, preplanned routes, and static control measures that reserve huge blocks of airspace for long periods of time.

Aircraft self-reporting their positions will not only facilitate the transition from ATC to air traffic management but will also allow for a reduction in ground-based legacy sensors, including radar and secondary surveillance radars.

Originally envisioned and designed as a modern tactical flight-following facility, TAIS has grown to encompass airspace C2, dynamic airspace management, and a migration from a complex operating system to a commonly used and understood commercial product. As the Army's system of record for airspace management and en-route air traffic services, TAIS provides automated tools to plan, deconflict, synchronize, integrate, and execute operations in the third dimension of the battlefield for manned, unmanned, civilian, and military aircraft.

TAIS determines conflicts between sets of airspaces and between airspaces and terrain, providing the planner with decision aids to develop, execute, and monitor the airspace plan in accordance with the commander's risk parameters.

TAIS also provides near-real-time situational awareness of the air picture, received through Tactical Digital Information Links, Blue Force Tracker, myriad radar feeds, and operator-generated flight-following tracks; it constantly checks the position of these air platforms against active airspaces and alerts the TAIS operator when the boundaries of active airspace measures are penetrated.

The single biggest modernization challenge facing the ATC community is the growing demand for UAS in controlled airspace. Integrating unmanned and manned aircraft in the same operational environment poses unique challenges to the ATC community as a whole and the military in particular. Successfully managing the combined use of controlled airspace will take the science of ATC to the next level of technical and procedural development.

The Voice Communications Switching System exemplifies the ongoing modernization of ATC fixed-base operations. (Photo courtesy of PM ATC.)

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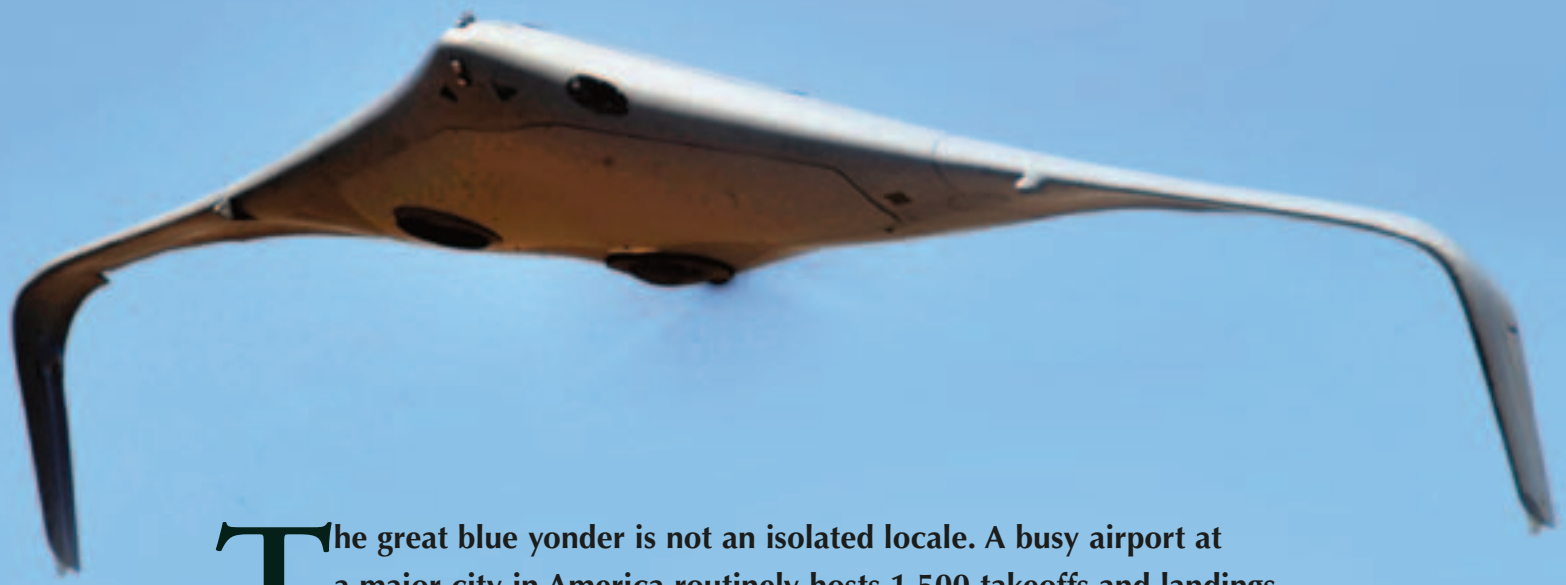
Yuma Proving Ground Developing into Unmanned Aircraft Testing Hub

Mark Schauer



The great blue yonder is not an isolated locale. A busy airport at a major city in America routinely hosts 1,500 takeoffs and landings a day. The sheer volume of national air traffic demands a vast infrastructure run by thousands of air traffic controllers who orchestrate safe passage from destination to destination. It is a stressful job that requires meticulous planning and reporting from every aircraft.

The Killer Bee family of reconnaissance unmanned aircraft systems (UAS) is renowned for its ability to carry a 30-pound payload on a diminutive 10-foot wingspan. In more than 40 years of UAS testing, Yuma Proving Ground (YPG), AZ, has been instrumental in refining the Killer Bees' many capabilities, particularly their ability to carry and fire weapons. (U.S. Army photo courtesy of YPG.)

Rigid adherence to the system permits this vital network to operate with few incidents, but dampens the spirit and ability to leap into the next epoch of air travel—refinement of unmanned aircraft systems (UAS), which are pilotless craft controlled autonomously. Our skyways are so busy that testing even the tiniest of these long-range marvels in a safe, sustained manner is problematic. However, such restraints do not exist at U.S. Army Yuma Proving Ground (YPG) in southwest Arizona.

Weaponizing any aircraft is a complex business, and adding weaponry to a UAS can be particularly challenging. Decades of expertise in all facets of UAS evaluation, combined with extensive targeting and other infrastructure, makes weapons integration on a platform such as this Fire Scout a manageable enterprise at YPG. (U.S. Army photo courtesy of YPG.)

"UAS testing is one of the most diverse commodity areas we have," said Mary Beth Weaver, Lead Test Director for UAS at YPG's Aviation Systems Branch. "We test everything from 1-pound platforms to very large platforms that weigh more than a ton."

YPG is the second-largest installation in DOD in terms of area, which allows for the testing of long-range artillery projectiles and other weapon systems without fear of hitting occupied areas. However, YPG also includes nearly 2,000 square miles of restricted airspace. This vast holding is used by YPG's Aviation Systems Branch for extensive testing of a variety of UAS platforms. The proving ground seems as close to an ideal venue for UAS testing as can possibly exist, with clear, stable air and an extremely dry climate in which inclement weather is a rarity.

"We have a low-density altitude, which translates into enhanced engine performance," said Pat Franklin, a Test Director for the Aviation Systems Branch. "We also have a natural terrain bowl surrounded by high terrain on three sides, which keeps weapons, laser emissions, and radio frequency energy from propagating out and disturbing anything outside of the proving ground."

This testing takes place across all stages of the development cycle. Though more than 90 percent of the YPG workload is conducted on behalf of military customers, private industry clients are attracted to the same expertise and range characteristics that military testers covet.

"We have a very diverse customer base with many different test objectives," said Weaver. "On a given day, we might be working on a command-and-control system, while at the same time supporting another customer who is developing a new airframe. There are no cookie-cutter tests here."

A History Dating to World War II

Small aircraft drones have played a role in Army training since World War II. The gradual adaptation of these small-target craft to more sophisticated functions has been an important part of YPG's test and evaluation mission for decades. The first hangar at Castle Dome Heliport, one of YPG's UAS launching points, was constructed in the late 1950s to support a drone competition. More important for UAS testing at the proving ground, however, was the presence of the AH-56 Cheyenne helicopter in the early 1970s, which resulted in an influx of aviation testers from Aberdeen Proving Ground, MD, and construction of a substantial amount of infrastructure, including laser and optical tracking sites that can support both manned and unmanned aviation testing.

In the latter 1970s, construction started on a site for a vertical-lift UAS testing site, which began as a 250-square-foot asphalt landing pad and a lone double-wide trailer that served as a command center. Over the years, the size of the pad was doubled and an airstrip was added to accommodate fixed-wing air vehicles; four additional UAS shelters were constructed; an additional trailer was brought in; and a large earthen berm was added to shield the command center from tests involving weapon fires, supporting efforts to weaponize what previously had been platforms meant only for surveillance.

In the recent past, a number of unmanned aircraft have undergone testing at YPG, including the A160 Hummingbird, Fire Scout, Shadow, and Hunter.

Large or small, fixed- or rotary-wing, UAS are exquisitely intricate machines that must prove far more than the difficult enough question of whether they are capable of flight. Like their manned cousins, UAS must be able to fly stably while supporting functioning sensors and accurate weaponry.

YPG is always busy testing the machines' ability to do this and more. "UAS have shown their utility and

value, and everyone is clamoring for them," said Weaver. "Any time you take a Soldier out of harm's way, it is beneficial. Unmanned aircraft provide much more accessibility and flexibility."

UAS have shown their utility and value, and everyone is clamoring for them. Any time you take a Soldier out of harm's way, it is beneficial. Unmanned aircraft provide much more accessibility and flexibility.

Weaponizing any aircraft platform is highly complex, but it is even more challenging with unmanned systems. Testers have to take into account various effects of firing a missile, most notably the thermal and blast overpressure and how that affects the aircraft's sensors and its ability to maintain stability in flight. The data needed to make such a determination include measurements of pressure, temperature, and vibration, all of which require sophisticated instrumentation. One recent test on a vertical-lift UAS required test officers to construct a 3-story tower and to tether the running craft's landing gear to the top, after which the test rocket was loaded using a cherry-picker bucket. Tests taking place early in the development cycle, on the other hand, might simply entail mounting the gun tube to a hard stand to collect firing data.

Whether or not the platform is weaponized, YPG testers concern themselves with the sophisticated sensors that UAS carry, as well as the aircraft's ability to sustain flight for long periods of time.

YPG's testers can accommodate every phase of the developmental process. "We have the infrastructure here to easily move from testing one level of platform maturity to another," said Franklin. "It is good synergy for the private industry customer."

YPG's capabilities also allow for extensive testing of platforms that blend conventional aircraft with unmanned systems. Furthermore, all of the tests can be conducted concurrently and, typically, without having to compete for runways and airspace with manned fighter jets, as is common at other installations. Another bonus is the wealth of infrastructure meant for other sectors of YPG's broad test mission that can be leveraged to support UAS evaluations. YPG is home to technical and tactical targets, as well as generator and combined maintenance shops, all of which are useful for UAS testing. YPG testers can even do cooperative tests with artillery firing.

"We have the air and ground resources customers need to challenge their systems," said Weaver. "Flying is one thing. Once you have achieved flight, what is your purpose for flying? We have everything you need to demonstrate a platform's utility."

YPG Test Officer Bill Loftis measures the temperature of an unmanned aircraft's motor. (U.S. Army photo by Mark Schauer.)

Safety in the Skies

Most of the airspace over the United States is unrestricted. To fly their craft in these conditions, UAS developers must acquire a certificate of authorization (COA) from the Federal Aviation Administration (FAA).

This is a lengthy and exhaustive process that can take months. It is specific not only to the aircraft, but also to the aircraft configuration.

An armed MQ-9 Reaper UAS sits in a shelter on Joint Base Balad, Iraq, before a mission. The MQ-9 Reaper Predator UAS underwent extensive testing at YPG. The proving ground has more than 2,000 square miles of restricted airspace, plenty of room for UAS evaluators to test their platforms to the limit without the possibility of crashing into populated areas. (U.S. Air Force photo by TSgt Erik Gudmundson.)

Thus, if developers want to modify the UAS in response to testing, they must get a new COA after every change. Achieving these stringent conditions is unrealistic for an untested UAS in the early stages of development.

Additionally, an important part of the developmental process is testing worst-case scenarios. It is unlikely that the FAA would allow such testing in the national airspace. YPG's restricted airspace, on the other hand, covers miles and miles of land far from any populated area.

'Without a Doubt, It's the Future'

Although the government remains the primary consumer of UAS, the Government Accountability Office (GAO) predicts that the number of these cutting-edge craft in civilian hands will more than quadruple in the next 5–10 years, performing a variety of missions with less risk, cost, and pollution than a conventional manned aircraft.

Futurists look to the day when the military technology will be adapted to the commercial marketplace. The technology transfer between military and civilian applications goes both ways, too. One portable UAS used for surveillance by Soldiers was originally used by commercial fishing operators as a low-cost, long-endurance aircraft for spotting schools of tuna.

> Flying is one thing. Once you have achieved flight, what is your purpose for flying? We have everything you need to demonstrate a platform's utility.

Despite UAS' vast potential, the same GAO report identified a lack of airspace for test and evaluation as an impediment to progress, a void that YPG is filling for both government and private industry.

YPG's UAS workload reflects the state of the art. Recent tests evaluated new composite materials that seek to improve an airframe's fuel efficiency and aerodynamics, as well as advanced acoustical sensors and micro-aircraft systems that can easily be carried and deployed for short distances by ground units conducting operations, such as house-to-house searches.

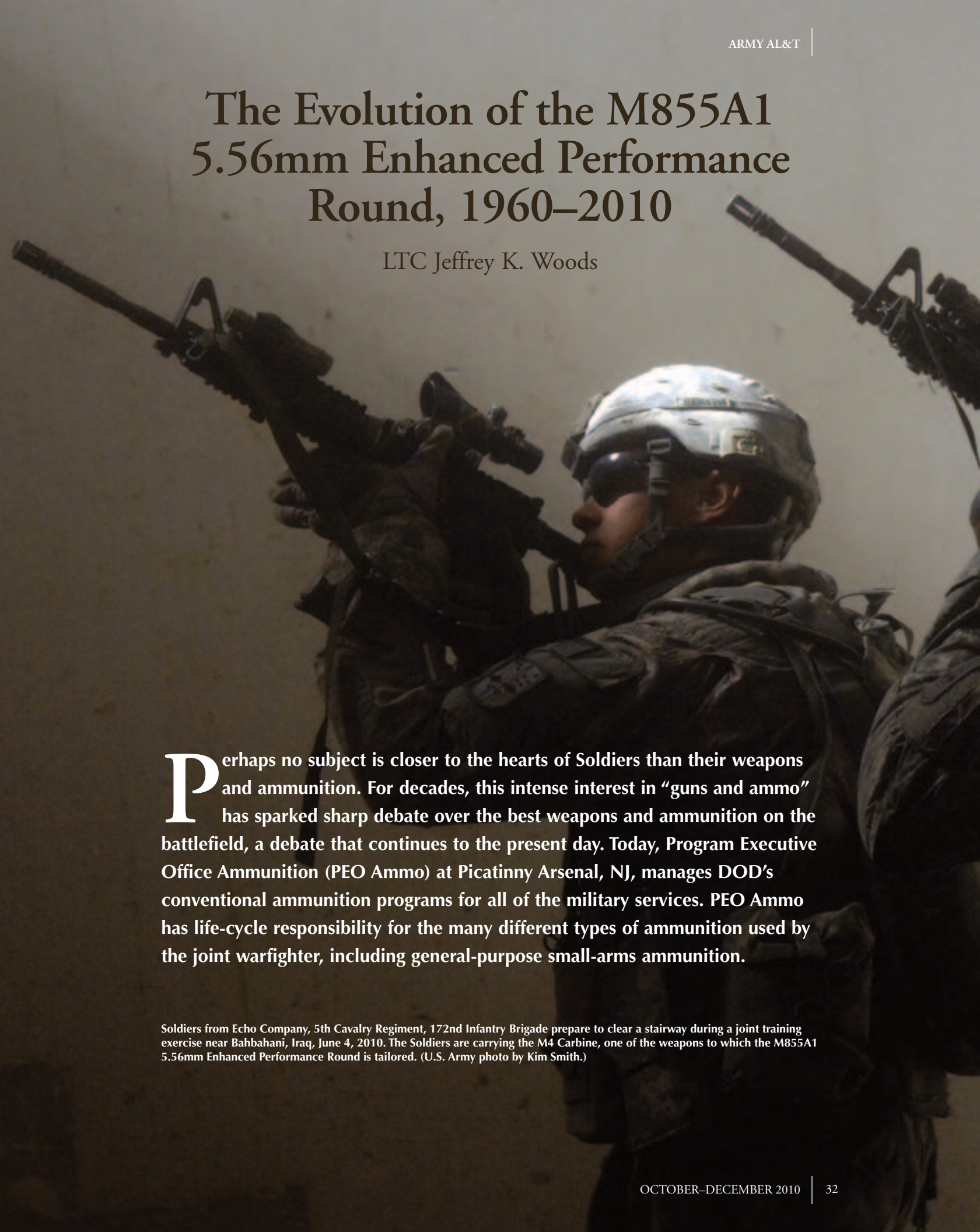
"Without a doubt, it's the future," Weaver said. "The day is soon coming when there will be an even ratio of manned and unmanned aircraft. Eventually, one ground controller will be flying multiple unmanned aircraft simultaneously. There are already several initiatives that do this."

YPG is firmly poised to continue UAS testing for military and industry customers. "At YPG, there is significant room for future site expansion," said Test Officer Jerry Crump.

MARK SCHAUER is a public affairs writer at YPG. He holds a B.A. in history from Northern Arizona University and is pursuing an M.A. in English, also from Northern Arizona University.

The Evolution of the M855A1 5.56mm Enhanced Performance Round, 1960–2010

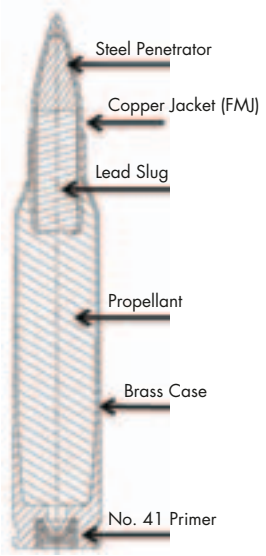
LTC Jeffrey K. Woods



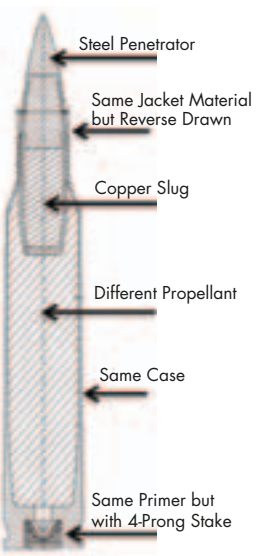
Perhaps no subject is closer to the hearts of Soldiers than their weapons and ammunition. For decades, this intense interest in "guns and ammo" has sparked sharp debate over the best weapons and ammunition on the battlefield, a debate that continues to the present day. Today, Program Executive Office Ammunition (PEO Ammo) at Picatinny Arsenal, NJ, manages DOD's conventional ammunition programs for all of the military services. PEO Ammo has life-cycle responsibility for the many different types of ammunition used by the joint warfighter, including general-purpose small-arms ammunition.

Soldiers from Echo Company, 5th Cavalry Regiment, 172nd Infantry Brigade prepare to clear a stairway during a joint training exercise near Bahbahani, Iraq, June 4, 2010. The Soldiers are carrying the M4 Carbine, one of the weapons to which the M855A1 5.56mm Enhanced Performance Round is tailored. (U.S. Army photo by Kim Smith.)

FIGURE 1. COMPARISON CHART: M855 AND M855A1 EPR



Characteristic	M855	M855A1 EPR
Cartridge Length	2.248 in	No Change
Bullet Weight and Length	62gr	No Change
Tip ID	Green	Bronze from Corrosion Protection
Slug	Lead	Copper
Cup/Jacket	Copper	No Change
Penetrator	Steel	Steel Arrow Head
Corrosion Resistance	None	Yes
Propellant	WC-844	SMP-842
Flash Suppressant	No	Yes
De-Coppering Agent	No	Yes
Velocity	3,113 ft/sec	Increased
Chamber Pressure	M855 Spec	Increased
Penetration	3/8" Mild Steel @ 160m	3/8" Mild Steel @ 350m
Soft Target	Not Specified	Improved Consistency and Range



In 1960, when *Army Research and Development Newsmagazine*—the forerunner of *Army AL&T* Magazine—first appeared in print, a major controversy was raging over the relative merits of the then-standard 7.62mm round and a lighter, higher-velocity 5.56mm alternative. The Army adopted the 5.56mm M16 rifle in 1967; it fired the M193, the first 5.56mm round. Nevertheless, the controversy continued over which caliber was better—5.56mm vs. 7.62 mm—as the magazine noted through the years. In 1982, a review by *Army Research, Development, and Acquisition Magazine* (as it was then called) of small-arms ammunition development praised the lighter weight and lesser recoil achieved with the smaller round, yet observed that, "One of the inferiorities is, however, its penetration capability."

In 1982, the Army adopted the 5.56mm M855 round to replace the M193 in an effort to achieve better performance at longer ranges with the M249 Squad Automatic Weapon (SAW). A steel penetrator in the front end of the M855 provides increased hard-target performance.

Development of the M16A2 rifle, which matched the twist of the M249 SAW, also allowed use of the heavier M855 round. The M193 is still produced today, largely for foreign military sales.

> Once the M855A1 replaces the leaded M855, it will reduce the amount of lead in production by approximately 2,000 metric tons yearly, based on the amount now used to make the M855.

From 2003 to 2006, the Army conducted a study of available bullets, commercial and military, and found none that provided improved performance over the M855 against the target sets required of a general-purpose round.

Ensuring Consistency and Environmental Responsibility

In post-combat surveys and field reports from Iraq and Afghanistan, most Soldiers have indicated that the round works fine, delivering the desired effects against threat targets. But some Soldiers have reported that the round did not perform consistently, causing concern in the ammunition community.

In parallel, mounting environmental concerns drove the Army to consider replacing environmentally unfriendly materials such as lead. The Army's ammunition community, led by PEO Ammo, saw an opportunity to address the two concerns associated with the M855 round—lead and consistency.

The Army's solution is the new M855A1 Enhanced Performance Round (EPR). This round offers better performance than the M855 against *all* targets likely to be engaged with small arms. This is quite a feat, considering the long-standing solid performance of the M855.

The EPR provides the same effects when striking its target, regardless of the angle of yaw. This means the EPR provides the same desired effects every time, whether in close combat situations or longer engagements.

While it's true that a number of bullets (such as armor-piercing bullets) can penetrate hard targets well, they don't provide the needed effects against soft targets. Conversely, some bullets (such as hunting rounds, hollow-point, and other bullets) work well against soft targets but can't penetrate harder barriers. Nor do hollow points meet the Army's requirement to adhere to the Law of War, defined as "[t]hat part of international law that regulates the conduct of armed hostilities. It is often called the 'law of armed conflict' " (DoD Directive 2311.01E, *DoD Law of War Program*). Even today, we have found no other round—other than the new EPR—that can outperform the M855 as a capable, general-purpose round.

Why the M855A1 Excels

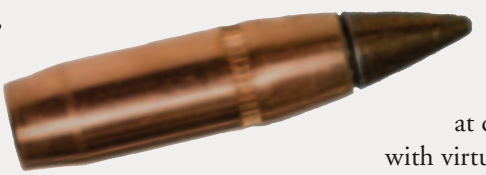
So what makes the EPR so good? It uses the same components as the M855—a jacket, a penetrator, and a metal slug. But the new round contains some subtle changes (see Figure 1). The copper cup, from which the jacket is formed, is reverse-drawn, the opposite of how the M855 jacket is drawn. The hardened steel penetrator is almost twice as heavy as the one used in the M855 and is fully exposed instead of hiding beneath the softer copper jacket.

The slug is made of copper, making the projectile nonhazardous to the environment while delivering needed performance. Since the EPR is similar to the M855, the Army can use the same manufacturing equipment now used for the M855, providing additional savings and large-scale manufacturing capability. Once the M855A1 replaces the leaded M855, it will reduce the amount of lead in production by approximately 2,000 metric tons yearly, based on the amount now used to make the M855.

There are three main areas in which the new round excels: soft-target consistency, hard-target penetration, and the extended range at which it maintains these performance improvements.

This is not to imply that the EPR increases the maximum effective range of the M4 or M16. Its trajectory matches the M855's, which aids in training, lessens the need to re-zero the weapon, and allows it to link to the current tracer round (the M856) for eventual use in the M249 SAW. So while the maximum effective range does not increase, effectiveness at range does, meaning the round greatly extends the range of desired effects along its trajectory.

The Army tackled the consistency issue by focusing on the yaw of a projectile and how differences in yaw can influence results when striking soft targets. The M855 round, similar to the Army's M80 (7.62mm ball round), is a "yaw-dependent" bullet. As any bullet travels along its trajectory, it "wobbles" in both pitch and yaw, causing the projectile to strike its target at different attitudes with virtually every shot.



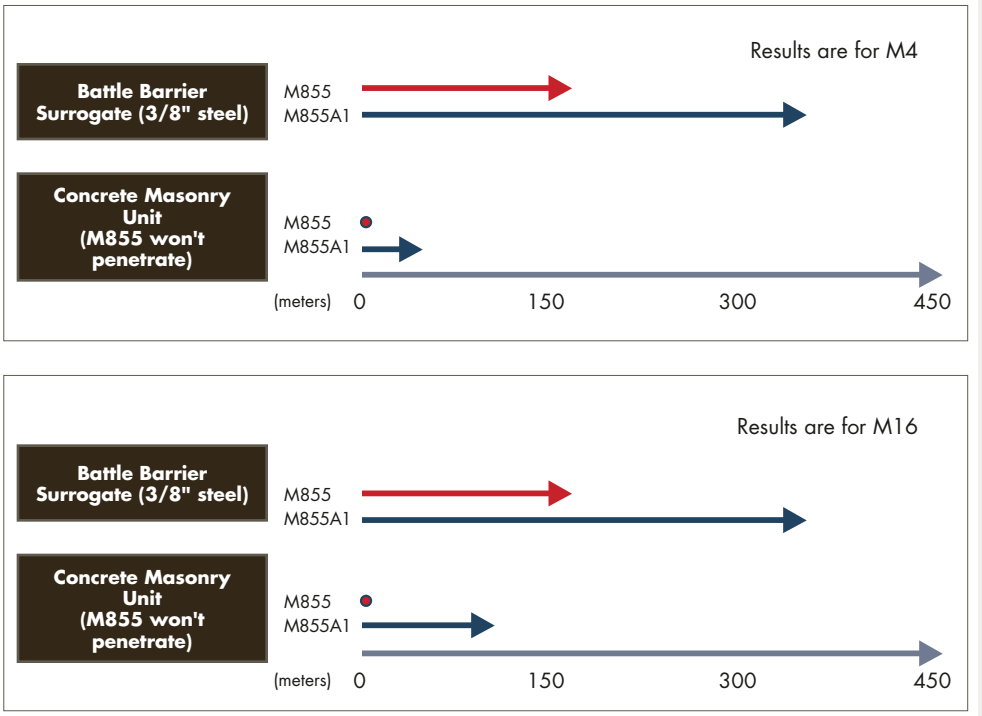
The M855A1 Enhanced Performance Round offers better performance than the M855 against all targets likely to be engaged with small arms. (Photo courtesy of PEO Ammo.)

For a yaw-dependent bullet such as the M855 or M80, this results in varying performance, depending upon where in the yaw/pitch cycle the bullet strikes its target. For example, at a high angle of yaw, the M855 performs very well, transferring its energy to the target in short order. At a low angle of yaw, however, the bullet reacts more slowly, causing the inconsistent effects observed in the field.

The M855A1 is *not* yaw-dependent. Like any other bullet, it "wobbles" along its trajectory. However, the EPR provides the same effects when striking its target, regardless of the angle of yaw. This means the EPR provides the same desired effects every time, whether in close combat situations or longer engagements. In fact, the U.S. Army Research Laboratory (ARL) verified through live-fire tests against soft targets that, on average, the M855A1 surpassed the M80 7.62mm round. The 7.62mm, although a larger caliber, suffers from the same consistency issue as the M855, but to a higher degree.

Hard-target performance is a second area where the EPR really shines (see Figure 2 on Page 35). The exposed, heavier, and sharper penetrator, along with a higher velocity, allows Soldiers to penetrate tougher battlefield barriers than is possible with the current M855. Although it's not an armor-piercing round, the EPR can penetrate 3/8 inch-thick mild steel at distances approaching 400 meters (based on the range at which 50 percent of the rounds can pass through the barrier). The M855 only penetrates this material out to approximately 160 meters. Not only

FIGURE 2. HARD TARGET PERFORMANCE



is this performance much better than the M855's with its smaller steel penetrator, it is vastly better than the M80 7.62mm round.

Additionally, the EPR can penetrate concrete masonry units at ranges out to 80 meters with the M16 and 40 meters with the M4. The M855 can't penetrate this type of battlefield barrier at any range.

Also notable is the EPR's excellent performance against softer intermediate barriers such as car doors, windshields, or Kevlar fabric. The thinner metal found on car doors poses no problem. When engaging targets behind windshields with the EPR, ARL has shown an increase in the probability of hitting the occupant, due to both the steel penetrator and the copper slug remaining intact through the glass. Furthermore, ARL tested the round against 24 layers of Kevlar fabric out to 1,000 meters, but discontinued the test as the Kevlar showed no sign of being able to stop the EPR. The EPR also penetrates some lesser-quality body armors designed to stop 7.62mm ball rounds.

Another benefit Soldiers will see from the new round is its effectiveness when engaging soft targets at longer ranges.

As a small-caliber projectile's velocity decreases, it eventually will reach a point at which it can no longer transfer most of its energy to its target. Below this velocity, which equates to range, the round is more likely to pass through its target with little effect. The M855A1 can maintain consistent, desired effects at a much lower velocity, resulting in excellent effectiveness at far greater ranges along its trajectory.

In addition to the above-mentioned performance improvements, the EPR is more accurate than the M855. Accuracy testing during production lot acceptance has shown that, on average, 95 percent of the rounds will hit within an 8 x 8-inch target at 600 meters. It also uses a flash-reduced propellant optimized for the M4's shorter barrel.

The good news is that all of these performance improvements come with no weight increase to the Soldier.

Soldiers Are the Focus

Soldiers will surely discuss the M855A1 EPR during their ritual debates on guns and ammo. The new M855A1 will greatly increase Soldier performance on the battlefield, but inevitably, Soldiers will have the final vote as they must maintain their weapon systems, train, aim, and engage their targets. As always, good marksmanship skills are critical for success in small-arms engagements. No matter how good the bullet, it can't do its job if it doesn't hit the target.

During the past 50 years, 5.56mm general-purpose ammunition has evolved to a level of performance that addresses all of the major warfighting needs of our services. The M855A1 EPR is a significantly improved 5.56mm round that provides excellent soft target consistency and vastly better hard target performance, and increases our Soldiers' effectiveness at extended ranges with better accuracy—all without increasing their load.

The M855A1 represents the most significant performance leap in small-arms ammunition in decades. Our Soldiers deserve the best, and with the M855A1 EPR, they get it.

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Army's Newest Helicopter Blends Aviation Traditions with Innovation

COL L. Neil Thurgood and LTC David Bristol

The UH-72A Lakota, the Army's newest helicopter, is the latest in a long line of successful aircraft aiding Soldiers in carrying out diverse missions around the globe. It is a product of the Light Utility Helicopter (LUH) program started in early 2004. On June 30, 2006, the Army awarded a contract to EADS North America to provide and support the Lakota. It is replacing aging UH-1 and OH-58A/C aircraft used by the Army National Guard (ARNG) and at test and training centers across the United States, its territories, and in Germany.

A UH-72A Lakota lands during a training exercise at Fort Polk, LA. (U.S. Army photo courtesy of Fort Polk.)

The UH-72A is named after one of the tribes that make up the Sioux Nation. The Lakota live primarily in southern South Dakota. The Lakota tribe considered that killing an enemy was disrespectful; the noncombat, support role of the UH-72A reflects that philosophy. The Lakota name reflects the intended missions of the aircraft and its contributions to homeland defense, medical care, and natural disaster response.

A Unique, Innovative Solution

The UH-72A's contribution to the history of Army rotary-wing aviation represents an innovative solution to rapidly improve capability and get it into the hands of the Soldier. The Lakota is unique to Army aviation because it is a variant of a commercial aircraft, the Eurocopter EC-145. The UH-72A is certified by the Federal Aviation Administration (FAA) rather than by the Army and is flown and maintained in accordance with FAA requirements. Everything on the aircraft except for the ARC-231 secure radio is commercially available as well and is certified by the FAA. Given that the Lakota is intended to fly in nonhostile and permissive environments, only the FAA certification allowed a quicker acquisition and fielding of the aircraft that is rapidly retiring the UH-1 and OH-58A/C, which have become increasingly expensive to operate and maintain.

The decision to pursue a commercial solution to the LUH requirement meant that the program went from concept to approval by the Army in 26 months.

The decision to pursue a commercial solution to the LUH requirement meant that the program went from concept to approval by the Army in 26 months. The first aircraft was delivered 5 months after contract award; the First Unit Equipped was the Air Ambulance Detachment at Fort Irwin, CA, 6 months later.

The EC-145 is a modern twin-engine aircraft that performs test and training support, medical evacuation (MEDEVAC), counter-drug, natural disaster response, transport, and general support missions. A total of 345 aircraft will be purchased, with 210 ultimately fielded to the ARNG and the rest to the Active Army. They will serve in the United States, some territories, and Germany.

The aircraft has two basic configurations with specific Mission Equipment Packages (MEPs) for some missions. The standard configuration carries two pilots and up to six passengers, and the MEDEVAC configuration carries two pilots, up to three passengers, and two litters that are mounted to the floor. The MEDEVAC aircraft also has racks to support the carriage of equipment such as defibrillators, pumps, and intravenous supplies.

As of June 1, 2010, the Army had received 110 of the Lakotas; 97 were fielded to units, and 4 were designated for the Army's Space and Missile Defense Command for use at Kwajalein Atoll in the Pacific Ocean. The aircraft are also being fielded to Yakima Training Center

A UH-72A Lakota supports a training mission at Fort Polk. (U.S. Army photo courtesy of Fort Polk.)

in Washington state and the Tennessee National Guard. These latest units will join others at Fort Irwin; Fort Polk; Fort Rucker, AL; Fort Eustis, VA; the U.S. Military Academy; and Germany, flying with the Active Army. The UH-72A is also used by the ARNG in Louisiana, Mississippi, Texas, Florida, Alabama, Arkansas, Pennsylvania, North and South Carolina, Vermont, Puerto Rico, and Washington, DC.

The aircraft are assembled, flight tested, and delivered from the American Eurocopter facility in Columbus, MS. Production of the EC-145 was transitioned from the main Eurocopter plant at Donauworth, Germany, over 4 years. This process has allowed the plant to reach a production peak rate of 4–5 aircraft a month. At the same time, American Eurocopter sought out and invested in American suppliers to support this production, which has increased the contribution American industry is making to the LUH program.

Mission Equipment Packages

To further increase the capability of the UH-72A, the Army and its contractor team are developing and integrating MEPs. There have also been additions of equipment to aid operations and the reliability, availability, and maintainability of the aircraft as it has entered service. These include the installation of the AN/ARC-231 radio to provide secure communications, examination of coatings for the rotor blades and windshields to improve wear in extreme environments, and use of medical equipment storage racks.

The two major MEP kits being developed for this aircraft are for the ARNG Security and Support (S&S) mission and to support training at the Combined Training Centers (CTCs) at Forts Irwin and Polk and in Germany. The S&S MEP includes an electro-optical sensor, searchlight, laser pointer, and equipment to collect data and transmit it to ground stations. The CTC MEP has increased radios, a loudspeaker, and equipment to simulate shooting and being shot at. The acquisition of these MEP kits to maintain the commerciality and FAA certification has been led by the contractor and maximizes the use of commercial parts and equipment. This process again demonstrates the innovative underpinnings of the UH-72A program.

The UH-72A Lakota has quickly been deployed with the Army, providing improved capability and availability. The more than 100 Lakotas flying with the ARNG and Active Army units have amassed more than 30,000 flight hours in 3 years. An additional 80 aircraft will enter service by the end of 2011, accelerating the retirement of the UH-1 and OH-58 from service. The UH-72A Lakota has proudly taken its place alongside the other aircraft of Army aviation, fulfilling the needs of its operators and contributing to the security and safety of the United States and its people.

The District of Columbia Army National Guard flies its new UH-72A Lakotas over the city in support of transition training. (U.S. Army photo by SSG Jon Soucy.)

American Eurocopter sought out and invested in American suppliers to support this production, which has increased the contribution American industry is making to the LUH program.

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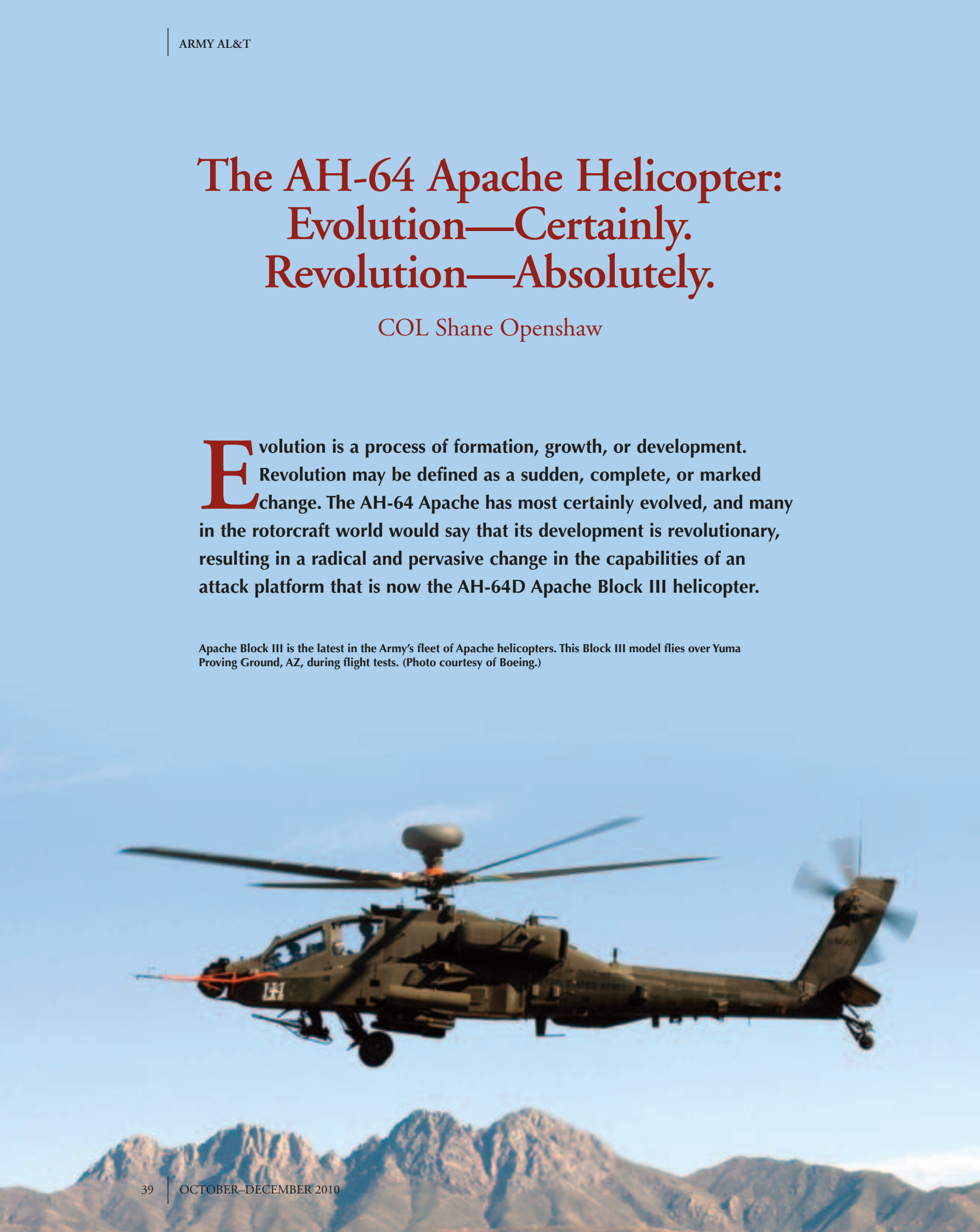
The AH-64 Apache Helicopter: Evolution—Certainly. Revolution—Absolutely.

COL Shane Openshaw

Evolution is a process of formation, growth, or development. Revolution may be defined as a sudden, complete, or marked change. The AH-64 Apache has most certainly evolved, and many in the rotorcraft world would say that its development is revolutionary, resulting in a radical and pervasive change in the capabilities of an attack platform that is now the AH-64D Apache Block III helicopter.

Apache Block III is the latest in the Army's fleet of Apache helicopters. This Block III model flies over Yuma Proving Ground, AZ, during flight tests. (Photo courtesy of Boeing.)



In a Shephard Press book titled *Promises Kept: 25 Years of the Apache*, Al Winn, Boeing's Vice President of Apache Programs, was quoted on the helicopter's revolutionary evolution, "Apache … Block III is a visionary concept based on a legacy of success. In 1984, when the U.S. Army accepted delivery of the first A-model Apache, the operational effectiveness of the [service] was positively altered. With the advantages and capabilities of the AH-64A, U.S. Army aviators coined the phrase 'we own the night.' And as those who flew the A-model helicopter in conflict can attest, the applications and usefulness of helicopters in battle was forever changed."

Phased Development Begins

Conceptual design and development of what would ultimately become the Apache began in 1973 as the Secretary of Defense initiated a phased development effort for a new Advanced Attack Helicopter program. Bell Helicopter and Hughes Helicopters were awarded contracts to design and fabricate a static test article, a ground test vehicle, and two flying prototypes. Understanding that tank killing for a Fulda Gap scenario was a critical capability, Hughes designers developed an aircraft with a range of performance advantages—integrating weapons and sensor systems, developing drive and rotor system components for maneuverability, and designing a crew station that enhanced survivability. The development team also spotlighted aspects of reliability, availability, and maintainability in the helicopter's initial design.

The Hughes YAH-64 was selected by the Army's engineering flight test detachment at Edwards Air Force Base, CA, following a flyoff in which it was determined that the helicopter met more of the specified requirements than its competitor. The first Apaches were produced and delivered beginning in 1984.

Powered by two General Electric T700-GE-701 turbine engines, the self-deployable, multimission AH-64A Apache, like today's AH-64D, carried a lethal array of armaments including missiles, aerial rockets, and a 30mm Chain Gun. Author Scott R. Gourley, in *Promises Kept*, said, "that dry description of power and lethal capabilities hardly did the Apache justice. The fact is that, even as the first Apaches started moving off the production line at the new plant in Mesa, [AZ,] it became quite apparent to Army aviators that they were dealing with a true revolution in aerial platform capabilities."

The U.S. Army Aviation Systems Command conducted a product improvement study of the Apache in 1983 to determine potential capabilities improvements. The result was initiation of a requirement for an advanced configuration of the helicopter. The FY88 budget included a program that led to an advanced Apache model being operational in 1994.

Apache Longbow Leverages Capabilities

The first AH-64D Apache Longbow was rolled out for its first public flight in September 1993. It featured a new digital crew station and a mast-mounted, millimeter wave fire control radar (FCR) with a passive radio-frequency interferometer, along with airframe modifications and an upgraded processing system.

The AN/APG-78 Longbow FCR is the principal component of the revolutionary Longbow Weapon System, comprising the FCR, AN/APR-48A Radar Frequency Interferometer,

The Apache Longbow with Fire Control Radar maneuvers over desert terrain. The Longbow currently has two different production lines ongoing: a remanufacturing line that converts older AH-64A model Apaches into the newer AH-64D Longbow, and a new-build production line that makes new Longbow aircraft. (Photo courtesy of Boeing.)

M299 Launcher, and fire-and-forget AGM-114L Longbow Hellfire missile. The FCR was designed to meet three needs: increased performance in bad weather and battlefield obscurants, rapid wide-area search, and increased survivability against specific air defense systems that threaten the Apache in low-level environments.

Leveraging the expertise of development engineers and the experience of former Army aviators, the new D-model introduced cockpit management attributes employing new technologies that managed, by exception, the cockpit's systems and the information available to the aviators. The collective information and data are available to pilots, but are not apparent unless a need-to-know is evident, allowing the pilots to focus time and effort on the mission outside the cockpit. Specifically, this eliminates the need to scan information that is deemed acceptable; information is provided to the crewmember only when there is an abnormal condition.

The Army's initial operational test and evaluation of the AH-64D Apache Longbow, which concluded in 1995, demonstrated that the modernized helicopter was 28 times more effective that the A-model Apache. The effectiveness was measured by the U.S. Army test community in terms of aircraft survivability and lethality. Through testing, it was determined that the D model was seven times more survivable than the A model and four times as lethal.

The Apache Longbow remanufacturing line converts older AH-64A Apaches into the AH-64D Longbow. The Boeing assembly line in Mesa, AZ, conducts this remanufacturing process. (Photo courtesy of Boeing.)

Operational validation of the AH-64D Apache Longbow came after the Sept. 11, 2001, attacks, when the helicopters were deployed to Iraq in support of *Operation Iraqi Freedom* and later to Afghanistan, following the AH-64As in supporting allied efforts in *Operation Enduring Freedom*. Reports from battlefield commanders, aviators, maintainers, and Soldiers affirmed the capabilities of the Apaches. MG Virgil Packett II, then-U.S. Army Aviation Branch Chief and Commanding General of the U.S. Army Aviation Warfighting Center, said, "The Apache is a symbol around the world that brings the best in industry, technology, the best in Soldiers, and it brings confidence because in the heat of battle, it is there when you need it."

The completion of two multiyear contracts and delivery of 501 AH-64Ds marked a milestone for the Apache program along with a new beginning, as follow-on orders for additional remanufactured and new-build AH-64Ds for the Army and helicopters for international customers sustained production. Evolution is a continuous process, and the Army continued working on another modernization plan for the AH-64D that would result in the Apache Block III helicopter.

The AH-64D Apache Block III is the next phase of the Apache's evolution. Block III is a remanufacturing program that adds additional capability, addresses obsolescence, and improves the sustainability and maintainability of the airframe by Soldiers and logisticians. Block III low rate initial production is scheduled for FY11. (Photo courtesy of Boeing.)

The Army further enhanced the Apache Longbow by awarding the Modernized Target Acquisition Designation Sight/Pilot Night Vision Sensor (M-TADS/PNVS) contract in 2000. This competitively won system design and development program advanced the helicopter's forward looking infrared (FLIR) capability to the next generation and replaced the aging electronics in the forward avionics bays. Lockheed Martin rolled out the first system to the Army in May 2005 and completed the first unit equipped in June of that year.

M-TADS/PNVS vastly improved the capabilities of the legacy system. The most important of these improvements is the FLIR's ability to simply see better. Visual acuity, measured in resolution (more pixels), increased tenfold. Crews can see things with M-TADS/PNVS that are not visible in the legacy system. This greatly increased the standoff range to enemy gunners, making the Apache helicopter inherently more survivable. Utilization of the M-TADS/PNVS systems has resulted in a tremendous improvement in mean time between failure and mean time between maintenance actions.

Members of 2nd Attack Reconnaissance Battalion, 159th Aviation Regiment depart for a mission while supporting operations in *Operation Iraqi Freedom*. The AH-64D Apache has proven to be one of the major combat multipliers in theater. Apache units provide convoy security, search and destroy, route reconnaissance, deliberate attack, and area security missions on a daily basis. The AH-64D Apache Longbow pictured here also has several of the mission modifications specific to wartime deployment. (U.S. Army photo.)

While these statistics are impressive, the real-world result of the system's fielding has been the success of the Apache warfighters in the defense of friendly combatants, attacks on enemy fighters, and identifying and neutralizing enemy teams emplacing improvised explosive devices. The M-TADS/PNVS has had a significant impact on combat support for the Army Team. The aircrews now see farther and more clearly, and they prosecute far more threat combatants than before. The result is a significant increase in lethality and survivability for the Apache helicopter and the crews that fly them.

Block III Enhancements

The Army signed a development contract in early 2006 with a plan to complete a limited user test in late 2009 and wrap up a Milestone C decision in 2010, in anticipation of entering low rate initial production for AH-64D Apache Block III helicopters. The operational deployment of Apaches in support of today's requirements makes evident the need to bring the technologies planned for the Block III helicopter through test and into production for on-time delivery to Soldiers.

Flip the calendar forward through design, development, and testing on a rigorous schedule for the AH-64D Apache Block III, and the July 2008 ceremony to celebrate the first flight of the Army's AH-64D Apache Block III prototype aircraft comes into sharp focus. Major enhancements that make up the AH-64D Apache Block III include Future Force connectivity through seamless Global Information Grid communications, availability of off-board sensors carried on unmanned aerial platforms for extended-range sensing, and increased survivability through extended-range sensors and weapons. All of these enhancements are facilitated through open systems architecture, enhanced aircraft performance with an improved transmission and drive system, and reduced operations and support cost for increased aircraft readiness.

New capabilities and advancing technology continue to play a significant role in the future of Apache, as the needs of the ground commander bring about new requirements. Several programs are in the works to respond to these growing needs. The Modernized Day Sensor Assembly will complete the modernization of M-TADS/PNVS to enhance performance and prevent obsolescence. This modernization will include a new laser, a color TV, an internal measurement unit, and an image fusion capability. VNsight, a visible/near infrared sensor, is a low-light-level TV integrated into the M-PNVS. VNsight provides the warfighter with increased situational awareness and enhanced flight safety, resulting in significant tactical advantages blending visible light imagery with the pilotage FLIR. These new capabilities are expected to be in production over the next several years and will reach the field between 2012 and 2016.

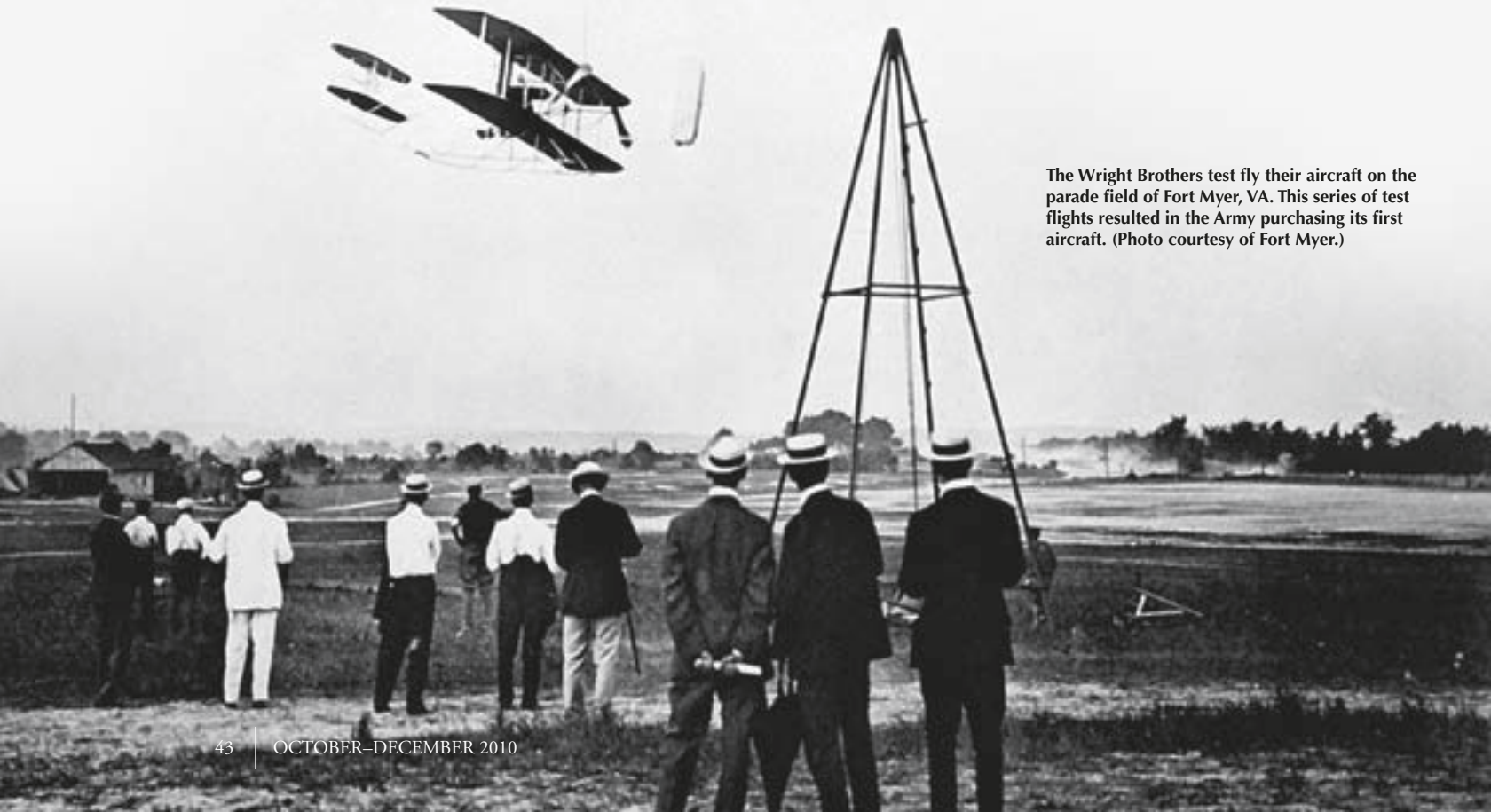
The Apache has brought about major change in the way our Army fights across the spectrum of conflict. The evolution of the Apache program demonstrates the manner in which a revolutionary change in a product must evolve with the current state of technology while meeting the needs of our commanders. The Apache Project Office and industry partners are committed to ensuring that our Soldiers have the tools necessary to fight, win, and come home safely.

COL SHANE OPENSHAW is the Project Manager Apache Advanced Attack Helicopter. He holds a B.S. in business management from the University of Utah and an M.S. in systems acquisition management from the Naval Postgraduate School. Openshaw is Level III certified in program management and is a U.S. Army Acquisition Corps member.

U.S. Army Signal Corps, 150 Years Old and Still Breaking New Ground

Robert E. Demus

Congress created the U.S. Army Signal Corps on June 21, 1860, assigning Albert James Myer as the first and only Signal Officer. Myer was an Army doctor and the first to come up with the idea of a separate, trained, professional military signal service. Throughout its history, the Signal Corps had initial responsibility for a number of functions and new technologies that are now being managed by other organizations, including military intelligence, weather forecasting, and aviation.



The Wright Brothers test fly their aircraft on the parade field of Fort Myer, VA. This series of test flights resulted in the Army purchasing its first aircraft. (Photo courtesy of Fort Myer.)

In 1870, for example, the Signal Corps established a congressionally mandated national weather service, the Division of Telegraphs and Reports for the Benefit of Commerce.

The electric telegraph had become the responsibility of the Signal Corps in 1867. Within 12 years, the Corps had constructed, maintained, and was operating some 4,000 miles of telegraph lines along the country's western frontier. The weather bureau became part of the Department of Agriculture in 1891 while the Corps retained responsibility for military meteorology. For more than a century, the term "Signal Corps" referred to units involved in visual signaling, telephone and telegraph wires, and cable communications. Shortly after the Spanish-American War in 1898, the Signal Corps constructed the Washington-Alaska Military Cable and Telegraph System, developing the first wireless telegraph in the Western Hemisphere.

SSG Dennis Hoffman of the 112th Signal Battalion (Special Operations, Airborne), Fort Bragg, NC, explains the function of the Special Operations Forces Deployable Node-Medium. (U.S. Army photo.)

Contracting with the Wright Brothers

The Wright brothers' first flight, performed in a powered heavier-than-air machine near Kitty Hawk, NC, on Dec. 17, 1903, marked the dawn of a new age. But a trip of 59 seconds for a distance of 852 feet did not convince anyone, let alone the military, of the commercial viability of air travel.

By late 1907, the U.S. Army showed renewed interest in the Wright brothers, however. Rather than offering them a contract, the U.S. Signal Corps announced an advertisement for open bids to contract and fly an airplane. The design and performance specifications were such that the Wright brothers were the only responsible bidder. A price of $25,000 was established for the airplane if the brothers could meet the design specifications in actual flight trials.

On Aug. 1, 1907, an Aeronautical Division was established within the Corps. The first Army contract within the division was in December 1907 for the purchase of an aircraft. The contract was awarded by U.S. Army Signal Corps CPT Charles S. Wallace, on behalf of the United States of America, to Wilbur and Orville Wright, trading as Wright Brothers of 1127 West Third Street, Dayton, OH.

The Corps and the Wright Brothers entered into an agreement for the purchase of one heavier-than-air flying machine, in accordance with Signal Corps Specification No. 486, dated Dec. 23, 1907. The contract called for a machine that could fly at a speed of 40 miles per hour (mph) and could carry two people a distance of 125 miles. It had to be steered in all directions without difficulty, stay aloft for a 1-hour endurance demonstration, and land undamaged at the takeoff point. The machine had to be disassembled easily and transportable. The agreement was two pages long and included 12 articles.

The Wright Brothers' trials began in late summer 1908 at Fort Myer. Orville Wright did the flying accompanied by an Army observer, 1LT Thomas Selfridge. Unfortunately, the plane crashed, causing fatal injuries for Selfridge and injuring Wright. The Wrights returned to Fort Myer in 1909 to complete the Army trials. Over several weeks, the brothers fulfilled each requirement in Signal Corps specifications, the final one being a flight of 10 miles with a passenger. This flight also served as the official speed trial. The contract stipulated that the Wrights would receive a 10-percent bonus for every full mph above 40.

Their average speed was 42.5 mph, which brought them a $5,000 bonus. That made the final purchase price of the airplane $30,000.

The Wrights presented the Army with an entirely new airplane in 1909. The Army purchased it that year, used it to train pilots in 1909–1910, then donated it to the Smithsonian Institution in 1911 after acquiring other aircraft. Designated as Signal Corps No. 1 by the Army, it was generally referred to as the Wright Military Flyer, the world's first military airplane.

For more than a century, the term "Signal Corps" referred to units involved in visual signaling, telephone and telegraph wires, and cable communications.

Harnessing Technology for War and Peace

The Signal Corps transferred the Aeronautical Division to the Army Air Service in 1918 but lost no time in meeting the technology challenges of World War I. Chief Signal Officer MG George Squier worked closely with private industry to develop radio tubes, creating a major signal laboratory at Camp Alfred Vail (later renamed Fort Monmouth), NJ. Early radio telephones were introduced to Europe during the war.

COL William Blair, a director of the Signal Corps laboratories at Fort Monmouth, patented the first Army radar (radio detection and ranging) device in May 1937. Mass production of two radar sets had begun before World War II. This radar became one of the most important communications developments of World War II, along with the production of tactical radios.

As of March 1942, the Signal Corps was one of the first organized components to supply both the Army Ground Forces and the Air Forces. It was responsible for establishing and maintaining communications service schools for officers and enlisted personnel at Fort Monmouth. The Signal Corps developed radar, a term used to designate radio sets and similar equipment. However, the SCR-268 and 270 were not radios at all, but for top-secret reasons were designated as such. Radar emerged historically from the defensive need to counter the possibility of massive aerial attacks. Radar technology continued to be developed and upgraded at the Fort Monmouth laboratories during World War II; development continued into the Cold War.

In 1946, the Signal Corps bounced radar signals off the moon, paving the way for space communications. The Corps also grew the first large quartz crystals used to manufacture electronic components, leading to the development of the circuit card. In December 1958, with Air Force assistance, the Signal Corps launched its first communications satellite in space, demonstrating the feasibility of worldwide communications. This led to the development of the first military Very High Frequency radio, which was used extensively during the Korean conflict.

The Vietnam War required high-quality telephone and message circuits, leading to the development of troposcatter radio links that could support locations more than 200 miles apart in a tropic environment. The Signal Corps also developed a satellite communications service known as Synchronous Communication Satellite and a commercial fixed-station system known as Integrated Wideband Communications System, creating the Southeast Asia link in the Defense Communications System.

The escalation of the Vietnam conflict and the number of troops involved created an increasing need for an expanded communications infrastructure. In spring 1966, the assorted Signal Corps units were reassigned to the newly formed 1st Signal Brigade. By the close of 1968, this brigade consisted of six Signal Corps groups and 22 signal battalions.

Advancements Continue

Since the 1980s, development of communication technology has continued, upgrading older-technology radios and communications equipment with radios that send signals across many frequencies, "hopping" from one to another at lightning speed. Later generations of these radios were combined with encryption devices for improved security. By the advent of *Operation Desert Storm*, all Army units were deployed using the most secure communications equipment in the world.

On June 21, 2010, MG Randolph P. Strong, Commanding General, U.S. Army Communications-Electronics Command (CECOM) and Fort Monmouth, and a former Army Signal Corps Chief, said that with the closure of Fort Monmouth on the horizon, the day was one of both celebration and commemoration. "Fifty years ago, our predecessors buried this time capsule in honor of the 100th birthday of the U.S. Army Signal Corps," Strong said. To commemorate the 150th anniversary of the Corps, Strong and others ceremoniously unearthed the capsule to prepare it for its move to the Army Signal Center and School at Fort Gordon, GA.

Radio Operator CPL John Robbins, 41st Signal, 41st Infantry Division, operates his SCR-188 radio in a sandbagged hut at Station NYU, Dobodura, New Guinea, during World War II. (U.S. Army Signal Corps photo by T/4 Harold Newman.)

Command Historian Melissa Ziobro also commented, "I think it is really going to highlight just how far communication electronics technology has come; but I think it is also going to reinforce how little the Signal Corps mission will have changed." The U.S. Army Signal Corps Museum has received the time capsule and is planning an interment ceremony. The capsule will be reburied at Fort Gordon until June 21, 2060, when it will be opened to commemorate the Corps' 200th anniversary.

ROBERT E. DEMUS is a CECOM Contracting Center Procurement Analyst. He retired with more than 20 years of service in the Army Signal Corps. He holds a B.S. in public administration from Brenau University. Demus is certified Level III in contracting and is a member of the Army Signal Corps Regimental Association and the National Contract Management Association.

SFC Kelly Javier, Combat Service Support Management Office Noncommissioned Officer in Charge (NCOIC), 311th Theater Support Command, performs a maintenance check on a Very Small Aperture Terminal (VSAT) used for communications in theater. The wireless SIPRNET kit can interconnect with a VSAT to provide SIPRNET capability. (U.S. Army photo by PFC Alicia Torbush.)

Telecommunications Upgrades Anchor Army Modernization Goals

Michael Dorsey

The Army's innovative and newly launched wireless Secure Internet Protocol Router Network (SIPRNET) kit will transform how quickly and easily units around the world can access and use classified data. For the past few years, the Army has been working diligently to improve communication products for its warfighters with a superior information vehicle that would help transform the Army into a more net-centric environment. The new SIPRNET kit reflects a significant move in supplying such a need.

The Army's newly launched wireless SIPRNET kit is a quick, cost-effective, transportable device that provides Soldiers with on-the-go productivity. Here, SSG Stevie Jones (left), the U.S. Forces-Iraq (USF-I) J6 Communications Directorate Server Room NCOIC, and U.S. Air Force TSgt Samuel Sapiera, USF-I System Administrator, work on their mission of providing network core services on both the SIPRNET and Non-classified Internet Protocol Network throughout Camp Victory, Iraq, March 4, 2010. (U.S. Air Force photo by SMSgt Trish Bunting.)

The Program Executive Office Enterprise Information Systems (PEO EIS) Project Manager Network Service Center (PM NSC), working with U.S. Army Information Systems Engineering Command (ISEC), developed a secure communications system at an "unprecedented level of efficiency," said Miguel Buddle, Mobility Kit Project Lead for PM NSC.

Versatile Components

Buddle said that the SIPRNET kit, like a commercial broadband wireless card, is a quick, cost-effective, transportable device that provides Soldiers with on-the-go productivity. The kit comes in two parts:

- The Part A Component, which resides anywhere that has both a SIPRNET point-of-presence and a local area network (LAN) for use of the Non-classified Internet Protocol Network (NIPRNET).
- The Part B component, which supports the user and can be placed anywhere there is a local NIPRNET LAN drop. One Part A component can provide connectivity to one or more Part B components, thus expanding wired and wireless operational capability.

One kit can support three users in wireless connectivity and 20 users using wired connectivity.

The kit's versatility stems from its modular, flexible design. Both components can operate on 110- or 220-volt electrical power. The kit can interconnect with a Very Small Aperture Terminal to provide SIPRNET capability.

Once it is added to a facility and is hooked to non-secure network cables, anyone can receive access to the SIPRNET system. Secure communication is established across an unsecure network through encryption tunnels between the two components.

'An Excellent Solution'

The acceptability of the SIPRNET kit continues to rise quickly, thanks to the value it brings to organizations. At Camp Shelby, MS, the largest state-owned training site in the Nation, the 2-part kit has improved training efficiency.

Of Camp Shelby's more than 100 available buildings used for battalion and brigade elements, only four are physically wired for SIPRNET. However, the kits allowed the installation to accommodate 4,000 Soldiers over time without the huge investment in money, manpower, and materials needed to change building infrastructure. With 8,000 more people trained over the summer, "the kits have been an excellent solution for our posts because of so many visiting units. The speed is good, with no limitations," said LTC

With its state-of-the-art technology and expedient delivery, SIPRNET will help the Army successfully distribute and process information services to its warfighters.

Beverly Hartsfield, Telecommunications Program Coordinator at Camp Shelby.

SSG Terry Stewart, a member of Hartsfield's staff, agreed. "The first unit to use the kit had zero service calls for the kit itself," Stewart said. "The kit is truly plug-and-play. You plug it in and it works … it is extremely user friendly and portable."

In the past, delivering classified information often required hardened facilities, miles of installed wiring, and limited phone equipment. By developing and improving telecommunication products such as the SIPRNET kit, PM NSC continues to support the Army's infrastructure on and off the battlefield with technical efficiency and reliability. With its state-of-the-art technology and expedient delivery, SIPRNET will help the Army successfully distribute and process information services to its warfighters.

"The SIPRNET kit is a reflection of PM NSC's commitment to transform the Army to a more modular, net-centric, expeditionary force," said Robert Golden, NSC Project Manager. "The kits keep our sites in the Nation technologically current, thus allowing top-notch training that equates to a more combat-agile force—precisely what we want for our Soldiers, and nothing less."

Configuration Accounting Information Retrieval System

The NSC acquires and fields telecommunications infrastructure at Army installations worldwide. Providing project oversight, NSC works with commercial vendors to develop products, while ISEC validates information assurance compliance for the mobility kit.

Meanwhile, additional NSC efforts to upgrade the Army's telecommunications continue; a recently installed telephone network management system at home installations in Europe boosts both mission capability and morale for Soldiers and their Families abroad.

The SIPRNET kit is a reflection of PM NSC's commitment to transform the Army to a more modular, net-centric, expeditionary force.

NSC's Defense Communications Systems Europe (DCSE) Installation Information Infrastructure Modernization Program and the 5th Signal Command teamed up to modernize telephone communications at Army posts in Germany.

The Configuration Accounting Information Retrieval System (CAIRS) provides the capability to manage all of the communications infrastructure, telephone billing, telephone switch provisioning for voice and Voice over Internet Protocol telephones, cable and facilities management, directory operator services, and the ability to integrate third-party billing services for personal digital assistants, cell phones, and lease lines into one consolidated telephone bill. CAIRS will be used to order, manage, and report on all aspects of telecommunications in Europe.

Because of its design, CAIRS is interoperable with the Defense Switched Network (DSN), enhancing DSN as a management and reporting system.

"DSN connects every Soldier, Sailor, Airman, and Marine together and does it so seamlessly, no one appreciates it until it fails," LTC Joseph Dupont said earlier this year as PM DCSE. "This tool benefits the Soldier because it keeps the system running."

CAIRS provides 2-way connectivity between a central server at the Kaiserslautern Area Processing Center and one in Grafenwoehr. This arrangement services 31 Electronic Worldwide Switch Digital switches and 17 5th Signal Command-managed private branch exchanges. The system's connectivity is through Internet Protocol (IP) established between the area processing centers and each switch location.

The overflow of morale calls from the automated attendant to the telephone operators is expected to improve by 50 percent because of the IP process. CAIRS also automatically bills the calls through a digital toll ticket. Mission-related conference calls are expected to see the same 50 percent improvement.

With the rise in cyber communications, telephone DSN remains relevant and in high demand. As the European theater continues its transition to an IP network, a goal throughout the entire Army—improving telephone use by installing a computer processor-based platform like IP—makes the antiquated DSN system more effective and efficient, which brings ever more communications support to Soldiers stationed worldwide.

MICHAEL DORSEY is the Strategic Communications Officer for PEO EIS Project Manager Network Service Center. He holds a B.A. in communication studies from the University of Maryland University College. Dorsey is a U.S. Air Force veteran with more than 20 years' experience in military public affairs.

At Bundeswehr Test and Evaluation Facilities, a Window onto Possible U.S.-German Cooperation

Michael Cast

In April 2010, representatives from the U.S. Army Aberdeen Test Center (ATC) and the U.S. Army Evaluation Center (AEC) at Aberdeen Proving Ground (APG), MD, visited Germany to get a close look at how the German Bundeswehr [Federal Defense Force] conducts its test and evaluation programs and to meet with German officials. Together, the U.S. and German officials discussed the potential for information and engineering exchanges that could benefit both countries. The visit provided valuable insight into how Germany marshals its resources to test and procure technologies designed to protect German troops from today's battlefield threats, said COL Jeffrey Holt, ATC Commander.

COL Jeffrey Holt (left), ATC Commander, and Brendon Webb, Chief of AEC's Tactical Mobility Division, ride in a German Leopard 2 tank. (Photo courtesy of Eberhard Kloeckner, German Liaison Officer at APG.)

"Each of the German test centers we visited provided something significant for ATC to consider," Holt explained. "The German army operates under much tighter constraints of test funding. As a result, they have invested wisely in equipment and facilities that can bring down overall test costs. As resources become tighter for our Army, we need to make similar investments."

During the trip to Germany, Holt and one of ATC's test managers, Daniel Terek, were joined by Brendon Webb, Chief of AEC's Tactical Mobility Division, and Eberhard Kloeckner, German Liaison Officer at APG. The group visited the Bundeswehr Technical Center for Weapons and Ammunition in Meppen; the Federal Ministry of Defense's Directorate General of Armaments, Army Equipment and Technology in Bonn; the Federal Office of Defense Technology and Procurement in Koblenz; the Bundeswehr Technical Center for Automotive and Armored Vehicles in Trier; and the Bundeswehr Technical Center for Information Technology and Electronics in Greding. Officials of these German defense agencies provided their American visitors with tours and briefings.

Focus on Soldier Protection

Among the most important topics of the trip were the development and testing of systems that protect Soldiers from improvised explosive devices (IEDs) and explosively formed penetrators, and the development and testing of vehicles needed in the combat theater, Kloeckner said.

Holt was especially interested in the Target Simulation Dome at the Technical Center for Information Technology and Electronics. Upgrading the Moving Target Simulator at ATC is on Holt's to-do list, and he would like to achieve this with technical support from the Bundeswehr test center.

Kloeckner said the visitors from ATC also focused on Germany's development and testing of technologies that provide command, control, communications, computers, intelligence, surveillance, and reconnaissance (C4ISR) capabilities. "On the subject of C4ISR, ATC especially posed questions on the themes of network data models and critical network performance criteria," Kloeckner said. "They wanted to know, 'How does the Bundeswehr determine the effectiveness and suitability of a network system?' There were also many points of discussion about cooperative efforts and an information exchange between German and American testers."

Opportunities to Learn

Holt said a long-term engineer exchange program could benefit both Germany and the United States in the long run. "I would very much like to put a long-term program in place to exchange engineers between each of our test centers," he said. "Several years ago, we were able to send one of our young automotive engineers to the Technical Center for Automotive and Armored Vehicles in Trier. Tim Hoy learned a great deal from the exchange and has put those skills to use as one of our critical leaders on the MRAP [Mine Resistant Ambush Protected vehicle] program. I would like to leverage similar opportunities for live-fire and electronics engineers.

"One major challenge we face is access," Holt continued. "When we send a U.S. engineer to Germany, he or she is provided with almost completely unfettered access. The barriers to equal access for German engineers working at APG are far more difficult to overcome."

Hoy's 13 months at the German test center in Trier prompted him to raise the issue of instrumentation on MRAP vehicles operating in the combat theater that could benefit coalition partners by collecting data. The idea is to install sensors, such as the black boxes in aircraft, on MRAPs in Afghanistan to collect data that can be used to assess vehicle survivability and automotive performance on the battlefield and to make improvements in vehicle design and acquisition strategy.

"Especially after an IED hit, one can evaluate valuable data, which provide conclusions about the vehicles' improvement potential," Kloeckner explained. "The Bundeswehr has similar systems,

Wolfgang Vollmar (left), director of the Bundeswehr's Technical Center for Information Technology and Electronics, and COL Jeffrey Holt, ATC Commander, shake hands before exchanging coins. (Photo by Erika Jordan.)

and we want to compare these technologies with each other. The data themselves are not so interesting in this case, as our vehicles are different, but the technologies used and their implementations are interesting themes for our engineers."

Holt said he was particularly impressed with the survivability test fixtures at the Bundeswehr Technical Center for Weapons and Ammunition. "We rely primarily on full-up vehicle blast events, while the [center] leverages an array of specialized test fixtures," he said. "Our approach provides great data, but it is expensive in terms of vehicle repair and instrumentation."

Testing Protective Equipment

Terek, Chief of the Light Armor Operations Branch in the Weapons Facilities Division of ATC's Firepower Directorate, has been involved with testing personal protective equipment (PPE) for the past 3 years. He is responsible for six ranges at ATC where these systems are tested. Holt tapped him for the visit to Germany because he thought Terek could learn something valuable about German test equipment, ranges, and processes for PPE systems.

Terek said the overall test process of the Bundeswehr appears to be similar to that of the U.S. Army, with a few notable differences. "Their test centers incorporate the research centers all on the same installation, I assume because they have less real estate than the U.S.," he said. "For example, we visited their automotive test facility, where they have similar courses as we have here, but they also test engines and transmissions on dynamometers, whereas we typically do those tests at our research centers."

While in Germany, Terek saw a test fixture that could shed light on the formation of explosively formed penetrators, special types of shaped charges designed to penetrate armor at stand-off distances. "This test fixture is designed to contain most of the blast and debris while allowing the penetrator to form and be filmed without the excess debris obstructing the view of the formation," Terek said.

The test center that interested him the most was the Technical Center for Weapons and Ammunition in Meppen because it conducts the type of PPE testing for which he is responsible at ATC. "It would behoove ATC to see how the German army tests PPE and possibly incorporate their medical research data into evaluating U.S. armor effectiveness," he said.

> The German army operates under much tighter constraints of test funding. As a result, they have invested wisely in equipment and facilities that can bring down overall test costs.

An Integrated Process

Webb said that exchanging technical information between the Bundeswehr and the U.S. Army is important because both nations are pursuing the development of protected vehicles such as the U.S. military's MRAP and the Bundeswehr's Dingo, a mine-resistant vehicle that German troops are using in Afghanistan.

"We are both pursuing the same capabilities for our protected trucks, and it just makes sense to try and share information," Webb said. "It saves time and resources for both countries to share the expertise that has been developed in addressing our shared concern of under-vehicle attacks.

"In addition, they are significantly involved in the early engineering of systems," he said of the Bundeswehr. "For vehicles, they test new technologies in models, then in test rigs, then on vehicles. While our vehicle development system is similar, it is on a much larger scale, so these steps would typically be split between ATEC [U.S. Army Test and Evaluation Command], the Army Research Lab, and the program manager shop or TARDEC [U.S. Army Tank-Automotive Research, Development, and Engineering Center]. So the German process is much more integrated, and their test and evaluation centers take a lead role in developing, testing, and modeling new technologies very early in the acquisition process, even at the subsystem level.

"This is something the U.S. Army has also been working toward," Webb said. "It is good to see the payoff [the Germans] have achieved in the quality and performance of their vehicles."

Holt said he hopes this trip to Germany will be the basis for the renewal of cooperation between the Bundeswehr and the U.S. Army. Since Sept. 11, he explained, the scale of cooperative efforts has dropped significantly when compared with the 1980s and '90s, mostly because of the tremendous workload for both the U.S. and German test centers. "I hope this visit serves as a jump start for regaining the deep technical relationship we used to share with key allies," he said. "We have superb test liaison officers in place here at APG, but I think it is critical to take things to the next level and have a continuous rotation of engineers and technicians between U.S. and allied test centers."

MICHAEL CAST is Deputy Public Affairs Officer at the U.S. Army Developmental Test Command, APG, MD. He holds a B.A. in journalism from Arizona State University. Cast is a former Army photojournalist and a Keith L. Ware Award winner.

The Green Procurement Program: Implications and Applications to the Acquisition of Materiel Systems

Samantha Gibson, W. Michael McDevitt, and Mohamed Athher Mughal

Green procurement (GP) encompasses several procurement preference programs that apply to purchases made by the federal government, programs that consider environmental and energy-saving attributes in the products that we procure. Together, these programs encourage DOD acquisition purchasers to make environmental benefits a key part of their procurement decisions. Energy savings, reduction in landfill use, reduced pollution, and long-term environmental sustainability are just a few of the benefits of GP. Examples of green purchases include hybrid vehicles, absorbent material made from cottonseed lint, energy-efficient computers, and recycled copy paper.

Daegu electric vehicles are being evaluated as replacements for the Army's gasoline-fueled non-tactical vehicle fleet. (Photo courtesy of the U.S. Army Environmental Command.)

This article provides a brief overview of federal, DOD, and Army GP requirements and responsibilities. It offers ideas for applying GP to the acquisition of materiel systems and cites recent examples of DOD's successful use of GP.

Why Green Procurement?

The short answer is because it's mandated by federal regulations, laws, and executive orders (EOs). EO 13514, *Federal Leadership in Environmental, Energy, and Economic Performance*, requires that 95 percent of new contract actions for products and services other than acquisition weapon systems be energy-efficient, water-efficient, biobased, environmentally preferable, and non-ozone depleting; contain recycled content; and use nontoxic or less toxic alternatives. EO 13423, *Strengthening Federal Environmental, Energy, and Transportation Management*, requires that federal purchasers show preference for products that conserve resources such as fossil fuels, water, and energy.

Part 7 of the *Federal Acquisition Regulation* (*FAR*) emphasizes procurement of recycled-content and environmentally preferable products and services. Part 7.105(b) (16) requires that acquisition plans "discuss all applicable environmental and energy conservation objectives associated with the acquisition… ."

The *Resource Conservation and Recovery Act* (*RCRA*), Section 6002, requires federal agencies to develop programs to promote the procurement of products that the Environmental Protection Agency (EPA) designates as helping to create and sustain markets for recycled products.

But beyond the EOs, regulations, and laws, there are many practical, compelling reasons for implementing GP. GP uses the power of federal spending to do something positive for people's health and the environment. It creates markets for environmentally beneficial products and saves money and resources, because greener products require less energy. GP reduces pollution and adverse health effects, and those positive health implications have been linked to fewer lost workdays. GP provides incentives to develop new environmentally friendly technologies, and it promotes environmental stewardship and sustainability.

> DOD's GP policy encourages incorporation of GP when it is consistent with the demands of mission, efficiency, and cost-effectiveness.

Requirements and Responsibilities

The August 2004 *Green Procurement Policy and Strategy* formally established DOD's GP program and metrics. It requires review of proposed procurement actions for inclusion of GP provisions, consideration of environmental and energy aspects of planned acquisitions or procurements, and identification and development of specifications based on consideration of all of the green attributes identified.

In short, the policy requires that green products and services be considered as a first choice for all procurement. The Army's *Green Procurement Policy Memorandum*, dated Nov. 22, 2006, established the Army GP Program. It fully supports DOD's GP policy and calls for 100-percent compliance with GP requirements.

Requirements imply responsibilities. Procurement request originators and acquisition program managers (PMs) are responsible for identifying whether green products and services are available and can satisfy requirements for price, performance, and availability. They must ensure that relevant GP requirements are identified before submitting a procurement request to the contracting office. They do this by consulting with contract and environmental specialists to prepare statements of work (SOWs) or specifications that incorporate relevant GP requirements; document exceptions to GP requirements; apply life-cycle cost concepts to determine cost-effectiveness of green alternatives; and provide for oversight of contract execution to ensure that GP requirements are addressed in accordance with the terms of the contract.

Procurement offices review requests for green supplies and services; provide guidance to procurement request originators and PMs; incorporate GP language and *FAR* provisions and clauses into contract SOWs; ensure that all contract actions meet *FAR* requirements for GP through execution and close-out; and place any necessary written justifications in the contract file to document why GP options were not included in the procurement action.

GP is a good idea. But a good idea that ignores reality can quickly devolve into a bad idea. Recognizing this, DOD's GP policy encourages incorporation of GP when it is consistent with the demands of mission, efficiency, and cost-effectiveness. Additionally, *RCRA* provides exceptions to the procurement of recycled-content and biobased products when procurement of those products is cost-prohibitive; when they do not meet reasonable performance standards; or when they are not available within a reasonable time or at a sufficient level of competition.

That said, there are many practical ways to incorporate GP into the acquisition of materiel systems. PMs who develop technical requirements for SOWs can determine whether the system or contract could use EPA- or U.S.

The California National Guard has adopted fuel cell systems powered by photovoltaic panels on some of their posts. These innovative hydrogen cells use a solar array to convert water into hydrogen gas through electrolysis and can be used to power various facilities. (Photo courtesy of the U.U.S. Army Environmental Command.)

GP is required by law, regulation, and EO. Properly applied, it can contribute to a cleaner environment and lower overall program costs.

Department of Agriculture-designated products, and then include the applicable recovered-material or biobased standards for those products as specifications or technical exhibits.

PMs can also determine if there are green alternatives to the products or services used in the performance of the contract. They can identify other applicable GP elements (such as energy and water efficiency) that may apply, and include appropriate requirements in the SOW.

Sounds Good; Does It Work?

Properly applied, DOD's GP policy produces positive results. There are numerous examples of its successful application. Performance-based contracting was used to incorporate green elements into the post-Sept. 11 Pentagon renovations, and 7½ tons of steel recovered from the World Trade Center was used to construct the bow of the USS New York. The Virginia Class Submarine design used recovered materials and removed cadmium and hexavalent chromium, while the AH-64 Apache helicopters now use a chrome-free primer. The U.S. Army Tank-Automotive and Armaments Command developed a retread tire specifications and qualifications list. The Naval Facilities Engineering Command incorporated sustainability and green products into construction specifications. Crane Army Ammunition Activity reused Mobile Jettison Unit decoy flares. The F/A-18 Super Hornet fighter, the Stryker, and other armored vehicles use a non-ozone-depleting fire suppressant. The F-35 Joint Strike Fighter program reduced hazardous material use by 75 percent, and the unmanned aircraft system Solar Eagle now uses some solar power.

Conclusions

GP is required by law, regulation, and EO. Properly applied, it can contribute to a cleaner environment and lower overall program costs. Both DOD and the Army have established policies requiring GP but also recognizing that its application may not always be practical. GP is a useful tool for "greening" the acquisition of materiel systems, and its utility has been demonstrated through numerous successful applications in DOD.

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From the Acquisition Support Center Director

Congratulations to *Army AL&T* Magazine on its 50th anniversary of bringing the latest information on developments in Army Acquisition, Logistics, and Technology (AL&T) to the Army community. The first edition of the then-*Army Research and Development Newsmagazine* was published on Dec. 1, 1960.

The Honorable Wilber M. Brucker, then-Secretary of the Army, wrote the first article launching this innovative publication. "To those who would travel the long, hard road of progress in assuring the security of our Nation, I commend this and future issues of this new publication in the full confidence that it will assist you in maintaining your professional competence at the constantly high level which the vital mission of our Army demands," he wrote. Brucker's words still ring true 50 years later.

Over the decades, the magazine's name, design, staff, and authors have changed numerous times, and the Army has made giant leaps in AL&T, spanning three wars, numerous conflicts, and 11 presidential administrations. Today, the award-winning *Army AL&T* Magazine continues energizing the Army AL&T Workforce with a first-class publication that is a venue for an exchange of AL&T organizational, operational, and technological developments, best business practices, and lessons learned. Most of all, it continues to serve the Soldiers who vigilantly stand in harm's way protecting our Nation. Again, congratulations to *Army AL&T* Magazine, and may it remain a continuum of success for the next 50 years and beyond.

Memorandums from Under Secretary of Defense for Acquisition, Technology, and Logistics and Director, Army Acquisition Corps

Under Secretary of Defense for Acquisition, Technology, and Logistics Dr. Ashton B. Carter has released a memorandum (see Pages 56–60) highlighting several of his goals for the acquisition community, including overcoming the challenges ahead and finding efficiencies in our daily activities. Because of a flat-lined budget, Carter focuses on his underlying theme, "doing more without more." As members of the acquisition community, we need to adhere to his goals.

In Director, Army Acquisition Corps Memorandum #6 (see Pages 61–62), LTG William N. Phillips emphasizes using Section 852, *2008 National Defense Authorization Act*, Public Law 110-181 as well as the importance of certification and professionalism of the AL&T Workforce.

To stay in alignment with this memorandum, AL&T Workforce members and their supervisors should focus on establishing a strong Individual Development Plan (IDP) and then executing it. That requires participation by both the individual and the supervisor. AL&T Workforce members can also use the tools that the U.S. Army Acquisition Support Center (USAASC) provides to help them develop a solid IDP.

Craig A. Spisak
Director, U.S. Army Acquisition Support Center

The remainder of this column will feature comments from the new USAASC Deputy Director, COL Bill Boruff.

From the USAASC Deputy Director

In my first assignment to this organization, I witnessed the Acquisition Career Management Office and the Army Acquisition Executive Support Agency transform into USAASC. Now, at a higher level of responsibility, I'm privileged to help USAASC continue its transformation into a Direct Reporting Unit to the Assistant Secretary of the Army for AL&T by managing personnel changes, providing control and oversight, and developing the best acquisition support we can. These are exciting times, and I'm looking forward to serving USAASC at the next level of providing world-class support for our customers and the acquisition community.

MEMORANDUM FOR ACQUISITION PROFESSIONALS SUBJECT: Better Buying Power: Mandate for Restoring Affordability and Productivity in Defense Spending

On Pages 56–60 is the text of the June 28, 2010, Memorandum for Acquisition Professionals from Dr. Ashton B. Carter, Under Secretary of Defense for Acquisition, Technology, and Logistics, with supporting slides. Dr. Carter's memorandum and slides are also online, at **http://www.acq.osd.mil/docs/USD(AT&L)_Memo_to_Acquisition_Professionals_June_28_2010.pdf**.

MEMORANDUM FOR SEE DISTRIBUTION SUBJECT: Director, Army Acquisition Corps Guidance Memorandum #6

On Pages 61–62 is the text of the Director, Army Acquisition Corps Guidance Memorandum #6, dated July 8, 2010. In it, LTG William N. Phillips, Principal Military Deputy to the Assistant Secretary of the Army for Acquisition, Logistics, and Technology and Director, Army Acquisition Corps, addresses the Defense Acquisition Workforce Development Fund and adds a personal note encouraging the Army Acquisition Team to "take full advantage of these resources." LTG Phillips' memo is also available online, at **http://asc.army.mil/docs/programs/852/Memo_DACM_6.pdf**.

THE UNDER SECRETARY OF DEFENSE
3010 DEFENSE PENTAGON
WASHINGTON, DC 20301-3010

ACQUISITION, TECHNOLOGY AND LOGISTICS

JUN 28 2010

MEMORANDUM FOR ACQUISITION PROFESSIONALS

SUBJECT: Better Buying Power: Mandate for Restoring Affordability and Productivity in Defense Spending

I have written to you previously to emphasize, with President Obama and Secretary Gates, that your highest priority is to support our forces at war on an urgent basis. Over the last year, the Department has also worked to reform its acquisition system, including implementing the Weapon Systems Acquisition Reform Act. Today I write to give direction on another important priority: delivering better value to the taxpayer and improving the way the Department does business.

We are a nation at war, and the Department does not expect the defense budget to decline. At the same time, we will not enjoy the large rate of growth we experienced during the years after September 11, 2001. We must therefore abandon inefficient practices accumulated in a period of budget growth and learn to manage defense dollars in a manner that is, to quote Secretary Gates at his May 8, 2010 speech at the Eisenhower Library, "respectful of the American taxpayer at a time of economic and fiscal distress."

This reality, combined with a determination to take care of our service members and avoid major changes in force structure, has led the Secretary and Deputy Secretary to launch an efficiencies initiative in the Department. The initiative requires the Department to reduce funding devoted to unneeded or low-priority overhead, and to transfer these funds to force structure and modernization so that funding for these warfighting capabilities grows at approximately three percent annually. This is the rate of growth needed historically to continue to give the troops what they need.

Some of these savings can be found by eliminating unneeded programs and activities; and, indeed, the Department's leadership has already taken strong action in this area and will need to do more. But other savings can be found within programs and activities we do need, by conducting them more efficiently. Deputy Secretary Lynn expects that two-thirds of the savings transferred to warfighting accounts should come about this way. Pursuing this kind of efficiency is the purpose of my message today to the Department's acquisition professionals. We need to restore affordability to our programs and activities. I would like

us to embark upon a process today to identify and then act on steps we can take to obtain two to three percent net annual growth in warfighting capabilities without incurring a commensurate budget increase by identifying and eliminating unproductive or low-value-added overhead; in effect, doing more without more.

The Department is spending approximately $700 billion per year for our nation's defense. Approximately $300 billion of those funds are spent within the Department's walls – on the salaries and benefits of military personnel and civilian employees, and on the buildings and facilities within which they work. But the remainder – $400 billion – is spent on contracts issued to entities outside of the Department of Defense. This $400 billion is divided about equally between products (e.g., weapons, electronics, fuel, and facilities) and services (e.g., IT services, knowledge-based services, facilities upkeep, and transportation). We, the Department's acquisition officials, agree to these contracts on behalf of the taxpayer. Each of these contracts contains a statement of the services or products it is procuring; an arrangement between the government and the contractor for how the costs of those items will be paid; and the overheads, indirect charges, and fees that complete the business transaction and make it possible for the defense industry to be economically viable.

The guidance memorandum I plan to issue will require each of you, as you craft and execute the Department's contracts in coming years, to scrutinize these terms to ensure that they do not contain inefficiencies or unneeded overhead. The guidance will give you specific features to examine and targets to hit in the pursuit of greater efficiency. The guidance will focus on getting better outcomes, not on our bureaucratic structures. But it must also take note of where the government's processes and regulations contribute to inefficiency in our business relationships.

Today I want to share with you the preliminary outlines of this guidance, so that I can have the benefit of your experience and perspective before I issue it in final form. I am also asking our partners in industry for their thoughts and input. I am also sharing these plans with the Congress. A process of analysis and dialogue is necessary to make sure our actions are effective and soundly based.

I want to emphasize two points about this initiative:

First, the savings we are seeking will not be found overnight. It has taken years for excessive costs and unproductive overhead to creep into our business processes, and it will take years to work them out. We will be concentrating on new contracts as they are awarded in coming years, to ensure that they reflect new efficiencies. Some of the targets and objectives we decide to pursue will only be able to be achieved on a timeline of several

years. On the other hand, Secretary Gates has explained clearly why we need to embark now. And the earlier we embark, the easier it will be to succeed.

Second, we in the Department cannot succeed at this task alone. We need the input and involvement of industry, and I will be actively seeking their support and ideas. We do not have an arsenal system in the United States: the Department does not make most of our weapons or provide many non-governmental services essential to warfighting – these are provided by private industry. Our industry partners are patriots as well as businessmen. This initiative should contribute to the continuing vitality and financial viability of the defense industry in the era ahead by aligning the direction and incentives of the Department and industry. It is intended to enhance and incentivize efficiency and total factor productivity. Most of the rest of the economy exhibits productivity growth, meaning that every year the buyer gets more for the same amount of money. So it should be in the defense economy. Increased productivity is good for both industry and government. So also is avoiding budget turbulence and getting more programs into stable production.

We also need the help of Congress. Members of Congress observe with dismay as they are asked to approve ever-increasing funding for the very same product or service. We will need their input and support to make necessary adjustments that will in some cases be difficult.

What is contained in the attached charts is an initial framework for restoring affordability to defense. I will be refining this framework over coming weeks, in full consultation with you, with industry, with Congress, and with outside experts and leaders. I plan to issue a final version of this mandate later this summer.

Realizing the objective of this initiative will be a formidable endeavor. But it is imperative. Secretary Gates, Deputy Secretary Lynn, and I have concluded that we cannot support our troops with the capabilities they need unless we achieve greater efficiency.

Ashton B. Carter

Objectives

- Deliver the warfighting capability we need for the dollars we have
- Get better buying power for warfighter and taxpayer
- Restore affordability to defense goods and services
- Improve defense industry productivity
- Remove government impediments to leanness
- Avoid program turbulence
- Maintain a vibrant and financially healthy defense industry

Obtain 2-3% net annual growth in warfighting capabilities without commensurate budget increase by identifying and eliminating unproductive or low-value-added overhead and transfer savings to warfighting capabilities. Do more without more.

Providing Incentives for Greater Efficiency in Industry

- **LEVERAGING REAL COMPETITION:** Avoid directed buys and other substitutes for real competition. Use technical data packages and open systems architectures to support a continuous competitive environment.
- **USING PROPER CONTRACT TYPE FOR DEVELOPMENT AND PROCUREMENT:** Phase out award-fee contracts and favor fixed-price o cost-type incentive contracts in which government and industry share equally in overruns and underruns, and overruns have analytically-based caps. Use cost-reimbursement contracts only when either government requirements or industry processes cannot be adequately specified to support pricing. Adjust sole-source fixed-price contracts over time to reflect realized costs. Work down undefinitized contract actions. Seek authority for multi-year contracts where significant savings are possible.
- **USING PROPER CONTRACT TYPE FOR SERVICES:** Phase out Time and Material and sole-source ID/IQ contracts wherever possible. Utilize fixed-price performance-based contracts when requirements are firm and can be measured, with payments tied to performance. Utilize fixed-price level of effort or cost-plus-fixed-fee contracts (with profit/fee tied to weighted guidelines) when requirements are still being defined. Award fees should be used only by exception. Maximize the use of multiple-source, continuously competitive contracts.
- **ALIGNING POLICY ON PROFIT AND FEE TO CIRCUMSTANCE:** Align opportunity to earn profits/fees to both value to the taxpayer and risk to the contractor. Apply weighted guidelines to profit/fee levels. Reward higher productivity with higher profits. Incentivize investment i innovation.
- **SHARING THE BENEFITS OF CASH FLOW:** Ensure that taxpayers receive adequate consideration (price reductions) for improved cash flows. Progress payments must reflect performance but can be increased above customary levels in return for consideration by the contractor. Reduce over time the gap between proposed and actual rates in forward price rate agreements.
- **TARGETING NON-VALUE-ADDED COSTS:** Identify and eliminate non-value-added overhead and G&A charged to contracts. Limit fees fo subcontractor management to reflect actual value provided (risk assumed by prime and continuous subcontractor risk reduction). Limit B&P allowable costs in sole source contracts and encourage effective use of IRAD.
- **INVOLVING DYNAMIC SMALL BUSINESS IN DEFENSE:** When establishing multiple award contracts for services, make every effort to provide for small business participation. If at least two small businesses are deemed capable of performing on such a contract, consider setting aside that work for competition among them.
- **REWARDING EXCELLENT SUPPLIERS:** Emulate the Navy's pilot program to provide special benefits to consistently excellent industrial performers.

Adopting Government Practices that Encourage Efficiency

- **ADOPTING "SHOULD-COST" AND "WILL-COST" MANAGEMENT:** Use historically informed independent cost estimation ("will-cost" estimates) to inform managing of programs to cost objectives ("should-cost" estimates).
- **STRENGTHENING THE ACQUISITION WORKFORCE:** Achieve SECDEF goal of adding to government acquisition workforce with increased skill levels. Leverage unique qualities of non-profit FFRDCs and UARCs to augment acquisition workforce capability.
- **IMPROVING AUDITS:** Improve consistency and quality of government audits, and focus them on value-added content.
- **MANDATING AFFORDABILITY AS A REQUIREMENT:** In new programs such as the SSBN-X nuclear missile submarine, the Presidential Helicopter, the Ground Combat Vehicle, and the Air Force/Navy Long Range Strike Family of Systems, cost considerations must shape requirements and design.
- **STABILIZING PRODUCTION RATES:** To ensure more programs are in stable, economically favorable rates of production and avoid cost escalation, program managers may not adjust production rates downward without head of component authority.
- **ELIMINATING REDUNDANCY WITHIN WARFIGHTING PORTFOLIOS:** Emulate the Army's Precision Fires Capability Portfolio approach to identify where multiple programs are pursuing similar objectives.
- **ESTABLISHING SENIOR MANAGERS FOR PROCUREMENT OF SERVICES:** Follow the Air Force lead in establishing a Program Executive Officer for services in each DOD component to focus on improving policy and practice in this high-dollar-value area.
- **PROTECTING THE TECHNOLOGY BASE:** Protect the future by sustaining investment while focusing on high value-added work.

DEPARTMENT OF THE ARMY
OFFICE OF THE ASSISTANT SECRETARY OF THE ARMY
ACQUISITION LOGISTICS AND TECHNOLOGY
103 ARMY PENTAGON
WASHINGTON DC 20310-0103

SFAE-CDD

JUL 8 2010

MEMORANDUM FOR SEE DISTRIBUTION

SUBJECT: Director, Army Acquisition Corps Guidance Memorandum #6

1. Section 852 of the 2008 National Defense Authorization Act, Public Law No. 110-181, directed the establishment of the Defense Acquisition Workforce Development Fund (DAWDF). This fund enables the Department of Defense to recruit and hire; develop and train, and recognize and retain its acquisition workforce.

2. The DAWDF provides the Army an unprecedented opportunity to invest in the health and growth of the Army Acquisition workforce. There are three categories for acquisition workforce initiatives: Training and Development; Retention Programs; and Recruitment Programs.

a. Training and development initiatives support training facility upgrades and acquisition proponent course enhancements which include new curriculum and acquisition workforce tracking technology.

b. Retention incentives often utilize a service commitment to retain civilian Government employees for a specific length of time as well as support training and education programs. These types of programs are a direct investment in our acquisition workforce career development.

c. Recruitment programs allow the Army to hire in order to close the capability gap in shortage acquisition career fields by hiring at each level–Intern, Journeyman, and Highly Qualified Expert (HQE). Other recruitment initiatives include civilian incentive programs and opportunities for recruitment fairs.

3. The Secretary of Defense, on 6 April 2009, announced an initiative to grow the defense acquisition workforce by ~20,000 positions by Fiscal Year 2015 (FY15). This growth consists of in-sourcing ~10,000 positions and hiring ~ 10,000 new acquisition workforce members Service-wide. As a result, by FY15, the Army will have in-sourced over 3,200 positions and hired 1,885 new Government acquisition civilian personnel to meet the Secretary of Defense goal.

4. An Army Acquisition Workforce Growth Taskforce was established in January 2010 to capture specific organization input and acquisition career field designation with regard to the new hires for FY11-15. The taskforce findings

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SUBJECT: Director, Army Acquisition Corps Guidance Memorandum #6

directly address the Secretary of Defense new hire initiative for Army acquisition workforce growth and provide the strategy, by Army command/acquisition organization, acquisition career field, and FY for hire.

5. The DAWDF became the funding mechanism to "prime the pump" with regard to the new hire initiative. The taskforce-approved requirements for Intern and Journeyman level new hires will receive Section 852 funding for at least two-years of salary dollars, and HQE hires will receive one-year of salary dollars. Sustainment of these new hires will be addressed in an overall acquisition workforce growth concept plan.

6. I serve as the Principal Agent of the Section 852 DAWDF. I have delegated authority for management and execution of the DAWDF to the Deputy Director for Acquisition Career Management (DDACM). The DDACM has developed an operating guide that provides details for every Army Acquisition, Logistics and Technology organization for use of the DAWDF.

7. Currently, all requests for DAWDF funds are in response to a data call from the DDACM. Organizations must submit requirements following the operating guidance. Accurate spend plans are key to executing Section 852 funding in a timely manner. The DDACM will conduct monthly reviews of submitted and approved spend plans to review the status of expenditures. Senior level quarterly reviews (at ASA(ALT) and other organizations) will be held to identify and, if necessary, re-distribute under-executed funds. It is crucial that organizations receiving Section 852 funds immediately obligate and disburse funding in accordance with approved spend plans.

8. Details regarding Section 852 can be found at the following website: http://asc.army.mil/career/programs/852/default.cfm.

9. The point of contact is Ms. Joan L. Sable, commercial (703) 805-1243, DSN 655-1243, or e-mail: joan.l.sable@us.army.mil.

Team,
This is an important program and key to our growth. The acquisition workforce initiatives. I expect that we will take full advantage of this resource!
v/r
Bill

William N. Phillips

WILLIAM N. PHILLIPS
Lieutenant General, GS
Director, Army Acquisition Corps

2

Contracting Community Highlights

In keeping with the 50th anniversary theme of this issue of *Army AL&T* Magazine and the showcasing of evolutionary weapon technological capability through the years, I want to address some significant changes to the contracting mission. Technology evolution traditionally builds on previous capability, with each subsequent generation (upgrade) a natural progression to enhancement. Changes to contracting, however, are neither progressive nor sequential. They are often an abrupt change in statute, policy, regulation, and clause, which must be immediately interpreted and implemented by the contracting officer (KO) and specialist, and then articulated to the industrial and vendor base.

We have been, and continue to be, under a microscope on contracting. Specifically, during the past 2 years we have received guidance from, or have had to justify our contracting actions to:

- The President of the United States.
- Commission on Wartime Contracting (COWC).
- Office of Management and Budget (OMB).
- Congress.
- DOD Task Force on COWC.
- DOD Inspector General (IG).
- Department of Army IG.
- Special IG for Afghanistan Reconstruction.
- Special IG for Iraq Reconstruction.
- U.S. Army Audit Agency.
- Panel on Contracting Integrity.
- Commission on Army Acquisition and Program Management in Expeditionary Operations (Gansler Commission).

The President issued guidance on March 4, 2009, requiring greater emphasis on competition, the minimal use of no-bid contracts, and stipulations that the government will not engage in noncompetitive contracts without full justification. This memo marks the first time we received language from an administration regarding the proper mix of contractors and civilians in the federal workforce and the potential problem of inherently governmental duties being performed by contractors. Further, we must now clarify when government outsourcing for services is, and is not, appropriate.

OMB issued implementing guidance on the President's letter for Phase I on July 29, 2009, and for Phase II on Oct. 27, 2009. Phase I requires a 7-percent savings to baseline contract spending by the end of FY11 and a 10-percent reduction in the share of dollars obligated in FY10 for new contract actions. The administration set a net savings target of $40 billion a year; each agency must develop a plan to save 3.5 percent in FY10 and an additional 3.5 percent in FY11.

Phase II provided implementing guidelines for increasing competition and structuring contracts, listing three questions with accompanying considerations to specifically address the questions during the contract pre- and/or post-award phases.

Another significant change in recent years is the *Weapon Systems Acquisition Reform Act* (*WSARA*), signed into law May 22, 2009, which contains many initiatives affecting the acquisition community (see related article on Page 64). Of special interest to contracting professionals is the provision addressing organizational conflicts of interest (OCI). The *WSARA* requires the Secretary of Defense (SECDEF) to revise the *Defense Federal Acquisition Regulation Supplement* (*DFARS*) to provide "uniform guidance and tighten existing requirements for OCI by contractors in major defense acquisition programs."

The SECDEF was directed to consider recommendations from two sources: the DOD Panel on Contracting Integrity and a similar ongoing study by the Office of Federal Procurement Policy.

Recommendations from the Panel on Contracting Integrity addressed actions that program executive officers and program managers must take. Their recommendations for KOs require that offerors fully disclose all contracts and subcontracts they perform in support of an agency or organization whose requirements are being solicited for proposals; that OCI determination is made before awarding each contract and task order; and that annual OCI training occurs. The *Defense Acquisition Regulations* Council has drafted a proposed rule to the *DFARS* that is being reviewed by the appropriate regulatory offices within OMB.

Army contracting professionals are well trained and flexible. They react quickly to implement any mandated change. We keep ourselves apprised of the latest rulings and policies to maintain that professional edge. What will not change, however, are the values, integrity, and commitment we bring to the job as we continue to serve those who serve.

Edward M. Harrington
Deputy Assistant Secretary of the Army for Procurement

Defense Acquisition Regulations Council Corner

Ann Budd

On May 22, 2009, the *Weapon Systems Acquisition Reform Act* (*WSARA*) *of 2009* was signed into law. Two sections of this act—Section 202, *Acquisition Strategies to Ensure Competition Throughout the Lifecycle of Major Defense Acquisition Programs*, and Section 207, *Organizational Conflicts of Interest in Major Defense Acquisition Programs*—required the initiation of two *Defense Federal Acquisition Regulation Supplement* (*DFARS*) cases.

DFARS Case 2009-D014 was initiated to implement Section 202 of the *WSARA*. This section directed the Secretary of Defense (SECDEF) to ensure that the acquisition strategy for each major defense acquisition program (MDAP) included measures to ensure competition at both the prime contract and subcontract levels of the program throughout its life cycle, as a means to improve contractor performance; and adequate documentation of the rationale for selecting the subcontractor tier or tiers. It also outlined the measures to ensure such competition. Furthermore, it required the SECDEF to take specific actions to ensure fair and objective "make-buy" decisions by prime contractors on MDAPs. Whenever a decision regarding the source of repair results in a plan to award a contract for performance of maintenance and sustainment of a major weapon system, actions are also required that will ensure that the resulting contract is awarded on a competitive basis with full consideration of all sources.

An interim rule was prepared with a request for comments. It outlined a new *DFARS* Subpart 207.106, *Additional requirements for major systems*. The rule was published in the *Federal Register* (*FR*) on Feb. 24, 2010, with public comments requested by April 26, 2010. Since no public comments were received, the *Defense Acquisition Regulations* (*DAR*) Council approved conversion of the interim rule to a final rule without change. The final rule was published Sept. 8, 2010.

The second *DFARS* case, *2009-D015*, was initiated to implement Section 207 of the *WSARA*. It required revisions to the *DFARS* to "provide uniform guidance and [tighten] existing requirements for organizational conflicts of interest by contractors in major defense acquisition programs." The statute specified the minimum requirements to be incorporated into the regulation and required that the case developers consult with the DOD Panel on Contracting Integrity to ensure that its recommendations were considered during the case development. The panel's recommendations were due to the SECDEF within 90 days after the enactment of the *WSARA*.

In addition, review and consideration were required of the findings and recommendations of the Administrator of the Office of Federal Procurement Policy and the Director of the Office of Government Ethics, pursuant to Section 841(b) of the *National Defense Authorization Act for Fiscal Year 2009*, *Review of Federal Acquisition Regulation Relating to Conflicts of Interest*.

This case was published in the *FR* on April 22, 2010, with a request for comments by June 21, 2010. Following receipt of a request from the Aerospace Industries Association to extend the deadline, the date was extended by 30 days. As of late summer 2010, comments were being compiled for submission to the appropriate *DFARS* committee to address. After the *DAR* Council reviews and analyzes the committee case report and the recommendations proposed therein, the council will determine whether the issuance of a final rule is appropriate.

The rules that result from both of the above cases will be published in the *FR* at a future date. To keep abreast of the two *DFARS* cases included in this article, go to **http://www.gpoaccess.gov/fr/index.html** and browse the table of contents daily. The two *DFARS* rules will be published under the *DAR* system.

Ann Budd is assigned to the Office of the Deputy Assistant Secretary of the Army for Procurement by the U.S. Army Contracting Command. She is a DAR Council member. Budd holds a B.S. in business administration from Mary Washington College, an M.B.A. from Strayer University, and an M.S. in national resource strategy from National Defense University. Budd is certified Level III in contracting and Level II in program management, and is a U.S. Army Acquisition Corps member.

AbilityOne Base Supply Center Forges Win-Win Relationship with Fort Detrick Partners

Jack Meikrantz

On June 4, 2009, AbilityOne opened its 136th Base Supply Center (BSC) to serve the Fort Detrick, MD, community. One year later, nearly 20 of the installation's 40-plus "mission partners" are regular customers. "Mission partners" are a specific group of primarily large, on-post organizations and customers that support the U.S. Army Medical Research and Materiel Command (USAMRMC) mission. The AbilityOne store also serves many other Fort Detrick tenants, such as the U.S. Department of Veterans Affairs, the U.S. Department of Homeland Security, and the National Cancer Institute; they are customers, but not mission partners.

Dan Bailey, Director of Federal Sales for IB Milwaukee, is seated with "Phelps." Behind them are the Fort Detrick IB Express Store management team: from left, Assistant Manager George Leary, Manager Tim Selby, and Customer Service Expert Todd Thomas. The AbilityOne Program and the Fort Detrick IB Express Store are driven by their mission of providing jobs for the blind and severely disabled. (U.S. Army photo by Larry Sorcher, Fort Detrick Directorate of Plans, Training, Mobility, and Security.)

For many, the Industries for the Blind (IB) Express Store has quickly become the "go-to" source for competitively priced office and cleaning supplies, furniture, and personalized customer service. "It's convenient; if they don't have it, they get it faster and cheaper than anyone else—then, they deliver," said Mary Lusby, U.S. Department of Agriculture Purchasing Agent.

"The products are good, competitively priced, and they always make things right," said Eric Lesnow, Chief, Materiel Control Branch, U.S. Army Medical Research Institute of Infectious Diseases, the store's largest customer. "I would support AbilityOne even if it weren't a *Federal Acquisition Regulation* requirement."

Year-One Successes

Asked to assess first-year operations, IB Express Store Manager Tim Selby said, "We've been blessed. We opened our doors with very high expectations, and we've exceeded them all." Selby explained that in-store sales (including calls, faxes, and e-mails) have increased for each of the last 9 months and have substantially exceeded initial sales projections. Internet sales, which were strong even before the store opened, have continued strong, and market penetration (the percentage of mission partners served) is approaching 50 percent.

"These are impressive year-one accomplishments," noted Todd Hobart, Director of BSC East Division, which oversees six BSCs. "They are the direct result of our solution-oriented approach to customer service; store employees' unwavering commitment to AbilityOne's mission of generating gainful employment for visually impaired and severely disabled individuals; the support of the Fort Detrick and Forest Glen, MD, communities; and the steady leadership and support provided by USAMRMC and Fort Detrick Commander MG James K. Gilman, U.S. Army Garrison Commander COL Judith Robinson, and USAMRMC Principal Assistant Responsible for Contracting Dr. Paul Michaels."

The store has seven employees, four of whom are legally blind. One of these employees, Karen Brake, the store's inventory control associate, was the IB Express employee of the month in June. The newest employee is 42-year-old Stacey Goff. Blind since birth, Goff is beginning her first job as a merchandising associate. "She's already a huge contributor," said Selby. Brake and Goff are just two of the more than 43,000 blind and severely disabled Americans employed by the AbilityOne Program.

"Our Fort Detrick customers are driven by their mission of supporting the warfighter," said Dan Bailey, Director of Federal Sales for IB Milwaukee. "They let us know early on that every dollar saved on products and services purchased from AbilityOne is a dollar they can use on research to support the warfighter. Similarly, the AbilityOne Program, and specifically the Post IB Express Store, are driven by their mission of providing jobs for the blind and severely disabled."

"What's neat about the IB Store's relationship with Fort Detrick is that the success of AbilityOne's mission is totally dependent on our ability to meet our customers' needs, not just 'wowing' them with our capabilities and selling them stuff," said Selby. He and his staff have demonstrated that AbilityOne can compete head-to-head against anyone's prices, including the office super stores, and win nine out of 10 times.

Future Expectations

Expectations for next year continue to run high. The 2011 walk-in sales are projected to increase substantially, while AbilityOne maintains current Internet sales levels. Also, the percentage of mission partners served is expected to increase from 50 to 75 percent. AbilityOne Milwaukee is developing a strategy to make this happen with input from Robinson and Michaels. Accomplishing these goals will generate the resources to hire at least two additional visually impaired employees, while increasing Fort Detrick's contribution to AbilityOne's job training and gainful employment programs nationally.

Fort Detrick was also selected to "test drive" the IB Express Mobile Store concept. Designed to save customers time with

on-the-spot sales at the customer's location, the Mobile Store is stocked with more than 125 top-selling products such as toner, writing implements, and paper.

"We expected the IB Express Store-Fort Detrick partnership to be a huge success even before the doors opened," said Hobart. "Fort Detrick has vigorously supported AbilityOne for nearly 10 years via its online e-commerce program. Typically, Internet sales take a big hit when we open a new store. Not only have Fort Detrick's Internet sales remained strong, but Fort Detrick continues to lead all IB Milwaukee BSCs in gross Internet sales, even though many of our BSCs are much larger."

In June, just 1 year after it opened, the Fort Detrick AbilityOne Store was selected by the National Industries for the Blind to be one out of eight cornerstone BSCs, of a total of 136, to be showcased as part of the 15th anniversary celebration of the national BSC program.

AbilityOne History

The AbilityOne Program, formerly the Javits-Wagner-O'Day Program, was established by Congress in 1938. It is the country's largest source of employment for blind and severely disabled individuals. It coordinates the participation of 650 nonprofit agencies throughout the country that hire and train blind and severely disabled Americans to produce many of the products and services purchased by the federal government. The program operates at nearly 1,000 locations nationally, including 136 military bases.

The Fort Detrick IB Express store stocks more than 1,300 "in-demand" products, including office products, cleaning supplies, clothing, and mission-essential items. In addition, mission partners have access to more than 500,000 commercial products and services, ranging from information management and information technology to full "turn-key" furniture solutions, through AbilityOne's network of authorized manufacturers and distributors. Post customers are assured that all purchases from IB Express stores comply with federal procurement regulations.

Additional information about the AbilityOne Program is available at **www.abilityone.gov**. Products and services can be purchased online through AbilityOne's e-commerce program at **www.basesupply.com**.

Jack Meikrantz is a Business Development Specialist at the U.S. Army Medical Research Acquisition Activity, Business Oversight Branch, Fort Detrick. He holds a B.A. in business administration and accounting from Lycoming College.

Contracting Lessons Learned and Used During Haiti Deployment

Larry D. McCaskill

Members of the U.S. Army Expeditionary Contracting Command (ECC) nullified potential problems during their contingency deployment to *Operation Unified Response*, the Haiti humanitarian assistance disaster relief mission that ended June 1, 2010.

The first ECC Soldier arrived in Haiti within 48 hours after the devastating 7.0 earthquake rocked the country on Jan. 12, 2010. The deployment provided opportunities to use lessons learned from previous military deployments, as well as to capture new ones.

During *Operation Unified Response*, ECC contracted for supplies, services, and equipment for military and federal responders, as well as Haitians affected by the earthquake. At one point, ECC helped to supply and deliver more than 15 million meals to the Haitian population within 10 days, establishing distribution points for families to receive 25- and 30-pound bags of rice, beans, and cooking oil. ECC contracting efforts also helped turn dangerous rudimentary shelters into areas with safer tents where water and meals were delivered on a routine basis. By the end of the mission, ECC had created more than 380 contracting actions valued at almost $12 million.

"We took advantage of a lot of lessons learned from previous deployments," said BG Joseph L. Bass, Commander, ECC. "We didn't do these types of things early on in *Operations Enduring* and *Iraqi Freedom*. However, we learned those lessons and brought these capabilities to Haiti early on. We were very proactive from the beginning, deploying the right personnel mix needed to provide quality assurance, legal, policy, and other

During *Operation Unified Response*, ECC contracted for supplies, services, and equipment for military and federal responders, as well as Haitians affected by the earthquake. (U.S. Army photo.)

areas of expertise where we could address issues on the front end rather than after they've been done."

Bass said actions such as establishing contracting reachback support stateside, bringing in logistics civil augmentation program planners in the early stages, and working with units to establish coalition and joint acquisition review boards were based on lessons from previous military deployments to Iraq and Afghanistan.

The concept of reaching back to contracting centers away from the Area of Operations was first used to support operations in Kuwait, Iraq, and Afghanistan. The Rock Island Contracting Center (RICC), IL, provided support on an on-call basis rather than as an active participant. This allowed contingency contracting officers (CCOs) to concentrate on immediate onsite requirements, leaving complex actions for the RICC.

"Learning from the past helped us deploy quicker and smarter," Bass said. "Just as we gathered lessoned learned from previous deployments, we have gathered some from the Haiti deployment that should help us the next time we have to deploy."

Further Improvements Identified

During the Haiti deployment, contracting officers (KOs) identified areas where challenges still existed, even as they responded to a host of immediate needs. "This is the first time the command has been involved in a disaster relief effort of this magnitude," said John Hess, ECC, Principal Assistant to the Director, Mission Operations. The Joint Task Force-Haiti Regional Contracting Center developed contracts for latrine services; water; support to current facilities; vehicles; and other assets needed by military personnel supporting the relief effort.

As CCOs arrived in Haiti, they relied heavily on outside units and agencies for basic life support services. The immediate mission for the contracting Soldiers was obtaining the supplies and services needed by those providing the direct assistance to the Haitian people.

"The lack or limitation of resources within country, and the speed in which contracting requirements came in for action and award, was a challenge," said LTC Lynda Royse, 410th Contracting Support Brigade.

"As with any disaster type-relief operation, there were immediate needs-type items," Royse said. "As they [Combined Joint Task Force-Haiti responders] were planning, they were coming in with requirements needing a quick turnaround, usually for the next day."

To ease the initial burden, ECC developed prepositioned deployable equipment packages for its contracting teams as part of an early-entry equipment capability.

Building upon lessons learned, it was determined that a contract review threshold should be established early to allow CCOs to adjust to the administrative requirements of contracting operations in a deployed environment. This would also allow oversight, management control, and quality control of high-dollar contract actions.

In addition, it was evident that the decision to issue a contracting warrant should be based upon the CCO's experience level. The fact that the simplified acquisition threshold increases from $100,000 to $1 million during a declared contingency operation does not mean that all CCOs should be issued a $1 million warrant. Warrants should be issued based upon a CCO's contracting experience and the dollar size of actions needed to meet the mission. The bottom line: it takes time to train KOs and for them to gain experience.

Bass would also like to improve the ECC's reachback capabilities by creating standardized reachback support for contingency operations. "We're looking into the possibility of establishing a reachback center of excellence for global contingencies that would include creating points of contact [POCs] aligned regionally with the combatant command and the contracting support brigades," Bass said. "There's a lot more to it, including integrating the reachback POC into our training events and exercises, creating a logistics planning team for contracting, and providing assistance for immediate and/or complex requirements.

"Moving forward means reviewing what we've done and how we have done it in the past, then reviewing it again and constantly using those lessons to better ourselves with each new challenge," Bass concluded.

Larry D. McCaskill is a U.S. Army Contracting Command Public Affairs Specialist. He holds an A.A. in liberal arts from Queensborough Community College and has attended numerous military schools, including the Defense Information School.

Unit Readiness Means Train and Train Some More

MAJ Thomas Lutz

The Commission on Wartime Contracting indicated in a 2009 interim report that there was an inadequate number of trained contracting officer's representatives (CORs) assigned to contractor oversight in Iraq and Afghanistan. In response to that report, the 413th Contracting Support Brigade (CSB), Fort Shafter, HI, a subordinate command of the U.S. Army Expeditionary Contracting Command, is doing its part to

ensure that deploying units go into theater with initial COR training. Additional specialized training unique to the COR's assigned contracts is accomplished in-theater, enabling the COR to effectively oversee contractor performance.

Professional Development

The 413th CSB ended the second quarter of 2010 focusing on the professional development of contingency contracting officers (CCOs). The quarterly training is based on three tenets: contracting, leader development, and warrior development.

COL Michael Hoskin, 413th CSB Commander, kicked off the training with an Army contracting transformation update and lessons learned from contracting and reconstruction in a wartime environment. Other specific contracting-related tasks involved a detailed focus on predeployment advance echelon operations, market research, and COR program training.

The brigade benefited from joint training opportunities with participation from the U.S. Air Force's 15th Contracting Support Squadron, Joint Base Pearl Harbor-Hickam, HI, and the 1950th Contingency Contracting Team (CCT) of the Hawaii Army National Guard.

Predeployment Training

The standards of conducting mission analysis, identifying requirements for deployment, and effectively preparing oneself and equipment for deployment helped CCOs provide immediate contracting support upon arrival in theater. In situations or exercises that allowed for site surveys and advanced liaison requirements, CCOs learned market research techniques to help them become better business advisors while conducting contracting support to tactical and operational forces.

Training CORs is one of the contracting officer's many responsibilities to ensure the oversight of contractor performance. The COR training re-emphasized the critical skills that units nominating CORs must consider, including the technical aspects, monitoring frequency, and monetary value of the requirement, to ensure that the COR's subject matter expertise and availability are commensurate with these factors.

The joint training provided substantial value as CCOs from different services participated in an open forum panel that provided newly assessed contracting Soldiers with feedback from CCOs who had multiple years of experience. More than 30 percent of the CCOs assigned to the 413th CSB have less than 6 months' contracting experience, making the discussion and the rest of the training even more essential.

Tools and Topics

Throughout these classes, significant emphasis was placed on using *Contingency Contracting: A Joint Handbook for the 21st Century*. The handbook, a key training component and valuable resource, contains task checklists, training, templates, resources, tools, and other information essential for meeting the challenges faced by CCOs, regardless of mission or environment.

Combined training prepares CCOs to provide the best support possible to deployed forces. Here, 413th CSB Soldiers CPT Michael Deems (left) and MAJ Isaac Torres maneuver over the reverse climbing obstacle during training at Bellows Air Force Station, Waimanalo, Oahu, HI. (U.S. Army photo.)

For leadership development, Hoskin reviewed manning and leadership opportunities for CCO career progression. SSG Artenillo Gutierrez, a CCO with the 617th CCT, Schofield Barracks, HI, emphasized the noncommissioned officer's role. The brigade also used this training to ensure that every CCO understood the brigade mission-essential task list, operational mission, contingency support, exercise support, and the way ahead to achieve fully operational capability status.

Completing warrior task training requirements was another focus of CCO professional development. This quarter's focus was training Soldiers on movement through an urban area, hand and arm signals, and room clearing. Additionally, all Soldiers participated in combatives training and a 13-station obstacle course.

The training concluded with an after-action review and an in-depth focus of CCO skills referred to as a "deep dive," to maximize future opportunities that lend themselves well to collective training. Topics such as government purchase card, unauthorized commitments, and sole-source justifications will be featured in future scenario-based training.

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ALTESS News

Continual Service Improvement Supports the Customer and the Soldier

Iman Shebaro and Charles Smith

Efficiency and standardized practices are essential for any organization. For Product Director Acquisition, Logistics, and Technology Enterprise Systems and Services (PD ALTESS), they are also essential to the customers. PD ALTESS provides the Army acquisition community and hosted customers with full life-cycle information technology (IT) support in a secure environment. Inherent to the fulfillment of that mission is customer satisfaction. The Information Technology Infrastructure Library (ITIL) approaches services from the perspective of the customer and the value delivered.

In addition to its focus on the customer, PD ALTESS must approach services from the perspective of the Soldier. The products and services used by the warfighter require efficient planning, deployment, and support. The ITIL framework recognizes the importance and attainability of this efficiency. PD ALTESS' adoption of ITIL and an IT Service Management (ITSM) Program has been essential to the execution of its mission and its support of the Soldier.

PD ALTESS must approach services from the perspective of the Soldier, as the products and services used by the warfighter require efficient planning, deployment, and support. Here, Soldiers of the 30th Heavy Brigade Combat Team, 1st Cavalry Division, acquire a grid coordinate for a suspected improvised explosive device during a search near Combat Outpost Meade, Baghdad, Iraq, Dec. 5, 2009. (U.S. Army photo by PFC Benjamin Boren.)

ITIL is a best-practice set of processes that establishes a framework for aligning people, resources, processes, and technology to create a superior level of service. PD ALTESS' ITSM actively implements ITIL across the organization.

PD ALTESS implemented ITIL in 2007 to standardize its business practices. Implementation was accomplished via a "Quick Wins" initiative. A series of small teams were formed to identify organizational pain points and develop initial measures to mitigate them. During the Quick Wins initiative, 11 teams were established to focus on processes throughout the ITIL life cycle and how they could be implemented within the organization. These processes included, but were not limited to, Capacity Management, Change Management, and Incident Management. This initiative was a steppingstone toward mature ITIL development and a formal ITSM.

ITSM now includes Process Managers who represent teams throughout the organization and guide the development and application of specific ITIL processes, supporting these throughout the service life cycle. They meet regularly to discuss improvement opportunities and to leverage ITSM advancements.

Keeping the Focus on the Customer

ITIL processes standardize the way business is conducted. By facilitating communication and cooperation among team members, PD ALTESS sustains a customer-focused culture. Below are some of the major benefits that the most mature ITIL processes at PD ALTESS have provided to the organization and its customers:

- Incident Management has instituted a Single Point of Contact, which provides customers with a centralized location for all issues, concerns, and requests. Incident Management has also standardized the recording, classification, and resolution of incidents.
- Using Problem Management, PD ALTESS identifies the underlying problems behind recurring incidents and resolves them using problem investigations and root-cause analysis.
- Change Management has instituted the coordination and control of changes, ranging from those as simple as resetting passwords and rebooting a server to more complex actions such as creating a new server and upgrading a system. All changes are categorized according to type, based on the risk of executing the change; the impact to the affected users; and the amount of time, resources, and effort required to implement the change. Changes occurring on an enterprise level are communicated across the organization and presented before the

Change Advisory Board. Communication of change activities between teams prevents conflicts of time and resources, thus providing customers a more reliable level of service.
- Service-Level Management has created robust relationships between PD ALTESS and its customers. Service-Level Agreements are created in concert with the customer; PD ALTESS Service-Level Coordinators identify each party's needs and responsibilities.

Continual Service Improvement

As part of the ITIL life-cycle framework, PD ALTESS has also developed a robust and ongoing Continual Service Improvement (CSI) initiative that identifies improvement needs. CSI allows PD ALTESS to determine where the organization is, where it wants to go, and—the top priority—how it will get there.

A recent CSI effort is PD ALTESS' revised Change Management process. Through feedback and analysis, the ITSM Program staff determined that the initial Change Management process, used throughout the organization, relied too heavily on "oral history." Information was passed along by word of mouth instead of being properly documented.

The initial process also relied on a culture of individuals acting as heroes to accomplish tasks. Change types were not clearly defined, and the organization lacked a central repository for change requests. Further, Team Leads and Service-Level Coordinators did not receive notifications for changes affecting their teams or customers.

After identifying these deficiencies in the Change Management process, the ITSM staff developed improvements. To ensure support and ownership across the organization, PD ALTESS leadership at all levels was included in the design of the improved process prior to its deployment.

PD ALTESS selected the BMC Remedy Change Management application, by BMC Software, to automate the change process and to serve as the organization's central repository for changes. As a result, communication among teams became more efficient. The workflows of the Change Management process were also modified and automated in BMC Remedy to include a new step requiring Team Lead approval, as well as notification to the Service-Level Management Team for changes affecting customers.

The revised Change Management process also introduced a Forward Schedule of Change (FSC) calendar, which provides a central location for information on upcoming business events, releases, and other activities. The FSC enables PD ALTESS to raise the awareness of change and release activities taking place throughout the organization. In doing so, the FSC improves interorganizational communication and reduces scheduling conflicts. The FSC is coordinated by a dedicated Master Scheduler, a role introduced in connection with the revised Change Management process. Collaborating with the Change Initiator, the Master Scheduler sets the scheduled start and end dates for each proposed change to avert potential conflicts.

Once the design of the revised Change Management process was complete and it was added to the CSI communication plan, training on the revised process was provided to meet each team's specific needs and concerns.

Overall, PD ALTESS' ITSM, coupled with its institutionalized ITIL processes, has created quick wins for the organization and its team members. Adopting ITIL processes has also created benefits that will be realized for years to come.

These efforts have effectively "broken down the silos" between PD ALTESS teams. Each team now shares a common organizational goal: to provide value-added service to customers and, ultimately, to the Soldier.

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United States Postal Service

Statement of Ownership, Management, and Circulation

1. Publication Title	2. Publication Number	3. Filing Date
Army AL&T Magazine	0 8 9 2 . 8 6 5 7	August 26, 2010
4. Issue Frequency	**5. Number of Issues Published Annually**	**6. Annual Subscription Price**
Quarterly	4	$21.00 domestic; $29.40 foreign

7. Complete Mailing Address of Known Office of Publication *(Not printer) (Street, city, county, state, and ZIP+4)*
DEPARTMENT OF THE ARMY, ARMY AL&T, 9900 BELVOIR RD SUITE 101
FORT BELVOIR, VA 22060

Contact Person: Margaret C. Roth
Telephone: (703) 805-1034

8. Complete Mailing Address of Headquarters or General Business Office of Publisher *(Not printer)*
DEPARTMENT OF THE ARMY, ARMY AL&T, 9900 BELVOIR RD SUITE 101
FORT BELVOIR, VA 22060

9. Full Names and Complete Mailing Addresses of Publisher, Editor, and Managing Editor *(Do not leave blank)*

Publisher *(Name and complete mailing address)*
U.S. ARMY ACQUISITION SUPPORT CENTER, 9900 BELVOIR RD SUITE 101
FORT BELVOIR, VA 22060

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10. Owner *(Do not leave blank. If the publication is owned by a corporation, give the name and address of the corporation immediately followed by the names and addresses of all stockholders owning or holding 1 percent or more of the total amount of stock. If not owned by a corporation, give the names and addresses of the individual owners. If owned by a partnership or other unincorporated firm, give its name and address as well as those of each individual owner. If the publication is published by a nonprofit organization, give its name and address.)*

Full Name	Complete Mailing Address
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THE ARMY FOR ACQUISITION, LOGISTICS	WASHINGTON, DC 20310-0103
AND TECHNOLOGY	

11. Known Bondholders, Mortgagees, and Other Security Holders Owning or Holding 1 Percent or More of Total Amount of Bonds, Mortgages, or Other Securities. If none, check box → ☑ None

Full Name	Complete Mailing Address
N/A	

12. Tax Status *(For completion by nonprofit organizations authorized to mail at nonprofit rates) (Check one)*
The purpose, function, and nonprofit status of this organization and the exempt status for federal income tax purposes:
☐ Has Not Changed During Preceding 12 Months
☐ Has Changed During Preceding 12 Months *(Publisher must submit explanation of change with this statement)*

PS Form **3526,** October 1999 *(See Instructions on Reverse)*

13. Publication Title: Army AL&T Magazine	14. Issue Date for Circulation Data Below: July-September 2010	
15. Extent and Nature of Circulation	**Average No. Copies Each Issue During Preceding 12 Months**	**No. Copies of Single Issue Published Nearest to Filing Date**
a. Total Number of Copies *(Net press run)*	6,442	5,536
b. Paid and/or Requested Circulation (1) Paid/Requested Outside-County Mail Subscriptions Stated on Form 3541. *(Include advertiser's proof and exchange copies)*	150	150
(2) Paid In-County Subscriptions Stated on Form 3541 *(Include advertiser's proof and exchange copies)*		
(3) Sales Through Dealers and Carriers, Street Vendors, Counter Sales, and Other Non-USPS Paid Distribution		
(4) Other Classes Mailed Through the USPS		
c. Total Paid and/or Requested Circulation *(Sum of 15b. (1), (2),(3),and (4))*	150	150
d. Free Distribution by Mail *(Samples, complimentary, and other free)* (1) Outside-County as Stated on Form 3541	5,594	5,056
(2) In-County as Stated on Form 3541		
(3) Other Classes Mailed Through the USPS		
e. Free Distribution Outside the Mail *(Carriers or other means)*	625	300
f. Total Free Distribution *(Sum of 15d. and 15e.)*	6,219	5,356
g. Total Distribution *(Sum of 15c. and 15f)*	6,369	5,506
h. Copies not Distributed	73	30
i. Total *(Sum of 15g. and h.)*	6,442	5,536
j. Percent Paid and/or Requested Circulation *(15c. divided by 15g. times 100)*	2.36	2.70

16. Publication of Statement of Ownership
☑ Publication required. Will be printed in the Oct-Dec 2010 issue of this publication. ☐ Publication not required.

17. Signature and Title of Editor, Publisher, Business Manager, or Owner: MARGARET C. ROTH, EDITOR-IN-CHIEF — Date: 26 AUG 10

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Fort Belvoir, VA 22060-5567

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ARMY ACQUISITION, LOGISTICS & TECHNOLOGY
ISSN 0892-8657

DEPARTMENT OF THE ARMY
ARMY AL&T
9900 BELVOIR RD SUITE 101
FT BELVOIR, VA 22060-5567

http://asc.army.mil

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- **Integrated Waveforms Will Bring Battle Command to the Soldier Level**
- ***Operation Enduring Freedom* Camouflage Pattern: A Rapid Response to a Complex Need**
- **Army's Newest Helicopter Blends Aviation Traditions with Innovation**

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