ARMY
AL&T

The Life Cycle Management Commands — Providing the Capabilities Soldiers Need Now

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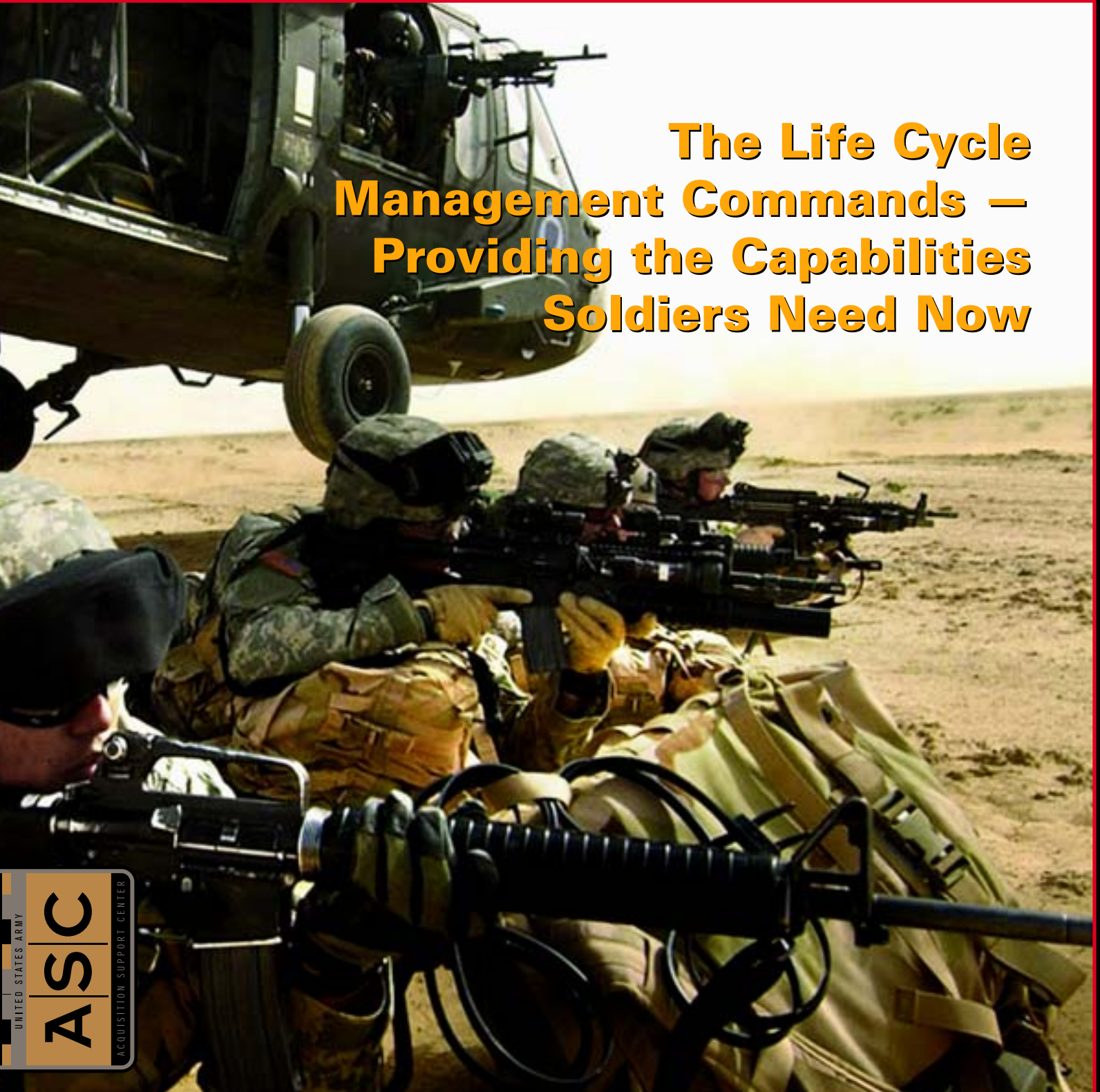
The LCMCs — Providing Better Capabilities and Support to Our Soldiers

It is imperative that we continue to provide products to the Soldier faster, make good products even better, minimize life-cycle costs and enhance the synergy and effectiveness of our Army's acquisition, logistics and technology community. It is our job to work constantly to provide much better capability to the Soldier as quickly as possible. As you will read in this edition, that is what our Life Cycle Management Commands (LCMCs) are all about. We are making significant progress.

Our Soldiers continue to serve magnificently as we enter the fifth year of the global war on terrorism. In Iraq and Afghanistan, they are consistently defeating the enemy. They have created the conditions to permit free, democratic elections and to reconstruct vital infrastructure and institutions. Our Soldiers are making enormous contributions and sacrifices, and our Nation must remain committed to them by providing the capabilities and support they need to succeed in their mission.

Protecting our Soldiers continues to be our highest priority. With great support from Congress, the Department of Defense and the President, we have accomplished the following:

- The Army, along with our industry partners, has fielded more than 750,000 sets of Individual Body Armor worldwide. Fielding to deployed Soldiers is complete.
- The Army, with industry, is fielding an enhanced version of Small Arms Protective Inserts that will provide increased ballistic protection to our Soldiers.
- The Army, with industry, has provided more than 36,000 armored wheeled vehicles to the area of operations, more than 11,000 Up-Armored Humvees and more than 25,000 trucks with factory-designed and manufactured armor kits.
- Through the Rapid Fielding Initiative, the Army has issued 600,000 sets of commercial-off-the-shelf technology to provide Soldiers increased survivability (Advanced Combat Helmet), lethality (improved carbine optics) and mobility (kneepads) capabilities. This program provides 19 force protection items for our Soldiers and other items that are critical to their success.
- The Army also has the Rapid Equipping Force (REF) to better protect our Soldiers. REF works in partnership with industry, academic and military leaders to support Soldier needs as quickly as possible.
- The Army has fielded roughly 1,400 Strykers to newly formed Brigade Combat Teams and deployed them in support of *Operations Enduring* and *Iraqi Freedom*. Strykers continue to maintain a superb operational ready rate. More than 5 million miles have been driven by the first two deployed Stryker Brigades.

It is important that we maintain full funding support for equipment modernization programs to accelerate state-of-the-art force protection systems and weapons to our Soldiers. That is one of the chief reasons why successful transformation of the business end of the Army is essential to the long-term health of the Army and its Soldiers. With initiatives similar to our LCMCs, we are achieving greater efficiencies, improving quality, decreasing cycle time and reducing cost.

Keep up the good work!

Claude M. Bolton Jr.
Army Acquisition Executive

ACQUISITION, LOGISTICS & TECHNOLOGY

ARMY AL&T

April - June 2006

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ARMY AL&T

ACQUISITION, LOGISTICS & TECHNOLOGY

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Features

2006 U.S. Army AL&T Senior Leaders Conference

The 2006 U.S. Army Acquisition, Logistics and Technology (AL&T) Senior Leaders Conference will be held Aug. 14-17, 2006, in Norfolk, VA. The conference is hosted by Claude M. Bolton Jr., Army Acquisition Executive (AAE)/Assistant Secretary of the Army for Acquisition, Logistics and Technology, and GEN Benjamin S. Griffin, Commanding General, U.S. Army Materiel Command (AMC).

The conference's primary purpose is to enable the AAE, senior Army acquisition leaders and AMC leaders to communicate directly with Life Cycle Management Command (LCMCs) Commanders, program executive officers (PEOs), program/project and product managers (PMs), and acquisition directors to discuss new acquisition direction, transformational change, guidance and policies. This year's conference theme is "One Force, One Vision, One Network." This theme emphasizes net-centric systems of various natures, including acquisition, technology, logistics and human networks. The 2006 conference highlights the criticality of networks in preparing our warriors for full-spectrum combat operations.

The conference will include more than 400 invited Army senior acquisition leaders, LCMC Commanders, PEOs, command selected PMs, AMC command staff and major subordinate command commanders, and selected members of the Army's senior leadership who manage several billion dollars in acquisition programs and weapon systems management. General Officers and Senior Executive Service members are attending "by invitation only."

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This medium is approved for official dissemination of material designed to keep individuals within the Army knowledgeable of current and emerging developments within their areas of expertise for the purpose of enhancing their professional development.

By order of the Secretary of the Army

PETER J. SCHOOMAKER
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0612904

The Army's Life Cycle Management Initiative

On Aug. 2, 2004, Army Acquisition Executive (AAE)/Assistant Secretary of the Army for Acquisition, Logistics and Technology (ASAALT) Claude M. Bolton Jr. and U.S. Army Materiel Command (AMC) Commanding General Paul J. Kern signed a historic Memorandum of Agreement formally establishing the Army's Life Cycle Management (LCM) initiative. The initiative's objective was to create a synergy that would enhance the efficiency and effectiveness of the Army's Acquisition, Logistics and Technology (AL&T) Workforce in delivering better products and capabilities to our Soldiers faster, while also minimizing total life-cycle cost across an entire grouping of systems.

The LCM initiative's intent was to integrate significant elements of AL&T leadership responsibilities and authority to enable a closer working relationship between AMC and the program executive offices (PEOs). Since its inception, the LCM initiative has provided an integrated, holistic approach to product development and system support across the Army. This edition of *Army AL&T* Magazine will take you inside the Army's Life Cycle Management Commands (LCMCs) and provide you a unique "top-line" perspective from the AAE's and LCMC commanders' points of view.

Four LCMCs have been established to align AMC's systems-oriented major subordinate commands with the PEOs to create the synergy that meets the overall LCM goals. The LCMC concept of operations was created to better manage the life cycle of equipment — by commodity — to create greater effectiveness for our Soldiers, while also achieving greater efficiencies within major enterprise and organizational level processes. Through continued collaboration, each LCMC aligns its resources to support the value produced for combatant commanders and their Soldiers.

As part of the LCM initiative, each LCMC has implemented Lean/Six Sigma processes to prevent quality deficiencies and product defects caused by a lack of resources. As the LCM initiative becomes more fully integrated at the enterprise level, the LCMC commanders will be able to measure quantitative and qualitative results. Future efforts will focus on process integration that will help the Army realize greater efficiencies, improved quality, decreased cycle time and reduced cost. What this means for our Soldiers is faster fielding of equipment, systems and services that address operational needs and real-world requirements now. Ultimately, the LCM initiative's results will produce better-equipped, more lethal Soldiers who are more survivable and sustainable regardless of where the mission or operational contingency takes them.

Michael I. Roddin
Editor-in-Chief

Interview With MG Jerome Johnson, Commanding General, U.S. Army Field Support Command

Michael J. Varhola

"Operational readiness rates, especially for low-density equipment items, are some of the highest we have ever seen," MG Johnson remarked. Here, Soldiers from Task Force Liberty, 3rd Infantry Division, provide overwatch at an Iraqi traffic control point outside Tikrit, Iraq, from their M3A3 Cavalry Fighting Vehicles. (U.S. Army photo by SGT Matthew Acosta.)

MG Jerome Johnson, Commanding General, U.S. Army Field Support Command (AFSC), Rock Island Arsenal, IL, discusses with *Army AL&T* Magazine his command's constantly evolving role in providing logistical support to U.S. warfighters around the world.

AL&T: As the Army transforms, the Army Materiel Command (AMC) and the Life Cycle Management Commands (LCMCs) have been leaders in spiraling technology to the Current Force. How has the AFSC helped to facilitate change while also meeting the Army's transformation initiatives and requirements?

Johnson: AFSC has been a leader in the Army's transformation. We are a command that seeks change to meet the ever-evolving needs of the warfighter. I think we have been able to make an outstanding contribution to the Current Force through our core missions: field support, Army pre-positioned stocks, the Logistics Civilian Augmentation Program (LOGCAP) and Joint Munitions.

In addition, we have established Army Field Support Brigades [AFSBs] and Battalions [AFSBns] in CONUS and around the world, including combat zones in Iraq and Afghanistan. By bringing the LCMC concept of synchronizing acquisition, logistics and technology [AL&T] to the tactical level, we're pushing the capabilities forward and connecting directly on the battlefield and in geographic areas of responsibility. I see these new units as a key element of transformational logistics support.

We continue to receive positive and helpful feedback from commanders in the field and new missions keep coming our way. An organization's success is measured by how well it adds value and effectiveness to a process, and AFSC has been blazing the trail for innovative and effective ways of improving the distribution, deployment, employment and sustainment processes. I believe the new missions are a testament to our command's ability to transform and evolve.

As a practical matter, we have been integral in the Add-on-Armor (AoA) program and heavily involved in the Reset mission. In addition, we've taken on the challenge of overseeing installation property accountability for theater-provided equipment as well as in-theater refurbishment. In short, the AFSC's not just facilitating change, but leading the way for expeditionary logistics operations. Using your metaphor, AFSC is where the technology spiral connects with troops.

AL&T: During your presentation at the Acquisition Senior Leaders and AMC Commanders Conference in August 2005, you said that AFSC does not have a lot of organic capabilities and that it gets its capabilities from LCMCs and program executive offices (PEOs). Would you expand on this?

Johnson: By harnessing the full powers of AL&T, AFSC is the national

> An organization's success is measured by how well it adds value and effectiveness to a process, and AFSC has been blazing the trail for innovative and effective ways of improving the distribution, deployment, employment and sustainment processes. In short, the AFSC's not just facilitating change, but leading the way for expeditionary logistics operations.

integrator for warfighter support. We do this in large part through our Army Field Support Brigades and Battalions worldwide. They are the units where the Army's AL&T capabilities are synchronized with units in the field. Brigade staffs are relatively small, but are augmented by LCMC senior command representatives and logistics assistance representatives [LARs] from the LCMCs and others, including the Defense Logistics Agency. By linking operational commands on the battlefield to the national industrial and technical base, we are able to act quickly to deliver logistical solutions. For example, the AFSB commander in Iraq participates in Corps Support Command planning and execution, giving us a predictive picture of current and future operations. That commander and staff can

then reach back to the LCMCs to have solutions in place before they become problems. Likewise, the LARs serving with troops in the field identify and report trends and recommend solutions. The entire purpose is to focus and apply logistics capabilities as far forward as possible.

AL&T: You've said before that your number one priority is ammunition. As the AFSC commander, you oversee the Joint Munitions Command [JMC], which is doing something it has not done in the past — becoming involved in the requirements process. How is this progressing?

Johnson: We recognize that to support the Soldiers, Sailors, Airmen, Marines and Coastguardsmen in the field with the best, safest and highest quality munitions, it takes the synergized effort of our AL&T competencies. These are provided through the ammunition enterprise comprising the PEO Ammunition, U.S. Army Armament Research, Development and Engineering Center and JMC. As combatant commanders provide the services their munitions requirements to fight and win, we have to work diligently with HQDA to
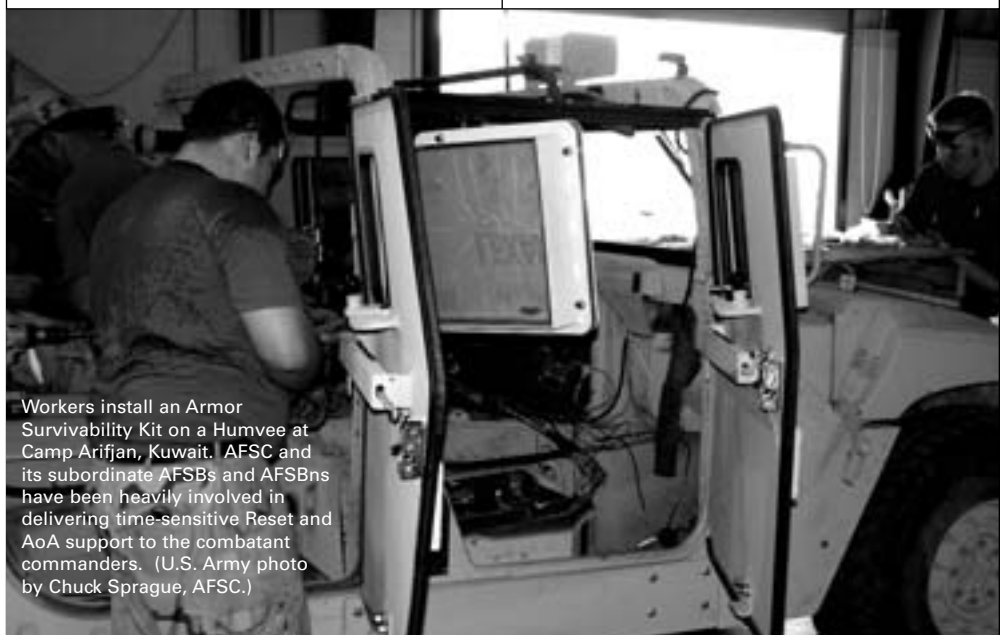
Workers install an Armor Survivability Kit on a Humvee at Camp Arifjan, Kuwait. AFSC and its subordinate AFSBs and AFSBns have been heavily involved in delivering time-sensitive Reset and AoA support to the combatant commanders. (U.S. Army photo by Chuck Sprague, AFSC.)

An M1A2 Abrams main battle tank receives an engine overhaul at the AFSBn in Kuwait. By pushing maintenance forward, AFSC is transforming logistics support on the battlefield. (U.S. Army photo by Chuck Sprague, AFSC.)

assessment through our continued refinement of the analytical data included in the Munitions Readiness Report [MRR]. The MRR is recognized as the overarching metric for ammunition readiness throughout the Army. These assessments provide the data needed at the HQDA level to support decisions on establishing requirements and prioritization of ammunition programs.

AL&T: In the short time since the LCMCs were formed, what kind of feedback have you gotten from combatant commanders regarding the AFSC's responsiveness in meeting Soldier warfighting requirements?

Johnson: Combatant commanders have experienced improved responsiveness in meeting Soldiers' needs. Operational readiness rates, especially for low-density equipment items, are some of the highest we have ever seen. Another example is the rapid response to the need for up-armored vehicles. In short order, we've had shops up and running in both Iraq and Afghanistan, delivering improved vehicles directly to troops in combat. Moving the capability forward saved time and money, especially in transport, and I believe it saved lives.

Similar forward-based activities are improving readiness in communications, weapons and the entire range of equipment and materiel. The AL&T community is transforming on a number of fronts. Establishing LCMCs is just one element of that transformation. We are doing a better

ensure that we understand the requirements and apply our knowledge to best meet the requirements — be they better technology, additional procurement or maintenance and pre-positioning.

We are increasingly involved in the requirements process by working with the HQDA G-3 and G-4 on the analysis piece. As part of that, we are undertaking our first Lean/Six Sigma project spearheaded to support the DA G-3. As the Joint Munitions LCMC Commander, which aligns the JMC with PEO Ammunition, I ordered a process complexity analysis on the Ammunition Requirements Determination/Prioritization Process. This process has been identified as one of the primary challenges in ensuring that ammunition acquisition and logistics planning supports the most urgent

> By linking operational commands on the battlefield to the national industrial and technical base, we are able to act quickly to deliver logistical solutions.

Army needs across the entire life cycle. Previously, there was not a high confidence level in the requirement, and multiple requirements caused confusion. This ongoing analysis will identify alignment and linkages among process participant organizations, in turn building a longer-term road map for improvement, identifying short-term benefit opportunities and helping prioritize next steps.

Additionally, we are continuing to enhance our ammunition readiness

> We are doing a better job of accelerating and deploying research and development technologies to solve problems and we are integrating our AL&T capabilities more effectively under a single forward-deployed field support structure — the Army Field Support Brigade.

Contracted logistics and maintenance support actually improve combat readiness by freeing Soldiers to train and conduct operations. The AFSBs and AFSBns are enabling the AL&T community to push logistics and maintenance support to the tactical level, thereby increasing responsiveness and greatly reducing equipment downtime. (U.S. Army photo by Chuck Sprague, AFSC.)

job of accelerating and deploying research and development technologies to solve problems and we are integrating our AL&T capabilities more effectively under a single forward-deployed field support structure — the Army Field Support Brigade. It's all about breaking down the walls between traditional stovepipe support structures and functioning more as an AL&T team on the battlefield and at our training centers. The LCMCs are a critical piece of that support.

AL&T: What sort of benchmarks does the AFSC use to determine if combatant commanders and their Soldiers are satisfied with the level of logistics support they receive in the field?

Johnson: Like other senior logisticians, I believe this is an area where we still have work to do. One of the field commander's important evaluation factors is tied to the Unit Status Reporting process. This is a well-established process and serves as a metric for AL&T support as well. Other relevant metrics are customer wait time and order ship time. We have a lot of capture points to assess the pipeline.

Our LOGCAP operation has brought form and organization to what is the first sustained employment of contractors on the battlefield. By implementing the Army's move toward contracting CSS and some CS functions, we've helped make it possible for Soldiers to spend more time becoming better trained, more lethal warfighters.

The problem is that these are all lagging indicators. We are short on leading indicators that can help us anticipate support requirements as we replace mass with velocity in our logistics processes.

I know of no metrics or mechanisms that would enable anyone to document and take credit for any improvements the field sees in responsiveness. There are so many ongoing initiatives it would be unfair and inaccurate to attribute success in some discrete portion or the whole process to any one change, such as establishing LCMCs. The idea that combatant commanders have visibility of the end-to-end logistics system is a goal for all of us — a common operating picture which also is yet to be achieved, but that we're working on diligently.

AL&T: As the AFSC moves forward to support a modular Army, will there be more reliance on contracted logistics and maintenance support and why?

Johnson: Even before Sept. 11, our Army was moving toward a modular Army with contracted logistics and maintenance support. Many of these duties in the past were done by Soldiers — cooking, cleaning, supply and vehicle maintenance. Soldiers were still required to maintain their skills in weapons training and other duties unique to the Soldier. Our LOGCAP operation has brought form and organization to what is the first sustained employment of contractors on the

MG Johnson confers with his logistics and maintenance support leaders during a recent trip to Southwest Asia. (U.S. Army photo courtesy of AFSC.)

Contract workers repair the suspension and hydraulics assembly on a cargo trailer at the AFSBn in Kuwait. (U.S. Army photo by Chuck Sprague, AFSC.)

battlefield. By implementing the Army's move toward contracting Combat Service Support [CSS] and some Combat Support [CS] functions, we've helped make it possible for Soldiers to spend more time becoming better trained, more lethal warfighters. Our Soldiers are now faster, smarter and quicker; can move anywhere in the world; and can fight any type of battle. Let me also say the work that our contractors and maintenance support workers are doing is great and a testament to America's ability to sustain troops in combat.

A worker removes armor plating on a Stryker vehicle at the Stryker Repair Facility in Qatar. The facility is managed by General Dynamics Land Systems under the direction of AFSBn Qatar. (U.S. Army photo by Chuck Sprague, AFSC.)

AL&T: At the 2005 Acquisition Senior Leaders and AMC Commanders Conference, GEN Benjamin S. Griffin noted that the Special Operations community is doing a great job of fixing materiel in the field and attributed their success to the critical role noncommissioned officers (NCOs) play in the maintenance and sustainability process. Has the AFSC taken steps to strengthen the role of NCOs in its logistics, maintenance and sustainment processes?

Johnson: Our NCOs are committed and have my backing to serve as representatives between our industrial operations/maintenance facilities and command headquarters. What NCOs do best is take care of Soldiers. I believe this is their core

mission. Our NCOs are on the ground in our field support brigades and battalions, ensuring that the equipment and materiel that reaches Soldiers is top-notch and combat-ready. They work in small groups, generally in a largely civilian and contractor environment, putting their stamp of approval on gear that's going into the hands of their comrades in combat. There's no more vital or challenging role than that. Our command sergeants major travel extensively to our installations and depots listening to what the workers, Soldiers and Army civilians have to say and deliver the messages to me. NCOs are my eyes and ears — and sometimes my conscience.

MICHAEL J. VARHOLA is a former BRTRC Technology Marketing Group editor. He holds a B.S. in journalism from the University of Maryland and is a former U.S. Army infantryman and civil affairs specialist.

U.S. Army TACOM Life Cycle Management Command (LCMC) — Providing Our Soldiers the Best Support Through Technological Integration and Innovation

MG William Lenaers

Add-on-Armor (AoA) Kits for the Humvee, Heavy Expanded Mobility Tactical Truck (HEMTT), tractors, 5-ton trucks and fuel tankers have helped Soldiers perform their operational missions safely and reliably despite insurgent threats from improvised explosive devices (IEDs), roadside car bombs and rocket-propelled grenades (RPGs). (U.S. Air Force photo by SrA Desiree N. Palacios.)

Established in August 2004, the TACOM LCMC unites every organization that focuses on Soldier and ground systems. By aligning our efforts on managing systems throughout their life cycles, the TACOM LCMC can deliver improved warfighting capabilities — quality, reliability, performance and readiness. Accordingly, the TACOM LCMC has a single focused objective — support our Soldiers fighting the global war on terrorism (GWOT). This means that the LCMC gets products to the warfighter faster, increases the quality and performance of those products, minimizes life-cycle costs and enhances the effectiveness and integration of our acquisition, logistics and technology (AL&T) communities.

Our transformation as an LCMC must be linked to our efforts toward transforming Soldier and ground systems. Doing so provides the Army with more flexible and versatile combat capability within a more adaptive and responsive management structure. The entire LCMC is fully engaged in all areas of Army transformation, from "Resetting" — repairing, rebuilding and overhauling — a wide range of Army Soldier and ground systems returning from Iraq and Afghanistan, to planning for the capability needs of the Current and Future Forces.

Structure

Transforming an Army at war requires a shift in the paradigm of a "business as usual" approach to reorganizing the command. Program Executive Office (PEO) Ground Combat Systems (GCS), PEO Combat Service and Combat Service Support (CS&CSS), PEO Soldier, Integrated Logistics Support Center (ILSC) and the TACOM Acquisition Center have taken a process approach to our LCMC implementation and are now operating as a single organization instead of five separate entities as depicted in Figure 1. In lieu of rushing to draw a new wiring diagram for the LCMC, we are using Lean/Six Sigma (LSS) methodology to create LCMC processes. A key outcome of this approach has been improvement in communication across the LCMC. This, in turn, has fostered a cultural change that recognizes collaboration across the life cycle with integrated processes that have made us more agile and effective in responding to our mission.

The TACOM LCMC enterprise also includes three of the U.S. Army Research, Development and Engineering Command (RDECOM) centers: the U.S. Army Tank Automotive Research, Development and Engineering Center (TARDEC); U.S. Army Armament Research, Development and Engineering Center (ARDEC); and the Natick Soldier Center. While retaining their strategic and organizational links to RDECOM, this corporate linkage to the LCMC and our program/project managers (PMs) allows us to rapidly address improvements to fielded systems and also improves the linkages for future acquisitions. Because the TACOM LCMC is founded on effective integration of AL&T processes and procedures, the institutionalization of LSS fact-based decision making and continuous measurable improvements is possible. We are using LSS every day to fight bureaucracy, be more agile and work faster, smarter and more effectively.
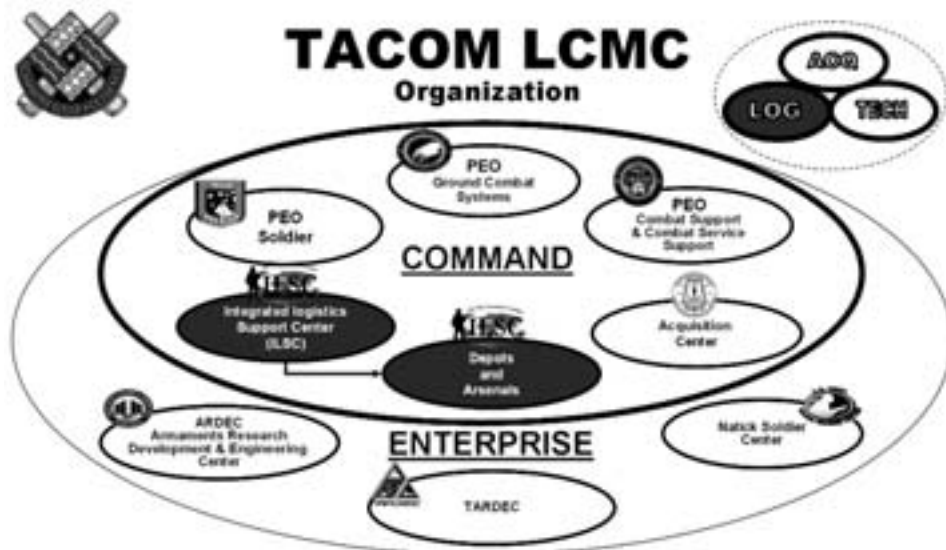
Figure 1. The TACOM LCMC integrates Army AL&T responsibilities, authorities and processes to provide the best possible support to warfighters and one voice to the customer.

The TACOM LCMC is designed to ensure that each organization throughout the life cycle is involved in the planning of all life-cycle phases as illustrated by Figure 2. The effective and efficient accomplishment of our shared missions requires significant internal and external integration. Our future direction is based on process identification, process ownership and greater effectiveness and efficiency to benefit the entire TACOM LCMC community. More importantly, by speaking with one voice, we aim to provide the best possible support to our warfighters.

Warfighter Support

The TACOM LCMC's greatest impact has been supporting our Soldiers in *Operations Enduring* and *Iraqi Freedom* (*OIF*). Because of the LCMC's monumental efforts and the tremendous support from our industrial base, today's warfighters are better equipped against constant threats of insurgent attacks. Tanks and armored personnel carriers were the vehicles of choice during initial operations in Iraq, and those performed exceptionally well. Because of the nature of peacekeeping and coalition-building missions, the mission has now

been modified, and much of the day-to-day business of nation building is accomplished with support vehicles. The Army employs, and the LCMC supports, thousands of trucks, engineering vehicles and combat vehicles doing everything from moving ammunition, food, water and fuel across vast distances, to providing a platform for security patrols protecting Iraqi citizens.

Insurgents target TACOM-managed vehicles and Soldiers by using IEDs, roadside car bombs, RPGs and ambushes to disrupt U.S. forces from

conducting their missions. The combatant commanders requested support to develop materiel solutions to counter these threats and we responded by developing vehicle AoA Kits for the Humvee, HEMTT, M915 series tractor, M939 series 5-ton truck and M969 fuel tanker. Tremendous effort has also been placed on post-blast safety enhancements to these systems to protect our Soldiers.

LCMC PMs, in cooperation with the Army Research Lab and TARDEC, quickly designed AoA Kits. The plans for the kits were passed along to both civilian industry and the TACOM LCMC's organic manufacturing base. The true might and flexibility of the industrial base has been demonstrated by many of these orders coming in well ahead of schedule to ensure the fastest response for our Soldiers' vehicles and weapons platforms.

We have also upgraded personnel armor in numerous areas as the insurgents adjusted to our existing body armor. Deltoid Auxiliary Protection, side plates and enhanced body armor are just a few examples of how the LCMCs and their PMs are continuously improving Soldier protection.

During 2006, a key TACOM LCMC initiative is the Tank and Bradley Urban Survivability Kits Active Protection System. Here, an M1A2 Abrams main battle tank provides overwatch during a search and cordon operation in Biaj, Iraq. (U.S. Army photo by SSG Aaron Allmon II.)
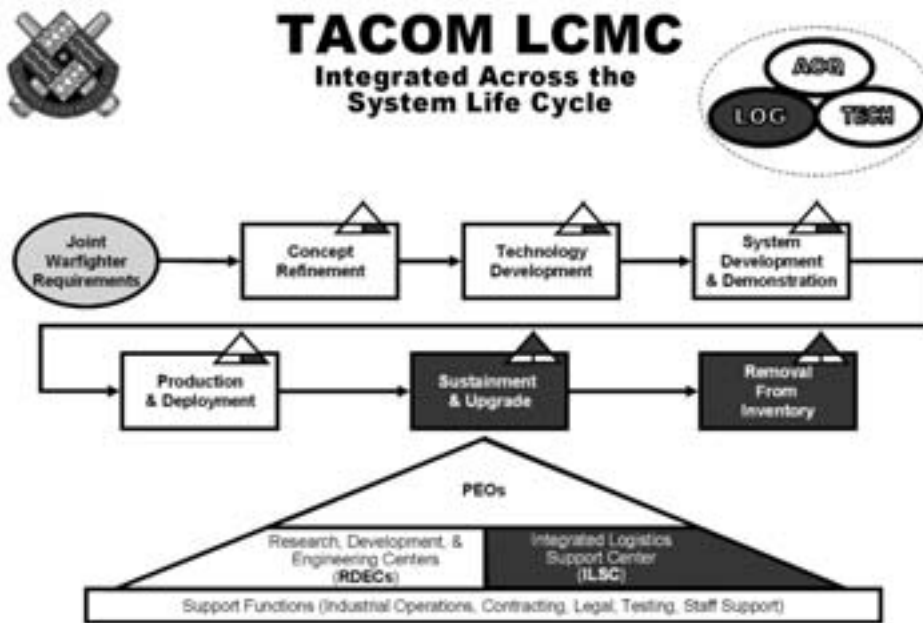
Figure 2. The objective is to get products to the warfighter faster, make our good products even better, minimize life-cycle costs and enhance the effectiveness and integration of our AL&T communities.

The TACOM LCMC has more than 750 personnel on the ground in theater that we put under the command and control of another Army Materiel Command (AMC) organization — the Army Field Support Command (AFSC). AFSC serves as a direct conduit to different LCMC organizations to enable quick response and assessment of any need that warfighters may have — both deployed and at home station. The TACOM LCMC's ability to respond rapidly to urgent requirements is a direct result of its industrial capacity and employment of its core competencies in both skills and technology. As a result, the LCMC has demonstrated its ability to support and protect our warfighters under all conditions.

LCMC AL&T Integration

One year into the implementation of our LCMC concept, we're pleased with the initial results and continue to work hard as we generate improvements across our scope of operations. The TACOM LCMC is beginning to show

measurable results — specifically in the areas of technology transfer, materiel management and common practices. This brings a much-needed balance to the way we do business and is breaking down cultural and functional barriers across the community.

To strategically manage the integration and improvement of AL&T throughout

our community, we created the TACOM LCMC Executive Steering Committee, which is composed of LCMC senior leaders. Senior leader commitment, both within the TACOM LCMC and from AMC and the Office of the Assistant Secretary of the Army for Acquisition, Logistics and Technology (ASAALT), makes the TACOM LCMC work.

As a direct result of the close collaboration achieved through the LCMC concept, many complex AL&T integration issues have been addressed. Among those are:

- Tactical Wheeled Vehicle (TWV) Strategy.
- GCS Strategy.
- Small Arms Campaign Plan.
- Numerous mission-related improvements to our Humvee Repower, Bradley transmission, AoA, up-armored vehicles and Total InteGrated Engine Revitalization engine programs.

LSS process methodologies have been successfully used within the TACOM LCMC Acquisition Center to review and improve current processes or to

The TACOM LCMC is supporting thousands of trucks, engineering and combat vehicles doing everything from moving ammunition, food, water and fuel between bases, to providing security patrols to protect Iraqi citizens from insurgent attacks. Here, a Stryker vehicle maintains security along a U.S. supply route. (U.S. Army photo.)

This 24-ton Buffalo vehicle offers combat engineers a safe, effective means of searching for IEDs by using its 30-foot remote-controlled hydraulic arm to prod suspicious items found along roadways and main supply routes. Innovations such as this are saving Soldiers' lives and thwarting the insurgency's best efforts. (U.S. Army photo by MSG Lek Mateo.)

develop processes to implement new requirements in conjunction with our command and enterprise partners. Value stream analysis (VSA) sessions are an ideal forum for LCMC partners to map out business processes with an eye toward more efficient operations. The TACOM Acquisition Center has hosted and facilitated LSS VSAs with a number of its LCMC customers, including:

- ILSC, PEO CS&CSS, PEO GCS and TARDEC to develop processes and templates to implement the Army policy for the use of non-DOD contractual instruments.
- PEO CS&CSS to improve the timeliness and quality of our contracting support under a multiple award task order contract.
- ILSC to update the government-furnished property/government-furnished equipment process and procedures.
- ILSC, PEO CS&CSS, PEO GCS, Small Business Office, Procurement Law Office and TARDEC to develop

a set of "guiding principles" to ensure early participation of all LCMC partners in the procurement package development process.
- ILSC to improve current processes for tracking long-term contracts so that new indefinite delivery indefinite quantity contracts are in place before current contracts expire.

Communication

Critical to our process is continuous communication. We routinely share lessons learned, best business practices and integration successes at conferences, seminars and symposia. The first Joint AMC/ASAALT Acquisition Senior Leaders Conference, held in August 2005, was an excellent forum that helped foster communication between our AL&T communities. LCMC commanders and PEOs shared improvement suggestions, examples of effective integration and LSS successes.

TARDEC also shares lessons learned through a wide range of management

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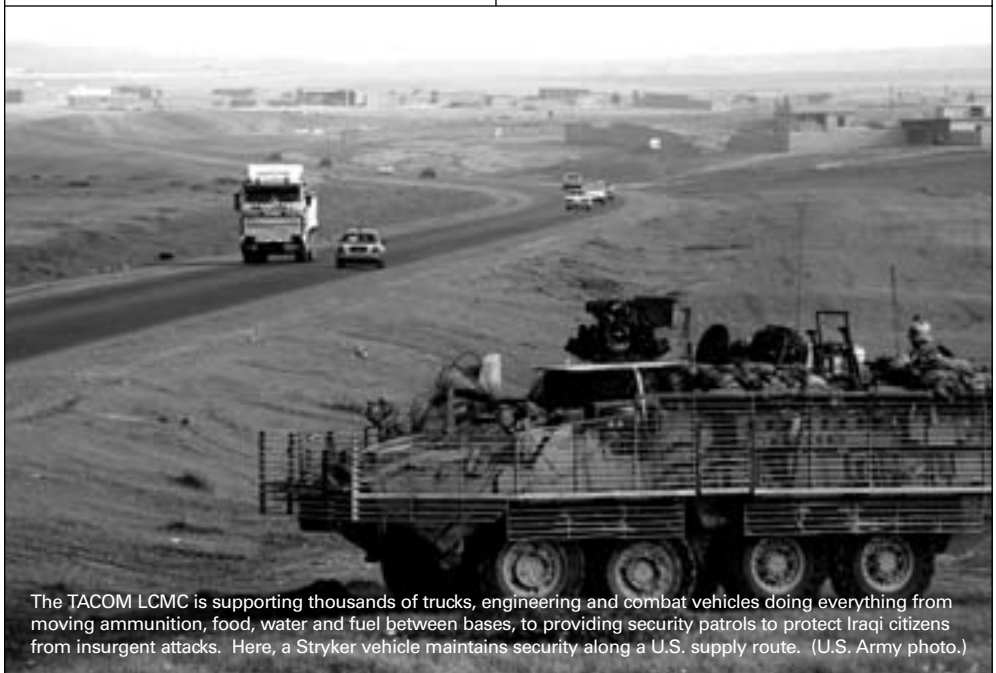
interactions. They hold frequent face-to-face management meetings, quarterly technical reviews with each PEO, process reviews for TARDEC reimbursement to support each PEO and process reviews to receive support through the ILSC.

Within the contracting community, there are regular opportunities to share initiatives, best practices and management approaches at AMC Principal Assistant Responsible for Contracting (PARC) conferences. At these conferences, various contracting and acquisition initiatives are shared and fostered by ASAALT. DOD procurement conferences provide similar opportunities.

The entire LCMC has increased our focus on sharing information with our private industry partners concerning their systems' performance. When there is an issue, I will personally call the company president to get leadership involvement. We are now working to harvest and share the digital health and diagnostic data that electronically control components so the original equipment manufacturers can help us improve their systems and speed the process to achieve condition-based maintenance.

Path Forward

The concept for this LCMC is a new one, and like any organization that is undergoing change, there are areas to improve, concepts to clarify and processes and practices that need review, evaluation and implementation. This is less about organizational change than it is about a commitment to use LSS principles to make fact-based decisions and to continuously improve our processes and structure.

Every day we must become faster, more agile and less bureaucratic as we

An M2A3 Bradley Fighting Vehicle (BFV) outfitted with Reactive Armor Tiles patrols the streets of Tal Afar, Iraq, during a routine security patrol. The venerable BFV has proven to be a versatile "street fighter," but Urban Survivability Kits/Active Protection Systems are under development by the TACOM LCMC team to make the BFV even more survivable against any foe. (U.S. Navy photo by PH1 Alan D. Monyelle.)

continue to move forward with Army transformation, modularity and support to our Soldiers fighting the GWOT. The products and services for our Soldiers evolve as we continue the cycle of research and development, production, testing, fielding and sustainment to provide those in harm's way with the best possible equipment. Some of our initiatives for the coming year are:

• The Natick Soldier Center's Future Force Warrior (FFW) Advanced Technology Demonstration (ATD) is the Army's flagship science and technology program that will transition mature technologies to the Ground Soldier System acquisition program, led by PEO Soldier and PM Soldier Warrior. By the end of the ATD (FY07), we hope to successfully demonstrate that FFW technologies will contribute to system development and demonstration of the Ground Soldier Threshold System,

which in turn will address Future Force operational requirements for dismounted Soldiers, including those within the Future Combat Systems (FCS) Brigade Combat Team.
• TARDEC continues its research and development of future technologies with efforts in FCS survivability, FCS robotics platforms, the Future Tactical Truck System (FTTS), a hybrid-electric drive for FCS and crew station technology for FCS.
• Continue fielding the Tank and Bradley Urban Survivability Kits Active Protection System, Common Remotely Operated Weapon Station, Individual Body Armor and safety enhancements for our tactical vehicles.
• Design, develop and test Long-Term Armor Strategy solutions for the TWV fleet.
• Continue Reset and modularity programs.
• Complete endeavors in FTTS Advanced Concept Technology

Demonstration, Forward Repair System evolution and Expedited Modernization Initiative Procedure execution.

As the LCMC continues internal process improvements, we do so listening to the feedback from our Soldiers. We have made great progress in providing our products to the warfighter — giving them what they need, when and where they need it, and then making it better. That is our way ahead. It is a team effort that must include every TACOM LCMC member.

MG WILLIAM LENAERS is the Commanding General, U.S. Army TACOM LCMC. He holds a B.S. in chemistry from the University of Santa Clara and an M.S. in oceanography from Oregon State University. His military education includes the U.S. Army Command and General Staff College and the U.S. Army War College.

The RDECOM LCMC — Increasing Efficiency Through Improved Collaboration

MG Roger A. Nadeau

The U.S. Army Research, Development and Engineering Command (RDECOM) and the Life Cycle Management Commands (LCMCs) have been in existence for about two years now. Much has already been written about the LCMCs. Let me focus my comments on RDECOM.

An LCMC enterprise goal is to eliminate unknown redundancy in Army RDE to maximize return on investment (ROI) across the board. This will result in more technology being spiraled to Soldiers faster. (U.S. Air Force photo by SSGT Shane A. Cuomo.)
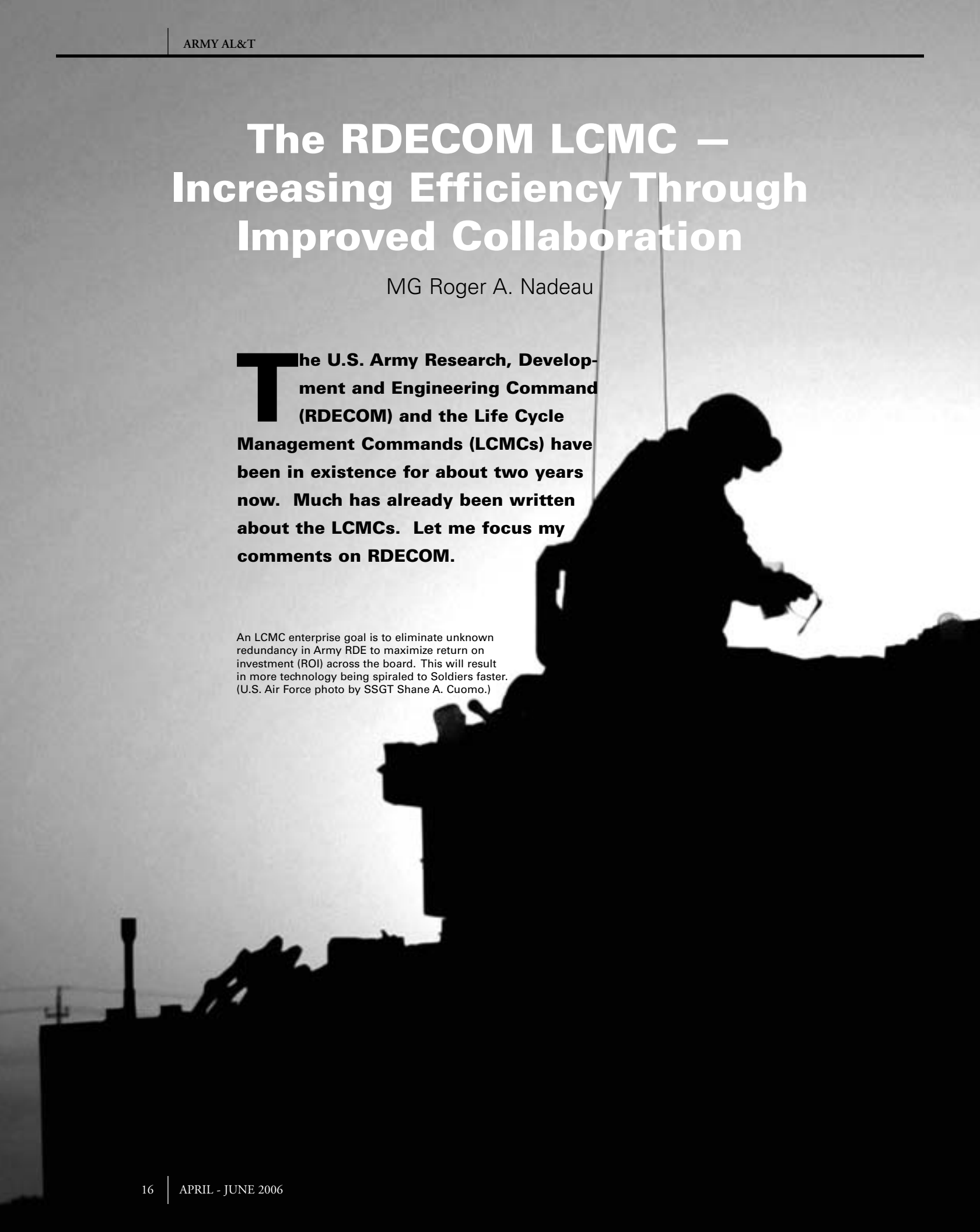
As a start, let me say that I am a strong supporter of the RDECOM concept. While that might not surprise anyone, since I am its commander, it's equally important to state that I was a skeptic on day one of my assignment. That skepticism originated from multiple program executive office (PEO) jobs over time and concerns about the efficiency of Army labs. Today's environment and the critical research, development and engineering (RDE) demands of our Future Force make a strong RDECOM an absolute necessity. Let me start explaining that last comment from the local level and work up the command chain.

Did the professional daily life of an RDECOM employee change the day
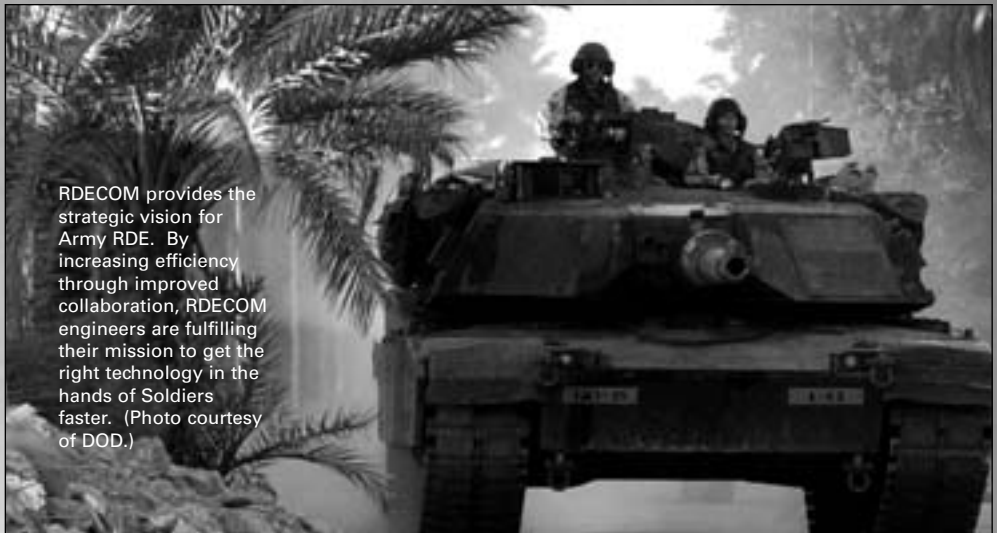
RDECOM provides the strategic vision for Army RDE. By increasing efficiency through improved collaboration, RDECOM engineers are fulfilling their mission to get the right technology in the hands of Soldiers faster. (Photo courtesy of DOD.)

after the RDECOM and LCMCs came into existence? Generally, no. RDECOM employees matrixed to the PEOs and program managers remain matrixed. Lab workers still worked in the labs. Basically, not much changed that was visible at the individual worker level. The value of an RDECOM becomes more visible as you move up in the organizational structure.

Greater Value to LCMCs and PEOs

The good news is that the LCMCs and their supported PEOs get greater value from the U.S. Army's Research, Development and Engineering Centers (RDECs). The better news, and one of RDECOM's many values, is that the required support does not necessarily come from the most local RDEC. The new organizational construct now provides a more effective, efficient mechanism to draw on the collective Army RDE organization to get the right R&D expertise working a problem. And that's not always a local solution for an LCMC. U.S. Army Tank Automotive Research, Development and Engineering Center engineers might be the best talent to respond to an Aviation Missile Command LCMC issue, or Aviation Missile RDECOM engineers to a TACOM LCMC issue. Prior to the existence of an RDECOM headquarters, those type actions were the rare exception. Today, they're becoming more the standard rule.

> The new organizational construct now provides a more effective, efficient mechanism to draw on the collective Army RDE organization to get the right R&D expertise working a problem.

Along that same general thought process, the professional growth of our scientists and engineers is being broadened through developmental assignments between the labs and centers as well as between RDECOM and the LCMCs. Matrixed engineers won't stay matrixed for their entire careers either. Could this have been done without an RDECOM headquarters? Yes. But the fact is, it wasn't. A consolidated headquarters at the lowest possible level created the right operating environment to facilitate this kind of change.

MG Roger A. Nadeau listens to suggestions from Soldiers and civilians during one of his many visits to various research centers and laboratories. (Photo courtesy of RDECOM.)

Improved Communications

Communications between the myriad Army labs and centers has increased exponentially through the existence of a central headquarters. Prior to RDECOM, the R&D focus was so local, maximizing the national and international research and development talent internal to the Army was grossly suboptomized. This was clearly not intentional. Great folks accomplished great things for our Soldiers under the old organizational construct. The continuing growth and performance maturity of both the LCMCs and RDECOM are opening our collective eyes to just how much more efficient we can be for an Army at war and an Army transitioning to meet the needs of the future. Another growing value of an RDECOM construct is the headquarters' ability to facilitate frequent contact and cross-talk between directors that only a shared common headquarters can do. Again, this is something that was not maximized under the old organizational structure.

An M2A2 Bradley Fighting Vehicle, equipped with Reactive Armor Tiles, moves into an overwatch position near a traffic control point outside of Ad Duluyiah, Iraq. These Soldiers are from Alpha Troop, 1st Battalion, 4th Cavalry Regiment, 1st Infantry Division. Constant innovation and testing result in equipment and accessories that keep our Soldiers safe. (U.S. Air Force photo by SSGT Shane A. Cuomo.)

RDECOM RDE initiatives will ensure that Army Ground Combat Systems such as this Stryker vehicle will perform at optimum levels regardless of environment, climatic conditions or operational missions. Here, a squad from 2nd Battalion, 1st Infantry Regiment, 172nd Stryker Brigade Combat Team, patrols Mosul, Iraq, during a downpour. (U.S. Air Force photo by TSGT John Foster.)

Better communication and coordination between Army RDECs is just part of the value of a centralized headquarters. Using a board of directors organization at the RDECOM level continues to facilitate coordination and communication beyond Army boundaries. RDECOM headquarters continues to create synergy with the national labs, other service R&D organizations, international organizations, academia and private industry — just to name a few. More frequent contact creates a more open communications environment, which helps focus R&D at all levels. The goal is to eliminate unknown redundancy in research, development and engineering to better maximize the ROI across the board. The result is

> The professional growth of our scientists and engineers is being broadened through developmental assignments between the labs and centers as well as between RDECOM and the LCMCs.

greater technology delivered to the Soldier faster through collaborative cooperation. And who wins? The Soldier.

Increased Efficiency

Let me wrap this up by stating what is arguably the greatest value of an RDECOM to the Army. For the first time, we have a headquarters at the lowest possible level responsible for creating a strategic vision for Army RDE. Resources are allocated against the goals and objectives approved by the headquarters. Constant monitoring at the headquarters level allows for the reallocation of resources to meet the changing demands of an Army at war. It also directs course corrections relative to technology development priorities based on

numerous factors as the Army continues its transformation. Prior to the existence of an RDECOM, the process was inefficient and suboptimized. In two short years, the organizational construct of an RDECOM has already proven its value and has only just scratched the surface of what it can do for our Soldiers and the Army.

MG ROGER A. NADEAU is the RDECOM Commanding General and LCMC Commander. He holds a bachelor's degree from the University of Rhode Island where he was a Distinguished Military Graduate of the Reserve Officers Training Corps, an M.B.A. from the Florida Institute of Technology and a master's degree in national resource strategy from the National Defense University. His military education includes the Armor Officer Basic Course, Armor Officer Advanced Course, U.S. Army Ranger School, Command and General Staff College and the Industrial College of the Armed Forces.

The AMCOM LCMC — Maximizing System Performance While Delivering Unparalleled Soldier Support

MG James H. Pillsbury

I n the education business, the three 'Rs' of reading, 'riting and 'rithmetic are basic and fundamental. In the warfighting business and, specifically, for the U.S. Army Aviation and Missile Life Cycle Management Command (AMCOM LCMC), the three 'Rs' of reduce, reduce and reduce are basic and fundamental. Those reductions are focused on decreasing the burdens on our Soldiers as *Operations Enduring* and *Iraqi Freedom* (*OEF/OIF*) continue.

New technology and maintenance management information systems will help automate parts ordering, tracking and maintenance scheduling for high operations tempo (OPTEMPO) utility helicopters like the Black Hawk. (U.S. Army photo by SSG Angelique Perez.)

Since being formed in October 2004, the AMCOM LCMC at Redstone Arsenal, AL, has managed to transform from a concept to an integrated, closely aligned organization with a single commander who has the primary responsibility for the life cycle of all the Army's aviation and missile weapon systems. Put simply, we have comprehensively transformed from the industrial age to the information age.

We began with the CH-47 Project Manager (PM) as a one-team, dual-hatted systems integrator — the "Trail Boss." Readiness, modernization and sustainment have all come together to produce a smoother flow of better products to the field since then. By way of maximum support, AMCOM elements are working with their Program Executive Office (PEO) Aviation and PEO Missiles and Space (MS) counterparts to set the standard that was envisioned 20 months ago.

We now have a single point of contact and a direct conduit for situational awareness and the total support structure of our systems when help is needed. Improved communications, decision making, system optimization and shortened response times are the returns on the LCMC investment. We are fully integrated and continually assess our effectiveness to provide unparalleled weapon systems support.

Developed over time — and tailored to meet the unique needs and requirements of each PM and the weapon systems supported today — we are providing the day-to-day operational direction for well-informed decisions that affect the weapon systems, including supporting activities from AMCOM, such as the Integrated Materiel Management Center (IMMC), Acquisition Center, Security Assistance Management Directorate and the Aviation and Missile Research Development and Engineering Center (AMRDEC). Matrixed personnel maintain a strong and clear relationship with their owning organization. This initiative is based on an active information flow about equipment status, beginning at the weapon system and flowing back to a combined PM/AMCOM Team. Enablers are being designed to provide the PM with the necessary information and inputs with which to make decisions that will maximize system performance and minimize the sustainment burden on Soldiers.

Bravo Co., 2nd Battalion, 502nd Infantry Regiment Soldiers prepare to conduct search and sweep operations from their Black Hawk helicopter near Shakaria, Iraq, last December. Behind the scenes at Corpus Christi Army Depot, TX, technicians continue to overhaul, repair and retrofit helicopters, engines and bearings to keep the fleet flying. (U.S. Army photo by SSG Kevin L. Moses Sr.)

Recently, an AMCOM team comprising members from the command group, IMMC and AMRDEC traveled to the theater to assess equipment issues and the status of test equipment used by aviation maintenance units. We discovered that our legacy Electronic Equipment Test Facility (EETF) was old and using antiquated technology. Through our discussions with the units, we were able to focus our attention on both parts and support issues and work with the units to develop solutions that have resulted in a dramatic increase in EETF readiness rates. This is vitally important because the *OEF/OIF* OPTEMPO is four times greater than peacetime. The importance of keeping helicopters flying and minimizing down times reduces operational vulnerabilities for the Soldiers on the ground. Simply put, when our aircraft fly, troops live. We are working to get parts to Soldiers in hours, not days.

> Enablers are being designed to provide the PM with the necessary information and inputs with which to make decisions that will maximize system performance and minimize the sustainment burden on Soldiers.

PEO Aviation Priorities

Paul Bogosian, Program Executive Officer Aviation, continues to focus on acquisition and modernization for integrated and streamlined fleet management. This year, his top five technology challenges are:

- Lightweight Armor — Improve protection to crew and flight- and/or mission-critical components from small- and medium-caliber ordnance, yet reduce overall weight of the aircraft, and produce a cargo aircraft floor system for integrated cargo handling and ballistic protection.
- Infrared (IR) Suppression, Active and Passive — Better protect aircraft from IR-guided weapons, lower the IR signature of aircraft to make seeker lock-on difficult and to defeat incoming threats with jammers.
- Improved Lift Technologies — Respond to the need for lighter-weight blades, engines and transmissions that provide increased lift and power. Additionally, respond to the need for improved specific fuel consumption. This technology effort will provide enhanced aircraft performance while carrying more mission weight.
- Obstacle- and Wire-Avoidance System — We are pursuing funding to develop a system that will provide all-weather, day and night obstacle and wire-strike detection and warning capability. Low-hanging wires and towers continue to cause incidents and pose a significant hazard to aircraft and crews in combat.
- Helicopter Autonomous Landing System — We are developing corrections for brown- and white-out conditions and are pursuing funding to develop a system to improve aircraft stability and control in low-speed flight in degraded visual environments. The ability to recover an aircraft in brown- and white-out conditions needs to be upgraded, removing aircrews and aircraft from current risks.

The PEO has used value stream analysis for its local hiring process. This analysis has led to significant changes in the PEO's operating procedures, resulting in streamlining the time involved in announcing and filling critical positions. It is vitally important to have our key support positions fully staffed and ready to meet Soldier requirements. The PEO also uses business process improvement tools as the command's lessons learned program, as well as sharing best practices during staff, integrated process team (IPT) and task force meetings.

Keep 'em Flying

The AMCOM LCMC is directly supporting combatant commanders and Soldiers in the field by developing the aggressive sustainment activities required to support a fleet of more than 4,000 manned and unmanned aerial vehicles (UAVs) and an OPTEMPO that competes with hostile weather and environmental conditions. More than one million hours have been flown in the U.S. Central Command area of responsibility, and we have maintained readiness rates above Army standards with no negative impact on our warfighters. Likewise, there has not been a fleet grounding attributable to materiel failure.

Ancillary to the manned aircraft and UAVs is the equally important effort to provide and sustain aviation ground support equipment such as maintenance platforms, auxiliary power units, tooling and aircraft recovery equipment. The LCMC is directly involved in supporting the warfighter through the Preset and Reset of aircraft as they deploy and redeploy to theater with the latest survivability modifications and environmental modifications. These complex, challenging and critical programs prepare aviation units and their aircraft for deployment on *OEF/OIF* rotations.

Aircraft PMs have the primary responsibility for coordinating and managing the Preset program for their particular airframe or platform. The platform PMs coordinate the Modification Work Order (MWO) kit requirements and deliveries with the "Kit" PMs, scheduling MWO installations with AMCOM OLR sites and units, to help minimize the impact to the unit's critical predeployment training requirements.

> Our growing Lean/Six Sigma effort has been embraced as a cultural innovation that continuously listens to customers, questions the status quo and improves results through fact-based decisions.

We are engaged in numerous efforts to continually enhance capabilities in the utility mission area. The maintenance management information system being developed in the Black Hawk Health Utility Monitoring System will benefit the system and will become an integral part of the Army's logistics transformation by providing the necessary information to automate parts ordering, tracking and maintenance scheduling. These capabilities will be fielded Armywide with the UH-60M. Moreover, the UH-60M Black Hawk upgrade will clearly provide leap-ahead technologies to the warfighter as well as stable support operations for unprecedented capabilities in future modular force operations.

Supporting the global war on terrorism (GWOT) has significantly increased fleet OPTEMPO. The AH-64 Apache fleet is well into the second round of Reset. During the first iteration, 222 Apaches were Reset in an average time of 105 days per aircraft. Thanks to aggressive LCMC efforts, we can now Reset an Apache in 72 days.

Our LCMC maximizes both the service provided to the Soldier and the go-to-war capability of the weapon system. Soldiers care very little about how the acquisition

and sustainment communities are organized or managed. What they care about is having functional, reliable, effective weapon systems. Having a single point of contact when help is needed, and having all the folks back home do everything possible to minimize the Soldier's burden is what our LCMC is all about.

The LCMC team at Redstone Arsenal has worked to improve system readiness by giving Logistics Assistance Representatives a direct conduit to the total support structure for the system. LCMC teams have visited the theater of operations to learn firsthand how to aid in improving the go-to-war capability of the system by improving communication, decision making, system optimization and response times to meet Soldiers' needs.

PEO Missiles and Space

PEO MS, which became part of the LCMC in June 2005, is led by BG Mike Cannon and his dedicated team of experts who are continuing to design and develop an organization that is centered on rapidly adapting responsive acquisition management processes that respond to combatant commanders' changing battlefield requirements. (See related article by BG Mike Cannon and Dr. Roger L. Cole on Page 10 of the January-March 2006 *Army AL&T* Magazine.)

Most notable is the continuing progress to quickly get the High Mobility Artillery Rocket System (HIMARS) and Guided Multiple Launch Rocket System (MLRS) products fielded to the Soldiers who need them. The PEO is using the following five key organizational elements to understand the context of supporting transformation and achieving success in forming aligned, integrated and flexible weapon system teams that will

PEO MS continues to develop and adapt acquisition management processes that respond to combatant commanders' changing battlefield requirements and significantly reduce engineering and maintenance costs. Here, the 13th Field Artillery Regiment, 42nd Infantry Division, responds to a fire mission in Central Iraq. (U.S. Army photo.)

Letterkenny Army Depot (LEAD) technicians continue to deliver the highest on-time delivery rate in the Army – an accomplishment that resulted in LEAD being selected for the Shingo Award for Excellence in Manufacturing. (U.S. Army photo courtesy of LEAD.)

respond to today's complex, varied and unpredictable threats.

• Environment
• Vision and strategy
• Organizational design
• Culture and leadership
• Results

PEO MS has initiated an M270 MLRS launcher recovery program that has resulted in significantly reduced engineering costs — $40 million — that will allow us to keep Foreign Military Sales commitments through 2016. Likewise, the PEO has worked with IMMC to accelerate M299 launcher electronics assembly spare parts deliveries, eliminating Non-Mission-Capable-Supply backorders to prevent fielding impacts.

In addition, LCMC coordination support strategies have resulted in the elimination of Hellfire missile training seekers backorders on an out-of-production item that has increased availability of this critical training asset. Further, Hellfire II tactical missile spare parts administrative lead times and associated costs have been reduced, bringing economies of scale and reducing government and contractor work that did not add value.

Forming an LCMC is much more than collocation. *Collocation* only sets the stage for efficient and effective

management and coordination. *Integration* is the desired state and is attained by:

• Collocating supporting personnel with a single weapon system authority.
• Establishing common metrics and process improvement tools such as accurate and timely information flow from the field.
• Employing readiness modeling capability.
• Practicing Lean/Six Sigma (LSS).

This integration is producing significant improvements in weapon system support to the warfighter and equally significant improvements in life-cycle management effectiveness and efficiency. Although rooted in the corporate method of eliminating wasted time, money and material, our growing LSS effort has been embraced as a cultural innovation that continuously

listens to customers, questions the status quo and improves results through fact-based decisions.

Army Depots Leading the Way

We point with pride to our Letterkenny Army Depot in Pennsylvania — the first Army depot to win the coveted Shingo Award for Lean initiatives on the Patriot launcher. For 16 years, the Shingo Award for Excellence in Manufacturing has honored businesses and researchers for using and expanding world-class manufacturing practices with the Lean body of ideas. *Business Week* magazine has dubbed the Shingo as the "Nobel prize of manufacturing." The award is named for Shigeo Shingo, the engineer who developed the renowned Toyota production system.

With the highest on-time-delivery rate in the Army, our military knows that when the first shot has to count, they can depend on LEAD. In terms of raising the bar and then jumping well over it, LEAD has saved the military $21.5 million and notched a 99-percent customer satisfaction rating in the face of a 52-percent workload increase, with a corresponding workforce increase of only 27 percent. What's more, by using Lean, the 2,800-member workforce has saved almost 100,000 square feet of interior and

HIMARS continues to deliver precision strike capability for artillery units operating in Iraq and Afghanistan. (Photo courtesy of Lockheed Martin.)

exterior workspace. Letterkenny is leading the pack and setting the standard for future multifunctional depots. The depot is not only doing better, it's continuing to improve every day.

Likewise, the Corpus Christi Army Depot (CCAD) in Texas continues to champion the cause of overhauling, repairing, modifying, retrofitting, testing and modernizing helicopters, engines and components for all services and foreign military customers. CCAD is also the home of a unique facility that repairs and refurbishes bearings. While there are many different components required to keep a helicopter flying, they all have one critical part in common — bearings.

The CCAD bearing facility is one of only three sites in the Nation certified for complete bearing reconditioning. The facility implements an extensive tracking system of all items serviced, which includes both computer and hard copies of serial numbers and invoice information. The CCAD bearing facility received its ISO 9001:2000 certification in November 2003, and has been validated as "Best Manufacturing Practice" every fiscal year since 1997. Turnaround times to repair and refurbish bearings are three days or fewer. Last year, depot employees processed more than 55,000 bearings, saving the Army more than $28 million. Not only did we have mission-ready aircraft ready to prosecute the GWOT, but we also had aircraft ready to support Hurricane Katrina relief efforts as well.

In December, the entire depot received its ISO 9001:2000 certification. Bear in mind that this certification is not bestowed lightly. Following an audit that reviewed all the depot's management systems, CCAD didn't just pass, it was certified "deficiency free."

Truly, this is a significant AMCOM LCMC business management system milestone. ISO certification now puts CCAD at a higher level, and it will help

During *OEF/OIF*, AH-64 Apaches have been in high demand to provide U.S. and coalition troops with critical close-air support during combat and search and sweep operations. During the course of the war, the AMCOM LCMC has Reset hundreds of Apaches. (U.S. Army photo.)

open doors to private and public partnerships with some of the larger commercial corporations. Accordingly, it postures the LCMC for further improvements, putting us on a more competitive level, which is a primary ingredient of ISO certification. It also will allow us to maintain our workforce during non-war times by contracting with commercial companies that require their contractors to be ISO certified.

Looking Ahead

As we continue to evolve, not all future LCMC implementations will look alike. Differences in weapon system life cycles will affect the form future LCMC teams take, and differences in the matrix structures of the missile and aviation teams may result in different team structures. However, the general principles of consolidating the activities of a weapon system life cycle and giving control and authority to execute the life-cycle management mission to the PM will remain the same.

The best measure of our ability to meet Soldiers' requirements is the readiness of the system as measured by its go-to-war capability. All common metrics and process improvement tools used to measure the weapon system are being correlated to three primary vectors — reduction in downtime rates, reduction in demand rates and reduction in total cost of ownership.

The cross-functional IPTs comprise the PEOs, PMs, AMCOM and AMRDEC, and they are continuing to develop the system of measurements that will be used to assess the overall LCMC's effectiveness. In summary, LCMC implementation is providing unparalleled weapon system support that meets the Army's and the Army Acquisition Corps' transformation goals.

As I said at the outset, reducing the burden on our warfighting Soldiers is what our LCMC efforts are focused on. In line with that, I am reminded of what the Netscape Chief Executive Officer once said, "The main thing is to keep the main thing the main thing." For the AMCOM LCMC, "The Main Thing" is reducing Soldier burdens by providing the best, most reliable and effective equipment at the right time, at the right place and at the right price.

MG JAMES H. PILLSBURY, AMCOM Commanding General, assumed command Dec. 1, 2003. He holds a B.A. in history from Trinity University and an M.S. in international relations from Troy State University. His military education includes the Infantry Officer Basic Course, Transportation Officer Advanced Course, U.S. Army Command and General Staff College and the U.S. Army War College.

Sustaining and Supporting Superior C4ISR Systems for the Joint Warfighter

MG Michael R. Mazzucchi, Commanding General, Communications-Electronics Life Cycle Management Command (CELCMC), requested that his team of subject matter experts "team up" on the two articles that follow. Under the CELCMC collaborative umbrella, CELCMC personnel consistently provide our Soldiers with command, control, communications, computers, intelligence, surveillance and reconnaissance (C4ISR) tools and systems that are highly developed, sustainable, reliable, usable and technologically current.

Timothy L. Rider's article on the next page focuses on the Mounted Battle Command on the Move (MBCOTM) communication system and the Command Post of the Future (CPOF). MBCOTM encompasses a total redesign of command and control functions that integrate computer-based applications and a mobile Ku-Band satellite antenna into the Army's current Joint Network Node battlefield network. CPOF will become the Army's principal suite of planning, situational awareness and automated battle command applications currently known as the Army Battle Command System.

The second article in this series by Kevin Toolan, "Black Belt Team to Systemize Problem-Solving Techniques," discusses the Lean/Six Sigma (LSS) approach that Tobyhanna Army Depot – and others – is applying to reduce defects and improve manufacturing processes in daily operations, planning and procedures. His article discusses LSS as a "disciplined, process-focused methodology" that focuses on the customer, uses statistical measures to determine process quality and defines and implements problem-solving techniques that are helping the depot deliver superior C4ISR tools, sensors and systems for the Joint warfighter.

These articles in tandem will give the reader an inside look into the new technology and innovation that is being spiraled to the Current Force from the CELCMC.

Michael I. Roddin
Editor-in-Chief

The MBCOTM communication system has been engineered to fit into the Stryker, Bradley and Humvee vehicles. This network package will provide operational commanders and their subordinate leaders a common operational picture that will update information automatically, thereby allowing commanders the opportunity to make critical battlefield decisions while on the move. (U.S. Army photo by SGT Jeremiah Johnson.)

New Army Capability Will Extend the Reach of Battle Command on the Move

Timothy L. Rider

Somewhere in Iraq a division commander faces a difficult choice. An important operation is underway, and one of his brigade commanders (Bde Cdrs) implores from his area of operation — "Maybe if you could see it from my vantage point, you would understand my concerns." The division commander agrees the situation needs personal attention, but it is a bad time to leave the command post (CP) because his other Bde Cdrs are, likewise, on the move.

MBCOTM is a wholesale redesign of C2 functions that integrates computer-based C2 applications and a mobile Ku-Band satellite antenna into the Army's current battlefield network, built around the JNN.

He asks himself, "If I leave, will I still be able to make sound decisions regarding the next phase of the operation?" Fortunately, in today's Army, this tough choice is mitigated by a CP that rides along — the Mounted Battle Command on the Move (MBCOTM) communication system.

MBCOTM

Starting as a "side project" to meet an urgent operational needs statement (ONS) developed by U.S. Army Training and Doctrine Command Commanding General (CG) GEN William S. Wallace when he was V Corps CG in 2002, MBCOTM (frequently pronounced "em-bi-cot-um") became a program of record June 20, 2005, and is preparing for the production contract phase intended to deliver six vehicles for each modular division, said LTC Michael Ryan, MBCOTM Product Manager.

Built upon the concept of the Command and Control (C2) Vehicle that was used during *Operation Iraqi Freedom* by V Corps and the 4th Infantry Division, MBCOTM is a wholesale redesign of C2 functions

that integrates computer-based C2 applications and a mobile Ku-Band satellite antenna into the Army's current battlefield network, built around the Joint Network Node (JNN). The MBCOTM network package is a "B-Kit" that fits into a number of vehicles, including Humvees, Bradleys and Strykers.

With MBCOTM, a commander and his battle captains can keep abreast of operations by viewing a common operational picture (COP) updated automatically through the network, review plans, view various map overlays or visual representations of the battle and issue orders. Communications capabilities are conducted using line-of-sight

> With MBCOTM, a commander and his battle captains can keep abreast of operations by viewing a COP updated automatically through the network, review plans, view various map overlays or visual representations of the battle and issue orders.

(LOS) terrestrial radios and beyond-LOS (BLOS) satellite communications. BLOS communications are enabled by the JNN network, which can pass data and voice simultaneously using Voice Over Internet Protocol. A portable satellite telephone is also included.

"Command is an art and a science," said Ryan. "The science behind it is basically looking at what has been done in the past, analyzing it, applying it to a current situation, then coming up with a process that enables military decision making. The art is how a guy filters through all the data available and quickly assesses what's important in terms of providing guidance to his

CERDEC's C2D Project Manager for MBCOTM, Rodney Young, performs a complete systems check of a Humvee equipped with the MBCOTM systems suite at the Tank Shop fabrication facility at Fort Monmouth. (U.S. Army photo by Marie Moulder.)

subordinates. If that data is current, relevant and there's no erroneous data, then he's going to come up with a decent battle plan and be successful."
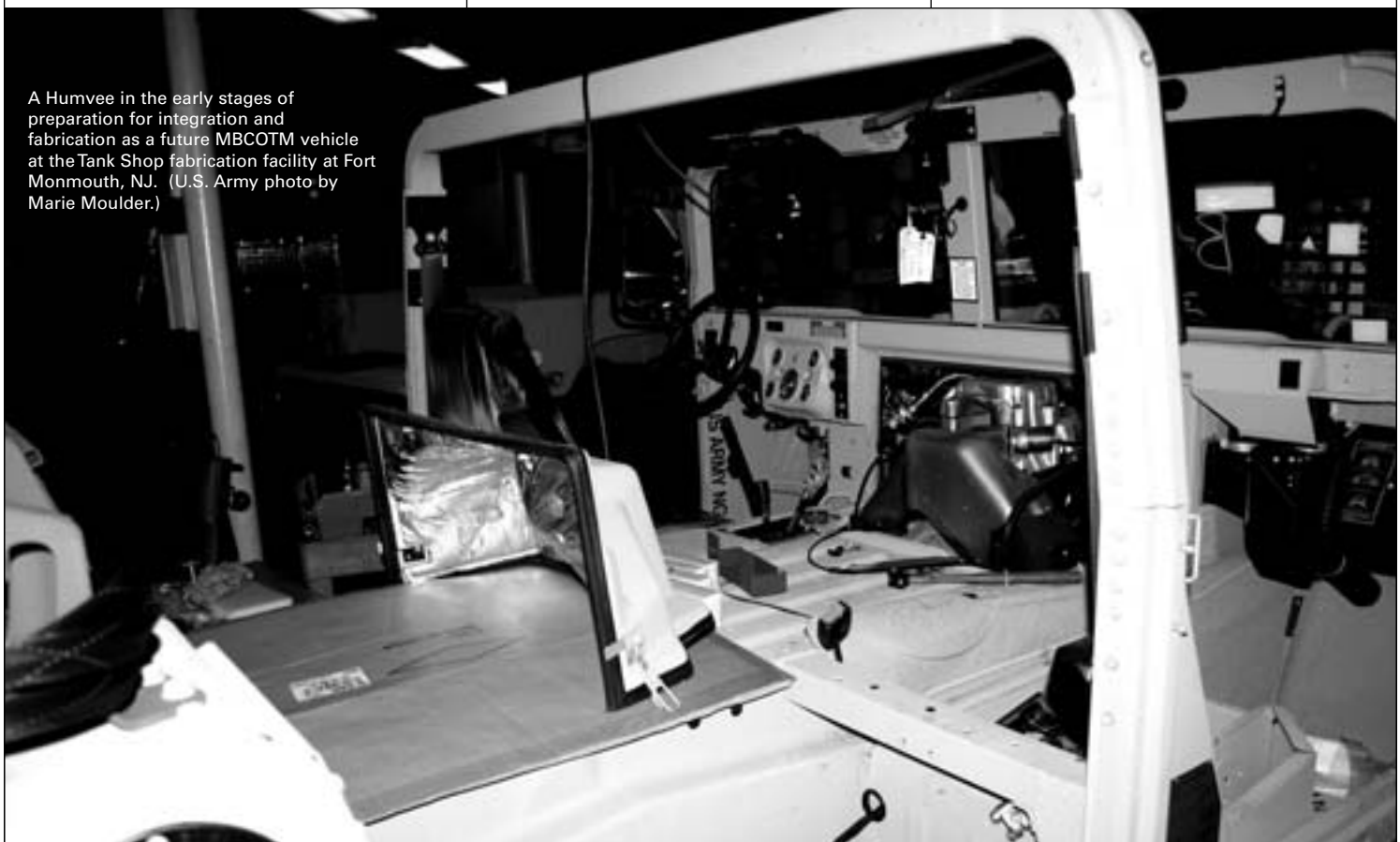
A Humvee in the early stages of preparation for integration and fabrication as a future MBCOTM vehicle at the Tank Shop fabrication facility at Fort Monmouth, NJ. (U.S. Army photo by Marie Moulder.)

An engineer uses the CERDEC C2D Computer Automated Visualization Environment, a 3-D tool that was used to allow MBCOTM's product design to be developed in a virtual environment. (U.S. Army photo by Gregory Bower.)

the Signal Center at Fort Gordon, GA, provides Internet Protocol space. You roll that up and you crank out configuration templates. It's a big job."

The CERDEC Command and Control Directorate (C2D) was selected as the builder to meet the ONS requirements. "We signed a memorandum of agreement with them last year and they performed exceptionally," Ryan recounted.

That directorate used a virtual reality system to integrate and fit components into the vehicle design using a computerized 3-D tool called the Computer Automated Visualization Environment. The C2D went from production design to fabrication of the first 12 vehicles at the Tank Shop facility at Fort Monmouth.

"As we transition forward, we are going out on a source selection for a systems integrator to provide a baseline material solution that will be horizontally integrated across all three MBCOTM variants," said Ryan. "CERDEC's function as a systems builder will cease after this fiscal year, but they will still be relied on for technical expertise."

CP of the Future (CPOF)

The battle command applications that reside in the vehicle will be reengineered to include the CPOF, an application that began its development in the Defense Advanced Research Projects Agency and is now being managed by the Army's CELCMC PM Battle Command.

"What's important to the commander while he's on the move are visualization tools tailored to his particular military decision-making process," said Ryan. "MBCOTM operates with the commander, two battle captains and a driver. When MBCOTM is operational, there is less emphasis on planning, which is handled primarily by staffs at the fixed CPs."

The development, testing, fabrication, training and sustainment packages for the system were created within the Communications-Electronics Life Cycle Management Command (CELCMC) in its formal partnership with the U.S. Army Communications-Electronics Research, Development and Engineering Center (CERDEC).

MBCOTM illustrates how building a platform with a net-centric mindset differs from traditional platform-focused development efforts. "I'm a customer on the network," explained Ryan. "The Project Manager [PM] for Battle Command builds the applications. The PM for Tactical Radio Communications Systems [TRCS] builds the network. I don't even own the platform."

That doesn't mean MBCOTM's developers didn't face platform-type developmental challenges. "The biggest issue

with the whole design was just fitting it into the Humvee," remarked Pat DeGroodt, MBCOTM's lead systems engineer and team leader of a support staff provided to CERDEC's Product Manager Space and Terrestrial Communications Directorate. Integrating network components into the vehicle and within the battlefield network is an orchestrated process. Degroodt said he worked with the Systems Engineering Integrated Product Team, a part of PM TRCS, which leads Army network configuration at echelon divisions and below.

The vehicle cannot operate successfully in a network environment until its network components are configured into the tactical network. "It involves a detailed understanding of the network within each division," Degroodt continued. Units provide their unique mission requirements, task organization and component lists. "Once you know every device on the battlefield,

> Commanders want to see the data in a logical form that replicates the battlefield situation, and CPOF's ease of use in creating combined operational overlays tailored to the commander's particular style makes it desirable. They're concerned about how data is displayed for them so they can make solid tactical decisions.

"The CPOF can shift easily between topographic views with operational overlay — known as the COP — timeline views and data spreadsheet views of the battlefield situation, but it also features collaboration capabilities that make it a primary briefing tool for the 4th Infantry Division now in Iraq," remarked Dave Stevens, Principal Engineer for the CPOF Product Director. "Well over 500 people are hearing the commander's Battle Update Briefing across the entire division using CPOF. It creates an environment that makes it a primary tool for communication."

"Commanders want to see the data in a logical form that replicates the battlefield situation," Ryan suggested, "and CPOF's ease of use in creating combined operational overlays tailored to the commander's particular style makes it desirable. Most of the guys are used to seeing a battle that way. It's not about the technology. Warfighters don't really care about that and rightfully so. They're concerned about how data is displayed so they can make solid tactical decisions."

There remain engineering challenges integrating CPOF into the network and applications architecture, including optimizing CPOF to work with the mobile antennas and integrating operational threads from the Army's principal suite of planning, situational awareness and automated battle command applications known as Army Battle Command Systems (ABCS). "We'll conduct tests of CPOF in MBCOTM at Aberdeen Proving Ground, MD, this summer," Stevens mentioned.

"From January 2005 to January 2006 we went from concept to a material solution. We started turning wrenches last summer and we were testing in August," said Ryan. "We had to take all the brainpower from CERDEC; Program Executive Office Command, Control and Communications Tactical; and PM TRCS, and use all those people to put together a material solution in a year." The CELCMC's Logistics and Readiness Center helps Ryan to understand spares requirements and develop training packages.

"MBCOTM's story is a perfect example of what happens when you engineer networked systems," said BG Nickolas Justice, CELCMC Deputy CG for Command, Control and Communications. "By definition, a network touches everything. So many organizations within and without the CELCMC become involved that I can't list them all. From my perspective within the

> MBCOTM's story is a perfect example of what happens when you engineer networked systems. By definition, a network touches everything. From my perspective within the CELCMC, MBCOTM is a big success because we went about creating the LCMC structure here to help us more flexibly direct personnel and resources toward collaborative efforts that meet Soldier needs.

MBCOTM will benefit from BLOS satellite communications capability, which is enabled by the JNN. Here, PFC Jarred Smith, 1st Special Troops Battalion, 1st Brigade Combat Team, operates a JNN satellite receiver during testing last September at the National Training Center, Fort Irwin, CA. (U.S. Army photo by SSG Brent A. Hunt.)

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"Everything is linked together," said Ryan. "MBCOTM extends the reach of battle command by linking into the network while on the move to receive, send and display the ABCS data necessary to make sound tactical decisions. It takes the entire CELCMC team to make MBCOTM a successful battle command enabler.

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Black Belt Team to Systemize Problem-Solving Techniques

Kevin M. Toolan

"The Six Black Belts" is not the title of a new karate-themed action movie. Instead, it is the number of Tobyhanna Army Depot, PA, personnel learning and helping to apply Six Sigma techniques to reduce defects and improve processes in shops and offices across the depot. Six Sigma is a disciplined, process-focused methodology that complements the depot's existing Lean initiatives. "It incorporates a customer-focused philosophy, statistical measures of process quality and defined problem-solving techniques," explained Jim Bochicchio, one of the six engineers moving toward Six Sigma black belt certification.

Lean/Six Sigma (LSS) process improvements are helping technicians and engineers reduce product defects and dramatically improve efficiencies and procedures. Here, Lawrence Plunkett calibrates a piece of equipment used to test thermal night vision sights. (U.S. Army photo.)

Therese Paxton, Firefinder Division Electronics Mechanic, Intelligence, Surveillance and Reconnaissance Directorate, wires a phase shifter as Jennifer Godusky observes. Godusky is one of six Tobyhanna Army Depot engineers completing LSS black belt training. (U.S. Army photo by Anthony Medici.)

Joining Bochicchio are Don Engel, Jennifer Godusky, James Waters and Mark Viola, who are training through the Northeastern Pennsylvania Industrial Resource Center, and Bob Young, who is receiving Master Black Belt Training through a U.S. Army Materiel Command (AMC) program.

"Our continuous improvement process is LSS, which capitalizes on the strengths and synergy of both methodologies," remarked Robert Katulka, Director of Productivity Improvement and Innovation. "Lean looks to remove non-value-added steps from processes, while Six Sigma is used for detailed analysis and to identify root causes of process variability."

Sigma is a statistical measure of dispersion — or variability — in a process. Six Sigma is a measure of an extremely

Six Sigma is a disciplined, process-focused methodology that complements the depot's existing Lean initiatives. It incorporates a customer-focused philosophy, statistical measures of process quality and defined problem-solving techniques.

low percentage — 0.00034 percent — of defects. As variability declines, so do defects, and the depot is better able to meet customers' expectations.

The black belts work with subject matter expert (SME) teams to address process and defect issues. Black belts bring their analytical training to the teams, while SMEs bring technical experience and training to the project. The process typically includes creating a process map, collecting data and using Six Sigma statistical tools to analyze the data and develop solutions through a collaborative team effort. As part of the black belt training and certification process, each black belt works with technicians and other personnel on projects that reduce defects and variables and improve quality.

One of Godusky's projects evaluated antenna test and repair on the AN/TPQ-36 Firefinder System. Working with shop personnel, the black belt team implemented a standardized test and repair procedure that has improved process yields from 12 to 54 percent in the near field probe. Yield is defined as a percentage of met commitments (total of defect-free events) over the total number of opportunities.

"Six Sigma data collection and analysis helped us find several process improvements in the repair of the Q36 antenna," says Joe McCafferty, Chief of Firefinder Components Division. "We've addressed problems with spacers, the linear array, antenna re-facing and phase shifters as causes of failures that were occurring."

Mark Cooper inserts a microprocessor chip into the mother board of an Itronix® laptop computer at Tobyhanna Army Depot. Tobyhanna and 30 Forward Repair Activities worldwide now repair computers under a manufacturers' warranty repair program. (U.S. Army photo.)

Engel's team is working on reducing Line Replaceable Unit (LRU) failures in AN/TRC-170 shelters. The team developed a data sheet to capture failures. The team then analyzed the data and identified those LRUs with the highest failure rates and technicians were interviewed to determine possible causes for the failures. The project goal is to reduce the failure rate by 50 percent, which would also reduce the shelter's repair cycle time.

Don Engel (standing) collects data as Pete MacKarey, Communications Division Electronics Mechanic, Communications Systems Directorate, performs an azimuth and elevation adjustment on an AN/TRC-170 V3 alarm monitor. Engel is completing his black belt training and certification under a collaborative program sponsored by AMC. (U.S. Army photo by Anthony Medici.)

Bruce Telincho, Tobyhanna Army Depot, tests a telephone circuit switch power supply component to be issued in AN/TTC-46/47 Mobile Subscriber Equipment. LSS standardized test and repair procedures have improved process yields at Tobyhanna from 12 to 54 percent. (U.S. Army photo by Anthony Ricchiazzi.)

training through AMC adds creative problem solving, ISO 9000 lead auditor certification, ethics, psychometric measures and instructor certification. As a master black belt, Young will travel frequently to instruct various aspects of Six Sigma processes to workforce personnel.

The black belts' initial projects are part of their training and certification process that started in October 2004. As they complete their certification, black belts will begin to apply their Six Sigma expertise on new projects across the depot.

Tobyhanna Army Depot is DOD's largest center for the repair, overhaul and fabrication of numerous electronics systems and components — from tactical field radios to the ground terminals for the defense satellite communications network. Tobyhanna's missions support all branches of the military.

About 4,400 personnel are employed at Tobyhanna, which is in the Pocono Mountains of northeastern Pennsylvania. Tobyhanna Army Depot is part of the Communications-Electronics Life Cycle Management Command (CELCMC). Headquartered at Fort Monmouth, NJ, CELCMC's mission is to research, develop, acquire, field and sustain command, control, communications, computer, intelligence, electronic warfare and sensors capabilities for the military.

The investigation has resulted in the use of a mock-up shelter to test selected components, development of a course to train personnel on troubleshooting high-power amplifiers and other improvements. Data collection and analysis are continuing. Initial results are promising, with significant failure reductions in both the receiving and transmitting modems.

Bochicchio worked with a team looking at production order errors as they impacted workload in the Tactical Radio Branch. At the time, there was no clear process to adjust workload requirements for radios that are part of other systems repaired in other cost centers. As a result of the Six Sigma analysis, a new process was established that more clearly defines available workload and increases the branch's capacity by half a work year. It couldn't have been done as effectively without the Six Sigma techniques Bochicchio is learning. "Staying focused on the data gets us to the root cause, and the 'improve' and 'control' phases ensure that the improvements are valid," he noted.

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Viola, Chief of the Process Engineering Division, will work to reduce administrative errors on documentation moving between the depot and the Defense Distribution Depot Tobyhanna. The project is in its initial stages. Viola likes the reliability of Six Sigma problem-solving techniques. "It's not uncommon to just take a stab in the dark to solve a process variation. Six Sigma offers a systematic approach to identifying the root cause of the problem and leads to more reliable improvements."

One of Waters' teams is looking at warranty returns on the RT-859A component of the AN/APX-72 Identification Friend or Foe Transponders. Following data collection and analysis, the team is moving to the project's improvement phase, which may include using alternate packing material and determining if warning labels should be attached to shipping containers.

As a master black belt, Young received the same training as his five peers. His

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An Interview With Army Acquisition Executive (AAE) Claude M. Bolton Jr. — Creating the LCMC Construct

Cynthia D. Hermes and Michael I. Roddin

On April 10, 2006, AAE/Assistant Secretary of the Army for Acquisition, Logistics and Technology (ASAALT) Claude M. Bolton Jr. met with Army AL&T Magazine staff to discuss the accomplishments, challenges and goals of the Army's Life Cycle Management Commands (LCMCs).

U.S. Army Soldiers from 3rd Battalion, 187th Infantry Regiment, and Iraqi army soldiers from 1st Battalion, 4th Iraqi Division, exit a CH-47 Chinook during *Operation Swarmer*, March 16, 2006, northeast of Samarra, Iraq. (U.S. Army photo by SSG Alfred Johnson.)

AL&T: The LCMCs have been the leading change agents in spiraling technology to the Current Force. How have the LCMCs spearheaded change while also meeting the Army's transformation initiatives and requirements?

Bolton: The LCMCs started almost two years ago — in August 2004 — I believe. They were the initial culmination of what then Army Materiel Command [AMC] Commander GEN Paul J. Kern and I wanted to do in terms of bringing the total life-cycle management approach together to provide systems and capabilities to the warfighter. Up to that point, we had the beginnings of that concept, but had not really formalized what we now call the LCMCs. Our overriding

motivation — "How do we provide much better capability to the warfighter — particularly in the warfight right now — much faster?" One way of doing that is by bringing both the acquisition and logistics communities together. In terms of providing a better capability, that was the whole aim and it's what we're doing. There are examples of this that we can talk about later. As for modularity and where the Army is heading: modularity is an organizational construct and to be able to respond to those changes, we had to create something like an LCMC just so we could be responsive. To date, we've been able to respond very quickly to modularity and, of course, to the rest of the force that's not modular.

AL&T: The LCMCs were formed, in part, to provide the Army with "cradle-to-the-grave" capabilities and integrated maintenance support and to provide a single interface between Soldier field requirements and Army modernization and modularization initiatives. How well are the LCMCs doing and what would you say are their greatest success stories to date?

Bolton: I think they are doing very well. We've only been at this for a couple of years and we're not where we want to be yet. We first began life-cycle management integration at AMCOM [Aviation and Missile Command], so we'll talk about the CH-47 Chinook helicopter program. Prior to going to an LCMC construct, the program manager [PM]

there would take an input from the field and, as long as it was within his lane in terms of acquisition and development, take care of it. If the requests were out of his lane, and a lot of them were, then he'd have to take the requirement down to Corpus Christi Army Depot or someplace else to handle the non development acquisition-type things. Some of those turnarounds would take 4 to 6 months. That's OK if we're not at war, but it's not OK if Soldiers are depending on us to keep their equipment operational.

Jumping ahead in the scenario a year or so, now the PM has the wherewithal to perform the entire life cycle. He is the single point of contact in terms of that weapon system. His LCMC commander is the single point for everything there, but if a new requirement comes from the field, as it did on the CH-47, it's quickly dispatched to the person who has the resources. He has all colors of money — operational, working capital funds, Recap/Reset — and all the expertise including acquisition, fielding, sustainment or similar tasks. Where we were taking several months to accomplish before, we are now only taking upwards of 4 weeks to repair and replace. I think that's a dramatic improvement in a very short period of time.

Take a look at the CECOM [U.S. Army Communications-Electronics Command] LCMC and talk about how Blue Force Tracking and JNN [Joint Network Node] have improved the Army and Joint communications capability across the battlespace. JNN is an

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excellent example of bringing together COTS [commercial-off-the-shelf] pieces of equipment and putting the capability together to better network the force. And we're at least in the second, if not third, iteration of the modular units that are going over there.

At the TACOM [U.S. Army Tank-automotive and Armaments Command] LCMC, just look at the up-armoring of the Humvees. We use the same contractor and essentially go from producing 30 up-armored Humvees a month to now more than 700 a month with at least three different types of armoring that's being installed over, essentially, the last 2 to 2 ½ years. I think that's unique. The Stryker out of the TACOM LCMC is a success story as well.

So, yes, I think the LCMC concept is working very well. Whether or not we had implemented this formally back in 2004, we would have had to have done it eventually because that's what the warfight demands.

AL&T: The LCMCs are a work in progress. As you have already explained, this is a journey that has taken several years and, obviously, will take several more to get the Army where it needs to be. What are the biggest challenges right now and where do the greatest opportunities for the future lie?

Bolton: Well, I think it all comes from the same place, and that's our people. It's a journey and I'm not sure it will ever really end. What we're trying to do is realize something that
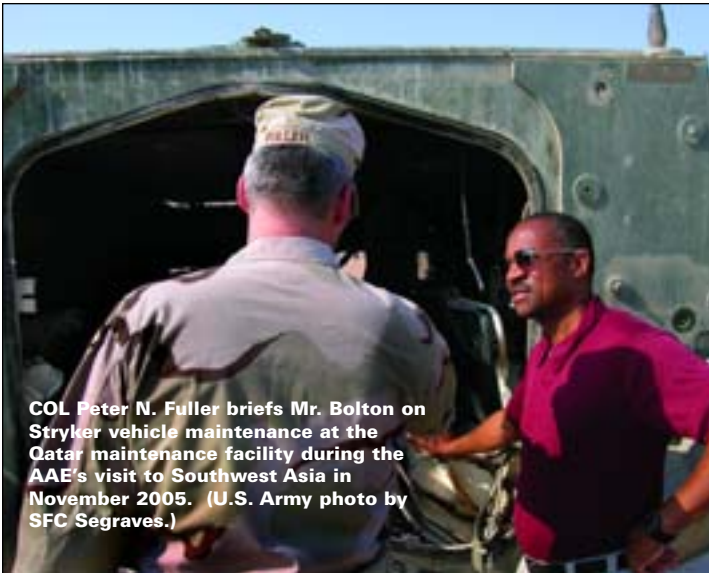
COL Peter N. Fuller briefs Mr. Bolton on Stryker vehicle maintenance at the Qatar maintenance facility during the AAE's visit to Southwest Asia in November 2005. (U.S. Army photo by SFC Segraves.)

started back in the late 1980s or 1990s in DOD, and that's the notion of bringing the life-cycle approach together. There are all sorts of acronyms and phrases that we use for this — "cradle to grave" being one of them — but in fact, even though the banners and viewgraphs were out there about life-cycle management, nobody in DOD really did much about it. We told ourselves, "PMs have life cycle responsibility," but we never gave them the tools to actually execute that reesponsibility. Now we have.

As I said earlier, the acquisition community started in 2002 thinking about how we would recognize this, and we codified the first LCMC with AMCOM in August 2004 and gave them the wherewithal — the policy, money and people. The key point here is the people — the right people, in the right place, at the right time to make this happen. What's our biggest challenge in the future? Recruiting and retaining quality and qualified people. You know, we didn't change any natural laws when we brought this concept together, we certainly didn't get any more money and we've not used a whole lot of new technology. What's changed is how folks are actually relating to and working with one

another with the common goal being to provide better capability to the warfighter.

So as we move toward the future, what we're doing now is looking at our folks and saying, "OK look, how are we going to go to the next level?" You go to the next level with education and training, bringing these very good world-class cultures together but bringing them together to make an even better culture — this life-cycle management culture. That's what the challenge will be for the combined acquisition and AMC communities. It will not be easy to change our culture. We're human beings and we don't like to have a whole lot of change in our daily lives. We're all relative on that — some folks adapt to change better than others, but basically humans don't like change. So we're going to take these cultures and bring them together.

We're working with the folks at DAU [Defense Acquisition University] to see what we can do about training courses and educational programs. We just had an offsite leadership meeting in early April where we brought the leaders together to say, "Hey, this is what we mean by it, where do we go from here?" It's well entrenched in our strategic planning here at ASAALT and also at AMC. People, ultimately, will be the key to success for our LCMCs.

AL&T: Given the tremendous transformational changes the Army and Acquisition, Logistics and Technology (AL&T) Workforce have gone through over the past few years, the importance of implementing cultural change, not just organizational change, is of critical importance. How successful have the LCMCs been, across the board, in implementing organizational design and structural change while also orchestrating sweeping cultural changes for their respective workforces?

Bolton: I think for the former — that was easy. We wrote and signed the first charter for the AMCOM LCMC. And we organizationally have changed the buying centers and we're looking at others to change. That's fairly straightforward — put a charter out and change the boxes. And then with a great deal of focus by first GEN Kern and now GEN [Benjamin S.] Griffin [current AMC Commanding General] and I in making sure that the workforce gets what it needs so we can actually get some payback out of this concept. I've given you some examples of that already. The cultural change is a longer effort and we're not there by a long shot. I've often said that it's at least a 7-year journey to do this and we started in 2004. By the time we get to year 7, if we stay on track, we will be where GEN Kern and

A JNN operator from the 3rd Infantry Division monitors activity on the network during a pre-deployment training exercise. (U.S. Army photo by Robert Wilson, PM Tactical Radio Communications Systems.)

I wanted to be the very first year. So, there's some change that has to take place here, but it's not going to be overnight. However, the benefits to the Army — and certainly to the Soldier — are astronomical, both in terms of getting weapon systems and equipment to the warfighter quicker and sustaining those items once they get there. And for the Army and America's taxpayers, we'll also be getting these things done a whole lot cheaper than in the past.

AL&T: You have said before that the LCMCs and AL&T Workforce, in general, are making great strides in aligning with the Army's vision, mission, direction and goals. Where can we declare victory and what areas are on the "short list" that require the workforce's immediate attention?

Bolton: Well, victory is not an end. We're not just going to say, "We're there and let's have a party." That's never going to be the case. It is a journey and when we get to that 7-year point, there will be a lot more things that have to be done in all areas. Additionally, there will be a press on resources as we come out of this part of GWOT [global war on terrorism] funds, the fighting part, because funding is normally taken away from DOD, and certainly it will be taken away from the Army.

So, how do you maintain the world's best Army when your resources get constrained? There will be a lot of focus on what we're doing in supplying and sustaining the force and that will be driven by how much better we can do our business than we're doing it today. It's a journey that will go on and on. Then we have to look at the prospect of fighting another war sometime in the future. And once that war starts, there will be a lot of focus on this community to respond, as we have this time. Our enemies are clever and they are not going to hit our strengths. They will find our weaknesses, and we must be able to respond quickly and lethally to counter any and all threats. We must build on our collective successes in this war, which have been many, and sustain that momentum and capability for the future. In truth, we've compressed the acquisition process to weeks, months or a year, in some areas. In the not-too-distant future, we will have to be able to "ramp up" even faster. How do you collapse that process or cycle down to hours or days and work on that between now and the next war when, typically, you don't have the resources to make all that happen?

> We must build on our collective successes in this war, which have been many, and sustain that momentum and capability for the future.

Then there's the workforce itself, which is shrinking. About half of the civilian workforce in the next three years will be retirement eligible. So where are the programs? Where is the back bench? How are you going to replace and retain that expertise? How is that all coming about? I think there are some interesting challenges there as we go forward to make all this work and keep it working. But the journey itself will continue for a long time.

AL&T: You and LTG Joseph L. Yakovac Jr., Director, Acquisition Career Management, are actively working with DAU to standardize education and professional development criteria and streamline certification and training requirements for AL&T Workforce members. Other than resourcing,

SGT David Wood, F Co., 131st Aviation Battalion, Georgia National Guard, services a CH-47 Chinook at Kandahar Air Field, Afghanistan, in support of *Operation Enduring Freedom*. (U.S. Army photo by Claudia K. Bullard.)

what are the greatest challenges you both are facing in standardizing education and professional development criteria and streamlining certification and training requirements for the future of the AL&T Workforce?

Bolton: Let me change the premise just a little bit. Resourcing is an issue and everyone says that. We put very little attention on that across DOD, on whether it's training our workforce, educating our workforce or providing time. Are we going to do these things offline, Web-based or whatever? Are you going to do that while you're in the office working or are you going to do it while you are at home? My view is that it is important to provide the resources, not only money, but also having supervisors allow their employees or subordinates time to train. It's also incumbent upon us to understand what we are getting once we invest in these resources, whether it's time, money or what have you. Right now, we don't have adequate tools to do that. My belief is that you get what you pay for, and if you are not ready to pay for it, you are going to lose. So I do emphasize that again and again. I emphasize it whenever I go to Capitol Hill to give testimony, and

now LTG Yakovac and I are emphasizing it more with DAU.

Obviously, DAU is a world-class organization. It was started back in the mid-1970s for a good reason by David Packard. During his opening remarks, he commented that the school — then it was called the Defense Systems Management School — would be on the leading edge of management business innovation in terms of how you do business. In the early 1990s, with the passage of *DAWIA* [*Defense Acquisition Workforce Improvement Act*], we formed the DAU with all the consortium schools, DSMC [Defense Systems Management College] being one, although a bigger one, and now we've gravitated all that together into a big DAU on the same campus.

DAU is absolutely world-class, and it's gotten national and international awards over the last few years. It was nominated to receive the prestigious Malcolm Baldrige National Quality Award back in the 1995 time frame. It was one of three institutions recognized across the United States in that particular year for that particular category, and the only federal government institution recognized. So it is world-class, and it's also a place where private defense industry sends its employees for advanced training and education.

Knowing that DAU is on the leading edge, we've urged the president, Frank J. Anderson Jr., to take a look at this LCMC concept, find out a little more about it and then offer a course or class where we could send our folks through, sit them around a table and talk about the LCMC approach and the tools that are being used to make organizations more effective and efficient. Let's talk about what we can do as an entity to provide services and capabilities to the warfighter better — help us to break

down some of the cultural challenges that we have. So, Mr. Anderson is stepping up to that request and there are a couple of more areas of interest that are peculiar to us that we'd like to see implemented and fielded as well.

AL&T: The advantages of implementing Lean/Six Sigma principles are well documented and the LCMCs are embracing this systematic approach to manufacturing in all their respective activities. As the AAE, you have led the charge to conquer complexity, leverage technological innovation and identify and eliminate non-value-added activities through continuous process improvement. Moving forward, how will the LCMCs continue delivering products and services with speed, customer satisfaction and lower cost through operations excellence? What metrics are being developed and used to measure the value of the LCMCs?

SGT Julius McLarin, Brigade Support Battalion, 172nd Infantry Brigade, cuts armor plate at Forward Operating Base Marez in Mosul, Iraq, April 18, 2006. (U.S. Air Force photo by TSGT John M. Foster.)

Bolton: Lean/Six Sigma is a set of tools that we use to achieve the latter part of the question — provide a capability, service or part to the warfighter faster and better — and we hope by doing the first two — that it's actually cheaper. A lot of it will boil down to how we develop and formulate the LCMC metrics over the next few months. We have metrics today. Every LCMC has metrics — they have metrics on the sustaining side, the maintenance side, the supply side, the acquisition side. That's a lot of metrics.

They are not necessarily common across the centers, and so when GEN Griffin and I look at all these things and want to see how they're working across all the LCMCs, we are in the process of developing a common set of metrics. So on the acquisition side, I can look at the probability of success on a program that's in development, I can look at the baseline, I can look at cost of performance. On the maintenance side, I am looking at how long it has taken me to get that aircraft through this building for maintenance. How much is it costing? How long does it take to get back to the warfighter? I can look at the working capital funds and how far over or under I am at the end of the year. I can look at all these ways to measure our performance and we'll continue to do that in the future.

What we have to do now is look at this more as an enterprise. So this thing called LCMC, now it's here and we're using tools like Lean and Six Sigma, not only for the plants and depots but for the headquarters and what I call the "light column" part of the business. But how well is it working? We don't have a good answer for that because we don't have a common metric. And there's been some resistance to that — "Bolton, you can't have a common metric because we're all different." My reply to that is, "You're all different, and for good reason."

Now from a taxpayers' standpoint, I see money going into one end of this LCMC. It gets consumed in there, but what do I get out the other end? We ought to be able to look at things simply that way and be able to, in a short sound bite, tell the taxpayers and ourselves what we're getting out of it. So we'll be addressing this particular challenge over the next few months — and if anybody has a good idea about how to measure performance across the board on how

well the LCMC concept is doing from the viewpoint of providing capabilities to warfighters — I'm all ears. Anecdotally, and with the metrics we've used in the past, we know this is fair. I gave you examples of the Chinook, JNN and Humvees. We know we are there, what the AL&T Workforce and our industry partners are truly capable of doing. We're now trying to figure out how to measure this across the board, and that will become the measure we use in the future as we integrate Lean and Six Sigma and whatever new manufacturing or business processes come along. We're still very much a work in progress.

It's the same as sitting here at the headquarters and saying we're going to spend some time and effort on Lean — your time and the boss's money — and you're not going to like it. It's the same question we've had over the last 15 years starting with TQM [total quality management], reengineering and the various acquisition reform movements. You ask yourself, as a result of all that, "How much have we really saved?" There's no answer. They never ask us to measure the actuals. We always have a briefing that says, "This is the best thing since sliced bread. We're gonna save so much money." And after browbeating several bosses, they finally give you money and you walk off to do your job. They never ask you what the return on that investment was or what everyone derived from it. For one thing, you've probably gone on to your next assignment and, two, they're probably gone from their position. We're trying to do something that, historically, has rarely been done in DOD

> Lean/Six Sigma is a set of tools that we use to provide a capability, service or part to the warfighter faster and better — and we hope by doing the first two — that it's actually cheaper.
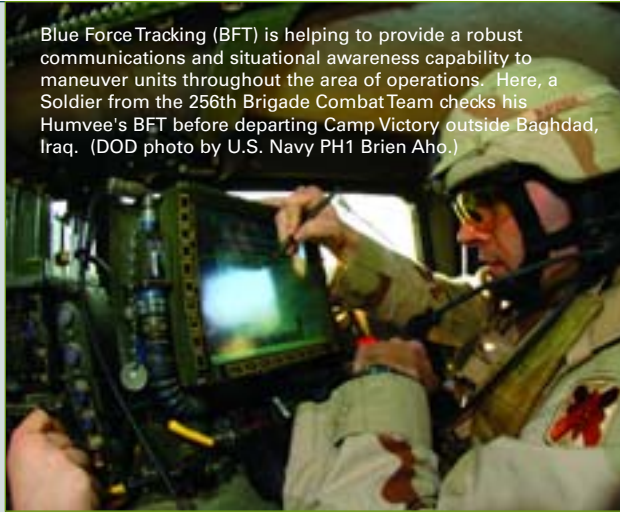
Blue Force Tracking (BFT) is helping to provide a robust communications and situational awareness capability to maneuver units throughout the area of operations. Here, a Soldier from the 256th Brigade Combat Team checks his Humvee's BFT before departing Camp Victory outside Baghdad, Iraq. (DOD photo by U.S. Navy PH1 Brien Aho.)

— develop some metrics that make sense and actually measure performance.

AL&T: As the AAE and ASAALT, what is the most salient point that you want our readers to know about LCMCs and where they are going?

Bolton: Good question. Let me put it this way, if you don't do the LCMC right, the life cycle management portion of our business, then we will not be able to sustain a world-class Army. Resources will get very, very tight when this war is over. And if we continue to do business the same way, we will not have the Army that this country deserves. Also, look at the workforce, I could have all the money in the world, but if I don't have an experienced, competent workforce, it doesn't really matter.

What I envision is that when you come into this business — whether it's through AMC, the laboratories or acquisition — your career path takes you through all aspects of the life cycle. You may be in a program office, depot, ammo plant or program executive office — those who will ultimately run this business will come up that experiential

path. And somewhere in there you'll get the requisite education and training. On the sustainment side, our logisticians get some basic training and they get some training later on, but that's it. And that's not enough. It's a hard business and we need more education, training and better tools. Every time we sit around a resource table, the problem that we have communicating to our budgeteers is that if you don't resource training and professional development, here's what will happen to us. We have a long way to go to make this business a whole lot better in terms of dollars, time and expertise. We need to begin implementing this now or we will suffer the consequences the next time the Nation goes to war.

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Fielding the Best Equipment to the Best Army in the World

Michael I. Roddin and Michael J. Varhola

Army AL&T Magazine recently spoke with LTC John Lemondes, Product Manager Clothing and Individual Equipment (PM CIE), Fort Belvoir, VA, about some of the latest items being fielded to units engaged in the defense of freedom's frontier.

When you look at a Soldier — no matter what his mission is, no matter what the environment he's operating in — from head to toe, everything that he has on him, except for sensors, lasers, optics and lethal weapons, comes from PM CIE — 273 items in all. (U.S. Navy photo by PO1 Jeremy L. Wood.)

AL&T: Briefly, what is PM CIE's mission?

Lemondes: Our mission is to continually upgrade, optimize and field the latest, most capable individual equipment possible for our Soldiers. What we try to do in our pursuit of functionality is make sure that whatever we're fielding has lower weight, less cube and more functionality than the item it's replacing. If we can achieve cost parity or cost reduction, that's good as well. We do look for economy of scale whenever we can, but sometimes the items that we buy are more expensive because we're paying for best value and higher capability for our end users — Soldiers.

AL&T: So your emphasis is on best value, not lowest bid?

Lemondes: Absolutely! Let me rephrase that question for you to answer: Given the opportunity to walk out of here into, say a cold weather environment with heavy snow, subzero temperatures and biting wind, just like the 10th Mountain Division's Soldiers were experiencing in Afghanistan this winter, would you want the lowest bidder providing your cold weather gear or the manufacturer with a product performance-based reputation that can deliver best value when and where Soldiers need that equipment most? We are always looking for products with the best capability, most functionality and lightest weight that assures the best value for our Soldiers.

AL&T: Talking about your mission a bit more, how do combatant commander and Soldier requirements

find their way to your organization for development?

Lemondes: Let me answer that question a couple of different ways. First, there is the traditional means. You have the U.S. Army Training and Doctrine Command (TRADOC) Directorate of Combat Developments (DCD) and TRADOC Systems Manager Soldier who are the user representatives. The DCD gathers the requirements and then coordinates them via a worldwide staffing process. Once the Soldier requirements are developed and substantiated, DCD gives us requirements and supporting documentation, and with that, we pursue materiel solutions. However, before we can pursue a materiel solution, we must go through a profile and see if

The 10th Mountain Division (Light Infantry) recently field tested the Improved Modular Sleep System depicted here. As PM CIE, LTC John Lemondes asked this rhetorical question, "Would you want the lowest bidder providing your cold weather gear in a cold weather environment with heavy snow, subzero temperatures and biting wind, or would you want a manufacturer with a product performance-based reputation that can deliver best value when and where Soldiers need that equipment most?" We believe the answer is obvious — take care of our Soldiers. (U.S. Army photo courtesy of PM CIE.)

there was something in the requirement that could be done prior to deciding to spend more money and buy something brand new.

However, given the Army's high operations tempo, the traditional system doesn't always work. The requirements process isn't agile or flexible enough to deal with emerging requirements from theater. As a result, combatant commanders will use an Operational Need Statement to address these unforeseen requirements. Given our operational flexibility and the numerous partnerships we have with the commercial sector, we can quickly develop, test and evaluate commercially available materiel solutions to defeat the new threats. The bottom line: we're working as fast as the acquisition process allows to fill combatant commander and Soldier requirements as quickly and cost-effectively as possible.

We primarily deal with the Infantry DCD at Fort Benning, GA. We also work closely with the Aviation DCD at Fort Rucker, AL, and the Mounted DCD at Fort Knox, KY, but the bulk of our coordination — 80-85 percent — is with the Fort Benning DCD. So when you look at that in terms of the

> The bottom line: we're working as fast as the acquisition process will let us to fill combatant commander and Soldier requirements as quickly and cost-effectively as possible.

scope of what we have to support and who we have to supply, you see how overwhelming it is for everyone involved in the process. PM CIE has approximately 273 different items of individual equipment, organizational clothing items and uniforms. Put another way, when you look at a Soldier — no matter what his mission is, no matter what environment he's operating in, no matter who the enemy is — from head to toe, everything that he has on him, except for sensors, lasers, optics and lethal weapons, comes from this office. Dress uniforms, T-shirts, socks, boots, rucksacks, cold weather equipment, ballistic protective equipment, sleeping bags, hydration systems, parachutes, take your pick — it's all part of the 273 items we supply. So to look at the impact of the PM CIE mission on the Army, just think in these terms: "We touch every single Soldier, everywhere, everyday." It doesn't matter where they are, it doesn't matter what they're doing, it doesn't matter who they are or what their mission is — we touch every Soldier, every day.

This brings us back to PM CIE's overall purpose, which is to upgrade and optimize equipment. From an operational standpoint, that means we are improving

the survivability, lethality and comfort of Soldiers. That's the real crux of it. When you get right down to it, we make people more comfortable, more capable, more lethal and more survivable. We help make better Soldiers! There's no other PM shop in the Army that touches Soldiers in the manner that we do.

AL&T: What is the most significant product that PM CIE has recently tested and fielded to Soldiers on the front lines?

Lemondes: Let's discuss some products that have direct life-saving benefits. The Improved First Aid Kit [IFAK], for example, is currently being fielded and one can only guess how many lives and limbs it will save. A key feature, the Nasopharyngeal Airway Device [NAD], will help mitigate one of the top three causes of Soldier battlefield deaths: choking. Specifically, the NAD helps clear the Soldier's airway. If he's choking from his tongue blocking the airway, saliva, blood, bones, teeth, facial trauma or throat trauma, the NAD can help the Soldier breathe more easily, ensuring oxygen is getting into the lungs. The NAD can be inserted into a Soldier's throat or through the nasal passageway or down the back of the throat at the top of the esophagus, bypassing the site where most choking takes place. The NAD allows the combat medic to bypass the Soldier's entire oral cavity, creating a clean airway from the nose into the throat, ensuring the continuation of breathing so the Soldier can be stabilized and then transported from the battlefield.

Another medical innovation included in the IFAK is the single-handed tourniquet. The Army's been around for 231 years, and we've finally developed a single-handed tourniquet.

This product is a quantum leap forward. When you look at what we do for a living, you can't help but ask, "Why didn't we have that product 10, 20, 50, 100 years ago?" When I think of the good fortune we've had in procuring this tourniquet in sufficient quantities to meet Soldier battlefield needs, I'm grateful we've been able to deliver this evolutionary product. We issued more than 31,500 IFAKs in FY05 and we'll issue approximately 361,000 in 2006 and 240,000 in 2007. It's a great piece of equipment and it has and will save lives.

Editor's Note: The contents of the IFAK include the NAD, single-handed tourniquet, a pressure dressing impregnated with an anti-hemorrhaging agent, adhesive tape and surgical gloves, all packed in a Squad Automatic Weapon (SAW) ammunition case. PM CIE worked tirelessly with PM Medical to procure the IFAK components.

AL&T: How does the new Army Combat Uniform (ACU) enhance Soldier performance? What is the general Soldier reaction to the new ACU and is it being well received?

Lemondes: I'm going to give you the good, the bad and the ugly on this. The new ACU has a general approval rating of more than 90 percent. Of the units to which it has been fielded, most Soldiers absolutely love it. There are, however, some units and some Soldiers who don't like it. You're going to find that with any type of new equipment, regardless of what it is. We have had our fair share of complaints that we've addressed as quickly as our manufacturing process allows. With respect to immediately identified technical failure points, we've addressed them, quickly, in only a few months, sometimes less than that. Let me give you an example

of some of the things that have gone wrong which we have fixed, then I'll get to the things that this uniform does that the Battle Dress and Desert Combat Uniforms [BDU/DCU] don't. Using my own uniform as an example, and I'm wearing an older one, you see that the waistband tends to fray. This uniform is five months old and it has had largely only garrison duty — I've done a few parachute jumps in it, but mostly garrison duty. On a typical Soldier's field uniform, the ACU would be worn much more and much harder than I do in garrison. So pretty quickly, from our own testing, we knew we had some challenges ahead of us.

So one of the things we've done is change the waistband material and make the band wider. That's one failure point. Another was that the crotches in the uniforms were splitting. By quickly addressing the problem and finding potential solutions, we were able to immediately resolve this challenge as well. The uniforms with reinforced crotches are being fielded as we speak. Because we received immediate feedback from the field, we identified the potential material failure and fixed it relatively quickly.

AL&T: Was it a failure of the material, the seam or a combination of both?

Lemondes: Look at this uniform like you would the summer-weight BDU. It is the same thing — 50-50 nylon-cotton ripstop fabric, so the blend and weave is exactly the same. You're looking at the summer-weight BDU right now, in a different pattern, with different technical features. I have a pair of

my own summer-weight BDUs that I like to use as an example. You can definitely see wear spots and other defects. It doesn't matter how you care for it, you're going to wear this uniform out, especially in combat duty. The current wear-out rate for this uniform in combat duty is six months. Don't expect to put this uniform on a Soldier and think he's going to complete a deployment to Iraq or Afghanistan with it. It's not going to happen!

The "problems" we are dealing with are simply educational. This uniform has additional washing instructions that have to be followed. These instructions are different from the old directions for the BDU, DCU and first ACUs. If the directions are not followed, the material will deteriorate more quickly. So there is a learning curve that we simply have to get out to the force, and we're doing things to expedite that process. We published an article in *PS Magazine* and I recently did an interview with the Pentagon Channel. The Pentagon Channel interview was a little different. My message was primarily about identifying knockoffs and informing Soldiers not to buy knockoffs. During the program, I showed the audience some sample knockoffs and tried to drive home the point,

The IFAK was recently fielded by PM CIE and has direct life-saving benefits for Soldiers injured in combat. The IFAK includes the newly developed NAD, the single-handed tourniquet and a pressure dressing impregnated with an anti-hemorrhaging agent. (U.S. Army photo courtesy of PM CIE.)

Army Combat Uniform

Patrol Cap constructed with double thick bill and internal pocket

Moisture-wicking tan T-shirt

Mandarin collar worn in the down position

ACU with pin-on skill badges

Hook-and-loop tape backed rank and insignia

Elbow Pouch with hook-and-pile tape closure for internal elbow pad inserts

Slide fastener front closure, reinforced with hook-and-loop tape, which provides a smooth surface when worn with the OTV

3-slot pen pocket for easy access, optimized for use with the OTV

Knee pouch with hook-and-loop tape closure for internal knee pad inserts

Leg cuff with front closure tie, which allows more comfortable closure on the outside of the boot collar

ACU with Boonie Hat

Hook-and-loop tape backed U.S. Army and last name tape

Tilted chest pockets with hook-and-loop tape closure, optimized for use with the front opening of the Interceptor Body Armor Outer Tactical Vest (OTV)

Infrared (IR) feedback American flag that provides both day and night recognition for friend or foe identification

Integrated blouse expands for increased upper body mobility

Hook-and-loop tape sleeve cuff closure, which provides positive closure for all sizes

Expandable calf storage pocket with hook-and-loop tape closure on the left and right legs

Combat Boot hot weather, or Combat Boot temperate weather

ACU worn with the Black Beret

Hook-and-loop tape-faced shoulder pockets that allow for the wearing of unit patches, skill tabs, and recognition devices

Permanent IR feedback squares affixed to each shoulder for nighttime identification

Shoulder pocket maximized for storage when wearing the OTV-easily accessible on the left and right shoulders

Mandarin collar worn in the up position to keep out debris and protect the neck when wearing the OTV

Forward tilted cargo pocket for easy access whether sitting, kneeling, or standing-incorporated elastic drawstring for positive closure on the left and right leg

ACU design is maximized for use with the OTV, with easy access pockets and maximized storage space

"Wait until the Clothing Sales store gets them in. Don't waste your money on cheap imitations."

There are a lot of reasons why you shouldn't buy knockoffs. Also, the ACUs are now available in the clothing bag and issued to units by the Project Manager Soldier Equipment fielding teams. Nevertheless, some Soldiers aren't going to listen and they're going to go out and buy their own. And the range of mimicry is extreme, all the way from the tops having button-down pockets — instead of zippers and Velcro® — like the old BDU. Counterfeiters have gotten so savvy that they're manufacturing the tags in the collar with false NSNs [National Stock Numbers], so a Soldier thinks, "That looks like a government-issue NSN, this has got to be real." Keep in mind that knockoffs won't have the glint tape. Talk about a positive feature that can mean the difference between life and death; the ACUs have them, and that's something that the old BDUs don't have.

AL&T: How does glint tape make the difference between life and death?

Lemondes: Because at night, it allows friendly forces to see you with low light/night vision devices in the near-infrared [IR] spectrum, and, as a result, can reduce fratricides. That's the intent. A Soldier wearing a nonstandard knock-off puts himself and his unit at risk.

When you get right down to it, very little is right on these knockoffs. The pockets are not the right size, metal versus plastic zippers — the list goes on and on. The bottom line: the new ACU is much more capable than the one that it replaced, and the BDU is considerably more expensive when you compare raw purchase price; maintenance price; having to sew on patches, rank, name tags, etc.; and laundering. The ACU has wrinkle-free treatment applied to it, so

it's wash and wear. Let's look at it from a cost perspective. This uniform (see figure on Page 44) costs approximately $78. The old BDU was approximately $56. So when you are posed with the argument, "Well, the BDU is cheaper, we should have that, and it lasts longer," well, it's actually untrue. You will make up the cost difference in this uniform in comparison to the BDU in one cycle of professional dry cleaning — which you're not supposed to do anyway on the BDU, but everybody did, and it degraded its IR capability. In one cycle of dry cleaning, and buying all of the patches and sewing them on, you have made up that cost delta. So when you look at the overall life-cycle cost to a Soldier to maintain a set of ACUs versus BDUs, it is significantly cheaper.

Let me address some other ACU technical features. First, you've got built-in knee and elbow pad holders — pockets at the knee and elbow — so Soldiers can put foam pads in there. And then for different types of missions and units, the uniform can be "sterilized quickly" — all insignia and patches can be removed. The ACU is a very flexible uniform, especially the back for larger men, which is a huge improvement because you don't have that tightness that

PM CIE LTC John Lemondes discusses some of the life-saving benefits of the new IFAK with the authors. He also discussed the strengths and weaknesses of the ACU he is wearing and what uniform improvements his team has directed the uniform manufacturing community to make. (U.S. Army photo by Mike Roddin.)

you did with the BDU. The hook and loop on the sleeves is also a nice feature. The ACU has a lot more pockets and drawstrings on one of the trouser cargo pockets, so you don't have to worry about items shaking out. Soldiers absolutely love these features.

And the most important thing about this uniform is that this wasn't an Army Acquisition Corps force-fed item — "here's your uniform." We had upfront Soldier involvement with the design, testing and fielding process the whole way.

AL&T: You mentioned that this uniform was made from a summer-weight cloth. Is this uniform then primarily for summer or warm-weather environments?

Lemondes: This uniform is for all three environments: woodland, urban and desert. What we found was that, regardless of where they're stationed, Soldiers prefer the hot-weather BDU to the heavier-weight temperate-weather BDU. And with the improvements in layering systems and undergarments — you know, the older polypropelene or newer silk-weight underwear and a variety of items now available in the inventory, that has allowed Soldiers to turn around and use the uniforms they prefer, regardless of where they're located. That's primarily why we chose this fabric.

AL&T: So, everything from parkas and field jackets will be available in the same pattern for cold-weather wear?

Lemondes: We are going to the universal camouflage pattern [UCP] conversion for everything. What makes this pattern so versatile is there's no black in it like the old BDU. The reason black was removed is because the naked eye discerns movement of anything black before any other color. By having that black removed from the pattern, you

remove a lot of potential for detection from the Soldier's uniform.

AL&T: And the intent is that the ACU will perform equally well in woodland, urban and desert environments?

Lemondes: Yes. The ACU might not be the best in any one of those environments, but it's the best all-around uniform for all of those environments. We will be converting pretty much everything else in the inventory over to this pattern, which, as you might imagine, is a considerable challenge. Just getting the uniform manufacturers stocked with these materials and making this pattern was challenging, and now you're talking about all materials that are used — from NOMEX®, Cordura®, various nylons and cotton for T-shirts — having to be produced in completely new colors. You see the primary T-shirt is no longer dark brown, it's sand colored. Everything is changing to the new color pattern. We actually have to go back to the fabric houses and get them to start rolling out thousands and thousands of yards of the right material just to send to the "cut-and-sew" vendors.

Plus, all the other components such as barrel locks, plastic materials, threads, tapes — all the individual components you don't even think about — have to be transitioned. Keep in mind that unit patches, and there are probably close to 500 unit patches Armywide, all have to be manufactured with hook-and-loop fasteners on them. As you can see, this uniform changeover had a fair amount of built-in challenges just from a sheer volume standpoint.

Transitioning completely over to the new pattern will take some time, which is why there is a mixed-wear policy in place. As units get fielded, you'll still see them wearing woodland or desert components with the ACU for the next couple of years because it's going to take time to replace all uniform items. The mixed-wear policy is in place through 2008. So, it's a pretty significant thing to stand up the entire industry base in America that makes uniforms and cuts and sews for the military to make it in this pattern. Given the Active and Reserve Components, it's a big Army.

AL&T: What other Program Executive Office Soldier programs is PM CIE actively supporting? What new clothing or equipment is on the immediate horizon for either Soldier testing or actual fielding?

Lemondes: We could literally talk for hours about all the new products we've got in development. I'll try to narrow the focus to something I think is really important. The Modular Lightweight Load-carrying Equipment [MOLLE] is one such product we're particularly proud of.

A key point I want to make is that the MOLLE rucksack is

The MOLLE rucksack, depicted here, is replacing the Alice system. The new MOLLE will revolutionize how Soldiers outfit and go into battle. This new ruck was designed with the Soldier as a system in mind so it is extremely modular, flexible and versatile to be reassembed based on whatever the operational mission calls for. (U.S. Army photo courtesy of PM CIE.)
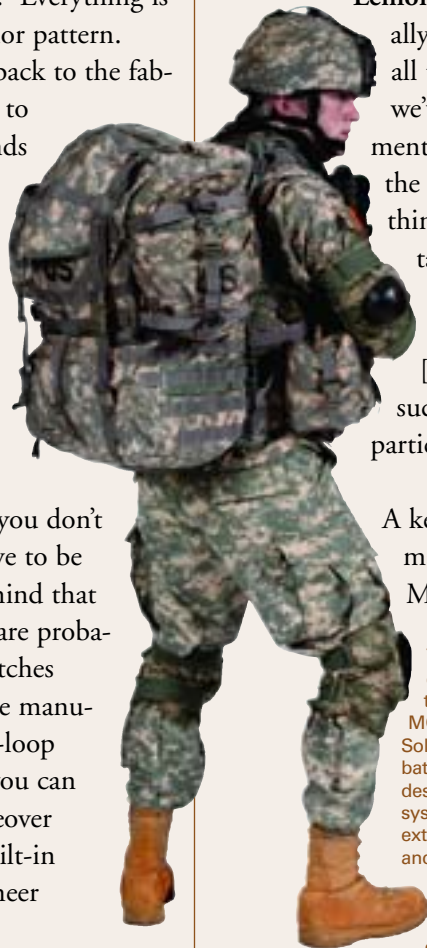
replacing the Alice system. What your readers need to know is that this new system is generation three-plus. Many Soldiers out there hear MOLLE and they think, "MOLLE's garbage, I had that and my frame broke." With this new frame, the ergonomics are much better than the previous generations. You could shoot it, you could drop it, you could drive over it, you could take the two biggest men in the world you could find and have them try to pull it apart — nothing will break it. I have personally seen it with bullet holes in it and seen it dropped from 30 feet with 80 pounds on it. It's a polymer made in conjunction with the automotive industry and it's really good stuff. This new MOLLE will revolutionize how Soldiers outfit to go into battle and will dramatically outperform the previous versions that were tested in 2000 and 2001.

There are approximately 260,000 sets of this version of MOLLE in the Army inventory right now. MOLLE is much more than just a backpack. In fact, it's a load carriage system designed to integrate with current body armor and uniforms. The large ruck is what Soldiers will deploy to the field with and it will contain all of their basic essentials. The key point I want to emphasize is that what we're trying to do is look at everything as it pertains to the Soldier as a system. And so, whether that's a sock or whether that's a pack, if you look at it systemically, then you see how it fits together better, thus, allowing better optimization.

Some key MOLLE features include the following:

• In the old days, you used to have to deal with clamps down on the sides of the waist belt to get the thing apart. That means that if it was sucked up against your stomach

or other gear, or you had another belt on top of it, it was physically impossible to get it off without help. Now you just hit a quick-release tab and it comes right out.

- With the new system, the straps adjust to your carriage. We're purchasing "one-size-fits-all" because the adjustable straps allow each Soldier to have a personally fitted pack. Alice packs did not have this capability and they didn't have the ability to actually handle heavy loads. The MOLLE will allow Soldiers to hang a whole bunch of equipment on it, and be able to carry the load high enough so it's over their hips.

- It has a broader kidney strap around the back for better support.

- The frame is anatomically shaped to fit your back better, but there's also compression space in there to allow you to wear an OTV [outer tactical vest] with SAPI [Small Arms Protective Insert] plates back there while you're wearing the pack. You wouldn't be able to do that with Alice because it's got an aluminum frame that pressed directly on your spine.

- You can jump this pack as well for airborne operations.

- Assembly includes an assault pack, where Soldiers can carry their Class V, their water and maybe a little food. You can actually buckle the assault pack right on top of the MOLLE ruck.

- One of my favorite features of MOLLE that is greatly improved from Alice is the breakaway shoulder straps. The shoulder strap connectors/snaps never used to hold up right, so a lot of Soldiers taped them shut to keep them from coming apart. However, if they had an

emergency, they wouldn't be able to get it apart. But MOLLE's new snap system has been completely redesigned and it's a breakaway that works when you need to drop your ruck quickly.

- This pack is worn underneath and contains everything you need for your ammunition magazines. You could put SAW ammunition in this, you could put a canteen in this and your IFAK. Then, you've got two grenade pouches as well, and you can load all sorts of magazines on MOLLE as well.

What MOLLE delivers is a core Rifleman's Set, which consists of your assault pack, your hydration system and your fighting load carrier, and then you're going to get a large ruck. And we'll also have a series of other sets: a Medic Set, a SAW Gunner's Set, a Grenadier's Set and a Pistolman's Set with a drop-leg extender and a holster for officers. We do have an improved modular holster specifically for the Military Police Corps that will allow the use of a 9 mm with or without an ILWIP [Integrated Laser White-light Pointer]. A Grenadier, of course, would have all sorts of pouches that would affix to the front of the lightweight load-carrying equipment to accommodate the 40 mm grenades. There's also a shotgun panel that you can put on here for shotgun shells. We've also designed MOLLE vehicle panels for all sorts of attachments that you can put inside your vehicle, your Humvee, Stryker, whatever. The key is modularity and flexibility, to reassemble this based on what your operational mission needs are.

Previously, all Brigade Combat Teams were issued MOLLE. Now, all

> Transitioning completely over to the new pattern will take some time, which is why there is a mixed-wear policy in place through 2008.

deploying Soldiers will receive MOLLE. So that includes your Echelons Above Brigade Soldiers, which are your individual replacement Soldiers. They will now receive a complement of the MOLLE. All deploying Soldiers might find themselves in a combat situation, and they must have the same configurable system as everybody else.

Of course, there are knockoffs of the MOLLE out there. They are not made to the same standard and Soldiers should not waste their money purchasing them.

PM CIE supports Soldiers in operational environments and improves their survivability, situational awareness, health, safety, mobility, lethality and sustainability by providing state-of-the-art ballistic protection and safe, durable and operationally effective individual and unit equipment. PM CIE enhances survivability through technologically advanced tactical and environmental protective clothing and individual chemical protective gear.

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First U.S. Army Cost-Avoidance Strategies Achieve Real Results

First Army Public Affairs Office

At First Army, cost avoidance is not just another catchphrase, but rather a concrete principle incorporated into every aspect of training and mobilization operations. While First Army's top priority is to provide the best training in the world to mobilized Army National Guard (ARNG) and U.S. Army Reserve (USAR) units preparing for war, accomplishing that mission doesn't have to come at a premium price.

The mission-essential, immersive training USAR and ARNG Soldiers receive from the Combat Training Centers (CTCs) and mobilization installations such as Camp Shelby, Hattiesburg, MS, helps prepare them for real-world combat operations in Iraq and Afghanistan.   For First Army, the 3rd Training Support Brigade, 87th Division, has performed that mission admirably over the past two years. Here, Soldiers from the 1st Scout Platoon, Delta Co., 155th Brigade Combat Team, 11th Armored Cavalry Regiment, clear a building of insurgents in Al Iskandariyah, Iraq. (U.S. Air Force photo by A1C Kurt Gibbons III.)

"Cheap is good," said LTG Russel L. Honoré, Commanding General, First Army. "It doesn't mean we sacrifice the quality of our service. It means we use innovation and creativity to increase quality while avoiding costs."

The First Army staff and subordinate commands have taken their commander's guidance to heart, implementing significant cost-avoidance measures and saving millions in taxpayers' dollars. In developing its cost-avoidance strategy, First Army conducted a thorough review of cost-producing activities at all the mobilization sites in the unit's area of responsibility. The study looked at using better business practices, the proper use of labor, eliminating duplication and excess capability, identifying hidden costs and collaborating at various training sites to learn what was charged for like services in different regions of the country.

By evaluating and comparing costs at different installations, First Army developed a cost comparison model to establish a fair price for a product or service supporting mobilization. If there is a significant difference in price for the same service in two or more regions, First Army then uses that data to leverage a better price in the more expensive areas.

"The initiative ensures dollars are spent in an intelligent way on things that are actually needed," said Deborah Murphy, Acting First Army Resource Management Director. "In today's environment of competing resource needs, we must make every effort to eliminate waste wherever possible."

> In developing its cost-avoidance strategy, First Army conducted a thorough review of cost-producing activities at all the mobilization sites in the unit's area of responsibility.

Mobilizing for War

Although First Army has always done its best to be a good steward of government resources, its deliberate campaign to eliminate and avoid unnecessary costs really began in earnest in the summer of 2004 during the stand up of mobilization station Camp Shelby. First Army's mission was to create a first-class mobilization and training site at the state-owned installation, basically from scratch, and begin training a brigade combat team (BCT) for war within weeks.

With a blank canvas at Camp Shelby, Honoré's vision was to create a CTC-like environment that would replicate conditions in theater as much as possible and maximize the use of training time and resources. "When Soldiers get off the bus at the mobilization station, they must feel they have arrived in Iraq or Afghanistan," Honoré remarked. "I call this approach theater immersion training. This concept has developed into a definitive, proven training methodology employed across the entire First Army area of operations today."

Transforming the southern Mississippi pine forest into the combat zones of Iraq and Afghanistan was no small feat for First Army and its lead training element at Camp Shelby, the 3rd Brigade, 87th Division (Training Support). Time was critically short

Forward Operating Base "Hurricane Point" at Camp Shelby, MS, was stood up in the summer of 2004 to create a first-class mobilization and training site. (Photo courtesy of Camp Shelby Public Affairs Office.)

and the Training Support Brigade's (TSB) logistics section was not organized, manned or equipped for this wartime task.

"The TSB S-4 (logistics) section was originally designed to support daily peacetime operations and surge logistical support operations to Observer Controller/Trainers as they trained, providing support to Reserve Component units during annual training periods," remarked MAJ James A. Mosser, Executive Officer, 3rd TSB. "The typical TSB S-4 section is very austere."

The logical answer to the time and organic resource constraints was to establish commercial contracts to make up the shortfalls, but the ensuing cost estimates left the First Army commanding general with sticker shock, and "cost avoidance" quickly became the new watchword across the command.

"LTG Honoré was very concerned with the prospect of spending significant dollars on commercial contracts without the assurance that every single other option had been explored first," Murphy explained. "He challenged the command to take a hard look at every cost-producing activity in the mobilization process, and he personally reviews every expenditure in excess of $100,000."

"Because of the time constraints, we were forced initially to accept higher costs for our first BCT," said COL Daniel L. Zajac, Commander, 3rd TSB. "But with the command emphasis from LTG Honoré and the help of the First Army Resource Management Office, we have made great strides in reducing costs with every training rotation."

Camp Shelby has trained four BCTs and dozens of smaller units since its birth as a mobilization station a year ago. The following are some of the major cost-avoidance initiatives undertaken there:

- *Creative Reorganization.* The first step to implementing an effective cost-avoidance strategy was to put the people and structure in place to get the job done. As previously mentioned, the traditional TSB S-4 section is not designed to handle a task of this scope. To remedy this, the TSB reorganized its logistics section into a support operations section built around the major cost-related functions: supply and services, lodging coordination, purchasing and contracting, warehouse operations, contingency operations, funds management and construction/engineering. The brigade found Soldiers within its organic units and mobilized others with the necessary skills and experience to fill the new positions in each functional area.

A Soldier peers out from his perimeter defensive position at Forward Operating Base (FOB) Hurricane Point, Camp Shelby. First Army's theater immersion training replicates, as much as possible, the conditions and potential situations Soldiers may face once they deploy to Iraq or Afghanistan. (Photo by Phil Manson, First Army Public Affairs Office.)

- *Borrowed Equipment.* Supporting theater immersion training and BCT deployment activities required a significant increase in tactical, transportation, maintenance, fuel, power-generation and material-handling vehicles and equipment. Instead of contracting for this equipment, the TSB canvassed First Army and other units from across the Southeastern United States, borrowing more than 150 items to include tractor-trailers, 5-ton cargo trucks, water trailers, fuel tankers, forklifts and generators. The total savings compared to commercial contract equivalents was more than $3 million.

- *Reutilized Equipment.* The Defense Reutilization and Marketing Service (DRMS) is the DOD agency charged with the disposition of excess property from all of the services. Thousands of items are available for free issue and re-utilization for DOD entities. Surplus equipment can be accessed through the Internet at **http://gsaxcess.gov**. The TSB at Camp Shelby searched the Web site weekly to find items it could use for theater immersion training. Items acquired included camouflage nets, tents, digital cameras and cell phones. The old cell phones were used to replicate trigger devices for improvised explosive devices used in the combat zone. In total, more than 200 items were recovered from DRMS, saving about $200,000.

- *Contracted Lodging.* Another cost-avoidance challenge

To increase training realism and authenticity, several Iraqi and Afghan villages were replicated, complete with traffic control points, live-fire "shoot houses" to train building-clearing techniques, minarets for mosques and low-hanging utility wires. (Photo by Phil Manson, First Army Public Affairs Office.)

was that the training timelines for the different BCTs at Camp Shelby overlapped — meaning that for most of the last year there have been two BCTs in different phases of training simultaneously. That required First Army to augment Camp Shelby with a second TSB from Fort Knox, KY, and mobilize additional Soldiers to support both BCTs. The result was that more than 700 training personnel required temporary lodging at Camp Shelby. Using its cost-comparison model, First Army was able to negotiate lodging contracts with local hotels and apartment owners for a considerable daily savings from the authorized per diem rate for the area. For a 12-month period, this initiative saved more than $2.2 million.

FOB Construction

One of the critical pieces of theater immersion is replicating the FOBs where the Soldiers will live and conduct operations from within the theater. At Camp Shelby, the TSB constructed three battalion-sized FOBs, consisting of 8-foot berms, entry control points, sleep tents, a tactical operation center, blast protection walls, hygiene trailers, guard towers, concertina wire and electrical power. The TSB's newly formed construction and engineering section, affectionately referred to as the "Acorn Construction Co.," took the lead on the projects with the help of the TSB's logistics support battalion. The 223rd

Engineer Battalion, Mississippi ARNG provided the bulk of the groundwork for one FOB as part of its annual training, saving $150,000 in contract costs. Internal operators using loaned equipment saved $400,000 and designing/building the guard towers internally saved $75,000. Consolidation of tentage from across First Army saved $148,000. Using a sandbagging machine from range control and a labor force courtesy of the Mississippi Department of Corrections to fill 300,000 sandbags saved another $300,000 in contract labor costs. In total, cost-avoidance measures saved $1.1 million in FOB construction costs.

Replicating Iraqi and Afghan villages is also a key aspect of theater immersion training, allowing company-sized formations to interact with "local" leaders and citizens and deal with insurgents who may be using a village as a base of operations. The rectangular structures common in Iraq and Afghanistan were well represented by 40- and 20-foot steel shipping containers. Instead of using new containers costing an average of $14,000 each, the TSB found used containers for $2,100 for the 40-foot versions and $1,500 for the 20-footers. Acorn Construction enhanced the realism of the structures by adding windows and doors, minarets for mosques, privacy walls, municipal and election building facades, taxi stands, tunnels, tombs and low-hanging utility wires. The estimated savings per village was

Using real expatriates as COBs added realism to the Soldier's theater immersion program training experience at Camp Shelby. Through careful negotiation of labor contracts, and leveraging by providing on-post housing and dining facilities for the COBs, more than $2.2 million in cost avoidance was achieved over the original contract proposals. (Photo by Phil Manson, First Army Public Affairs Office.)

$119,000 versus new containers and contract labor. There were five villages built at a total savings of $595,000.

Another project to increase the realism of training was the construction of two "live-fire shoot houses." These buildings are used to train building-clearing techniques with live ammunition. After studying designs from other installations, Acorn Construction and the logistics support battalion built the two structures with organic or loaned resources and locally purchased materials. This saved the taxpayer approximately $1.2 million compared to contractor costs to build the same facilities.

Civilians on the Battlefield (COB)

Theater immersion training would not be possible without civilians playing the roles of people our troops will encounter in their day-to-day duties once deployed. They represent mayors, police chiefs, religious leaders and insurgents. Many are actually Iraqi and Afghan Americans who speak the native languages and are intimately familiar with the customs and culture in the theater of operations. With 300 COBs required, a labor contract was the only option. However, the specifics of the contract were closely scrutinized to find ways to avoid costs. For example, management positions were streamlined, on-post lodging was used and meals were provided at government dining facilities. Also, detailed planning ensured that COBs were not present when training ceased. Total cost avoidance from original contractor estimates for COBs was more than $2 million.

Garrison Operations

In addition to the TSB, the garrison operations command at Camp Shelby did its part to

reduce total operating costs. Through detailed cost and efficiency analysis, savings were realized through leased vehicle modification or elimination, porta-john, temporary storage, labor and shelf-stable food contracts for a total savings of about $1.3 million.

First Army Implementation

As First Army learned cost-avoidance lessons at Camp Shelby, it quickly moved to implement those measures at its 10 other active mobilization sites in the Eastern United States with impressive results. For example, the single modification of using contracted and on-post lodging or barracks and installation full food service (dining facilities) saved more than $12 million.

In turn, as other installations discover creative ways to avoid costs, those initiatives are immediately shared with all the mobilization stations in First Army. Just like the training that First Army provides to America's finest, cost avoidance is an evolving strategy that is constantly improving. The ultimate goal is to achieve a confident level of cost avoidance by eliminating all non-value-added activities, maintaining high levels of quality in the training provided and continually improving all aspects of fiscal spending, while ensuring commanders and Soldiers have the resources to meet deployment timelines. In summary, it's been a win-win endeavor for First Army and the units it is responsible for training.

FIRST U.S. ARMY PUBLIC AFFAIRS MISSION: Communicate First Army's activities, capabilities, goals and priorities to internal and external audiences, assuring them that Reserve Component units are getting the best training and equipment possible and are well prepared to fight the global war on terrorism.

COTS Technology Digitizes the Stryker Brigade Motorpark

LTC Charles A. Wells and Jimmie Morris

The Product Management Office for Defense Communications Systems-Europe (PM DCS-E) recently completed a project leveraging commercial-off-the-shelf (COTS) products and technologies to support warfighters in Europe. PM DCS-E serves as one of three theater-specific PMs (Europe, CONUS and Pacific) reporting to the Project Manager Defense Communications Systems and Army Switched Systems, and its mission is to implement LandWarNet (U.S. Army enterprise network) through the Army's Installation Information Infrastructure Modernization Program (I3MP). PM DCS-E reports to the Program Executive Office for Enterprise Information Systems.

Strykers from 1-14 Cavalry, 3rd Brigade, Stryker Brigade Combat Team (SBCT), 2nd Infantry Division from Fort Lewis, WA, provide security in Mosul, Iraq. (U.S. Army photo by SPC John S. Gurtler.)

PM DCS-E provided cutting-edge data network support for the transformational 1st Stryker Brigade, which relocates from Fort Lewis, WA, to Grafenwoher, Germany, this summer. In coordination with the 5th Signal Command and U.S. Army Europe, PM DCS-E designed, engineered and implemented an expansion of the original Grafenwoher I3MP project, including the 1st Stryker Brigade headquarters and seven Stryker brigade motor pools at Vilseck, Germany. The next-generation Stryker Digital Motorpark (SDM) is a secure, standards-based, low-maintenance data network. It provides high-speed data connectivity to Stryker vehicles at their tactical motor pools, while requiring minimum support to maintain and operate. PM DCS-E completed the Systems Acceptance Test (SAT) for the Stryker I3MP project well ahead of schedule because of the adaptation and integration of COTS products into a military environment.

Digital Motorpark

Stryker battalions are assigned approximately 72 Stryker vehicles. Tactically, the battle command systems in each vehicle are networked using secure digital radios for communicating with the Tactical Operations Center, Internet Controller, Tactical Multinet Gateway or other network control centers operated by a signal company. In garrison, a Stryker brigade's vehicles are typically in the same motor park, which may cause their tactical radios to be inoperable because of interference, host-nation requirements or other operational considerations.

The SDM, installed by PM DCS-E at Grafenwoher, provides networking to all brigade Stryker vehicles by using various interfaces at seven Stryker motor pools. The ultra-high-speed (10 gigabit per second) data backbone installed by PM DCS-E at Grafenwoher was the fastest ever installed for an I3MP project. It ensures consistent, reliable

> The next-generation SDM is a secure, standards-based, low-maintenance data network. It provides high-speed data connectivity to Stryker vehicles at their tactical motor pools, while requiring minimum support to maintain and operate.

interconnection of all the brigade's motor pools and guarantees high-capacity access to LandWarNet supporting the network-centric Stryker brigade. All Stryker vehicles in the motor pool can connect to each other by accessing any of several communications distribution points at multiple locations. These points are connected via fiber optic cable through an underground duct system as depicted in the figure. The end result is the Stryker brigade can conduct training, simulations or operational planning in a garrison environment using equivalent (or better) connectivity than what's available in the field.

Motor Pool Distribution Point

The Motor Pool Distribution Point (MPDP) is a key SDM component because it provides on-the-ground data

Stryker Digital Motorpark Design
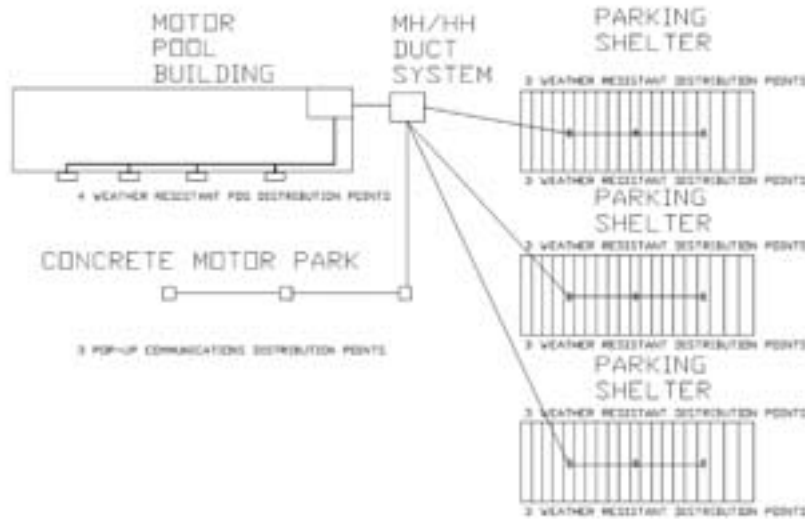
connectivity allowing Stryker vehicles linkage to the brigade network and LandWarNet. Each MPDP, located in the motor pool's cement floor, has two compartments. One compartment has a removable cover for maintenance and accessing a data cable distribution case known as a cable splice tray. The other compartment contains a Pop-up Communications Distribution Point (PCDP) that extends above the ground for easy data network access.

While in a closed position, the PCDP remains flush with the ground and can support heavy vehicular traffic (up to 90 tons) that passes directly overhead.

The PCDP allows quick and easy connection to a variety of Stryker vehicle network interfaces greatly speeding up connectivity to the brigade network and LandWarNet. (U.S. Army photo courtesy of PM DCS-E.)

To raise the distribution point, the Soldier turns and lifts a recessed aircraft-type handle. The distribution point requires only two pounds of pressure to release, and then rises automatically to a height of approximately three feet. Once above the ground, the Soldier can easily access any four sides of the distribution point, which are configured with multiple data network interfaces. This allows quick and easy connection to a variety of Stryker vehicle network interfaces, including eight RJ-45 copper Ethernet connectors, eight fiber optic connectors and two tactical fiber optic cable assembly connectors. Each connector provides 10/100 megabit-per-second connectivity to the brigade network and LandWarNet.

The PCDP was modified from an existing COTs product that provides convenient power access used in commercial industry at airports, shopping complexes and outdoor activities. The original COTS product (the Schacht EK 808) provides electrical and grounding connections primarily at airports including Frankfurt (Germany) International — Europe's busiest. PM DCS-E modified the original design for the Stryker project to provide quick, accessible data connectivity instead of power.

The PCDP provided leverage to a proven design used successfully in commercial environments that were just as demanding as a tactical military motorpool. Because of its demonstrated reliability in commercial applications, PM DCS-E had high confidence in the Schacht EK 808 modified version's potential to perform successfully in the field supporting Stryker. PCDP use was consistent with the overall I3MP philosophy of using commercial products and standards to quickly and effectively field cutting-edge data networks to the Army. This was the first time the physical design of commercial hardware was modified for a major I3MP project.

Industrial Ethernet Switch

Another COTS product proven critical to the SDM's success is the industrial Ethernet switch. Most Stryker vehicles use standard RJ-45 Ethernet connectors for network access. However, because the typical Stryker motor pool area exceeds the 90-meter distance limitation on Category 5 Ethernet cable, it was impossible to install an Ethernet-only network. The only vehicles connecting would be parked directly next to the motor pool building, which was impractical given the number of vehicles in a Stryker battalion. RJ-45 Ethernet connections were needed at the distant motor pool areas. PM DCS-E overcame the distance limitation by installing fiber optic cabling in the motor pool duct system and using the industrial Ethernet switch in the communications distribution points providing RJ-45 Ethernet connectivity for any Stryker vehicle.

The industrial Ethernet switch is a commercial product of the same type and manufacturer as the tactical Ethernet switch operating successfully on the Stryker vehicle. It has no moving

PM DCS-E has high expectations for this Ethernet switch based on its reliable performance in rugged industrial applications and in battle-proven performance of the tactical Ethernet switch on Strykers in the field. (U.S. Army photo courtesy of PM DCS-E.)

parts, a meantime between failure rate of more than 1 million hours of operation, works effectively between -40 to +70 degrees Centigrade, and meets military electrical surge and spike protection standards. PM DCS-E had high expectations for the switch based on its reliable performance in rugged industrial applications and in the battle-proven performance of the tactical Ethernet switch supporting Stryker in the field. Including the industrial Ethernet switch as a "drop-in" solution to the SDM saved PM DCS-E significant time, cost and effort during the design and integration phases, while

Securing the SDM

Security was a critical SDM design element. PM DCS-E ensured that network and physical security were built into the original design so the Stryker network would remain completely secure even though it was easily accessible. The design gives the local Network Control Facility (NCF) total oversight. Security is essential because the Stryker network is a closed private network connecting only to the motor pool access points at the NCF. It has complete control over the tactical network including who can talk to whom, activation or deactivation of network ports and turn-on or -off access for any port in any motor pool.

By default, the Stryker network is not connected to the Non-classified Internet Protocol Router Network or the Secret Internet Protocol Router Network. These network connections are activated only when authorized by the commander. Network physical security is guaranteed because access to all data ports on the PCDP is controlled by a physical switch inside a secure

room in the motor pool, which enables or disables power. Without the switch activation, it is impossible to raise a distribution point from the motor pool and access the network. All Protected Distribution System network distribution boxes in the motor pool remain locked until needed.

The benefits of using COTS products and technologies to support the SDM are remarkable. PM DCS-E expedited the system design and integration phases, completing the SAT more than two months ahead of schedule. The solution met all stringent security, reliability and durability requirements. While some COTS products, like the industrial Ethernet switch, can be added into a military-specific design, others — such as the Schacht EK 808 — can be successfully modified for military use. The SDM project demonstrates a tremendous advantage in leveraging commercially available solutions to the warfighter for immediate tactical benefit.

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JIMMIE MORRIS is the I3MP Lead Engineer for PM DCS-E. He is a retired Army chief warrant officer with more than 26 years of service in Army communications, information technology and security. Morris holds a B.A. in accounting from Troy State University and is Level II certified in both program management and information technology.

The SDM project demonstrates the numerous advantages of leveraging commercially available solutions to provide immediate tactical benefit where and when Soldiers need it most — on the battlefield. Here, SPC Tyler Sloan, 2nd Battalion, 1st Infantry Regiment, 172d SBCT, provides point security near Mosul, Iraq. (U.S. Army photo by SSG James L. Harper Jr.)

Distributed Testing Develops a Network-Centric Warfare Capability for the Future Force

Brian M. Simmons

New technologies and enhanced capabilities have made modern combat systems much more complex. The changing nature of threats, the nearly universal access to advanced technology and the requirement to adapt people, organizations and capabilities produce dynamic challenges. An outgrowth of this is DOD's transformation and the Future Force, which will be characterized by Joint, networked forces and effects-based operations. The networked force will operate over large distances while maintaining shared battlespace awareness, remaining agile and lethal, and achieving mass effects from separate locations.

The Future Combat Systems (FCS) 18+1+1 System-of-Systems (SoS) must link the Soldier to all battlefield platforms through a single network that must be capable of Joint and combined interoperability. Here, SPC Frank Mireles, 36th Infantry Division, patrols the streets of Hit, Iraq, with an Iraqi soldier April 11, 2006. (U.S. Army photo by CPL Brian M. Henner.)

Battlefield network-centric warfare (NCW) systems can comprise thousands of platforms and are much more complex than commercial and cellular networks. NCW systems must provide battlefield network connectivity within the military services while enabling them to be interoperable. The services' overarching networks — the Army LandWarNet, Navy FORCEnet, and the Air Force Command and Control (C2) Constellation Net — must interoperate as the Global Information Grid's service components. They must provide interconnected, end-to-end sets of information capabilities, associated processes and personnel for collecting, processing, storing, disseminating and managing information on demand to

warfighters, policymakers and support personnel. The heart of the transformed Army forces will be the FCS Brigade Combat Team (FBCT).

FCS is an 18+1+1 SoS linking the Soldier, at the heart of FCS, to 18 battlefield platforms through a single network. The platforms comprise eight manned ground systems, four unmanned air systems, six unmanned ground systems, various unattended munitions and ground sensors.

> Battlefield NCW systems can comprise thousands of platforms and are much more complex than commercial and cellular networks. NCW systems must provide battlefield network connectivity within the military services while enabling them to be interoperable.

Army development is focused on FCS, as is the Developmental Test Command (DTC), the Army Test and Evaluation Command's (ATEC's) technical tester. DTC's focus on distributed, networked military capabilities stems from the Army's top priorities:

- Win the war on terrorism while sustaining the all-volunteer Army.
- Accelerate the Future Force strategy.
- Accelerate military transformation and process improvements.

Testing FCS

These priorities also are driving distributed testing, which is the most efficient and effective method for testing a network-centric SoS. DTC is committed to making it a value-added part of the acquisition process. DTC has traditionally conducted serial developmental testing of independent platforms by performing tests, gathering data and then moving the system to the next test center. Evaluation would also typically be serial. This has worked well for today's systems, including the recent Stryker program. But for FCS, the integration of systems within systems, interoperability and networking are prime concerns. Consequently, DTC had to reconsider testing requirements.

Realistic FCS operations exceed the area of a single test range, but it can be expanded by linking ranges with live, virtual and constructive entities interoperating in real time. Customer system integration laboratories can also be linked into the distributed test capability by providing access before there is hardware to test. DTC's distributed test capability is providing a tactically relevant environment for the systems. It links all of DTC's test center instrumentation, modeling and simulation (M&S) and stimulation tools with those presented by the customer, creating a network-centric test environment.

FCS has many network nodes and platforms, and every entity is a potential node. The network requires testing along with all network nodes. Technologies will not all be delivered at once, but will be weaved into the Current Force as they become available. Because systems won't be available, M&S must play a key role in test and evaluation by providing realistic environments and stimuli. A mix of live, virtual and constructive simulation capabilities is used to immerse the FBCT into an operationally realistic, complex synthetic environment. Platforms will be tested as usual, but we recognize that they must be tested as more than just hardware-in-the-loop. The platform now can produce, consume and relay information as a node in the FCS network.

Building a Distributed Capability

DTC's distributed testing began with its Virtual Proving Ground (VPG) following an approach that led from the simple to the complex. The components of a complex synthetic environment existed across the command, and DTC test centers were connected, making the most effective use of developing simulation capabilities. Early efforts, such as the Combat Synthetic Test, Training and Assessment Range (Combat STTAR) and Project Constellation, used point-to-point telephone modems to link a small number of players in limited interaction simulations. Each test center achieved an initial operational capability in 1998, with the focus centered on integrating

> Technologies will not all be delivered at once, but will be weaved into the Current Force as they become available. Because systems won't be available, M&S must play a key role in test and evaluation by providing realistic environments and stimuli. A mix of live, virtual and constructive simulation capabilities is used to immerse the FBCT into an operationally realistic, complex synthetic environment.

Today's Stryker Brigade Combat Teams are integrating DTC-tested systems within systems. As FCS technology is spiraled into the Current Force, interoperability and networking remain a paramount concern for Joint system integration for future forces. (U.S. Army photo by SGT Jeremiah Johnson.)

those capabilities using the Defense Research and Engineering Network (DREN).

Subsequent experience came from the VPG's Synthetic Environment Integrated Testbed (SEIT), designed to be a high-resolution representation of the natural and man-made environment leveraging existing M&S and live capabilities. Using SEIT, the VPG conducted six demonstrations in five events beginning in March 2003 and culminating with Distributed Test Event 5 (DTE 5) Aug. 22-Sept. 2, 2005. During the first week of DTE 5, Army, Navy, Air Force and Marine participants executed three Joint tasks within a sample FCS scenario, preparing the battlefield for incursion of Army forces. The Army was the only service participating in the tactical scenario during week two, when the Current and Future Force brigades' performances were examined.

> Every test center now has a baseline simulation capability that connects across the DREN to support testing. A Distributed Test Control Center at each DTC test center manages interactions among them. DTC's IRCC at White Sands Missile Range, NM, gives a commander or test officer a bird's-eye view of SoS testing.

Every test center now has a baseline simulation capability that connects across the DREN to support testing. A Distributed Test Control Center (DTCC) at each DTC test center manages interactions among them. DTC's Inter-Range Control Center (IRCC) at White Sands Missile Range (WSMR), NM, gives a commander or test officer a bird's-eye view of SoS testing. The IRCC gives the tester sufficient situational awareness of the assets and players, ensuring the test progresses as designed. The IRCC serves as the single point of entry for the FCS Lead Systems Integrator by providing the test

execution interface between ATEC and the FCS SoS integration laboratories.

Lessons Learned

Many distributed testing lessons learned date back to Combat STTAR and Project Constellation. They underscore four requirements:

- Define the architecture first.
- Stand up a network.
- Develop test tools and processes.
- Establish test management and control.

Spiral development, a cyclical approach in which customers evaluate early results and engineers identify potential trouble spots before the system progresses to the next level, is key to the FCS acquisition program.

The desired architecture is visualized as an end state achieved after a series of intermediate states. All players in a simulation or distributed test have the same architecture, such as the Test and Training

The future networked force must be capable of operating over large distances. Distributed testing today will ensure the Future Force employs shared battlespace awareness, network connectivity and interoperability. (U.S. Air Force photo by SSGT Shane A. Cuomo.)

Enabling Architecture (TENA) — the middleware for test and training range instrumentation and simulation standard interfaces. In practice, test resources are a combination of distributed interactive simulation, high-level architecture and TENA linked into a mixed architecture. It will take several years to migrate the test range architecture to TENA.

The DoD Architecture Framework (DoDAF) descriptions for documenting range capabilities and interfaces can be extremely complex and time-consuming to fully document, so it is expedient in the interim to focus on key views to define and communicate that architecture to partners. These intermediate states exist because we must continue to support customers with existing capabilities.

FCS UA Network

PLATFORMS & SENSORS

APPLICATIONS

Training MSS

FCS UA Command & Control Sustainment

Application Layer

SERVICES

SoSCOE

System Services Interoperability Services

Messaging Data Store

TRANSPORT

JTRS Cluster 5

Cluster 1 NDL WIN-T

STANDARDS

Engineering

Doctrine Policy

Common Data Models Spectrum

Governance Standards

Architecture

With multiple entities, it's easy to envision the network as a wide area network (WAN) for long-haul, center-to-center connectivity with local networks in a test center. The DREN is the WAN of choice because of its high bandwidth, security and reliability. It is Internet protocol-based and available at all DTC test centers, ATEC and several Operational Test Command ranges. DTC has made substantial investments for local networks, especially funding installation of range-wide fiber optic cable and investing in encryption devices as well as network characterization and monitoring tools.

The network is often the most important part of a distributed capability. The cost, time, expertise and effort required to build and validate a network make it necessary to have a persistent network. For the customer to have confidence in the data from a distributed test, the network must function properly before the test. Additionally, the test must be closely monitored and the results documented, so impacts on the test data are known and corrected. The network will make or break distributed testing on any SoS program.

Validated and supported tools and processes are essential for executing distributed tests and analyzing results. More than 100 such tools have been produced through the VPG, including software for collecting, analyzing and reporting data; stimulating C2 messages; estimating radio frequency propagation loss; and network monitoring

> The FCS network is a network-of-networks, not necessarily tiered or layered, with many of them overlaying in the infrastructure, though each have distinct functions. Networks for intelligence, C2/maneuver and logistics share the same space for propagation of signals.

and analysis. A major tool for simulating the necessary environmental conditions is the 4-D weather model used at all DTC test centers.

Testing the FCS and Test Networks

The FCS network is a network-of-networks, not necessarily tiered or layered, with many of them overlaying in the infrastructure, though each have distinct functions. Networks for intelligence, C2/maneuver and logistics share the same space for propagation of signals. With the Joint Tactical Radio System (JTRS), they may exist as different channels in the same radio set, yet they will have distinct frequencies and cryptography to control access. The FCS tactical network will provide tactical interfaced communication for prototypes, surrogates, emulators and simulations. The FCS tactical voice network will occupy part of the tactical network spectrum via JTRS to provide voice communications.

Testing this complex network-of-networks is a great challenge that requires a crucial test resource — the test network. Its performance must be identified, quantified and isolated from the FCS network.

The FCS network is conceived as having a five-layer structure as depicted in the figure at left. Each platform and sensor represents the network terminus where the mission is accomplished. Applications are computer programs allowing Soldiers to perform training and C2 tasks. Services, especially the
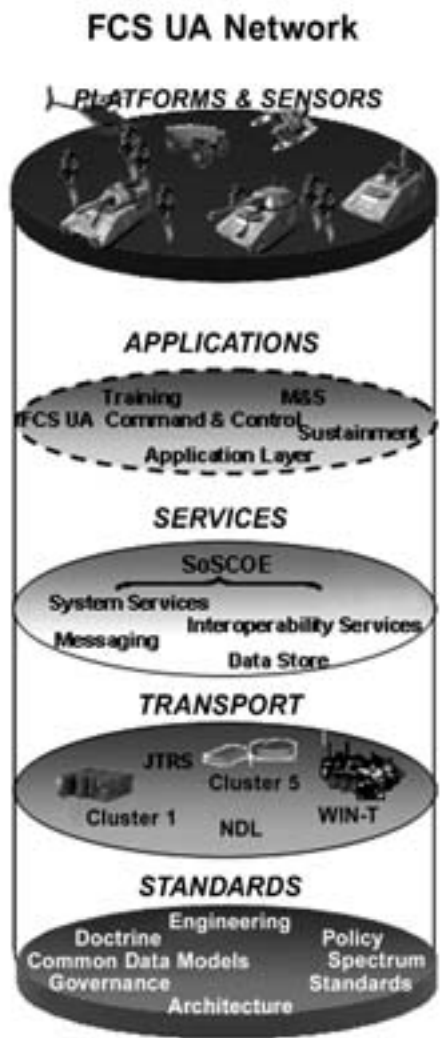
Communications systems must be tested by real Soldiers on real terrain during actual missions. Existing events must be used to test Joint service interoperability. Here, SSGT Aamir Greene (right), 2nd Marine Division, communicates with pilots providing close air support from his PRC-117 radio. Army SSG Jimmy Rogers, 1st Cavalry Division, remains in radio contact with his scout team during a "presence patrol" in Avon Park, FL, April 5, 2006, during Exercise Atlantic Strike III. (U.S. Army photo by SSG Ashley S. Brokop.)

System-of-Systems Common Operating Environment (SOSCOE) and databases, allow the applications to interoperate. SOSCOE is middleware that permits developers to quickly integrate new applications with common interfaces. Transport, JTRS and the Warfighter Information Network-Tactical (WIN-T) carry the information. Standards include JTRS standard waveforms, standard message formats such as the U.S. message text and Joint variable message formats, DoDAF architecture standards and *Army Regulation 5-12, Army Management of the Electromagnetic Spectrum.* These rules must be followed to ensure that the FBCT can work with anyone, anywhere, at any time.

> JTRS and WIN-T must be included in all FCS network tests under mission conditions because they bond the diverse FCS players.

Testing the FCS network means explicitly testing the five layers. For platforms and sensors, network simulation will be used to test the network during platform testing. End-to-end testing must begin immediately in the program. Mission threads are used as test drivers to assess application performance. Real Soldiers on real terrain must be engaged in early testing. Existing events will be used to test Joint service interoperability. Ideally, JTRS and WIN-T must be included in all FCS network tests under mission conditions because they bond the diverse FCS players.

Finally, existing test standards and methods will be used to test the FCS network. DTC must prepare technology for testing before complete systems are created and the technology must be ready and validated before test articles arrive. This can be achieved only by connecting the developer, tester and trainer from the outset and providing access to developing software, hardware, systems, processes and procedures. DTC's distributed testing uniquely addresses these challenges.

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Developmental Test Command's (DTC's) Aberdeen Test Center Is Focusing on the Future

Michael Cast

As the Army grapples with the technological complexities of developing and fielding its Future Combat Systems (FCS), the Army Test and Evaluation Command (ATEC) and its subordinate commands are working to ensure the testing and evaluation process directly contributes to the program's success and effectiveness. At DTC's Aberdeen Test Center (ATC), Aberdeen Proving Ground (APG), MD, unique capabilities exist for helping ATEC test and evaluate the 18 FCS, the network and the Soldier who will link them all together in a configuration the Army refers to as "18+1+1." Support for FCS throughout the DTC and its ATC is undergirded by innovative technologies and test procedures as well as emerging partnerships with the FCS program's other key players.

The program to develop FCS will rely heavily on DTC's test and evaluation program, and ATC will be a key player in engineering and testing its unique capabilities. (Image courtesy of ATC.)

The FCS System Integration Lab Optimization Study Team visited ATC in December 2005, looking for ways to consolidate technologies and processes whenever possible to reduce government expenditures on the FCS test and evaluation program. ATC sponsored briefings and tours for them, covering facilities and capabilities at APG that can provide valuable and unique support to the FCS test and evaluation program.

From Data Collection to Live-Fire Survivability/ Lethality Testing

ATC conducted more than 1,500 tests in FY05, completed nearly 470,000 miles of roadway tests and is the Army's premier test center for land combat systems such as tanks and trucks. "The experience and capabilities ATC has developed for testing such systems can provide crucial FCS program support," remarked Harry Cunningham, Director of ATC's Future Force Directorate. "ATC's unique capabilities have given us a proven track record for acquiring valuable test data from diverse locations and transmitting it in real time, or near-real time, to test customers and decision makers, regardless of location."

One ATC initiative making this possible is the Versatile Information System Integrated Online (VISION), which includes:

- State-of-the-art instrumentation for collecting data.
- Use of a Mobile Ground Station for tests in remote locations.
- Communications for rapidly distributing test data, including by satellite.

- An online digital library for posting test data and reports, photos, video feeds and other test information easily accessible to test customers and other authorized users.

Under congressional mandate, ATC is the Army's lead test center for live-fire survivability and lethality testing. ATC has decades of experience in conducting this testing and the right mix of ranges, instrumentation and expertise to conduct such testing for FCS. ATC is also DOD's lead center for direct-fire testing of firepower systems and has partnered with the Army Research Laboratory in testing electromagnetic and electrothermal/electrochemical ignition systems.

ATC Conducts Tracked and Wheeled Vehicle Testing

Electric and hybrid-electric vehicle testing is another area where ATC has experience and facilities applicable to the FCS program. The FCS-Tracked, a diesel-electric vehicle with a band track and lithium ion batteries, and the FCS-Wheeled, a turbine-electric 8-by-8 wheeled vehicle with an advanced structure/armor, are two prototypes unveiled by United Defense Industries in October 2002 featuring hybrid-electric drive systems.

Though a great deal of ATC's automotive testing occurs at various outdoor automotive courses at APG and another site in Churchville, MD, the center can also conduct tests and experiments in an indoor laboratory setting on its Roadway Simulator. The Roadway Simulator is the world's largest flat-track simulator for automotive

> ATC conducted more than 1,500 tests in FY05, completed nearly 470,000 miles of roadway tests and is the Army's premier test center for land combat systems such as tanks and trucks.

testing — a technology enabling testers at ATC to replicate various driving and road conditions with computer input. It is designed to handle vehicles as small as an Army Humvee or as large as a tractor-trailer rig, and is used to test braking and steering, suspension system and powertrain performance and various other automotive-performance characteristics. According to ATC personnel, the Roadway Simulator will be modified with new pedestals to accommodate the smaller wheel base of the FCS Manned Ground Vehicle variants.

Common data-collection technologies, protocols and data formats, which can support FCS test and evaluation across ATEC, are found in the Common Vehicular Instrumentation Initiative (CVII). Under this initiative, ATC has worked closely with ATEC's Operational Test Command to develop this suite of instrumentation technologies to collect the full range of performance data from test systems. CVII is designed to support data acquisition on everything from the performance of global positioning and communication systems to the performance of weapons and automotive systems. Additionally, the Army is looking at having common instrumentation embedded in vehicles as they are manufactured to enable data collection from them not only during testing but also throughout their life cycle.

One element of this initiative developed by engineers at ATC is the Advanced Distributed Modular Acquisition System (ADMAS), a configurable instrumentation suite designed to collect automotive performance data such as engine temperature, powertrain performance, fluid temperatures and fuel consumption.

ADMAS has been designed to fit in vehicles much smaller than tanks and

ATC is the Army's premier test center for land combat systems such as this Bradley Fighting Vehicle maneuvering in the Iraqi desert. ATC scientists and engineers are improving combat system survivability and lethality through rigorous performance testing, continuous research and development, and modeling and simulation. (U.S. Air Force photo by SSGT Shane A. Cuomo.)

work together to develop, test and evaluate the FCS network connecting vehicles and warfighters on the battlefield.

The APG facility is a phased project, with construction already underway. The initial phase of construction is expected to be completed this spring and the final phase is planned for completion in June 2007. When completed, it will include a viewing portal, also referred to as the test operation meeting center, for video teleconferences, test-event viewing and similar purposes, and two after action review meeting centers geared toward test directors. Among other features, the CCN will also contain a tactical operations control center, a server room, office space in various sections of the building, integrated system and test facilities, and areas for the operation of red, blue and gray cells, which represent enemy and friendly forces and noncombatants. Construction of a similar facility at DTC's White Sands Missile Range (WSMR), NM, is nearing completion.

trucks. With the aid of microchip technology and small memory cards such as those used in digital cameras, ADMAS has been miniaturized to produce Pocket ADMAS, a version about the size of a cigarette pack, which could fit unobtrusively on relatively small platforms such as unmanned ground vehicles (UGVs) or be used on individual Soldiers.

UGVs designed to scout and reconnoiter dangerous areas, remove dangerous objects such as mines, or serve as platforms for weapons or sensors are integral FCS components, and ATC is DTC's lead center for testing them.

Aberdeen Common Control Node (CCN)

In addition to ADMAS and VISION, ATC has undertaken initiatives that position it to support FCS testing, according to John Wallace, ATC Director. Among other projects, ATC will develop line-of-sight (LOS) and beyond-LOS ranges, a research and development range to test active protection systems designed to shield FCS systems from attack, a hybrid-electric-propulsion test laboratory, a test course for UGVs and the CCN.

The CCN, which is being constructed under the auspices of the FCS Combined Test Organization (CTO), was a key subject of the December 2005 briefings. The CCN at APG is designed to complement and augment Boeing's $35 million System-of-Systems Integration Laboratory (SoSIL) in Huntingdon Beach, CA. The SoSIL is a 140,000-square-foot testing and simulation lab designed to allow Soldiers and civilian experts to

ATC is DOD's lead center for direct-fire testing of firepower systems and has partnered with the Army Research Laboratory in testing electromagnetic and electrothermal/ electrochemical ignition systems.

gray cells, which represent enemy and friendly forces and noncombatants. Construction of a similar facility at DTC's White Sands Missile Range (WSMR), NM, is nearing completion.

The Road Ahead

The Army Science Board and the Senior Advisory Board of the Defense Advanced Research Projects Agency have recommended several areas of concentration for FCS/Future Force systems. Among these are an electromagnetic gun with a pulsed power supply, conventional cannon to supply direct and indirect fire, directed-energy weapons, robotics, wireless communication systems and sensors, hypervelocity anti-tank rounds, advanced armor and active-protection technologies.

ATC's Roadway Simulator is the largest facility of its kind in the United States. It will play a significant role in testing the Army's FCS components. (Photo courtesy of ATC.)

When asked by one of the scientists on the optimization team how ATC can realistically prepare itself to test FCS systems that have not yet gone from the drawing board to reality, Cunningham referred to the Operational Requirements Document (ORD) — the formal Army document that spells out the capabilities required. "The ORD gives us an idea of what these FCS systems will be," he projected. "It gives us clues as to where the Army may be headed."

To help the Army get where it is going, ATC and other DTC test centers have participated in several exercises that challenged their FCS testing capabilities, the most recent in August 2005 called Distributed Test Event 5. It was also known as the Multi-Service Distributed Event because of Air Force and Navy participation. Its purpose was to help participants develop technologies, tactics, techniques and procedures (TTPs) to pave the way for realistic testing of FCS and the network linking them, and to provide the capabilities for testing to reflect a Joint-service role in future military operations.

Range and Test Control Centers

DTC is developing an Inter-Range Control Center (IRCC) at WSMR and a Distributed Test Control Center (DTCC) at each of its test centers across the United States. IRCC is designed to be the control center for testing simultaneously across multiple sites and orchestrating events to keep them on track with test objectives. IRCC has played a leading role in past distributed events and has served as the point of entry in these events for the FCS Lead Systems Integrator — Boeing and Science Applications International Corp. DTCC is the event controller at the test-center level.

A network test node at ATC was established in collaboration with the Electronic Proving Ground, the lead DTC center for electronics and

ATC's Fire Impulse Simulator, known as "gun banger," is used to test recoil on gun systems. It is one of several Virtual Proving Ground capabilities employed to test FCS. (Photo courtesy of ATC.)

communications testing and network connectivity issues. This effort enables the simultaneous testing of the network while the platform is being exercised. Combining these two disparate test functions helps DTC to enact the FCS CTO philosophy of "Plan Together — Test Once," according to Cunningham. ATC is also actively engaged in providing fiber optic connectivity to the ranges that will be used by FCS. The ATEC Test Integration Network (ATIN) is designed to support the inter-range and intra-range connectivity requirements. This connectivity is designed to support network-centric testing during the development process by linking FCS development teams to Army test ranges, private-industry's system integration labs and other services.

MICHAEL CAST is DTC's Public Affairs Officer. He is a former Army photojournalist and Keith L. Ware Award winner. He has a B.A. in journalism from Arizona State University.

Modeling and simulation will increasingly play a role in the Army test and evaluation of FCS and the technologies and TTPs associated with using the System-of-Systems. (Artwork courtesy of DTC's Test Technology Management Division.)

CONFIRM MODEL

Hand-Held Barcode Scanners Provide In-Transit Visibility for Army Supplies and Equipment

Stephen Larsen

Army officials in Beaumont, TX, are one step closer to achieving in-transit visibility and total asset visibility for the thousands of tons of cargo that pass through the port each month, thanks to the implementation of a new generation of radio frequency data communications (RFDC) hand-held barcode scanners and secure, wireless Combat Service Support Automated Information Systems Interface (CAISI).

The hand-held scanners capture cargo linear and 2-D barcode information, such as the cargo dimensions and tracking work performed by stevedores. CAISI then wirelessly transmits the data to the Worldwide Port System (WPS) database at the port's terminal management directorate (TMD) office. Both the hand-held scanners and CAISI are products of the Program Executive Office Enterprise Information Systems (PEO EIS). The scanners were acquired via the Automatic Identification Technology (AIT)-III contract managed by the Product Manager (PM) Joint-AIT. The CAISI is a commercial-off-the-shelf (COTS) solution provided by the PM Defense Wide Transmission Systems.

As port operations returned to normal after Hurricane Rita, the hand-held scanners and CAISI were successfully tested together during full-scale loading operations Nov. 14-19, 2005. Stevedores loaded more than 1,200 pieces of cargo — including tanks, Bradley Fighting Vehicles, wheeled vehicles and containers — to a large, medium-speed, roll-on/roll-off (LMSR) ship.

Key Port for *Operation Iraqi Freedom* (*OIF*) Cargo

"This port [Beaumont] is kind of a center of gravity for troop movements," explained LTC Timothy Whalen, Commander, 842nd Transportation Battalion. "I'm a big advocate of CAISI. Testing it here sends the right message. The ports of Beaumont and Corpus Christi [TX] transport 63 percent of the military's cargo to Iraq. More than 80,000 pieces — some 14 million square feet of cargo — have passed through Beaumont for *OIF*," Whalen continued. "CAISI streamlines things. Previously, as we've scanned, the equipment data was vulnerable until we brought back the scanner and downloaded. CAISI makes it more efficient, more accurate and less vulnerable."

Chris Easton, Headquarters, Surface Deployment and Distribution Command (SDDC), Alexandria, VA, agrees with Whalen. "CAISI gives us the

An LMSR ship is unloaded at the Port of Ash Shuaiba, Kuwait. The large vessels are used to ship tanks, Bradleys, Stryker vehicles, Humvees, weapons and communications equipment, containerized supplies and spare parts anywhere in the world that U.S. forces need materiel. (U.S. Army photo by Stephen Larsen.)

ability to talk live to the WPS database from the cargo instead of having to wait four to five hours until we get the scanner back to download at the TMD office. The real key is to allow the scanner to solve problems at the cargo, rather than going back to TMD, and CAISI gives us the wireless 'bubble' that allows us to do that. The SDDC's goal is to increase the efficiency of data capture and data quality assurance processes, with an eye toward reducing manual effort," Easton added.

CAISI Wireless Fidelity (WiFi) Network

The Port of Beaumont implementation includes one CAISI Bridge Module (CBM), at the TMD office, and 16 CAISI Repeater Modules (CRMs), mounted on poles throughout the port in small weather-tight boxes called National Electrical Manufacturers Association (NEMA) enclosures.

According to Brad Amon, U.S. Army Information Systems Engineering Command Lead Systems Engineer for the CAISI program, CAISI offers a flexible configuration with multiple paths for redundancy. "When one radio link is blocked or interfered

with, CAISI radios create a self-healing meshed network. When one path to the root is down, the other radios automatically repeat for each other to form an alternate path to the root."

Easton said the CRM coverage allows stevedores to transmit data from hand-held scanners to the WPS database from nearly anywhere throughout the port's 50-plus acres, except from inside vessel holds, which is why the hand-held scanners can do both batch and real-time downloading of cargo data.

Another challenge is the industrial nature of the water port. "Look around," Easton said, in a staging area filled with tanks, Bradleys and other vehicles. "Our cargo is very large and forms 'canyons of steel,' with walls made of multiple corner reflectors. Sometimes down these canyons, we may lose coverage. Part of the job is to solve as many problems as we can here at the cargo, without putting it in the 'frustrate yard,' which costs dollars."

At the TMD office, Traffic Management Specialist Kyle Lee opened a hatch list on his computer that shows, for each hold section of a cargo ship, a description of the items stowed, their

SDDC's Chris Easton (left), observes a stevedore using a new RFDC hand-held barcode scanner to scan the information from a vehicle in the hold of a ship. The hand-held scanners and secure, wireless CAISI were successfully tested together during full-scale loading operations at the port Nov. 14-19, 2005. (U.S. Army photo by Stephen Larsen.)

volume and weight, the consignee of each, and the total volume and weight of materiel in the hold. Lee gave the CAISI/hand-held scanners tandem a thumbs-up, noting that it was the first test, and SDDC personnel would have a better feel for what the system could do with additional missions under their belts.

"So far, I am satisfied that these scanners will provide a real-time numbers update to WPS," Lee remarked. "I see an added advantage for our vessels section (stow planners) in that they can pull updates from WPS into the Integrated Computerized Deployment System more quickly. This allows them to stow the vessel as the mission progresses. The real-time updates at least provide an opportunity for us to stay even with the operation, if not actually work ahead. I think we have a good thing going here."

Gloria Barnes, WPS Administrator, gave her impression of CAISI. "I love it. We don't have to upload scanners,

> CAISI streamlines things. Previously, as we've scanned, the equipment data was vulnerable until we brought back the scanner and downloaded. CAISI makes it more efficient, more accurate and less vulnerable.

CAISI implementation at the Port of Beaumont includes 16 CRMs (inset), which are mounted on poles throughout the port in small weather-tight boxes called NEMA enclosures. The CRMs help maximize WiFi coverage throughout the port. (U.S. Army photos by Stephen Larsen.)

Stevedores drive medical vehicles onto a ship during full-scale operations at the port of Beaumont Nov. 14-19, 2005. (U.S. Army photo by Stephen Larsen.)

CAISI — A Standard, Accredited Army System

Army officials saw several advantages to the CAISI solution versus other COTS solutions, starting with cost. The cost of the current implementation at Beaumont was $55,000 — less than a third of what other commercial alternatives would have cost. "CAISI is very cost-effective compared to other means to get this done at Beaumont," Whalen reflected. "We get a lot of bang for our buck."

Another major benefit is that CAISI is a standard, accredited Army system. "It's a big advantage for the SDDC that the support infrastructure for CAISI is already in place," said Easton. "Also, compatibility with existing Army infrastructure is assured both now and into the future, and host-nation approvals for these radios and frequencies are already in place with major U.S. allies." Another plus, Easton added, was the CAISI support team. "I spent some time in Kuwait and had an opportunity to meet several of the CAISI field service engineers. I found them to be both knowledgeable and proactive."

so we have more real-time data. Before, we would see near-real-time data because we would upload the scanners a couple times a day. CAISI is better for stow planners and better for staging. It makes manifesting easier, reconciling easier — it makes everything easier. It also gives better in-transit visibility, even down to stow locations on a ship or staging locations on the port."

The SDDC selected CAISI in large part because it enables a WiFi capability in a port setting. This is a critical first step toward building a Battle Command Sustainment Support System (BCS3)-based 'digital

dashboard,' which is the vision of SDDC Commander MG Charles Fletcher. "He envisions the logistician should see things as the warfighter does. He calls it his BCS3-based dashboard," said Whalen.

The dashboard would allow logisticians at every step along the way to "drill down" at their laptop computer and see where pieces of cargo are in the supply chain. This would be possible with the near-real-time wireless exchange of data with WPS that CAISI allows, and would provide port commanders with more timely information about an exercise's progress. "I shouldn't need to wait until it gets to Beaumont to see a piece of equipment in the supply chain," explained Whalen. "I should see it in Fort Hood, TX, and all the way through the system. I don't want the warfighter in Fort Hood to have to worry about it — he has other things to worry about, like fighting battles. Right now, we have liaisons from Fort Hood here watching over things. We could avoid them feeling they have to be here if we could provide them the confidence of knowing where their materiel is."

"We're sustaining the war now as opposed to surging," Whalen concluded. "With what we send over there currently, it's absolutely critical that we see these items as they go because there's very little redundancy in the Army right now. CAISI facilitates us seeing this very critical cargo."

STEPHEN LARSEN is the PEO EIS Public Affairs Officer at Fort Monmouth, NJ. He has more than 20 years' experience writing about Army systems. He holds a B.A. in American studies from the College of Staten Island of the City University of New York.

Kyle Lee, 842nd Transportation Battalion Traffic Management Specialist, checks a hatch list at the port of Beaumont's TMD office. (U.S. Army photo by Stephen Larsen.)
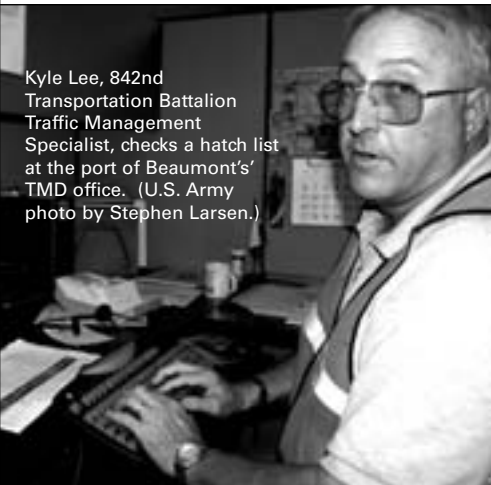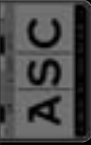
From the Acquisition Support Center Director

Close to a year has passed since I took over as the Acquisition Support Center (ASC) director. As I look back, it has at times been a great challenge and sacrifice for our organization's dedicated employees, but also a time for tremendous individual and professional growth as our team of problems solvers found new and innovative ways to reduce costs and increase efficiencies in supporting the Acquisition, Logistics and Technology Workforce and Army Transformation program. I would like to thank my senior staff and the entire ASC team for making this past year an overwhelming success. As I look forward, I challenge each of you to keep reaching for your professional and personal goals. Ultimately, with the necessary combination of training, education and experiential assignments, you will achieve them. Together, through our collective strength and enthusiasm, we can continue to make things better for our Army. Thanks for a tremendous year!

Change in Slating Approval

I'm happy to report on a change in the slating approval authority and process for centrally selected project/product managers and acquisition directors. Claude M. Bolton Jr., the Army Acquisition Executive (AAE), now has the responsibility for approving the slate of the selected principals to PM and acquisition director positions. He will have sole responsibility for the acquisition function within the Army Secretariat and the Army Staff. The Secretary of the Army (SECARMY) will continue to be the convening authority and the Army G-1 will still manage all centrally selected lists and command selection boards. All PMs and acquisition directors will be centrally selected.

Before this change, there were two approval chains: the SECARMY (through Army G-1) and the Director, Acquisition Career Management. Slating approval was a lengthy process even for minor changes. The new slating process creates one approval chain and reduces the time frame of all future command selection lists and subsequent slates. The new process combines the two chains and makes Secretary Bolton the final approving authority, although HQDA G-1 and the SECARMY will continue to provide oversight. For more information about this procedural change, contact MAJ Andrea Williams at (703) 805-1248 or **andrea.williams@us.army.mil**.

Intermediate Qualification Course (IQC) Launched

Congratulations to the first graduates of the FA51 IQC on acquisition leadership pilot class Feb. 17, 2006. The FA51 IQC class comprised 20 officers and 6 civilian Competitive Development Group (CDG) candidates. Student assessments were positive, with 65 percent of the students rating the course with an "A" and 35 percent giving it a "B." Their feedback will be incorporated into future iterations of the course to improve training value. FA51 IQC is the Army Acquisition Corps' functional-area specific Intermediate Level Education (ILE) follow-on course.

ILE, the Army's replacement for the legacy Command and General Staff Officers' Course (CGSOC), is required for Military Education Level IV for officers as of January 2006. The target population is primarily officers in year groups 1994 and younger, with some exceptions for officers who did not complete the legacy CGSOC or make sufficient progress to stay enrolled in the legacy CGSOC correspondence course. IQC is now a requirement for civilians to graduate from the CDG program. The FA51 IQC is part of the overall FA51 leader development plan for captains and majors. There are four classes scheduled per year with an optimal class size of 30 and a maximum class of 36. The class is offered through the University of Texas (UT) at Austin's Institute for Advanced Technology and the Army's Senior Service College (SSC) Fellowship program. UT-Austin is ideally situated near Army facilities at Fort Hood, TX, close to industry and academia. The course uses a combination of seminars, workshops, guest speakers, staff rides, site visits and mentorship from the SSC Fellows to accomplish these objectives:

- Provide tools to assist in developing acquisition leaders capable of leading, directing and commanding any acquisition organization at the O-5/GS-14 and O-6/GS-15 levels.
- Develop and motivate a pool of future senior officers trained in innovative leadership and prepared for complex acquisition challenges.
- Expose students to real-world customer needs and PM/program executive office (PEO) operations through a series of speakers, staff rides and field trips.
- Leverage the SSC Fellows and visiting senior leaders to provide student mentorship.
- Develop an enhanced understanding of the customer and his or her support needs, industrial operations and its defense interface, and the civilian workforce.
- Expose students to the knowledge base of a world-class, tier-1 university for practical application tools that have proven successful.

If you are interested in attending IQC, contact your assignment officer at the U.S. Army Human Resources Command's Acquisition Management Branch (for officers) or the CDG Program Manager (for civilian candidates). More information on the FA51 Leader Development Plan can be found by contacting the ASC proponent, LTC Aaron Brown, at (703) 805-1236 or **aaron.m.brown@us.army.mil**.

Briefings and information on the FA51 Leader Development Plan are available online at **http://asc.army.mil/programs/LDP/default.cfm**.

Specific information from UT-Austin on the FA51 IQC is available online at **http://www.iat.utexas.edu/FA_51.html**.

Wounded Warrior Program
The Wounded Soldier Program was created from an Army Vice Chief of Staff tasker called Disabled Soldier Support System. The initial program has migrated to what is now the U.S. Army's Wounded Warrior Program. On Jan. 6, 2004, the Acting SECARMY signed a memo authorizing the AAE to develop a program to allow Soldiers, wounded during operations, the opportunity to remain on active duty (AD). The Wounded Soldier Integrated Process Team developed a plan and ASC received the mission to go forward with the pilot program in November 2004. Soldiers eligible for this program are assigned to Walter Reed Army Medical Center (WRAMC), Washington, DC, where they receive medical care and are waiting for their physical evaluation board results to see if they are fit to remain on AD. Once accepted into the program, they will travel from WRAMC to Fort Belvoir, VA, and other communities within the National Capital Region to train with PEOs/PMs and other acquisition agencies. For more information about the Wounded Warrior Program, contact CW3(P) Sabrina Gay-McKoy at (703) 805-1249/DSN 655-1249 or **mckoy.gay@us.army.mil**. Additional information is also available at **https://www.aw2.army.mil**.
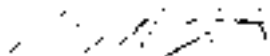
Craig A. Spisak
Director, U.S. Army
Acquisition Support Center

Practical Project Management — Program Perspective

COL John D. Burke

Practical Project Management — Program Perspective is the second in a series of short articles to improve Army project and product managers' (PMs') effectiveness.

"A businessman in uniform." These were the most hurtful and instructive four words spoken to me over the nearly 16 years of my acquisition experience. Hurtful because the comment really meant, "you're not one of us," and instructive because of the importance to have and convey a realistic, Army-team perspective.

The comment, made by a fellow officer, came during a Pre-Command Course conducted at Fort Leavenworth, KS. I hadn't seen him since moving into the acquisition track a few years earlier. The comment wasn't intentionally disparaging. He said it spontaneously when, upon meeting him, I explained what I had been doing since we last saw each other.

Army acquisition professionals have different time horizons, complexities, and regulatory and statutory requirements than our combat arms and line-Army counterparts. One of the key tasks for acquisition leaders is to set the perspective for their project to the outside community so the potential information gap between "them" and "us" is closed.

U.S. Army CWO Eric A. Saldana, 57th Medical Co., Air Ambulance, updates the data loaders for an aircraft global positioning system at Balad Air Base, Iraq, April 21, 2006. (U.S. Air Force photo by TSGT Denise Rayder.)

A Project's Internal and External Views

The internal and external view concept is borrowed from database design. Databases have an internal view of the data elements, database management programs, data design, rules, hierarchy and relationships. For instance, the data elements on a driver's license include metadata (definitions of data), database links, rules, relationships and the database engine (Oracle® or Access®). Specific data fields include the picture reference number and format, driver's license number, date of birth and others. These data elements are linked through a process that, except for the database designers and software engineers, is arcane detail.

The external view — what you hold in your hand — of the driver's license is the actual picture, the printed card, stamps and signatures. None of the underlying structure of the data fields on your license is visible to you, nor does it need to be. What you care about is the good-looking picture for the highway patrolman to see, not how it was produced on the card stock.

Reconciling the Internal and External Views

The first step is to understand the difference between the internal view and definition of your project and the external view. Although this concept may seem simple, like the underlying structure of the driver's license, within the project office there are sophisticated processes, knowledge and regulatory compliance that should be largely invisible to the external community. We often rely on what's familiar and thus easy to use in explanations. Unless there is a pressing requirement to educate others about the acquisition process, I recommend focusing on the output — what the product does.

A project office's workforce manages the internal view. Engineers of various disciplines, logisticians, cost estimators, contract

U.S. Army SPC Aaron Dewir, 57th Medical Co., Air Ambulance, performs a preventive maintenance inspection on a Black Hawk helicopter at Balad Air Base, Iraq, April 21, 2006. (U.S. Air Force photo by TSGT Denise Rayder.)

specialists, budget analysts and administrative support personnel represent expertise in their respective areas. A contract specialist's knowledge includes the *Federal Acquisition Regulation (FAR)* as well as the fixed, cost-plus and General Services Administration contracts in force.

A professional contract specialist should feel comfortable discussing a fixed-price-plus-incentive-fee contract and its sub-elements. Processes, rules, techniques and structure are examples of how, internal to the project, we manage programs every day. The internal view is incomplete without the corresponding external view.

The external view is the observer's perspective. There are many external views of your project. Examples include:

- Operational, such as combatant commanders and their Soldiers.
- Financial, such as Army, Office of the Secretary of Defense (OSD) and congressional budget offices.
- Personnel, such as local unions, the U.S. Army Human Resources Command and the U.S. Army Acquisition Support Center.
- Community, such as the local chambers of commerce, installation support and media.
- Industry, such as prime, support, subcontractors and competitors to your prime.

Case in point, a division commander sees your products from the dimension of combat capability, training skills, integration with other combat systems, required personnel proficiency, ranges required and safety, just to name a few. None of these elements directly relate to contract types or incentive fees. When the question comes in from a combatant commander regarding engine deliveries for attack aircraft, how does the project office respond?

Depending on the internal or external perspective, the G-4's answer could be, "Sir, the PM office says the 701C engines will be inspected IAW *FAR Part 30* by the GFR, then DD250'd by DCMA on or about August 17, where they will be shipped GBL to the APOD. There is an issue with DFAS about billing cycles … but DCAA is working with the prime to clear that up." This is an excellent internal description but a terrible external explanation. What the field commander really wants to know is when the engines will be installed to make his aircraft operational and "off ground." The representative from the project office answering this question has to understand and know the context to respond appropriately.
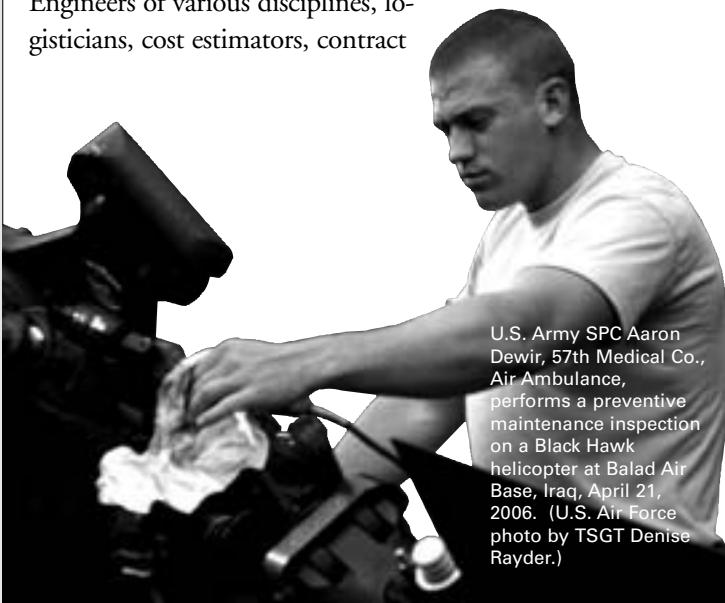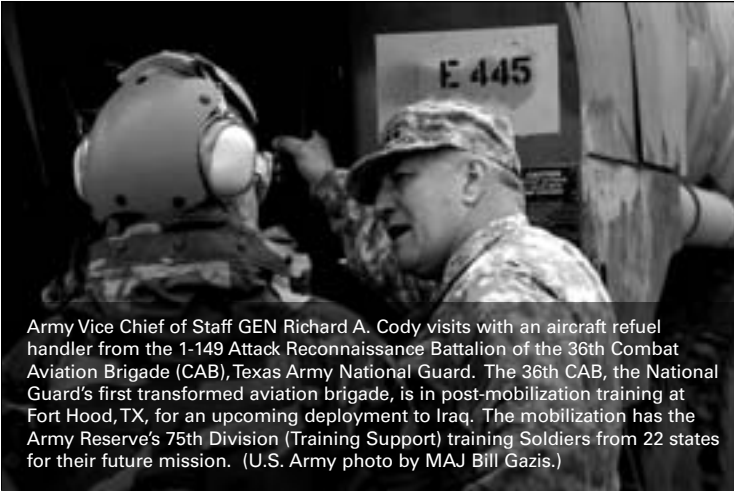
Army Vice Chief of Staff GEN Richard A. Cody visits with an aircraft refuel handler from the 1-149 Attack Reconnaissance Battalion of the 36th Combat Aviation Brigade (CAB), Texas Army National Guard. The 36th CAB, the National Guard's first transformed aviation brigade, is in post-mobilization training at Fort Hood, TX, for an upcoming deployment to Iraq. The mobilization has the Army Reserve's 75th Division (Training Support) training Soldiers from 22 states for their future mission. (U.S. Army photo by MAJ Bill Gazis.)

A second example is a congressional staffer who, when asking questions on cost and schedule, is unlikely to ask the same question as an Army or OSD cost estimator in the same vein. The question would probably relate to how your product compares to other products within the Army, other services, OSD priorities or industry pressures.

Successful project leaders must fully understand the internal view — or how the program management engine works — to relate and communicate the value to the external community. Likewise, within the project office, a full understanding of the internal processes and relationships is essential to the program's leadership so they too can relate inside and outside the program.

Developing a Workable Project External View

The project manager and the project will establish a means to reconcile the internal and external product views. In one sense this is easy because a program office has intimate knowledge of the product's cost, schedule, performance, contracts and funding profile. After all, this is the workforce's expertise.

The challenge is how to develop the project's portrayal of its capabilities, functions and systems. Once we know how to present these project elements, they can now be readily translated, understood and integrated between the internal and external views. The problem develops when there is no translation. When the user needs an answer to a question, the best response is often simply found between the internal knowledge and its use, "When does the engine for A451 come in?" Interpretation: when will the aircraft be operational?

An example of the project leadership's task is how to relate a specialized element such as electromagnetic interference (EMI) and the effects on supply provisioning and maintenance training. How do they explain that the different approaches to EMI have ripple-out impacts affecting how

we train maintainers and develop test equipment? The specialized tasks of repairing EMI-compliant wiring and shielding could be something the gaining division's leadership should know during the initial fielding conference because this is a low-density, high-skill task requiring specialized and recurring training.

There are ways to broaden or create opportunities for project office members to think of the internal and external views depending on the situation. The project workforce's best case would be to become familiar with the external communities' priorities, operating procedures, lexicon, personalities and background. They now must be capable of converting internal knowledge into external action so it becomes routine and tightly coupled. A secondary benefit is the education and trust transferred to the external community when the project office can succinctly explain how problems are solved in the context of cooperating together to accomplish the mutual mission.

Areas fruitful for gaining external perspective include participating in user training, including new equipment training, maintenance training and instructor training, as well as observing advanced individual or sustainment training. Another area is for the workforce members to participate in fielding conferences, division readiness reviews, division systems synchronization conferences and operational test and evaluation, especially the pre-test work-ups with the operational test unit.

A different venue includes the many statutory and regulatory interfaces with government agencies. Even without directly participating, sitting in on Government Accountability Office (GAO) inquiries, DOD Inspector General briefings, congressional staff briefings, media interviews and industry conferences are valuable training for the project workforce. Success is when the electrical engineer answering a question from the Army public affairs office realizes, "I suspected his question on EMI filters had to do with a small company in a congressional district looking for business, not ferrous properties."

Becoming 'One of Us'

Project office personnel aren't assigned members of an operational command, such as the 1st Cavalry Division, nor are they full-time members of the GAO or other federal agencies. As experts in the mechanisms that build the project's internal view, while also gaining knowledge of the external view of those same mechanisms, the project leadership and workforce is able to lash together the two viewpoints.

This ability to reconcile the two viewpoints enables confidence and trust that the PM and the project office really understand the mission. With that trust and reliance on the expertise that project office members bring to the fight, we broaden an appreciation for what Army acquisition can do across the Army spectrum.

A response to the label "businessman in uniform" should be, "I am an acquisition professional doing my job to help the Army, just like you. Let me explain what we bring. One team, one fight."

COL JOHN D. BURKE serves as the Director, Unmanned Systems Integration, Army G-3/-5/-7, HQDA. He has served as a project and product manager in Aviation and Battle Command programs since 1987.

News Briefs

Augmented Cognition Technology to Help Warfighters Handle Information Overload

Natick Soldier Center

Scientists at the Natick Soldier Center (NSC), the Defense Advanced Research Projects Agency (DARPA) and Honeywell Corp. are developing augmented cognition technology to solve the modern warfighter's new and overwhelming problem — information overload.

"Augmented cognition is a very important program for the Army because it will increase survivability and effectiveness," explained Henry Girolamo, the NSC DARPA agent for the Army's Augmented Cognition Program. "The technology we are developing will ultimately help warfighters when they are under stress and faced with information overload, and it will significantly improve mission performance."

According to Girolamo, DARPA and NSC are managing a research team led by Honeywell Laboratories that foster the development of prototype systems

that can detect and measure a combatant's cognitive state. The technology will assess the warfighter's cognitive state and then influence the way information is sent to the warfighter. This capability will be integrated into communications, computer and intelligence systems currently under development in the U.S. Army's Future Force Warrior (FFW) program and other transformational warfighter systems.

Less Stress for the Warfighter

Augmented cognition systems are expected to reduce warfighter stress by adjusting information management to the combatant based on his cognitive, physical and emotional states as well as environmental conditions. The augmenting system features neurophysiologic sensors that assess the warfighter's focus of attention. The sensors measure and record brain activity as well as physical responses, such as heart rate. This technology will help enhance warfighters' decision-making capabilities by helping them determine which available information is most important, and then to help them decide the best course of action in varying environments. The system will be designed to adapt to each warfighter's preferred learning style, such as whether they respond better to audio, visual or tactile cues and instructions.

Augmented cognition technology may be designed to respond to the context in which the warfighter is operating. For example, if Soldiers are moving in a tactical line formation, the system could use this information, along with brain signals, to better determine the state of attention and readiness for receiving information and in the modality most useful to the Soldiers.
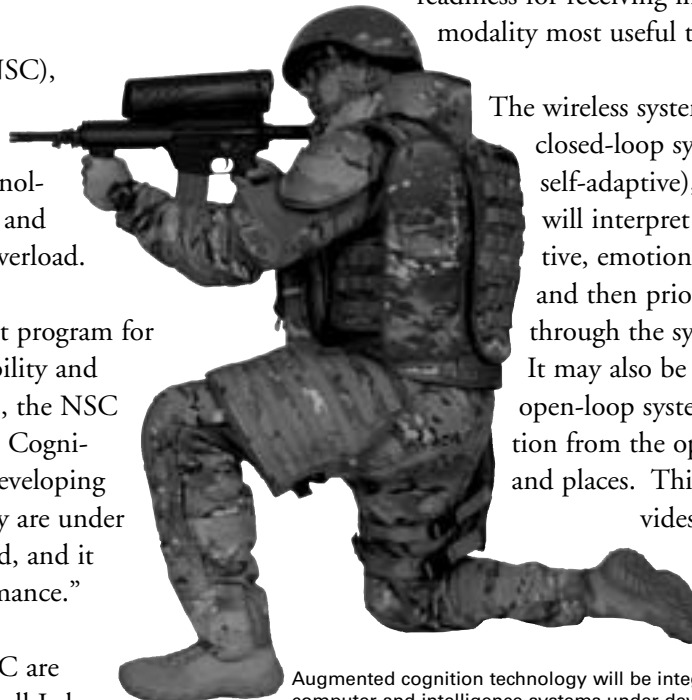
The wireless system will primarily be a closed-loop system (i.e., internally self-adaptive), meaning the system will interpret the warfighter's cognitive, emotional and physical state and then prioritize information through the system for the warfighter. It may also be designed to be an open-loop system, funneling information from the operator to other people and places. This type of system provides decision-making tools to a commander or a medic and assists them in directing or

Augmented cognition technology will be integrated into communications, computer and intelligence systems under development in the Army's FFW program and other transformational warfighter systems. (NSC photo by Jane Benson.)

helping the warfighter during mission execution. Open-loop technology is easier to design and allows Soldiers to receive information from remote sensors on equipment so they will be aware if the equipment is functioning properly.

Staying Focused on the Mission

Related studies performed by the U.S. Army Research Institute of Environmental Medicine have shown that sleep deprivation, exertion, hunger and exposure to temperature extremes can reduce the warfighter's ability to focus his attention and process information, which can lead to making poor decisions. NSC has also been exploring how humans process information while on the move and how this influences decisions and mission performance.

According to Dr. James Sampson, Human Factors Engineering Consultant, "Augmented cognition technology is the result of advances in neuroscience, computer technology and neuropsychology. Much research and engineering still needs to be done, but there is considerable promise in this technology for the military. In the future, it will be possible that this same technology will be used by the public at-large to manage information for a wide range of applications." For example, drivers may have such systems to help them be more situationally aware as they negotiate unfamiliar and complex networks of highways.

The goal is to incorporate the technology into the FFW program by 2007. For more information about the Soldier Systems Center, go to **http://www.natick.army.mil**.

Developing Nanostructured Advanced Protection Technologies for Ground Vehicle Systems

Ashley John

Using transparent armor to safeguard Army vehicles has been on the military's wish list since the 1960s, and the reality may be closer than ever. The U.S. Army Tank Automotive Research, Development and Engineering Center (TARDEC) is partnering with industry to develop a lightweight, transparent ceramic armor that can be applied in both military and commercial settings. Transparent armor solutions are at the forefront of an evolutionary transition into a major technological collaboration between the military and industry.

During the summer of 2005, Nanocerox Inc., a small technology-focused business based in Ann Arbor, MI, and lead partner General Electric's (GE's) Global Research Center, received $4 million to develop next-generation transparent armor. Congress appropriated the funds to support research in nanostructured armor materials.

The project entails developing both opaque and transparent armor solutions through the use of nanotechnology. TARDEC, Nanocerox, GE Global Research, the U.S. Army TACOM Life Cycle Management Command's (LCMC's) Cost and Systems Analysis Team, U.S. Army Research Laboratory and Program Manager Light Tactical Vehicles (PM LTV) are collaborating on a groundbreaking cost study to develop the break-even point for advanced transparent armor versus conventional transparent armor. TARDEC is taking the lead to ensure the nanostructured solution is cost-effective.

Nanostructured Transparent Ceramic Armor

The cost for current ballistic armor is substantial — monthly material costs alone exceed $1 million. Cost is not the only reason for researching transparent armor solutions. The ballistic glass currently being used adds hundreds of pounds to military vehicles. It also has the potential to create high levels of distortion and glare. Both of these concerns might be eliminated by use of nanostructured transparent ceramic armor. The weight is greatly reduced, while increasing warfighter protection.

TARDEC and industry are looking at new technologies for ground vehicle systems. Team members include (from left): Dr. Anthony C. Sutorïk, Nanocerox Director of Research; Dr. Douglas W. Templeton, TARDEC Emerging Technologies Team Leader; Dr. Christine M. Furstoss, GE Global Research Global Technology Ceramic and Metallurgy Technologies Leader; Dr. Mohan Manoharan, GE Global Research Nanotechnology Program; Richard Barnak, TACOM Cost and Systems Analysis Analyst; Lisa Prokurat Franks, TARDEC Materials Engineer; and David Holm, TACOM LCMC Cost and Systems Analysis Team Leader.

"Through nanotechnology research and development, we will be able to increase ballistic capabilities of transparent armor," said Steve Swanson, Nanocerox Chief Executive Officer. Nanostructured transparent ceramic armor's structure makes it stronger, harder and lighter than conventional transparent armor. The team is looking at new nanostructured advanced protection technologies for ground vehicle systems. Complex protection systems require materials with:

• High mass efficiencies
• Superior strength
• Damage tolerance under multiple impact conditions

Transparent armor also requires a very low distortion rate. Rapid progress in nanotechnology provides a unique opportunity to procure a tailor-made material with properties that surpass those of current transparent armor.

Teaming Technology and Research Initiatives

Developing unique, nano-engineered armor materials for armor systems by combining mechanical, optical and sensing properties allows for multiple uses. While DOD is focusing on the military applications of advanced transparent armors, industry is focusing on the commercial applications of nanostructured, transparent materials. "The armor will be serviceable to light and heavy combat vehicles, aircraft and missiles, and face and body shields that can be used for warfighter protection," said Swanson. "The uses of this product are endless. Transparent

armor would have many applications in homeland defense and law enforcement vehicles. It would also have architectural design application where increased strength is required to deal with man-made and natural threats."

By making this a joint military and industrial research project, a national, cost-effective basic research effort will quickly provide much-needed products for warfighters in the field. "There is potential to achieve the accelerated development of advanced transparent ceramic materials by making this a military, small business and GE Global Research effort," commented TARDEC Director Dr. Richard McClelland.

"The work done at Nanocerox is on the cutting edge of 21st-century armor for our troops," said Rep. John D. Dingell. "I am confident this work will lead to better, more advanced armor solutions getting to the brave men and women in the U.S. military."

TARDEC is an integral player in bringing nanotechnology government and industrial researchers and PM LTV together to ensure that this is a coordinated military and industry effort, and that the path to procurement is established and shortened. The Army and industry are at the forefront of groundbreaking developments in nanostructured transparent armor. Armoring the Army has evolved into an operational requirement.

Ashley John is a Booz Allen Hamilton consultant working in support of the TARDEC Communications Team and is the Editor of the TARDEC Quality Report.

Nanostructured transparent ceramic armor will greatly reduce the cumulative weight of current ballistic glass while also increasing Soldier protection inside ground combat vehicles. (U.S. Army photo by 2LT Paul Fisher.)

ALTESS News

Improving the IT Infrastructure Through Innovation and Integration

Bobby D. Jones

Product Manager Acquisition, Logistics and Technology Enterprise Systems and Services (PM ALTESS) serves as the Army acquisition domain gatekeeper. Over the past several years, PM ALTESS has developed several critical applications used by Army AL&T workforce members. Applications such as Web Army Research, Development & Acquisition Budget Update Computer System; Procurement and Research, Development, Test and Evaluation Forms; and Acquisition Information Management have provided necessary functionality to users for budgeting and reporting processes.

At the heart of these applications is the PM ALTESS information technology (IT) infrastructure, which encompasses all aspects of network communication, storage and security. It has evolved from a simple architecture into one built on the latest available technology to provide scalability and redundancy throughout the infrastructure. During the genesis of application development, the systems engineering division's network applications branch began modernizing the infrastructure for current and future growth by implementing the following improvements:

• Redundant load balancing devices to disperse traffic across Web farms to increase performance and provide higher availability.
• Gigabit Ethernet switching to ensure application and database servers could communicate as quickly as possible with the highly transaction-oriented applications architecture.
• Clustered firewalls to provide critical, highly available protection for the infrastructure's assets and applications.
• Additional bandwidth was added in the form of dual fractional DS-3 lines.

Recently, PM ALTESS installed a storage area network (SAN) to meet the large storage requirements of emerging commercial-off-the-shelf and government-off-the-shelf database applications. The SAN infrastructure consists of a 2-gigabit fiber channel switching and an enterprise storage array providing

"five-nines" availability (up to 5 minutes of downtime per year) and scalable to 146 terabytes using current technology. To help ensure data integrity, PM ALTESS modernized its tape backup architecture to include robotic tape libraries that help automate the data backup process by scaling petabytes of data.

Defense in-depth security principles are built into the ALTESS infrastructure. Starting at the Army security router, down to the server level, technologies such as firewalls, intrusion detection, packet filtering and anti-virus are used to secure the infrastructure. Virtual local area networks are used to isolate network traffic into virtual enclaves, increasing security and communication efficiency between groups of assets.

The network applications branch is responsible for the PM ALTESS IT infrastructure. The 14-member team includes government, contractor and student intern staff. They're highly proficient in networking, telecommunications, storage, security and systems administration. Their technical expertise provides the critical "glue" that bonds the infrastructure and ensures it is operating correctly. A key ongoing project is the implementation of a Network Operations Center that will provide the capability to monitor the infrastructure and proactively isolate and resolve problems to enhance network performance and operating environment reliability.

These elements combine to create a very flexible, scalable and available infrastructure to support user requirements. Other Army and DOD agencies have recognized the value and significance of the infrastructure and have selected PM ALTESS as their hosting site. The recent Acquisition Decision Memorandum for the Virtual Insight (VIS) application will further improve the infrastructure. The Oracle® Collaboration and E-Business Suites of the VIS application will create a module-based software infrastructure that builds upon the current hardware infrastructure. The overarching hardware and software infrastructures will provide the framework for future military business systems.

PM ALTESS has succeeded in building a flexible infrastructure capable of meeting virtually any requirement. As gatekeepers for the acquisition domain, PM ALTESS continues growing and improving the infrastructure to the Army horse blanket functional/area processing center concept. Through these improvements, PM ALTESS will pave the way for enterprise business systems by satisfying the requirements of today's military and positioning itself for future customer and network demands.

Bobby D. Jones is an IT specialist at PM ALTESS. He is the Supervising Team Leader for the Network Applications Branch.

Contracting Community Highlights

Challenges in Negotiating a Complex Indefinite Delivery Indefinite Quantity (IDIQ) Requirements-Type Contract

Greg Armstrong

This issue's feature article highlights the negotiating strategies of the U.S. Army Aviation and Missile Command (AMCOM) in getting the best value for the government within the constraints of a multiyear indefinite delivery indefinite quantity requirements-type contract for the Hydra-70 2.75-inch rocket system. Of particular interest, was the challenge of achieving fair and reasonable pricing when the government was not making quantity and item guarantees on what would be bought under the contract, if anything at all. This informative article delineates the strategies involved when evaluating 19 major subcontractors, using multiple pricing matrices and adding special clauses to the contract to protect the government's interests. The successful negotiation of this contract was a long and arduous process. The lessons learned from AMCOM in its achievement of fair and reasonable pricing for unknown quantities of multiple noncommercial items is exemplary.

In addition to the feature article and the regular "DAR Council Corner," we are proud to provide news and achievements from several of our contracting organizations, including best practices of the Contracting Center of Excellence Purchase Card Division in reducing the delinquency rate on purchase card accounts and the Wage Determinations OnLine initiative.

We appreciate support from the field in providing material for publication, and we hope you are finding the submissions informative and interesting. If you need further information on any of the topics presented, contact Ann Scotti at (703) 604-7107 or **ann.scotti@hqda.army.mil**.

Ms. Tina Ballard
Deputy Assistant Secretary of the Army
(Policy and Procurement)

The U.S. Army Aviation and Missile Command recently awarded a 5-year IDIQ requirements-type contract for the Hydra-70 2.75-inch rocket system. The Hydra-70, an Acquisition Category II program that is actually a family of munitions, is a free-flight rocket that has become the standard ground-attack rocket for the U.S. military. It was used extensively in the Korean War, Vietnam and *Operation Desert Storm*. The system performs numerous combat roles, including anti-materiel, anti-personnel and air-to-ground suppression missions. It also provides smoke screening and illumination functions. The Hydra-70 consists of various rocket configurations, designed for a specific target set or to accomplish a specific combat mission or training purpose. The system's rocket launchers come in two basic configurations, carrying either 7 rockets (M260) or 19 rockets (M261) per launcher. The rocket launchers are extremely versatile and are currently used on several different firing platforms including the Army's Apache, Cobra and Kiowa Warrior helicopters and other fixed- and rotary-wing platforms used by the Marines, Navy and Air Force, as well as several foreign nations.

Hydra-70 is managed by the Joint Attack Munition Systems Program Management Office (PMO) under the Program Executive Office (PEO) for Missiles and Space at Redstone Arsenal, AL. The system prime contractor is General Dynamics Armament and Technical Products (GDATP). GDATP is primarily engaged in composites technology and production, chemical/biological detection, protection systems and integrated armament products for air, land and sea platforms. The Hydra-70 rocket system is managed from GDATP facilities in Burlington, VT, with manufacturing facilities in Camden, AR.

Contract Description

The IDIQ requirements-type contract covers anticipated system requirements for FY05 through FY09, with a minimum estimated value of $984 million and a maximum estimated value of $3.4 billion. The evaluation process included a review of 19 major subcontractors from whom limited or full field pricing support was requested. Successful contract negotiation was a long and arduous process involving significant contributions by many people from both the government and industry. The contract was negotiated and awarded using Alpha contracting procedures and presented

CONTRACTING COMMUNITY HIGHLIGHTS

several unique challenges, one of which was getting fair and reasonable pricing when the government was making no quantity and item guarantees concerning what would be bought, if anything at all.

Challenges

This contract type inherently introduces a degree of risk to the contractor. This risk does not exist under other contract types, where exact quantities and delivery dates are known and where such additional risk would certainly find its way into the contract pricing. However, this contract type allows the government tremendous flexibility in meeting its requirements on time and at an overall fair price, even when those requirements cannot be determined and planned well in advance. The uncertainty surrounding the program's future, when combined with the fact that total program volume has such a significant impact on the contractor's total business and final costs, made the contractor understandably hesitant to make aggressive pricing assumptions for this contract. Besides, it is in the contractor's best interests to price a "worst-case" scenario when signing up to a fixed-price contract, especially when the period of performance extends years into the future. An approach was ultimately taken that balanced the contractor's risk of unknown order quantities with the government's risk of pricing based on much lower quantities than might actually be ordered.

The Solution

Resolution of these pricing concerns was achieved through the use of multiple pricing matrices and adding other special clauses to the contract to protect the government's interests.

Multiple Pricing Matrices. With no defined quantities to price, the contractor had to make certain assumptions concerning what quantities would be procured to price their proposal. The contractor proposed using three different pricing matrices (each matrix provides unit pricing for various quantity ranges of all items in all five years). For each matrix, a different set of best-estimated quantity (BEQ) assumptions was used to develop the pricing. The BEQs negotiated for the low matrix assumed a minimal program with no cargo rounds. The BEQs negotiated for the medium and high matrices assumed increasingly higher total program volume, with the high matrix quantity assumptions being approximately equal to historical volume. For the pricing of actual orders under the contract, the applicable matrix will be determined by the quantities actually ordered. This method allowed the contractor to avoid undue risk if

the orders under the contract were significantly curtailed as had been envisioned, but also protected the government's interests if order quantities under the contract ended up being high. Although difficult and time-consuming to propose and negotiate upfront, this approach was considered to be absolutely essential in protecting both the government's and the contractor's interests under the planned contract type.

Order Quantity Accumulation. A special cumulative quantity clause was included in the contract to avoid a situation where multiple low-quantity orders were placed, which would result in the government paying low-volume prices although the sum of order quantities placed would actually put the contractor in a high-volume production environment. This clause stipulates that the pricing matrix will be determined by the total of quantities placed on order during a defined ordering window each year extending from Sept. 1 through the end of the following February. The clause dictates retroactive re-pricing of quantities previously ordered during the window to consider the final sum of qualifying quantities ordered. The window includes the last month of each government FY to capture any year-end "sweep-up" requirements and allow them to be priced along with any of the following FY's requirements that are placed within the FY's first five months. This window is considered sufficient to capture most of the government's annual requirements and allow them to be priced as one order, although they may, in fact, be placed at different times under different orders. Orders placed outside of the ordering window will be priced on a stand-alone basis.

PMO Allocation Caps. The contract prices included an allocation of PMO costs to each item, based on its BEQ. This approach protected the contractor from being denied a full recovery of its PMO costs, but it virtually guaranteed the government would pay excessive PMO costs for any quantity over the absolute minimum required to get on a higher matrix and receive the more beneficial pricing. This "over recovery" concern was alleviated by a special contract provision, which places a cap on the total PMO allocation to be paid yearly. The cap is based on the negotiated PMO amount for each matrix in each year. Each pricing matrix shows the per-unit PMO allocation for each item. Once sufficient quantities have been ordered to allow the contractor a full recovery of the negotiated PMO amount, the unit prices of all subsequent quantities purchased during the ordering window will be decremented by the PMO allocation.

The Hydra-70 is used on several helicopters, including the AH-64 Apache shown here. (U.S. Army photo.)

SPC Melvin Reden, D Co., 3rd Battalion, 101st Aviation Regiment, 101st Airborne Division, loads a 2.75-inch rocket into the launcher of an AH-64 Apache helicopter. (U.S. Army photo by PFC James Matise).

Minimum Buys. Yet another special contract clause was added to protect the government's interests for costs associated with minimum materiel buys on select component parts. Depending upon the circumstances of a particular acquisition, minimum materiel buys may or may not be significant. But in our case, there were a select few component parts with minimum buy quantities far in excess of the quantities that would be required at the lower range quantities for a given end item. Many of these parts were common to multiple end items. With no guarantees concerning what the government would buy, the contractor initially priced a minimum buy for each of these components separately into each end item at the lower quantity ranges.

Given that the pricing point for the lower quantity ranges of each end item was the lowest quantity of that range, the potential overstatement in end-item unit price became significant. In fact, the minimum buys on two or three components served, in some cases, to nearly double the end-item unit price of cargo rounds at lower quantities. To get the unit prices of the cargo rounds at lower quantities down to a fair and reasonable level in comparison to historical prices for equivalent quantities, the contractor agreed to price the components at the economic order quantity (EOQ), even for quantities below that level. This protected the government from possibly paying multiple times for the same component hardware. To protect the contractors from having to buy excess and unnecessary materials at their own expense, a special clause was included in the contract that provides for

re-pricing of the end items if they are ordered in quantities below the component EOQ to cover the contractor's minimum buy requirements. Any excess materials would then be credited to the government on any future orders that might require re-pricing under the clause.

Achieving a consensus on fair and reasonable pricing for unknown quantities of multiple noncommercial items proved to be quite a challenge, requiring a significant amount of work by many people in addition to some creative contract writing. I believe our mission was accomplished. The negotiated prices are generally in line with historical prices, and the current contract was negotiated in a sole-source environment amidst abnormal uncertainty. The previous contract was awarded from a competitive solicitation, so the bar was set fairly high from the beginning. An obvious drawback is that contract administration will certainly be more difficult than normal. But, it provides the government almost unlimited flexibility in meeting its future requirements at fair and reasonable prices. It also allows the government to significantly influence the prices ultimately paid through proper management and placement of its requirements.

Greg Armstrong is a Contract Specialist with the PEO Tactical Missile's Directorate.

Supporting the Aviation Mission Through Contracting

Patricia Wilkinson

In the past, Fort Sill, OK, was home to aviation units. Now, once again, they are supporting multiple aviation efforts, including the training mission of Black Hawk and Chinook helicopters and their crews that are arriving at Henry Post Army Airfield from all over the country.

Recently, the First and Fifth Armies selected Fort Sill for their mission needs because the installation had the required infrastructure and facilities. However, the facilities needed repair, renovation and maintenance. The Army Contracting Agency-Southern Region, Fort Sill Directorate of Contracting (DOC), stepped up and executed numerous contractual actions to meet the installation's growing demands.

LB&B Associates Inc., the Directorate of Public Works contractor, upgraded existing airfield facilities and performed maintenance work in the hangars to accommodate aviation unit mobilization. The work included electrical system maintenance, crane load testing, checking ground points, fixing plumbing and repairing fire protection systems and security lights. LB&B also restriped the runways, repaired airfield perimeter fencing and constructed a wall to separate the administrative areas. Because of the influx of Soldiers after two years of inactivity, the Fort Sill Blockhouse Dining facility was reopened under the installation food service contract. Before opening, the facility required substantial renovations including asbestos abatement and installation of new fire and safety systems and kitchen equipment. T.P. Enterprises, Fort Sill's job order contractor, installed security fencing, repaired heating systems, replaced floor tiles, renovated latrines and provided eye-wash stations.

Fort Sill has also issued aviation maintenance requirements delivery orders to Sikorsky Support Services, DTS Aviation Services and Lear Siegler Services Inc. by using the Aviation Joint Administrative Management Support Services multiple award contract that was awarded by the Fort Hood, TX, Contracting Command.

A dozen Black Hawk helicopters and their crews from the 1st Battalion, 189th (Combat Support Aviation Battalion), were the first to arrive at Henry Post Army Airfield Sept. 9, 2004. Since then, the Fort Sill DOC and its contractors have provided continuous aviation mission support. Black Hawk and Chinook helicopters and their crews have deployed from Fort Sill to participate in *Operations Enduring* and *Iraqi Freedom* and to assist with earthquake relief efforts in Pakistan.

Patricia Wilkinson is a Contracting Officer with the Fort Sill DOC.

Eliminating Purchase Card Delinquencies

The Contracting Center for Excellence (CCE) Purchase Card Division has developed best practices for reducing the delinquency rate on purchase card accounts. Accounts are considered delinquent when payment is not made within 60 days. Delinquencies contribute to waste, resulting in the government paying interest fees and failing to get prompt payment rebates. In addition, delinquent accounts are suspended by the bank until the past-due amounts are paid, leaving the cardholder without purchase card privileges and, therefore, adversely impacting productivity.

The Army's standard for delinquencies is .75 percent. However, over the past 12 months, CCE's Purchase Card Division has succeeded in reducing its delinquency rate to zero by following preventative and reactive best practices such as:

- Ensuring each billing official has received approved payment policies and procedures training.
- Ensuring alternate billing officials are appointed to each account to certify payment in the absence of the billing official.
- Monitoring the delinquency report in the Customer Automated Reporting Environment (CARE) system and itemizing monthly breakdown of delinquent accounts on a monthly basis.
- Notifying billing officials by telephone and e-mail about their delinquent accounts.
- Sending e-mail notifications to billing officials whose names appear on the rejected payments report received from the Defense Finance Accounting Service (DFAS).
- Contacting resource managers and billing officials telephonically to provide assistance in processing manual payments of rejections.
- Working diligently with resource managers and DFAS after the bank's 45-day delinquency notice is received to correct deficiencies in lines of accounting, reallocation of funding and routing information in the CARE system.
- Contacting the billing officials for accounts that have been suspended because of 60-day delinquency to meet with the CCE Purchase Card Division chief to discuss the delinquency and develop resolutions.
- Conducting annual reviews of every billing official's account, including each account's payment history, and requesting corrective action plans to bring delinquent accounts into compliance to prevent suspension.

For more information about purchase card delinquencies, contact CCE Assistant Director Susan Taylor at (703) 695-0704 or **Susan.Taylor@hqda.army.mil.**

CELCMC Acquisition Center Career Intern Institute — A Proactive Approach for Transitioning New Employees Into the Workforce

Kimberly A. Tedeschi and Andrew O'Rourke

Over the past two years, the U.S. Army Communications-Electronics Life Cycle Management Command (CELCMC) Acquisition Center (CAC) has hired more than 100 interns, including several from our Fort Huachuca, AZ, and Washington, DC, satellite offices. The CELCMC CAC Career Intern Institute was created to provide formal class instruction on the acquisition process and to help interns transition into the workforce. Supervisory contract specialists and lead contract specialists were tasked to facilitate this important training. They shared their time, talent and particular areas of expertise with the newly hired interns by preparing briefings and handouts for classes. They took time out of their schedules, sharing their knowledge to preserve the integrity of the acquisition process, and their contributions helped accelerate intern development.

In addition to formal class instruction, briefings were provided by personnel from the CELCMC CAC, Defense Contract Audit Agency, the Defense Contract Management Agency (DCMA), CELCMC Legal Office, CELCMC Competition Management Office, CELCMC Deputy Chief of Staff for Resource Management, CELCMC Small and Disadvantaged Business Utilization Office and Program Manager Intelligence and Effects. These subject matter experts shared their experiences and viewpoints in certain critical areas that impact the way we do business. Presentation topics included:

• Knowledge management
• The Army single face to industry
• Market research and competition requirements
• Contracting with small business
• Professional development
• Reverse auctioning
• Procurement automated data and document systems training
• Ethics training
• Fiscal law
• Contract audit
• Alpha contracting

• DCMA's role
• Paperless contracting

After completing training, the interns were placed in positions within the CAC where they received on-the-job training and continued classroom instruction from the Defense Acquisition University.

As a result of this comprehensive training, the interns are able to work as contributing members of the CELCMC CAC team. They enter the workforce with a knowledge of how we do business versus being ill-prepared.

Feedback from the contracting officers who are assigned interns has been overwhelmingly positive. The interns also provided feedback saying the program is educational, yet enjoyable, and that the experience has helped them feel like team members.

A much deserved "well done" goes out to the facilitators involved, because they were key to making this training experience valuable to our newest acquisition professionals.

Kimberly A. Tedeschi and Andrew O'Rourke are CELCMC CAC Lead Contract Specialists.

Wage Determinations OnLine (WDOL) Launched

WDOL is the result of collaboration among the Office of Management and Budget, the Department of Labor (DOL) and other government agencies to make wage determinations issued by DOL readily available online (**www.wdol.gov**) to federal contracting offices and the public. This initiative is consistent with the federal government's objective to improve its efficiency and effectiveness by reducing paperwork through electronic processing.

WDOL eliminates the mechanical processing and submittal of *Standard Forms 98* and *98a* to DOL by contracting agencies. It also streamlines the process of getting wage determinations issued by DOL for service contracts subject to the *Service Contract Act (SCA)*. WDOL also automates the process for obtaining DOL's wage determination issued for construction contracts subject to the *Davis-Bacon Act (DBA)*.

The contracting officer (KO) now has the option to prepare this wage determination using the WDOL process.

Alternatively, the KO may request the wage determination directly to DOL by using the electronic 98 (e98) process. Whichever process is used pursuant to predecessor contractor's collective bargaining agreement (CBA), it is no longer necessary to include in the solicitation the clause notifying offerers of CBA submission to the DOL and that the agency is awaiting the wage determination decision that reflects the economic terms of the agreement.

In summary, the WDOL Web site offers its users numerous features including:

• Guidance to the KO on selecting the correct wage determinations for each contract action.
• Access to the current *SCA* and *DBA* wage determinations.
• Access to archived wage determination databases under both the *DBA* and *SCA*.

To assist the KO in selecting the correct *SCA* wage determination, the WDOL Web site guides the user through a series of questions. Based upon the responses provided by the user, the WDOL site will either identify an *SCA* wage determination or direct the requester to submit an e98 to DOL.

Alternatively, the WDOL Web site provides the requester with the option of going directly to the e98, thus avoiding the questions. If the KO has any questions or concerns, he or she can review the user's guide on the Web site or go directly to the e98.

The DOL e98 process generally provides an instant response linking the requester electronically to the wage determination. If the initial analysis cannot provide the wage determination request, an e-mail response will be sent indicating that it was referred to an analyst for further evaluation. After a DOL analysis, an e-mail response is sent to the requester. Following this process, the e98 system provides monitoring to alert the requester by e-mail if a wage determination is revised.

The responsibility in selecting the correct wage determination will continue to rest solely upon the KO. As specified on the WDOL Web site, compliance with the process and the guidance presented by the user's guide does not relieve the KO from the requirement to review the contract or solicitation, the *Federal Acquisition Regulation (FAR)* and DOL regulations.

The WDOL Web site has an extensive user's guide with links to pertinent information. It also features a robust library of related regulations, directives, desk guides and other information relating to contract labor standards application.

The WDOL is designed to be user-friendly, and has proven to need minimal training for federal agency and general public use.

FAR Case 2005-033 implements the WDOL into the *FAR*. As of February 2006, this case is pending publication as an interim rule.

This information is provided by Army DAR Policy Member Barbara Binney at (703) 604-7113.

Defense Acquisition Regulation (*DAR*) Committee and *Federal Acquisition Regulation* (*FAR*) Team Member Changes

Over the past several months, there have been numerous changes in *DAR* committee and *FAR* team members. Welcome to the new members who have volunteered to support the following committees and teams:

DAR Commercial Products/Practices	April Miller, U.S. Army Materiel Command (HQAMC)
DAR Construction	Parag Rawal, U.S. Army Corps of Engineers (HQACE)
DAR Contract Administration	April Miller, HQAMC
DAR Contract Finance	Susan Orris, HQAMC
DAR Cost Accounting Standards	Michael Gallagher, HQAMC
DAR Cost Principles	Michael Gallagher, HQAMC
DAR Environmental	Dr. Tom Kennedy, HQ, Army National Guard Bureau
DAR Government Property	Ann Scotti, HQDA
DAR Pricing Committee	Susan Orris, HQAMC (already on *DAR* Contracting Finance Committee)
DAR Systems Acquisition	April Miller, HQAMC
DAR Transportation Committee	Frank Giordano, Military Surface Deployment and Distribution Command (SDDC)
FAR Acquisition Finance Team	Michael Gallagher, HQAMC
FAR Acquisition Strategy Team	Jean Kampschroeder, HQAMC

The Army contracting community would also like to thank those who have left these positions:

DAR Commercial Products/Practices	Zalerie Moore, HQAMC
DAR Construction	Karen Thornton, HQACE
DAR Contract Administration	Zalerie Moore, HQAMC
DAR Cost Accounting Standards	Mark Gomersall, HQAMC
DAR Cost Principles	Mark Gomersall, HQAMC
DAR Environmental	Pete Stemniski, HQAMC
DAR Government Property	Joe Pieper, HQDA
DAR Pricing	Zalerie Moore, HQAMC
DAR Systems Acquisition	Zalerie Moore, HQAMC
DAR Transportation	Frank Galluzzo, SDDC
FAR Acquisition Finance Team	Mark Gomersall, HQAMC

Letter to the Editor

Dear Editor:

I just finished reading the article about changing the publication from bimonthly to quarterly in the online *AAC Transformation Newsletter* and I approve. I seldom find any articles or information in the magazine to be of benefit to me. This may be because I work in a contracting office that supports base-level contracting and the magazine seldom deals with installation support.
Carole Benson

Editorial Response:

Dear Ms. Benson:

Thank you so much for your comments about *Army AL&T* Magazine. It's always a pleasure to hear from one of our readers.

I appreciate your support regarding the distribution changes and going from bimonthly to quarterly publication. We are doing our part in supporting the Army transformation program. However, I'm disappointed that you're having difficulty finding articles about installation support or base-level contracting.

I invite you to look at the Contracting Highlights section of our magazine. It's a regular feature that provides in-depth

information and news relating to the contracting community. Featured in the January-March issue are articles regarding contracts awarded for Hurricane Katrina relief and a proposed change to a *Federal Acquisition Regulation* to simplify government property rules. Additionally, our upcoming July-September issue will be a special contracting-focused edition and will include numerous feature articles on Army contracting and a contracting update interview with Tina Ballard, Deputy Assistant Secretary of the Army for Policy and Procurement, Office of the Assistant Secretary of the Army for Acquisition, Logistics and Technology.

There are other Army publications and avenues to receive information about base level contracting and installation support. They include the *Installation Management Agency Newsletter* at **www.ima.army.mil**, the Army contracting Web site **http://aca.saalt.army.mil**, the Army Corps of Engineers *Public Works Digest* at **www.hq.usace.army.mil** and the *Army Logistician* at **www.almc.army.mil**.

I'm also excited about the launching of our new monthly *Army AL&T* Online "ezine." The inaugural edition was e-mailed to the entire Acquisition, Logistics and Technology Workforce April 6. I hope you have found it timely, interesting and informative.

Once again, thanks for taking an interest in *Army AL&T* Magazine.

Bob Coultas
Departments Editor

Editor's Note: We value your feedback. Please e-mail your comments or questions to us at LetterToEditor@asc.belvoir.army.mil.

Did You Know?

MG George O. Squier, a soldier-scientist who served as Chief Signal Officer from 1917 to 1923, created one of the Army's largest scientific organizations at that time. The Army's first Ph.D., Squier conducted electrical and radio research that led to patents and membership in the National Academy of Sciences. He established the Army's radio research laboratory at Fort Monmouth, NJ, and an aviation research laboratory at Langley Field, VA. Squier was also a pioneer of Army aviation. You may be more familiar with one of his later accomplishments—the invention of piped-in music. Squier is the founder of Muzak®.

In This Issue

Interviews With:
- **Army Acquisition Executive Claude M. Bolton Jr.**
- **U.S. Army Field Support Command Commanding General MG Jerome Johnson**
- **Project Manager Clothing and Individual Equipment LTC John Lemondes**

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