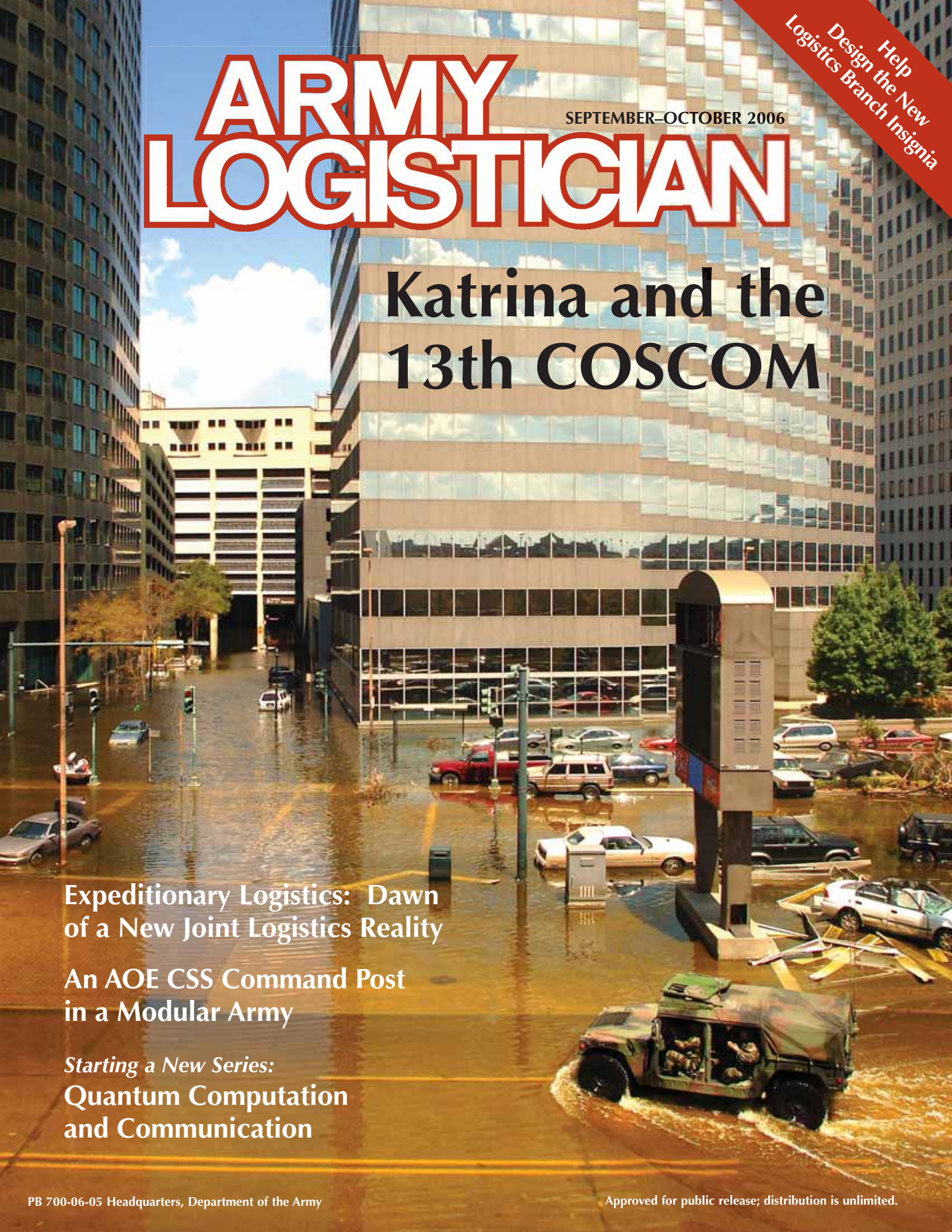

ARMY LOGISTICIAN

SEPTEMBER–OCTOBER 2006

Help Design the New Logistics Branch Insignia

Katrina and the 13th COSCOM

Expeditionary Logistics: Dawn of a New Joint Logistics Reality

An AOE CSS Command Post in a Modular Army

Starting a New Series:

Quantum Computation and Communication

PB 700-06-05 Headquarters, Department of the Army

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Cover: As the Army pursues the Global War on Terrorism on multiple fronts and manages the transition to the Modular Force, it also must be prepared to respond to domestic emergencies such catastrophic storms and forest fires. It has been a year since Hurricane Katrina, followed closely by Hurricane Rita, devastated the gulf coast. Among the many units from all of the armed services responding to the back-to-back disasters was the 13th Corps Support Command. Its story begins on page 22. In the cover photo, an Army high-mobility, multipurpose wheeled vehicle slowly makes its way through the flooded streets of downtown New Orleans, Louisiana.

This medium is approved for the 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:

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ALOG NEWS

ARMY APPROVES NEW AMC SUBORDINATE COMMAND

The Army recently approved the transition of the Army Materiel Command's (AMC's) Army Field Support Command (AFSC) at Rock Island Arsenal, Illinois, to the Army Sustainment Command. The transition has already begun; formal activation of the new command is scheduled for October.

"The Army is transforming, and so is the Army Materiel Command," said Greg Kee, AMC Deputy Chief of Staff, G–5, Strategic Plans and Policy. "The Army has transformed to a brigade-centric Army, and AMC is realigning its organizational structures to support the Army modular force from the brigade to the national level."

Transitioning to the ASC expands AFSC's current mission, which includes managing the Army's prepositioned stocks, the Logistics Civil Augmentation Program, and field support. The transformation adds reset synchronization, distribution and materiel management, and integration of logistics support with joint and strategic partners to ASC's missions.

So that it can more closely support combatant commands, ASC will add authorizations for several hundred Soldiers and realign a number of civilian positions with the command's global operations.

"Standing up the ASC is a step in the right direction to improve logistical support to the Warfighter for several reasons," said Lieutenant General William Mortensen, AMC Deputy Commanding General. "ASC enables us to be more responsive and provides a single interface point to the Soldier in the field for acquisition, logistics, and technology. Converting AFSC to ASC will link the industrial Army to the expeditionary Army and help provide greater logistical integration and support to deploying forces as well as redeploying and training forces."

CIVILIAN LEADER DEVELOPMENT OVERHAULED

As a part of its overall transformation, the Army is changing civilian leader development by speeding up implementation of the Civilian Education System (CES). The transformation is driven in part by the Army's growing reliance on civilians in an environment in which uniformed leaders are increasingly focused on warfighting missions.

CES is a series of four centralized, progressive, and sequential courses: foundation, basic, intermediate, and advanced. The foundation course is designed for civilians entering the Army and will be taught entirely by distributed learning. The basic course is geared toward civilians who exercise direct leadership. The intermediate course is targeted to civilian leaders who exercise both direct and indirect supervision. The advanced course is for civilian leaders who exercise primarily indirect supervision. These three courses will be taught by both distributed learning and resident instruction.

Implementation of the CES is scheduled for January 2007. Current leader development courses and programs will be phased out or transitioned into the CES curriculum as follows—

- Sustaining Base Leadership and Management (SBLM) class 06–03, which was scheduled to begin on 11 September, is canceled.
- Personnel Management for Executives I and II will end on 30 December.
- Strategic Leadership for Executives is canceled.
- Organizational Leadership for Executives is canceled.
- Leadership Education and Development (LEAD) Train the Trainer is canceled.
- LEAD will end 30 December.
- Intern Leadership Development continues until 30 December 2007.

CES progress updates will be posted to the Civilian Leader Development Transformation Community on the Army Knowledge Online Web site. Information also is available on line at http://amscportal.belvoir.army.mil.

ARMY CHANGES MAJOR COMMAND STRUCTURE

Based on a recommendation from the Army Campaign Plan, the Army has changed its major command structure to reflect a more effective and efficient command and control structure for supporting the modular force. With this change, the term "MACOM" (major Army command) will no longer be used. The Army now has three types of major commands: Army command, Army service component command (ASCC), and direct reporting unit.

(ALOG NEWS continued on page 49)

The Logistics Officer Corps: Growing Logistics Pentathletes for the 21st Century

BY MAJOR VICKIE D. STENFORS

Logistics officers have debated the merits of combining Ordnance, Quartermaster, and Transportation Corps officers into one "Logistics branch" ever since the first multifunctional support battalion was established 25 years ago. With today's emphasis on growing "pentathletes," it is only fitting that the logistics community take a look at what logisticians have been doing for the last 15 years to see if the functional area (FA) 90 multifunctional logistician program is enough or if multifunctional logistics should be taken to a higher level.

As many logistics units evolved from functional to multifunctional in the mid-1980s, it became evident that training had to be updated. The Combined Logistics Officers Advanced Course (CLOAC) was established in 1992. CLOAC later evolved into the current Combined Logistics Captains Career Course (CLC3). In 1993, FA 90 was created within the operations career field to support the development of multifuntional logisticians. For the last 12 years, the FA 90 designation has been used to indicate a Soldier skilled in multiple areas of logistics operations across the spectrum of combat service support.

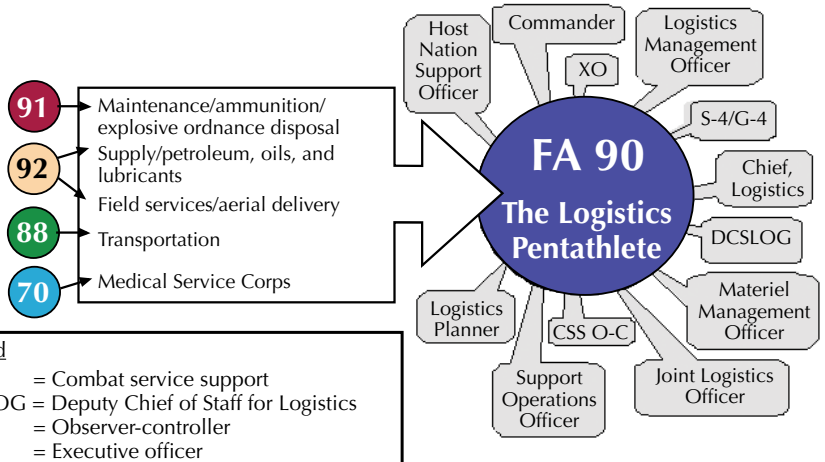
The charter to build Army leaders for the 21st century was the genesis of the establishment of the Officer Personnel Management System 3 Task Force in 2004. This task force is analyzing current personnel policies, procedures, and practices. As a part of the task force's analysis, the Chief of Staff of the Army (CSA) charged the Army Training and Doctrine Command (TRADOC) with developing an implementation plan for a Logistics Officer Corps.

The Army Combined Arms Support Command (CASCOM) took the lead within TRADOC and established a comprehensive integrated concept team (ICT) that included participants from Headquarters, Department of the Army; TRADOC; Army Forces Command; Army Medical Command; CASCOM; and the Active and Reserve components. The ICT met four times between November 2005 and April 2006 and, using the Joint Capabilities Integration and Development System, analyzed requirements and capabilities, determined future needs, and identified capability gaps. This process facilitated the development of potential long-term solutions by establishing a comprehensive crosswalk among doctrine, organization, training, materiel, leadership and education, personnel, and facilities (DOTMLPF) domains. Major tasks included analyzing current and future logistics units, reviewing logistics officer positions in manning documents, examining Basic Officer Leadership Course Phase III programs of instruction, and conducting a survey of logistics officers.

Some significant trends and insights surfaced during the analysis. For example, it became apparent that officers must be designated and trained as multifunctional logisticians earlier in their careers. Although approximately 60 percent of all logistics captain positions are currently functional, this number is decreasing. By fiscal year 2008, 55 to 60 percent of all captain positions will be coded multifunctional. Over 60 percent of field-grade logistics officer positions are already coded multifunctional, and that number is growing. Officers from all three logistics branches (Ordnance, Quartermaster, and Transportation) in the ranks of captain to colonel serve in many multifunctional-coded positions throughout their careers.

Functional Area 90A Multiskilled Leader

Part of a joint team . . . competent in planning and directing multifunctional logistics operations across the tactical, operational, and strategic spectrums.
—Department of the Army Pamphlet 600-3, Commissioned Officer Professional Development and Career Management



The analysis confirmed that, despite these statistics, there is a continuing need for functional expertise at all grade levels. Therefore, a way must be found to develop functional expertise in niche skills such as petroleum operations, strategic transportation, and explosive ordnance disposal. The analysis also revealed that life-cycle manning could affect the developmental assignments of officers in ways not yet modeled, and this could affect the experiences of logistics officers.

The ICT developed several courses of action that included training strategy modifications, doctrine updates, and organizational changes. In a May update on the progress of the ICT, the Commanding General of CASCOM presented several courses of action to the Chief of Staff of the Army.

The CSA-selected course of action met most of the identified requirements and described a Logistics Officer Corps made up of the three current "Logistics Corps" branches (Ordnance, Quartermaster, and Transportation) and the creation of a new Logistics branch. Officers will be inducted into the Logistics branch after graduating from CLC3. Each logistics officer will be required to have at least one functional area of expertise, such as petroleum operations or strategic transportation.

Many key tasks must be completed before this plan is implemented. The ICT expects the plan to be implemented fully by July 2007.

The number-one question on everyone's mind probably is, "Okay, so what does this do for me?" There are several answers to this question—

- Establishing a Logistics Officer Corps makes it clear that, first and foremost, the Army expects its logistics officers in the grades of captain through colonel to be multifunctionally educated, skilled, and experienced. Command opportunities will be greatest in multifunctional units.
- It also makes clear that the Army will continue to encourage its logistics officers to be competent in one or more specific functional areas of expertise. Not all jobs will be multifunctional. Some will be completely functional, and those will be open only to officers who have the credentials for those functional positions.
- Officers in the grades of captain through colonel will not be branch focused or limited to only what is available in a specific branch. Rather, logistics officers will be able to pursue any functional area of expertise regardless of the basic branch into which they were accessed. Officers will continue to be associated with the Ordnance, Quartermaster, or Transportation regiment, starting with the one into which they were accessed as a second lieutenant, but they will be able to change regiments based on their desires and the needs of the Army.

Logistics officers have been leading the way on the battlefield by gaining as much experience as possible in all areas of logistics. The logistics community is now "kicking it up a notch" in order to stay in tune with what the Army needs from its logisticians in the 21st century. **ALOG**

Major Vickie D. Stenfors is the Chief of Functional Area 90 Proponency at the Army Combined Arms Support Command at Fort Lee, Virginia. She has a bachelor's degree in Spanish from the U.S. Military Academy. She is a graduate of the Quartermaster Officer Basic Course, the Combined Logistics Officers Advanced Course, the Support Operations Course, and the Army Command and General Staff College.

WANTED: NEW LOGISTICS BRANCH INSIGNIA

Major General Mitchell H. Stevenson, the Commanding General of the Army Combined Arms Support Command (CASCOM), is offering Army logisticians an opportunity to put their creative talents to work and become a part of the history of the Army's newest branch.

On 2 May, the Chief of Staff of the Army approved the establishment of a Logistics Officer Corps and a new Logistics branch. With the creation of the new branch comes the need for an appropriate insignia.

General Stevenson invites all members of the Army's extended logistics team to submit design suggestions for the new corps insignia. He is looking for new and imaginative proposals that incorporate the many invaluable contributions that logisticians have made and continue to make to the Army. Sketches of proposed insignia should include a short, succinct English-language motto for the new corps.

Submission of an entry implies that the submitter—

- Assigns to the Department of the Army all rights to the design, including copyright.
- Disclaims any trademark rights. All entries become the property of the Army, and, at its discretion, the Army will have the sole right to alter or modify any submitted design.
- Certifies that the design is original, that it has not been published previously, and that it does not infringe on the copyright of any other person or entity.

Proposed designs and accompanying mottos should be emailed to Dr. K.B. Sterling, the CASCOM Historian, at keir.sterling@us.army.mil, or mailed to him at 3901 Adams Avenue, Fort Lee, Virginia 23801. All entries must be received by 31 October.

Expeditionary Logistics: Dawn of a New Joint Logistics Reality

BY MAJOR BRIAN M. MCMURRY

When the 64th Corps Support Group deployed to Iraq, it had to change the way it did business.

Focused logistics is a key tenet of Army logistics transformation. Its goal is to provide rapid response, asset visibility, and improved agility tailored to sustain strategic-, operational-, and tactical-level forces. As the Army transforms, its leaders are finding that modularity and transformation require a mindset and a set of conditions that produce different capabilities—particularly the ability to execute expeditionary logistics. Army logisticians must be adept and flexible enough to support either expeditionary or protracted operations.

Expeditionary logistics is uninhibited logistics provided by a task-organized CSS element tailored to support maneuver elements with multi-echeloned support in a single support package.

Operations in Iraq are changing the traditional roles of the services. The Marine Corps is learning to be a protracted-operations force, breaking from its traditional theater-opening force (expeditionary) role as units stay in the theater for months. Army maneuver units are learning to fight as a leaner force. Transformation and the struggle against violent extremism are driving logisticians to be more capable, nimble, and expeditionary in supporting light and heavy forces simultaneously.

Establishing new paradigms while the fighting force transforms is very difficult. Accepting change, let alone embracing it, is often daunting in a profession that is steeped in doctrine and tradition. History has shown that gaining widespread acceptance of good ideas is easier when necessity and the survivability of the fighting force are the driving factors behind change.

Out of necessity, the U.S. military is much more "purple" (joint) than it has ever been. As the Army changes to a modular institution to support a dynamic environment ranging from high-intensity operations to support operations to stability operations, logisticians are required to look vertically within their own services for solutions to problems and horizontally across service lines to find the tools that work best.

Today's military exists in a unique and dynamic time and environment in which it is transforming its organizational structure and equipment while fighting in a very permissive environment. Even the tactics, techniques, and procedures written less than 5 years ago are proving to be of little value to an Army operating with a changing force structure. This article will describe how the 64th Corps Support Group (CSG) transformed from a legacy Force XXI CSG to a brigade-level combat service support (CSS) organization that serves as an example of logistics support in a modular and joint environment.

Expeditionary Logistics

In the far western sectors of Anbar province in Iraq, the 64th CSG is at the forefront of expeditionary logistics. Organizationally a legacy CSS element, it has adapted and task-organized its force structure so that it now looks less legacy and more expeditionary. In the logistics circles of Operation Iraqi Freedom 05–07, use of the term "expeditionary logistics" has become common. However, finding an accurate definition of this term is easier said than done, with the term usually being defined more by examples and deeds than by Army doctrine. Although many definitions are available for the term expeditionary, most of them mention the Marine Corps or Navy in relation to military service abroad. Obviously, this is not what the word means to Army logisticians currently serving in Iraq.

So, what is expeditionary logistics? You can "Google" it, "Yahoo" it, or dive deep into Army logistics doctrine, and you will not find a clear-cut definition of expeditionary logistics. Months of executing "graduate-level" logistics in the deserts of Iraq has allowed us to gain a clearer understanding of the term. Expeditionary logistics can be defined as uninhibited logistics provided by a task-organized CSS element tailored to support maneuver elements with multi-echeloned support in a single support package. In this definition, "uninhibited" means that the supporting element is not tied to a specific equipment set or bound by conventional constraints (the specifications of a modification table of organization and equipment), and is capable of providing organic- to general support (GS)-level support.

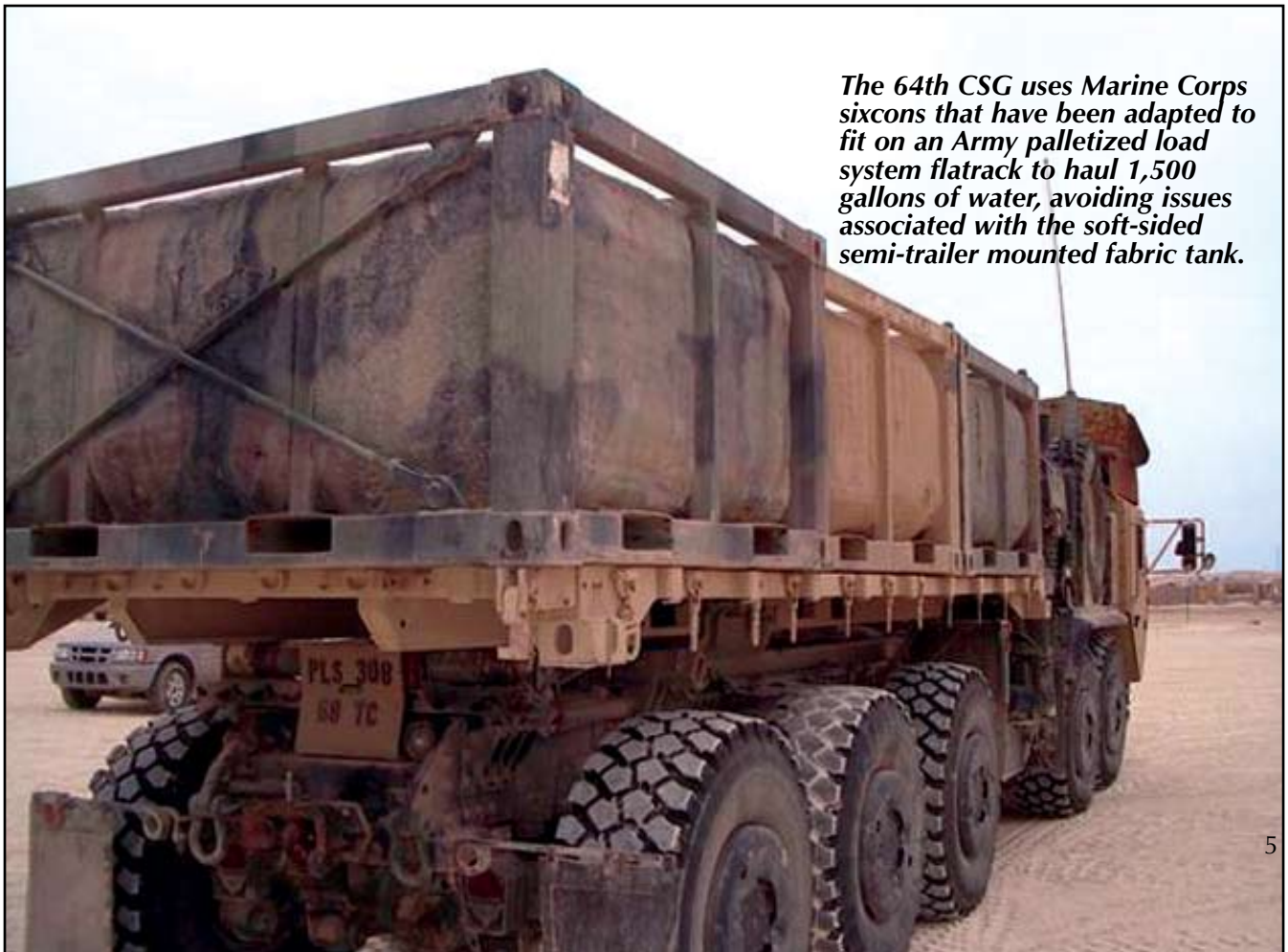
Metamorphosis

As a legacy CSG designed to provide direct support to echelons-above-division units and GS to armored heavy divisional assets, the CSG's modification table of organization and equipment was not designed to support the mix of Army, Navy (Seabees), and Marine Corps forces that were in the area of operations that it supported. However, as a caterpillar transforms to a butterfly, the 64th CSG transformed. Out of necessity and the desire to provide the best support to very austere locations in the Jazirah Desert of Iraq, the 64th CSG quickly tailored itself to support any force, anywhere, anytime.

Based on the capabilities of the supported unit and mission, enemy, terrain and weather, troops and support available, time available, and civil considerations, the 64th CSG, through its corps support battalions, stood up both forward logistics elements and logistics task forces. Over a 3-month period, the 64th CSG supported Army, Marine Corps, and Navy units over an 84,000-square-mile area by executing expeditionary logistics.

Expeditionary Logistics in Action

In the 64th CSG, we executed container delivery system drops to Stryker elements. We designed ration and water racks that could withstand the beating of 10 hours of cross-country driving in the desert. We borrowed and embraced Marine Corps bulk water hauling containers, called "sixcons," to transport water because our own semi-trailer mounted fabric tanks would not withstand the trip. We went from being a linear battlefield-oriented CSG outfitted with line-haul transportation assets to a CSG with corps support battalions that look and function more like divisional forward support battalions. We traded our fleet of 5-ton commercial-style tractor-trailers for palletized load system trucks and our 7,500-gallon bulk fuel tankers for 2,500-gallon tactical fuel delivery systems. Although we had no slingload equipment, we obtained slingload systems and cross-trained with units that were slingload-qualified so we could execute slingload operations.



The 64th CSG uses Marine Corps sixcons that have been adapted to fit on an Army palletized load system flatrack to haul 1,500 gallons of water, avoiding issues associated with the soft-sided semi-trailer mounted fabric tank.

An extra bar has been added to the Marine Corps' ISO (International Organization for Standardization) shipping containers to allow for oversized pallets.

The CSG provided multi-echeloned support through its corps support battalions that were embedded in cavalry squadron combat trains. We provided rations and ammunition to firebases, moved M1A2 Abrams tanks into battle positions for the Marine expeditionary unit, provided direct support to a parachute infantry regiment, and provided operational rations for over 54,000 joint and coalition personnel.

Tenets of Expeditionary Logistics

The four tenets of expeditionary logistics are—

- Modularity: Capable of task organizing or plugging into various supported elements.
- Flexibility: Able to transform or adjust quickly to changing support packages based on a fluid, asymmetric environment.
- Adaptability: Able to support different services using equipment sets and doctrine that are familiar to the supported units.
- Dexterity and agility: Capable of providing multi-echelon support using different support packages tailored to the supported units.

Ten years ago, it would have been unheard of for a CSG designed to support a mechanized heavy force to execute container delivery system drops and slingload operations. Similarly, it would have been unrealistic to expect a CSG to task-organize its corps support battalions into lean forward logistics elements and logistics task forces that would be embedded into Marine regimental task forces to support high-intensity urban operations. These accomplishments of the 64th CSG during Operation Iraqi Freedom 05–07 set a standard for other CSGs. **ALOG**

Major Brian M. McMurry is the Operations Officer of the 64th Corps Support Group, which is deployed to Iraq. He has a B.A. degree in political science from Washington University and a M.S. degree in business (procurement and acquisition) from Webster University. He is a graduate of the Quartermaster Officer Basic Course, the Combined Logistics Officers Advanced Course, and the Army Command and General Staff College.

An AOE CSS Command Post in a Modular Army

BY MAJOR J.A. MORITZ

The 1st Armored Division Support Command reengineered its command post around processes, off-the-shelf technology, and improved use of systems to create a logistics command post that can function in many environments.

What does an organization do when the Army has decided to modularize and the organization is still structured under the Army of Excellence (AOE)? First, it must assess who or what the enemy really is. For a combat service support (CSS) unit, the enemy is more than an opposing combatant; it also can be time constraints and the shortfall between capabilities and requirements. Second, the organization must define its relevance to the fight. An AOE organization's headquarters is designed to control support battalions that are unlike the modular support battalions in brigade combat teams. Third, the organization must reassess its tactics, techniques, and procedures to ensure that its headquarters can provide logistics command and control to both AOE and modular formations.

At one time, division support commands (DISCOMs) were the largest brigade formations in a division, consisting of five battalions and a separate company. Only two DISCOMs are left today, and soon there will be only one with just one battalion task-organized under its control. The Army is transitioning from DISCOMs to sustainment brigades that can support multiple divisions. Warfighters assume that logisticians will do whatever is needed to support their plans. They are right because logisticians today do whatever they can to support the warfighter, and that in itself creates a problem. We may soon find that every unit has its own standing operating procedures designed to support a microcosm but that they do not support the CSS community as a whole.

Uniform command post structures would ensure that all logistics units are interoperable. Appropriate use of off-the-shelf products and the Standard Army Management Information Systems (STAMIS) would improve situational awareness throughout the command post.

The Army should reengineer logistics command posts (LCPs) based on processes, not functions. A function is the action for which a person or thing is particularly fitted or employed. It may refer to an assigned duty or activity or to a specific occupation or role. A process is a series of actions, changes, or functions that brings about a result.

Some sustainment brigade headquarters are reorganizing into configurations that are different from those of other sustainment brigade headquarters. Some of these units see the processes in terms of current and future operations, while others see the processes in terms of synchronization, movement, and regeneration. Army leaders must rethink how they look at deployed LCPs and logistics headquarters in garrison. They also should consider treating brigade-sized logistics headquarters as command and control combat systems instead of individual personnel and equipment. Then all tactical operations centers (TOCs) would look the same, have the same or similar equipment and manning, and be pacer-type items tracked on the unit status reports.

Possible Operating Environments

The 1st Armored Division DISCOM quickly realized that, to be relevant in the next fight, the division rear command post needed to be reorganized to support many operating environments. Planning this reorganization involved identifying missions that the DISCOM could face in the future. Many of the missions identified involved operating apart from the 1st Armored Division in support of other units that require a brigade headquarters with CSS capabilities.

From these missions, four operating environments were deemed the "most likely" and used as the basis for the command post's reorganization. These include—

- The traditional linear battlefield division rear command post, which is a combination of the DISCOM headquarters, the division materiel management center, the division medical operations center (DMOC), and a large slice of division staff (G–1, G–4, combat support, and CSS elements).

• The intermediate staging base in a remote area, which would serve as a logistics support base for deploying units in transit to a combat theater or other area of operations.

• The forward staging base close to airport or seaport facilities, which would enable the linkup of equipment and personnel for reception, staging, onward movement, and integration operations for incoming forces. Both the intermediate staging base and forward staging base environments could be supported with the DISCOM's current manning and capabilities.

• The forward operating base in direct support of combat operations, where logistics command and control is needed and no terrain management is needed beyond a local perimeter. The forward operating base environment can require a sustainment brigade headquarters to provide logistics command and control for multiple divisions. The DISCOM headquarters, which is designed to support a division, would need augmentation to perform this task because of the loss of division staff and the more robust and complex logistics mission.

Functions and Processes

With the possible missions identified, the next task for the division was to determine the functions and processes needed to make the LCP successful in all of those environments.

The DISCOM staff laid out all of the functions that it brought to the fight under its organic modification table of organization and equipment (MTOE), such as management of classes I (subsistence), IIIB (bulk petroleum, oils, and lubricants), and V (ammunition); S–2 assessment of the vulnerability of main supply routes to enemy action; coordination for the use of brigade common-user land transportation assets; and coordination for medical operations. After all functions were identified, the staff defined the processes needed to integrate and synchronize the functions in order to provide timely reports, orders, and decisions to commanders and units for controlling logistics in the area of operations.

Six processes were identified: the military decision-making process (MDMP); command, control, communications, computer, intelligence, surveillance, and reconnaissance (C4ISR); combat loss regeneration; logistics synchronization; battlefield distribution; and rear battle, or terrain, management. The layout of the LCP supports the processes.

Once the processes for each environment were determined and overlaid on one another, the staff discovered that two command post playbooks would cover virtually all missions. The LCP is based on the five core processes (MDMP, C4ISR, combat loss regeneration, logistics synchronization, and battlefield distribution). The division rear command post uses these five core processes and adds the rear battle or terrain management process when in control of rear battlespace on a traditional linear battlefield or in control of any battlespace outside of its perimeter on an asymmetric battlefield. According to emerging modular force doctrine, the rear battle becomes the responsibility of the combat support brigade (maneuver enhancement) supporting the division, reducing the need for G–3 or rear operations center personnel to perform this task.

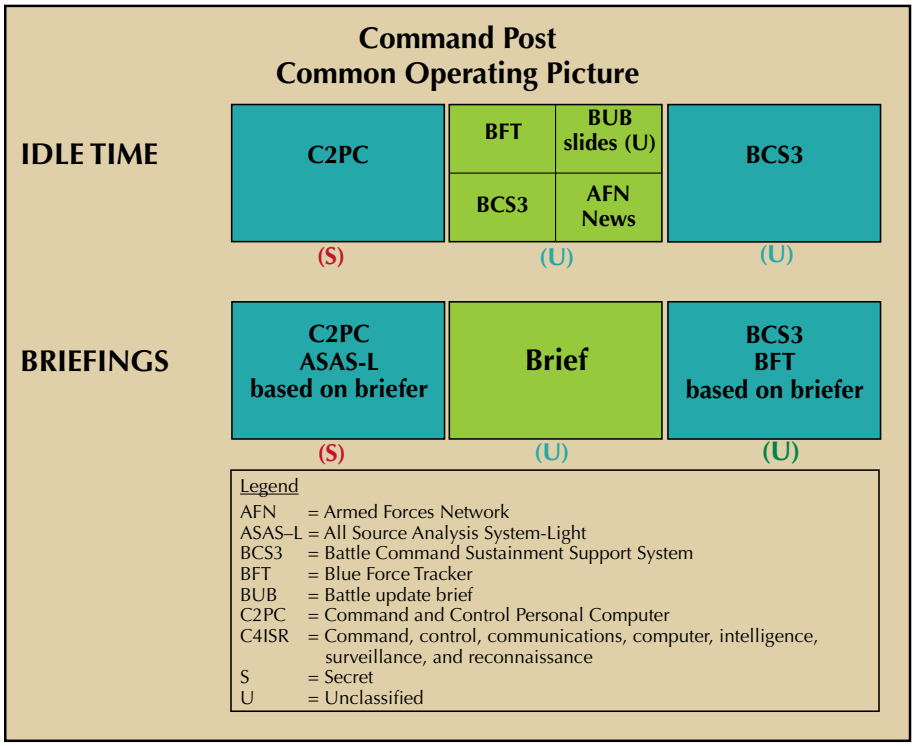
Process Management

It is important to understand that the size and capabilities of the LCP fluctuate based on the mission and task organization. The integration of division staff still occurs under a traditional division rear command post setup. Any units or enablers that become part of the LCP are incorporated into the command and control processes in order to provide better command and control of logistics. While all MTOE functions have managers or officers in charge, each process is assigned an owner to keep the process or board focused on the agenda and timeline and to ensure that the products are completed, facilitating other processes and functions. If the division staff is integrated, a process may have multiple owners to allow it to continue in case one of the owners is absent. If the division staff is not integrated and the headquarters deploys independently of the division, the process still has an owner in the DISCOM headquarters that can fulfill the responsibilities.

MDMP. The MDMP is conducted by a process action team with members of the LCP representing multiple functions. The MDMP owner is the DISCOM support operations officer (SPO), who is the DISCOM representative who coordinates with divisions and higher headquarters. The SPO provides a conduit to division and brigade logistics staffs. The MDMP produces an order that is passed to division or higher headquarters for publishing. The DISCOM creates a distinctly different MDMP in its order for subordinate units.

C4ISR. The C4ISR process owner is the DISCOM S–3. The S–3 is responsible for the battle rhythm of the LCP, orchestrating the timing of all other processes and all communications into, out of, and within the LCP. Battle update briefs are the primary synchronized events that control this process. All members of the LCP participate in the C4ISR process. An associated process occurs when the planning cell has to stand up to support the MDMP for supported divisions.

Outputs of the C4ISR process include logistics orders, graphics for the Command and Control Personal Computer (C2PC) program, command and



The common operating picture is broadcast to the command post 24 hours a day, 7 days a week, using three monitors. Information on the center screen is also broadcast with audio to the logistics synchronization, combat loss regeneration, and battlefield distribution sections and each expansible van for situational awareness during briefings and idle time.

control of assigned battlespace, and all division logistics assets. [C2PC is a map and database software used in many operations centers.]

Combat loss regeneration. The combat loss regeneration process owner is the DISCOM materiel management officer. The combat loss regeneration board is responsible for the regeneration of equipment and personnel combat losses when operating in the division command post configuration; it is responsible for regeneration of combat losses of equipment and supplies while operating in the LCP configuration. Through this process, the board monitors and strives to increase the combat readiness of assigned and attached units.

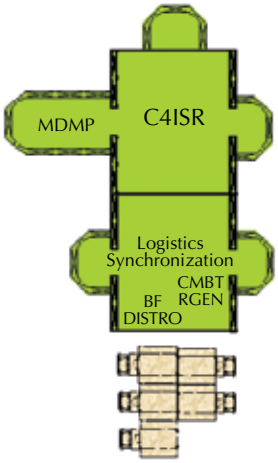
The combat loss regeneration process results in requirements that the logistics synchronization and battle field distribution processes will use later. The requirements that drive the remaining processes rely heavily on the data from the logistics status report, unit liaison officers (LNOs), C2PC, and the Battle Command Sustainment Support System (BCS3). Board members include representatives of the DMOC, the materiel readiness section, the general supply office, the property book office (PBO), and the class IX (repair parts) section. This process occurs daily, before all others, to set the conditions for future process boards.

Logistics synchronization. The logistics synchronization process owner is the DISCOM SPO. The SPO is responsible for synchronizing requirements and missions of all CSS units in the supported task organization. This process identifies all CSS requirements against capabilities and mitigates shortfalls 24, 48, and 72 hours out. A daily CSS synchronization drill is the primary event that controls this process. Using the output of this drill, a daily fragmentary order is published by the C4ISR cell that is synchronized with the combat loss regeneration and battlefield distribution processes. Primary participants in this process include the movement control officer, SPO, division ammunition officer, general supply officer, class IX officer, a materiel section representative, PBO, combat service support automation management officer, DMOC, and unit LNOs. The logistics synchronization process occurs daily after the combat loss regeneration process in relation to the LCP battle rhythm. An associated process occurs when the planning cell has to stand up to support the MDMP for a supported division.

Battlefield distribution (movement). The battlefield distribution (movement) process owner is the DISCOM movement control office. This process synchronizes all movements between sectors or forward operating bases in the division's battlespace. It identifies and schedules all unit movements in the division battlespace 24 and 48 hours out. It is linked to all other processes to make the best use of common-user land transportation assets and determine requirements for force protection for combat logistics patrols.

Participants include the DISCOM S–3, DISCOM S–2, movement control officer, unit LNOs, SPO, DISCOM materiel management officer, and general supply officer. The battlefield distribution (movement) process is scheduled daily after the logistics synchronization process. The process produces a daily movement matrix and orders or requests for transportation assets, including requests for combat units to provide force protection.

Conceptual Intermediate Staging Base, Forward Staging Base, or Forward Operating Base Logistics Command Post



Staffing of Cells

C4ISR cell
DMMO, S–2, S–3, S–4, S–6, SPO, SJA, MCO, DMOC, MS

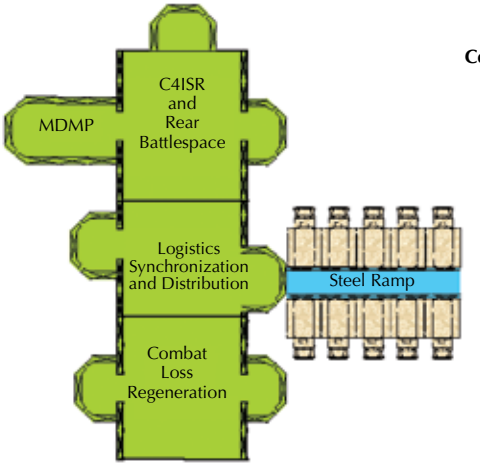
Logistics Synchronization and Distribution cell
SPO, MCO, GSO, DAO, CSSAMO, LNOs, DMOC

Combat Loss Regeneration cell
MS, PBO, class IX

MDMP cell
S–3

The conceptual layout of the logistics command post (above) includes areas for each of the five processes used. Below, the layout of the division rear command post shows how this would be set up with six process areas.

Conceptual Division Rear Command Post



Cell staffing

C4ISR and Rear Battlespace cells
G–3, ROC, DMMO, G–4, G/S–2, G–1, SPO, G–6, SJA, MCO/DTO, AVN, DMOC, MS, Fire Support

Logistics Synchronization and Distribution cells
SPO, MCO, GSO, DAO, CSSAMO, LNOs, DMOC, PMO, Engineers

Combat Loss Regeneration cell
G–1, G–4, MS, PBO, class IX

MDMP cell
ROC

Legend

AVN	= Aviation
BF DISTRO	= Battlefield distribution
C4ISR	= Command, control, communications, computer, intelligence, surveillance, and reconnaissance
CMBT RGEN	= Combat regeneration
CSSAMO	= Combat service support automation management office
DAO	= Division ammunition office
DMMO	= Division materiel management office
DMOC	= Division medical operations center
DTO	= Division transportation officer
GSO	= General supply officer
MDMP	= Military decisionmaking process
LNO	= Liaison officer
MCO	= Movement control officer
MS	= Materiel section
PBO	= Property book officer
ROC	= Rear operations center
SJA	= Staff judge advocate
SPO	= Support operations officer

Rear battle or terrain management. The sixth (noncore) process is rear battle or terrain management. The process owners are the rear operations center and the DISCOM S–3. This process manages the battlespace on a linear or asymmetrical battlefield by integrating all battlefield operating system functions. This integration creates a common operating picture that senses and responds using assets ranging from intelligence to a tactical combat force that assists units within the area of operations. This process relies heavily on division intelligence summaries, operation orders, and other tactical and strategic intelligence sources to manage the division's rear area of operations. The process results in daily fragmentary orders published through the C4ISR cell and reconnaissance and surveillance plans and situational overlays for C2PC to enhance decisionmaking capabilities for all missions.

To best facilitate coordination between functions and processes, the LCP was originally organized based on these processes. However, many functions and capabilities were found to be part of multiple processes, so the organization had to rely on process boards to ensure that integration and synchronization took place when physical barriers otherwise would have prevented it.

Improving Situational Awareness

To facilitate further the integration and synchronization of information in the LCP, the 1st Armored Division gave careful consideration to the battle rhythm and the method of disseminating information. Of the many improvements made while reengineering the LCP, three distinct improvements have significantly improved situational awareness, integration, and synchronization: broadcasting a combination of products using a common operating picture; maximizing the use of Microsoft Outlook Journal; and stressing the capabilities of BCS3. Some of these work to improve situational awareness not only in a tactical environment but also in garrison operations.

A common operating picture is available in the C4ISR cell of the LCP on three screens, which show all STAMIS (Blue Force Tracker, Force XXI Battle Command Brigade and Below, BCS3, C2PC, All Source Analysis System-Light), the previous battle update briefing slides, and a 24-hour news program. The center screen is divided into four screens that are broadcast throughout the command post to provide situational awareness of internal and external events. Each cell has a large plasma screen and monitors in the expansible vans that receive information. All announcements are made over a public address system that feeds audio in addition to the video, providing sight and sound for battle update briefs throughout the command post 24 hours a day. All "Attention in the TOC" announcements can easily be heard and shown on a digital map to provide instant situational awareness of the functions and processes of the command post.

Microsoft Outlook's Journal function allows the LCP to share data and products better. Two journals have been created—one for situation reports and the other for request for information (RFI) tracking. The goal was to get away from having one "keeper" of the duty log by creating a duty journal that allows knowledge to be shared and entered by everyone who is granted access. This allows any user working in the LCP to open the journal, scan the subjects, and develop a snapshot of tactical and logistics actions. The second journal is used solely to track RFIs; this allows visibility to all users and ensures that there is one source document, guaranteeing that no RFIs are lost. This option has proven more efficient and user friendly than using Excel spreadsheets. In garrison, the headquarters changed from the cumbersome process of preparing Department of the Army Form 1594, Daily Staff Journal or Officer's Log (duty log), to the use of Outlook Journal, which allows multiple users to review and update the staff duty log from virtually any computer granted access.

The last great improvement in situational awareness came through the use of BCS3. BCS3 systems were placed throughout the LCP, allowing all sections to gain better visibility of logistics functions by "drilling down" to the units to see convoys, stockage levels, and equipment readiness. The system is updated through current STAMIS and provides data as good as the last STAMIS report sent to higher levels. This allows multiple operators to become "gateways to knowledge" and increases the productivity of staffs because they have readily available information. In garrison, BCS3 is used in the movement control section, the division materiel management center, and the staff duty section to review daily the status of authorized stockage lists and ammunition supply points and the location of convoys.

The Future of Modularity

In the future, the modular force will have—

- Coherent lines of command and control for logistics, linking support directly to priority of maneuver.
- An enhanced logistics capability to support the operation plan within the decision cycle of the commander.
- Fewer problems created by distance, time, simultaneity, and complexity of operations.
- The capability to enable or influence outcomes and effects because logistics planning is integrated into deployment and redeployment, movement, sustainment, and reconstitution.

The operating environment in 2015 and beyond will be characterized by joint, interdependent forces and fully integrated operations supported by state-of-the-art technology used to enhance capabilities across the entire battlespace. Missions will be performed simultaneously across vast distances and will have multiple avenues of approach and markedly shorter deployment and employment timeframes than missions do today.

Each regional combatant commander will employ a joint logistics headquarters that has the responsibility and authority to coordinate, integrate, and direct materiel and logistics support assets across services in the operational environment. An Army theater sustainment command will unify the logistics effort by commanding and controlling highly capable, net-centric, deployable headquarters and organizations that fully integrate and synchronize logistics requirements and resources to ensure that the provisioning of critical logistics supports decisive maneuver. This unified logistics capability will be fully integrated into each headquarters planning and execution process.

It is critical that all headquarters be aware of the future of modularity and continue to see the enemy in terms of requirements, capabilities and shortfalls, and time. LCPs must use more knowledge-centric methods to ensure that they can operate on the same level as higher headquarters so that logisticians can stay one step ahead of the warfighter and relevant for future missions. **ALOG**

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Meeting the Warfighter's Medical Needs

by Lieutenant Colonel Kimberly A. Smith and Dawn L. Rosarius

Logisticians and clinicians are working together to find medical technology that not only meets urgent healthcare requirements but also can be supported and maintained in field conditions.

The U.S. Army Medical Materiel Agency (USAMMA) selects and recommends medical equipment and materiel needed for all levels of care in support of the warfighter. In addition to experienced logisticians, engineers, and maintainers, the USAMMA staff includes clinicians to ensure that the medical equipment provided to the warfighter is not only sustainable and maintainable but also meets user expectations.

If an urgent need for a capability identified by the field requires rapid distribution of new medical technology, USAMMA uses a dual-path approach to meet the need. The first path is to find an interim solution: USAMMA selects a product that can be acquired quickly and then distributed with a minimal logistics tail. While implementing this provisional solution, USAMMA starts on the second path—to select a long-term solution. This second path is a deliberate process that may take several months to complete because it requires USAMMA to progress through a market analysis, environmental and operational testing, and an integrated logistics support analysis before final selection of a product. Inevitably, the time involved in this detailed second-path process exceeds customer expectations. So the interim solution implemented in the first path is crucial to meeting warfighter requirements in a timely manner.

This article uses two case studies to illustrate how the dual-path process works and the importance of interim solutions in meeting urgent healthcare needs.

Short-Term: Pain-Control Technology

Anesthesia providers of all three armed services identified a new pain-control technique, known as a patient-controlled analgesia (PCA) pump, for treating wounded service members being evacuated from the U.S. Central Command area of responsibility. Because the requirement for this capability originated in the theater, the Coalition Forces Land Component Command surgeon's office developed an operational needs statement that was quickly approved and passed up the chain of command.

While this process was underway, USAMMA addressed an interim solution (the first path). The USAMMA staff conferred with clinicians; quickly assessed all required consumable support items, necessary accessories, and repair parts needed to support this interim technology; and pushed that information to the theater for rapid procurement of the technology through a separate Army funding source. USAMMA also coordinated with the Defense Medical Standardization Board to expedite the needed items through the national stock number (NSN) request process so that they could be supported and reordered within the automated theater logistics system. The NSN process, which normally takes 30 to 45 days, was accomplished in less than 7 days. The NSNs of these items were immediately provided for inclusion in theater stock record catalogs.

The theater headquarters then purchased the PCA technology and distributed it to the combat support hospitals in November 2005. This process only required about a month, while it normally can take several months depending on the complexity of the equipment. The interim-solution PCA technology currently is being used with great success and is working to relieve patients' pain on long air evacuation flights to Europe and the United States.

While this rapid process was getting needed pain-control technology into the theater, USAMMA engaged in a deliberate process to select a long-term solution (the second path). Because the requirement was generated in theater on the recommendations of clinicians from all three services, the service logistics agencies worked with the Defense Medical Standardization Board to complete a comprehensive survey of PCA technology in the marketplace and evaluate available products for multiservice application.

At this time, the services have selected a preliminary pool of four products to undergo testing, including airworthiness certification, environmental and

The new operating room table procured under the long-term process is shown in its storage and transport position (left) and in its operational position (right).

operational testing, and integrated logistics support analysis. When these analyses are complete, the service logistics agencies will reconvene to select a final product for acquisition. Once selected, this product will replace the interim solution in theater.

Long-term: Operating Room Tables

At the same time that it works to fill urgent requirements through rapid fielding of technology, USAMMA also works toward finding long-term solutions for replacing obsolete equipment or introducing new medical technology. Although both approaches are similar in terms of the process followed, the long-term approach requires additional time to ensure that the solution that is selected is fully supportable and can withstand a variety of environmental conditions.

Since about 90 percent of medical equipment for field use is commercially available, and medical technology advances significantly every 18 to 24 months, most of the items that USAMMA reviews are replacements for obsolete systems. However, if a new, previously unknown technology is being introduced, the combat developer must draft a capabilities document. Since the documentation process can take many years, USAMMA, as the materiel developer, begins a market analysis as soon as the need is articulated.

Take the operating room (OR) table used in combat support hospitals as an example. The OR table currently in use is approximately 17 years old. Parts for it are no longer available, and it is considered to be clinically obsolete. As a result, the Army Medical Department required that a new product be procured that would be both sustainable and clinically viable. In less than 6 months, USAMMA determined the availability of potential vendors, conducted a thorough market investigation, and identified two vendors that could address the stated requirements.

Surgeons and OR nurses at Walter Reed Army Medical Center in Washington, D.C., clinically evaluated both vendors' products. USAMMA also requested that the Aberdeen Test Center at Aberdeen Proving Ground, Maryland, test both products under harsh physical and environmental conditions. After rigorous testing, the logisticians, engineers, maintainers, and clinicians at USAMMA compared these two potential products and conducted a supportability analysis. In the words of one of USAMMA's contract engineers, Eric Abbott, the supportability analysis "examined how easy the units would be to maintain in the field, availability and expedient delivery of spare parts, availability and source of technical support . . . , and stability of the manufacturer . . . ." Although both products passed environmental and operational tests, USAMMA's source selection board chose the one system (see photos above) that met both clinical (or operational) and supportability requirements.

In many acquisition programs, the needs of the equipment user and the logistician supporting that equipment may be overlooked. However, USAMMA product teams include engineers, users (USAMMA's clinicians), logisticians, and maintainers who work side by side on a daily basis. Each of these subject-matter experts is committed to ensuring that a newly introduced product not only will function clinically as intended but also will be sustainable and maintainable in the field.

While a relatively new concept, this team approach has proven to be very successful. Deployed clinicians and Soldiers ultimately benefit by getting an interim solution to the field as quickly as possible while USAMMA works through the intricate process of selecting a commercial product. Only through USAMMA's dual-path process can the military clinician assist or lead the selection of a product one year and use that product in the field the very next year to save a life. **ALOG**

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Training Medical Logisticians

by Major Paul Wakefield

Medical logistics commanders must ensure that critical medical logistics skill sets do not diminish after Soldiers redeploy.

In his 2004 testimony to the Senate Armed Services Committee, Lieutenant General James R. Helmly, Chief of the Army Reserve, stated, "The Army Reserve must be able to provide a variety of enlistment and retention incentives for both officer and enlisted personnel in order to attract and retain quality Soldiers." Retention is sometimes a challenge because Soldiers feel that they spend too much time performing required warrior task training on battle assembly weekends and too little time exercising their military occupational specialty (MOS) skills.

As the new executive officer of the 172d Medical Logistics (MEDLOG) Battalion (Forward), an Army Reserve unit based in Ogden, Utah, I faced a major hurdle after the unit returned from Operation Iraqi Freedom (OIF) in 2004. In order to retain the Soldiers in the unit, I had to find a way for them to maintain their MOS skills, especially those with critical MOSs such as medical equipment repairer (91A), optical laboratory specialist (91H), and medical logistics specialist (91J). The Soldiers of the 172d MEDLOG Battalion had honed their skills during an intense year of service to their country and the people of Iraq. However, I knew that quality training is the best incentive leaders can offer their troops to retain them and prepare them for future mobilizations.

The new battalion commander and I met the returning Soldiers at Fort Carson, Colorado. We wondered how many would stay in the unit because we knew other units had experienced attrition rates as high as 60 percent when their stop loss ended. Contrary to our fears, almost all of the unit's original members reported to the first battle assembly drill 3 months later, on fire and eager to share their knowledge with new unit members. Now it was our job to devise a training plan for ensuring that the medical logistics skill sets they had acquired and practiced in Iraq did not decline at home station.

While in Iraq, the 172d MEDLOG Battalion had used a forward-deployed team (FDT) concept to facilitate the training of critical MOS skills. Because the FDT concept had been so successful during the OIF deployment, the new commander decided to apply it to the garrison hands-on training mission.

The FDT Concept in Iraq

More than 55 percent of the personnel who mobilized with the 172d MEDLOG Battalion to serve in OIF 1 had been cross-leveled from other Army Reserve units nationwide or from Professional Filler System (PROFIS) sources. (Eligible Active component officer and enlisted personnel with deployment-essential skills are identified as PROFIS fillers. During mobilization, they fill positions in field medical units' modification tables of organization and equipment.) The cross-leveled personnel included the entire command group and staff, two company commanders, and a miscellany of enlisted personnel. Because the unit had departed Ogden for Fort Carson just 5 days after its activation, it was not able to conduct home station annual training that would have allowed its new leaders to evaluate individual MOS competency levels. Fortunately, after the Soldiers arrived at Fort Carson and completed required warrior task training, Soldier readiness processing, and logistics operations associated with mobilization, their leaders were able to arrange for them to receive medical supply, optical fabrication, and medical equipment repair on-the-job training with the Evans Army Community Hospital Logistics Department. Some 91Js also received refresher training on the Theater Army Medical Management Information System (TAMMIS) at the Army Medical Department Center and School at Fort Sam Houston, Texas.

Medical equipment repairers usually retain their MOS 91A skills because they hold full-time civilian jobs in that field. However, 91H and 91J Soldiers rarely work in civilian jobs that match their MOS skills. As a result, battle assembly drills and 2 weeks of annual training are the only opportunities these Soldiers have to practice their MOS skills. In fact, the lack of MOS training created a potentially serious logjam in the medical logistics mission during the first stages of OIF 1 while these critical personnel relearned their MOS skills "on the fly."

In March 2003, the 172d MEDLOG Battalion arrived at Camp Arifjan, Kuwait, to conduct reception and staging operations. The unit then moved on to Forward Logistics Base Dogwood at Iskandariyah, Iraq, and finally to Logistics Support Area (LSA) Anaconda in Balad for integration operations.

By the time the unit arrived at LSA Anaconda, its leaders had determined that the best way to support their customers was to send out FDTs to provide direct support to combat support hospitals and area support to joint and multinational forces. The battalion formed six FDTs. A team of three 91Js was assigned to augment the Coalition Provisional Authority in Baghdad. A team of three (and sometimes four or five) 91Js was dispatched to Camp Doha, Kuwait, to work with the Coalition Forces Land Component Command. Three 91Js composed a team that was sent to help the 1st Marine Expeditionary Force set up its medical supply warehouse. A team of 28 Soldiers [a distribution company (-)] formed a team that provided medical logistics support to the 101st Airborne Division (Air Assault) and the Stryker brigade combat team in Mosul. A team of five to six 91Js provided medical logistics support to U.S. forces in the vicinity of Baghdad International Airport. Finally, a team of two 91Js provided medical supply support to the multinational forces at Hillah. The 172d also stationed a liaison team at Camp Arifjan to assist with medical supply issues. That team included a Medical Service Corps officer with medical functional area 70K (health services materiel) and two to three 91Js.

Customers in the field typically used Very Small Aperture Terminals to send requests for medical supplies to the FDTs. The teams relayed the requests to the 172d's logistics support company in Balad. The requests were consolidated and sent electronically to Camp Arifjan (later to the Army Medical Materiel Center Southwest Asia in Qatar). In the early stages of OIF 1, the medical supplies flowed back into theater through Camp Arifjan. Later, as facilities became available, the supplies were sent directly to Baghdad International Airport and LSA Anaconda from Qatar.

A biomedical equipment repairman stands beside a nostalgic sign at Camp Dogwood in Iraq.

In addition to providing medical supply support, the battalion's main body and the FDT at Mosul sent 91A contact teams and division medical supply officers to the 21st Combat Support Hospital in Balad and to the respective division medical supply offices to provide biomedical equipment repair support as needed.

Requests from outlying units for eyeglasses came through the combat support hospitals to the battalion's Optical Fabrication Section at LSA Anaconda. The 172d also set up an eye clinic in the troop medical clinic there to provide area support to troops stationed in and around Balad. When they received a prescription, the 91Hs ground new lenses and sent the glasses directly to the customer or back to the troop medical clinic for personal pickup if the customer preferred.

The FDT Concept at Home Station

The 172d is the only MEDLOG battalion west of the Rocky Mountains. Headquartered in Ogden, Utah, with a distribution company based in St. George, Utah, the battalion is ideally located to provide medical supply, optical fabrication, and medical equipment repair support for 15 Western states (Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, North Dakota, Oregon, South Dakota, Utah, Washington, and Wyoming). With the assistance of its higher headquarters—the 2d Medical Brigade in San Pablo, California—the unit could easily set up FDTs in some of those states.

Each team would have a derivative unit identification code of the parent unit, but it would receive personnel and logistics support from the Army Reserve unit with which it collocated. For example, medical equipment repair and optical fabrication services could be based with the unit's main body in Ogden, and support requests typically would flow through that location. However, units could schedule 91A and 91H contact teams to come to their locations (or to their servicing FDT's location) to conduct annual medical maintenance or mobilization assistance as needed.

Medical supply requests would flow through the teams as either routine or emergency requisitions.

Routine requisitions. Most medical supply requests would be treated as routine because units normally are able to schedule training 90 days in advance. On battle assembly weekends, Army Reserve units would submit requisitions to their servicing FDTs by email. The FDTs would forward the requests to the 172d MEDLOG Battalion's hands-on training mission manager in Ogden. He would consolidate the requests before forwarding them by email or TAMMIS to the medical supply source for filling. The hands-on training mission manager would be either an Active Guard/Reserve 91J or a civilian contractor with experience in medical supply processes. To maintain continuity of services when the MEDLOG battalion is mobilized, the hands-on training mission manager ideally would be either a civilian contractor who is not a mobilization asset or a retired or discharged 91J.

A 172d Medical Logistics Battalion Soldier stacks medical supplies in a warehouse in Iraq.

Emergency requisitions. Because units sometimes receive little or no notice of mobilization or changes to training schedules, customers would generate emergency requests on a fill-or-kill basis. For example, Army Reserve units in each geographic area would submit their medical supply requisitions by email directly to the hands-on training mission manager in Ogden. If he had the item in stock, the manager would ship it immediately to the customer. If he did not have the item on hand, the manager would forward the request to his medical supply source for fill or kill. If the item was on hand, the supply source would ship it to the hands-on training mission manager, who would FedEx it to the customer. Under extreme circumstances, the hands-on training mission manager would have the medical supply source ship the item directly to the customer. If a medical supply source was located nearby, the customer's servicing FDT could order and receive the item from the source and ship it directly to the customer.

Feasibility of the Home Station FDT Concept

Because of the potential time lag for receiving medical supplies, some unit commanders are hesitant to support the home station FDT concept. Army Reserve units located near Active Army installations want to know why using the MEDLOG battalion's services would be better than setting up their own medical supply account and receiving supplies directly from the hospital on post. This is a valid concern because using the FDT concept actually would add a few days to the customer wait time.

The hands-on training mission can meet the demand for most authorized medical supplies in a timely manner, provided a unit's ordering agent follows the appropriate requisition processes. It is true that units can receive medical supplies directly from the source while at home station. However, once deployed to a combat area, they have to use the supply requisition system that is managed by the theater MEDLOG battalion.

The home station FDT concept complements the Army Reserve Expeditionary Force model in three ways. First, it ensures that Army Reserve logistics personnel understand the medical supply requisition processes used in theater. Second, it provides a viable means for 91J and 91H Soldiers to maintain and sharpen their MOS skills. Third, it enhances the ability of combat support hospitals and forward surgical teams to maintain the operability and readiness of their medical equipment sets.

Medical logistics commanders must ensure that critical medical logistics skill sets honed during deployment do not diminish when Soldiers redeploy. If implemented regionally throughout the Army Reserve by the Army Reserve Command (USARC) and the new Army Reserve Medical Command (AR–MEDCOM), the home station FDT concept would provide the quality MOS training that combat-experienced Soldiers want and need. Combined with warrior task training, this support concept would produce a synergy that would help the Army Reserve retain and field a fully trained and ready force.

The USARC, AR–MEDCOM, and unit commanders must work together to retain critical medical logistics assets by affording 91A, 91H, and 91J personnel regular and realistic MOS training in conjunction with warrior task training. They can do this by using the FDT concept to facilitate the training of these critical MOSs while improving the readiness of all Army Reserve units, especially medical units. This, in turn, will enhance the readiness of the Army Reserve's Expeditionary Force by generating and retaining trained and ready medical logistics personnel who can support the force effectively during mobilization. **ALOG**

Major Paul Wakefield is assigned to the 84th Army Reserve Readiness Training Center at Fort McCoy, Wisconsin, with duty as an instructor for the Department of Logistics and Resource Operations, Army Command and General Staff College. He served previously as the executive officer of the 172d Medical Logistics (MEDLOG) Battalion (Forward) in Ogden, Utah, where he worked to develop the home station forward-deployed team (FDT) concept of support. He has a bachelor's degree in Spanish from Weber State University and a master's degree in administration and management from Lindenwood University.

The author wishes to thank Colonel Jeffrey Cockrell and Command Sergeant Major Vicki Briggs, former Commander and Command Sergeant Major, respectively, of the 172d MEDLOG Battalion, for their input to the development of the FDT concept.

Maintenance Management in the Heavy BCT

BY CAPTAIN ERIC A. MCCOY

Leaders at all levels of the Army emphasize the importance of logistics and the freedom of maneuver it allows tactical commanders in the execution of combat operations. Of the tactical logistics functions, maintenance is especially critical. Soldiers must have confidence that the equipment they use will function when they press the button, turn the key, or pull the trigger.

A commander must consider several elements, or "building blocks," when developing a maintenance program for his unit. This article focuses on maintenance operations for the brigade combat team (BCT) at both the forward support company (FSC) and the brigade support battalion (BSB) levels. It is meant to provide a commander with additional insight about his maintenance program before deployment to a combat training center or theater of operations.

Maintenance Management in FSCs and FMCs

The maintenance control officer, commonly referred to as the "shop officer," is the senior maintenance officer in the maneuver battalion's FSC or the BSB's field maintenance company (FMC). He is responsible for providing field maintenance to his supported battalion or, in the case of the FMC shop officer, to specified BCT units and backup support to the FSC. He also serves as the battalion maintenance officer. This gives him a great deal of responsibility.

Under the previous edition of Department of the Army (DA) Pamphlet 600–3, Commissioned Officer Development and Career Management, senior Ordnance Corps lieutenants assume the position of shop officer after 12 months of experience as maintenance platoon leaders. However, because of the manpower demands created by transformation and the Global War on Terrorism, lieutenants, some of whom are Quartermaster or Transportation officers, often are assigned as shop officers directly from the Basic Officer Leader Course.

Changes to the modification tables of organization and equipment (MTOEs) of FSC maintenance sections also have resulted in growing pains for the shop officer. Sergeants first class are authorized in the positions of shop office maintenance control sergeant and company repair team noncommissioned officer (NCO) in charge. However, the MTOEs do not authorize a battalion maintenance sergeant at either the master sergeant or sergeant first class level to serve as an integrator and direct assistant to the shop officer. As a result of their inexperience and lack of senior NCO support, many shop officers who deploy to the National Training Center (NTC) at Fort Irwin, California, have difficulty executing maintenance management techniques.

Shop Officer Responsibilities

Field Manual-Interim (FMI) 4–90.1, Heavy Brigade Combat Team Logistics, defines the responsibilities of the shop officer, or maintenance control officer, as follows—

> The maintenance control officer [MCO] is the principal assistant to the commander, both battalion and FSC, on all matters pertaining to the field maintenance mission. The MCO serves as maintenance officer for the maneuver battalion and FSC using SAMS–1 [Standard Army Maintenance System-1], SAMS–2, BCS3 [Battle Command Sustainment Support System] and FBCB2 [Force XXI Battle Command Brigade and Below]. He is also is the senior person in the UMCP [unit maintenance collection point] and is responsible for the local security requirements and tying in with adjacent units. He is responsible to the commander for the management of the combined efforts of the maintenance control section, maintenance section and service and recovery section, and the maintenance system teams . . .

The shop officer is responsible for the combat readiness of his unit. Therefore, it is essential that he be aware of his roles and responsibilities and the capabilities and limitations of his organization.

To ensure the successful execution of his company's mission, the shop officer must do the following.

Evaluate and ensure the quality of all maintenance completed by the maintenance platoon. Having company repair teams embedded with their habitual maneuver companies increases the complexity of this task. The shop officer must coordinate primary, alternate, contingency, and emergency methods of communication between the UMCP—the location of maintenance Standard Army Management Information Systems (STAMIS)—and forward locations on the battlefield.

An effective way of accomplishing this may be to "redball" critical repair parts forward and send DA Forms 5988E (Equipment Inspection and Maintenance Worksheet) and changes to maintenance status by reverse LOGPACs (logistics packages).

Develop a training and cross-training plan for maintenance personnel. The shop officer and his maintenance warrant officers are responsible for ensuring the technical proficiency of maintenance Soldiers in the battalion. Because commanders and senior NCOs are focused primarily on tactical training, technical proficiency in various aspects of maintenance military occupational specialties (MOSs) may be sacrificed. The shop officer and warrant officers must develop a plan for ensuring that technical competence is not degraded. Ways to maintain maintenance MOS proficiency include keeping critical MOS job books on each maintenance Soldier, conducting monthly low-density MOS training across the battalion, and coordinating with civilian agencies to provide training.

Coordinate the recovery of battalion equipment. Lack of planning for primary, alternate, contingency, and emergency means of communication can cause a significant time lag between vehicle breakdown, request for recovery assets, deployment of recovery assets, and arrival of recovery assets at the breakdown site. In theater, the lack of an effective recovery plan may endanger the lives of mechanics and recovery vehicle operators. Shop officers should provide input to battalion planners on maintenance procedures during combat operations. This can be done by incorporating maintenance operations standing operating procedures (SOPs) into battalion tactical SOPs so that all personnel in the battalion know how to request, receive, and incorporate maintenance support into their tactical operations. These procedures should include battle drills for recovery asset requests, section precombat checks and precombat inspections, and communications among the supported unit, the recovery team, and the shop office.

Monitor the status of equipment undergoing repairs, and determine the status of the repair parts required to complete those repairs. The shop officer must communicate daily with the BSB support operations (SPO) maintenance officer and supply support activity (SSA) accountable officer to receive updated status on repair parts. In high-intensity conflict rotations at the NTC, this communication frequently is hindered, resulting in an unclear picture of the BCT's current and projected combat power. The shop officer, battalion executive officer (XO), and BSB SPO must ensure that daily updates are communicated vertically and horizontally to all maintenance managers in the BCT. These updates should include improved SAMS–2 026 reports (Maintenance Summary by Battalion); DA Forms 5988E, turn-in and processing cycles; priority 02 (life or death or total mission stoppage), 05 (severe impact to mission or reportable items), and 12 (routine) parts ordered by unit; and workable and nonworkable backlogs. [Nonworkable backlogs include equipment for which either the repair parts or the mechanics are not available to complete the work.]

Perform maintenance according to the priorities established by the maneuver battalion commander. With modularity, a significant amount of logistics capability resides in the FSC and, in most cases, the BSB commander no longer has the organic capability to provide support beyond the capacity of the BSB's assets. As a result, maneuver battalion leaders must be intimately involved in their maintenance operations. Current and upcoming maintenance priorities should be discussed as part of mission operation orders and unit battle update briefs. This ensures that maneuver company commanders are using their company repair teams according to the battalion commander's guidance. The shop officer must provide sound guidance to the maneuver battalion XO, who is the material readiness officer of the battalion.

Roles and Missions for the BCT Maintenance Meeting

Customers	Managers		Boss
All battalions and separate companies	**MMC or LAO**	**SSA OIC, shop officers, and SPO maintenance officer**	**BSB commander, brigade XO, or brigade SPO**
• Commander's NMC report • Accurate reports • Priority 02 status • Face-to-face reconnaissance with FSB • ULLS hardware status • ULLS maintenance disk turn-in • AOAP status • PLL listing and zero balance • FED LOG—verify part NSN • Review ULLS DCR	• 026 report with updated status (ASL/NSL/ILAP) • Main ASL list • Over-aged recoverable list • High-priority status • IPD–02 manifest status – NSL parts status • LAO present	• 026 report • Attendance roster • High-priority parts status • DS jobs status • IPD–02 manifest status and tracking • Shop section summary (006 print) • SSA ASL critical stockage status	• Chair meeting • Review 026 report • Interface with battalion XOs • Brigade ULLS maintenance/supply disk turn-in status • Provide mission or battle focus and priorities • Review and enforce commitments • Enforce compliance of brigade maintenance policies • Synchronize maintenance and class IX with sustainment brigade

Legend

AOAP = Army Oil Analysis Program
ASL = Authorized stockage list
BCT = Brigade combat team
BSB = Brigade support battalion
DCR = Document control register
DS = Direct support
FED LOG = Federal Logistics Data on Compact Disk
FSB = Forward support battalion
ILAP = Integrated Logistics Analysis Program
IPD = Issue priority designator
LAO = Logistics assistance officer
MMC = Materiel management center
NMC = Not mission capable
NSL = Nonstockage list
NSN = National stock number
OIC = Officer in charge
PLL = Prescribed load list
SPO = Support operations officer
SSA = Supply support activity
ULLS = Unit Level Logistics System
XO = Executive officer

Maintenance Management at the BSB Level

The principal maintenance operator for the support operations officer and BSB commander is the SPO maintenance officer. He recommends the allocation of resources to the supported unit's chain of command and coordinates maintenance company operations. He also forecasts and monitors the workload for all equipment by type.

The SPO maintenance officer is normally a senior logistics first lieutenant awaiting orders for the Combined Logistics Captains Career Course or a career course graduate in line for command of an FMC or FSC. He is assisted by a maintenance NCO, typically an MOS 63-series (mechanic) master sergeant or sergeant first class. The maintenance officer and NCO use SAMS–2 to collect and process maintenance operations data and assist in the management of maintenance operations. SAMS–2 processes the maintenance information needed to control workload, manpower, and supplies. SAMS–2 is designed to assist in both maintenance and readiness management.

The SPO maintenance cell also works with the SSA accountable officer to develop plans and policies for reparable exchange and class IX (repair parts) operations. The SPO maintenance officer monitors shop production and job status reports in the FMC and FSCs. He also monitors the combat spares and coordinates the status of critical parts with the sustainment brigade. For unserviceable items, the Standard Army Retail Supply System-1 (SARSS–1), located in the SSA, generates disposition instructions based on the guidance of brigade and division commanders. Possible instructions include evacuation, cannibalization, and controlled exchange policies.

The SPO maintenance officer and brigade S–4 review backlogs of critical weapon systems. For any additional support requirements, the BSB SPO coordinates through the sustainment brigade's materiel management branch.

Ensuring Maximum Combat Power

The SPO maintenance officer must take several actions to ensure that maximum combat power is built in support of the BCT commander's intent. He must do the following.

Monitor the BCT's maintenance posture using SAMS–2. Properly applying and using the reports and matrices generated by SAMS–2 will help the maintenance officer execute his mission. BCT shop officers must understand the timeline and standards for submitting STAMIS data. Meeting the established BCT standard should not be an issue when the Unit Level Logistics System (ULLS) and SAMS are collocated with the shop officer. Typically, failure to achieve the standard results from a lack of command emphasis and insufficient systems training for automated logistical specialists. A way to counter this is for the maintenance officer to track and brief the status of unit STAMIS data transfer at a regular brigade maintenance meeting, allowing the BCT XO and BSB commander to focus resources on the problem. The maintenance officer also should talk with the BSB command sergeant major to ensure that all SAMS operators in the BCT have additional skill identifier B5 (SAMS operator) before they are assigned to a shop office or the BSB SPO section.

Forecast and monitor the workload for all equipment, by type. Because the heavy BCT maintenance meeting primarily focuses on tracked and wheeled combat systems, other combat systems typically are not discussed in detail or not discussed at all. Maintenance of power-generation and communications equipment and small arms can be just as critical to the success of the BCT as maintenance of an Abrams tank or a Bradley fighting vehicle. The maintenance officer should discuss shop workloads with shop officers weekly, including an extensive review of the SAMS–1 022 (Backlog Report). The maintenance officer should also track the number of jobs that have been closed out in SAMS–1 but have not been closed out in ULLS and the jobs awaiting pickup from the FMC.

Coordinate maintenance priorities with the brigade S–4. Just as the shop officer recommends and coordinates maintenance priorities with the XO of his supported battalion, the SPO maintenance officer and the brigade S–4 must recommend and coordinate maintenance priorities with the BCT XO. These priorities should be reviewed in the brigade maintenance meeting to ensure that all units understand and comply with the BCT commander's guidance, ensuring unity of effort among the maintainers of the BCT.

Track and investigate class IX high-priority requisitions. One of the SPO maintenance officer's most important responsibilities is to track critical repair parts for the BCT. Units that have trouble with parts research and tracking in the NTC tactical environment frequently look back to an echelons-above-brigade capability to track parts. Units tend not to prioritize the maintenance officer's efforts, which causes many hours to be spent expediting the order of a part for a noncritical combat system. The BCT XO, in conjunction with the BSB SPO, must identify the roles of maintenance managers at each level in the research of critical repair parts so that the maintenance officer can focus on the critical parts that will directly affect the BCT's ability to accomplish its mission. The chart at left depicts a recommendation for the responsibilities of each maintenance manager in the heavy BCT.

Soldiers conduct field maintenance on an M577 command post tracked vehicle during a rotation at the National Training Center at Fort Irwin, California.

Provide recommendations to the BCT S–4 on how to redistribute FSC maintenance assets within the BCT. Because maneuver commanders have their own FSCs, they tend to hold on to their assets. As a result, the BSB commander cannot directly influence the maintenance posture of the BCT because the BSB's FMC does not have a robust reinforcing support capability. Therefore, the maintenance officer should monitor FSC workloads and be ready to recommend through the BCT S–4 to the BCT XO the reallocation of FSC maintenance elements if necessary. Maneuver units must transmit combat slants (the number of systems on hand versus the number of systems fully mission capable) and their maintenance status electronically to the brigade S–4 and BSB SPO. This allows the SPO to identify problems quickly and allocate resources more efficiently. FBCB2 also provides map graphics that portray unit locations, grid coordinates, and terrain features so that the SPO can track maintenance on the battlefield.

Brigade Maintenance Meeting

The single most important tool in the heavy BCT for identifying and overcoming maintenance issues is a regular maintenance meeting. The goal of the maintenance meeting is to provide a clear picture of the BCT's current maintenance posture and to set the conditions needed to produce maximum combat power for the next mission. Several factors determine how effective a BCT's maintenance meeting will be, but none has a more positive effect than the attendance and active participation of the BCT's leaders. If maintenance is a priority to the BCT leaders, it will become a priority to the units within the brigade.

Here are some factors that must be considered in order for the maintenance meeting to run efficiently.

Time. Mission, enemy, terrain and weather, troops and support available, time available, and civil considerations (METT–TC) will always drive the time of the maintenance meeting. However, the time must be set according to the established supply and maintenance data processing windows so that meeting participants have the most current 026 report possible. Units should try to use a 026 printout that is less than 8 hours old. The meeting also should conclude so that enough time is available to request that critical class IX parts be placed on the evening LOGPAC from the sustainment brigade.

Location. Establish a standard meeting location. This will alleviate confusion if communication breaks down. Units still will know where and, generally, when the meeting will occur. Having the meeting where the unit attendees can conduct other business, such as in the brigade support area, will help maximize the time that task force maintenance managers have to build combat power.

Agenda. Have a posted agenda that supports the BCT commander's priorities for the next missions and focuses on building combat power. This will center the meeting's purpose. By briefing the administrative data for all attendees at the start of the meeting and allowing units to leave after briefing their task force status, critical players will have more time to build combat power. The information the attendees will be expected to brief, such as current slants, expected slants, and the number of circle X systems, should be specified on the agenda. ("Circle X" are systems that are not mission capable according to the technical manual but are placed temporarily in a partially mission capable status by the commander for a specific mission or event.) A BCT sustainment meeting that includes representatives of other logistics commodity areas, such as combat health support and supply managers, should be conducted in conjunction with the maintenance meeting. The chart at right is an agenda that has been effective for units deployed to the NTC.

Attendees. The BCT XO should chair all maintenance meetings in order to be the "hammer" and ensure the meeting runs efficiently. As chairman, he speaks with the commander's authority and can enforce standards on those units that either do not attend the meeting or are unprepared to brief their status. He can provide direct feedback to the BCT commander on the BCT's combat readiness.

Another key player is the BSB SPO, who is responsible for taking action on any shortcomings that surface during the meeting. Other required attendees should include the maintenance officer, a materiel management center representative (if available from the sustainment brigade), the brigade S–4 or his representative, each battalion or task force XO or shop officer, the separate company XO or motor sergeants, the SSA officer in charge, the BSB shop officer, the logistics assistance officer, the combat service support automation management officer, and a BCT Army Oil Analysis Program representative.

Once the framework for a successful meeting has been set, direct support (DS) maintenance managers must not waste the time of the supported units by coming to the meeting unprepared. To ensure that everyone is prepared, a pre-maintenance meeting should be conducted by the maintenance officer, materiel management center representative, shop officers, and SSA officer. The following actions should be taken during this meeting: a through scrub of the 026 printout; update of the status on the nonstockage list of parts required; and identification of critical class IX awaiting pickup, required class IX available on the authorized stockage list, jobs requiring a DS workorder or DS support, and units that may require organizational maintenance reinforcement. The goal for the pre-maintenance meeting is to synchronize DS efforts and resolve issues before the BCT maintenance meeting.

The final "must have" during the brigade maintenance meeting is a contract. A contract, simply put, is a closed-loop reporting system. Contracts should specify who will take specific actions, when those actions will be completed, and who will report their status. Contracts should be tracked and briefed by the SPO or maintenance officer. Tracking contracts during the maintenance meeting, reviewing the responsibilities of personnel before they depart, and closing out contracts before and during follow-on maintenance meetings are fundamental to the success of the maintenance mission. Not every issue should be considered a contract—only those requiring actions over and above normal, day-to-day operations.

BCT Sustainment Meeting Agenda

Roll call
Opening remarks and commander's guidance
BCT mission update
BCT S–2 update
BCT S–6 update:
- Commo architecture update
- CSSAMO update

BCT S–4 update:
- LOGSTAT feedback
- Combat power slant
- Contracting feedback and issues

SB SPO update:
- CSS synchronization matrix
- CSS graphics
- 026 feedback/issues to BN TFs
- Class IX reconnaissance feedback and issues
- Class IX ORILs feedback and issues
- AOAP feedback and issues

CHS update:
- MEDEVAC/coverage plan update
- Medical trends

BN TF updates:
- Combat slant
- 5988Es: number turned in
- Verification:
  -NMC report
  -Parts-received-not-installed listing
  -PLL
- Maintenance issues
- LOGSTAT issues

SSA update:
- Units with 02 parts for pickup

Maintenance enablers update:
- AOs, TSC, etc.

BCT XO conclusion:
- Summary of issues/contracts
- Confirmation of next meeting

Legend

AO	= Area of operations	NMC	= Not mission capable
AOAP	= Army Oil Analysis Program	ORIL	= Overaged reparable item list
BCT	= Brigade combat team	PLL	= Prescribed load list
BN	= Battalion	SB	= Support battalion
CHS	= Combat health support	SPO	= Support operations officer
Commo	= Communications	SSA	= Supply support activity
CSS	= Combat service support	TF	= Task force
CSSAMO	= CSS automation management office	TSC	= Theater sustainment command
LOGSTAT	= Logistics status	XO	= Executive officer
MEDEVAC	= Medical evacuation		

Thoughtful preparation for maintenance management will pay dividends during a deployment, whether it is to the desert of Fort Irwin or Baghdad. Commanders should encourage the development of their subordinates and train them in the fundamentals of maintenance management so that they have confidence in themselves and their equipment. Commanders should ask themselves, "Would I stake my life right now on the condition of my equipment?" If the answer is anything other than an immediate "yes," then improvements can and must be made within their formations. ALOG

Captain Eric A. McCoy is assigned to the Army Student Detachment while he completes studies at Georgetown University. When he wrote this article, he was the Brigade Combat Team Maintenance Trainer for the National Training Center at Fort Irwin, California. He holds a B.S. degree in mental health from Morgan State University and an M.S. degree in administration from Central Michigan University. He is a graduate of the Ordnance Officer Basic Course and the Combined Logistics Captains Career Course.

13th COSCOM Support of Task Force Katrina

BY CAPTAIN RYAN T. TIERNEY

On 3 September 2005, 5 days after the devastating landfall of Hurricane Katrina in southeast Louisiana, a leaders' reconnaissance team from the 13th Corps Support Command (COSCOM) [now known as the 13th Sustainment Command (Expeditionary)] departed Fort Hood, Texas, for New Orleans.

After assessing the damage, the COSCOM's commander, Brigadier General Michael J. Terry, decided that the 49th Movement Control Battalion, part of the 13th COSCOM, was the unit best suited to assist in distributing civilian humanitarian supplies to the affected people of Louisiana. General Terry obtained consent from the State of Louisiana and the Federal Emergency Management Agency (FEMA) to deploy the 49th as part of Joint Task Force Katrina in support of the humanitarian relief effort.

The personnel of the 49th would manage movement control and distribution of commodities. Because the relief effort was a unified endeavor of many Federal and state civilian agencies and military units from all branches of service, it was decided that the normal wartime function of the 49th—managing and controlling the roadways throughout an area of operations—would be an inappropriate mission for a military unit engaged in a humanitarian operation. The State of Louisiana would maintain control of the highways because it would be unreasonable and possibly unconstitutional for the military to commandeer the roadways during a humanitarian mission.

Based in Baton Rouge with FEMA, the 49th Movement Control Battalion strategically emplaced distribution management teams (DMTs) throughout Louisiana to provide assistance, advice, and asset visibility to Army National Guard and civilian relief agencies. The primary directives to the DMTs were to assess and advise the units managing the distribution of relief supplies and, more importantly, track and report movement and distribution status by commodity at each node throughout the distribution system. Titles 10 and 32 of the U.S. Code (Armed Forces and National Guard, respectively) prohibit the Active Army from assuming a controlling role in a relief effort, so the 49th provided support to Army National Guard units on site. The DMTs were a mix of transportation movement control personnel from the 49th Movement Control Battalion and materiel management specialists from the 4th Corps Materiel Management Center (CMMC), also part of the 13th COSCOM.

The Soldiers of the 4th CMMC melded flawlessly with their transportation counterparts, forming fully integrated teams that were highly knowledgeable in transportation, commodity accountability and tracking, warehouse and truck yard organization, and distribution planning.

Tracking Supplies Across Louisiana

Nested in regional staging areas (RSAs) throughout Louisiana, the DMTs were in direct contact with the battalion operations center in Baton Rouge. They formed an efficient tracking network through each level of the distribution system and allowed FEMA and state authorities to maintain a common operating picture of humanitarian commodities in the supply pipeline.

Acting much like a switchboard operator, the 49th communicated with both FEMA and state authorities, not only reporting when a supply truck was dispatched but also confirming the time and date it reached its destination. The 49th used automated systems such as the Battle Command Sustainment Supply System (BCS3) as well as "eyes on" reports it received three times daily from each DMT to keep FEMA and state authorities posted.

Tracking began at the federally operated RSA at Camp Beauregard in Alexandria, Louisiana. There, trucks loaded with relief supplies gathered from all over the country were staged to provide efficient distribution into southern Louisiana. After receiving an order, FEMA sent the appropriate commodities to the ordering RSA. Once in an RSA, the commodities were staged to wait for the order to move them to points of distribution (PODs) that were established in places large enough to accommodate full truckloads of supplies, such as shelters, churches, and fire departments. Once at a POD, the supplies were distributed to nearby residents.

At first, two RSAs—one each in Hammond and Harahan, Louisiana—coordinated the distribution efforts above and below Lake Pontchartrain, respectively. Later, the DMT at RSA Harahan was removed to make

Brigadier General Terry offers encouraging words to a student at the Louisiana School for the Visually Impaired in Baton Rouge.

personnel available to start two new RSAs in Lafayette and Lake Charles to support the affected people in those areas. This move greatly increased the coverage area for relief supplies.

Within 6 days of arriving in Louisiana, the 49th Movement Control Battalion effectively reduced truck download time from 10 to 14 days to 3 to 5 days, which resulted in a corresponding reduction in the time required to deliver humanitarian supplies to affected residents. This achievement improved the flow of commodities and saved approximately $140,000 a day by reducing the number of truck drivers required, some of whom were paid as much as $1,400 a day under a per-day contract.

By using manual status reports and asset visibility systems such as the BCS3 and radio frequency identification tag interrogators, the battalion was able to improve the efficiency of distribution operations at the RSAs. The on-hand truck count was reduced by 58 percent—from 285 to 120. The battalion was able to reduce backorders, curtail excessive ordering, and decrease the number of refused loads at RSAs and PODs. These systems permitted the 49th to identify and cancel an excessive order for 150 trucks of meals, saving as much as $1 million.

Hurricane Rita

Around the middle of September, the 49th began tracking Tropical Depression 18, which soon became powerful Hurricane Rita. Considering the fragile state of southern Louisiana and the now-compromised levee system, New Orleans was in grave danger. Because of the breaches in the 9th ward levee and the trash and debris that were clogging sewers, a heavy rain or moderate storm surge could be enough to flood New Orleans again, causing further harm to already-damaged buildings.

Hurricane Rita could not only wreak further havoc in New Orleans but also create a path of destruction that likely would generate an even greater need for humanitarian aid. In turn, more logistics and movement control support would be needed from the 49th.

Soldiers of the 49th Movement Control Battalion stretch their legs during a rest stop en route to Louisiana.

The battalion commander and his staff developed contingency plans for the various points where Hurricane Rita could make landfall and identified potential locations where FEMA and Louisiana authorities would place RSAs and PODs.

Once they were confident that the hurricane's path would be along the border of Texas and Louisiana, FEMA and state authorities selected initial RSA and POD sites. Immediately, the 49th began to assess the capabilities of each site to distribute relief supplies quickly to the areas most likely to be affected. As late as 36 hours before Rita made landfall, an assessment team was dispatched to Lake Charles for an on-ground assessment of the RSA at Chennault International Airport, which was soon to be in the middle of Hurricane Rita's path. The assessments provided a solid understanding of the capabilities of each RSA.

New DMTs were organized, and mission planning continued even as Rita raged onto land. Just 2 days before Rita's landfall, two new DMTs arrived at the RSAs at Lake Charles and Lafayette and linked up with their respective Army National Guard units. Both RSA's were already receiving supplies from the staging area in Alexandria.

The courage and perseverance of the people of Louisiana were exemplified by the immediate requirement for RSAs and PODs in the hardest hit areas. Before drinking water was restored, before stores reopened, and even before floodwaters receded, people began returning to damaged homes eager to rebuild their neighborhoods and their lives. The RSAs and PODs were able to help by quickly supplying basic necessities, such as food, water, and tarps to cover the roofs of damaged houses.

The austere living quarters in Louisiana provide a welcome respite for the 49th Movement Control Battalion Soldiers.

Within the first 6 days of its arrival in Louisiana, the 49th delivered enough meals and water to sustain 150,000 people a day on average. By the 10-day mark, that average had risen to 160,000 people a day. During its month-long deployment, the 49th distributed nearly 1.7 million gallons of water; 3.6 million meals, ready to eat; and 11.5 million pounds of ice to the people of southern Louisiana.

Without having to worry about their next meal, many displaced residents quickly returned. Today, many of the neighborhoods helped by the 49th Movement Control Battalion are well on their way to full restoration. **ALOG**

Captain Ryan T. Tierney is currently deployed to Afghanistan, where he serves as the Commander of the 151st Movement Control Team, 49th Movement Control Battalion, 13th Sustainment Command (Expeditionary), from Fort Hood, Texas. He has a bachelor's degree in biology from California State Polytechnic University Pomoma and a juris doctor degree from Western State University College of Law in California. He is a graduate of the Transportation Officer Basic Course.

Fuel Safety in Iraq

BY CAPTAIN PETER A. CAGGIANO

Soldiers of the 240th Quartermaster Battalion used their ingenuity and construction skills to make a fueling facility at an Iraqi training base a safer place to work.

In June 2005, I deployed to Iraq with the 58th Quartermaster Company, 240th Quartermaster Battalion, 49th Quartermaster Group, at Fort Lee, Virginia. Our mission was to provide fuel to five coalition forward operating bases and two Iraqi training bases.

The coalition sites that we visited routinely were well developed by Kellogg Brown & Root (KBR). The Iraqi bases, however, had only basic fuel tanks with no safeguards. When we first began delivering fuel to the Iraqi bases, we were told that the only way to download fuel was to stick the 4-inch hoses into the tanks and open the valves on the pony pumps. To do this, a Soldier had to climb on top of the tank and hold the hose in the tank opening—a very dangerous method that was definitely not the military standard.

Something had to be done that would provide a long-term fix to this dangerous situation. We brainstormed how to fix these problems and, after several weeks of experimentation, developed a plan to construct steps and platforms for safely traversing the fuel tanks and to fabricate fuel connectors for downloading the fuel into the tanks. This would be difficult because no materials were at the sites, which meant starting from scratch with few supplies. We ordered hoses and connectors and coordinated with KBR to design and construct the steps and platforms.

The first step was to measure the dimensions of all the tanks and their concrete pads. A group of noncommissioned officers and enlisted Soldiers from the company went to the first Iraqi training base to measure all the tanks there. When they arrived, the team encountered a fueler's nightmare. No ladders or steps provided access to the tops of the tanks, so the Soldiers had to jump to the tops of the tanks from the tops of their fuel trucks. The openings on top of some of the tanks had no lids. Fuel had been exposed to sandstorms, animals, and weather, causing contamination and evaporation loss. All of the tanks had puddles of fuel at their bases, which meant that there was a serious possibility of leaks. The Soldiers spent all day getting the dimensions for each tank in the fuel farm and collecting the data needed to fabricate working systems for safely downloading fuel.

The steps and platforms on these tanks allow for safer downloading of fuel for Soldiers. The connectors fabricated by the 58th Quartermaster Company make the download not only safer but also easier.

Soldiers, civilians, and KBR employees worked together to develop several courses of action for fixing the fuel problems. The company ordered T and right-angle connectors, hoses, and butterfly valves and had to fabricate the means of attaching the connectors to the tank. KBR built wooden stairs for each tank. While installing the connectors, platforms, and steps, the team made other needed repairs to the tanks.

We completed the improvements to the tanks in 2 months. A pressure test of the fuel tanks confirmed that our efforts were successful. Once we had completed this project, we began improvements on the second Iraqi training base, using the plans we had developed for the first base to expedite the process. Both sites are now safe for Soldiers to download fuel and for the Iraqi Security Forces to refuel their trucks. **ALOG**

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Enhancing Joint Fuel and Munitions Logistics

BY MICHAEL E. CAST

The Army Developmental Test Command is hosting a program that tests ways to improve planning for joint munitions and fuel support by making better use of information.

The Global War on Terrorism has underscored the need for close cooperation and coordination among the armed services, and future conflicts are just as likely to require joint military operations. This means that the logisticians of each service must be prepared to work closely with their counterparts from the other services to support operations of varying scope and intensity.

Since October 2002, a multiservice team has been conducting a test and evaluation program designed to improve joint logistics planning and execution. This program, known as Joint Logistics Planning Enhancements (JLOG/PE), was established by the Department of Defense's (DOD's) Director of Operational Test and Evaluation. Under JLOG/PE, the team is working with combatant commanders and their logistics staffs to develop and test a variety of methods for enhancing joint logistics. The team is hosted by the Army Developmental Test Command (DTC)—the technical tester for the Army Test and Evaluation Command—at Aberdeen Proving Ground, Maryland.

The objective of the JLOG/PE program is to improve the determination of sustainment requirements and the management of sustainment resources through the better use and exchange of information. The program was developed to examine how information is accessed and used, which means taking a close look at those information systems with the greatest potential for helping the joint force commander assess the logistics sustainability of forces in a theater of operations. Another key focus of the program is to determine the extent to which enhanced logistics processes, or business practices, can improve the joint force commander's ability to assess the logistics needs of an in-theater force.

The JLOG/PE program has focused on improvements to joint logistics operations in the areas of bulk class III (petroleum, oils, and lubricants) and class V (ammunition). This effort is critical because the services have numerous hurdles to overcome if joint logistics operations are to provide combatant commanders with fuel and ammunition where they are needed, when they are needed, and in the quantities they are needed.

Sailors aboard the guided missile cruiser* USS Monterey *stand ready to receive a diesel fuel line from the underway replenishment oiler* USNS Kanawha. *The underway replenishment of the* Monterey's *fuel took place during Partnership of the Americas, a maritime training and readiness deployment of U.S. Naval Forces with Caribbean and Latin American countries.

Soldiers from the Florida Army National Guard fuel their vehicles during a deployment in support of Hurricane Rita humanitarian assistance operations.

JLOG/PE Organization

Before the actual test and evaluation effort got underway, the JLOG/PE program initiated a feasibility study with support from representatives of the other services and SRS Technologies and Computer Sciences Corporation, two California-based companies that provide information technology services to the Government and private industry. Representatives of these two companies also have been taking part in the joint test and evaluation.

A general officer steering committee oversees the JLOG/PE program. It includes general and flag officers and senior executives representing all of the services; the combatant commands; the Joint Staff; the Director for Logistics, J–4; the Defense Logistics Agency; and the Defense Energy Support Center. Brigadier General Michael Combest, DTC's commander, is also a member of this committee, representing his command as it hosts testing of JLOG/PE concepts. The team includes both Army and Air Force participants as well as contract staff who have expertise in logistics operations.

Personnel assigned to the JLOG/PE program are responsible for briefing the Joint Warfighter Advisory Group (JWAG), which has convened four times at DTC headquarters. This advisory group includes representatives of the combatant commands and their logistics staffs, the U.S. Joint Forces Command, the Defense Logistics Agency, the Defense Energy Support Center, and other organizations responsible for military logistics.

The JWAG's meetings have focused on various proposed enhancements to class III and class V logistics operations. Among these are the Joint Staff Munitions Report (JS MUREP), the National Level Ammunition Capability (NLAC), the Web-Based Bulk Petroleum Contingency Report (REPOL), the Joint Theater Level Simulation (JTLS), and the Rolling Brief.

Joint Staff Munitions Report

The JLOG/PE team deployed to Camp Smith, Hawaii, in December 2004 to collect data and introduce potential enhancements during the Terminal Fury 05 exercise conducted by the U.S. Pacific Command (PACOM). The Terminal Fury exercises are designed to help the United States and its allies deal with potential threats in the western Pacific. PACOM planned to use the JS MUREP for munitions reporting.

During a review of PACOM's JS MUREP reporting procedures, the JLOG/PE team identified several issues for exercise planners to consider. One was the lack of specific procedures to follow for extracting munitions expenditures from the JTLS (an exercise tool used to simulate the battle) and entering those data in the JS MUREP. Since then, the JLOG/PE program has been developing and testing procedures in their computer lab at Aberdeen Proving Ground. A white paper was provided to PACOM headquarters in August 2005 outlining those procedures and plans so that they could be included in Terminal Fury 06.

National Level Ammunition Capability

The NLAC is a Web-based automated system that provides authorized users with near-real-time asset visibility of ammunition for all of the services. Ammunition asset data are furnished to the NLAC each day by service ammunition management and visibility systems and DOD transportation and document tracking systems. The NLAC allows users to view ammunition items in a number of ways—by location, serial number, lot number, condition code, service ownership, and location in the transportation pipeline.

During Terminal Fury 05, ammunition action officers described NLAC as a significant source for maintaining situational awareness of ammunition. Action officers used the NLAC to assess the status of munitions, resolve problems, and prepare briefings, including briefings on the status of the worldwide ammunition stockpile.

JLOG–PE's resident expert on the NLAC, Sergeant First Class Lacey Cabble, observed—

> We have come up with some improvements to help action officers manage ammunition. One of the tools that we came up with was a predictive analysis tool. This would allow action officers to go in and see the ammunition (in the logistics system) and make decisions at critical points, to find out if they needed to pull in ammunition at a certain time during a conflict. Also something that is currently in development is that we're trying to build in a database that will allow action officers to train on deploying ammunition realistically—using real-time data.

Web-Based Bulk Petroleum Contingency Report

The Defense Energy Support Center and the Naval Operational Logistics Support Center conducted several developmental tests involving the Web-Based REPOL in February and March 2005. The Joint Petroleum Office of PACOM and the JLOG/PE team provided support for an additional test in April 2005. Each of these tests succeeded in identifying areas that needed improvement and demonstrating the viability of a Web-based reporting system.

According to Donald Hogge, a member of the JLOG/PE team—

> [The current REPOL system uses] a current manually produced spreadsheet report that each level of command spends anywhere from 1 to 2 hours preparing and manually transfer[s] from spreadsheet to spreadsheet as the report goes up the chain of command. That process takes anywhere from 48 to 72 hours. The Web-Based REPOL process will bring that to near-real time, which is anything less than 12 hours.

Joint Theater Level Simulation

The JTLS is an interactive, computer-assisted simulation tool used in joint training programs. It focuses on the operational level of war as experienced by the combatant commands and joint task force staffs.

While participating in joint exercises, the JLOG/PE staff gained insights into how the JTLS could more accurately model real-world logistics and improve training for combatant commanders and joint task force staffs. The JLOG/PE program has funded improvements to the JTLS as a test product.

Rolling Brief

The Rolling Brief is a Web-based briefing that scrolls continuously across projection screens or monitors in a joint logistics operations center on a 24-hour basis. It provides real-time situational awareness of selected classes of supply so that logistics staff personnel can provide the latest information to their combatant commanders during joint operations. It eliminates the need for action officers to present time-consuming daily briefings.

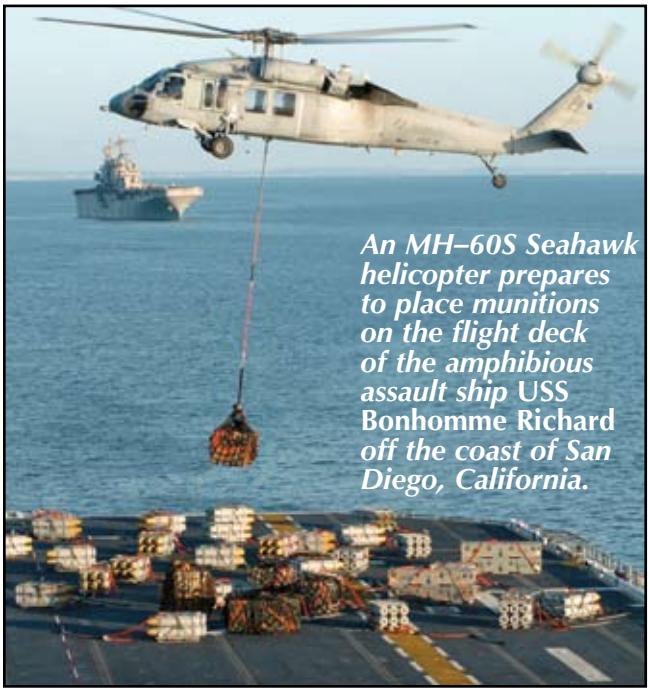
The Rolling Brief was developed by using basic computer codes that make it portable and easy to use; it is not restricted to a specific operating platform, and no tools are needed other than a text editor. The files used in the brief can be Word documents, PowerPoint slides, Excel spreadsheets, or even other Web pages. During their routine submission cycles, action officers can update files from key referenced items found in the REPOL, the JS MUREP, and the Logistics Situation Report.

Air Force Master Sergeant Michael Ashton, another member of the JLOG/PE team, summarized the advantages of the Rolling Brief like this—

> The action officers, whether for fuel, ammunition, etc., can put PowerPoint slides together, or whatever briefings they have, and the Rolling Brief pulls them all together and scrolls through each one every 20 seconds, or however long they set it for. It also has time-zone clocks and calculated days to keep them informed of the day of the exercise, or whatever relevant day, they're on.
>
> Prior to developing the Rolling Brief, for example, a typical staff officer for a logistical operations center during an exercise or wartime would be dealing with his specific commodity, whether it be ammunition or fuel. He wouldn't cross over into fuels, transportation, host-nation support, civil affairs, or engineering lanes. He wouldn't know a great deal about that until providing a briefing for the commander twice a day. So what we introduced was this tool that rolls 24 [hours a day]-7 [days a week] on a projected screen and shows each action officer's slides. There is a constant feed of updated information. The general in his headquarters or the colonel in charge of the operations center could also view those slides 24-7 during an operation or exercise. It was used during the real-world tsunami relief operation that occurred in Indonesia.

Exercises in Other Theaters

In addition to taking part in a major military exercise such as Terminal Fury, JLOG/PE team members



An MH–60S Seahawk helicopter prepares to place munitions on the flight deck of the amphibious assault ship **USS Bonhomme Richard** *off the coast of San Diego, California.*

An Airman refuels an F–16 jet during an exercise at Shaw Air Force Base, South Carolina.

observed logistics operations in the Foal Eagle 04 exercise, the largest annual exercise for U.S. and allied forces in South Korea.

In June 2004, team members also visited the U.S. Central Command (CENTCOM) area of responsibility in Qatar and Kuwait. During this trip, sponsored by Lieutenant General William E. Mortensen, CENTCOM's Director of Logistics and Engineering, the team visited the CENTCOM Forward Logistics Operations Center as well as the Combined Forces Land Component Command and the Combined Forces Air Component Command. They interviewed fuels and munitions managers and collected data on the management processes and tools currently in use. The data collected from these visits helped the JLOG/PE team analyze munitions and fuels sustainment processes, focusing on how to enhance CENTCOM's joint logistics operations. Team members also visited CENTCOM headquarters at MacDill Air Force Base, Florida, on several occasions.

Joint Logistics Training Packages

The JLOG/PE program developed a training package on logistics operations involving munitions, and a similar package on fuels is being prepared. Creation of these training packages was requested by the JWAG.

As described by Colonel Edward J. Fisher, the test director for the JLOG/PE program, "People come right out of their individual services and get assigned to a joint command with hardly any training whatsoever. This [training] walks them down from the joint perspective to the combatant command's [areas of re-sponsibility], to the joint combatant commander's staff, to the J–4 staff, where they would be assigned, and then to the individual desk and the tools they would be using while assigned there."

Other Initiatives

After developing the logistics enhancement products, the JLOG/PE team's role became the transfer of "custodianship" of the products to the appropriate organizations. As Charlie McKenzie, one of the team's principal operations research analysts, observed, "When we close down, we want to make sure that our products . . . continue past [the closing of] our organization."

The JLOG/PE team also has been working on what McKenzie called "ancillary test products." "Throughout our test and evaluation, we have identified some holes in the Universal Joint Task List—some things to be improved—so we've submitted improvements," McKenzie explained. [The Universal Joint Task List identifies logistics tasks that must be performed at the joint level.] "We are also developing what's called joint tactics, techniques, and procedures, primarily for joint munitions management."

The JLOG/PE team was asked to be the lead office for an initiative called Joint Theater Conventional Munitions Management, which is part of the Joint Theater Logistics Transformation. According to McKenzie, "What we were asked to do initially was, first, define and identify what joint theater logistics management is; second, to determine what are the processes and procedures that describe it; and, third, to determine the capabilities required to manage munitions at the joint theater level."

The U.S. Joint Forces Command asked the JLOG/PE team to support it in a related transformation initiative, Joint Experimental Deployment Support. "They've asked us to support them in data collection and analysis, and in developing the Department of Defense Architectural Framework [DODAF] associated with that effort," McKenzie said. "DODAF is a procedure or methodology for developing mappings of processes and mappings of systems that is common throughout the services and DOD. We have a capability to build those during our joint test and evaluation, and we've been supporting that effort for the Joint Staff."

At the close of the joint test and evaluation later this year, the JLOG/PE team will complete their reports and hand off the products they developed to the appropriate organizations. The military members of the team will move to other assignments, and the contracted personnel will go on to other jobs.

The transformation taking place within all of the armed services includes a significant transformation in logistics. In light of military operations in Iraq and Afghanistan, where a linear battlefront does not exist, the enhancements resulting from JLOG/PE are timely. More than ever, up-to-date information is a critical need. The work of the JLOG/PE program has improved the ability of the joint logistics community to obtain that information. **ALOG**

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A Special Operations Model for Forward Support Companies

BY MAJOR JAMES W. BOGART

With over 10 years of experience in providing multifunctional support, the Special Operations forward support company can serve as a model for conventional forward support companies that are learning to operate as multifunctional, modular units.

The Army's functional logistics companies have transformed recently to multifunctional companies that are assigned directly to maneuver battalions. However, the Special Operations forward support company (FSC) has been conducting multifunctional operations since 1995. The responsibilities of the Special Operations FSC commander have expanded over the years from mainly training, resourcing, and deploying the company in support of Special Operations Forces to include planning for operations. Planning and developing the concept of support are now critical duties for the FSC commander. This article will focus on the Special Operations FSC commander's expanded responsibilities and the organization of the FSC in today's operating environment.

Planning FSC Operations

For an FSC commander, developing plans with the supported battalion's logistics officer (S–4) is just as important as training or resourcing the company. Being aware of the supported battalion's operations allows the FSC commander to develop support concepts that sustain current operations but are flexible enough to function in the contemporary operating environment. This is a change from the current doctrine for an FSC commander outlined in Field Manual-Interim (FMI) 4–90.1, Heavy Brigade Combat Team Logistics—

> The commander is responsible for everything the FSC does or fails to do. He must be proficient in the tactical employment of the company and its assigned and attached logistics elements. The commander must also know the capabilities and limitations of the company's personnel and equipment in performing the sustainment mission as well as those of the logistical elements attached to him. Additionally, his responsibilities include leadership, discipline, tactical employment, training, administration, personnel management, supply, maintenance, communications, and sustainment activities of the company.
>
> These duties require the commander to understand the capabilities of the company's Soldiers and equipment and to know how to employ them to best tactical and logistics advantage. At the same time, the commander must be well versed in enemy organizations, doctrine, and equipment.

An analysis of the FSC commander's responsibilities as outlined in FMI 4–90.1 suggests that he also would be the officer best suited to develop the support concept and perform the role of support operations officer (SPO). Yet the FMI tasks the company executive officer or a platoon leader with this responsibility. The officer who performs the role of SPO must understand multifunctional logistics and logistics planning. These tasks require experience and schooling in order to create executable plans. Thus, SPO is a role that the FSC commander should perform with assistance from his subordinates.

When a Special Operations FSC commander deploys, he may have a planner from his battalion support operations shop to assist in conducting operations. Yet, he is the officer most experienced in providing logistics support. He attends the supported unit's meetings and updates to maintain situational awareness. He then can anticipate upcoming requirements and develop support plans to meet those requirements. He uses his personal experience and understanding of his company's capabilities to provide support without exceeding its capabilities. He is not only a commander but also a planner.

As a planner, the Special Operations FSC commander coordinates with conventional logistics units to request support when his unit's internal capabilities are exceeded. This requires him to understand conventional logistics units' capabilities to provide that support while not detracting from their missions. While the Special Operations FSC commander plans and coordinates, his

subordinate officers conduct parallel planning for execution of the same missions. This process mirrors what occurs at battalion or higher level, yet it is performed at company level. This trains the subordinate leaders and allows them to execute a plan they developed.

Coordinating With the S–4

A Special Operations FSC commander also coordinates with the supported unit's S–4 and his battalion SPO on current situations. This coordination allows the S–4 to verify the battalion plan and the SPO to conduct parallel planning. Constant communication with all players ensures that the mission is deconflicted and that any constraints are identified early and corrected.

FSC Structure

Planning is crucial to execution, but organization is also a key to success. Although conventional FSCs are multifunctional in organization, they are still broken down into functional platoons. The Special Operations FSC is configured the same, except that it has medics in the headquarters section and it has a transportation platoon that comprises a movement control section and truck squads. The charts at right show the standard composition of a conventional FSC and a Special Operations FSC.

Multifunctional Platoons

Multifunctional Special Operations FSCs have task-organized to better support their customers and allow for habitual support alignment. Developing multifunctional platoons from functional platoons has created flexibility and allows platoon leaders to train their personnel for upcoming missions and to create forward logistics elements more quickly. This process works for both contiguous and noncontiguous operations.

Reorganizing FSCs to create multifunctional platoons allows flexibility for the supported units as well as the FSC. It also trains the platoon leaders to perform not only troop-leading procedures but also mission analysis since they will execute what they develop. Multifunctional platoons also enhance support during mission sustainment operations at the maneuver company level.

Incorporating lessons learned and tactics, techniques, and procedures of Special Operations FSCs will give conventional FSC commanders more options. Examining the responsibilities of the FSC commander and the organization of the unit will help FSCs better perform current and future operations. Having platoon leaders conduct parallel mission planning trains future FSC commanders by allowing them to perform their duties and understand the duties of their leaders. **ALOG**

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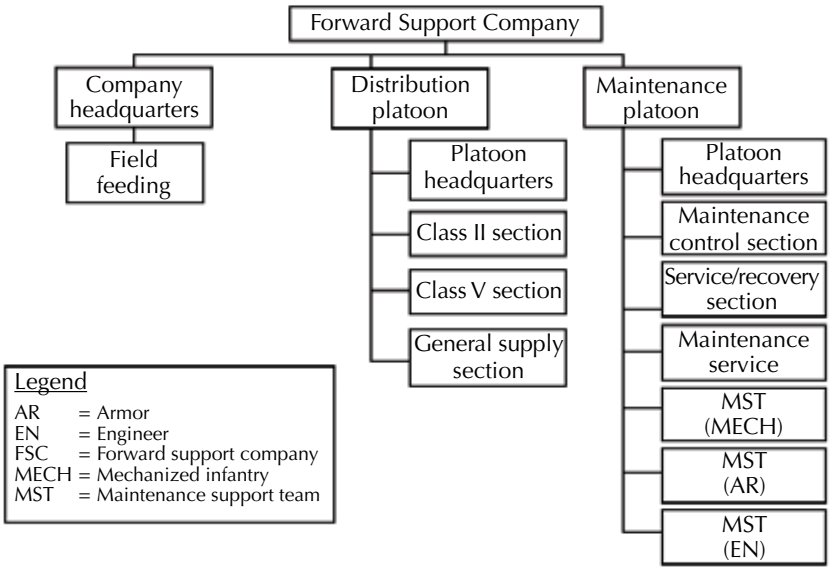
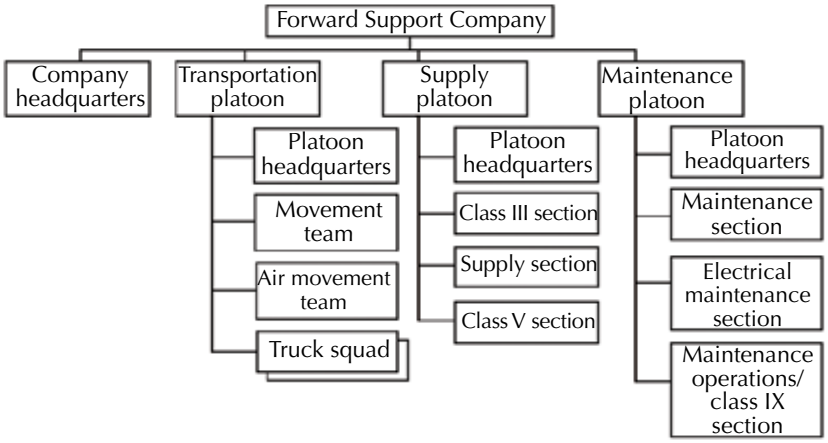
Forward Support Company



The chart above shows the standard organization of a forward support company (FSC). The chart below shows how the Special Operations FSC varies from the standard model.

Special Operations Forward Support Company



Transformation of Logistics Support of Special Forces

BY MAJOR EDUARDO SANTIAGO AND MAJOR WILLIAM C. JOHNSON, JR.

The Army Special Operations Forces' new group support battalion provides long-term sustainment at the tactical and operational levels of war.

The tactical employment of Army Special Operations Forces (ARSOF) in the Global War on Terrorism has changed the way the Department of Defense wages war. The Army Special Forces Command has had to adapt to an ever-changing environment to fulfill the prominent role assigned to the Special Operations community in winning a war against terrorism. The command has had to change the way it deploys and fights and even the way it is logistically sustained.

In response to the attacks of 11 September 2001, President George W. Bush announced his intention to begin a "war against terrorists and the states that aid them." As the President was making this historic proclamation, an entire Army Special Forces group was preparing to deploy to central Asia. ARSOF requested that the U.S. Central Command's (CENTCOM's) in-theater executive agent provide the base operations support and direct support needed to sustain ARSOF personnel in the theater of operations. Because there was no sustainable logistics infrastructure in place in the theater at the time, the executive agent requested the deployment of a short-term Active-duty logistics force to support approximately 3,000 ARSOF personnel.

In the current area of operations, the Special Forces sustainment community at the tactical and operational levels of war requires a robust organic logistics force structure for long-term sustainment. The U.S. Special Operations Command and the Army Training and Doctrine Command have addressed this requirement at the tactical level by realigning the service detachment of the Special Forces group support company to form a group support battalion (GSB).

ARSOF Organization

Under ARSOF's modular force structure, each active Special Forces battalion has a battalion service company and each Special Forces group has its own GSB. This is a major change that gives each commander control of a direct support unit. The obvious

At a remote forward operating base in Iraq, Special Forces Soldiers fill Hesco barriers with sand.

Within the safety provided by the Hesco barriers, Special Forces Soldiers test-fire weapons.

advantage is that each group can be independently employed without major augmentation. The new organizational structure also—

- Provides Special Operations forces with organic logistics sustainment.
- Can deploy rapidly to fill critical logistics requirements.
- Ties into the existing theater support structure.
- Establishes and collocates with habitual support and training relationships.
- Provides logistics management and planning capabilities.
- Can self-sustain at the group level under new modularity doctrine.

When theater Army combat service support is unavailable, the GSB is the primary common-user logistics provider for deployed Special Operations forces. Its mission is to plan, coordinate, synchronize, and control combat support and combat service support of the Special Forces group. It sends requirements to the Army Special Operations liaison element and reaches back to the Special Operations sustainment brigade as necessary. It is joint and multinational in that it can be augmented by combat service support common-user logistics assets from other services and nations and can integrate their capabilities into a cohesive plan that supports the commander's operational concept.

The GSB is capable, with replenishment, of supporting the logistics requirements of Army Special Forces groups. When augmented by other services and nations, it integrates those organizations' capabilities to provide common-user logistics support of an Army Special Operations task force or a combined or joint Special Operations task force. When assigned to a joint Special Operations task force, component forces provide internal support packages for service-specific and common logistics support. The GSBs provide rapidly deployable combat service support, combat health support, administration, communication, and all-source intelligence support to group headquarters elements and the Special Forces operational bases and deployed ARSOF.

Within the GSB, a group service support company (GSSC) and a battalion headquarters have been established with augmentation from other Army Special Operations combat service support elements.

A GSSC within the GSB adds significant logistics muscle to the Special Forces group. Each GSSC is designed to support approximately 2,200 personnel. It includes a supply warehouse; a truck squad; an ammunition transfer point; bulk fuel handling facilities; and water production, airdrop, movement control, maintenance, engineer, and medical support operations not assigned to the Special Forces group. These enhancements give a tremendous amount of flexibility and independence to the group commander and free him from having to wrestle support from conventional forces.

Support of Multiple Deployments

Before 11 September 2001, the only dedicated direct support unit for Special Operations forces was the

Immersion heaters (above) provide hot water for food preparation and showers (at right) in the field.

Army Special Operations Command's 528th Special Operations Support Battalion (SOSB) at Fort Bragg, North Carolina. Critics believed that this logistics organization was inadequate to support multiple Special Operations deployments. Operations Enduring Freedom and Iraqi Freedom confirmed that belief.

The mission of the 528th was to provide rapidly deployable combat service support and health service support to ARSOF in war and operations other than war. However, because of the small number of logistics support personnel assigned to the 528th's organic support companies, it was not able to sustain all of the Special Forces groups simultaneously over a long period of time without a conventional forces backbone. The 528th was able to provide logistics support for ARSOF in a training environment but could not provide simultaneous support for ARSOF deployments in geographically separated areas. The 528th SOSB was designed to support two deployments at the same time, but this proved to be an almost impossible task because of the limited operational design of the organization. Operation Iraqi Freedom further confirmed this when five of seven brigade-sized Special Forces groups were deployed simultaneously.

Although the new GSB structure enhances each group's capability, the Army Special Operations Command and the U.S. Special Operations Command do not have a support organization to use at their discretion. With the creation of the GSB, the Army Special Operations Command eliminated the 528th SOSB and moved its equipment and personnel to the Special Forces groups. This means that only those groups have support elements.

The Global War on Terrorism has proven to be a lengthy campaign characterized by an unprecedented number of ARSOF deployments around the world. The Army must continue to transform its logistics support system to meet the needs of these vital Special Forces units. **ALOG**

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Property Management for Company Commanders

BY CAPTAIN JAREN P. POWELL

You have been a company commander and your unit's primary hand receipt holder for 14 months. The unit supply sergeant recently moved to a new assignment, and the transition of the incoming supply sergeant was smooth and simple. So you thought! In conducting a 10-percent cyclic inventory, you discover that a Single-Channel Ground and Airborne Radio System (SINCGARS) is missing. And that's a sensitive item!

The above scenario could have been avoided by using the right property management "tactics." Army Regulation (AR) 710–2, Supply Policy Below the National Level, explains the different types of inventories and mandates the timeframes during which these inventories should be conducted and by whom. Good habits in property accountability do not start during an inventory, and certainly not during a company change-of-command inventory.

Building a Resource Management Team

A key element of unit readiness is an effective, skilled resource management team of sub-hand receipt holders. This team can ensure that your unit's end items and all of their associated components are fully operational. Team building starts with good, solid communication of what you, the primary hand receipt holder, expect from the team members. Most important, establishing an effective property management system will help set the conditions for excellence in accountability by allowing your sub-hand receipt holders to develop programs that will meet the objective of the system you have put in place. These programs will help inspire them to take a personal interest in ensuring that equipment will be available and operational when needed.

Small arms are ready for an upcoming sensitive items inventory.

Sub-hand receipt holder counseling should include proper management of critical items. Discussion also should include the five levels of property responsibility found in AR 735–5, Policies and Procedures for Property Accountability, the level of responsibility for which they are charged, and how each level affects you as the primary hand receipt holder. The five levels are—

1. Command. A commander is responsible for all property within his command.

2. Supervisory. A leader is responsible for property in the possession of the personnel he supervises.

3. Direct. The accountable officer is responsible for property not issued on hand receipt, and the primary hand receipt holder is responsible for property accepted on hand receipt from the accountable officer.

4. Custodial. The supply sergeant, supply custodian, supply clerk, or warehouse person is responsible for property in storage awaiting issue or turn-in.

5. Personal. Each person is responsible for exercising reasonable and prudent actions to properly use, care for, safeguard, and dispose of all Government property issued for, acquired for, or converted to his exclusive use, with or without receipt.

Unit Supply Standing Operating Procedure

A unit supply standing operating procedure (SOP) should be built around the provisions of AR 190–11, Physical Security of Arms, Ammunition and Explosives; AR 710–2; AR 735–5; Department of the Army (DA) Pamphlet 710–2–1, Using Unit Supply System (Manual Procedures); command policy letters; and local SOPs. AR 710–2 governs the processes that should be used in daily supply activities, and DA Pamphlet 710–2–1 tells you how to conduct these processes by providing examples of applicable forms.

Every SOP is different, but some points to consider when developing the inventory annex of your SOP are as follows—

- Ten-percent item inventories must be conducted by you, the primary hand receipt holder; only extreme cases warrant deviations. Your 10-percent item inventory should culminate in reconciliation with the supply sergeant of all shortages found and a review of the current status of last month's inventory. This will help you stay abreast of your unit's readiness status. All items not found will be listed on a shortage annex and initialed by you or your property book officer (PBO). A Department of Defense Form 362, Statement of Charges/Cash Collection, is a recommended method of obtaining relief from responsibility for items listed on the shortage annex.
- A memorandum for record listing line item numbers (LINs) for the upcoming month's inventory should be included in the company training meeting agenda and provided as a handout during the training meetings.
- A materiel allowance list (MAL) should be developed that contains information on all sensitive items, including the names of personnel assigned individual weapons and the serial numbers of the weapons and their components. It also may be helpful to develop a field MAL with an additional "signed out" column for quick reference in a field environment. Thousands of troops depend on the availability of sensitive items. Failure to account properly for these assets can have a huge impact on mission accomplishment.
- Consider adding information to your SOP on where Soldiers should stow their weapons when they return to garrison after a field training exercise.
- Management of critical items should also be detailed in your SOP. An example of a critical item is the fuel system supply point (FSSP), which is used to establish a refueling station for ground vehicles. The FSSP is a critical asset that is not issued as a complete system. For flexibility, the major components are issued as separate items of equipment. An FSSP can have an enormous impact on mission accomplisment, so it is important to inventory this item more often than is dictated by AR 710–2 or other time-driven inventories, such as the PBO-directed 10-percent cyclic survey or sensitive item inventory.

Planning the Change-of-Command Inventory

Planning is the most overlooked phase of a change-of-command inventory. Its purpose is to familiarize the incoming commander with the importance and scope of the upcoming inventory and establish a realistic and acceptable inventory schedule. Planning also provides an opportunity for you to gather essential supplies and references for the inventory. Diligence and hard work during this phase will pay off during the actual inventory.

Planning should begin as soon as you know that you will be assuming command and the concurrent responsibility of primary hand receipt holder. The first task is to schedule an office call with the battalion commander so that he can offer direction and advice. Ask the unit supply sergeant to accompany you. There

At an Inland Petroleum Distribution System site, Soldiers inventory components of an 800-gallon-per-minute mainline pump.

is no such thing as "officer business" when it comes to property accountability. All military and civilian personnel are stewards of Government property. Witnesses at any level to bad property management can bring attention to an issue.

Also, take the unit supply sergeant with you when you make your initial visit to the PBO, and require that he be on hand throughout the inventory. The PBO can provide you a copy of the unit's hand receipt, due-in listing, and nonexpendable item shortage annexes. Your copy of the hand receipt should reflect all transactions affecting the primary hand receipt for the current month and transactions not affecting on-hand balances. The PBO should be able to provide guidance on current lateral transfer directives; local policies, including those set by major Army commands; the status of end items that are due in, including all components; the availability of publications needed to conduct an inventory; the estimated duration of the inventory; and the responsibilities of the current primary hand receipt holders.

Next, visit the outgoing company commander and discuss the change-of-command inventory schedule in detail. The schedule should allow time to inventory all unit property thoroughly and complete administrative actions required by regulations. The outgoing commander should allow time for you to visit the unit supply room and review all sub-hand receipts.

Develop an accountability matrix for property listed on the unit's table of distribution and allowances (TDA), modification table of organization and equipment (MTOE), or joint table of allowances (JTA). This matrix can serve as a managerial tool to facilitate the inventory and reconcile any discrepancies. Pay special attention to items not sub-hand-receipted down to user level.

Prepare a list of all technical manuals, supply catalogs, and supply and technical bulletins pertaining to the equipment on your hand receipt, including their latest publication date. Ask your unit supply sergeant to develop a publications library of all pertinent publications. These publications will provide you with a pictorial description of your equipment and indicate whether or not it has components. DA Pamphlet 25–30, The Army Publishing Program, provides a listing of publications. They are revised often, so ask the unit supply sergeant to maintain an up-to-date set so that you can track changes that affect your equipment and its associated components. Each sub-hand receipt holder also should have a copy of publications pertaining to property for which he has responsibility.

Conducting the Inventory

The outgoing commander typically prepares an inventory plan well in advance of his leaving. The plan addresses major requirements of the inventory, lists the schedule to be followed, and incorporates this plan into a coordinated unit training schedule.

An incoming company commander usually has 30 days to inventory all property before the formal change of command and transfer of the unit hand receipt. The unit supply sergeant should escort you and the outgoing commander during the inventory. It is helpful to have communications and maintenance subject-matter experts available to answer questions about sets, kits, and outfits and components that can sometimes be complex. The outgoing commander should make sure that sub-hand receipt holders are prepared for the inventory. One way of doing this is by holding a pre-inventory briefing with key personnel the day before the inventory begins.

There is no such thing as "officer business" when it comes to property accountability. All military and civilian personnel are stewards of Government property.

As the incoming commander, you should inventory all equipment by LIN, using all applicable publications to identify each type of assigned equipment. Be sure to count the items and verify serial numbers; do not simply rely on the hand receipts. If shortages are discovered, give sub-hand receipt holders time to search for the items before compiling a list of items that cannot be found. Remember: You have not assumed responsibility as the primary hand receipt holder yet and cannot process forms of relief from responsibility, so keep your battalion commander and S–4 informed and use AR 735–5 as a reference. Make sure you record shortages on the appropriate annex and post them to your matrix.

Once the inventory is underway, it is good practice to have the unit supply sergeant conduct administrative actions, such as updating sub-hand receipts and generating forms of relief from responsibility as required. Keep track of the administrative actions that should be conducted and coordinate with the unit supply sergeant to make sure all actions are completed before the next day's inventory proceedings.

Develop an inventory plan that suits you and your unit. Remember that all property acquired by the Army must be accounted for as prescribed by applicable Army regulations. You should take this inventory seriously; otherwise, your accountability program will be doomed before you even assume command.

Unit Supply Sergeant Audit

AR 710–2 does not discuss the unit supply sergeant's manual audit of the hand receipt. A forward-thinking company commander will ensure that he and the unit supply sergeant schedule a manual audit on the unit's approved annual training schedule. This manual audit serves as a managerial tool and provides a checks and balances system that can be used to validate that all unit property is accounted for when your unit supply sergeant is reassigned out of your unit. The audit also alerts the incoming unit supply sergeant of property that is on loan and accounted for as prescribed by regulation. Before the outgoing unit supply sergeant departs, he and the incoming unit supply sergeant should brief you after the manual audit is complete so that there will be no surprises down the road.

To maintain the integrity of the manual audit, certain reports must be obtained in advance. The Personnel Asset Inventory Report and manning roster, which can be obtained from the battalion personnel administration center, verify that individuals assigned as sub-hand receipt holders are actually assigned to your unit. A copy of the current primary hand receipt should be obtained from the installation PBO before the audit. It is important to remember that some sytems have many components that are listed as separate LINs in the property book. For example, a 30,000-watt generator is used to operate a reverse osmosis water purification unit, but it is has a separate LIN. Also review the due-in column of the primary hand receipt to confirm whether items received have been recorded correctly. Failure to confirm that items listed in the "due-in" column have been received could result in the ordering of unneeded equipment costing thousands of dollars.

Soldiers inventory components of the intake system of a Lightweight Water Purifier.

Property Management Advice

The lists that follow contain guidance that is not necessarily grounded in doctrine. Rather, it is derived from my personal property management experience. It is shared in an effort to help company commanders and their supply sergeants establish and maintain a successful property accountability program.

First, I offer this list of "do's"—

1. Ensure that copies of assumption of appointment orders and updated signature cards are forwarded to supporting agencies and the PBO.

2. Before signing the hand receipt you receive from the PBO, verify that it is an updated copy and that all changes have been posted. Use a memorandum for record to document any discrepancies found.

3. Ensure that the outgoing commander inventories unit property assets with you. In the event that the outgoing commander is not available, ask that a disinterested officer be appointed on orders to represent him.

4. Whenever feasible, inventory like items together. (This works well with vehicles.) Ask the sub-hand

receipt holders to be present when inventorying property on sub-hand receipts and component hand receipts. Once sub-hand receipts have been inventoried and manually posted to the hand receipt listing, have sub-hand receipt holders update their hand receipts.

5. Require the supply sergeant to obtain copies of all outstanding temporary hand receipts for property loaned to other units. Inventory property and renew the hand receipts.

6. Compare the authorizations on your primary hand receipt with the current TDA, MTOE, or JTA, as applicable.

7. Submit a DA Form 1687, Notice of Delegation of Authority-Receipt for Supplies, to the PBO to designate individuals who are authorized to receive and turn in supplies on your behalf.

8. Verify the validity of pending DA Forms 5504, Maintenance Requests, with pertinent maintenance support elements and DA Form 2404 or DA Form 5988–E, Equipment Maintenance and Inspection Worksheet.

9. Verify all outstanding administrative adjustment reports and incomplete equipment requests, receipts, and turn-ins. Question and follow up on any documents that are older than the date of the hand receipt. Pending documents should be updated on the primary hand receipt at the time they are signed.

10. Brief all sub-hand receipt holders on the importance of accurate accountability, the severe implications of supply discipline infractions, and the layout of their equipment for inventory purposes. Ensure that vehicles have all vehicle operator maintenance equipment and all basic issue items displayed. The tool sets, kits, and outfits should be open and complete when the items are inventoried.

11. If, during the inventory, it is determined that equipment has been lost, damaged, or destroyed by other than normal wear and tear, take action immediately to determine the facts leading to the loss and the amount of loss to the Government. Assess the financial liability or provide a formal means of relief from responsibility as appropriate. When assessing damages to property, seek assistance from your S–4 and have a technical inspector assist in determining the proper condition code.

12. Ensure that any unrecorded excess equipment found during the inventory is secured and reported to the PBO for disposition and accountability.

13. Ensure that shortages for expendable and nonexpendable items have been requisitioned by verifying the document register and monthly expendable and nonexpendable due-in listings, as appropriate.

14. Make sure that all nonexpendable component and end item shortages discovered during the inventory are processed in accordance with AR 735–5. Relief-from-responsibility forms should be processed for any unresolved discrepancies found when comparing your copy of the hand receipt to that of the PBO. The reason for the discrepancy dictates what form is used. One form used for this is a Department of Defense (DD) Form 200, Financial Liability Investigation of Property Loss. All property loss forms must be initiated before you sign the hand receipt.

My experience has likewise led me to compile this list of "don'ts"—

1. Never delegate a physical inventory. This is your personal responsibility as company commander. Remembering this one rule could prevent you from being subjected to financial liability.

2. Do not extend the inventory past the allotted time unless an extension is obtained from the PBO. Before submitting a request for an extension, make sure it has been cleared through the battalion executive officer and the battalion commander. The executive officer usually will know if you can get approval. However, try to prevent situations from developing that would warrant an extension.

3. Do not delay initiating an investigation of financial liability for property when loss, damage, or destruction is evident.

4. Do not issue property unless it is authorized by MTOE, TDA, JTA, supply bulletin, technical manual, or other official authorization.

5. Do not allow temporary hand receipts for loaned property to expire. Temporary hand receipts expire after 30 days. It is a good idea to record the name of the individual signing for the property, his place of work, his phone number, and the date the property is to be returned so you can follow up.

Every unit is different. The tactics that I have shared above are intended to serve only as a guide to establishing solid property accountability in your unit. I hope that, by applying some of these tactics, you will be a successful property manager and leave your successor with a unit that has all of its property on hand and ready to perform the functions for which it was intended. **ALOG**

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Disc Versus Drum Brakes

BY LOUIS J. GORENC

Most Army wheeled vehicles are adapted from commercial models. However, the Army is not keeping upwith the best commercial automotive technology in one important area: the brakes.

The Army has a fleet of vehicles that numbers approximately 500,000. Combat vehicles operate on both unpaved roads and paved highways. Normally, light trucks, heavy-haul trucks, and high-mobility, multipurpose wheeled vehicles use paved concrete or asphalt roads for everyday duties. Nearly all of the engines, transmissions, differentials, and brake systems used in Army vehicles are commecially produced.

Why are so many commercial systems integrated into Army vehicles? The reason is that Army vehicles are adaptations of commercially marketed vehicles. Army light trucks are modified civilian vehicles, heavy-haul dump trucks are modified commercial dump trucks, and semi-tractors and -trailers are modified over-the-road rigs—the same type we see moving freight down our Nation's highways. They have the same frame designs, the same driveline designs, and the same brake systems. In fact, the number of vehicle manufacturers is limited, and many use all of the same components.

It would be neither efficient nor effective for the Army to design, create, and test new engines or transmissions from scratch, and the costs would be prohibitive. Minimizing risks to personnel is a priority, and tests on vehicle equipment previously conducted by industry provide data and engineering information that can be used to reduce the danger of injuries or death. System upgrades contribute to risk reduction, but occasionally state-of-the-art advances in the private sector are overlooked. The best example is the use of technologically superior disc brakes over traditional drum brakes.

European and Domestic Use

Most European heavy over-the-road trucks use disc brakes on all axles, with over 1.5 million disc brakes produced in Europe. U.S. commercial truck manufacturers entered the disc brake market with front-axle discs, but they were not promoted in the industry. (I worked on Mack Truck disc brakes in the 1970s.) Four-wheel disc brakes have been available for American-made light trucks for several years, and they have demonstrated superior stopping efficiency. FWD/Seagrave, Pierce Manufacturing, Spartan Motors, and Sutphen use air discs on fire, emergency, and rescue vehicles. Motor Coach Industries and Prevost Car order them installed on intercity coaches.

Currently, the Army uses disc brakes only on M998-series high-mobility, multipurpose wheeled vehicles, with four-wheel hydraulic discs, and a limited number of commercial light trucks adapted for military use, with front disc brakes.

Drum Brakes

Drum brakes operate using two steel shoes with a friction material bonded or riveted onto the faces of the shoes. The two shoes are mounted at the outer end of an axle on a backing plate. When hydraulic or air pressure is applied to the shoes, they expand inside the brake drum, which is attached to the wheel and tire. The force of the shoes against the inside of the drum produces friction and stops the rotation of the drum-wheel-tire unit, thus stopping the vehicle.

This is a satisfactory system for some applications, such as light-duty vehicles. However, the larger and heavier the vehicle, the larger and heavier the drum brake unit must be to dissipate the enormous heat generated in stopping a large vehicle. This means a large vehicle needs large shoes, a massive (150 pounds or more) cast-iron drum, heavier gauge steel backing plates, and large supporting operation activators.

The shoes also must be enclosed in a drum, which greatly reduces or eliminates the air circulation needed to remove heat buildup. The drum sheds heat only from the surface area on its outer circumference. When the shoes get wet, their ability to brake weakens (a phenomenon known as "brake fade") because the drum cannot sling water out of the unit; the water is trapped and held inside the drum by centrifugal force as the drum rotates until it is evaporated by heat. Air drum brakes have approximately 20 internal moveable parts and another 20 external parts for operation.

To maintain air drum brakes on a heavy rig, time must be allotted to inspect material wear of the shoes caused

The M998-series high-mobility, multipurpose wheeled vehicle is one of the few Army vehicles equipped with disc brakes.

by friction. The maintainer must crawl under the vehicle to see the wear. If all 40 parts are mechanically acceptable, the brake is adjusted using one wrench while the wheel is raised off the ground. If the problem diagnosed requires that the brake be torn down, the wheel must be raised; if it is a dual wheel, a wheel jack must be used to remove the duals and drum—a 600-pound package—before the tear-down can be started.

Disc Brakes

Disc brakes were developed in England in the 1890s and patented in 1902. They were extensively used on fighter planes during World War II and were adapted to automobiles in the 1940s and 1950s. By 1970, front disc brakes were installed on most American cars. In the late 1970s, light American trucks and a limited number of heavy trucks used front axle discs. Today, use of disc brakes has become common in the U.S. automotive industry.

Heavy truck air disc brakes have many advantages over drum brakes. Disc brakes operate with a large cast-iron rotor attached to the vehicle spindle or axle that rotates. A steel wheel and tire are bolted to the rotor. A stationary caliper is mounted to the axle housing, with two steel pads made of friction material bonded or riveted to one side of the pads. The pads, operated by an internal cylinder, float outward when air or hydraulic pressure is applied. This forces the pads against the rotor, stopping the vehicle. Disc rotors are not enclosed, so they sling water when wet and thus dry quickly with minimum brake fade. They do not pull the vehicle to one side, as drums can do; all stopping is in a straight line.

Disc brakes dissipate heat quickly because the rotors and pads are open and the rotors have large internal ventilation air passages. Because discs run cooler than drums, less heat is transferred to tires, which increases tire longevity. Disc brakes are 30 to 40 percent lighter in weight than drum brakes, which also reduces tire wear and, with less rebound over potholes and rough roads, keeps tires in contact with the road more effectively. Consistent tire-to-road contact produces consistent steering efficiency.

Disc brakes have approximately one-fourth the number of parts of drum brakes. They require inspection, but not adjusting, and that inspection can be performed without lifting the axle. Discs last four times longer than drums, making them the more cost-effective alternative. The most important vehicle functions are braking and steering. All-wheel disc brakes immediately improve both. They decrease stopping distances by up to 50 percent and, with less brake weight, reduce the unsprung weight of axles and wheel bounce, thereby maximizing tire-to-road contact and increasing steering control. ["Unsprung weight" is the weight of all components of a vehicle that are not supported by the vehicle's springs. These components include wheels and tires. The lower the weight of these components, the better they can handle bumps and potholes in the road.]

I believe that future tactical military vehicles should be ordered with all-axle disc brakes. Whether current brake systems are hydraulic- or air-operated, a retrofit developmental program could be initiated to fit tactical vehicles and trailers with all-axle disc brakes. Several major brake manufacturing corporations are able to provide the necessary expertise and components to reach this objective.

Requiring disc brakes on Army vehicles would reduce the long-term logistics footprint by helping the Army to reduce brake maintenance time, extend brake replacement intervals, increase tire life, and consume fewer brake replacement parts. If a single vehicle component can provide all these benefits, I believe that serious consideration must be given to including that system on all Army vehicles. **ALOG**

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Quantum Computation and Communication

BY DR. KEITH ALIBERTI AND THOMAS L. BRUEN

The amazing world of quantum mechanics may revolutionize the way logisticians compute support requirements and communicate on the battlefield.

Editor's note: Innovative developments in science and technology will change how the Army is deployed and sustained. This is the first in a series of articles written by members of the Army Logistics Innovation Agency's Futures Group that survey some of the most promising possibilities.

We live in a time of unprecedented technological advances that hold profound logistics implications for our Army. The journey to fascinating, powerful, and novel computation and communication capabilities, in particular, will lead to new scientific and technological developments with many benefits to Army logistics.

"Quantum Computation and Communication" is one of five themes for future logistics innovation identified by the Army Logistics Innovation Agency (LIA) at Fort Belvoir, Virginia. The others are "Prediction and Cooperation," "Energy-on-Demand," "Designer Materials," and "Telepresence." Each of these themes describes plausible future advances in technology and business processes that may improve logistics effectiveness significantly. They also depict future conditions under which logistics functions will be significantly improved and logistics requirements radically reduced. Together, the themes offer an advanced look at some amazing possibilities for Army logistics.

Our goal in this and subsequent articles in *Army Logistician* is to explain the science underlying these themes in plain language while outlining the possibilities they offer for future logistics. In this article, we examine the salient features of quantum computation and quantum communication. We will explore the quantum world and explain how quantum mechanics (QM) forms the bedrock of these emerging technologies. The effects of QM are counterintuitive and require that we rethink our everyday view of how the world operates. Relating the effects of QM to quantum computation and quantum communication will give you an appreciation of how these technologies will benefit and revolutionize logistics. Admittedly, this is a challenging subject. The terminology and concepts will be new to many readers. But we feel it is important to realize that, over the course of a 20-year career, today's sergeants and second lieutenants undoubtedly will be affected by developments in this and related scientific fields.

We should mention that LTA serves a unique role in the Army logistics community. As "scouts" for advanced business processes and technology for the Army's Deputy Chief of Staff, G–4, LTA looks for opportunities to inform the logistics community about research efforts of potential value to logisticians. Articles like this provide information that can contribute to the development of a vision for future logistics capabilities, policies, and plans.

Technology for a New Logistics Environment

Future Army logisticians will have to manage a range of logistics functions across an end-to-end logistics enterprise and will need tools that permit effective decisionmaking and rapid, dynamic planning.

In an increasingly complex environment, we must consider new ways to model and analyze diverse and dynamic processes that exist at globally distributed locations. We must be open to the most efficient methods of modeling interrelated phenomena among the intelligence, operational, and logistics domains. Decreased cycle time, increased situational awareness, and secure transmission of real-time logistics information are just some of the benefits that quantum computation and quantum communication will offer to Army logistics. These exciting new fields of science will harness the fundamental laws of physics to dramatically improve the acquisition, transmission, and processing of logistics information. The goal is unprecedented computation capabilities and secure communications for complete battlefield dominance.

Emerging joint warfighting concepts require that Army logisticians be completely integrated into the

joint fight. To realize fully many of the capabilities prescribed in the Joint Logistics (Distribution) Joint Integrating Concept, Army logisticians must perform their missions with unprecedented levels of connectivity and joint interdependence. Quantum computation and quantum communication promise to provide those capabilities. Quantum computers would be capable of computing at speeds far exceeding those of conventional computers and performing calculations that are too large for conventional computers to complete in a reasonable time. Likewise, quantum communication devices would allow for real-time, highly secure transfer of information with near-zero latency. ["Latency" refers to the time lag encountered in an end-to-end communication. Humans can detect time lags of about 16 milliseconds and greater. "Near-zero latency" refers to a lag of less than 16 milliseconds.]

The Quantum World

Before 1900, the laws of classical physics did an excellent job of describing large, slow-moving particles, but they could not explain the behavior of subatomic particles such as electrons, protons, neutrons, photons, and quarks. It was not until the development of QM that the behavior of such particles could be explained.

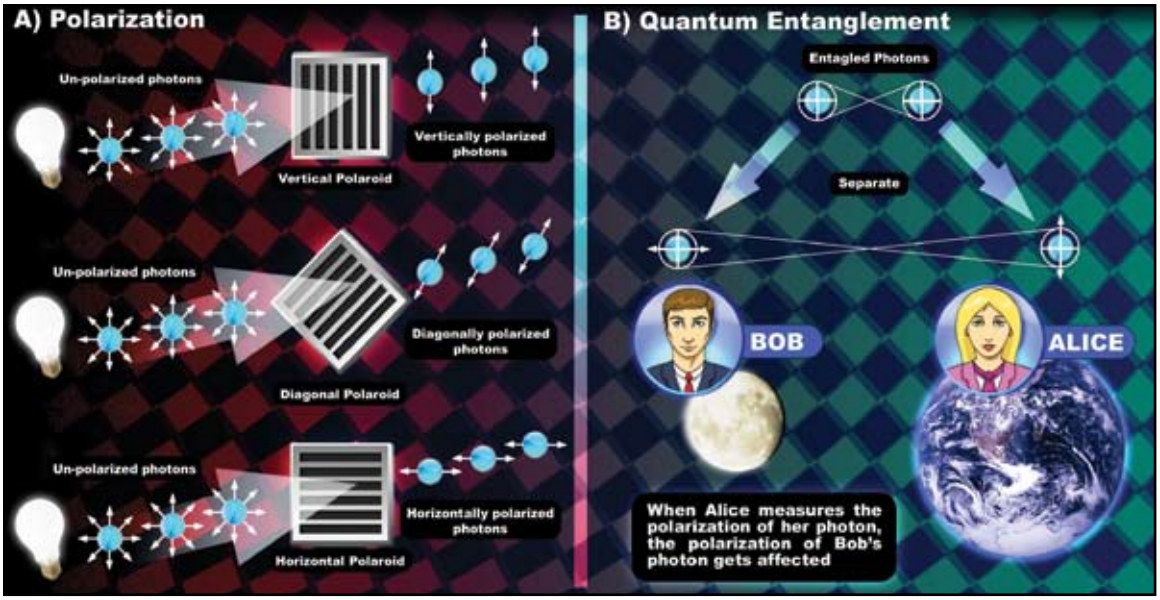
Today, QM is the most satisfactory theory available for explaining life in the quantum world. QM, however, is notoriously difficult to understand because it requires a complete revision in our concept of a "particle." While the features of QM presented here may seem bizarre, it is important to remember that a host of astonishing, practical applications have resulted from QM. Some everyday examples include the laser, the processors in a computer, and the many forms of medical imaging in use today. With this in mind, let's try to understand those features of QM that are most relevant to quantum computation and quantum communication.

What is a subatomic particle? The development of QM followed a number of surprising observations that could not be explained by classical physics. One observation in particular—the photoelectric effect—led Albert Einstein to suggest that light exists in discrete packets of energy called "photons." Before 1900, light always was described as a wave. After Einstein, light was described as consisting of little "quanta" of energy. Today, physicists accept the fact that light behaves as both a wave and a particle—it has "wave-particle duality." In fact, it is the wave-particle duality of light that allows night-vision goggles to operate. Light exhibits wave-like properties when passing through the goggles' lens but particle-like properties when it hits the goggles' internal sensor.

In the years following Einstein's suggestion, suitably designed experiments demonstrated that electrons also exhibit wave-particle duality. At the time, QM's proposition that electrons had wave-particle duality was quite disconcerting. Didn't electrons have mass? Weren't they little point-like things that orbit the nucleus of an atom like planets orbiting the sun? Perhaps even more disconcerting was the fact that wave-particle duality applies to all subatomic particles. Quantum particles were not the tangible particles that we were used to. QM rendered our conventional images of particles obsolete.

Where is that particle? If a subatomic particle is not really a particle in the classical sense, then how can we say where it is? In QM, the physical properties of subatomic particles are not evident until someone decides to measure them. This is rather disquieting. It implies that physicists can predict the possible outcome of a particular measurement but cannot, with absolute certainty, ensure the outcome of that measurement.

The definite location of an electron, for example, cannot be given until one measures its location. Before a measurement is made, the particle is actually in several possible locations, so several possible outcomes to its whereabouts are possible and the best one can do is



When photons travel, they vibrate, and the direction in which they vibrate is called "polarization." In figure A, photons can be forced to vibrate in certain directions (vertically, diagonally, or horizontally) by passing them through a filter known as a Polaroid. Figure B portrays quantum entanglement, a concept of fundamental importance for quantum communication. Two photons have become entangled. They then no longer have individual quantum states; they are interrelated.

give the probability that it will be "over here" or "over there." In the language of QM, the particle is said to be in a "superposition of states."

Immediately after a measurement is made, we can say with certainty where the particle is; but until the particle is measured, it does not have a position. This feature of QM is very important to both quantum computation and communication. As we will see shortly, the fact that measuring a subatomic particle forces it to take a value is *the* feature that allows us to know if a quantum communication has been compromised.

Where is that particle going? Isaac Newton is famous for, among other things, the laws of motion governing everyday objects. For example, given the position and momentum of an object, we can determine where that object is going using Newton's laws of motion. In QM, the position and momentum of a subatomic particle cannot be measured with very high accuracy. Simply trying to measure the position of an electron will alter its state. If we measure its position with great accuracy, we alter its momentum; if we measure its momentum with great accuracy, we alter its position. These features are embodied in what is called the "Heisenberg Uncertainty Principle." This principle, along with wave-particle duality and superposition of states, is crucial to our discussion of quantum computation and communication.

Quantum entanglement. Quantum entanglement is actually a useful feature of QM; it is a resource at our disposal. To explain what it is, suppose that we have two photons that have become interrelated. If a measurement of one photon instantly influences the other photon—even if the photons are very far apart and isolated from each other—then these two photons are "entangled."

As an example, let's introduce two characters, Alice and Bob. When photons travel, they vibrate, and the direction in which they vibrate is called "polarization." (See figure A above) Now, let's consider that Alice and Bob share entangled (and perfectly correlated) polarized photons. Alice (let's put her on Earth) has one photon, and Bob (let's put him on the Moon) has the other photon. It is important to realize that, while these entangled photons are polarized, neither Alice nor Bob knows what the polarizations are. If Alice then proceeds to measure the polarization of her photon with a polarizer and finds that it is vertically polarized, then Bob's photon must be horizontally polarized. (See figure B above.) Such quantum entanglement, which Einstein called "spooky," is of fundamental importance for quantum communication and, in particular, for quantum teleportation.

The main characters. The stage is now set. Quantization (subdivision into quantum particles), wave-particle duality, superposition of states, uncertainty, and entanglement are the only features of QM that we need to consider in order to explore quantum computation and communication. It is important to realize that these quantum effects are not a result of shortcomings in QM but that they are inherent in nature; they reflect the essence of our world.

Quantum Computation

We begin our discussion of quantum computation with an example adapted from Dr. Lov Kumar Grover, the inventor of the Grover quantum search algorithm.

Assume that you are trying to solve a crossword puzzle and you have the following: _ _ r _ n h _. (The solution is "piranha.") In an effort to solve the puzzle, you check an online dictionary with

1,000,000 alphabetically arranged words and then develop a program to search the dictionary automatically for a fit to the puzzle. Your program typically solves the puzzle after looking through 500,000 words. This is really the best one can do using a conventional computer [a computer that measures data in bits (0s and 1s)].

What would happen if we used the multiple states available to a photon or other quantum particle rather than the 0s and 1s of a conventional computer? What if we used a quantum computer (a computer with data that can be in multiple states at the same time)? If we had a quantum computer with an online dictionary, it would be possible to carry out multiple computations simultaneously. A quantum computer, using quantum search algorithms, could complete the search for an answer to our puzzle after 1,000 words.

In the future, database searches will occur at speeds faster than possible with even the most powerful conventional computer in existence today. This kind of revolutionary computing power would be a tremendous aid to the exploitation of massive supply, maintenance, and transportation databases and holds great potential for improving the responsiveness of highly complex logistics systems. So, how does a quantum computer work?

Superposition of states at work. Recall that subatomic particles, until measured, are in a superposition of states. Let's see how this applies to quantum computation. The memory in a conventional computer is made up of bits. A bit is a **b**inary dig**it**. For example, the binary number 1001011 is 7 bits long. (A byte is a collection of bits—almost always 8 bits.) A bit can be either a 0 or a 1 but not both. A bit is like a switch; it can either be "on" or "off." A conventional computer can do three things: it can set a bit to 0, it can set a bit to 1, or it can look at a bit and use it to decide what value to give to some other bit. In a nutshell, a conventional computer operates by interpreting bits and figuring out what to do with them.

A quantum computer uses qubits (**qu**antum **bits**.) Quantum computers operate by observing the state of qubits. A qubit can be a 0, a 1, a combination of the two, or it can represent a number that is somewhere between 0 and 1; that is, it can be in a superposition of states. Now, imagine for a moment that you have 200 qubits; this represents a quantum superposition of as many as 2^{200} states. Each one of these states is equivalent to a conventional computer's single list of 200 1s and 0s. A quantum computer would simultaneously operate on all 2^{200} states in the process of doing a computation. In the same amount of time it takes a conventional computer to operate on one state, a quantum computer can operate on 2^{200} states.

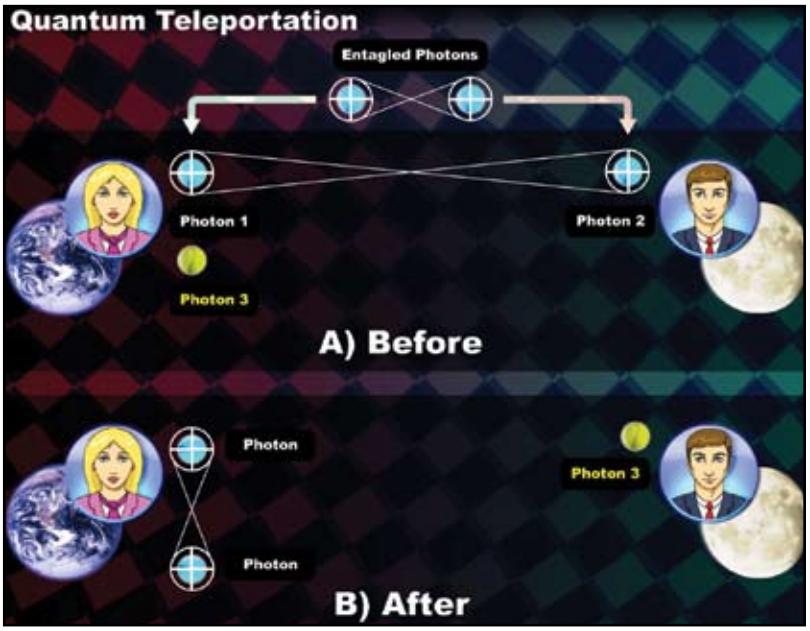
To perform a calculation in the same amount of time as a quantum computer, a conventional computer would need 10^{60} processors. This amount of computing power is staggering; we certainly would not use such a computer for word-processing or email. Dr. Peter W. Shor of AT&T's Bell Laboratories has provided an application of a quantum computer, rapidly factoring very large numbers in a matter of seconds. Currently, the premier application of quantum computing is in the area of cryptology, which is the art of making and breaking ciphers (secret codes) that are used to encrypt messages. Virtually all encryption methods in use today can be decrypted using quantum algorithms. However, many exciting potential applications of quantum computers remain to be discovered.

The state of quantum computation today. Current quantum computers can perform simple operations on 2 and 3 qubits. This level of computational power, however, does not rival the conventional computer. The challenges to creating a quantum computer of any value are primarily in the areas of "decoherence" and error correction.

If a qubit comes into contact with its environment (for example, becomes entangled), then its quantum state will decay into a mixed state and the qubit is said to "decohere." Decoherence destroys the efficiency of a quantum computer. This interaction of quantum states of a particle with the environment is typically referred to as "noise." Conventional computers correct for noise through error correction codes that store the bits with redundancy (the bits are copied and later recovered). The states of a quantum particle cannot be copied, and, even if they could, we would not know if an error occurred without making a measurement (which we cannot do without altering the state of the particle). Nevertheless, enough progress is being made in error correction so that we can realistically predict (although it is a precarious endeavor to predict technology breakthroughs) that, within a decade, error-free quantum computation on a small scale will be achieved.

Quantum Communication

Quantum communication aims to provide secure communication mechanisms by using the features of QM. Some questions that quantum communication seeks to answer are: What novel ways are there to achieve secret communications? Is it possible to improve the efficiency of sending conventional communications? Is it possible to communicate information to distant locations without ever transporting the actual information? These questions are best answered within the realms of quantum teleportation and quantum cryptography, which are subsets of quantum communication.



Quantum teleportation does not involve the actual transportation of particles; it is based on re-creating the quantum states of all the particles that make up a piece of matter in another location. This is demonstrated at left. In figure A, Alice and Bob share an entangled pair of photons. Using this entangled pair of photons, they can teleport another photon (Alice's Photon 3), or, equivalently, the state of that photon, between them. To do this, Alice entangles her Photon 1 with her Photon 3. Figure B shows that Alice has succeeded in teleporting the state of her Photon 3 to Bob, so they no longer share an entangled pair of photons.

Quantum Teleportation

According to classical physics, teleportation is defined as "the disembodied transport of matter through space." It is perhaps unrealistic to think that an object can be disintegrated in one place, transmitted, and then perfectly reconstructed in another place; the process of teleportation conjures up memories of the "transporter" in the television series *Star Trek*. QM, however, makes teleportation, in a sense, plausible.

Let's take this periodical as an example. At the fundamental level, *Army Logistician* consists of particles such as electrons. According to QM, all "fundamental" particles of the same kind are identical. The electrons in this periodical are identical to the electrons in any other periodical. What are *not* identical, and what distinguishes this issue of *Army Logistician* from another magazine, in terms of QM, are the quantum states of the electrons that collectively make up each periodical. QM implies that, to transport matter from one location to another, it is not necessary to actually transport the particles that make up the matter in question. It is sufficient to re-create, in the other location, the quantum states of all the particles that make up the piece of matter. So, teleporting the quantum states of all the particles that make up this periodical would create a replica in another location. In other words, this *Army Logistician* would have been teleported to the other location.

However, to re-create the quantum state of a particle, one has to measure the particle's quantum state with great accuracy. We know from our earlier discussion that this is not possible; nature simply will not allow it (recall the Heisenberg Uncertainty Principle). Even if it were possible, re-creating the quantum states of the particles that make up *Army Logistician* would require a phenomenal amount of information—so much information that it would take much longer to transmit the information than to physically send the periodical by airmail to the remote location in question.

Let's imagine for the moment that we can determine the quantum state of a particle without measuring it. This is possible if we use entangled pairs of particles. (See chart above.) Let's assume, again, that Alice and Bob share entangled polarized photons (Alice has photon 1 and Bob has photon 2) and that neither Alice nor Bob knows what those polarizations are. Alice also has another photon (let's call this photon 3) with an unknown polarization that she would like to teleport to Bob. Remember, Alice cannot measure the polarization of her photons. If she does, she will cause them to assume specific polarizations. But if Alice performs a measurement on her photons *jointly*, then she will cause Bob's photon to correlate with the joint measurement she makes. Bob's photon then will be in the same quantum state (that is, have the same polarization) as Alice's photon 3. In other words, the state of Alice's photon 3 will have been teleported to Bob's photon 2.

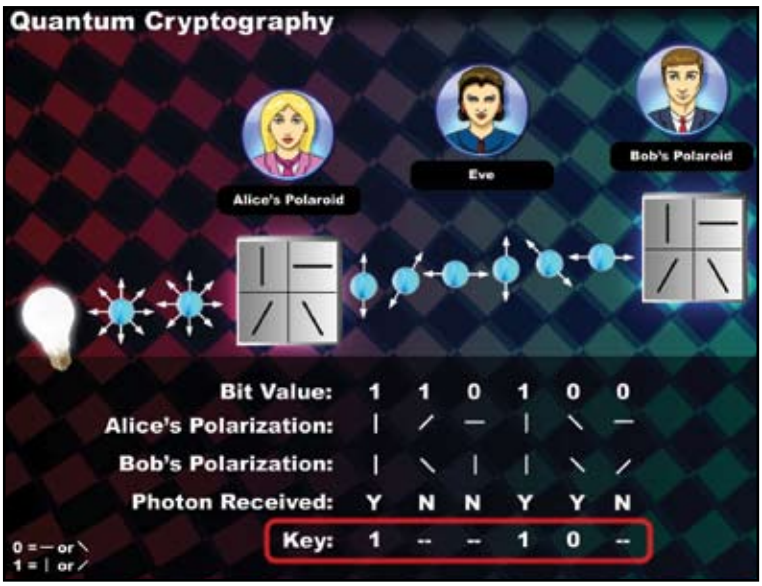
Some comments are in order. First, teleporting the *state* of a photon is completely equivalent to teleporting a photon. Thus, entanglement provides a means of communication. Second, during the process of Alice's measurement of photon 3 (in conjunction with photon 1), photon 3 became entangled with photon 1 and, as a result, photon 3 lost its original state. In a sense, it forgot what state it was in. This does not matter too much to Alice since she succeeded in teleporting the state of photon 3 to Bob. However, it is important to understand that, if we try to teleport an object from one location to another, the state of the original object will be destroyed in the process.

Classical Cryptography

Cryptography is the art of sending messages in disguised form. Message encryption is accomplished using an "encryption algorithm," or "key." Some of

the earliest keys in existence consisted of what are known as substitution algorithms. The Caesar Cipher (allegedly used by Julius Caesar), which consisted of encrypting a message by shifting letters, is an example of a substitution algorithm. The size of the shift is the key, and that is what needs to be kept secret. This is where the problem of key distribution arises. The key must be shared between the sender and the receiver in order for the receiver to decipher the message. How can Alice send the key to Bob without an eavesdropper (Eve) monitoring the communication? Without a key, a classically encrypted message must be decrypted using cryptanalysis.

Today, the problem of key distribution is solved and cryptosystems are nearly impossible to crack with conventional computers. The reason is simple: while it is fairly easy to multiply two large numbers, it is very difficult to factor very large numbers because factoring a large number requires a lot of computing power. Our discussion of quantum computation, however, indicates that this might not always be the case. Is there a better way to encrypt messages? Is there a way for Alice and Bob to communicate and know if their communication has been compromised? Classical cryptography has no way of addressing these questions.



Quantum cryptography uses physical objects such as photons to communicate securely. In the illustration above, Alice randomly polarizes photons in one of four possible positions (the photon's polarization) to transmit a "key" to Bob. Alice represents a '0' by a horizontal or left diagonal polarization and a '1' by a vertical or right diagonal polarization. Bob uses his Polaroid filter to "read" Alice's photons. If he chooses the correct polarization, he can read the bit. After Alice sends her message to Bob, they speak over a normal communications channel to determine what key to use for further encryption.

Quantum Cryptography: Secure Tansmission

Quantum cryptography is a means of communicating securely using physical objects such as photons. One of the central issues in cryptography, as we have noted, is key distribution. Using mathematics in classical cryptography circumvents the problem of key distribution, but the coming of quantum computers puts classical cryptography in jeopardy. Another way to circumvent the key distribution problem is to use the effects of QM to create quantum cryptography. In quantum cryptography, the security of a communication is guaranteed by the uncertainty principle and by the fact that performing a measurement on a quantum particle alters its state. One way to achieve quantum key distribution is to use polarized photons: bits of information are encoded using polarization.

To demonstrate communication using polarized photons, let's turn to Alice and Bob again. Alice wants to send an encrypted message consisting of 0s and 1s to Bob and, at the same time, wants to outwit Eve. (See chart at left.) She can use a scheme ($\oplus$) in which she represents a 0 with a horizontal photon "—" and a 1 with a vertical photon "|," or she can use a scheme ($\otimes$) where she represents a 0 with "\" and a 1 with "/." To send a binary message, Alice sends an unpredictable series of polarized photons using either the $\oplus$ scheme or the $\otimes$ scheme.

In order to intercept the message, Eve needs to identify the polarization of each photon. As she sees a photon coming, she will orient her Polaroid filter. However, every time she performs the wrong measurement, she alters the photon's state. Alice, after sending her photons to Bob, picks up the phone and tells Bob what scheme she used but not the polarization she used for each photon. In this way, Alice and Bob can monitor the communication for disturbances and will be able to determine if eavesdropping occurred. Bob also will know which photons he measured correctly simply by knowing the scheme that Alice used. In this way, they will have created a secure key that they can use to encrypt further messages. Eve cannot intercept a photon, and she cannot measure the quantum state of that photon with great accuracy and then re-emit it without introducing some error into the communication.

The uncertainty principle guarantees secure communication between two parties. Today, there are point-to-point commercial quantum cryptography devices on the market. Cost, the lack of dedicated fiber-optic lines (for sending the photons), and the nonexistence of single-photon sources are the factors currently limiting quantum cryptography. The use of

quantum cryptography over networks is anticipated in the next few years, and long-haul secure quantum communication (such as by satellite optical communications) is anticipated to occur within the next decade.

The range and reliability of quantum cryptography devices currently are a concern. Scientists and engineers may be able to overcome these problems by using devices such as quantum repeaters and by employing quantum error-correction techniques. These devices would enable quantum signals to be restored at distant locations without reading, and hence altering, the quantum information. Quantum cryptography may be applied to achieve completely secure communications involving sensitive logistics plans in support of widely distributed, and, in some cases, potentially vulnerable forces on future nonlinear battlefields.

Future Benefits for Army Logistics

Assuming that scientists can overcome several of the challenges described in this article, it is possible that, within the next decade, we will be able to identify a number of practical applications for Army logistics planners. For example, breaking through the scalability barrier (that is, solving the problem of decoherence) may lead to applications with tremendous military utility for solving seemingly impossible problems inherent in complex systems and chaotic environments. Quantum computation and quantum communication would permit precise logistics support to future Army forces and allow for an enormously high level of control over an integrated deployment, distribution, and sustainment system, so that Soldiers deployed anywhere on the globe would receive exactly the right support at the right time and at the right place.

The future battlespace will be populated by an increasing number of unmanned or robotic systems and equipment, which will place enormous demands on logisticians and their planning systems. In such an environment, with apparently intractable problem sets, quantum computation and communication may serve as enabling technologies for other remarkable future capabilities. In our next article, for instance, we will describe the idea of telepresence (remote presence in the battlespace). In the area of telepresence, there may be a role for emerging quantum technologies such as quantum robots. Such robots, operating within a distributed quantum computing system, could allow small-scale sensors and actuators to be controlled remotely over great distances. This would truly revolutionize the concept of "sense and respond" logistics.

In fact, the speed of quantum computation, properly harnessed, may enable future logisticians to meet, or preempt, real-time requirements rapidly. Rather than relying on logistics estimates that are based on historical data processed at today's speeds, computational and communication speeds attained from quantum systems may replace "best guesses" with real-time, actionable knowledge. Functioning within a common logistics operating environment, such radically capable systems truly would change the conduct of warfare.

The goal is to remain alert to the advances in quantum information science so that we are better prepared to exploit potential capabilities to solve intractable computational challenges impacting Army logistics. In particular, we are concerned with the application of these capabilities to solve increasingly dynamic logistics planning and simulation requirements. As we monitor advances, we may indeed see new classes of simulations that allow for accurately predicting logistics requirements and outcomes.

We hope that this article and the others that follow in *Army Logistician* will give logisticians and acquisition personnel a basic understanding of the possibilities, and the limitations, of emerging scientific areas. The intent is to pique interest among the logistics community and allow a glimpse of future concepts and technologies that young logisticians will inevitably encounter in their careers. The Quantum Computation and Communication theme is perhaps the most difficult to grasp conceptually and technically. Subsequent articles will be less complex, but the ideas and scientific areas discussed will be just as significant in their far-reaching implications. The next two articles in this series will address the themes of Telepresence and Designer Materials. Like the other themes, they offer the potential of improved capabilities for deployment and sustainment and a wide range of prospective solutions to the challenges facing logisticians. **ALOG**

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ALOG NEWS

(continued from page 1)

Army commands perform many Title 10 functions across multiple disciplines. The Army commands include the Army Forces Command, Army Training and Doctrine Command, and Army Materiel Command.

ASCCs are primarily operational organizations that serve as Army components for combatant commands. An ASCC can be designated by the combatant commander as a joint forces land component command or joint task force. The ASCCs include U.S. Army North, U.S. Army South, U.S. Army Europe, U.S. Army Central, U.S. Army Pacific, Eighth U.S. Army, U.S. Army Special Operations Command, Military Surface Deployment and Distribution Command, and Army Space and Missile Defense Command/Army Forces Strategic Command.

Direct reporting units consist of one or more units that have institutional or operational functions. These units provide broad, general support to the Army in a single, unique discipline not available elsewhere in the Army. The direct reporting units include the Army Network Enterprise Technology Command/9th Signal Command (Army), Army Medical Command, Army Intelligence and Security Command, Army Criminal Investigation Command, Army Corps of Engineers, Military District of Washington, Army Test and Evaluation Command, U.S. Military Academy, Army Reserve Command, Army Acquisition Support Center, and Army Installation Management Agency.

The restructuring will help accelerate the Army's transformation and increase its responsiveness by recognizing the global role and multidisciplined functions of the Army commands; establishing the ASCCs as reporting directly to the Department of the Army (DA) while serving as unique points of contact for combatant commands; acknowledging direct reporting units as functional proponents at the DA level; and promoting effectiveness and efficiencies by transforming the Army's business processes while operationally focusing the ASCCs on the missions of their combatant commands.

Army Regulation 10–87, Major Commands in the Continental United States, is currently being revised to reflect these changes and becomes effective 1 October.

JOINT TASK FORCE-PORT OPENING WILL SPEED SUPPORT TO TROOPS

The Military Surface Deployment and Distribution Command (SDDC) and the U.S. Transportation Command (TRANSCOM) are developing a concept for receiving forces, equipment, and supplies in austere areas that have no military footprint. This concept will create closer Army and Air Force cooperation through the establishment of a Joint Task Force-Port Opening (JTF–PO). The JTF–PO will consist of an Air Force element to manage airfield operations and an Army element to manage movement control and cargo-handling operations. After a joint assessment team confirmed that an aerial port of debarkation (APOD) was capable of supporting military operations, the JTF–PO would be deployed to the APOD to receive forces, equipment, and supplies. Logistics support personnel would set up tracking equipment and open distribution pipelines immediately after an area is secured. Within hours, supplies could be brought in to support humanitarian, disaster relief, and contingency operations.

In the past, initial-entry military forces typically established a presence at the airfield nearest the area of operations. The Air Force received an airplane, unloaded its cargo, and processed its passengers. Army logisticians followed a few days later and stood up at the airfield to dispatch cargo to its end destination. At times, large amounts of equipment and supplies were stockpiled at the airfield until they could be directed to the right place or unit. Troops often had difficulty locating their much-needed supplies in the logistics pipeline. As a result, they often submitted new requests for items already in the supply channels, creating a logjam in support operations.

Before the JTF–PO concept was conceived, the geographic combatant commander (GCC) was responsible for the deployment of all forces to an operation. Assigning to TRANSCOM the responsibility for deploying the JTF–PO and standing up the APOD will allow the GCC to focus his attention on his primary responsibilities. TRANSCOM will be able to deploy the forces needed to open the APOD quickly because it has access to internal airlift assets needed to support en route and airbase infrastructures.

The first JTF–PO unit is scheduled to stand up later this year. Although most initial equipment will arrive by air, SDDC is already looking into how to expand the role of the JTF–PO to integrate joint forces and missions, including in-transit visibility at sea ports of debarkation.

PBUSE WINS TECHNOLOGY AWARD

The Property Book Unit Supply Enhanced (PBUSE) system was one of the winners of the 2006 Intergovernmental Solutions Awards (ISA) presented at the 26th annual ACT Management of Change Conference held in Hilton Head, South Carolina, in June. PBUSE is an Army property management system developed by the Project Manager for Logistics Information Systems at Fort Lee, Virginia.

ISA winners were chosen by a committee of Government and industry information technology professionals who evaluated each entry based on its collaboration with other public and private organizations, its use of innovative or emerging technologies, its ability to change the organization's business processes and deliver the mission, its availability and accessibility regardless of economic or disability status, its impact on the organization or stakeholder community and resulting significant cost or time savings, and its potential to serve as a model for other agencies or departments.

TRADOC TRAINING FLEETS TO BE MANAGED BY AMC

The Army Materiel Command (AMC) is assuming responsibility for managing and maintaining training base equipment from the Army Training and Doctrine Command (TRADOC). Under the Fleet Management Initiative (FMI), which is being implemented in phases, AMC provides fleet maintenance and supply support to TRADOC training vehicles. This allows AMC to manage related functions centrally. Because maintenance programs have not been coordinated centrally in the past, competition for the same repair parts and contract labor has sometimes occurred. With FMI, maintenance and supply actions can be synchronized, which enhances long-term planning for acquisition of scarce parts and creates the opportunity to improve the process.

A February 2002 study on the feasibility and desirability of transferring the TRADOC maintenance and supply mission to AMC determined that such a transfer potentially would optimize AMC's core competencies and allow TRADOC to focus on its primary mission of training.

Pilot FMI programs were conducted at the Army Aviation Center at Fort Knox, Kentucky, and the Army Armor Center at Fort Rucker, Alabama. Based on the success of those programs, the initiative was expanded to the training base fleets at Fort Benning, Georgia, Fort Lee, Virginia, Fort Leonard Wood, Missouri, and Fort Sill, Oklahoma.

According to Oliver B. Bonner, Jr., the Maintenance Director at the Integrated Materiel Management Center, Aviation and Missile Life Cycle Management Command, at Fort Rucker, FMI optimized repair and buy decisions based on triage review, improved time on wing (the time an engine can remain on an aircraft wing before a shop visit is required) for repaired and overhauled components, reduced repetitive Government and contractor inspections, and increased the availability of parts and components.

According to Shelley Antle, Director of Resource and Logistics Management at Fort Knox, most components of the fleet at the Army Armor Center have higher operational readiness rates, primarily because of the access to hard-to-get parts. "One of the key advantages for maintenance and sustainment at Fort Knox has been AMC forward repair programs conducted on site to include M1A1 tank engine repair and the M88 recovery vehicle refurbishment fly-away team," Antle said. "These actions improve operational readiness rates and get equipment back on line and in the field to meet our mission to train Soldiers."

DLA CONSOLIDATES CALL CENTER OPERATIONS

The Defense Logistics Agency (DLA) has consolidated its customer contact operations into two contractor-managed Customer Interaction Centers. The centers are located at Defense Supply Center Richmond, Virginia (DCSR), and the Defense Logistics Information Service (DLIS) in Battle Creek, Michigan. Together they form a "virtual" service for customers calling, emailing, or faxing queries to DLA.

DSCR is the primary center for supply and distribution questions. DLIS handles central contractor registration, cataloging, and other core DLIS mission areas and acts as a backup to DSCR. Agents are on duty 24 hours a day, 7 days a week, in order to provide immediate service to military customers around the world.

The consolidation is the result of a study performed last year by a contractor for DLA Customer Operations and Readiness (J–4). Before the consolidation, two additional DLA sites staffed by Government employees were also part of the enterprise support service.

A rough-terrain container handler offloads containers from the landing craft, utility (LCU) 2026* Matamoros*, during the Joint Logistics Over-the-Shore (JLOTS) 2006 exercise. The multiservice cargo distribution exercise took place at Fort Story, Virginia, from 11 to 22 June. JLOTS exercises test the Department of Defense's ability to deploy, discharge, and move unit equipment and supplies in areas where no port facilities exist.

This year's JLOTS simulated a disaster relief effort in which the military provided humanitarian aid. Cargo was discharged from the* USNS Red Cloud*, a large, medium-speed, roll-on-roll-off vessel, onto the* Matamoros *using a ship-based crane. The LCU then transported the cargo to shore, where it was transferred to trucks for onward movement.

The exercise also involved the use of the Offshore Petroleum Discharge System to pump fuel to shore. For purposes of the exercise, water was substituted for fuel.

JLOTS 2007 will be held in Central America.

The DLA Customer Interaction Centers can be reached at 1–877–352–2255 (1–877–DLA–CALL), commercial (269)961–7766, or DSN 661–7766.

OEF AND OIF SOLDIERS CAN REPLACE UNIFORM ITEMS ON LINE

A program created by Department of the Army Headquarters, the Defense Logistics Agency (DLA), and Third Army/U.S. Army Central (ARCENT) allows Soldiers deployed in support of Operations Enduring Freedom (OEF) and Iraqi Freedom (OIF) to receive direct delivery of replacements for damaged Army combat uniform (ACU) items. Army Direct Ordering (ADO) is a Web-based program that permits a Soldier to go on line, order items, and have those items shipped directly to his APO mailing address.

Through ADO Web-based ordering, Soldiers use a simple point-click-and-ship process that is familiar to online shoppers around the world. The process is faster and more efficient for the user than customary direct exchange methods.

A Soldier must turn in unserviceable uniforms to unit supply before receiving replacement items. The following support items can be replaced through

ADO: ACU jacket; ACU trousers; black fleece overalls; ACU sun (boonie) hat; camouflage helmet cover; coat and trouser cold-weather liner; colored flags; desert boots; digitized name, rank, and Army tapes; drawers; elbow and knee pads; hot-weather boots; rigger's belt; sports bra; utility cap; and wicking T-shirt.

Only units currently in theater or about to deploy can enroll in the ADO program. According to Captain Tonya Gillard, the Theater Supply and Services Action Officer for the Coalition Forces Land Component Command, "There is a rumor that units must wait until they are deployed [for] 6 months prior to using ADO; this is not true. Units can enroll immediately and begin to use ADO after their first 30 days in theater. They must request to be disenrolled 45 days prior to redeployment to [allow for] complete shipment of all pending orders."

To enroll in ADO, units must submit a Department of the Army (DA) Form 1687, Notice of Delegation of Authority, a picture of their unit patch, and assumption of command orders. The DA Form 1687 must include a nonexpendable Department of Defense Activity Address Code, the unit's brigade and division designation, a complete APO address, and a complete phone number. The unit must provide information on where and when the unit was issued the ACU and how many Soldiers are assigned to it. This information must be emailed to ARCENT ADO administrators at adoc4@arcent.army.mil or adoc4@arifjan.arcent.army.mil. A Soldier can confirm that his unit is enrolled by going to the ADO Web site at https://army.kyloc.com and using his Army Knowledge Online (AKO) information and entering his unit name in the "submit unit name" box.

Each unit commander determines when individual Soldiers or the unit supply sergeant will submit ADO orders. A Soldier can place an order by logging on to the ADO Web site, entering the unit name in the submit box, and clicking on his unit name. The Soldier will be prompted to enter his name and Social Security number. The orders menu will appear, and the Soldier will be able to select the items and quantities he needs to replace damaged items. ADO has built-in restrictions on quantities, based on authorized initial issue and the 6-month durability of the ACU. The process is the same if a supply sergeant places orders for unit members, except that he will use the requesting Soldier's name and Social Security number to access the ordering menu. In either case, once the order is placed, the command-designated unit validator will receive an email message indicating that an order needs validation. Delivery time is 7 to 14 days following order approval.

The ADO program began in March 2005. As of 15 June 2006, 1,247 units were enrolled in the program and Soldiers in those units had submitted almost 60,000 orders worth over $17 million. Army Central Command funds ADO by multiplying the number of Soldiers in a unit by $55 to determine the unit's monthly allocation. Although there is no restriction on how much a unit can spend on an individual Soldier in a month, there is no retroactive funding and unused allocations do not carry over to the following month.

To learn more about the ADO program or how to enroll, visit https://army.kyloc.com or email adoc4@arifjan.arcent.army.mil (in Kuwait) or adoc4@arcent.army.mil (in Atlanta, Georgia).

ARMY ADOPTS NEW SERVICE UNIFORM

The Army announced in April that it would replace the three current Army service uniforms with one new blue uniform. The green uniform and white dress uniform will be phased out, and the existing blue dress uniform will be altered to become the Army service uniform.

Reducing the number of uniforms will reduce the financial burden on Soldiers for purchases and alterations. Streamlining various service uniforms into one Army service uniform will reduce the burden on Soldiers in the same manner that the Army combat uniform did for the battledress and desert combat uniforms. "We have all of these variations of uniforms—green, blue, and white," said Army Chief of Staff General Peter J. Schoomaker. "It makes sense for us to go to one traditional uniform that is really sharp and high quality and which Soldiers will be very proud to wear. And that's what we've done by adopting this blue Army service uniform that reflects simplicity, quality, utility, and tradition."

Army blue as a uniform color traces its origins back to the National blue first worn by Soldiers in the Continental Army of 1779. "World-class Soldiers deserve a simplified, quality uniform. The blue Army service uniform is a traditional uniform that is consistent with the Army's most honored traditions," said Sergeant Major of the Army Kenneth O. Preston.

The blue Army service uniform provides a basic set of components that can be worn for various types of functions. The uniform will be made of a durable material that is suitable for daily use without special care.

The Army service uniform should be available in Army military clothing sales stores during the fourth quarter of fiscal year 2007. The uniform will be included in the clothing bags issued to new recruits beginning in the first quarter of fiscal year 2009. Soldiers who already own a blue dress uniform may continue to wear it. The mandatory possession date is expected to be the fourth quarter of fiscal year 2011. A wear-out date for the Army green class A and white dress uniforms has not been determined yet.

HOT BEVERAGE BAG ALLOWS SOLDIERS TO HEAT WATER

Warfighters can enjoy a hot cup of coffee when organized food service is not available, thanks to the hot beverage bag (HBB). The HBB is a resealable, high-density polyethylene bag that is now included in each meal, ready-to-eat (MRE). When used with flameless ration heaters (FRHs) and recycled MRE chipboard cartons, the HBB provides warfighters a way to make coffee or prepare hot water for shaving and personal hygiene.

According to Stephen Moody, team leader for the Individual Combat Ration Team, of the Department of Defense Combat Feeding Directorate, Natick Soldier Center, the HBB was developed because it "was noted during field evaluations that Soldiers often did not reconstitute their hot beverages—coffee, cocoa, or tea—because of the mess they would make in their canteen cup. This led to the idea for the inclusion of a bag that could also serve as a cup. Also, some warfighters do not routinely carry a canteen cup." Moody said that use of the bag creates a demand for unused FRHs, thus reducing the number of surplus heaters and decreasing related waste disposal concerns.

A Soldier makes coffee in a hot beverage bag.

Response to the HBB has been extremely favorable. Soldiers deployed to war zones such as Afghanistan and Iraq believe that the ability to make hot coffee adds greatly to their quality of life.

Coming in Future Issues—

- **Lean Manufacturing and the Army Industrial Base**
- **Lean Goes to War**
- **Anniston Army Depot and Lean Six Sigma**
- **What to Pack: A Guide to Predeployment Planning**
- **Reset at Fort Bragg**
- **Telepresence**
- **Battlefield-Ready Civilians**
- **Standard Automotive Tool Sets**
- **Energy on Demand**
- **Encouraging Innovation in Iraq**
- **Implementing a Theater Medical Information Program**

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