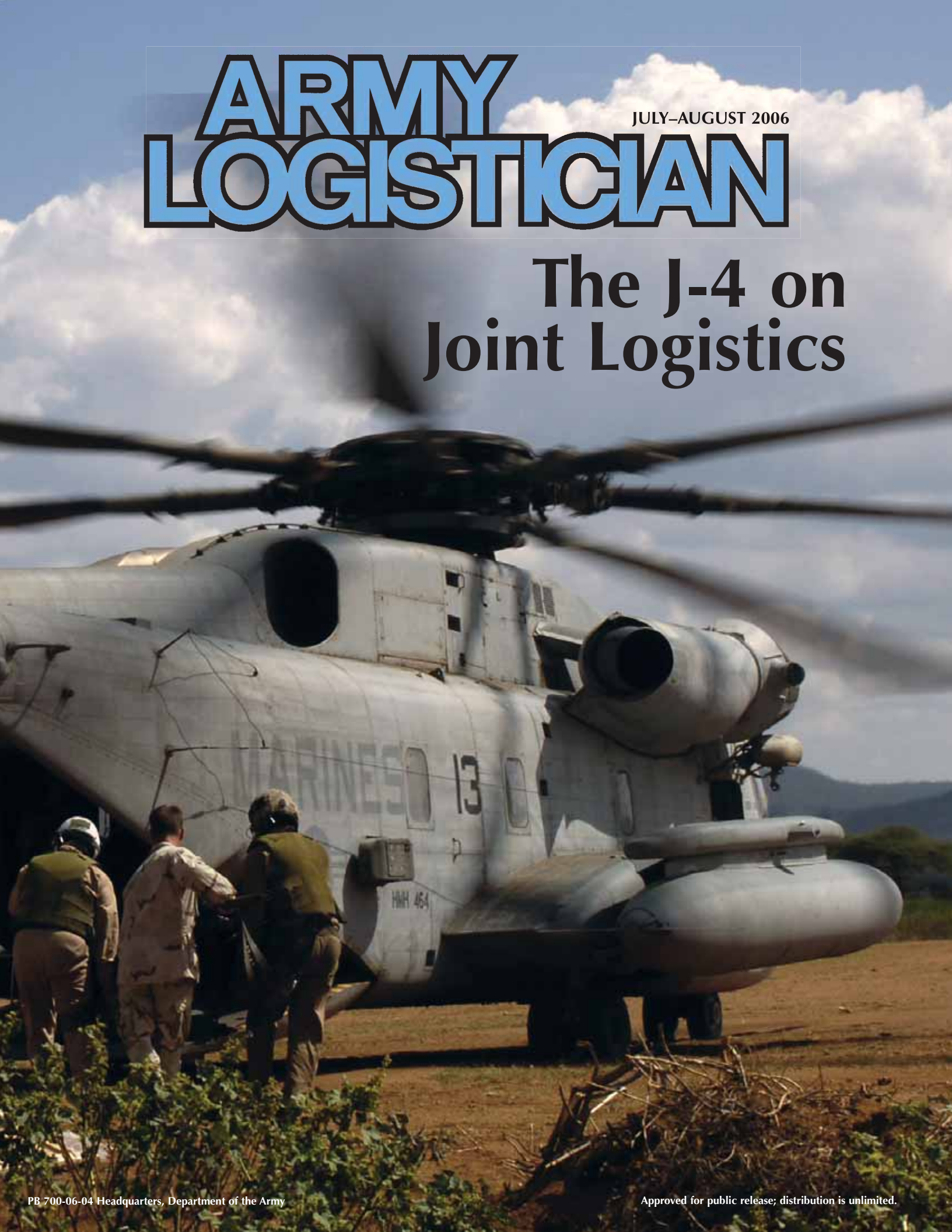
ARMY LOGISTICIAN

JULY–AUGUST 2006

The J-4 on Joint Logistics



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Cover: Joint logistics, when properly executed, allows the armed services, Defense agencies, and the private sector to support the joint force commander more effectively by combining their resources. Lieutenant General C.V. Christianson, the Director for Logistics, J–4, on the Joint Staff, reflects on the current state and the challenges of joint logistics in the article beginning on page 2. The cover photo captures the essence of joint logistics in the field: Army Soldiers and Navy Sailors work together to unload food and water from a Marine Corps CH–53E Super Stallion helicopter in Ethiopia.

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ALOG NEWS

PEO EIS GAINS LOGISTICS MODERNIZATION PROGRAM

As part of continuing Army efforts to streamline supply chain business processes and practices, the Program Executive Office Enterprise Information Systems (PEO EIS) assumed operational control of the Logistics Modernization Program (LMP) in March from the Army Materiel Command.

LMP is a key component of the Single Army Logistics Enterprise (SALE), which is the Army's larger vision for integrating its major logistics systems and processes. Since PEO EIS already managed several other enterprise resource planning (ERP) programs [Global Combat Support System-Army (Field/Tactical), Product Lifecycle Management Plus, and General Fund Enterprise Business System], consolidation of LMP with those programs under PEO EIS will facilitate integration of the programs and contribute to successful creation of the SALE.

One of the Army's largest and most comprehensive business transformation and technological modernization efforts, LMP provides the systems and processes to support all aspects of the Army's national- and installation-level logistics. When fully deployed, LMP will integrate procurement, asset management, depot maintenance planning and execution, financial management, ammunition manufacture and maintenance, requisition processing, and long-term supply planning for an inventory of up to 6 million items and $40 billion in goods and services annually. Ultimately, LMP will help manage a supply chain serving 50,000 vendors and up to a million customers.

LMP is already serving the Warfighter. Since 2003, LMP users at 12 locations have been able to release, track, and deliver supplies to troops in Afghanistan, Iraq, and other locations around the world. Most importantly, LMP does this faster and more efficiently than the Army's legacy systems.

The 12 locations now using LMP are the Army Communications-Electronics Life Cycle Management Command (C–E LCMC) at Fort Monmouth, New Jersey; the C–E LCMC Communications Security Logistics Activity at Fort Huachuca, Arizona; the garrison at Fort Monmouth, New Jersey; Tobyhanna Army Depot, Pennsylvania; the Army Materiel Systems Analysis Activity at Aberdeen Proving Ground, Maryland; the Army Security Assistance Command headquarters at Fort Belvoir, Virginia, and activities at New Cumberland, Pennsylvania, and St. Louis, Missouri; Defense Finance and Accouning Service (DFAS)-Indianapolis, Indiana, and DFAS operating locations at Rock Island, Illinois, and St. Louis, Missouri; and the Clothing and Heraldry Product Support Integration Directorate of the Soldier-Biological-Chemical Operations Directorate, Tank-automotive and Armaments Command, at Philadelphia, Pennsylvania. Future LMP deployments are planned at the Army Materiel Command's remaining commands and depots during the next 5 years.

More information about LMP is available by calling the LMP Project Office at (856) 988–4727.

ARMY LOGISTICIAN EDITOR DEPARTS

Janice Heretick, Editor of *Army Logistician,* has accepted a position as the Deputy Secretary to the General Staff at the National Guard Bureau in Arlington, Virginia. During her tenure as editor, Janice transformed the bulletin and modernized its production processes. She expanded coverage to include more articles on joint logistics, instituted digital production, contracted for performance of the bulletin's design functions, and developed the *Army Logistician* Web site. She earned the Secretary of the Army Award for Publication Improvements for 2003-2004 and managed an editorial staff that won three Secretary of the Army Awards for Army Editor of the Year within 7 years. Ms. Heretick joined the *Army Logistician* staff in 1989 and became the bulletin's third editor in 1998. The staff of *Army Logistician* and the Army Logistics Management College wish her well with her new endeavor.

(Continued on page 45)

Joint Logistics—Shaping Our Future: A Personal Perspective

BY LIEUTENANT GENERAL C.V. CHRISTIANSON

The Department of Defense's senior logistician offers some thoughts on the collaborative network of relationships and the operational imperatives needed to make joint logistics as effective as possible.

The logistics capacity of the U.S. military today is unmatched. Our Nation's ability to project military power gives the joint warfighter unprecedented capabilities. However, a constantly changing operating environment and resource constraints demand that we optimize joint logistics to enhance our capabilities for tomorrow. We have the opportunity to significantly advance our systems, processes, and organizations in order to improve support to tomorrow's joint force commander (JFC), and we must seize that opportunity.

My purpose in writing this is to generate thought and frame discussion. This article represents my view of joint logistics and today's environment, and it frames three essential "imperatives" and key strategic relationships around which we can build collaborative change. I offer these thoughts as a catalyst for the development of concepts and solutions that will make joint logistics as effective as possible.

Joint Logistics

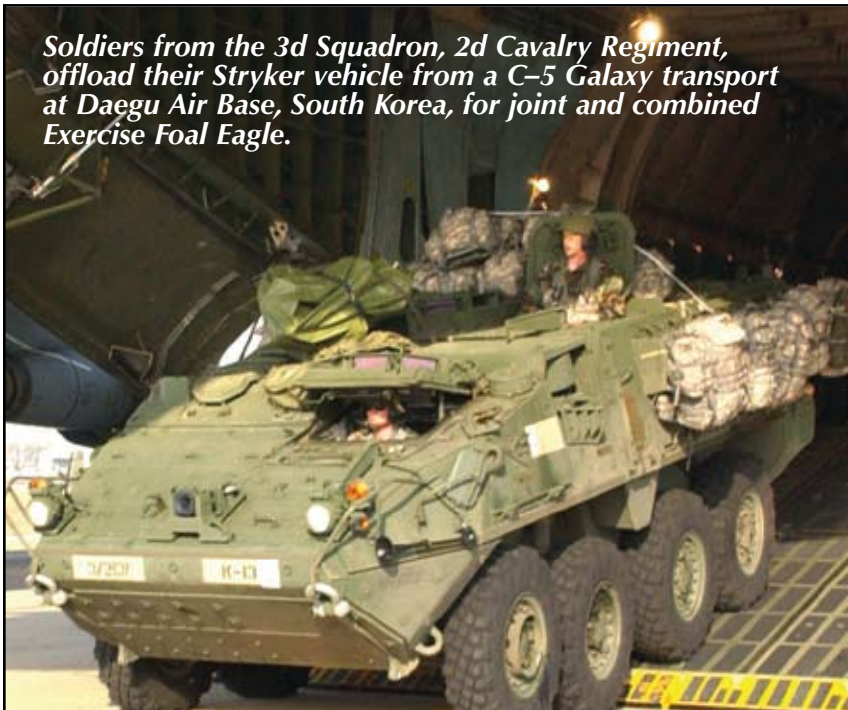
The necessity of joint logistics is widely accepted throughout the Department of Defense logistics community, and no one I know of would disagree that the effective delivery of logistics support is essential to the JFC, our ultimate customer. However, I believe that our current logistics systems include many inefficiencies, unnecessary redundancies, and process gaps that increase both risks and costs. Achieving harmony among military service- and Defense agency-funded missions, systems, processes, and programs will correct today's inefficiencies, but doing so poses a significant challenge. That challenge can be overcome with a common agreement on, and understanding of, the purpose of joint logistics. That understanding, in turn, requires answers to the fundamental questions, "What is joint logistics?" "Why do we need it?" and "What does it deliver?"

Joint logistics is the deliberate or improvised *sharing* of service logistics resources to enhance synergy and reduce both redundancies and costs. We need joint logistics because the services (especially during initial expeditionary activity) seldom have sufficient capability to independently support the JFC. By sharing, we can make the best use of limited resources to provide maximum capability to the supported commander.

The overall purpose of joint logistics is to achieve *logistics synergy*—getting more out of our combined resources than we can individually. The supported JFC expects joint logistics to give him freedom of action, so he is able to execute his mission effectively and according to his timetable. Sustained operational readiness gives the JFC the freedom of action he needs to respond effectively to operational objectives. Sustained operational readiness is the result of the cumulative efforts of service, Defense agency, and other logistics players across the entire joint logistics environment.

Joint Logistics Environment

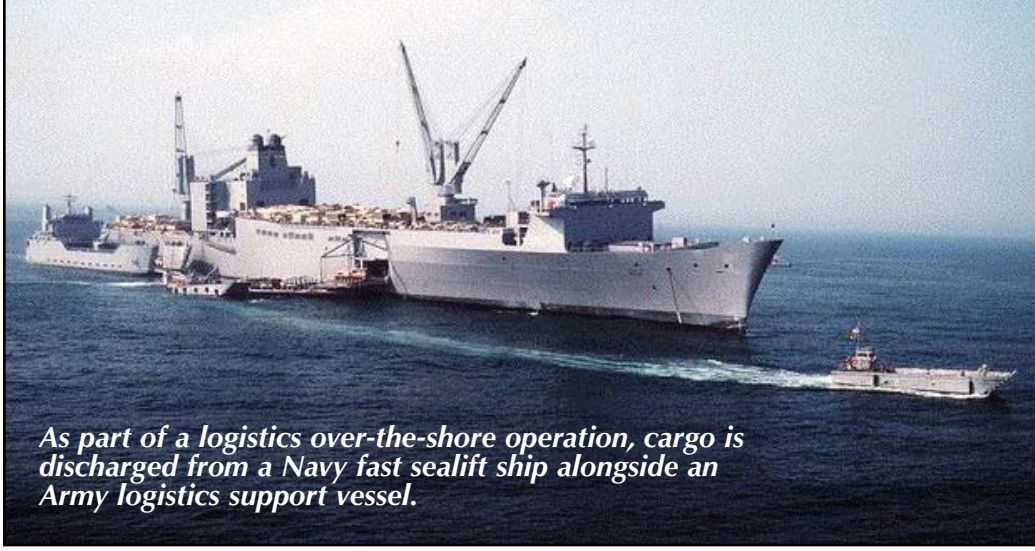
The joint logistics environment is characterized by the Global War on Terrorism, other threats to our security, frequent and diverse commitments around the world, and complex interagency and multinational operations. Future operations are likely to be distributed and conducted rapidly and simultaneously across



Soldiers from the 3d Squadron, 2d Cavalry Regiment, offload their Stryker vehicle from a C–5 Galaxy transport at Daegu Air Base, South Korea, for joint and combined Exercise Foal Eagle.

multiple joint operational areas within a single theater or across the boundaries of more than one geographic combatant command. The requirement to integrate sustainment and force-projection operations in a complex operating environment presents the greatest joint logistics challenge. This environment spans the strategic, operational, and tactical levels and provides the context in which we must deliver the capability, or "effect," expected by the JFC.

Freedom of action is the overall effect the JFC must have, and that freedom is delivered at the tactical level. We should measure success at the tactical level, and our performance metric should be the amount of joint operational readiness available to the JFC. However, sustained joint operational readiness depends on the efficiency and effectiveness of logistics processes, programs, systems, and organizations that are outside of the tactical level. The effective integration of all logistics capabilities is directly reflected at the tactical level, but there is a high tactical price to pay for inefficiencies at the strategic or operational levels.



As part of a logistics over-the-shore operation, cargo is discharged from a Navy fast sealift ship alongside an Army logistics support vessel.

> Sustaining and increasing the qualitative military advantages the United States enjoys today will require transformation—a transformation achieved by combining technology, intellect and cultural changes across the joint community.
>
> *—The National Security Strategy of the United States of America*

Our Nation's ability to project and sustain military power comes from the strategic level. The national sustainment system enables sustained military operations over time and leverages our most potent force multiplier—the vast capacity of our industrial base. At this level, modern, clearly defined, well-understood, and outcome-focused processes drive efficiencies across service, Defense agency, and commercial capabilities. Robust and efficient global processes, combined with agile global force positioning, are fundamental to joint logistics reform and to our Nation's ability to maintain global flexibility in the face of constantly changing threats.

The operational level is where the JFC synchronizes and integrates his joint operational requirements with the national system. It is there that joint logistics must excel and where the ability to fully integrate logistics capabilities provides our greatest opportunities. The operational level is where the joint logistician must bridge service, coalition, agency, and other organizational elements and capabilities, linking national and tactical systems, processes, and organizations to achieve the freedom of action that the JFC expects. The essence of joint logistics is found at the operational level, and it is at the operational level that the joint logistics community should focus its efforts.

Strategic Relationships

Effective joint logistics depends on clear roles, accountabilities, and relationships among the global players within the joint logistics domain. The collaborative network of relationships between these players should be based on the preeminence of the services. By law, the services are responsible for raising, training, equipping, and maintaining ready forces for the JFC, so they must lie at the heart of this collaborative network. Service logistics components form the foundation of the joint logistics network and are responsible for maintaining systems life-cycle readiness. Thus, the services act as Defense Systems Readiness Process Owners, and they are the supported organizations for logistics readiness. In this capacity, the services focus on their product: logistics readiness at best value.

The services and the Defense Logistics Agency (DLA) share responsibilities as the Defense Supply Process Owners. In that shared role, they act as supporting organizations to the components of the joint force for logistics readiness. The services and DLA are responsible for supply support and, supported by the Defense Distribution Process Owner, are focused on their product: perfect order fulfillment.

The U.S. Joint Forces Command (JFCOM) serves as the Joint Deployment Process Owner and is the primary provider of conventional forces. In this role, JFCOM, through its service components, ensures that the supported commander is provided with the forces needed to achieve national objectives. JFCOM is responsible for coordinating and making recommendations for

the global conventional force and, supported by the Defense Distribution Process Owner, is focused on its product: perfect capability fulfillment.

The U.S. Transportation Command (TRANSCOM) serves as the Defense Distribution Process Owner and is the supporting organization to DLA and the services for the movement of sustainment and to JFCOM for the movement of forces. TRANSCOM coordinates and synchronizes the Defense distribution system and is focused on its product: time-definite delivery.

The JFC, through his service components, is the ultimate customer of the joint logistics system. The JFC has authority over joint logistics resources in his area of responsibility and is the principal focus of the national organizations described above.

These national organizations have global responsibilities and form the backbone of joint logistics. They exist to provide and sustain logistically ready forces to the supported JFC. These organizations serve as global providers, responsible for the end-to-end synchronization and coordination of processes that deliver outcomes to the supported JFC. They should strive constantly to improve their capabilities in cooperation with each other, integrating deployment and redeployment, supply, distribution, and readiness processes to ensure that the supported commander receives both forces and logistics sustainment on time and where needed.

> The end for which a soldier is recruited, clothed, armed, and trained, the whole objective of his sleeping, eating, drinking, and marching is simply that he should fight at the right place and the right time.
> —Major-General Carl von Clausewitz, *On War,* 1832

Because the services lie at the heart of the joint logistics network, the joint logistics community (including processes, systems, programs, and organizations) should measure "value" at the tactical level from the perspective of the service components of the JFC. Every logistics program, system, and initiative should be viewed within the framework of these critical strategic relationships and should be measured by its ability to support the effect we are expected to deliver.

Imperatives for Success

The value of joint logistics is in its ability to sustain joint logistics readiness, and we can measure that value by how well we achieve three joint logistics imperatives: unity of effort, domain-wide visibility, and rapid and precise response. These imperatives are not goals in themselves. But they define the outcomes of a confederation of systems, processes, and organizations that are agile enough to adapt effectively to a constantly changing environment in order to meet the emerging needs of the supported JFC.

Marines line up their vehicles in a convoy formation after dropping off supplies at Camp India in Fallujah, Iraq.

Unity of effort. This imperative refers to the coordinated application of all logistics capabilities to focus on the JFC's intent. It is the most critical of all joint logistics outcomes. Achieving unity of effort requires the optimal integration of joint, interagency, multinational, and nongovernmental logistics capabilities. Unity of effort is built around three enablers—

- Appropriate organizational *capabilities and authorities* provide the means to execute joint logistics effectively and efficiently.
- *Shared awareness* across the logistics domain drives unity of effort by focusing capabilities to meet the joint warfighter's most important requirements. The effective integration of priorities and the continuous optimization of those priorities in space and time are key tasks that require shared awareness.
- *Common measures of performance* drive optimization across all processes that support the JFC. Clearly defined joint logistics processes, well-understood roles and accountabilities of the players involved in those processes, and shared JFC metrics shape this enabler.

Domain-wide visibility. This is the ability to see requirements, resources, and capabilities across the joint logistics domain. Three fundamental enablers are needed to achieve this imperative—

- *Connectivity* requires access to the information network 24 hours a day, 365 days a year. The objective of connectivity is to reach globally—backward, forward, and laterally—throughout the network to synchronize and coordinate the efforts of supporting Defense agencies, interagency participants, multinational partners, host nations, contractors, and commercial sector participants.

• Standard *enterprise data architecture* is the foundation of rapid and effective data transfer. This enabler is the fundamental building block for creating a common logistics operating picture and high logistics situational understanding. It serves to foster JFC confidence.

• A *global focus* on the processes that deliver support to the JFC is paramount to achieving the best joint logistics capability. Logistics support to the joint force is global business, and any view of joint logistics that operates below the global level will reduce the effectiveness of processes and deliver less-than-acceptable readiness.

Rapid and precise response. This imperative defines the ability of the supply chain to effectively meet the constantly changing needs of the joint force. Lack of key supplies, regardless of the reason, acts to undermine readiness and increase mission risk. The following performance measures can accurately indicate how well the supply chain is responding to the needs of the JFC—

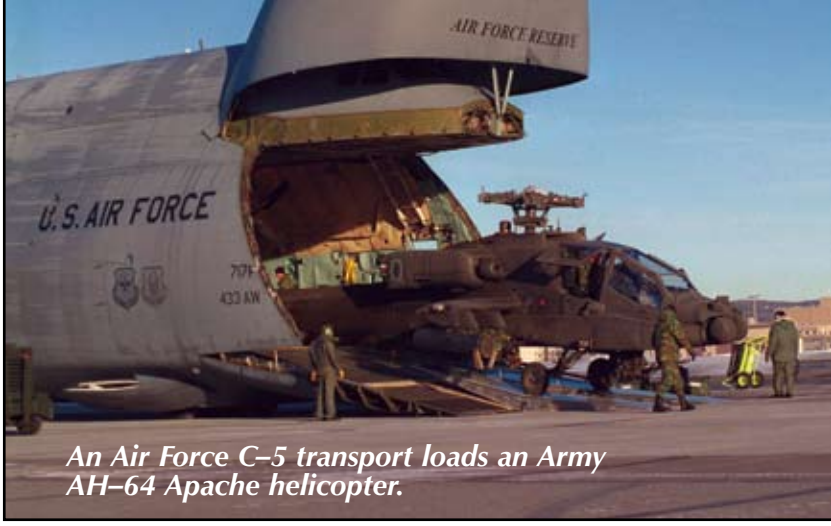
> Leaders win through logistics. Vision, sure. Strategy, yes. But when you go to war, you need to have both toilet paper and bullets at the right place at the right time. In other words, you must win through superior logistics.
>
> —Tom Peters,
> "Leadership Is Confusing As Hell,"
> *Fast Company,* March 2001

• *Speed* is the core characteristic of responsiveness, and the most critical to the JFC. In measuring speed, we should focus our efforts on what is "quick enough," recognizing that not all supplies are equal in importance. Items that truly drive operational readiness deserve special treatment.

• *Reliability* is the ability of the supply chain to provide predictable, or time-definite, delivery. When items are not immediately available, the joint logistics system must provide immediate and accurate estimates of delivery so the warfighter can make informed decisions about future mission options.

• *Visibility* provides rapid and easy access to order information. A subset of domain-wide visibility, this capability answers the JFC's fundamental questions, "Where is it?" and "When will it get here?"

• *Efficiency* is directly related to the supply chain's footprint. In the tactical and operational space, the footprint needed to provide support can be determined by the resources needed to compensate for inefficiencies within the supply chain itself.



An Air Force C–5 transport loads an Army AH–64 Apache helicopter.

The Need for Joint Logistics

Joint logistics exists to give the JFC the freedom of action he needs to meet mission objectives. We deliver this effect by integrating all logistics capabilities at the operational level, thereby bridging our Nation's strategic sustainment base to the complex tactical environment in a way that optimizes logistics readiness. Through rigorous self-assessment, discussion, analysis, and collaboration, we can make significant progress toward improving our ability to deliver logistics readiness.

It is important to move forward rapidly with programs and initiatives that truly support joint logistics. We cannot wait until every issue is resolved to make decisions. Viewing initiatives through the lens of the three joint logistics imperatives—unity of effort, domain-wide visibility, and rapid and precise response—should provide a reasonable starting point for assessing an initiative's value. The challenge of integrating service and agency programs and systems that were not designed to holistically support joint operations cannot be overestimated. However, the importance of achieving this integration also cannot be overestimated. We have a responsibility to the American people and the next generation of Soldiers, Sailors, Airmen, Marines, and Coast Guardsmen to do better—much better. **ALOG**

Lieutenant General C.V. (Chris) Christianson is the Director for Logistics, J–4, on the Joint Staff. He previously served as the Deputy Chief of Staff, G–4, Headquarters, Department of the Army. From August 2002 to July 2003, he served as Assistant Deputy Chief of Staff, G–4, Headquarters, Department of the Army, with duty as Chief of Logistics, Coalition Forces Land Component Command, in support of Operation Iraqi Freedom. General Christianson has a bachelor's degree in industrial engineering from North Dakota State University and is a graduate of the Infantry Officer Basic Course, the Ordnance Officer Advanced Course, the Armed Forces Staff College, and the Army War College.

Improving Situational Awareness in the Division Logistics Command Post

BY MAJOR JAMES E.P. MILLER

The 1st Armored Division learned the value of logistics command and control systems through a series of mission rehearsal exercises. The Army Battle Command Systems let logistics commanders view the battlefield so they can support the battle as it unfolds.

Exercising command and control of logistics units that are supporting fast-moving combat units on a far-flung, asymmetric battlefield is one of the greatest challenges facing the division. Units operating in a digital environment must have the proper Army Battle Command System (ABCS) systems to provide the commander with a view of the battlefield. The 1st Armored Division logistics command post (DLCP) uses several ABCS systems that enable the commander not only to see his forces, the battlefield, and the enemy but also to anticipate logistics requirements.

Two brigades of the 1st Armored Division conducted mission rehearsal exercises last year at the Joint Multinational Readiness Center (formerly the Combat Maneuver Training Center) at Hohenfels, Germany. These exercises, by the 2d Brigade Combat Team (BCT) in August 2005 and the 1st BCT in September and October 2005, gave the Soldiers of the 1st Armored Division Support Command (DISCOM) the opportunity to hone their logistics command and control capabilities using all of their battlefield ABCS systems.

Although the mission rehearsal exercise is a brigade-level predeployment training event, the Joint Multinational Readiness Center allowed the DLCP to conduct training as the brigades' higher logistics headquarters. The DLCP conducted training on C4ISR (command, control, communications, computers, intelligence, surveillance, and reconnaissance), logistics synchronization, and battlefield distribution, which provided an excellent opportunity to test and improve the skills of the DLCP.

The experience of the 1st Armored DISCOM demonstrates the vital role ABCS systems play in establishing and maintaining logistics command and control. These systems are crucial to the work of the

cells—C4ISR, logistics synchronization, combat loss regeneration, battlefield distribution (movement)—that make the DLCP, or division rear command post, function.

ABCS Systems

The ABCS systems the DLCP uses are the Battle Command Sustainment Support System (BCS3), the Defense Transportation Reporting and Control System (DTRACS), the Blue Force Tracker, the All-Source Analysis System (ASAS), and the Command and Control Personal Computer (C2PC). Here is a quick summary of what each system in the C4ISR/Fusion area of the tactical operations center (TOC) provides to the commander.

BCS3. This system supports the warfighting command and control and battle management process by rapidly processing large volumes of logistics, personnel, and medical information. It facilitates quicker, more accurate decision making by providing an effective means for force-level commanders and combat service support (CSS) commanders to determine the sustainability and supportability of current and planned operations.

BCS3 collects and processes selected CSS data in a seamless manner from CSS Standard Army Management Information Systems, DTRACS or the Movement Tracking System (MTS), radio frequency identification tags, manual systems and processes, and other related source data and hierarchical automated command and control systems (such as the Blue Force Tracker and the Global Command and Control System-Army).

Based on these inputs, BCS3 generates and disseminates near-real-time CSS command and control reports and responses to CSS-related ad hoc queries, updates its database (every 3 hours on average), and provides CSS battlefield functional area information in support of ABCS's common operating picture of the battlefield.

DTRACS. DTRACS is a satellite-based truck- and rail-tracking capability. It is used primarily for tracking organic movements within the U.S. European Command area of responsibility and in Korea in place of MTS.

The DTRACS fly-away kit allows a unit to exchange text messages with vehicles on the road. This capability facilitates the creation of real-time traffic reports and route reconnaissance updates. The system allows logistics leaders on the move to maintain in-transit visibility of critical logistics. DTRACS's messaging capability enables logisticians to reroute supplies using battlefield satellite communications.

Blue Force Tracker. Blue Force Tracker is a digitized battle command information system that provides on-the-move, real-time, and near-real-time information to tactical combat, combat support, and CSS leaders and Soldiers. Blue Force Tracker is a key component of ABCS and seamlessly integrates with the other components of ABCS at the brigade level and below. Blue Force Tracker supports situational awareness down to the Soldier and platform level across all battlefield functional areas and echelons. Blue Force Tracker also allows brigade- and battalion-level commanders to exercise command when they are away from their TOCs because they can interface with subordinate commanders and leaders who also are equipped with Blue Force Tracker.

ASAS. ASAS is an Army program to automate the processing and analysis of intelligence data from all sources. It is a tactically deployable, ruggedized, automated information system. It is designed to support management of intelligence and electronic warfare operations and target development in battalions, brigades, armored cavalry regiments, separate brigades, divisions, corps, and at echelons above corps.

ASAS is a "linchpin" system for forming a seamless intelligence architecture between and across echelons. The architecture can be broken down into three major groups: sensors, processors, and communications systems. The systems within each group support simultaneous demands for intelligence and targeting information at multiple echelons. They support commanders from the tactical through the strategic levels across the range of military operations.

The 1st Armored Division logistics command post (at left) was set up at Wiesbaden Army Airfield for the mission readiness exercises. Inside the command post (above), the C4ISR cell occupied this space. Note the three projection screens on which information from the ABCS systems was displayed for all participants.

C2PC. C2PC is a Windows-based client software application designed to facilitate military command and control by improving situational awareness and enhancing operational- and tactical-level decisions. C2PC collects and assimilates information from other battlefield tracking systems (such as Blue Force Tracker and ASAS) to provide the commander with a clear picture of the battlefield. It uses a collaborative approach to enable information sharing among commanders and units on the battlefield.

DLCP Cells

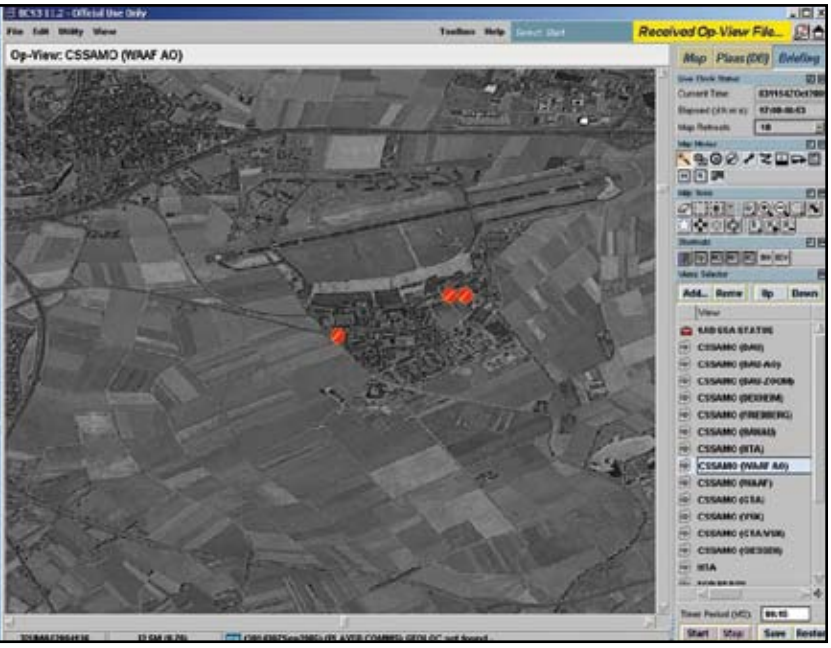
The DLCP is composed of cells that provide critical planning and operational tracking using all of the ABCS systems.

C4ISR. The DLCP's C4ISR cell is responsible for the DLCP's battle rhythm. This responsibility includes managing the timing of all actions and controlling all communications into, out of, and within the DLCP. Battle update briefs are the primary synchronizing events that control the battle rhythm process.

The C4ISR cell is the integrator of all processes in the DLCP, and all DLCP personnel participate. An associated process occurs when the planning cell has to be stood up to support the military decision making process for the division.

The C4ISR cell uses all ABCS systems to obtain a reliable picture of the battlefield. Outputs of the cell include division logistics orders and command and control of assigned battlespace and all division logistics assets.

The capabilities of the ABCS systems to show battlefield information are demonstrated in this view of a BCS3 computer screen. It shows the locations of radio frequency tag interrogators at Wiesbaden Army Airfield.



Logistics synchronization. The logistics synchronization cell is responsible for coordinating all CSS and combat health support requirements and for accomplishing all logistics missions for all CSS units in the division.

The cell identifies all CSS and combat health support requirements and measures them against capabilities and shortfalls 24, 48, and 72 hours out from division missions. The daily CSS synchronization meeting is the primary event that controls this process.

Primary participants in the logistics synchronization process include representatives of the movement control office, support operations office, division ammunition office, ground safety office, class IX (repair parts) section, property book office, CSS automation management office, division medical operations center, division G–1, and division G–4 and unit liaison officers.

The synchronization process is scheduled in relation to other DLCP processes in the DLCP battle rhythm. Synchronization has an associated process that occurs when the planning cell is stood up to support the division's military decision making process.

The logistics synchronization cell mainly uses Blue Force Tracker, C2PC, and BCS3 to obtain the information it needs to perform its mission. Outputs of the logistics synchronization cell include a daily fragmentary order, published by the C4ISR cell, that is synchronized with the combat loss regeneration and battlefield distribution processes.

Combat loss regeneration. The combat loss regeneration cell is responsible for regenerating combat losses of both equipment and personnel. The regeneration cell monitors the combat readiness of the division's assigned and attached units and works to increase unit readiness.

Regeneration is one of the requirements drivers for other logistics processes. Process participants include representatives of the G–1, G–4, materiel management center, property book office, and class IX section. The regeneration process occurs daily and is synchronized in the battle rhythm of the DLCP.

The combat loss regeneration cell relies heavily on input from logistics status reports, unit liaison officers, C2PC, and BCS3. The outputs of the regeneration process are the requirements that the logistics synchronization and battlefield distribution cells will use.

Battlefield distribution (movement). The battlefield distribution (movement) cell is responsible for synchronizing all movements among sectors and to and from forward operating bases in the division's

battlespace. The cell identifies and schedules all movements 24, 48, and 72 hours out for divisional and nondivisional units that move in the division's battlespace. Battlefield distribution is linked to all other processes in an effort to find the best way to use transportation assets while also meeting requirements for force protection of combat logistics patrols.

Members of the cell include G–3, G–4, movement control office, division transportation office, support operations office, division materiel management office, and corps movement control team representatives and unit liaison officers.

The battlefield distribution cell's ABCS contributors include C2PC, ASAS-Light, BCS3, and DTRACS. Cell outputs include a daily division movement matrix and division orders with force-protection requirements for combat units.

Military Decision Making Process

The military decision making process is accomplished by members of the DLCP battlestaff and participants from the different processes. The military decision making process is the sum of all of the other processes. The staff members who represent the DISCOM in the division's military decision making process are the support operations officer and the G–4 planner.

The military decision making process occurs as needed. The output from this process is a division order or annex. It is followed by a separate military decision making process for the DISCOM that results in the DISCOM's order for its subordinate units.

Logistics Command and Control Training

The 1st Armored Division DLCP used the BCT mission rehearsal exercises to create a training scenario for command and control of the division's logistics support systems and then integrated those systems to furnish a common operating picture in the C4ISR cell.

By using the command and control systems, the DLCP tracked not only the logistics systems and convoys in the division's battlespace but also the brigades' combat operations and the Red Ball convoys that brought supplies from the posts where the units were stationed to the Hohenfelds Training Area. Tracking each repair part from a supply support activity to Hohenfelds became a primary focus of both mission rehearsal exercises as the fight continued and returning essential combat systems to the fight became a crucial mission.

The Red Ball convoys and Iron Bullet Express missions logged over 110,000 miles in 45 days. Soldiers on those movements also served as essential observers of conditions on the autobahns. They provided text messages through DTRACS that updated road conditions, which allowed later missions to try to find more expedient routes. The DLCP used the German traffic-monitoring Web site to get the most up-to-date road conditions for all convoys before they left their starting points. The DLCP also sent text messages to the convoys alerting them to any accidents or traffic jams.

The ABCS systems fit into the processes by providing the DLCP staff with the information that they needed to see themselves, the battlefield, and the enemy. Inside the TOC, information was displayed on three projection screens in a standard setup so that everyone knew to look for the information in a standard configuration. This enabled the staff to rapidly detect problems or issues before they developed or before inaction delayed any potential solution so that it would be too late to help.

Armed with the ABCS systems and the processes managed by the cells, the DLCP developed into a very capable logistics command and control headquarters. The DLCP continued to refine its procedures and processes during three 1st Armored Division Iron Focus exercises in October 2005, December 2005, and February 2006. These division-level exercises were conducted in preparation for a division Warfighter exercise in 2007. In the Iron Focus exercises, the DLCP combined with elements of the division staff to form the division rear command post. All systems were exercised with division teammates present in order to develop the logistics estimate for the orders process. The DISCOM will continue to refine the processes through the upcoming division Warfighter exercise to ensure success for the 1st Armored Division.

The ABCS systems provide logistics commanders an unprecedented view of the battlefield, which will enable them to support the battle as it is being fought and anticipate future requirements. The systems allow commanders to see where the enemy can disrupt the supply chain and, most important, where the logistics commander can intervene to sway the fight in favor of victory. **ALOG**

Major James E.P. Miller is the S–6 for the 1st Armored Division Support Command in Wiesbaden, Germany. He served as the Deputy G–6 of the 1st Armored Division in Iraq. He holds a bachelor's degree in general science education from Indiana University of Pennsylvania and is a graduate of the Army Command and General Staff College.

The Role of UMOs and TC–AIMS Operators in Deployments

BY MAJOR MICHAEL E. SCARLETT, JR., SERGEANT FIRST CLASS CHESTER W. MONTGOMERY, AND BOBBY L. ROBERSON

The authors offer some advice, based on their unit's experience in deploying to Iraq and Afghanistan, on how to use unit movement officers and TC–AIMS operators to improve the unit deployment process.

The 16th Corps Support Group (CSG) and its subordinate battalions have deployed several companies to Iraq and Afghanistan. As these deployments have progressed, we at the CSG have learned a few lessons that may be helpful to others. While many of our thoughts are blinding flashes of the obvious, some specifically pertain to the use of unit movement officers (UMOs) and the operation of the Transportation Coordinators' Automated Information for Management System (TC–AIMS) and were learned through painful experience.

UMOs and TC–AIMS Operators

The selection and training of UMOs is one of the most critical factors affecting a unit's deployment process. However, the additional duty of UMO most often is assigned to the lieutenant with the most time left to serve in the company; that usually means the one with the least amount of experience. This is a recipe for disaster because of the lieutenant's lack of knowledge and background. Another problem with giving the UMO job to the "new lieutenant" is that he probably will leave the company after a year. A better alternative would be to select a smart staff sergeant or sergeant first class to be the UMO. That noncommissioned officer (NCO) will have the knowledge and experience to understand the deployment process and will be in the company for 2 or 3 years, which means that the commander will not be fighting constantly to keep a trained person in the UMO position.

Whoever is chosen to be the UMO must be detail-oriented and willing to dedicate the time needed to do the job right. The person selected to be the TC–AIMS operator needs to be computer literate and, like the UMO, detail oriented. It is possible for the UMO to also serve as the TC–AIMS operator, but we do not recommend this because the UMO will be busy enough coordinating transportation, performing crisis management, and executing many other tasks. Adding the chore of updating TC–AIMS data could be too much for a UMO.

Possibly the biggest challenge we encountered in the 16th CSG was a lack of operators with experience in using TC–AIMS. Most of our operators had been to TC–AIMS training, but their skills were perishable because they lacked post-training experience. The "help" function in TC–AIMS also was less than helpful. It is imperative that Soldiers get some sort of refresher training after their initial TC–AIMS training.

One way the 16th CSG is attempting to do this is by incorporating some UMO and TC–AIMS tasks into major training events or conducting UMO and TC–AIMS tasks at least once a quarter. Part of the unit's preparation to deploy to a training area will be to create a unit deployment list (UDL), burn a radio frequency identification (RFID) tag with level 6 data for a container, and print a transportation control movement document for a squad's equipment. [Level 6 data include descriptions and serial numbers for all items in a container or vehicle.] The group's unit movement coordinator will evaluate the tasks on a go/no-go basis. Tasks that are a "no go" will be redone with heavy coaching by the unit movement coordinator. This training also provides a good opportunity to inventory the TC–AIMS hardware suite.

Building Organizational Equipment Lists

The deployment planning process begins long before a unit receives a warning order. One of the first steps is building an organizational equipment list (OEL). Unfortunately, OELs often are poorly built. But if an OEL is developed properly, it can help the UMO and TC–AIMS operator avoid a great deal of pain when their unit is alerted to deploy and the pace of unit operations quickens.

Here are some key things to look at when a unit is building an OEL. All equipment on the unit's modification table of organization and equipment should be loaded with correct line item numbers, national stock numbers, serial numbers, equipment dimensions, and so forth. For equipment dimensions, each item should be measured physically (with mirrors folded in on vehicles). If measuring equipment is impossible, the unit can use information from Technical Bulletin 55–46–1, Standard Characteristics (Dimensions, Weight, and Cube) for Transportability of Military Vehicles and Other Outsize/Overweight Equipment, or go to https://www.tea.army.mil/pubs/default.asp and click on TB 55–46–2, Standard Characteristics (Dimensions, Weight, and Cube) for Military Vehicles and Equipment. All assigned personnel should be loaded into the OEL with correct information.

In building an OEL, the 16th CSG had trouble in assigning items to the correct categories (equipment, supplies, or sustainment), getting the passenger count correct, inputting level 6 data correctly, building shipment unit numbers (SUNs), and burning RFID tags. Here are some rules of thumb to help TC–AIMS operators—

- Equipment defined as vehicles and other items too big to go inside a container should get their own RFID tags.
- Supplies are everything that can go inside a 20-foot container, such as generators, tents, and computers.
- Sustainment includes items that will be left behind at the unit and items that will accompany troops, such as weapons and night vision devices.
- When entering the names of personnel on the OEL, everybody on the unit roster should be included, regardless of their deployability status. If there are confirmed due-in personnel, include them also. If names or Social Security Numbers are lacking, enter the due-ins as "Joe1, Joe2" and so on and use "111–11–1111" as a Social Security Number (each must be different).
- SUNs should be checked with the installation transportation office. If the unit is in U.S. Army Europe (USAREUR), SUNs should be built exactly to the standard prescribed in the USAREUR TC–AIMS standing operating procedure.

One final note concerning OELs: They must be updated and reviewed quarterly. Often, this is a "check the block" procedure. Units can save themselves a great deal of time during deployment if they make sure their data are correct. If they fail to do so at the quarterly update, they will do it as they prepare to deploy. One thing that helped the 16th CSG a great deal was conducting a "UMO conference," at which all company UMOs were assembled in one room for 5 days and assisted by knowledgeable NCOs in updating their OELs. This eliminated quite a few problems.

Preparing a Unit Deployment List

Once a unit receives a prepare-to-deploy order, the UMO must begin building the UDL. This is the list of what the unit is taking with it to war. In order to do this, the UMO must answer the following questions—

- How is the unit going to ship its equipment—by air, sea, rail, or road? The answer will determine the number of unit line numbers (ULNs) the unit will need. [A ULN is seven-character, alphanumeric field that describes a unit entry in time-phased force and deployment data.]
- Is the unit going to send an advanced party? If so, how big will that party be? Current U.S. Central Command regulations require that 1 Soldier be sent for every 10 vehicles.
- How will the unit ship its sensitive items? What are the escort and security requirements for shipping those items? Will they need additional containers?
- What equipment will deploy with the unit? Will the unit be falling in on stay-behind equipment in the theater?
- How many Soldiers will be deploying with the main body?
- When must the movement control team and the installation transportation office receive the UDL in order to request lift assets?
- What documentation will be required to ship sensitive items, hazardous materials (HAZMAT), and general cargo? USAREUR Regulation 525–1, Deployment Regulation, and Table 5–1 in Army Forces Command (FORSCOM) Regulation 55–1, Unit Movement Planning, lay out the requirements. (See chart on page 12.)

After the UMO answers all of these questions and builds the UDL, he must check it thoroughly to make sure that—

- Equipment, supplies, and sustainment items are categorized correctly.
- Serial numbers are included for all equipment.
- Weights listed match in all document fields.
- ULNs are assigned only to items with level 4 data, such as prime movers, trailers, containers, and 463L pallets (basically any items that require space on a conveyance). [Level 4 data include the nomenclature of vehicles and their SUNs and bumper numbers on trucks and equipment.] Do not assign ULNs to items with level 6 data, such as tents.
- Passenger counts are accurate.
- One ULN is assigned for each passenger move. (One passenger deploying three times—in the advance echelon, the main body, and the trail party—equals three ULNs.)
- One ULN is assigned for each move by mode (such as truck, rail, or air) and one for each point of origin, date, or destination.

Managing an Installation Staging Activity

Once the UDL is complete, the next significant event for the deploying unit is the installation staging activity (ISA) process. Preparation is critical to a unit's success during an ISA. A unit should have all of the following items to use in marking, tagging, or labeling all containers and rolling stock on hand—

- RFID tags (NSN 6350–01–495–3040), with level 6 data for containers and secondary loads.
- RFID tag batteries (NSN 6135–01–301–8776).
- Military shipment labels (DD Forms 1387).
- Packing lists (DD Forms 1760).
- Transportation control movement documents (DD Forms 1384).
- Shipper's declarations of hazardous goods (SDDGs).
- Materiel Safety Data Sheets and, for units in Europe, USAREUR 55–355, Joint Transportation and Traffic Management Regulation.
- Container seals.
- Keys for the containers.

These items require data input 9 days before the ISA. They will be needed again when the unit redeploys.

Quality assurance and quality control also are important during the ISA process. The 16th CSG experienced many occasions when data that were

Documentation Requirements	Vehicles (1)	Containers	463L Pallets	Personal Baggage
All Modes—				
Warning placards/labels (when applicable) (for hazardous cargo)	X	X	X	
Signature and Tally Record (DD [Department of Defense] Form 1907) (when applicable) (for sensitive cargo accountability)	X	X	X	
UIC and shipment unit number (stenciled)	X (4)	X (5)		
Military Shipment Label (DD Form 1387)	X (3)	X (3)	X (3)	
Packing lists (DD Form 1750 or DA [Department of the Army] Form 5748–R)	X	X	X	
Security seal	X (2)	X		
All modes—redeployment only—				
*Military Customs Inspection Label (DD Form 1253) or Tag (DD Form 1253–1)	X	X	X	X
*U.S. Customs Accompanied Baggage Declaration				X
+*Decontamination Tag (DD Form 2271)	X	X		
+ Commanders certificate (no ammunition or body parts)	X	X		
+ Certificate of Registration (CF 4455 or 4457) (when applicable)				X
+ Registration of War Trophy Firearms (DD Form 603) (when applicable)			X	X
Air only—				
Passenger Manifest (DD Form 2131)				X
Cargo Manifest (DD Form 2130 series)	X	X	X	
Pallet Identifier (DD Form 2775) or compatible form			X	
Special Handling Data/Certification (DD Form 1387–2) (for sensitive and classified)	X	X	X	
Shippers Declaration for Dangerous Goods (Form #: MISC PUB 55–3) (for hazardous, sensitive, and classified)	X	X	X	
Advanced Transportation Control and Movement Document (ATCMD) (TC ACCIS product copied to disk)	X	X	X	
Sea only—				
Shipping Paper and Emergency Response Information for Hazardous Materials Transported by Government Vehicles (DD Form 836)	X	X		
Rail/commercial truck only—				
Government Bill of Lading (GBL) (prepared by the transportation office)	X	X		
Convoy only—				
Convoy Clearance Request (DD Form 1265 or DD Form 2777)	X			
Special Hauling Permit (DD Form 1266 or DD Form 2777) (when applicable)	X			
Motor Vehicle Inspection (DD Form 626) (when applicable)	X			
Shipping Paper and Emergency Response Information for Hazardous Materials Transported by Government Vehicles (DD Form 836)	X			

Legend

X = Identifies documentation requirement.

* = Identifies items for which U.S. Customs or U.S. Department of Agriculture inspectors may substitute "CF" (copy furnished) for DD forms.

\+ = Overseas redeployment, if directed.

(1) = Includes major weapon systems and aircraft.

(2) = Seal affixed to all cargo access areas.

(3) = For all vehicles and consolidated shipment units (containers and 463L pallets) deploying outside the continental United States (OCONUS) or on emergency deployment readiness exercises (EDREs) or sea EDREs, regardless of mode, Military Shipping Labels (DD Form 1387) will be applied on two adjacent sides. For air, military shipping labels will be used for both CONUS and OCONUS moves. For vehicles, labels are placed on the front (driver's side) and on the left door (driver's door).

(4) = Stencil the unit identification code (UIC) and shipment unit number (SUN) on the front and rear bumpers in 2-inch lettering.

(5) = Only stencil/mark FORSCOM- and unit-owned containers.

At left, Table 5–1, Deployment Documentation Requirements, in Army Forces Command (FORSCOM) Regulation 55–1, Unit Movement Planning, shows the documents a unit needs to ship sensitive items, hazardous materials, and general cargo.

input correctly on the OEL or UDL were not printed on documents or were printed in the wrong places. The UMO needs to check *each* item. This is why USAREUR requires that everything be printed 9 days before the ISA.

Another critical factor is coordination with the installation or the base support battalion that is running the ISA. The unit should coordinate early and often. During initial in-progress reviews (IPRs), the unit needs to provide an estimate of the numbers and types of equipment to be processed (including all containers), the dates on which it will need an ISA, point-of-contact information for key unit personnel, and any unique support requirements. The unit should leave the IPRs with a clear understanding of the ISA process, the type of inspection stations used and the standards for each, frustrated cargo procedures, and available maintenance support capabilities (if provided during the ISA). From there, the unit can plan for maintenance support (if it is not provided during the ISA) and plan on how they will fix frustrated cargo and other problems. The 16th CSG had a maintenance support team on site to fix direct support-level faults and designated a single point of contact whose sole mission was to track, coordinate for correction, and release frustrated cargo.

Even if a unit expends a great deal of effort before the ISA, it is bound to be faced with equipment and documentation issues. So it needs to have a plan to fix problems on site. Having the right people and equipment on site is critical. Obviously, the UMO and TC–AIMS operator will need to be at the ISA, but the unit's HAZMAT certifier also should be on hand to correct any problems. If the unit has more than one HAZMAT certifier, the ones who signed the SDDGs should be on site; if they are not present, and there is a problem with an SDDG, the new HAZMAT certifier will have to unpack everything and recertify the container. The TC–AIMS hardware suite also must be present, specifically the computer, printers, and interrogator. TC–AIMS problems also should be anticipated. The 16th CSG had hardware problems at every ISA, and having a backup suite helped keep things moving. The most current UDL should be kept on a disk or memory stick.

Onward Movement and Port Operations

After the ISA is complete, the equipment is staged for onward movement. For most units, onward movement will be accomplished by train or truck to the sea port of embarkation. It is critical that a UMO get with his movement control team or installation transportation office as soon as he receives the prepare-to-deploy order to discuss the deployment. Some things will probably change, but it helps to have a foundation from which to start. Movement control team and installation transportation office personnel are the subject-matter experts in onward movement and will be a great help.

A couple of points about port operations, found in FM 4–01.011, Unit Movement Operations, should be noted. First, even if it is not required, a unit should send the UMO, the TC–AIMS operator, and the original HAZMAT certifier to the port. This will help ensure that small problems, such as damaged RFID tags and lost documentation, can be fixed quickly and easily.

Second, units at and above the battalion level should send at least one liaison officer to the port, especially when multiple units are deploying at the same time. (Since ports typically work 24 hours a day, it is better to have two liaison officers to share the workload.) The liaison officer's mission is threefold. First, the liaison officer is the sole point of contact for the agencies at the port, such as the Military Surface Deployment and Distribution Command and the marshaling area control group, for issues concerning the unit's equipment. The presence of a unit liaison officer makes it easier for port agencies to know who to talk to when many units are moving through the port. Second, the liaison officer is the conduit for information going to higher headquarters. Third, the liaison officer can serve as a shield from "information hounds" who try to skip several layers of the chain of command to contact the company UMO directly. Having the liaison officer act as a shield allows the UMO and his team to execute their mission without distractions. Selection of a liaison officer must be given careful thought so that the duty is assigned to someone with a basic understanding of what the operation is about, what information needs to be passed to whom, and how that information can be obtained.

Deployment to a theater of operations is a very complex process that can try the patience and test the expertise of even the best prepared unit. Using trained and skilled unit movement officers and TC–AIMS operators can improve the process and make an inherently challenging process less frustrating. **ALOG**

Major Michael E. Scarlett, Jr., is the S–4, Headquarters and Headquarters Company, 16th Corps Support Group, 3d Corps Support Command, in Hanau, Germany. He holds a bachelor's degree in history from Montana State University.

Sergeant First Class Chester W. Montgomery is the Transportation Noncommissioned Officer in Charge of the 16th Corps Support Group in Hanau, Germany.

Bobby L. Roberson is a traffic management specialist in the Transportation Division, Office of the Assistant Chief of Staff, G–4, V Corps, in Heidelberg, Germany. He served 22 years in the Army.

Protecting Civilian Logisticians on the Battlefield

BY MAJOR RICHARD J. HORNSTEIN

Now more than ever before in history, the support of U.S. military forces is inherently tied to the success of contractors on the battlefield.

A Soldier mans an M2 .50-caliber machinegun during a resupply mission at Camp Hit, Iraq.

The kidnappings, murders, and attacks directed against civilians supporting the rebuilding efforts in Iraq and Afghanistan continue to demonstrate the importance of force protection for noncombatants. Now, more than at any other time in our Nation's history, the success of our strategic mission in war is closely linked to the success of our contractors on the battlefield. It is imperative that support commanders have a clear understanding of the tactical planning and effort required to protect the contractors and contracted logistics convoys that enter the theater.

Three years before the initiation of hostilities in Iraq, the grim spectacle of the videotaped murder of *Wall Street Journal* reporter Daniel Pearl became the horrifying prologue to the killing of four American contractors in Fallujah on 3 March 2004. These crimes were an even darker prelude to other high-profile abductions and videotaped murders of contractors.

Logistics Support in Theater

Logistics is the lifeblood of any successful Army. General Omar Bradley is quoted as saying, "Amateurs talk about strategy; professionals talk about logistics." History has supported that premise. It is clear that, without the right mix of supplies routinely provided to the force to ensure its effectiveness, the mission will fail. The majority of logistics support in theater is provided by Kellogg Brown & Root (KBR) under the Logistics Civil Augmentation Program (LOGCAP) III contract. This competitively awarded contract is an indefinite delivery, indefinite quantity cost-plus-award-fee contract. LOGCAP uses multiple task orders throughout the theater to provide flexible, responsive support to the ground combatant commanders at multiple operating bases and camps. KBR performed worldwide contingency contracting in the Balkans and established a dependable reputation for delivering a full range of support.

In Afghanistan, Iraq, and Kuwait, KBR has taken over most of the delivery and sustainment of all classes of supply, and it is fully responsible for managing and distributing many of them throughout the theater. The unimpeded flow of these supplies is critical to successful operations and is directly tied to the Army's

combat capability. Most of these supplies are moved in, out, and within the theater by convoys of commercial trucks operated by civilian contractors. Combatant commanders and the contractors themselves must provide adequate resources and techniques to protect these essential convoys.

Protecting the Civilian Force

The responsibility for protecting contractors falls directly on the combatant commander. Field Manual 3–100.21, Contractors on the Battlefield, states—

> . . . the Army's policy has become that when contractors are deployed in support of Army operations/weapon systems, they will be provided force protection commensurate with that provided to DAC [Department of the Army civilian] personnel. Commanders must understand that contractors are subject to the same threat as Soldiers and must plan accordingly. Contractors, when placed in a position of risk, must be protected, or the support they provide may be degraded. . . .
>
> Protecting contractors and their employees on the battlefield is the commander's responsibility. When contractors perform in potentially hostile or hazardous areas, the supported military forces must assure the protection of their operations and employees. The responsibility for assuring that contractors receive adequate force protection starts with the combatant commander, extends downward, and includes the contractor.

The contractor's civilian leaders also are responsible for force protection and must do everything they reasonably can to safeguard their personnel and Government-furnished equipment from battlefield threats.

Although security still remains fragile in Iraq and Afghanistan, the number of contractors on the battlefield has grown since the initiation of hostilities. During Operation Desert Storm, 9,200 contractors deployed to support military operations—a ratio of approximately 1 contractor to 50 Soldiers. During the peacekeeping mission in Bosnia, the ratio increased to 1 to 10. This statistic was derived from figures compiled as the mission matured and troop strengths were drawn down toward the end of the 1990s. The current contractor-to-Soldier ratio in the Iraqi theater is hard to determine because the number of contractors in theater at any specific time is not known. However, the estimates are comparable to the Bosnia numbers.

The increased number of contractors in theater has brought a concurrent increase in the number of contractor casualties. Although exact casualty figures are not known, approximately 275 contractors have been killed in the Iraqi theater since the beginning of hostilities. This figure alone eclipses the total number of U.S. military fatalities in Afghanistan by 30 at the time this article was written. Although contractors are successfully filling many logistics roles traditionally performed by military personnel, they lack the ability to protect themselves as well as the Soldiers they replaced could. This fact adds an unforeseen security consideration to the battlespace that most combatant commanders did not anticipate when operations began. Commanders have adjusted rapidly to meet this requirement. However, the resources needed for this mission and the vast number and size of the supply routes and contractor convoys have taxed the sometimes tenuous mobile security forces that are often composed of support troops.

To Arm or Not to Arm

Based on international agreements, contractors are considered to be "civilians accompanying the force." They are in a unique category—they are considered neither combatants nor noncombatants. Though some security firms arm their employees, most do not. The reason for this is twofold. First, if contractors on the battlefield are permitted by the combatant commander to carry weapons for self-protection, their protected status as civilians could be jeopardized because they could be perceived as legitimate combatants by opposing forces or insurgents. Second, a force of armed logistics contractors mistakenly could be perceived as mercenaries.

Traditionally, contractors may be armed for self-protection only if all of the following conditions exist—

- The issue of weapons is authorized by the combatant commander.
- Contractor policy permits carrying weapons.
- Individual employees and the overarching theater contractor agree that the contractors should be armed.
- Side arms are Government-issued.

Currently, in both Afghanistan and Iraq, these conditions have not been met for the LOGCAP contractors on the battlefield. Only a small group of contracted personnel, such as Blackwater USA, is armed in theater. (Blackwater USA is a professional law enforcement, security, peacekeeping, and stability operations firm.) Most of the contractors who provide life support to our forces on the battlefield and support reconstruction efforts in Afghanistan and Iraq remain unarmed.

Securing Main Supply Routes

Perhaps the greatest convoy protection challenge facing the forces in the Iraqi theater is the inability to secure fully the main supply routes (MSRs).

Several MSRs are used for moving supplies from Kuwait into and throughout Iraq. With the expanded use of improvised explosive devices (IEDs) that are relatively effective against convoys traveling along vast stretches of unguarded roads, innovative use of combined arms force-protection measures is mandated.

Army doctrine calls for the use of both passive and active measures to secure the force. Field Manual 3–07, Stability Operations and Support Operations, defines antiterrorism as "defensive measures used to reduce the vulnerability of individuals and property to terrorist acts, to include limited response and containment by local military forces." These defensive measures can help to reduce the likelihood of attack or reduce the effectiveness of an attack if one occurs.

Passive Force-Protection Measures

Examples of effective passive force-protection measures used by civilian drivers and commanders include maintaining adequate intervals between vehicles when traveling; traveling during daylight hours; wearing individual protective gear; using up-armored protection on the local commercial vehicles if feasible; deterring remote detonation of IEDs with jamming devices; vigilance; nation building; and varying the time, route, and manner of travel.

Military drivers are taught that maintaining adequate intervals during convoy operations will limit the number of vehicles that will be affected in the event of attacks and ambushes and thereby reduce the number of casualties and the amount of cargo and vehicles lost. Civilian contractors and their convoy commanders must enforce this same discipline with contracted drivers. Military units designated to accompany convoys must ensure that the routes used are known by all vehicle operators and that there is adequate communication throughout the convoy. Everyone must be briefed on what actions to take on contact with the enemy. These actions should be standardized, trained, and briefed routinely as part of the convoy preparation process.

Contractor convoys do not travel at night because visibility along unimproved roads in the area of operations is reduced and the threat of attack is increased. Few, if any, contractors on the battlefield provide night vision devices for their drivers, many of whom are local nationals or third-country nationals. This fact further supports their decision to execute daytime convoys only.

The chances of surviving attacks are markedly increased by the use of ballistic helmets and vests. This practice, which is mandatory for KBR employees, should be required of all contracted civilian drivers, regardless of nationality.

Improvised explosive devices (IEDs) often are hidden in unlikely places. A look at the underside of this chunk of concrete reveals an encased IED.

Conversely, most ground shipments in Afghanistan are transported by local drivers who do not wear protective gear. The decision to forego the gear is actually a passive force-protection measure developed as a result of the tactical situation and threat. Local commercial drivers operate vehicles called "jingle trucks" (because of the sound made by the wide array of decorative colored tassels on the vehicles). They operate independently in most parts of Afghanistan without the benefit of military escorts because wearing helmets and vests along the austere supply routes through mountain passes and remote villages could bring unwanted attention and make them more vulnerable to attack.

The use of up-armored vehicles can passively deter the enemy and defend the convoy. However, armoring civilian trucks has proved challenging. Adding armor and ballistic glass significantly increases vehicle weight, sometimes causing instability that results in rollovers and catastrophic suspension failures when traveling on unimproved roads. However, any protection that can be added safely to vehicle cabs, such as sandbags or Kevlar floor mats, should be funded and exploited.

Jamming devices that prevent wireless detonation of explosives also have been used successfully in theater. The use of these devices should be incorporated into force-protection measures wherever possible. Of course, their use implies the need to filter radio frequencies used for normal communication to prevent interference.

The enemy has demonstrated an ability to react and change his tactical approach to counter our

threat-mitigation actions. IEDs have proven to be the convoy's greatest threat and are responsible for most of the fatalities in theater among contractors, Soldiers, and Marines. Keen vigilance is crucial to observe objects that look out of place on or along the road. Civilian drivers and their military escorts must be trained, and they should receive refresher briefings on how to identify IEDs or recognize the threat of a developing ambush. After-action reports and joint civilian and military debriefings should be scheduled to share information so that dangerous mistakes can be avoided.

Alternating convoy routes and avoiding chokepoints are also passive measures that are taught to military personnel and should be used by contractors as the situation allows. Although varying routes and departure times will necessitate more detailed planning and coordination, military convoy security forces and contractors must make a conscious effort to do it. Routine encourages complacency and increases convoy vulnerability.

Nation-building efforts, such as assistance by civil affairs teams to improve the standard of living in areas traveled by convoys, can significantly reduce attacks from criminals and reduce insurgent operations. However, the number of civil affairs missions has increased significantly, and limited resources restrict the assistance they can provide. Nevertheless, continued efforts to improve utilities and services throughout Afghanistan and Iraq will have positive effects and ultimately reduce criminal and enemy threats to contracted convoys.

Active Force-Protection Measures

Regardless of how well passive defensive measures are implemented, operational commanders must be prepared to protect and respond to direct attacks on contractor convoys. In the event of a direct assault by terrorists, insurgents, or common criminals who want to steal supplies, a convoy must have adequate firepower and an adequate number of trained Soldiers or Marines dispersed throughout the convoy to react to and defeat any threat. No set number of troops and vehicles or specific approach will ensure success, but most contractors require a certain amount of protection before their employees are allowed to travel into a hostile area. This requirement must be considered when assigning limited resources and personnel to secure convoys and MSRs.

Some factors that help the commander to decide how convoy security should be accomplished are the size of the convoy, the troops available, the route and distance of the convoy, and the risk of attack. A repetitive approach would be an invitation to insurgents, terrorists, or other criminals who reconnoiter convoys to identify patterns that can be exploited easily. For example, a convoy that routinely inserted one up-armored high-mobility, multipurpose wheeled vehicle after every 20 commercial vehicles would be an invitation to a synchronized attack.

Major-General Carl von Clausewitz, a renowned Prussian military theorist, advocated an active economy of force effort wherein the right assembly of men and equipment in time and space were most important for success. He knew that the critical use of pursuit and maneuver was important when applying force against the enemy. Thus, it is imperative to have dispersed throughout a convoy a trained force that is capable of flexible and rapid movement and can bring a great deal of force to bear on an enemy at a certain time and place.

Convoy Tactics

Although it is prudent to understand the importance of the deliberate planning methodology used in troop-leading procedures and the military decision-making process, some general, common-sense factors should be considered also to help ensure the security of a contractor convoy. Tactical commanders who have practical, firsthand experience will determine the tactics to use when forced to engage in direct small-arms fire with enemy combatants who may attack the convoy. However, several planning factors are important, and the commander must be aware of these.

Establish a force-protection ratio in the convoys. Unlike a tactical transportation unit that would self-protect during convoys and have weapons on every vehicle, a contractor convoy relies solely on the military to provide for its security. A workable ratio of up-armored security vehicles to contractor trucks must be established. Although the amount of force protection used is arguably the decision of the combatant commander, a contractor typically requires a standard ratio of security vehicles and personnel for safe ground operations. Planners must be aware of this requirement. Contractors may refuse to execute their mission if this ratio is too low or the right types of up-armored vehicles and weapons are not used. This has caused many commanders to feel that their operations have become vulnerable to the demands and rules of corporate executives. Because their military mission is so closely linked to and dependent on contractors, however, commanders cannot afford an impasse.

Some commanders may view convoy security as a drain on security personnel who are needed for other missions in theater. However, contractor force requirements thus far in the current hostilities have been reasonable, and many commanders have opted for increased protection based on the threat to and criticality of the convoyed supplies.

Maintain good communications. Maintaining good communications is essential when providing

security during a direct-fire engagement in a civilian convoy of 20 to 100 vehicles that may be strung out for miles. Contractors may use commercial radios to communicate with their drivers throughout the convoy. Nevertheless, security commanders also must be able to communicate with the convoy drivers and should ask the contractor to provide the means to maintain communications with them. For operational security, the use of code words or radio silence should be exercised along the route when using unsecured voice communications and during any direct engagement. Communications links with higher headquarters and fire support assets should be established, tested, and maintained for the duration of the convoy. If any IED detonation-jamming devices are used in the convoy, it is important to identify their communications frequencies to avoid voice communication interference.

Train and enforce battle drills for actions on enemy contact. The value of battle drills can never be underestimated. Clausewitz stated, "Everything is very simple in war, but the simplest thing is difficult." He called this phenomenon the "friction of war," wherein unforeseen circumstances frequently arise and routine tasks or expectations often become extremely difficult. Battle drills can help limit this friction. Soldiers and civilians alike should be drilled on actions to take on enemy contact. These actions should be explained thoroughly in preconvoy briefs and during force-protection training and awareness indoctrination. Soldiers charged with security must know how to react and maneuver rapidly to provide supporting fire to other elements engaged in fire during convoy operations. Seconds often mean the difference between life and death in combat operations.

Reduce security handoffs during the convoy. A convoy that stops or slows down is much more vulnerable to attack. Vehicles must enter and exit the secured areas quickly at handoff locations to avoid compromising security. Any security handover between different units must be planned, coordinated, and rehearsed, at least on a sand table. This rehearsal should be coordinated and precise to minimize delays and vulnerability to direct attack. Ideally, security handoffs should take place at a safe location. If possible, the same security forces should work with the same contracted convoy commanders along the same routes to minimize handoffs. This approach allows the security forces to become familiar with the route and sensitized to changes along the route. This awareness increases the likelihood for recognition of IEDs and possible ambushes.

Train all security personnel on how to call for fire, and establish fixed reference points along the route. Fire support is a critical component of contractor convoy security. All military personnel on the convoy security force should know how to call for and adjust fire as required. This is a perishable skill, so refresher training should be conducted frequently to maintain proficiency.

When available, attack helicopters provide the best fire support. They can provide direct fire and increased visibility and surveillance for the convoy and help to identify changes or threats along the route. Helicopters also can disrupt enemy activities before they become a direct threat to the convoy. Although the routine use of helicopters is not always feasible, security commanders should include these resources in their plans, and combatant commanders should allocate these attack assets when available for use in convoy security. Fire support plans for close air-support and artillery also are needed. Precision munitions make the use of close air support more feasible in populated areas and add increased lethality to security forces if they encounter an enemy strong point.

Fixed reference points should be developed and shared with all security elements. These reference points assist security forces in calling for fire support when the friction of a direct engagement may make the simplest task, such as reading a map, extremely difficult.

Know what to look for, and think asymmetric. The ability of security forces, commanders, and contractors to think "out of the box" is important. Insurgents and terrorists have been ingenious in using natural surroundings and other methods of camouflage to hide snipers, ambush positions, IEDs, and other threats to a convoy. Traditional ways to damage and disrupt convoys are rarely used. Security and contractors alike should maintain a high level of vigilance and look for anything that may appear odd or out of place. IEDs have been discovered hidden in animal corpses, potholes, guardrails, and many other unlikely places. The appearance of wires, evidence that digging has occurred, or dead animals or garbage may all be telltale signs of an IED emplacement. The approach of suspicious vehicles should be deterred through visual and audio signals. If those actions fail, the vehicles should be engaged with small-arms fire at the farthest distance practicable to prohibit the possibility of a suicide attack and the subsequent collateral damage that such an attack could cause.

Another nontraditional security method that may prove effective is having military troops ride shotgun with contractors in civilian trucks throughout the convoy. This method should be used sparingly and with the consent of the contractors, because it may have the unwanted effect of drawing increased enemy fire toward the contractors. Convoy security personnel must watch for vehicles or individuals who detour rapidly off the MSR as the convoy approaches.

These may be observers whose job is to identify the approach of a convoy. This dilemma has no easy solution, but security personnel should remain flexible, share all lessons learned, and try new approaches that may make sense based on the situation.

Know the operational contingencies. Contingency plans, rally points, and recovery plans for damaged vehicles are all critical. A policy for recovery or destruction of damaged or broken-down vehicles must be known and enforced. Millions of dollars worth of commercial vehicles have been lost on MSRs because of the inability to execute recovery plans rapidly and successfully. Security forces accompanying the convoys must determine if a broken-down vehicle has been carrying some critical repair components or sensitive items and quickly execute a plan to recover the equipment or destroy it in place based on approved guidance and the security requirements of the convoy.

Other contingencies that must be planned include actions to take on enemy contact, if the route is blocked, or if elements of the convoy become separated from each other. A standard list of contingencies should be drafted and briefed as part of the preconvoy briefing. Participants in this briefing should be military security personnel, all contracted drivers, and the contractor's civilian convoy commander. Contingencies are not limited to those with standard boilerplate solutions; the list should be flexible and updated frequently based on the latest intelligence.

A contracted Afghani driver stands beside his bullet-riddled "jingle truck."

The ideas presented in this article are intended to serve only as a template for forming an active plan of force protection for contractor convoys. The fact that this discussion does not focus on intelligence does not diminish its importance. Intelligence updates should be incorporated into all security plans and convoy briefings. Mobility, countermobility, and survivability also play important roles in the security of the MSR.

The use of contractor logisticians has increased significantly in the last decade. Theater commanders have adapted rapidly and have provided sustained force protection to the many contractor convoys operating in the theaters. However, because of the limitations of unarmed contracted civilians, the adaptive techniques of terrorists and insurgents, and a limited number of trained military police and other combat and support units available for convoy security missions, contractor convoy force protection remains a challenge in theater. Now more than ever before in our history, the support of our military forces is inherently tied to the success of these contractors, so their efforts must not be disrupted by insurgents or terrorists. It is imperative that we secure our contractor supply efforts since the accomplishment of our overall mission is intrinsically tied to their success on the battlefield. **ALOG**

Major Richard J. Hornstein is the Team Leader for the Army Surface-Launched Advanced Medium-Range Air-to-Air Missile and Joint Land Attack Cruise Missile Defense Elevated Netted Sensor Systems at the Defense Contract Management Agency in Andover, Massachusetts. He has deployed twice in the last 3 years in support of Operations Iraqi Freedom and Enduring Freedom. He has a bachelor's degree from the University of Rhode Island and a master's degree in acquisition and contract management from the Florida Institute of Technology. He is a graduate of the Ordnance Officer Basic Course, the Combined Logistics Officers Advanced Course, and the Army Command and General Staff College.

Advancing Aviation Depot Capability Forward on the Battlefield

BY LIEUTENANT COLONEL MARK A. VAN DYKE, CAARNG

The key to mission success is being effective. Although efficiency is logistically important, without effectiveness, efficiency is irrelevant.

In recent years, Army National Guard aviation classification repair activity depots (AVCRADs) have transformed faster than changes could be made to their tables of distribution and allowances or modification tables of organization and equipment. Deploying to Southwest Asia while they are transforming has increased the challenges AVCRADs face.

An AVCRAD performs two combat service support (CSS) functions executed at the depot level: maintenance and supply. It is responsible for limited depot aircraft maintenance, component repair, pass-back aviation intermediate maintenance (AVIM), and operation of a supply support activity (SSA). [Pass-back AVIM is repair that cannot be performed by the units designated to provide it because they have an excessive amount of work requests, lack personnel with the required training and expertise, or lack the proper tools and equipment.]

The Army National Guard has four AVCRADs. They are located in Connecticut, Mississippi, Missouri, and California. These units were originally designed either to operate from a fixed base at their home stations or to fall in on Corpus Christi Army Depot, Texas, to augment that depot's workforce.

AVCRADs deployed to the Southwest Asia area of operations support aviation reception, staging, onward movement, and integration (RSO&I) and the National Maintenance Program (NMP) for Army Materiel Command (AMC) Southwest Asia. The AVCRADs also are the Coalition Forces Land Component Command's (CFLCC's) reserve aviation maintenance resource.

AVCRADs have been instrumental in providing aviation maintenance support for Operations Iraqi Freedom (OIF) and Enduring Freedom (OEF). The 1109th AVCRAD in Groton, Connecticut, deployed to OIF 1 in 2003 and established depot operations in a warehouse in Kuwait. The 1107th AVCRAD in Springfield, Missouri, took over operation of the warehouse from the 1109th in 2004 and converted the warehouse into a series of shops that produced depot-repaired components in support of the NMP. The 1106th AVCRAD in Fresno, California, deployed to Kuwait in 2005 to support OIF 04–06 and expanded the operation to provide support to OEF. This article describes the experiences of the 1106th AVCRAD.

Soldiers in Afghanistan remove the engine from a CH–47 Chinook helicopter.

AVCRAD mechanics classify retrograde aviation parts in Iraq before shipping them to Kuwait by truck. Only those parts that can be repaired in Kuwait will be shipped there. The other parts will be shipped by strategic airlift to the continental United States for repair.

mission analysis team identified three primary areas of concern for application of the CSS characteristics: operations in Iraq and Afghanistan, the SSA, and maintenance support.

Mission Analysis Team

Within a month of its arrival in Kuwait, the 1106th AVCRAD sent a mission analysis team to Iraq to determine the warfighters' forward depot operations needs. The key problems identified by the team were difficulty in moving maintenance contact teams and components within the theater and in communicating requirements from units in Iraq to the AVCRAD in Kuwait.

When an aircraft suffers battle damage or is damaged in a hard landing, for example, it must be repaired and returned to the fight as quickly as possible.

From the initial identification of a maintenance requirement, it often took as long as 10 days to move a depot contact team into Iraq. Once the team was on site, it might not have all of the materials and tools required for the job (due, in part, to the difficulty in communicating depot requirements to Kuwait). Another problem was that aircraft on ground (AOG) components and other high-priority components that were picked up by liaison officers at the SSA in Kuwait often were lost in the transportation system. [AOG is a supply status used for aviation parts that can only be used when three or fewer parts are needed to make an aircraft flyable. It is the highest priority aviation logistics request. Using the AOG designator causes supply and transportation personnel to expedite delivery of the parts so that the aircraft can be back in operation in the shortest time possible.]

Field Manual 4–0, Combat Service Support, defines the eight characteristics of CSS as responsiveness, simplicity, flexibility, attainability, sustainability, survivability, economy, and integration. The

Operations in Iraq and Afghanistan

When an aircraft suffers battle damage or is damaged in a hard landing, for example, it must be repaired and returned to the fight as quickly as possible. Repairing a damaged aircraft requires parts, special tools, and skilled, technically adept personnel. To meet these needs, the 1106th AVCRAD developed the forward operations cell (FOC) concept of support.

The FOC provided depot expertise forward to communicate requirements, positioned a movement control team (MCT) in Iraq to manage parts flow, stationed depot teams and tools forward to reduce response time, and served as a forward command and control node for the AVCRAD commanders. The FOC was able to respond to customer requirements within minutes or hours instead of days, as had been the case when the AVCRAD had to respond from Kuwait.

Supply Support Activity

After an AOG component was picked up from the SSA, visibility of that component was lost for the 4 to 7 days that it took to get it to the unit. Sometimes the components got lost in the transportation system. The 1106th developed a tracking mechanism and established MCTs at Ali Al Salem Air Base, Kuwait, and at Camp Anaconda, Iraq, to expedite the movement of AOG components. As a result, delivery time was reduced to 1½ to 2½ days.

When the 1106th took over operations in December 2004, the SSA contained approximately 7,000 lines of authorized stockage list and nonstockage list items. The SSA routing identifier code was not on the Standard Army Retail Supply System (SARSS) search matrix, so the only way units in Iraq could get components was by using a walk-through process established by CFLCC. To automate the process, the 1106th coordinated with CFLCC to establish a new SSA routing identifier code in the search matrix in order to deplete the nonstockage list items and

place NMP-repaired components into the search matrix. To make more parts readily available to the warfighter, the 1106th established a remote SSA in Iraq that was filled with approximately 30 lines of critical, high-use components. This reduced the fill time of requests for those AOG components from 2 to 4 days to 1 hour.

The AVCRAD component repair mission required that unserviceable, reparable components be transported to Kuwait. Often, after receiving a component, the AVCRAD found that it would have to be evacuated to the continental United States (CONUS) for repair. Part of the FOC mission was to reduce the number of components being transported unnecessarily on the hazardous roads of Iraq by placing AVCRAD supply and technical inspectors forward in Iraq to classify unserviceable equipment. Only components that could be repaired by the AVCRAD's shops were shipped to Kuwait. Components that could not be repaired in Kuwait were consolidated and shipped by strategic airlift back to the appropriate CONUS depot.

Maintenance Support

The 1106th refined the maintenance process and made it more effective by selecting as critical components only those that are used extensively by Southwest Asia units in order to focus repair capability on fewer components. This reduced NMP repair lines by one-third. The portion of the AVCRAD's workload devoted to repair and return was reduced from 50 percent to 10 percent, and the portion devoted to the NMP was increased to 90 percent. This reduced the number of lost repaired components and the time customers had to wait for serviceable parts. A repair transaction effectively became a supply transaction ordering parts for the customers instead of a work order transaction sending parts for repair, with its accompanying difficulties of transportation, repair, and coordination.

AVCRAD personnel recover a downed CH–47 Chinook helicopter in Kuwait as part of their reception, staging, onward movement, and integration support mission.

Application of CSS Characteristics

The AVCRAD had to take the CSS characteristics into account when deciding how to address the problems identified by the mission analysis team. They addressed each of the characteristics as follows.

Responsiveness. Responsiveness is providing the right support in the right place at the right time. This was accomplished by establishing FOCs in Iraq and Afghanistan. The FOCs provided depot supply, maintenance, aircraft battle-damage repair, assessment, and technical assistance support forward, eliminating the customer wait time previously required for coordination and transportation from Kuwait.

Simplicity. This characteristic was exemplified through the establishment of a system for tracking AOG components being transported from Kuwait to customers in Iraq. Establishing MCTs to account for AOG components leaving Kuwait and arriving in Iraq was a simple concept. It involved placing Soldiers at chokepoints to track specific components and intercede at the first sign of trouble. This did more to improve delivery times and reduce the loss of parts in the system than any other procedure put into place. The MCTs also established an Army Knowledge Online collaboration site using Excel spreadsheets so that supported customers could track their AOG components in the system.

The 1106th AVCRAD depended on CFLCC, AMC Southwest Asia, and the Multinational Corps-Iraq to establish priorities when resources were short.

Flexibility. The 1106th Soldiers demonstrated their adaptability many times during this deployment. Flexibility was crucial to having an effective logistics operation. The lines of communication and transportation between the customers and the AVCRAD presented the greatest obstacle for the Southwest Asia operation. In the past, the AVCRADs had not established or operated FOCs or run MCTs and they were not part of the AVCRAD's established mission. To deliver the right support to the warfighter in Iraq and Afghanistan, leaders had to think "outside the box." This was demonstrated by the establishment of a second SSA, use of MCTs, and placement of FOCs in Iraq and Afghanistan.

Attainability. Attainability is the ability to determine the minimum essential support needed to begin operations. The 1106th displayed this characteristic with the phased establishment and manning of the FOCs. While the AVCRAD was heavily involved in RSO&I operations at the beginning of the deployment, it continued to maintain a minimum support presence in the FOCs. During the operational phase of the deployment, it manned the FOCs very robustly to assist in meeting pass-back AVIM and depot maintenance requirements in Iraq and Afghanistan. At the end of its rotation, the 1106th reduced the manning of FOCs to support redeploying forces in Kuwait and the inbound deploying forces through the RSO&I process.

Sustainability. Sustainability is the ability to maintain continuous support during all phases of operations. Sustainability was demonstrated repeatedly by the manning level reductions and increases made at different phases of the deployment. The AVCRAD commander ensured that the unit was never engaged in operations that would hinder its ability to lift and shift resources to higher priority requirements. This strategy was established to maintain the ability to be the theater commander's reserve maintenance capability for unforeseen mission requirements.

A good example of this was the AVCRAD's involvement in an air port of debarkation to sea port of debarkation operation in Qatar. A strategic air-to-sea-lift operation was used to move aviation units from Afghanistan using intratheater airlift assets to Qatar for redeployment using sealift resources.

Survivability. Survivability is the ability to protect support functions from destruction or degradation. The supply personnel and technical inspectors, working together to classify aircraft components as far forward as possible, supported the survivability of U.S. forces by reducing the amount of retrograde components trucked to Kuwait on the treacherous highways of Iraq. One less truck on the road was one less risk for the Soldiers and contractors supporting the war effort.

Economy. Economy is providing the most efficient support to accomplish the mission. A benefit of determining repair requirements forward was that unserviceable components were sent directly to the quickest source of repair, whether that was in Kuwait or CONUS. This ensured that components were not delayed in transit and were quickly repaired and returned to the warfighter.

Integration. Integration consists of synchronizing CSS operations with all aspects of operations. The 1106th AVCRAD depended on CFLCC, AMC Southwest Asia, and the Multinational Corps-Iraq to establish priorities when resources were short. It established liaisons with aviation brigades and battalions in Iraq and Afghanistan to ensure that customer requirements were properly identified and supported. Through its forward presence and use of liaison officers, the 1106th became part of the brigade combat teams.

Through the effective and efficient application of the CSS characteristics, the 1106th AVCRAD made itself a combat multiplier for OIF and OEF. Depot support was placed forward in Iraq and Afghanistan, reducing response time to hours versus weeks and days. AOG average wait time was reduced from an average of 5 to 7 days to 1½ to 2½ days. **ALOG**

Lieutenant Colonel Mark A. Van Dyke, California Army National Guard, is the Commander of the 1st Battalion, 140th Aviation Regiment, in Los Alamitos, California. He was the Operations Officer for the 1106th Aviation Classification Repair Activity Depot in Fresno, California, when it deployed to Kuwait in support of Operations Iraqi Freedom and Enduring Freedom. He has a B.A. degree in organizational development and human resources from Fresno Pacific University and is a graduate of the Army Command and General Staff College.

Insensitive Munitions Testing: Protecting Ourselves From Our Ammunition

BY ROBERT M. FORRESTER AND KENDAL M. DUNCAN

Everyone knows that ammunition is dangerous. It is designed to inflict damage, usually by hitting a target with great force, exploding, or both. When we look at the bare-bones theory behind ammunition, we see that it revolves around energy. When using ammunition, our objective is to throw "balls of energy" (projectiles, missiles, and bombs) at bad guys and hit them—hard.

To achieve this goal, we somehow have to get these balls of energy from the factories that manufacture them to Soldiers and other military personnel who will use them to protect and defend their units and themselves. Unfortunately, until we perfect ammunition teleportation technology, ammunition is vulnerable throughout the supply system. An article in the March–April issue of *Army Logistician*, "Preserving Readiness Through Ammunition Packaging," described the lengths to which packaging engineers go to protect ammunition from problems created by the transportation system and the environment. Readers of that article may be prompted to ask: "What's being done to protect *us* from our ammunition?" After all, energetic materials such as propellants and explosives are not discriminating. Give ammunition a good spark, a little fire, or a hot fragment, and most of the energy it has stored up for the bad guys will be hurled at the good guys instead.

Insensitive Munitions

So what are the Army's engineers and scientists doing to keep us safe from our own ammunition? The answer is that they are working to make ammunition *insensitive*. The goal is to develop ammunition that will react in a dangerous way when we want it to and not before.

A reaction is normally most dangerous if it is a "high order" detonation event. In "techno-speak," this means an event in which a chemical reaction produces high-pressure, high-temperature shock waves that consume the explosive material nearly instantaneously. Shock waves from high-order detonations can travel faster than a mile a second and cause a lot of damage. If we put these already potentially dangerous energetics into a closed container, such as a shell, an armored vehicle, or any other tightly enclosed space or structure, we introduce the effect of confinement to the explosive reaction. Confinement often increases the violence of an explosion because of a buildup of pressure, which eventually bursts the container that encloses it and creates what is essentially a bomb. So not only do we have fire, heat, and a shock wave, we also have flying fragments.

Propellants and Explosives

The ideal approach to making munitions insensitive is to use propellants and explosives that do not react unless they are hit with a specific stimulus. Unfortunately, this is probably the most difficult way to make explosives insensitive. We still want munitions to pack a punch and explode on impact with a target. This means we have to come up with new chemical mixtures that pack similar amounts of energy but react only when we want them to. Scientists and engineers have developed several new materials that are powerful but hard to set off by accident. A word of caution,

Modular Artillery Charge System (MACS) containers are staged for a fast cookoff test.

though: These materials still have more than enough stored energy to do real damage if mishandled, no matter how insensitive they may be.

Containers

One solution to this problem is the use of melt-away panels to protect munitions during transport. In the event of a fire, the panels melt before the ammunition has a chance to explode, leaving behind huge gaping holes in the container. Munitions may react much less violently if their containers are designed so that the munitions cannot build up pressure from confinement. They may burn, but they are not likely to explode. However, a container designed with insensitivity in mind still must be able to protect the munitions and pass stringent handling and environmental testing. This balancing act between insensitivity and ruggedness can be tricky.

Contained munitions can build pressure so fast that common solutions such as pressure-relief valves will not work. One solution to this problem is the use of melt-away panels. These panels protect munitions during transport, but, in the event of a fire, they melt away, leaving huge gaping holes in the container before the ammunition has a chance to explode. When the ammunition finally explodes, the pressure has somewhere to go; it does not turn the container into a bomb.

Several other techniques also are being tried. Most of them offer some way to weaken the structure of the container so that it will vent at precise spots under pressure. Ideas such as scoring the wall of the container or weakening the welds have been studied, but these approaches pose challenges for quality control and manufacturability. It is difficult to develop a container that is strong enough to pass all packaging tests but strategically weak enough to pass all IM tests.

IM Testing

All munitions acquired by the military services must be examined to determine if they meet established IM requirements. This is true whether the munitions are developed by the services or procured from commercial or foreign sources. This examination normally involves a series of six tests designed to assess the ability of munitions (typically in their shipping configuration) to withstand shock, heat, and impact. The specific tests are identified during a threat hazard assessment conducted by the acquiring service. The six tests normally include fast cookoff, slow cookoff, sympathetic detonation, bullet-impact, fragment-impact, and shape-charge jet impact tests. These test requirements, methods of conduct, and passing criteria can be found in Military Standard (MIL–STD)–2105, Hazard Assessment Tests, Non-nuclear Munitions, and in various North Atlantic Treaty Organization Standardization Agreements (STANAGs).

The containers are engulfed in flame during the test.

Both the fast and slow cookoff tests subject munitions to the threat of elevated temperature. In the fast cookoff, the munition in its container is placed over a huge vat of gasoline or jet fuel that is ignited. This raises the munition's temperature very quickly and tests how it reacts when it is engulfed in fire. In the slow cookoff test, the temperature is raised again but at a much slower rate in a specially designed oven. The munition is placed close enough to a fire for its temperature to rise above the ignition point, but the munition is not necessarily engulfed in flames. In both tests, the violence of the reaction, the degree of fragmentation, and the debris throw are evaluated. If the munition's reaction is no worse than burning and no hazardous fragments are projected, the munition passes these tests. For the purposes of IM, a hazardous fragment is one that produces 58 foot-pounds of energy out to a distance of 50 feet. This is calculated either with instrumentation during the test or by collecting and analyzing post-test debris.

A sympathetic detonation test involves several munitions that have been placed in their packaged configuration and stacked close together as they would be for transport or storage. The object of the test is to see if the explosion of one munition will cause a simultaneous, or nearly simultaneous, explosion in the surrounding munitions. In the test, one munition is intentionally detonated, and the rest are free to react. If one munition's reaction is no worse than an explosion and the other munitions do not react, they pass this test.

Above, a MACS container is positioned for a slow cookoff test. At right, the container is shown after a successful test in which the munition did not explode.

Bullet- and fragment-impact tests are performed to check a munition's reaction to small-arms fire and impact from high-speed fragments that may come from sources such as exploding bombs or artillery shells. Depending on the threat-level assessment (what the Army thinks might be fired at the particular type of munition being tested), various rounds are fired at the munition in its container. The projectiles vary from 5.56 millimeters up to .50 caliber for the bullet-impact test. Both armor-piercing and ball ammunition are used. The Department of Defense has developed more specific criteria for the fragment-impact test, which includes size, shape, and speed of the fragment. If the munition's reaction is no worse than burning and no hazardous fragments are thrown, it passes these tests.

The final IM test is the shape-charge jet impact. A munition is hit with a shape-charge jet to see how it reacts. If the munition detonates, it fails this test. (A shape-charge jet is a hollow metal cone built into a projectile. Explosives packed around the outside of the cone detonate on impact, squashing the cone and forcing a fine jet of metal out of the front of the shell.)

All IM testing must be approved in advance by the Army Insensitive Munitions Board. After the tests, the results are presented to the board for evaluation. The board has the final say in test implementation, test procedures, and data analysis. In other words, the Army Insensitive Munitions Board is responsible for declaring whether or not an item is "insensitive" and ready for fielding.

The Army's IM program has led the way in ensuring the safety of the munitions that Soldiers, Sailors, Airmen, and Marines use to protect and defend themselves, their units, and their country. After all, the enemy is the only one who should ever experience the power of our ordnance. **ALOG**

Robert M. Forrester is an engineer in the Logistics Research and Engineering Directorate of the Armament Research, Development, and Engineering Center at Picatinny Arsenal, New Jersey. He has a bachelor's degree in mechanical engineering from Virginia Polytechnic Institute and State University and a master's degree in mechanical engineering from the Stevens Institute of Technology in New Jersey.

Kendal M. Duncan is an explosives logistics specialist in the Logistics Research and Engineering Directorate of the Armament Research, Development, and Engineering Center at Picatinny Arsenal, New Jersey. He has co-chaired the Army Insensitive Munitions (IM) Board, served as the Army representative on the Joint Services Insensitive Munitions Technical Panel, assisted in managing IM improvement projects for Army munitions, and developed the Department of Defense Insensitive Munitions Handbook and Army policies and procedures for the implementation and management of IM within the Army.

Combat Vehicle Evaluation

BY LOUIS J. GORENC

In an effort to ensure that combat vehicles are combat ready, the Department of the Army established the Combat Vehicle Evaluation (CVE) program. Under CVE, vehicles are inspected to identify those most likely to qualify for overhaul at the depot level because of severe hull damage. Army Regulation 750–1, Army Materiel Maintenance Policy, states—

> Combat vehicles will be selected as candidates for recapitalization and overhaul during peacetime . . . Combat vehicles reaching a mileage or hour interval prescribed by [the Army Materiel Command] will be inspected by depot-level teams to identify vehicles requiring overhaul.

Combat vehicles that have not reached the prescribed mileage or hour threshold but are overhaul candidates may be nominated by the appropriate major command for evaluation.

CVE is administered by the Tank-automotive and Armaments Life Cycle Management Command (TACOM LCMC) in Warren, Michigan.

CVE Initiation

A typical evaluation is requested by the installation or division CVE manager. The TACOM LCMC CVE program also can initiate evaluations. When requesting CVE evaluation, the unit should provide model, serial number, USA (U.S. Army) number, overhaul data, and bumper number to the installation CVE manager. [The USA number is a vehicle registration number assigned to each vehicle and piece of equipment in the Army. This number indicates the vehicle type and serial number of the equipment.] The installation CVE manager then will contact the TACOM LCMC CVE office for further information and instructions.

A letter of agreement stating the inspection parameters and scheduling the inspections is prepared between the installation or division and the CVE program. The CVE program uses the information on the models, serial numbers, and other pertinent information to help determine the number of CVE personnel needed to conduct the inspections.

CVE Inspection

A CVE team from the TACOM LCMC travels to the requesting unit's location to inspect and evaluate the vehicles and determine their condition.

The CVE inspectors look for defects in the hull—dents, gouges, holes, warping, and broken or fractured welds. They also look for faults in turret operation and unserviceable, burned, or oil-soaked wiring harnesses and connectors. The inspectors document the location, description, and size of each defect.

A point system is used to determine if a vehicle qualifies for depot-level repairs. CVE inspectors use a voice-recognition device that verbally asks specific questions and assigns point values to answers. When the tally is completed, a report of all vehicles inspected, along with the serial numbers of those eligible for overhaul, is sent to the command, the vehicles' item manager, the overhaul depot, and the unit that owns the vehicles. Vehicles rated with the required number of points are sent to the depot for overhaul at a time determined by the major end item manager.

Nomination of Other Vehicles for Repair

A major command can nominate vehicles not meeting threshold requirements when the following conditions exist—

- The vehicle is not reparable below the depot level.
- The vehicle has experienced documented excessive maintenance or supply downtime.
- The vehicle has extensive fire or accident damage.

The CVE program manager alone or the CVE quality assurance team member and the CVE program manager together will make this determination.

CVE is a cost-saving and manpower-reduction program that helps to ensure that combat vehicles are in top condition by identifying those vehicles that need major hull depot repairs and informing the appropriate personnel of needed attention. Anyone who needs more information on the CVE program should forward all inquiries by e-mail to cve@tacom.army.mil. ALOG

LOUIS J. GORENC IS AN EQUIPMENT SPECIALIST WITH THE COMBAT VEHICLE EVALUATION TEAM AT THE TANK-AUTOMOTIVE AND ARMAMENTS LIFE CYCLE MANAGEMENT COMMAND INTEGRATED LOGISTICS SUPPORT CENTER. HE HAS A BACHELOR'S DEGREE IN CRIMINAL JUSTICE ADMINISTRATION FROM CONCORDIA COLLEGE IN MICHIGAN.

The Keys to a Successful Combat Logistics Patrol

BY LIEUTENANT COLONEL FREDERICK V. GODFREY

Logistics convoy skills learned during enhanced situational training at the Joint Multinational Readiness Center should prove valuable to Soldiers in Afghanistan and Iraq.

In today's asymmetrical operating environment, logistics Soldiers conducting logistics operations inside forward operating bases are relatively safe. However, when they leave those fortified enclosures, the threat becomes more menacing because the enemy actively hunts high-payoff targets such as logistics convoys. Because of this, logisticians now refer to logistics convoys as combat logistics patrols (CLPs) and approach their planning, coordination, and execution as deliberately as any other combat operation.

This is a living process, and only through timely lessons learned from deployed units can Army combat training centers such as the Joint Multinational Readiness Center (JMRC) (formerly the Combat Maneuver Training Center) at Hohenfels, Germany, remain current on what works and what does not when planning CLPs. Observer-controllers must integrate into training the lessons learned from CLP operations. To do that, JMRC trainers travel to areas of operations to observe firsthand new threats and new tactics, techniques, and procedures (TTP) that can be incorporated into future enhanced situational training exercises and simulated combat operations.

To help ensure success and avoid many of the pitfalls commonly associated with convoy operations, 12 important tasks must be completed (see chart at right) and sufficient time must be allotted before a CLP begins to fix any problems identified during the performance of these tasks. These tasks, which are taught at the JMRC, are discussed below.

Battalion Fragmentary Order

The initiation of a mission requirement usually comes from the support operations officer (SPO), who passes the CLP requirement to the support battalion S–3. The S–3 generates a written fragmentary order (FRAGO) laying out the specific requirements for executing the CLP in the next 24 hours. The requirements of the CLP are driven by the SPO, and the resourcing of the CLP is driven by the support battalion S–3. Therefore, it is incumbent on both officers to synchronize the logistics efforts that will drive CLP execution.

To keep the CLP on schedule, the SPO must anticipate logistics requirements at least 72 hours before the resources are needed and synchronize the projected requirements with the brigade and battalion task forces at least 48 hours out. Last-minute events, such as loading and offloading of supplies and equipment and changing start times, could cause CLP personnel to miss briefings and rehearsals. This could lead to a lack of synchronization of the entire CLP operation. Therefore, the SPO, brigade S–1 and S–4, and task force S–1 and S–4 must agree at least

This photo shows a "driver's eye" view of a combat logistics patrol as it heads toward its destination.

Combat Logistics Patrol Checklist

1. Generate a battalion fragmentary order (FRAGO) initiating the combat logistics patrol (CLP).
2. Coordinate air-ground integration, ground route reconnaissance, close air support, or a combination of all three.
3. Initiate a CLP quality control process, allotting enough time to identify maintenance issues.
4. Conduct an intelligence update that includes information on weather, terrain, obstacles, chokepoints, and potential threats.
5. Backbrief support battalion leaders.
6. Issue CLP leader FRAGO to drivers and transportation coordinators.
7. Execute precombat inspections and precombat checks.
8. Perform operator-level preventive maintenance checks and services.
9. Conduct communications system checks.
10. Rehearse.
11. Brief CLP participants.
12. Conduct end-of-mission debrief.

48 hours in advance of the CLP execution who and what the CLP will be hauling where and when.

After the requirements for the CLP are defined and the CLP leader has received a FRAGO from the battalion S–3, the CLP leader obtains an update on the weather, terrain, potential threat, road conditions, and chokepoints along the route and gives a confirmation backbrief to the battalion commander, executive officer, support operations officer, and S–3. At this point, the company in charge of executing the CLP begins identifying vehicles that will go on the CLP, the supplies that will be carried, the personnel who will accompany the CLP, and the internal and external CLP security required.

Air and Ground Security

It is important to coordinate air-ground integration, ground route reconnaissance, close air support, or a combination of all three well in advance of the CLP. After the CLP leader receives the FRAGO, he backbriefs the battalion leaders, and the company responsible for executing the CLP identifies the vehicles and equipment it needs. The support battalion staff submits air mission requests for an air CLP escort, an air sweep of the proposed CLP route, on-call close air support, or a "dry-run" of the potential danger areas along the CLP route. Even the most basic air coverage along the route can help to avoid or mitigate potential CLP interdiction and could mean the difference between a successful mission and one that results in lost supplies or equipment or injured personnel. Often, air assets are not available for CLP missions because of other operational requirements, so it is important to include ground security vehicles in the CLP and, if possible, forward of the CLP to reconnoiter the route. As a rule, it is best to submit air mission requests as far in advance as possible to give the aviation elements enough time to integrate the CLP into their mission planning.

> All CLP operations should be planned, coordinated, and executed as battalion combat operations.

The smaller the CLP, the easier it is to command and control, but the actual size of the CLP depends on mission, enemy, terrain and weather, troops and support available, time available, and civil considerations. At least 3 ground security vehicles should accompany a 10- to 12-vehicle CLP, with 1 additional security vehicle for every 3 additional vehicles in the CLP. The three security vehicles in the CLP should be positioned in the front, middle, and rear of the convoy. The front security

vehicle leads the CLP and, if necessary, blocks incoming traffic from the route of march until relieved by the rear security vehicle; then it again takes the front position.

The second vehicle in the CLP should be a 5-ton or larger vehicle with a manned crew-served weapon. This vehicle can serve two purposes: It can remove obstacles in the road, and it serves as the number-one vehicle if the designated number-one vehicle has to block traffic temporarily. The middle security vehicle in the CLP serves as the "blocking and tackling" vehicle and pushes out any civilian traffic that attempts to enter the CLP.

The third security vehicle performs rear-area security, keeps civilian vehicles from entering the CLP, and blocks traffic when the CLP has to turn at major intersections.

Each CLP security vehicle should carry a mix of .50-caliber and MK19 crew-served weapons. Each vehicle must be equipped with a Blue Force Tracker (which gives detailed information on both friendly and enemy units) or other internal and external communications systems with messaging and satellite communications capability.

Quality Control

A CLP quality control process identifies maintenance issues. The process begins with operator-level preventive maintenance checks and services (PMCS), but it also includes communications system checks, organizational and direct support maintenance if needed, load inspections, and weapons checks. This is a deliberate process that helps avoid many of the pitfalls that can lead to a failed CLP mission. Successful units have a designated maintenance team that executes technical inspections of all CLP vehicles, weapons, and communications equipment before every mission. The quality control process must be completed at least 12 hours before the CLP begins in order to identify and correct problems and, if necessary, swap out faulty vehicles or equipment.

At the end of the quality control process, the maintenance quality control team provides the CLP leader or noncommissioned officer in charge (NCOIC) a checklist on the status of all CLP equipment, including information on what equipment was fixed on the spot and what could not roll with the CLP because of a deadline fault.

Intelligence Update

Twelve to 24 hours before CLP execution and again 30 minutes before, the battalion S–2 and S–3 provide the CLP officer in charge (OIC) with an intelligence update that includes information on weather, terrain, obstacles, chokepoints, and potential threats. Then, during the CLP brief, the OIC and NCOIC update all CLP participants so that they will have the most current situational awareness possible.

CLP Leader Backbrief

While the quality control process is being conducted under the supervision of the CLP NCOIC, the CLP leader backbriefs the support battalion leaders on how the CLP will be executed and prepares a FRAGO for the CLP leaders and Soldiers. The briefing should cover command of the CLP, route of march, security, CLP makeup by vehicle type, communications platforms and the frequencies that will be used, start and release point times, CLP rehearsal time, and a CLP risk assessment.

CLP Leader and Soldier FRAGO

After the intelligence update, a FRAGO is issued to the CLP leaders and Soldiers. All vehicle drivers and transportation coordinators should receive a copy of the FRAGO from the CLP leader. This FRAGO should include a statement of the CLP mission; the execution timeline that includes vehicle staging time; precombat inspection (PCI) and precombat check (PCC) times and checklists; CLP rehearsal time; the equipment, personnel, and supplies that are being delivered; radio frequencies that will be used and the point at which the CLP will switch frequencies when crossing unit boundaries; a strip map; command and control down to the last Soldier in the CLP; and a risk assessment signed by the battalion commander if warranted by the expected threat level. As soon as the CLP FRAGO is issued, CLP Soldiers, NCOs, and officers start loading the vehicles with the required equipment and supplies and begin the PCIs and PCCs.

PCIs and PCCs

PCI and PCC execution should begin approximately 4 hours before the CLP start time to allow time to resolve

any unforeseen problems with equipment and personnel. PCIs and PCCs are the oil that keeps the friction out of CLP operations. Skipping any portion of these processes can result in mission failure and risk Soldiers' lives.

Every Soldier and NCO conducting checks must carry and use PCI and PCC checklists and have on hand any technical manuals on the equipment being prepared for the CLP. Key items to check during the PCI and PCC include overnight gear, weapon and communications systems, water and food stocks, safety items, ammunition, landing zone marking equipment, combat lifesaver bags, night vision goggles, and cold-weather gear. Without a checklist and an NCO to check that Soldiers have what they need for the mission, the potential for mission failure increases exponentially.

Operator-Level PMCS

As with the PCI and PCC processes, the vehicle PMCS process is deliberate and includes not only vehicle supervisors and NCO's but also a maintenance team capable of making on-the-spot corrections.

Communications Systems Checks

During operator-level PMCS, CLP Soldiers conduct both internal and external communications checks to identify and remedy potential communications glitches.

Rehearsal

The best way for a CLP operation to be successful is for the CLP to conduct a thorough rehearsal.

In Iraq, a 256th Brigade Combat Team Soldier prepares the Blue Force Tracker in his high-mobility, multipurpose wheeled vehicle (humvee) before departing Camp Victory.

In southern Afghanistan, Soldiers of the 173d Support Battalion (Airborne) are briefed on an upcoming combat logistics patrol.

The rehearsal agenda shows which vehicles are in the line of march; where the weapons check will be conducted; the start point location; the route of march; key terrain features along the route; chokepoints; potential problems associated with driving through urban areas; potential ambush areas; and actions to be taken on contact, when crossing friendly boundary lines, moving into a friendly forward operations base, and at the release point. To be effective, the rehearsal must include everyone in the CLP and use a terrain model that is similar to the area the CLP will cover. The rehearsal area should be quiet and free of distractions. The CLP leader should ask the Soldiers questions during and after the CLP rehearsal to ensure that everyone understands the mission.

CLP Briefing

The CLP briefing before rollout is the last opportunity the CLP leader and NCOIC have to meet face to face with the Soldiers and NCOs conducting the CLP. Therefore, it is essential that, during the briefing, every Soldier confirm that he understands the mission and his role in it. Typically, a CLP briefing includes a roll call; an explanation of the mission; threats or enemy actions that could be encountered; friendly force boundaries the CLP will be moving through; the route; hazards along the route; start and release point times; planned halts; actions during unplanned halts; convoy and catch-up speeds; coordinating instructions; radio frequencies to be used and by whom; the chain of command within the CLP; rules of engagement; the location of each medic, litter, and combat lifesaver; the location of towing equipment for use in case of a breakdown; actions during a rollover; actions on contact; and call signs.

Threats that the CLP may encounter include everything from improvised explosive devices (IEDs) to simple or complex ambushes to a crowd of locals who are upset that the CLP is slowing down or stopping traffic. Every theater has different rules of engagement, but it is important that all Soldiers in the CLP be able to act quickly when faced with threatening situations. One way to teach the rules of engagement is to use the four "S's": Shout (a verbal warning to

the threat), show (make your weapon system plainly visible to indicate that you are serious), shove (if possible, push the threatening vehicle out of your CLP), and shoot (first to disable the vehicle and then to defeat the threat if necessary). If the threat is deemed an immediate risk to life or property, the CLP Soldier can skip any or all of the four steps and immediately eliminate the threat.

Once the CLP brief is completed and every driver, truck commander, passenger, and gunner understands all of the instructions outlined in the CLP rehearsal and the CLP brief, a final check of the communications system is made, individual weapons are loaded and locked, and crew-served weapons are test-fired. The CLP is now ready to roll.

End-of-Mission Debrief

If any actionable events occur during the CLP, they are communicated immediately to higher headquarters via Blue Force Tracker, satellite radio, or some other communications system that can send real-time information to other CLPs or combat patrols traversing the same route and other friendly forces operating in the area. Once the CLP mission is complete, the CLP leader briefs the support battalion S–2 on the entire CLP operation in order to capture any observations that the CLP Soldiers made along the route. The battalion S–2 records any significant observations so that they can be communicated to higher headquarters and integrated into the bigger operational environment picture.

Do These Steps Work?

When I compared the enhanced situational training that rotating units receive at the JMRC at Hohenfels with what was actually occurring down range, I found that most of our TTP training was sound. In fact, I found that units that went through the JMRC before deployment found our enhanced situational training extremely beneficial to their CLP operations. However, I found that some actions were not executed as taught at the JMRC. I believe that future units could benefit from a review of, and more thorough preparation for, those actions before deployment. Here are some points to remember.

Secure the CLP as you would secure your own perimeter; nothing moves in or out of the CLP until it reaches the release point. At all planned and unplanned halts, secure the entire CLP. Anything that is not organic to the CLP does not move in, near, or through the CLP. Place a 5-ton or larger vehicle in the center of the CLP as a blocking or shoving vehicle in case a vehicle not organic to the CLP attempts to enter the order of march. Move the CLP down the center of the road in order to avoid hazards along the sides and require oncoming traffic to move to the left of the CLP. This provides a safety zone for the CLP and protects it from anything that could be thrown into a vehicle; it also gives the CLP the maximum possible distance from IEDs, vehicle-borne IEDs, and any other threats.

Use the leapfrog method to secure and move the CLP at turns and intersections. Use the clock method to identify hazards or anything else out of the ordinary while the CLP is moving down the route. For example, if 1200 is the direction of travel, anything identified in the road for 360 degrees can be assigned a specific clock position. This instantly gives every occupant in a vehicle the ability to locate the object of interest. Continuous communication in and among the vehicles is crucial; it ensures that every Soldier in the CLP has situational awareness.

Some of the biggest hazards that CLPs face are not from enemy action but from local nationals, traffic, and accidents. Therefore, CLP vehicle operators must drive defensively to reduce the possibility of an accident or incident that would jeopardize accomplishment of the CLP mission. It makes no difference to the enemy if he defeats us with a roadside IED, a vehicle-borne IED, an ambush, or an accident. The result is the same: The mission is not accomplished and lives are placed in jeopardy.

Today's asymmetrical operating environment demands that, now more than ever, changes in our TTP for CLPs must be identified, updated, integrated in our training, rehearsed, and embedded into our ever-changing and growing standing operating procedures. The JMRC and other combat training centers are dedicated to remaining current and focused on the continuously changing operating environments of Operations Enduring Freedom and Iraqi Freedom and ensuring that every deployed Soldier receives the best possible enhanced situational training before deployment.

ALOG

Lieutenant Colonel Frederick V. Godfrey is a brigade support battalion trainer at the Joint Multinational Readiness Center at Hohenfels, Germany. He has master's degrees in liberal arts from Louisiana State University and military arts and science from the Air Command and Staff College. He is a graduate of the Quartermaster Officer Basic and Advanced Courses.

Tracking Sensitive Item Maintenance

BY TERENCE LEE BROOKS

Tracking the required maintenance of sensitive items has always been a challenge for the unit commander. During modernization, the Army must automate manually performed tasks to improve the reporting of readiness status. One idea presented to the Army's Supply and Maintenance Assessment and Review Team (SMART) program suggests improving maintenance tracking of sensitive items by using the Standard Army Maintenance System-1 (SAMS–1) and the Unit Level Logistics System-Ground (ULLS–G).

Regulations require units to inspect reportable sensitive items for accountability, cleanliness, and serviceability on a daily, weekly, or monthly basis. They also require units to maintain equipment according to the equipment's technical manuals.

Logistics automation systems can track a wider variety of equipment for maintenance than they do currently. By using written references to clarify command responsibilities, maintenance units can use automated maintenance tracking for a broader baseline of equipment. Department of the Army guidelines require units and activities to comply with each automated system's user manual. Commanders also must comply with regulatory physical security policies, procedures, and guidance when setting up ways to track the frequency of sensitive item maintenance.

During tracking, it is critical to avoid producing questionable status resulting from improperly conducted or overlooked tasks. ULLS–G, SAMS–1, and the new Enterprise transition system, SAMS–E (Enhanced), are designed not only to support ground maintenance tracking but also to support and sustain other day-to-day operations. These systems send automatic alerts to the user and maintainer about pending actions for equipment listed in the database. ULLS–G, SAMS–1, and SAMS–E accept crucial identification data, such as the national stock number, line item number, and quantity, for all types of equipment to enable an expanded automated unit maintenance program.

ULLS provides automated procedures for performing limited TAMMS (The Army Maintenance Management System) functions and managing standard maintenance facility operations. SAMS provides automated procedures for performing and managing some TAMMS functions for direct support and general support maintenance operations. Including property accountability and supply system data on maintenance support automated system databases greatly simplifies the initial maintenance scheduling process. Adopting this procedure brings the added benefit of increased safety directly attributable to the improved review processes provided by TAMMS.

Units using Army logistics automation systems benefit from enhanced accountability and accuracy and increased Soldier safety. In the requisitioning process, generating want slips between maintenance and supply will create an accounting capability for support products such as weapons cleaning supplies and equipment. This process closes the loop on supply class spending by creating a "for record" account in automation systems, removing these items from the "untracked expendable transactions" category.

Including property accountability and supply system data on maintenance support automated system databases greatly simplifies the initial maintenance scheduling process.

Unit maintenance improvement is a three-step process. The first step is for the commander to direct the standing operating procedure (SOP) changes needed to promote a partnership between the arms room or supply activity and the maintenance section in which ULLS–G, SAMS–1, and SAMS–E are located. Next, the relevant hand receipt information is loaded into the appropriate database. The third step is to schedule periodic maintenance according to the guidance in applicable technical or operator manuals.

The initial setup process for using ULLS–G, SAMS–1, and SAMS–E in the maintenance shop is labor intensive. However, the proven benefits of saving Soldiers' time and Army funds make the effort worthwhile. With broader use as tools for sensitive item maintenance, these automated systems will provide excellent service as general equipment-tracking tools. If a command supports the use of these supply and maintenance automated systems, this SMART idea will enhance the defense capability of the Army on the modern battlefield. **ALOG**

TERENCE LEE BROOKS IS A LOGISTICS MANAGEMENT SPECIALIST AT THE ARMY COMBINED ARMS SUPPORT COMMAND AT FORT LEE, VIRGINIA.

Manila as a Logistics Center

BY LIEUTENANT COLONEL JOHN W. WHITMAN, USA (RET.)

For a brief period after Japan attacked the United States in World War II, Manila served as the center for American logistics in the Philippines.

As part of their attack on the United States in December 1941, the Japanese attacked U.S. Forces in the Philippines only hours after their attack on Pearl Harbor, Hawaii. When the attack on the Philippines occurred on 8 December, General Douglas MacArthur's Philippine Army was in the early stages of mobilization. MacArthur was trying to create an army from U.S. troops, native Regular U.S. Army Philippine scouts, recent Philippine Army draftees, and Philippine Constabulary policemen. [The Philippine Constabulary was a Philippine national police force that was organized by the United States in 1901. It became the backbone of the Philippine Regular Army under General MacArthur.] Although the United States was busy shipping equipment and supplies for the Army to the Philippines, planners estimated that it would take another 4 to 5 months to meet minimum requirements. Eighty thousand Soldiers on Luzon, the largest and most populous Philippine island, needed supplies. Without adequate supplies from the United States, MacArthur's U.S. Army Forces in the Far East (USAFFE) had to draw its supplies from those available on Luzon.

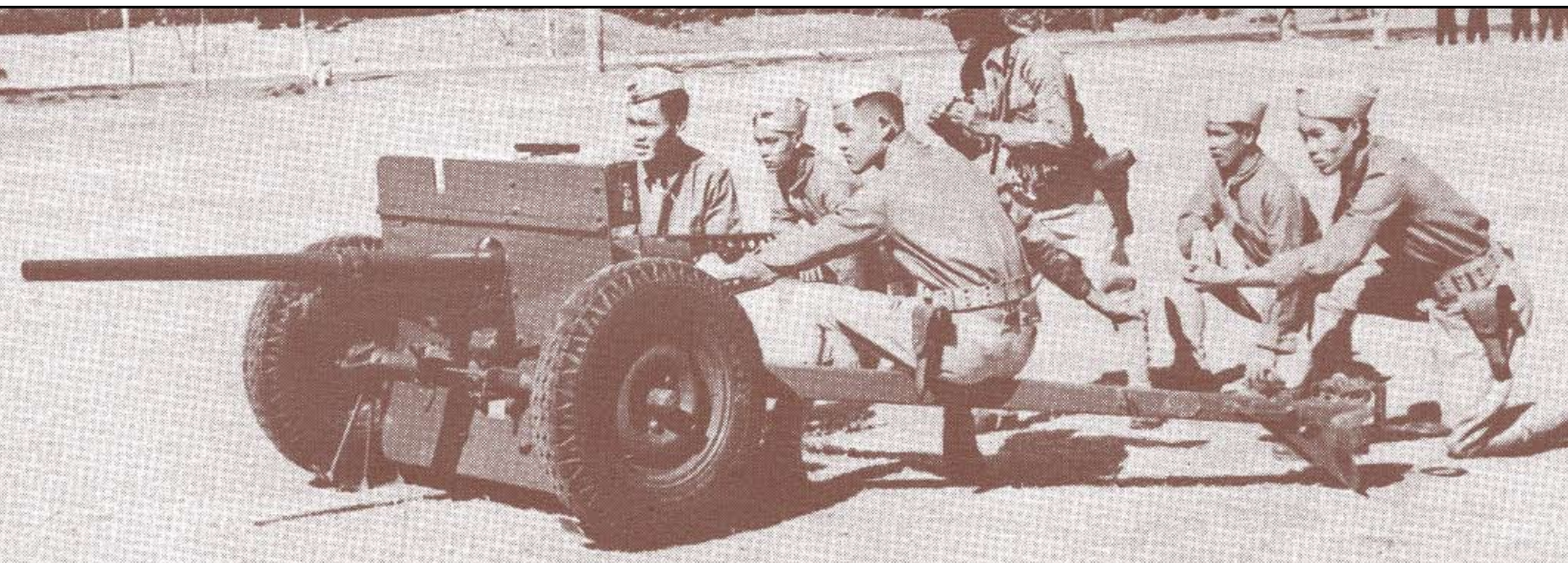
After the attack on the Philippines, the port area in Manila had no serious bomb damage and was fully functional. Manila had large docks that the United States had been using to unload its military supplies. Manila became the center of American logistics. Luzon's government, business, finance, maritime shipping, and wire and radio communications were centered in Manila. Luzon had the finest transportation network in the Far East and Pacific outside of Japan. When war began, Manila started exercising its primacy as the largest commercial storage center in the islands.

Local Purchases

Before Japan attacked, the War Department already had lifted all financial restrictions on the Army's local purchase authority. Almost all of the advance depots' supplies flowed from the Manila Quartermaster Depot, except for perishable food, rice, sugar, and coffee, which Army officers in the field purchased locally as needed. Starting on 8 December, 35 trainloads of supplies were shipped to the depots at Tarlac in northern Luzon; Los Baños, south of Manila; and Guagua, northeast of Bataan. Simultaneously, the Quartermaster Depot began procuring large stocks of polished rice.

The military soon was making so many purchases that civilian businesses nearly stopped serving the Filipino populace. In the most blatant cases, the requisitioning of property trended toward outright theft. American officers' actions were so arbitrary and technically illegal that, had it been peacetime, they would have spent the rest of their lives justifying their actions. Commander Harry H. Keith was acting as the Navy's fleet maintenance officer while he recuperated from the bombing of his destroyer, the *USS Peary*. "You just walked into a store," he wrote to his wife, "took what you wanted, and walked out. If you had time, you signed a receipt and if not, you tried to remember to send one the next day. My name is signed to thousands of dollars [worth] of paper all over Manila."

Philippine Soldiers conduct training before the attack by Japan.



The USAFFE Finance Office put its peacetime regulations in a bottom drawer and never looked at them again. They approved claims if they were arithmetically correct and had some kind of proof that the supplies had been delivered, dispersing cash for the supplies received. Vendors delivering supplies appeared with hand-written receipts that were signed by just about anybody. USAFFE also hired temporary labor as needed and paid them in cash at the end of each shift. Finance officers developed shortcuts to help fund the Philippine Army. These solutions and casual bookkeeping practices would have made a pre-war auditor scream.

Blackout Restrictions

Quartermaster officers boarded ships in Manila Bay, examined their manifests, and brought the vessels carrying militarily useful supplies and equipment to the docks. The ships could discharge cargo only during daylight hours. Nightly blackouts prevented unloading, so the ships would leave the docks and anchor in the bay each evening. These blackouts were actually more harmful than helpful. The Japanese seldom flew at night, and blackouts slowed land convoys carrying needed materiel to the troops. An exception to this restriction would have permitted cargo to be discharged at night, which would have sped cargo deliveries.

The *Maréchal Joffre*

The Vichy French ship, *Maréchal Joffre*, posed its own problem. Its skipper had reported that, although fully fueled and manned, the ship could not sail. Dissension between crewmen supporting the Vichy government sympathetic to Nazi Germany and crewmen supporting the Free French forces led by General Charles de Gaulle had immobilized the ship. The Americans decided to send an armed boarding party to seize the ship and sail it to Australia. The Americans were uncertain as to how the French might react. Would they need cutlasses and pikes to board the ship? Would the French resist? A Navy lieutenant, armed with a sword, a pistol, and a carbine, led his men aboard. The French were calm and offered no fight. The ship's captain strode up, smiled, and welcomed the Americans with an accented "Allo."

The Americans had each man choose either Vichy or de Gaulle. Vichy men stepped to the port side and went ashore into internment. The 63 de Gaulle supporters assembled starboard. A Navy lieutenant gathered 100 American naval air ground crewmen and aviators and raised anchor late on 18 December. They sailed the ship through Japanese waters to Australia, where the *Maréchal Joffre* was renamed the *USS Rochambeau*.

Death and destruction were left in the wake of the Japanese bombing of the Cavite Navy Yard on 10 December 1941.

Use of the City

Manila's dock area was chaotic as the city prepared for war. The Army had taken over all of Manila's piers for military use. The piers were jammed with pre-war goods that commercial brokers had not hauled away and with stocks of food that Armour and Company, Swift and Company, and Libby, McNeill, and Libby had agreed to turn over to the military. In addition, the piers were swamped with priority discharges. Vehicles and manpower to clear the piers were irregular and insufficient to do the job.

The city hummed with military activity. Inter-island freighters filled the mouth of the Pasig River. Truck convoys with American Soldiers in khakis and Filipino recruits in blue dungarees rushed through Manila. Many buildings and institutions were used to house military activities. MacArthur's headquarters was there, and the Navy had offices at the Marsman Building on the waterfront. U.S. Army engineers moved into the University of the Philippines. Finance offices occupied the Villamor Hall College of Liberal Arts, a two-story, reinforced concrete building that was the Taft Avenue campus of the University of the Philippines. The Quartermaster Corps took over Santo Tomas University and San Beda College. USAFFE's press relations section moved into the monastery and school of the Order of the Virgin Mary. The Office of the Superintendent, Army Transport Service, moved into the Custom House opposite Pier 5.

Supply Shortages

The military coordinated with local oil companies to control the distribution of approximately 10 million gallons of commercial gasoline that were in storage. The oil companies agreed to open their distribution centers at six sites. Those sites then serviced 30 issue points along the major highways. Each center could handle from 75,000 to 100,000 gallons a day. The oil companies ran rail tank cars out of Manila to replenish these centers.

Clark Airfield burns on 7 December 1941 after the Japanese attack.

Although most supplies for the Regular U.S. Army establishment had arrived before the war, supplies for the Philippine Army had not. Expected first in late October and then in late November, the convoy carrying quartermaster supplies was diverted to Australia after 8 December. The supplies and equipment requisitioned for the Philippine Army never did arrive. The Filipinos would go into battle with whatever they had been issued from local U.S. Army stocks or could be purchased from the local economy.

To remedy that shortfall, USAFFE purchased or contracted for what it needed. The Quartermaster Corps bought all the new cars and trucks it could find, directly from salesrooms and warehouses. Purchasing agents also bought all the second-hand vehicles they could find. USAFFE acquired title to several complete commercial motor transport companies. The cooperation of the vehicle dealers was all that could be desired. Automotive companies in Manila used their maintenance shops to service military vehicles. The Army turned the grounds of Santo Tomas University into a motor pool.

USAFFE took control of the various truck and bus companies on the first day of war. USAFFE froze sale of all vehicles, parts, and accessories without military clearance. The Army placed Soldiers and its own civilians in all shops to ensure that nothing was sold without Army permission. Bus companies stopped servicing the civilian community and placed all their fuel, repair parts, and vehicles at the disposal of the military. Without the support of the civilian transportation system and its employees, MacArthur's army would have been nearly immobile.

Communications

The Signal Corps purchased all available photographic, communications, and radio gear. It took over the Manila Long Distance Telephone Company and made its president a lieutenant colonel. The Army leased the Mackay Radio high-speed, machine-operated radio channel between Manila and San Francisco and staffed it with Signal Corps personnel.

Medical Preparations

Medical personnel swept through medical stores and surgical supply houses and bought or signed for enormous quantities of medicine, surgical instruments, and bedding. They used equipment from one of the two general hospital sets received from the United States to establish new hospitals at Santa Escolastica College, Rizal Stadium, the Women's Normal School, La Salle College, Holy Cross, and the Philippine Women's University. Doctors prepared to treat as many as 10,000 casualties.

Rizal Stadium became a medical supply depot. The chrome, steel, and glass jai alai building became a hospital. Its Keg Room served as an x-ray room and operating pavilion. Workers stuffed the once plush, red-carpeted, air-conditioned ballroom with cots for doctors and staff. The cavernous courts became wards with hundreds of metal-framed beds. The building was poorly suited to provide medical care, so extensive work was required to turn it into a hospital. Only one patient was ever treated there—a Soldier who fell off a truck outside the hospital and dislocated a hip.

For 2 weeks, Manila pulsed with logistics activity, but it was all for naught. The Japanese landed at Lingayen Gulf on 22 December and swept aside the Philippine Army troops. MacArthur decided to withdraw into Bataan, leaving Manila unprotected. After the decision was made to move, the Army's effort was focused on getting as much as possible out of the city and over to Bataan before the Japanese arrived. Even though Manila served as a logistics base for less than a month, it had served the U.S. Army well. **ALOG**

Lieutenant Colonel John W. Whitman, USA (Ret.), is the author of Bataan: Our Last Ditch, The Bataan Campaign, 1942. *He has a bachelor's degree from San Jose State College and a master of military art and science degree from the Army Command and General Staff College, holds a secondary Army speciality of historian, and is an Advanced Research Project Associate of the Army Military History Institute.*

Workplace Change and Worker Fears

BY DR. CRAIG C. KURIGER

When new technology enters the workplace, managers must address their workers' concerns and make sure the lines of communication run both ways.

Change in the workplace has a significant impact on the individual worker. Managers are especially interested in how change affects a worker's morale and performance. Some people react to change by seeing it as an opportunity for improved conditions, while others fear losing a workplace with which they are comfortable. To alleviate fear of change, managers must acknowledge that the fear is real and then address each person's specific concerns.

It is important to study the dynamics of overcoming the fear that causes resistance to change. This article examines the impact of the introduction of a major change—computer technology—into a workforce. It focuses on three actual cases, describing how the change was introduced, how the individuals in the workforce reacted, and how any subsequent adverse reaction could have been reduced.

The Coming of Organizational Change

The specific workforce studied was a multidisciplinary directorate of 140 civilian engineers, technical specialists, and clerical and managerial personnel employed by the Army. From 1981 to 1986, an all-encompassing management information system designed to automate all major functions was implemented in the directorate. The directorate's managers established a small computer systems office with 10 to 12 engineers and specialists to design, develop, and manage the introduction of computer-based tools.

The directorate was responsible for emergency production planning and for the planning, budgeting, and execution of capital investment projects, both in Government-owned facilities and in key privately-owned facilities. The directorate was organized into several divisions, each with a specific function, manager, and staff ranging from 10 to 30 employees. In the style of a traditional hierarchal organization, several of these divisions were divided further into branches. With one exception, the directorate's functions were performed manually (that is, without computer support) and were very paper intensive.

To improve productivity, the director created a special team (which eventually became a permanent systems office) to look at automating many organizational operations. The directorate was experiencing a 20-percent annual turnover rate in personnel at that time. The director and deputy director thought that automating organizational processes would reduce the impact of that turnover.

The special systems team researched and analyzed the directorate's business processes and designed the concept for an integrated management information system (IMIS) of 10 interrelated subsystems that would be phased in over a 3-year period. These subsystems were intended to automate and integrate the major "manual" functions of the directorate. The task of implementing the IMIS was inherited by the permanent systems office. However, none of the people who were on the special team that conceived the IMIS transitioned into the systems office. The systems office was a branch within a division and thus was two organizational levels below the director.

IMIS Implementation

The special systems team made several presentations on the IMIS to the directorate's managers while it was being designed. The director expressed his full support for its implementation. Automating key processes was thought by most managers to be useful in executing the directorate's mission. The system design was well thought out and incorporated design tools for automated systems that were in use at that time. The special team developed a set of system specifications for each of the 10 planned subsystems.

The first subsystem tackled was actually a reprogramming of the directorate's only existing automated system, which was a partially automated process that had been in use for several years by one specific branch. The employees of this branch had been clamoring for an upgrade in the programs they used. Other than normal programming problems, the transition to the new subsystem went well. The branch's employees were involved from design to test to production (that is, actually put into use).

When the permanent systems office moved to implement a new subsystem that automated part of the budget process, resistance started. The resistance was caused not so much by the technology itself but by the process of its introduction. This situation reflected the insight of Barbara M. Bouldin in *Agents of Change: Managing the Introduction of Automated Tools:* "The difficulties of implementing a new technology have very little to do with the product itself, rather they are related to the intangible but real obstacles associated with overcoming resistance."

Case 1: Failure

Although implementation of the budget subsystem supposedly had management support, the systems office immediately ran into a wall of resistance from the budget division itself. The resistance took the form of continual objections to the original specifications and to numerous revisions that attempted to incorporate budget division comments, the failure of budget division personnel to participate in meetings scheduled to resolve problems, and the refusal of the budget division chief to even consider automation of "his" processes. The systems office chief (who, remember, was one level lower in the directorate's hierarchy than the budget division chief) attempted to persuade the recalcitrant budget chief by pointing out the benefits of automating the processes. He also made the resistance known to his chief (who was at the same level as the budget division chief). Nothing changed.

The systems office found that the special team that prepared the system specifications had not obtained or even sought input from the budget division. As a result, the budget chief was offended from the beginning and was not willing to listen to "outsiders" describe how he should conduct and improve his business. As Bouldin notes, experience has shown that "resentment . . . usually accompanies recommendations issued by centralized groups." That had certainly occurred in this instance. Another dynamic at play was that the budget chief did not want to change the way he ran the budget process; he may have feared that he would lose control over the process.

The introduction of new technology results in change. People are required to stop using an old, comfortable method and start using a new tool that may be totally foreign to them. It was evident that automating the budget process with the use of computers would result in different ways of doing business, which the budget division's personnel (or at least the chief) did not want to learn. The budget chief also was not convinced of any reason to give up the old method. Neither the division chief who supervised the systems office nor the director were willing to confront the budget chief to gain some level of cooperation. The systems office chief did not possess the skills to persuade the budget chief in order to gain voluntary cooperation. This was a problem since, as Bouldin observed, "one prerequisite for successful implementation is [the involvement of] a zealot." The budget chief did not see a need to change his process, and he saw no advantage to automation. It was his view that there was no need to make a change for the sake of change.

Both sides dug in. The rather desultory discussions that did take place between the two groups centered on what the new subsystem, as it was designed by the special team, would do. The discussions rarely, if ever, addressed how this would help the budget division do its job or what the budget division's needs really were. Consequently, even after a 2-year "battle," the IMIS budget subsystem was never implemented.

This failure severely handicapped the implementation of other subsystems because it sent the message to the rest of the directorate that, if they resisted, they would not have to change. The workforce was quick to pick up on the fact that senior managers were not going to insist on the implementation of the IMIS subsystems. This confirmed the observation of William Umiker in a 1997 article in *Health Care Supervisor,* "Employees are particularly prone to resistance when . . . they have supervisors who fail to mean what they say, or fail to say what they mean."

Case 2: Success

The greatest success in the initial IMIS introduction was the implementation of a subsystem related to the planning-with-industry function. This initiative differed from the experience of the budget subsystem in that the special systems team had fully involved the users in the preparation of specifications. The branch getting the subsystem therefore received a subsystem that represented what they wanted. This user involvement was in keeping with the principle presented by Bouldin, that "not only is listening a key to success . . . but it will also lay the foundation for creating the proper environment in which change can take place."

Because of this earlier communication and coordination, the systems office found no resistance in the branch. Instead, they found impatient users anxious to get the new subsystem as soon as possible. The users had accepted the proposed change, had already projected themselves into their new roles, and were anxious to get there. This subsystem was developed and, after the normal debugging process, was used until replaced by newer technology about 10 years later.

Case 3: The Budget Division Revisited

About 2 years after giving up on the budget subsystem, the chief of the systems office approached

the chief of the budget division with a concept for a subsystem that would involve most of the directorate. This subsystem would categorize and track deficiencies in production capabilities and feed information on those deficiencies into the budget process. (In the intervening years, the importance of the systems function was recognized and the systems chief was now at the same level as the division chiefs, making communication possible at the same level.)

The two chiefs discussed the concept in general terms. The budget chief agreed that he needed a better process for tracking industrial base needs so that he could develop a budget that eventually would be supported by Congress. He felt that input to the budget process as it existed was too fragmented and inconsistent to support a budget.

The budget division and systems office chiefs agreed to form and co-lead a team to develop specifications for the new system. Other divisions were responsible for identifying the industrial base deficiencies, and they were asked to participate in the process. This method took longer to develop a product than just having one office do the work, but it resulted in a specification for a new system that everyone agreed with, primarily because everyone had input. Ultimately, the system was developed and put into successful operation within the directorate.

Analysis of the Cases

The implementation of the IMIS ran into several problems from the beginning. The first problem was that, for most of the 10 subsystems, the special systems team did not coordinate properly during the design process with the organizations responsible for the functions being automated. Experience has shown that the people who are doing the job and who will use the new system are the best judges of the system's merits. But the people who were doing the job were omitted from the design process!

In the case of the budget chief, this omission created resistance. It is not unusual for people to "dig in" when faced with unwanted change. As Mary Frances observed in her 1995 article in *Personnel Review,* "Organizational Change and Personal Mythology," "When we are hostile, we seek to keep things as they are even when we are aware that this is not working for us . . . It is a psychological fact of considerable significance that people who go around aggressively dilating other people's fields are likely to find themselves the targets of hostility." In the case of the budget subsystem, the chief's ideas and expertise had been snubbed by people who purported to know his business better than he did. So he refused to change until much later, when he was ready to change.

The next problem was the fact that the people who designed the system (as part of the special systems team) were not allowed to follow through on its development and implementation in the systems office. Consequently, the rationale behind the IMIS design was essentially lost. The original designer of the budget subsystem, for example, most likely would have been able to articulate the benefits of change and might have been able to persuade the budget division chief to support the automation effort.

The chief of the systems office did not have the skills needed to convince the budget division chief or upper management of the need for the budget subsystem. The new subsystem represented significant change in the way business is conducted, and implementing change requires a considerable sales job. Unfortunately, the systems chief was not a salesman, and the systems staff was too inexperienced to persuade their peers in the budget division who might have provided support for change.

Because of the original lack of coordination and the inability to communicate the need for change to a resistant and hostile manager, the budget subsystem was not implemented. Unfortunately, this had an adverse affect on the entire IMIS initiative. By allowing the budget chief to stop the implementation of the new process, upper managers sent a message that they were not really behind the IMIS. The directorate's workforce could see that management commitment was absent.

Management approval of a new technology without a strong commitment to that technology is not unusual. This is especially true if the new technology is being proposed primarily as a productivity enhancer. Increasing productivity usually is not a priority for most organizations. The primary reason for this is the press of day-to-day business, which often causes workers at all levels to feel that they do not have the time to develop new ways of doing business or—even if an acceptable new process is available—the time to learn the new way.

The success in the second case was due to the existence of conditions that were almost the opposite of those that caused the budget subsystem failure. First, the workers recognized that they needed improvements to their existing process (which was partially automated). Second, and perhaps most important, the systems team designer responsible for designing the new subsystem worked *with* the ultimate users to develop the specifications. Third, the function being automated was performed almost wholly within one branch, so any lack of support by the top directorate managers had minimal impact on the change. The branch chief was fully behind the effort and participated personally in many of the design meetings and in all of the status reviews. In this case, the managers involved were fully committed to the change.

The third case was successful for almost the same reasons as the second. However two additional factors were at work. First, the systems office and the budget division had gradually developed a level of trust since the earlier budget subsystem "battles." The systems office had supported the budget division in obtaining and learning to use new personal computer technology, the systems office chief and staff had learned how to work with and involve the user in solving problems and making improvements, and the budget division chief had decided that maybe the systems office really was trying to help.

Second, the budget chief and his workforce wanted to improve the function (the base capacity-budget interface). This time, rather than the systems office staff designing a system without outside input, a team drawn from both organizations was established to develop the specifications. The two managers found that the team could accomplish a considerable amount of coordination in a short time. This was much quicker than the old method of repeatedly preparing, staffing, commenting, and revising formal correspondence until consensus was reached. As most organizations have discovered, the use of teams speeds action and reduces bureaucratic delays.

The success of the latter two cases was due to the fact that the workers who were being asked to change were not having an unknown change forced on them. They were involved and had input into the change process. The new systems represented the users' thoughts and needs. As Frances concluded, "Our capacity to handle unwanted or imposed change is closely correlated with our belief that our reactions are understood and respected on our own terms." In both cases, workers' input was sought and their concerns carefully considered.

Lessons Learned

The systems office chief and his staff learned many valuable lessons about change from the failure described in case 1, especially when compared to the successes of cases 2 and 3—

- Planning for change must be include input from the workers who are going to be affected. This is the only way that their needs can be identified.
- The concerns and fears of workers must be addressed. They are real to the individuals who have them. Only after they are addressed will an individual be ready to accept change.
- An environment conducive to fostering change must be nurtured. This environment is marked by open, honest, two-way communication. An adversarial relationship must be avoided, or the organization will risk resistance caused by anger, not just anxiety.
- An implementation team consisting of representatives of all affected organizations is helpful in maintaining communication.
- The implementation of change will only go as far as the support of management allows. Change can happen at the grassroots level if the individuals at that level believe in it and management does not resist the change and provides at least some level of support.
- When all else fails and there are no other options, managers can take away the old technology and replace it with the new. Unfortunately, this occurred when a few clerical staff refused to use a new word-processing software that had become the Army standard. After an appropriate opportunity for transition, and in consultation with their supervisors, the old software was removed from their computers, leaving the workers no choice but to learn to use the new software to do their jobs.

Other technological changes buffeted the directorate in following years. New computers replaced the first ones (several times), new software replaced older software, and, in order to take advantage of newer technologies, new procedures replaced former processes. Problems associated with these changes still occurred, but, by using the lessons learned listed above, problems were held to a minimum. The workforce gradually became used to the continuous change and, for the most part, was able to accommodate to the different initiatives.

Managers must remember that they are susceptible to the same reactions to change as their subordinates. For affected managers involved in implementing change, it is therefore simply a matter of treating their workers as they want to be treated by their own superiors. The establishment of honest, two-way communication will facilitate the acceptance of change by the workforce and will make the managers' role as change agent a little more effective. **ALOG**

Dr. Craig C. Kuriger is an adjunct associate professor at Black Hawk College in Illinois and Matanuska-Susitna College in Alaska. A retired Department of the Army civilian, he has an M.S. degree in systems management from the Florida Institute of Technology and a Ph.D. degree in applied management and decision sciences from Walden University. He is a graduate of the National Security Management Course at the National Defense University. This article was adapted from his book, Organizational Change: Case Studies in the Real World, *published in 2005 by Universal Publishers.*

Reducing Solid Waste in Contingency Operations

by Stephen D. Stouter, Joseph Bost, and James F. Lee

U.S. Army Europe is using a new composting system to improve management of solid waste. The results are increased Soldier safety and a better quality of life in the field.

Armies around the globe have always had to deal with the problem of solid waste. Today, a large percentage of the Army's solid waste is packaging materials (such as cardboard, paper, and plastic), waste food, and sewage sludge. While much of the solid waste generated at base camps is biologically degradable, it presents significant waste management challenges for the Army. This is a particular concern when the Army operates in countries that have few, if any, modern waste disposal facilities.

During the last 2 years, the U.S. Army Europe (USAREUR) Engineer Support Operations Office tested a commercially available composting system that converts up to 85 percent of the putrescible waste (waste that decomposes and becomes putrified) generated at base camps into a usable product. This system also greatly reduces pathogens and minimizes odors and bio-aerosol emissions. The compost produced by the system can be used in a variety of ways, including erosion control, soil amendment, or application to agricultural, forest, or reclaimed mined lands. [A soil amendment is material added to soil to improve the soil's physical properties, such as its ability to retain water or drain.]

Solid Waste Management Challenges

When contingency operations base camps are established initially, solid waste landfills normally are not available and solid waste is usually taken to a burn box to be incinerated using diesel fuel. The incineration process requires approximately 1 gallon of fuel for each cubic meter of waste and reduces the volume of waste by approximately 80 to 90 percent. The residual materials (for example, ash and incompletely burned solid waste) then must be transported to some other location for disposal.

However, many local waste disposal sites are burial pits or excavation sites, and most of them lack liners, daily cover, run-off controls, or other modern techniques used for managing sanitary landfills. These disposal site conditions present another set of significant environmental problems, such as toxic leachate,

A crew sets up the AGILE Flex system. They place aeration tubes on the ground before dumping waste heap on top of the tubes. The semipermeable membrane cover is seen on top of the green ISO shipping container, which also houses blower fans, a computer, and office space.

vector attraction, and even greenhouse gas creation. [Vector attraction refers to the characteristic of sewage sludge to attract rodents, flies, mosquitoes, or other organisms capable of transporting infectious agents.]

The process of burning solid waste, including wastes with low BTU values such as dining facility and other organic or wet waste, creates other problems. [A "BTU" is a "British thermal unit" and equals the amount of heat required to raise the temperature of 1 pound of water by 1 degree Fahrenheit. The BTU often is used in the United States to describe the heat value of fuels.] The burning waste emits toxic, acrid smoke, which has caused military personnel to complain about eye and lung irritation. At Camp Bondsteel in Kosovo, Soldiers have sent numerous complaints up the chain of command about smoke produced by incinerators.

Since troop safety is a vital concern, it is critical to treat solid waste and sewage sludge effectively. Soldiers' safety and quality of life are enhanced by reducing pathogens associated with sewage sludge and reducing the amount of solid waste burned. It also is essential to minimize the volume and toxicity of solid waste disposed of at land disposal sites that lack modern environmental controls. The USAREUR Engineer Support Operations Office has tested different methods to improve solid waste management during contingency operations and thereby reduce long-term environmental liabilities and risks.

A New Composting System

The practice of burning solid waste ended at Camp Bondsteel in October 2005. The USAREUR Engineer Support Operations Office, along with the German firm COMP–ANY GmbH and Kellogg Brown & Root (KBR), now are using composting combined with recycling and landfill disposal. After successful pilot program testing during 2004 and 2005, a full-production mobile aerated static heap composting system was deployed at Camp Bondsteel in September 2005.

The new commercial system, AGILE Flex, incorporates semipermeable membrane technology that—

- Mitigates the effects of extreme weather on composting.
- Accelerates the natural composting process.
- Minimizes manpower costs.
- Allows composting to occur within the confines of a small base camp because the system reduces odors and vector attraction by more than 90 percent.

Odors are reduced by the scrubbing effect of the semipermeable GORE–TEX membrane cover, which also blocks vectors.

Currently, the Camp Bondsteel Directorate of Public Works and KBR manage and compost solid waste consisting of sewage sludge, dining facility waste, wood chips, shredded cardboard, paper, and hay. These ingredients are mixed and placed in a heap over air feeder aeration tubes that extend from a standard ISO [International Organization for Standardization] shipping container. A GORE–TEX fabric cover is placed over the heap and held to the ground with a water-filled fire hose. Temperature- and oxygen-monitoring probes are inserted through the cover into the heap to record temperature and oxygen data. Blower fans, controlled by a computer located in the ISO container, force air into the heap based on real-time feedback from the probes.

Waste heap is placed on top of the aeration tubes, and the cover is laid over the heap. Temperature- and oxygen-monitoring probes are installed in the heap through the cover.

The finished compost in this photograph was used as soil amendment in erosion-control projects at Camp Bondsteel.

Over 1,000 boxes of sewage sludge are stockpiled at Camp Bondsteel in Kosovo. All of the sewage sludge in this photo was composted during the early days of the pilot study in 2004.

During the initial 3-week processing period, bacterial activity is controlled as the computer automatically adjusts the air flow to maintain optimum temperature and oxygen levels in the heap. Internal compost temperatures easily reach 150 to 165 degrees Fahrenheit. After the initial 3-week period, the compost heap is uncovered and moved to the opposite side of the ISO container. The heap then is treated using the same procedure for an additional 3 weeks. After the total 6-week period, the compost is ready to be tested and used for soil amendment.

The AGILE Flex system has shown excellent results by minimizing pathogens and other problems created by solid waste in contingency operations. The AGILE Flex system increases composting efficiency by using cardboard and paper waste generated by the base population to balance the carbon-to-nitrogen ratio in the heap. This is critical to the successful composting of waste with a high nitrogen content, such as sewage sludge and food or catering waste.

Composting will reduce fuel costs associated with burning solid waste. In the past, the Army paid $65,000 for 1 year's worth of JP–8 fuel used as an accelerant to burn waste. Because of composting, that entire expense will no longer be necessary. The USAREUR Engineer Support Operations Office estimates that composting also will require fewer man-hours of labor. After successfully treating 100 percent of the sewage sludge and dining facility waste generated by two base camps in Kosovo during 2004 and 2005, the Engineer Support Operations Office firmly believes that this composting process will lead the Army into the next generation of solid waste management systems for contingency operations.

The AGILE Flex treatment system has proven to be a powerful solid waste management tool through its simplicity, reduced operating costs, reliability in all weather conditions, and short processing time for the treatment. More importantly, this system enhances force protection by reducing the need to use Soldiers to transport or escort solid wastes to off-site waste disposal areas. Because of its compact (ISO container), mobile, and self-contained characteristics, this innovative system is especially beneficial in contingency operations. The ability of this system to treat large amounts of solid waste successfully on site within a short time period increases its value to the Army's mission. ALOG

Stephen D. Stouter is a program manager in the Afghanistan Engineer District, Army Corps of Engineers, in Kabul, Afghanistan. He has a B.S. degree from Middle Tennessee State University.

Joseph Bost is the Chief of the Engineer Support Operations Office, Office of the Deputy Chief of Staff, Engineer, at U.S. Army Europe. A retired lieutenant colonel, he holds a B.S. degree from Troy University and an M.S. degree from the University of Southern California and is a graduate of the Army Command and General Staff College.

James F. Lee is an environmental management officer in the Engineer Support Operations Office, Office of the Deputy Chief of Staff, Engineer, at U.S. Army Europe. He has a degree in energy and environmental management from City University in Washington.

ALOG NEWS

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COSCOM TRANSFORMS TO THEATER SUSTAINMENT COMMAND

The 1st Corps Support Command (COSCOM) was inactivated on 18 April at Fort Bragg, North Carolina, marking the end of nearly 34 years of logistics support to the XVIII Airborne Corps and Fort Bragg. The same occasion marked the activation of the 1st Theater Sustainment Command (TSC).

Brigadier General Kevin A. Leonard, the 1st COSCOM commanding general, and Command Sergeant Major Luis Lopez, the 1st COSCOM command sergeant major, were joined by Lieutenant General John R. Vines, the commander of the XVIII Airborne Corps, in furling the 1st COSCOM colors.

Lieutenant General Steven Whitcomb, commander of Third U.S. Army and Army Central Command (CENTCOM), joined Leonard and Lopez in unfurling the colors of the 1st TSC. The 1st TSC is the first such command to exist in the Active Army. "We're going from several thousand Soldiers down to about 400," said Colonel Ferdinand Samonte, 1st TSC chief operations officer. "There's no manual or doctrine on being a theater sustainment command," he said. "[Young Soldiers] . . . will be at the forefront of Army change."

Logisticians of the 1st TSC do not support the XVIII Airborne Corps and Fort Bragg as 1st COSCOM had done since 1972. Instead, they will, when deployed, supervise, observe, and contribute knowledge to other logistics units deploying to the CENTCOM theater of operations. The CENTCOM theater is under the control of the Third Army from Fort McPherson, Georgia. Its troops are stationed in Afghanistan, Egypt, Israel, Iraq, Kuwait, Qatar, Saudi Arabia, Uzbekistan, and other Middle Eastern nations.

Other former 1st COSCOM units at Fort Bragg, such as the former 46th Corps Support Group and the Corps Distribution Command, also were inactivated as part of the transformation. Now, most logistics support is provided to the XVIII Airborne Corps by the 507th Corps Support Group, which will continue under the 1st TSC until it becomes an independent corps asset in October.

The most conspicuous change resulting from the transformation is that 1st TSC Soldiers do not wear the maroon berets worn by the Soldiers of airborne units because, unlike the former 1st COSCOM, the 1st TSC does not have airborne status. Instead, the 1st TSC Soldiers wear the standard black beret worn by most Soldiers throughout the Army.

TWO DEFENSE CONFERENCES SLATED

The American Defense Acquisition and Procurement Transformation (ADAPT) 2006 Conference will be held 18 and 19 July at the Westin Arlington Gateway in Arlington, Virginia. The conference will address efforts to transform Department of Defense acquisition and procurement business systems into an accountable, integrated, end-to-end supply chain. To register on line or view a list of prospective speakers, visit the conference Web site, www.adapt2006.com.

Defense Finance 2006 will be held 17 to 20 July 2006, also at the Westin Arlington Gateway in Arlington. This conference is a senior-level forum for the exchange of ideas, best practices, and lessons learned that will facilitate the efficient transformation of financial operations in support of the warfighter. For more information and to register on line, visit the conference Web site, www.defensefinanceusa.com.

NEW PROGRAM PARTNERSHIP LINKS GTN AND IDE

The U.S. Transportation Command (TRANSCOM) and the Defense Logistics Agency (DLA) recently established a new program office that unites TRANSCOM's Global Transportation Network (GTN) program and DLA's Integrated Data Environment (IDE) initiative. This partnership will increase logistics information sharing throughout the Department of Defense (DOD) by integrating defense supply chain-, logistics-, transportation-, and distribution-related data and information technology services. The new program office unifies IDE and GTN logistics, distribution, and transportation visibility efforts. Its goal is to eliminate redundancy, streamline access to data, and optimize resources.

Partnering the two programs will provide common integrated data services to assist with the development of applications that will give com-

batant commands, the services, DOD, and other Federal agencies a cohesive solution for managing supply chain, distribution, and logistics information. It will provide a single point of systems data integration between TRANSCOM and DLA and with other systems; ensure consistent access to common, authoritative logistics data; and provide reliable information for TRANSCOM, DLA, and their customers.

To smooth the integration process, both programs have been placed under a single program executive officer at DLA. The program manager is an Army officer assigned to TRANSCOM.

2006 COMBINED LOGISTICS EXCELLENCE AWARDS PRESENTED

The Chief of Staff of the Army recognized top logistics performers at the second annual Combined Logistics Excellence Awards ceremony on 18 May. The awards presented were the Deployment Excellence Award, the Army Award for Maintenance Excellence, and the Supply Excellence Award.

The **Deployment Excellence Award** winners are—

Operational Deployment

Small Unit. B Company, 1–35 Armor Battalion, 1st Armored Division, Aschaffenburg, Germany.

Large Unit. 426th Brigade Support Battalion, 101st Airborne Division (Air Assault), Fort Campbell, Kentucky.

Active Army

Supporting Unit. 832d Transportation Battalion, Jacksonville, Florida.

Small Unit. 305th Quartermaster Company, Yongsan, Korea.

Large Unit. 40th Signal Battalion, Fort Huachuca, Arizona.

Army National Guard

Supporting Unit. Joint Force Headquarters-Florida, St. Augustine, Florida.

Small Unit. D Company, 113th Aviation Regiment, Reno, Nevada.

Large Unit. 1st Battalion, 151st Infantry Regiment, Indianapolis, Indiana.

Army Reserve

Supporting Unit. Headquarters and Headquarters Company, Army Civil Affairs and Psychological Operations Command, Fort Bragg, North Carolina.

Small Unit. 828th Quartermaster Company, Wilkes-Barre, Pennsylvania.

Large Unit. 483d Transportation Battalion, Vallejo, California.

All Army

Installations. Fort Hood, Texas.

The **Army Award for Maintenance Excellence** winners are—

Active Army Modification Table of Organization and Equipment (MTOE)

Small Unit. Headquarters and Headquarters Detachment, 728th Military Police Battalion, Camp Walker, Korea.

Medium Unit. 297th Transportation Company, Fort Hood, Texas.

Large Unit. 5–52 Air Defense Artillery Battalion, Fort Bliss, Texas.

Active Army Table of Distribution and Allowances (TDA)

Small Unit. Maintenance Activity Vilseck, Germany.

Medium Unit. 58th Transportation Battalion, Fort Leonard Wood, Missouri.

Large Unit. Maintenance Activity Kaiserslautern, Germany.

Army National Guard MTOE

Small Unit. 540th Quartermaster Company, Lenoir, North Carolina.

Medium Unit. 1454th Transportation Company, Concord, North Carolina.

Army Reserve MTOE

Small Unit. Headquarters and Headquarters Detachment, 213th Quartermaster Battalion, Wausau, Wisconsin.

Medium Unit. 354th Medical Company, Seagoville, Texas.

Large Unit. 643d Area Support Group, Whitehall, Ohio.

The winners of the **Army Supply Excellence Award** are—

Active Army

Company, Battery, Troop, Detachment. 82d Airborne Division Band, Fort Bragg, North Carolina.

Battalion, Squadron. 58th Signal Battalion, Okinawa, Japan.

Small TDA Unit. Headquarters Operations Company, 527th Military Intelligence Battalion, Camp Humphreys, Korea.

Large TDA Unit. Maintenance Activity Mannheim, Germany.

Property Book. 58th Signal Battalion, Okinawa, Japan.

Supply Support Activity (SSA) MTOE. 26th Quartermaster Supply Company, Hanau, Germany.

SSA TDA. Aviation Center Logistics Command, Fort Rucker, Alabama.

Army National Guard

Company, Battery, Troop, Detachment. Headquarters and Headquarters Detachment, 733d Quartermaster Battalion, Delavan, Illinois.

Battalion, Squadron. 43d Army Band, Lincoln, Nebraska.

Small TDA Unit. 209th Regional Training Institute, Camp Ashland, Nebraska.

Property Book. Joint Force Headquarters-Jackson, Mississippi.

SSA TDA. U.S. Property and Fiscal Office, Supply and Services Division (Joint Force Headquarters), Springfield, Illinois.

Army Reserve

Company, Battery, Troop, Detachment. Headquarters and Headquarters Company, 353d Civil Affairs Command, Staten Island, New York.

Battalion, Squadron. Headquarters and Headquarters Company, 412th Civil Affairs Battalion, Whitehall, Ohio.

Small TDA Unit. Reserve Support Detachment-South, Vicenza, Italy

Large TDA Unit. Equipment Concentration Site 66, Fort Leonard Wood, Missouri.

Property Book. 643d Area Support Group, Whitehall, Ohio.

SSA TDA. 854th Quartermaster Company, Logan, Utah.

NATICK WORKING ON SAFE ALTERNATIVE TO SYNTHETIC FABRICS

The Natick Soldier Center (NSC) at the Army Soldier Systems Center, in cooperation with the American Sheep Industry Association and the American Wool Council, is developing a family of woolen, flame-resistant woven and knitted fabrics. The new fabrics may prove to be a safe replacement for synthetics such as polyester and nylon, which melt when exposed to flame. The synthetic fabrics are popular because of their perspiration-wicking properties.

The Marine Corps recently banned the wear of clothing made of synthetic materials by troops conducting operations in Iraq. The ban was prompted by serious burn injuries sustained when Marines and Soldiers were exposed to heat and flames. In some cases, their clothing melted and fused with their skin, compounding already serious injuries.

According to NSC textile technologist Carole Winterhalter, the woven fabrics being developed will be suitable for combat uniforms and other protective clothing. The new, washable fabrics will provide a low-cost alternative to existing military flame-resistant fabrics and offer flame and camouflage protection, she said. The woven fabrics are scheduled to be available to Soldiers later this year.

A flame-resistant knitted fabric made of 50 percent wool and 50 percent aramid is also under development for use in manufacturing underwear, hand wear, and headwear. (Aramid is a strong, fire-resistant fiber that is commonly known by its DuPont trade name, Kevlar.) Adding wool to aramid will increase comfort while maintaining the thermal protection provided by 100-percent aramid fabric. The blend will also cost less than the aramid fabric alone.

DDC THEATER CONSOLIDATION AND SHIPPING POINT OPENS IN KUWAIT

In February, the Defense Logistics Agency's (DLA's) Defense Distribution Center (DDC) opened a theater consolidation and shipping point (TCSP) at Camp Arifjan, Kuwait. The TCSP's staff of military, civilian, and contractor personnel will consolidate and segregate shipments from multiple sources and prepare them for shipment directly to customers.

DDC's presence in Southwest Asia began with a request from the U.S. Central Command (CENTCOM) for DLA to provide wholesale distribution support in theater in order to reduce customer wait time and transportation costs and improve overall readiness. In December 2002, DDC established a forward site in Bahrain to pre-position items needed during Operations Enduring Freedom and Iraqi Freedom. That site was able to avoid spending more than $30 million dollars in transportation costs in 1 year of operation.

CENTCOM requested a permanent DLA distribution facility in Kuwait in 2003. This was accomplished using a three-phased approach that began in May 2004 with dedicated support of shipments from DDC's distribution facility in Germany. In September of that year, DLA established an interim contingency contract

operation in Kuwait, which became operational when DDC activated the Defense Distribution Depot Kuwait, Southwest Asia, or DDKS. After open competition, a contract was awarded in August 2005 to Public Warehousing Company. Since the DDKS opened, DDC's total cost avoidance for air transportation is more than $290 million.

With the recent installation of the Distribution Standard System (DSS), the TCSP is now providing greater in-transit visibility of cargo, allowing DDC to further streamline processes and improve support to theater customers.

A welder with the 503d Maintenance Company disassembles an old combat lock on a humvee door at Forward Operating Base Falcon. He will replace it with a new combat lock with a single-action mechanism that allows the door to be opened with one motion.

FLY-AWAY TEAMS TRAVEL SO CUSTOMERS DON'T HAVE TO

A "fly-away team" from the 503d Maintenance Company's automotive platoon recently demonstrated the ability of mobile maintainers to take service to customers in the field. The seven-member team deployed from the platoon's usual facilities at Logistics Base Seitz in Iraq to Forward Operating Base Falcon to add new combat locks and gunner restraints to high-mobility, multipurpose wheeled vehicles (humvees) of the 4th Brigade Combat Team (BCT), 4th Infantry Division. The fly-away team taught 4th BCT mechanics how to install the upgrades while helping to reduce their workload.

Customers usually have to travel to the location of their supporting maintenance personnel to obtain equipment enhancements, thereby putting their vehicles and crews at risk from attacks while in transit. The use of fly-away teams spares customers from the dangers that can be encountered in traveling on Iraqi roads. As the team's noncommissioned officer in charge, Staff Sergeant John Mickens, commented, "The benefit of fly-away teams is that the customer doesn't have to go into harm's way to get safety upgrades. We come to them and it's easier for them." Bringing the teams to customers also reduces the time that vehicles awaiting upgrades are idle.

Additional fly-away teams work on Forward Operating Bases Prosperity, Rustamiyah, and Iskan, with a team scheduled to work at Mahmudiyah in the future.

A Soldier installs a gunner's harness bracket on a humvee. This gunner restraint keeps the Soldier from being ejected from the vehicle during a rollover or sudden stop.

AUTOMATED SYSTEM FOR MANAGING SUPPORT AGREEMENT UNVEILED

The Joint Staff and the U.S. Joint Forces Command (JFCOM) have implemented a new Web-based system for tracking bilateral logistics support agreements between the United States and allied nations. The ACSA [acquisition cross-servicing agreements] Global Automated Tracking and Reporting System (AGATRS) allows the Joint Staff, combatant commands, and service component to improve visibility and management of ACSAs.

While the United States has executed ACSAs with other nations since the 1980s, no system existed to manage the agreements. The need for an ACSA management system became clear from experiences early in Operation Iraqi Freedom (OIF). According to Karl Speights of JFCOM, "Coming out of [OIF], we learned that logistics visibility was poor and components going into OIF were not fully trained on the ACSA program. They didn't fully understand how to use the ACSA to exchange supplies and services with coalition partners."

ACSAs permit the United States to trade with other nations for logistics support, supplies, and services using equal exchanges, replacements in kind, or cash payments. Speights observed, "In many ways, ACSAs promote our working better together as coalition partners. It helps us reduce our logistics footprint because, if we can count on another nation to provide something, we don't necessarily have to bring that capability with us."

AGATRS incorporates a large library of ACSA data, advanced reporting capabilities that can be customized by the user, transaction histories, and cross-references to other supply and financial systems.

Development of AGATRS began in 2004, and a test version was available last November. JFCOM is now training service personnel to use the system.

DOD EMALL USERS GROUP FORMED

Department of Defense (DOD) EMALL customers now have a group to represent them and provide input about customer needs and issues to the Defense Logistics Agency's Defense Logistics Information Service. The group will meet quarterly to assess DOD EMALL's current capabilities, to identify user interface concerns and system problems, propose new system functions, and address specific user issues. The first group meeting in Charleston, South Carolina, in late February included representatives from a variety of Federal agencies and military services.

The group was established at the request of the Joint Requirements Board (JRB), the DOD-led group that oversees DOD EMALL system requirements. Its goal is to ensure that DOD EMALL is the system of choice for obtaining goods and services to meet specific customer needs.

"The user's group membership should consist of actual users from all organizations with different roles within EMALL–shoppers, orderers, [and] supervisors," said Diana Robinson of the Defense Logistics Information Service DOD EMALL program office. "We want . . . the group to have balanced representation."

User group members can use JIRA software—an issue-tracking and project-management application—to record new system issues and add comments on existing issues. The issues will be reviewed and prioritized by the DOD EMALL program managers. Proposed system changes will be forwarded to the JRB for review and funding prioritization.

For information on contacting organizational representatives in the users group or to volunteer as a representative, call (269) 961–5539 or (703) 767–1497 or send an email to diana.robinson@dla.mil or vicki.christensen@dla.mil.

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