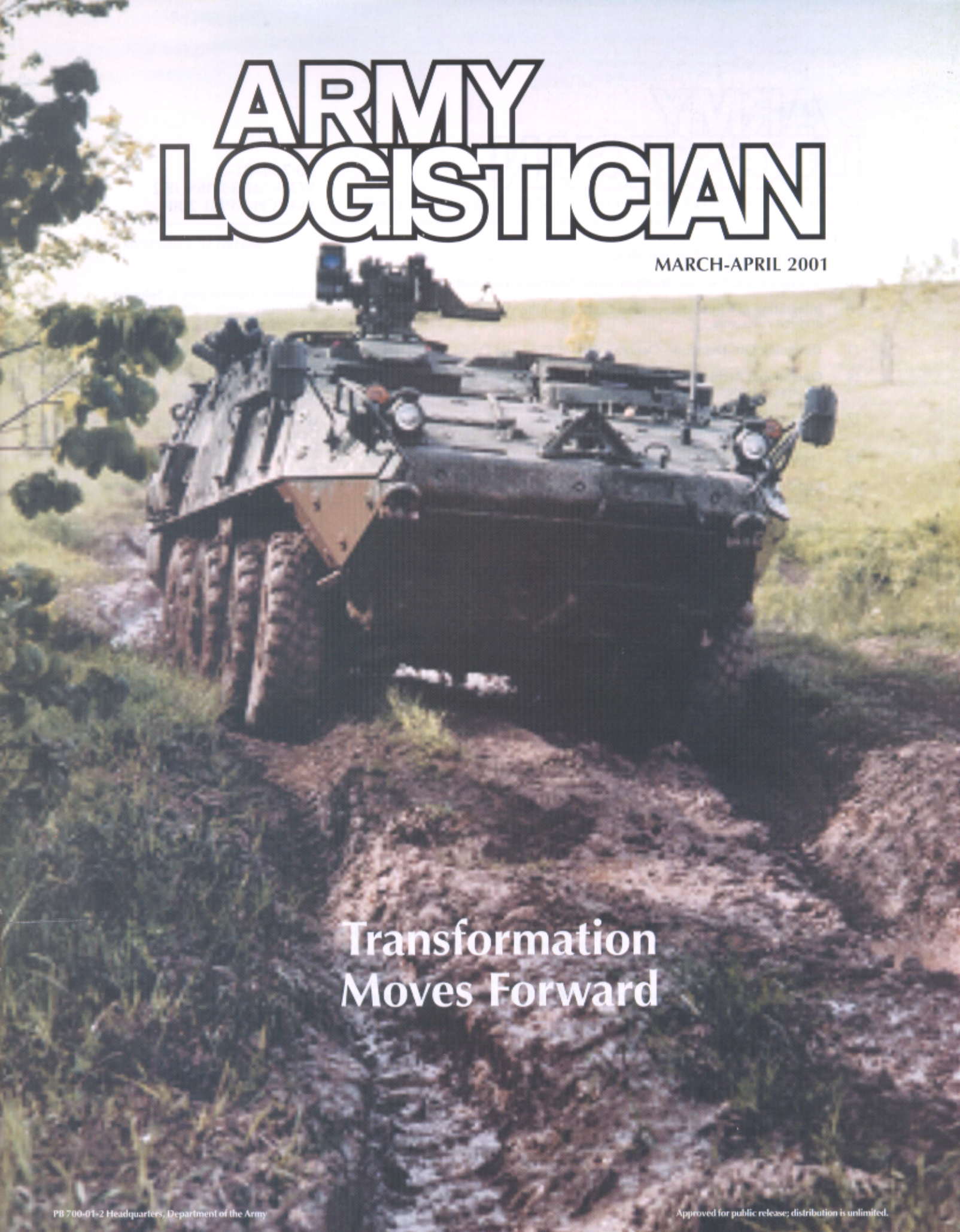

ARMY LOGISTICIAN

MARCH-APRIL 2001

Transformation Moves Forward

PB 700-01-2 Headquarters, Department of the Army

ARMY LOGISTICIAN

PROFESSIONAL BULLETIN OF UNITED STATES ARMY LOGISTICS

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ARTICLES

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COVER

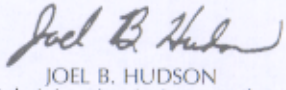
Army officials have announced plans to procure wheeled interim light armored vehicles (LAV's) for the Army's transformation (see article on page 1). The LAV is a major step in building the 21st century Army's Objective Force. Other articles in this issue, such as "Designing Out Demand" on page 11 and "Computing Requirements for a Changing Army" on page 21, discuss developments that may assist in the Army's evolution to 21st century logistics.

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

By Order of the Secretary of the Army:

ERIC K. SHINSEKI
General, United States Army
Chief of Staff

Official:



JOEL B. HUDSON
Administrative Assistant to the Secretary of the Army
00034901

Coming in Future Issues—

- War on a Shoestring
- Integration of System Contractors
- Aviation Support at the NTC
- The Critical Determinants in How We Fight a War
- Contractors in British Logistics Support
- Do We Need the Panama Canal?
- Providing Unified Support in the United Kingdom
- Supporting an NTC Rotation
- Role of the Division MMC at the NTC
- The Army Branch Detail Program
- Revising Army Supply Manuals
- Army Special Operations Support Command
- Streamlining Mobilization and Integration of the Reserves

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ALOG NEWS

ARMY UNVEILS INTERIM ARMORED VEHICLES

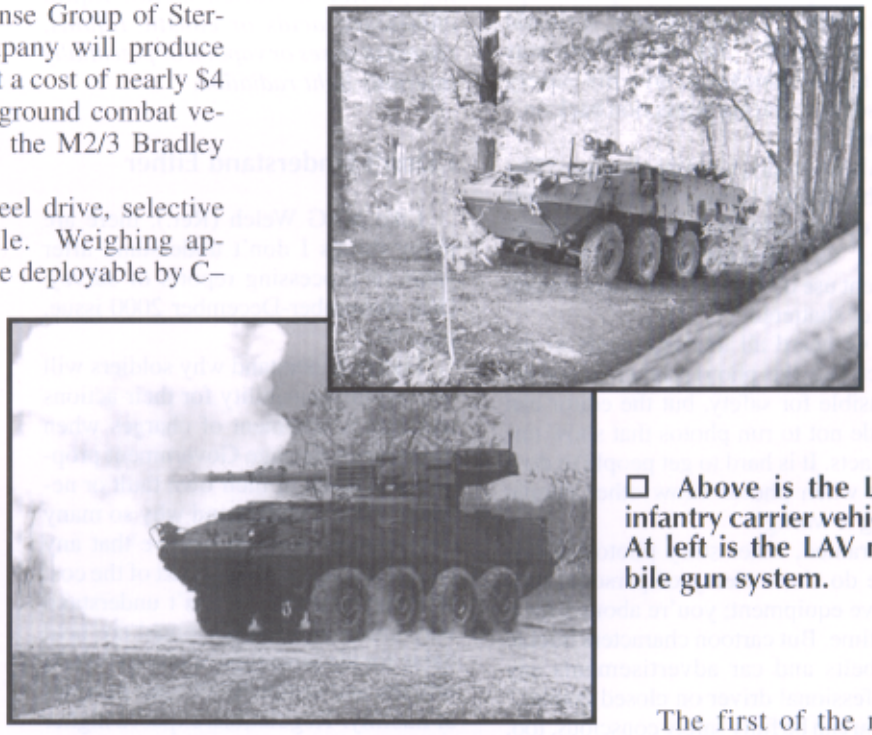
In November, Army officials announced plans to procure a family of wheeled interim armored vehicles for the Army's transformation. A contract to produce the new ground combat vehicles, called light armored vehicles (LAV III's), was awarded to General Motors General Dynamics Land Systems Defense Group of Sterling Heights, Michigan. The company will produce 2,131 LAV's over the next 6 years at a cost of nearly $4 billion. The LAV is the first new ground combat vehicle the Army has procured since the M2/3 Bradley fighting vehicle in 1980.

The LAV is a full-time four-wheel drive, selective eight-wheel drive, armored vehicle. Weighing approximately 19 tons, the LAV will be deployable by C–130 and larger aircraft. It will have a maximum speed of 62 miles per hour and a range of 312 miles on a tank of fuel. LAV's will give the new brigades a reduced logistics footprint and make the units cheaper to operate than today's heavy brigades.

The LAV will be manufactured in two major variants: the infantry carrier vehicle and the mobile gun system. Eight different configurations of the infantry carrier will be used as scout, support, and command vehicles. The infantry carriers will have armor protection all around that will stop 50-caliber bullets and protect against 152-millimeter airburst shells. The LAV's will run quieter than the current armored personnel carriers, increasing their "stealth." The mobile gun system will be equipped with a 105-millimeter cannon, the same gun tube as used on the original M1 Abrams tank.

The tires of the LAV's can be inflated or deflated from inside the vehicles to make them safer for different surfaces. The vehicles have built-in fire suppression systems and self-recovery winches.

The LAV's Caterpillar engine is common to the Army's family of medium tactical vehicles, which means some of the same repair parts can be used. According to Lieutenant General Paul J. Kern, military Deputy Assistant Secretary of the Army for Acquisition, Logistics, and Technology, "commonality of equipment reduces the brigade's logistical footprint and support costs and makes the entire vehicle fleet easier to maintain."



☐ Above is the LAV infantry carrier vehicle. At left is the LAV mobile gun system.

The first of the new LAV's should be fielded in fiscal year 2002. The contract's first iteration calls for enough LAV's to equip the first interim brigade combat team at Fort Lewis, Washington. The contract's 6 option years should produce enough LAV's to equip the first 6 brigade combat teams with more than 300 LAV's each.

"This is a win for the U.S. Army's soldiers," said Kern. "It is a first major step in our transformation to that 21st century Army, in the building of the Objective Force. It provides us capabilities which we have not had in the United States Army and will bring us a long way to developing the organizations and the operational and doctrinal steps as we move forward into the 21st century."

(News continued on page 44)

NEWS

(News continued from page 1)

DOD ANNOUNCES NEW ACQUISITION POLICIES

The Department of Defense (DOD) is changing the way it develops and procures future weapon and information systems. Dr. Jacques S. Gansler, Under Secretary of Defense for Acquisition, Technology, and Logistics, announced new policies to modernize the way the DOD does business and focus on obtaining technology that performs better, is more affordable, and can be delivered to the warfighter faster.

The new policies apply to all aspects of the research, development, production, deployment, and logistics support of DOD systems. They establish an environment in which requirements can be more flexible and allow for reasonable, thoughtful tradeoffs between cost and performance.

The new policies are intended to shorten the chain of command and provide program managers the ability to use more cost-effective approaches to acquisition. As a result, systems will proceed through development more rapidly and warfighters will acquire improved capabilities in far less time.

The policies also place increased emphasis on interoperability; give priority consideration to the use of commercial products, services, and technologies to meet DOD requirements; stress the benefits of competition to innovation and cost reduction; and emphasize integrating logistics and systems acquisition to produce more reliable systems and maintain them in a more timely and cost-effective way.

The new policies are spelled out in DOD Directive 5000.1, The Defense Acquisition System; DOD Instruction 5000.2, Operations of the Defense Acquisition System; and DOD Interim Regulation 5000.2R, Mandatory Procedures for Major Defense Acquisition Programs (MDAP's) and Major Automated Information System (MAIS) Acquisition Programs. Copies of these documents and related information are available on the Acquisition Resources and Analysis website at http://www.acq.osd.mil/ara; on the Acquisition Reform website at http://www.acq.osd.mil/ar; and in the DOD Acquisition Deskbook, an internet-based reference document used by DOD's acquisition work force.

MULTICAPABLE MECHANICS ENTER FIELD

The Army's first fully trained multicapable maintainers (MCM's) have been assigned to support the first digitized division (the 4th Infantry Division) at Fort Hood, Texas. Although the Total Army Personnel Command is placing priority on filling vacancies in Force XXI units, other units throughout the force also are acquiring some of these more capable, more flexible mechanics.

Graduates of the first advanced individual training classes for Abrams tank mechanics (military occupational specialty [MOS] 63A) and Bradley fighting vehicle mechanics (MOS 63M) began entering the field in September 2000. The MCM with a 63A MOS is qualified to perform all organizational maintenance tasks on M1 Abrams tank systems that were previously the responsibility of soldiers with MOS's 45E (M1A1 Abrams tank turret mechanic) and 63E (M1 Abrams tank system mechanic). They also can perform several forward, on-system direct support maintenance tasks currently performed by soldiers with MOS's 45K (armament repairer) and 63H (track vehicle repairer); these tasks generally involve replacement of hull and turret components that otherwise would cause the tank to be evacuated for repair.

The MCM with a 63M MOS can perform all organizational maintenance tasks on M2/3 Bradley fighting vehicles that previously were the responsibility of soldiers with MOS's 45T (Bradley fighting vehicle system turret mechanic) and 63T (Bradley fighting vehicle system mechanic) and various forward, on-system direct support maintenance tasks (mostly hull tasks) on M2/3 Bradleys that currently are performed by 45K and 63H personnel.

A supplement to the new general mechanics tool kit, consisting of seven tool sets from the A12 artillery and turret mechanic tool kit, has been developed to eliminate the need for MCM's to carry separate tool kits for turret and hull repairs. It should be available in the third quarter of this fiscal year.

FIRST CHEMICAL DISPOSAL FACILITY COMPLETES WEAPONS DESTRUCTION

The Army's chemical demilitarization program passed a milestone with the completion of chemical weapons disposal at Johnston Atoll in the Pacific. The last of 13,302 VX landmines stored at Johnston was destroyed on 29 November 2000, ending a 10-year disposal effort on the island.

The Johnston Atoll Chemical Agent Disposal System was the Nation's first fully integrated facility de-

signed to dispose of chemical weapons. Chemical munitions were stored at Johnston beginning in 1971, and construction of the disposal facility began in 1985. Since the facility began operating in 1990, over 400,000 rockets, projectiles, bombs, mortars, ton containers, and mines have been destroyed. These munitions have contained 2,031 tons of chemical agents, including VX, the nerve agent GB (also known as Sarin), and the blister agent HD. The Johnston Atoll stockpile constituted 6 percent of the Nation's total chemical munitions stockpile.

The Army expects to close the Johnston Atoll facility in 3 years, following the destruction of secondary wastes generated during the disposal process and chemical agent identification kits shipped from Guam.

Disposal of the Army's chemical stockpile continues at sites in the continental United States. The Tooele Chemical Agent Disposal Facility in Utah has been operating since 1996. The disposal facilities at Anniston, Alabama, and Umatilla, Oregon, are scheduled to begin operations in 2002; Pine Bluff, Arkansas, in 2003; and Edgewood (Aberdeen Proving Ground), Maryland, and Newport, Indiana, in 2004. Construction of the projected facilities at Blue Grass, Kentucky, and Pueblo, Colorado, is on hold.

☐ The Johnston Atoll Chemical Agent Disposal System is located on an island 825 miles southwest of Hawaii.

TEST EQUIPMENT INSTALLED IN LAV'S

Technicians from Tobyhanna Army Depot, Pennsylvania, installed communications equipment in light armored vehicles (LAV's) that the Army borrowed from Canada, Germany, and Italy for use by the first interim brigade combat team (IBCT) in Fort Lewis, Washington. The technicians installed antennas, antenna cables and mounts, power and communication cables, and racks and shelves to be used with command and control, communications, computers, intelligence, surveillance, and reconnaissance systems in the Canadian vehicles. Different installation sets were placed in the German and Italian LAV's, so the Army can compare the performance of each system with the others. These vehicles will be used while the Army determines what type of LAV and equipment will best suit IBCT needs.

Since the vehicles have to be returned in the same condition in which they were received, the technicians had to mount the equipment using the existing vehicle mounting points without drilling, cutting, or welding.

ON-LINE RESOURCE LOCATOR HELPFUL

The Logistic Toolbox resource locator is a searchable website maintained by the Defense Logistics Agency's Defense Logistics Information Service and the Navy's Standard Automated Logistics Tool Set Program Office. It contains dozens of links to logistics information systems that are cataloged by service and function. The site also identifies links to other information, such as weather, geography, and medical and political resources, that may affect the logistics community's ability to support customers. Users can learn to use the Logistic Toolbox by clicking on the self-paced "Training Wizard" provided on the website. If on-site training is preferred, users can call (616) 961–4829 or DSN 932–4829 or send an e-mail to logtool@dlis.dla.mil.

CONTRACT INITIATIVE SPEEDS SYSTEM DEVELOPMENT

The Army and the Parametric Technology Corporation have expanded the upgrade provision of the Army Enterprise Agreement for the Pro/ENGINEER (Pro/E) to include Parametric Technology's Flexible Engineering Package. This will enable Army Pro/E users to purchase a productivity-enhancing software tool at substantial discounts from General Services Administration Schedule costs.

The Army Enterprise Agreement for the Pro/E was negotiated by the Product Manager for the Small Computer Program (PM–SCP), at Fort Monmouth, New Jersey, in response to an Army Materiel Command (AMC) directive. This directive was the result of an initiative to provide Army activities with a contract vehicle for acquiring state-of-the-art software tools. The agreement is structured so that all provisions are open for use by authorized Army support contractors as long as the software in question is installed, maintained, and used within

Federal facilities for the sole purpose of supporting Army programs.

The Pro/E suite of design automation software is a premier computer-aided design/computer-aided manufacturing (CAD/CAM) package used extensively by engineering personnel within the Government, industry, and academia. Army users of this CAD/CAM package include AMC laboratories and research, development, and engineering centers, Army depots and ammunition activities, Army Corps of Engineers laboratories, Army Test and Evaluation Command activities, the National Ground Intelligence Center and the Military Traffic Management Command Transportation Engineering Agency.

The Army Enterprise Agreement for the Pro/E, including complete instructions for ordering, is available at http://pmscp.monmouth.army.mil/contracts/p-eds/p-eds.htm. For more information about the enterprise agreement or to arrange for a presentation by Parametric Technology, call (703) 617–5809 or send an e-mail to enidhiry@hqamc.army.mil.

ARMY UNIVERSITY ACCESS ONLINE OPENS TO SOLDIERS

A new Army program gives soldiers the opportunity to continue their education using Internet technology. This initiative—Army University Access Online—will empower eligible soldiers to obtain college degrees or professional technical certifications using notebook computers and on-line courses while they serve in the Army. Soldiers signing up for the program will receive a free technology package consisting of a laptop computer, printer, Internet service provider, and access to a technology service help desk. The laptop and printer become the soldier's personal property once he has completed 12 credit hours within a 2-year window. Course tuition and books are free.

The Department of the Army awarded a $453 million contract in December to PricewaterhouseCoopers to provide distance education for an estimated 80,000 soldiers over the next 5 years using the latest technologies and quality on-line learning experiences. The contract unites

☐ The deployment of the 2d Brigade, 101st Airborne Division (Air Assault) by train from Fort Campbell, Kentucky, to the National Training Center in Fort Irwin, California, was made easier by spanners improved by Roger Crowe, a veteran railroad engineer with Fort Campbell's Installation Transportation Division. Spanners are flat metal plates on the end of each railcar that provide a bridge for vehicles being driven from car to car. Railcars often arrive at the loading area without spanners. The aluminum spanners available through the Government supply system are 6 inches high and, because of their height, create dangerous situations when vehicles are being loaded onto railcars. The photo on the left shows Crowe with the aluminum spanners that he improved by reducing their height and increasing the supports in their base. In the photo on the right, a spanner is shown bridging the gap between two railcars.

an impressive group of more than a dozen technology providers and an initial set of 29 accredited higher education partners to create a customized, complete on-line university. This initiative puts the Army on the leading edge of distance education.

The on-line web portal opened in mid-January at Fort Benning, Georgia; Fort Campbell, Kentucky; and Fort Hood, Texas, where the program will be tested for the next year before expanding to other Army installations.

The Army University Access Online is the latest in a series of dynamic changes to the Army's recruiting and marketing programs designed to enhance the wide range of opportunities and skills the Army offers potential recruits.

SOLE CONFERENCE DATES SET

SOLE—The International Society of Logistics—will hold its 36th Annual International Logistics Conference and Exhibition (SOLE 2001) 14 to 16 August at the Wyndham Palace Resort and Spa, Walt Disney World Resort, Florida. The theme for the conference is "Logistics: Tools for the 21st Century." Additional information about the conference and on-line registration are available through the SOLE home page, http://www.sole.org. Telephone inquiries should be directed to (301) 459–8446.

WESTERN HEMISPHERE INSTITUTE ESTABLISHED

Classes began in January at the new Western Hemisphere Institute for Security Cooperation (WHISC), a predominantly Spanish-language professional education and training facility at Fort Benning, Georgia. The new school replaces the School of the Americas, which closed after 37 years of operation. That school and its predecessors, the Latin American Training Center (1946 to 1949) and the Caribbean Training Center and School (1949 to1963), trained more than 61,000 military students from Latin America and the Caribbean through professional military courses that reflected the U.S. Army's core values.

WHISC offers training for military, law enforcement, and civilian officials of the nations of the Western Hemisphere on the democratic principles set forth in the charter of the Organization of American States. Its goal is to foster mutual respect, confidence, and cooperation among the participating nations and to promote democratic values, respect for human rights, and knowledge of U.S. customs and traditions. Its curriculum includes offerings in peace support operations, transnational security threats, international operational law, and civilian operations, as well as information operations, democratic sustainment, and advanced counterdrug operations.

INFORMATION TERMINALS TO IMPROVE MULTINATIONAL COMMUNICATIONS

The United States, France, Germany, Italy, and Spain entered into an agreement in December for cooperative production of Multifunctional Information Distribution System (MIDS) terminals. The agreement is viewed as an important milestone in the Department of Defense's efforts to promote interoperability in systems and equipment, not only for U.S. forces, but also with its North Atlantic Treaty Organization (NATO) partners. The MIDS terminals will provide jam-resistant, secure, digital voice and data communications to NATO warfighters in the air and on the ground. Interoperability of the communications assets will improve multinational political and military communications during crisis situations.

The MIDS agreement establishes a cooperative and competitive acquisition strategy that will allow coalition members to share common procurement requirements and place orders competitively among U.S. and European industry teams. The 9-year MIDS agreement calls for production of more than 2,700 terminals.

POLYMERIC TRAY TO REPLACE STEEL TRAYCAN

A polymeric tray will replace the steel traycan used in the unit group ration-heat and serve (UGR–H&S) and the unitized tray pack (T-Ration). The tray provides soldiers and marines in a tactical environment with hot food similar to prepared entrees available in the grocery store—though not frozen. It serves as an intermediate step between meals, ready to eat (MRE's), and meals prepared from fresh ingredients.

The polymeric tray resembles a large plastic baking pan and is immersed in simmering water for 45 minutes to heat the food within the tray. Any sharp knife will

puncture and slice through the lid, which is made of a flexible, high-strength, multilayer material similar to that used in MRE pouches. This eliminates the on-the-job injuries caused by the sharp edges of the steel traycans and lids after opening with a can opener.

The military polymeric tray is based on a commercial model produced by Rexam Containers in Union, Missouri. It is made of polypropylene with an ethylene-vinyl alcohol barrier layer. A fiberboard sleeve provides puncture protection and compressive strength to the filled and sealed tray during transport and storage. Similar in size and shape to the steel traycan, the polymeric tray provides the same number of servings, though the serving size is slightly smaller.

The Department of Defense Combat Feeding Program at the Army Soldier Systems Center, Natick, Massachusetts, began research on the polymeric tray in 1995. The Army and Marine Corps approved limited procurement of the tray for field-testing in 1999. Full-scale production contracts were awarded in August 2000 for delivery to begin in early 2001.

☐ A soldier folds back the lid on a polymeric tray. Note the old steel traycan with the stiff metal lid at the bottom of the photo.

NEW PROTECTIVE SUITS TO BE ISSUED

Soon some soldiers will be issued new joint service lightweight integrated suit technology (JSLIST) overgarments to protect them from chemical and biological agents. The JSLIST will replace the battledress overgarment (BDO), which is no longer in production. The JSLIST is a Marine Corps initiative that was adopted by all services following a congressional mandate that future research, development, and procurement of chemical items be managed jointly.

The JSLIST consists of a coat and trousers in either woodland or desert camouflage that are available in seven different sizes. They will be "split-issued," which means that soldiers can request trousers in one size and a coat in another size. The mix-and-match sizes provide a better fit and therefore better protection from chemical agents. Depending on the temperature and the mission, the JSLIST can be worn over the standard uniform, over underwear, or over or under cold-weather garments.

The JSLIST features a number of significant improvements over the BDO—

- Its wear life is 45 days compared to 22 for the BDO, and it will provide 24 hours of protection after exposure to chemical/biological contamination up to the 45th day of wear life
- The JSLIST is approximately a pound lighter than the BDO. When packaged, it is 60 percent less bulky.
- It can be laundered six times; the BDO cannot be laundered.
- The JSLIST's liner consists of a nonwoven front laminated to activated carbon spheres and bonded to a knitted back that absorbs chemicals. Because the carbon is bonded to the liner, it remains intact instead of rubbing off on the wearer, which occurs with the BDO.

The new protective suits will be released to Army units as the supply of BDO's is depleted and additional JSLIST suits are produced. Fielding is expected to continue through 2005.

SB 38–101 IS AVAILABLE ON CD–ROM

The July 2000 CD–ROM version of Supply Bulletin (SB) 38–101, Spare/Repair Parts to End Item Application, is available for distribution. The new SB 38–101 is a user-friendly tool that can be used to identify all parts used on a selected end item and all end items that use a selected part. It also can assist in identifying excess repair parts.

SB 38–101 can be obtained through the Department of the Army 12–series requisitioning process; ordered from the Army Publishing Agency website at http://www.usapa.army.mil; requisitioned through the resupply system using the nomenclature EM 0010 with CD–ROM as the unit of issue; or by contacting the Army Materiel Command's Logistics Support Activity by telephone at (256) 955–9663 or DSN 645–9663 or by e-mail at amxlsrra@logsa.army.mil.

LOGISTICS TRANSFORMATION SYMPOSIUM SCHEDULED

The Association of the United States Army, in cooperation with the U.S. Army, will conduct a symposium on the "Industry Role in Logistics Transformation" 21 to 23 May at the Marriott Hotel in Richmond, Virginia. The symposium will bring together senior Army and Department of Defense logistics leaders, chief executive officers from industry, scholars from the academic world, and joint and Army warfighters. Proposed panels include an operations and logistics roundtable and sessions on enhancing Army deployment, reducing the logistics footprint in the battlespace, and reengineering for more cost-effective logistics. The desired outcome of the symposium is recommendations to further exploit commercial sector advances in transportation, distribution, technology, and business process change.

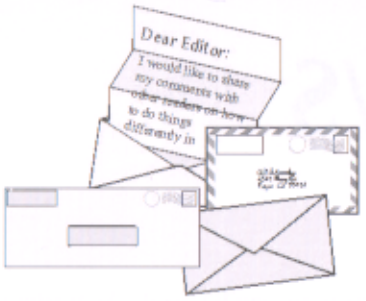
For more information on the symposium, send an e-mail to matthew.bubak@hqda.army.mil or roy.wallace@hqda.army.mil or call (703) 617–7044 or –7051.

BULLET-PROOF HELMET COMING SOON

A new helmet that provides improved protection, utility, and comfort will be issued to the Special Operations Forces sometime this year. The modular integrated communications helmet (MICH) is made of a different type of Kevlar that, when used with special bonding techniques, forms a shell capable of stopping a 9-millimeter round. The MICH is being considered as the helmet platform for Land Warrior, the Army's effort to create a revolutionary weapons system for the 21st century soldier.

The current Kevlar helmet only protects against fragmentation and, at best, deflects bullets. According to Richard Elder, equipment specialist with the Special Operations Forces Special Projects Team at the Army Soldier and Biological Chemical Command's Army Soldier Systems Center (Natick), the MICH is the first helmet designed to stop bullets in addition to protecting the wearer from fragmentation. An innovative seven-pad suspension system will allow the wearer to stay conscious after a hit. The MICH suspension pads are composed mostly of "slow-memory" impact foam that acts as a shock absorber against a striking bullet.

A communications subsystem to be included with the MICH is in the final stages of testing and, because of its modularity, it can be configured to specific needs. The subsystem will provide hearing protection and dual-channel communications capability. It offers features such as a low-profile microphone, microphone adapter for mask microphone, multiple radio and intercom adapters, and push-to-talk access. The headset may be worn alone or with the helmet.



LOG NOTES

Photo Depicts Safety Violation

The September-October 2000 issue was particularly well done and applicable to my mission. Lots of news I can use. But please tell me the photo caption on page 56 was a mistake. It should also have said: "After this photo was taken, the mechanic put his safety glasses and hearing protection back on." Right?

Alternatively, it might also say: "The mechanic didn't report to work the next day due to severe tinnitus and headache." Or: "The mechanic lost the permanent use of one eye when the wrench socket shattered."

I've heard all the arguments to the effect that the photographer is not responsible for safety, but the editor can decide not to run photos that show unsafe acts. It is hard to get people to do it right when photos show other people doing it wrong!

Granted, other story photos in this issue do show plenty of personal protective equipment; you're about 5 for 6 this time. But cartoon characters buckle seatbelts and car advertisements say "professional driver on closed course," so you can be fully safety conscious, too.

Safety is everybody's job.

William Ellis
Rock Island, Illinois

Editor's response: You are right, of course. You caught us not paying attention to details. We assumed from the expression on the mechanic's face that this was a posed shot, but that does not excuse us from considering the potential impact on our readers.

Occupational Safety and Health Administration (OSHA) guidance can be found in CFR [Code of Federal Regulations] 29, Subpart I, 1910.133, paragraph (a)(1), which states: "The employer [i.e., first-line supervisor] shall ensure that each affected employee uses appropriate eye or face protection when exposed to eye or face hazards from flying particles, molten metal, liquid chemicals, acids or caustic liquids, chemical gases or vapors, or potentially injurious light radiation."

I Don't Understand Either

Like MSG Welch (Ret.), there are many things I don't understand after years of processing reports of survey. (See November-December 2000 issue, page 42.)

I don't understand why soldiers will not take responsibility for their actions and sign a statement of charges when they lose or damage Government property as a result of their own fault or neglect. I don't understand why so many commanders seem to believe that any loss or damage is simply part of the cost of doing business. I don't understand why junior enlisted personnel are held liable for the same type of loss for which officers and senior NCO's are relieved of liability. Regulations expect a higher standard from officers and senior NCO's, but this is seldom seen in reports of survey. I don't understand why reports of survey are repeatedly processed incorrectly, even though commanders and S4/G4 personnel are continually reminded of correct procedures.

My experience has been that allowing commanders to "write off" losses below a specific dollar value increases the lack of care and control, just as dropping property book accountability of office furnishings below $300 did. The general attitude is, "If it's not accountable, you don't have to worry about it." I have seen soldiers push office furniture out of second story windows rather than carry it downstairs. After all, it's not accountable. The commander just tells the property book officer to order new furniture, then complains that his budget isn't sufficient to cover his unit's operations.

If finance regulations were changed so that monies assessed by reports of survey or collected on statements of charges were credited to the unit that suffered the loss or damage, more commanders would enforce the Army's standards of care, control, and proper use of Government property. In these times of ever-decreasing budgets, I believe standards should be raised, not lowered.

Name Withheld
By Request

One System for Four Services

First of all, I just want to tell everyone at *Army Logistician* that you have a great magazine. I've been a reader for as long as I can remember, and you always present cutting-edge articles in an informative and easy to understand format. In the November-December 2000 issue, I especially enjoyed "Staff Ride to Gettysburg" by Major General Juskowiak and Lieutenant Colonel Herson, "A Revolutionary Vehicle for the Future" by Colonel Harman, and the two commentaries by Colonel Paparone and Mr. Welch.

The staff ride article brought back many good memories of my last staff ride to Gettysburg when I was a student of the Sustaining Base Management course at the Army Management Staff College, Fort Belvoir, Virginia. One of our instructors, Lieutenant Colonel John Leonard, "forced" us to do similar research so we could more fully under-

stand and appreciate the history and lessons of Gettysburg. As we prepared to go on the trip, he continuously filled us with facts and interesting trivia about the battle there and essentially caught us up in his enthusiasm. I think the 1st COSCOM took it several steps further, and it was great to read about their event. I am certain those young officers will never forget it.

I also enjoyed reading about the Moller Skycar and Colonel Harman's insightful predictions for its potential and future uses, both on and off the battlefield. It is exciting to see something that is so innovative and flexible as this vehicle. When I got to Colonel Paparone's "friction index" and Mr. Welch's ordered confusion about current dumb (my word) things we do in logistics, I had a strong feeling that the two went hand in hand. I hope Army senior leaders really read and think about Mr. Welch's concerns and look into fixing those that are truly broken and strengthening the others—and better yet, finding solutions without creating another "committee." Colonel Paparone's article struck another note that related directly back to Mr. Welch's issues and the Gettysburg staff ride—his "friction index." Although that depiction is interesting, I cannot see it as being of any real value unless it is used to individually compute each of the phases he had near the end of his article. In other words, what is the friction index for "planning," for "pre-deployment," for "movement to port," and so on? And remember the "DIME" paradigm in the article by Major General Juskowiak and Lieutenant Colonel Herson? What is the "friction index" for each of those—separately? Some are alluded to in Mr. Welch's article, and in Colonel Harman's vision of uses for the light aerial multipurpose vehicle (LAMV), as well as in the Gettysburg staff ride story. It really is wonderful how they all relate.

Now, if we in the Army could only see our way clear to thoroughly consolidate our requirements with our sister services and our NATO allies, then we would be on the path toward General Shinseki's vision for the future. For example, how can we develop a single procurement for the LAMV to meet the needs for all services, with a single set of AVIM/AVUM (aviation intermediate and unit maintenance) levels, with a single class IX source of supply, with a single automated or internet supply system, with a single Total Asset Visibility (TAV, not ATAV) method for tracking transportation movement, and with a single accountability system for all services?

Again, great articles. Thanks for the updates.

Jeffrey Holmes
Fort Sam Houston, Texas

Free Issue at Wholesale Level?

Prior to 1992, all repair parts were free issue from the wholesale supply level down to unit level. In 1992, the Department of the Army converted all repair parts to the Stock Fund. Concurrently, all operations and maintenance, Army, budgets were increased, and all wholesale-level customers were charged for the stock-funded items. The conversion of repair parts to the stock fund was caused in large measure by slowness on the part of wholesale customers to return unserviceable maintenance repair code D, F, H, and L assets to wholesale repair depots. This slowness resulted in wholesale activities making new procurements to meet requirements, when assets that could be reutilized were on hand at field Army level.

The result of converting free-issue repair parts to stock-funded was two sided. That is, repair parts generally were returned faster to the wholesale supply level for repair. However, it also had drawbacks. Specifically, direct and general support level maintenance activities repaired more items instead of sending assets back to wholesale repair depots. At the same time, commanders were required to spend an exorbitant amount of time as accountants.

Enter the Single Stock Fund. This program is aimed toward having a single owner of repair parts through the tactical supply support activity (SSA) and a single manager of what is to be repaired and the repair location.

I have no problem with Single Stock Fund. However, I do have a suggestion to make. In conjunction with Single Stock Fund Milestone 3, which is the wholesale-level ownership of tactical-level authorized stockage levels, let's convert repair parts to free issue. I know there are some people that will object to this, saying that reverting to free issue will slow the progress of repair parts to wholesale repair depots. It could happen, but it doesn't have to. What we need to do is establish repair parts retrograde metrics, and then enforce them. In fact, the Velocity Management group has established a reverse logistics process improvement team (PIT) to look at this exact problem. What the PIT will do is not known as I write this. However, I suggest that we need to develop a tracking tool that allows field and wholesale commanders to track, in the aggregate, the national stock numbers and quantities, by requisitioner, of repair parts being issued versus those being returned. If a requisitioner falls outside a specific tolerance, the SSA issues no additional repair parts until the delinquent turn-in is made.

This will allow commanders to spend more time being leaders and less time being accountants. Just a thought.

Thomas R. Welch
Fort McPherson, Georgia

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Reengineering Defense Transportation Processes

by Kenneth Stombaugh

When Mary Lou McHugh, the Assistant Deputy Under Secretary of Defense for Transportation Policy, proposed a change in Department of Defense (DOD) transportation documentation and financial processes to Dr. John Hamre, then the Deputy Secretary of Defense, she knew that the change would radically transform the way DOD conducts its transportation business. Her recommendation led to Management Reform Memorandum #15 (MRM #15), one of Secretary of Defense William Cohen's Defense Reform Initiatives. MRM #15, which Dr. Hamre signed on 7 July 1997, is a plan to completely reengineer DOD's transportation documentation and financial processes.

For all modes of transportation, DOD now uses a single payment process that embraces the latest electronic commerce (e-commerce) technology, eliminates Government-unique documentation, and reduces both costs and infrastructure for DOD and its commercial partners. DOD spends over $1 billion annually on commercial freight transportation services, encompassing over 16 million shipments. These shipments originate at 550 DOD shipping locations in the continental United States alone and use nearly 500 commercial carriers.

The initial step in reengineering DOD transportation processes was to attack "the way we've always done things." All leaders and stakeholders had to be involved and fully committed to the effort. McHugh hosted a conference that brought together senior transportation and financial leaders from DOD and industry for one painful but productive day of reflection. By the end of the day, there was a consensus: "This process is badly broken and needs to be fixed now."

In addition to the internal demands of cutting infrastructure costs and improving efficiencies, the commercial transportation industry frankly told DOD that it was not a "customer of choice." DOD had to make drastic changes in its overall transportation documentation and related financial business processes. Carriers could no longer accept being paid between 30 and 90 days after delivery, and DOD could no longer tolerate having processing costs that could exceed the cost of the transportation being provided.

Getting Started

As the champion of this management reform, McHugh initiated the project with the goal of finding a solution that would benefit all stakeholders. She directed a study to examine current processes as well as commercial best practices. In addition, a prototype team representing all stakeholders for each mode of transportation tested and validated solutions, using a purchase card for payment on a small scale and in a controlled environment. The findings from the study and from the purchase card prototype resulted in five main themes to govern process improvements—

- Use an e-commerce solution.
- Adapt a credit card-like solution that includes a third-party payment process.
- Eliminate Government-unique documentation.
- Build in internal financial controls.
- Provide a single, standard payment system across all modes of transportation.

A board of directors was established with senior representatives from the DOD transportation, finance, and information technology communities and key commercial transportation companies to steer and oversee the project's implementation.

PowerTrack—The Enabling Tool

As DOD was testing the purchase card for transportation payments, the General Services Administration awarded one of its next generation Smart Pay credit card contracts to U.S. Bank. U.S. Bank already had recognized the unique nature of transportation transactions and identified a potential market for using credit instruments. The result was the development of a freight payment tool called PowerTrack—a commercial, off-the-shelf, third-party payment system—that soon became the backbone for implementing MRM #15. PowerTrack provides real-time information exchange through the World Wide Web and bridges the gap between DOD and carrier information systems. It collects shipment and financial data from both shippers and carriers in a single electronic document and makes those data available over the Internet to all parties who need it.

Early in the course of implementing PowerTrack, the implementation team (which I led with Alan Estevez) discovered that PowerTrack can act as more than a payment tool. Complete shipment data also can support budgeting, forecasting, and auditing processes, contract negotiations, traffic management analyses, and continuous process improvement. The comprehensive data base alone provides DOD a wealth of historical shipment information that previously was inaccessible.

Beyond meeting its immediate information needs, PowerTrack provides DOD with a valuable foundation for managing the entire distribution process. In the past, DOD resorted to managing segments of the transportation distribution pipeline. Now, DOD is gaining complete visibility of all of its transportation operations. PowerTrack offers a common, commercial business practice for all modes of transportation and, most importantly, a common system for integrating data through the entire transportation pipeline.

The New Process

The "old way" of doing business forced the transportation officer to enter all shipping data into one of several source shipping systems, print and store multiple paper copies, and finally provide commercial carriers with Government-unique transportation documentation. Once the shipment left the transportation officer, he received little information to track or process the shipment through the in-transit, delivery, payment, and post-payment processes.

In the new process, the transportation officer is accountable for the shipment from pickup to delivery. PowerTrack provides one data base for complete shipment and payment data that can be accessed by all interested parties. Once the transportation officer receives notification in PowerTrack that a service is completed, he can review the transaction for approval. Upon approval, the carrier then receives electronic payment from U.S. Bank within 3 business days.

Meeting the Challenge of Change

This large-scale organizational change had to resolve challenges in several areas: stakeholder commitment, technical infrastructure, process training, and security and Internet connectivity.

All stakeholders had to be assured of this management reform's advantages for them. For example, DOD had to convince its commercial transportation carriers that paying a 1- to 2-percent fee to U.S. Bank would be offset by the resulting benefits—being paid more quickly (within 3 business days) and being able to eliminate the unnecessary infrastructure they maintained solely for DOD accounts. DOD conducted sessions with many stakeholders to help carriers see the value of implementing PowerTrack.

The technical infrastructure across various transportation modes and sites also presented a challenge to implementing PowerTrack. For example, an Internet solution can provide easy access at reduced costs; however, the proper infrastructure has to be in place to make it work. DOD found various levels of communications capabilities and configurations at each of its 550 shipping locations that had to be changed or adjusted.

Process and user training became a primary focus as DOD moved forward with implementation. Training had to be comprehensive and address technical and process aspects as well as overall elements of coping with change. Training was offered through structured classroom sessions, computer-based training, on-site assistance, and other learning aids such as a 24-hour help line.

Security was another issue DOD encountered. Military department security policies and system firewalls can affect easy and timely access to the Internet. In order for PowerTrack to be used fully and have maximum connectivity, DOD needed to define base-level communications requirements and ensure that the DOD communications infrastructure could support e-commerce business applications without sacrificing security requirements.

MRM #15 Status

Following the completion of prototypes, implementation of MRM #15 began in February 1999. At the beginning of November 2000, PowerTrack was being used to process $2.5 million in daily carrier payments at about 485 DOD shipping sites and by 330 commercial carriers. DOD completed implementation for domestic freight and outbound international express and sealift container movements in December 2000.

Since 1 January 2000, DOD has processed over 1.1 million transactions using the new MRM #15 processes. The Defense Finance and Accounting Service (DFAS) work load represented by these 1.1 million transactions has dropped by 98 percent; this is because DFAS is processing transactions only at a summary level on a monthly basis, rather than processing individual transactions as it did before implementation of MRM #15 processes. This new payment process also is used for all modes of transportation, enabling DOD to achieve its goal of developing a standard payment process for transportation movements regardless of mode of delivery.

The fundamental change in DOD's transportation documentation and financial processes has been tremendous. The primary focus in the months ahead will be to institutionalize the reengineered business processes across DOD. While change is never easy, DOD's transportation and financial communities have successfully embraced it. This change was made possible because of partnerships with both the commercial carrier industry and U.S. Bank and the strong commitment of the senior DOD leadership. For more information, contact Kenneth Stombaugh at Kstombau@acq.osd.mil. **ALOG**

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Whatever Happened to the WOLF?

by Patricia L. Wilson

The Army Materiel Command's Logistics Support Activity (LOGSA) has integrated the Army's worldwide historical maintenance data base, the Work Order Logistics File, commonly known as WOLF, into the maintenance module of the Logistics Integrated Data Base (LIDB). [See page 13 in the January-February 2001 issue of *Army Logistician* for more information on the LIDB.]

WOLF is one of 66 separate data bases that are being incorporated into the LIDB. What impact does this have on the customer? It means that maintenance, supply, readiness, and force information are now available from one source and accessible by one log-on and password. The customer can move quickly from one functional module to another to track down root causes of logistics problems. Other features make it easier to retrieve and display data. You can right-click to quickly present data in different views, drill down to lower level details, and sort and save the data to other files.

Types and Sources of Maintenance Data

The LIDB maintenance module includes information associated with each maintenance action. This includes man-hours, days the equipment was down, parts consumed, cost of parts, reason for maintenance, military occupational specialty of the person who performed the work, and many other data elements. Each action also includes the unit identification code of both the owning and the supporting units and includes the national item identification number and end-item code of the item being worked, which allows customers to isolate information by item or unit.

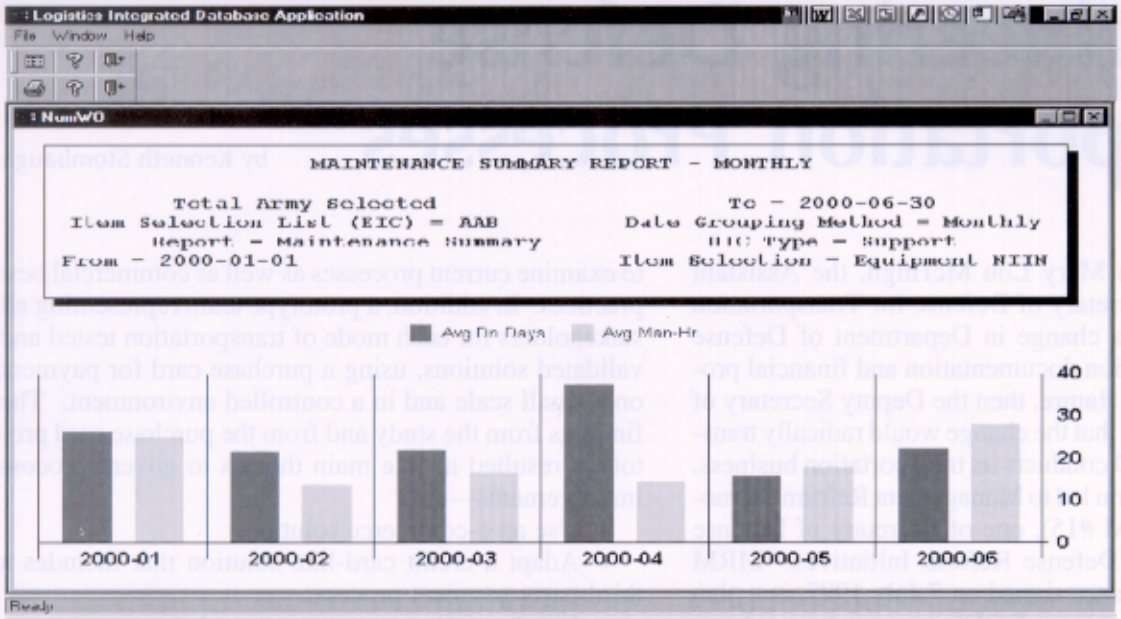
The maintenance module contains data only on completed maintenance actions reported from both direct and general support units and activities throughout the Active Army, Army National Guard, and Army Reserve. While only limited contractor data are currently available, recent policy changes require that all new maintenance contracts stipulate that contractors provide work order data to LOGSA. Visibility of open (active) actions will be available with the fielding of Tier I of the Global Combat Support System-Army (GCSS-Army).

Maintenance facilities feed data on closed work orders to the LIDB through two field maintenance systems. The first is the Standard Army Maintenance System (SAMS), which operates in table of organization and equipment units. The second is the SAMS-Installation/Table of Distribution and Allowances (TDA), which operates in TDA activities. Work order data are available on line back to January 1995.

The LIDB maintenance module also includes a history of each action performed during the maintenance process. This allows analysts to determine average time spent in a particular status, such as awaiting parts, in shop, awaiting pickup, or in initial inspection. This maintenance history is useful in identifying and correcting bottlenecks in the maintenance process. Data can be viewed from the perspective of organization, tasks performed, man-hours expended, military occupational specialty of the person who performed the work, labor and parts costs, or repair parts used in maintenance.

Data Uses

Maintenance work order data serve a large and active community of customers. Materiel developers and their supporting contractors use the data extensively in studies of operation and support costs. The Army Cost and Economic Analysis Center uses information provided by the LIDB maintenance module to generate annual costing reports for the Army. The Velocity Management Repair Cycle Time Program uses maintenance work order data to measure changes in repair cycle time and identify problem areas for improvement. Major commands, field users, and other management activities often are interested in repair parts listings, costing studies, and mean-time-between-failure, average downtime, average man-hours, and mean-time-to-repair data. Field units can access reports in the LIDB to verify completion of their file transmissions to the LIDB. If your job involves maintenance, it is likely there is information in the LIDB maintenance module that could assist you.



An example of an LIDB maintenance module screen.

As more customers access the data, new uses are being identified and new reports are being requested. The Department of the Army (DA) currently is implementing a requirement in AR 750–1, Army Materiel Maintenance Policy and Retail Maintenance Operations, for the field to use data from the LIDB to support resource requirements through the program objective memorandum. DA also is requiring maintenance facilities to use LIDB maintenance data to evaluate their performance in completing work orders based on priority.

Data Quality

Maintenance work order data serve as the source for metrics used to measure repair-cycle-time improvements under the DA Velocity Management Program. This has caused increased interest in maintenance work order data over the last couple of years, resulting in marked improvement in the percentage of units that report to the LIDB each month. Army-wide reporting is currently at 85 percent, with several major commands achieving 100-percent reporting consistently. Under GCSS-Army, additional edits and data checks will be invoked at the source. These checks will further improve the reliability of maintenance reports, particularly rollups that require a total picture by organization or item.

More Changes to Come

Many exciting changes are in the making. For example, charts and graphs displaying maintenance trends will be available at the click of a button through WebLOG, a web-based logistics system being developed at LOGSA. LOGSA is seeking a way to pull data from alternate sources, which will eliminate the need to push data forward through SAMS. During the next year, LOGSA plans to develop additional audit and feedback reports to provide the field with automatic receipt acknowledgement and feedback on data errors.

Post fielding support analysis (PFSA) is an integrated analysis capability currently being developed at LOGSA to assist with analyzing and correcting deficiencies and problems and responding to requests that affect logistics support. This analytical tool will enable the armed services to be proactive, as the user can predict and preclude potential support problems on weapon systems before they impact the soldier. Functional areas of the PFSA include problem reporting, logistics information, logistics analysis, standard reports, and query wizard. In the logistics information area, the PFSA accesses several data sources, including the LIDB maintenance data.

Military, civilian, and contractor personnel can request access to the LIDB by completing a system access request on line at www.logsa.army.mil/sar/sarprep.htm. To request maintenance data, contact LOGSA by telephone at DSN 645–9668/9674 or (256) 955–9668/9674 or by e-mail at wolf@logsa.army.mil. ALOG

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Integrating AIT Into Ammunition Logistics

by John Waddick and Jerry Rodgers

The authors report on progress made in extending automatic identification technology into the ammunition community.

Automatic identification technology (AIT) refers to a family of devices that capture, retain, and retrieve data quickly and accurately. AIT devices use a variety of read-and-write data-storage techniques to process asset identification information. These technologies include, but are not limited to, bar codes, magnetic strips, integrated circuit ("smart") cards, optical memory cards, radio frequency identification (RFID) devices, and magnetic storage media.

AIT also encompasses the hardware and software required to enter data into the devices, read the information in them, and merge that information with other logistics information. AIT offers a wide range of data-storage capacities; for example, an AIT device may store a single part number or function as a self-contained data base. AIT devices can be interrogated using contact, laser, or RFID devices, and the information obtained from those interrogations can be fed electronically into automated information systems to update stored records.

In November 1995, the Acting Deputy Under Secretary of Defense for Logistics designated the Army as the Department of Defense (DOD) executive agent for AIT and directed the Army to promote process improvements through the use of AIT and to support demonstrations aimed at expanding the use of AIT in logistics functions. With Operations Desert Shield and Desert Storm still fresh in the memories of many in the ammunition community, class V (ammunition) was recognized immediately as a candidate for AIT integration.

Proof of Principle

In December 1995, the Logistics Integration Agency in Alexandria, Virginia, hosted a meeting of representatives of the ammunition community. The major "stakeholders"—the Army Combined Arms Support Command (CASCOM), Operations Support Command (OSC), Military Traffic Management Command (MTMC), and the Project Manager, Standard Army Ammunition System-Modernization (PM, SAAS–MOD)—agreed to develop and implement a proof of principle (POP) for integrating AIT into ammunition business processes under the auspices of the Logistics Integration Agency.

The use of AIT to track ammunition shipments had been demonstrated already in the European Ammunition Retrograde Program. Using technological improvements resulting from that effort, the ammunition initiative sought to integrate a suite of AIT to automate source data input, incorporate the various automated information systems and business processes at each node in the ammunition pipeline, and provide in-transit visibility of assets. The POP's scope would be limited to tracking shipments from one or two continental United States (CONUS) depots, through a sea port of embarkation (SPOE) on the east coast, a sea port of debarkation (SPOD) in Europe, and an ammunition supply point (ASP) in Europe.

OSC selected Crane Army Ammunition Activity in Indiana as its initial depot for AIT integration; MTMC selected the Military Ocean Terminal Sunny Point, North Carolina, as its SPOE and the Port of Nordenham, Germany, as its SPOD. U.S. Army Europe joined the effort as a stakeholder and selected three sites in Germany—the Reserve Storage Activity at Miesau, ASP 1 at Vilseck, and ASP 8 in Weilerbach—for AIT integration.

A concept of operations based on the class V AIT requirements established by CASCOM for SAAS–MOD was developed, briefed widely, and published. Because of its experience in RFID, radio frequency data collection, and installation of radio frequency systems, Savi

☐ A locomotive engineer at Blue Grass Army Depot positions RFID-tagged ammunition containers for departure to an ammunition supply point in Germany.

Technology, headquartered in Sunnyvale, California, was chosen as the integrating contractor.

After surveying all of the sites involved in the initial effort, Savi developed a design document spelling out in detail a proposed technical solution to the requirements. The solution then was incorporated into the POP demonstration. Lessons learned would be included in a revised concept of operations for extending the automation effort across the ammunition logistics community.

Project Implementation

In the past, ammunition logistics has been characterized by cumbersome manual inputs and batch processes and disparate, or "stovepipe," automated information systems. As the DOD Single Manager for Conventional Ammunition, the Army, through the Joint Munitions Transportation Coordinating Activity, moves ammunition from CONUS depots and storage activities to overseas destinations. These shipments pass through common-user ammunition ports primarily in Containerized Ammunition Distribution System containers and as break-bulk cargo. At CONUS depots, AIT is being integrated into these stovepipe information systems, including the Munitions Transportation Management System-Field Module (MTMS–FM), the Standard Depot System, and the CONUS Freight Management (CFM) System.

AIT is being installed at depot container-stuffing areas and truck and rail departure gates to support various business processes and to transmit data back to the server. The server is programmed with an AIT asset manager that monitors, troubleshoots, and manages all connected AIT devices remotely. At MTMC ammunition ports, AIT is integrated into port business processes and automated information systems, including the Worldwide Port System (WPS), the CFM System, and location-specific systems.

The ammunition AIT project integrates AIT such as linear and two-dimensional bar codes and RFID tags to—

- Automate, streamline, and optimize the pick, pack, and ship process for ammunition transferred from OSC depots.
- Synchronize, within the depot, the creation of RFID tags, transportation control movement documents, Government bills of lading, and Department of Defense (DOD) Forms 1348–1A, DOD Single Line Item Release/Receipt Document.
- Record ammunition shipments departing from OSC depots and report them to the applicable in-transit visibility server, SPOE, SPOD, and ASP consignee.
- Report shipments arriving at the SPOE to the WPS, and record each action involved in the movement process at the port, including lifting the ammunition onto the vessel by crane.
- Report arrival of shipments to the WPS at the SPOD. Record any transload or diversion operations, and forward the report to consignees.
- Read RFID tags at the ASP to record arriving shipments and create pre-receipts.

Throughout the implementation of this project, the goal has been to create an auditable and seamless information system that—

☐ As each RFID-tagged container passes through the departure gate (above), it is identified using an RF interrogator (insert), and all nodes along the logistics pipeline are notified of its departure from Blue Grass Army Depot. At each node along the way, it will be interrogated and identified, and the data again will be dispatched to each node in the pipeline.

- Integrates AIT from the depot to the ASP and provides visibility of munitions anywhere in the ammunition supply chain.
- Makes source data automation a dominant business rule.
- Increases data accuracy, validity, and synchronization in and among the automated information systems used in the ammunition supply chain.
- Creates opportunities for continued business process improvement.

Phase I of the ammunition AIT project began in May 1996 and was completed in July 1998. During that phase, ammunition AIT integration was implemented at Crane Army Ammunition Activity, Military Ocean Terminal Sunny Point, the Port of Nordenham, and the ASP's at Miesau, Weilerbach, and Vilseck.

Phase II extended the project to Blue Grass Army Depot in Kentucky, Tooele Army Depot in Utah, the depot functions at McAlester Army Ammunition Plant in Oklahoma, and additional ASP's in Europe.

Phase III extends the project to the Tier II depots at Anniston Army Depot, Alabama; Letterkenny Army Depot, Pennsylvania; and Red River Army Depot, Texas. In this phase, AIT integration also will begin at other ammunition plants, including the plant functions at McAlester. Iowa Army Ammunition Plant will serve as the model for other ammunition plants. The project also will be expanded in Phase III to include U.S. Army Pacific and ASP's in Japan, Korea, and Okinawa.

A follow-on phase will encompass the remaining ammunition plants and selected Army Forces Command, Army Training and Doctrine Command, and reserve component ASP's. A mobile, or "fly-away," AIT package is being developed to allow deployable ammunition units to operate in austere or remote environments. These AIT capabilities are being integrated into the Global Combat Support System-Army, now under development.

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Designing Out Demand

by Deborah Pollard Reed and David E. Scharett

Reducing the demand for support is essential to deploying a force that retains its combat effectiveness on the battlefield.

As we enter the 21st century, the Army faces many new challenges. This is not a unique situation; the Army has been challenged throughout history. From Valley Forge to Kosovo, America's Army has faced and overcome adversity through the incredible sacrifice, patriotism, honor, and dedication of our soldiers. We have accomplished mission after mission for over two centuries, and our nation is safer, stronger, and more secure because we did.

Today, we face a very different kind of challenge as a nation and as an Army. We now have the challenge of being the world's only superpower and the exemplar of freedom and democracy for nations around the globe. This test is especially difficult because our military resources are limited and shrinking. We also must guard against the inevitable complacency that seems to accompany peace, prosperity, and national confidence. Even as we enjoy a thriving economy and a world free of major conflict and Cold War arms buildups, the Army must prepare for the compelling requirements of a new world and its different and emerging dangers.

Army leaders are challenged to transform the Army at a time when the United States has no equal competitor, even though the range and frequency of Army support to operations other than war have increased. The objective of the transformation is to create a force that is strategically responsive and dominant at every point on the spectrum of operations. We have a unique opportunity to meet the challenges of transformation at a time when information and technology are changing our society in ways unimagined just 5 or 10 years ago.

Achieving the Army Vision

Achieving the transformation objective will be difficult. The vision of the Chief of Staff of the Army, General Eric K. Shinseki, is to be able to deploy one brigade anywhere in the world in 96 hours, one division in 120 hours, and five divisions in 30 days. However, as the Army moves toward transformation, exciting opportunities will present themselves in the form of technologies and business processes that have changed world commerce fundamentally. If there ever was a time when opportunities transcended problems, it is now. Indeed, our most fundamental challenge may be to act boldly and decisively in using the opportunities and technologies at our fingertips to refocus, reshape, and realize our vision.

Since General Shinseki first presented the Army vision of a strategically responsive force, senior leaders have been identifying the requirements for achieving the vision and the path the transformation must follow. The goals have been set; decision points have been identified; assessments are being made; interim solutions are underway; and implementation plans for the Initial, Interim, and Objective Forces continue to gain more definition.

Army leaders have concluded that the Army must modernize to meet its current, emerging, and future missions. They also have determined that the new combat systems developed for this modernization must be more rapidly deployable, lighter weight, more reliable and lethal, and have a vastly reduced demand for logistics support. The focus of this challenge to the functional, research and development, and acquisition communities has been stated clearly by General Shinseki, who has said that we must pursue technologies that will reduce the size of the logistics footprint required for deployment. His statements indicate that business as usual is no longer the order of the day. The voracious appetite of current and future weapon systems for logistics support must be reduced.

Transforming Logistics

Closely tied to the goals of the Army Vision and the transformation strategy to achieve it is the Revolution in Military Logistics. The new Army Vision has accelerated the pace of logistics transformation. Transforming combat support (CS) and combat service support (CSS) processes and systems, reducing the demand for lift, and shrinking the logistics footprint are central to

☐ **The Army must design out the demand for logistics support needed by legacy systems such as the Bradley fighting vehicle (left) and in future systems such as the Land Warrior (right).**

the ongoing Revolution in Military Logistics. A key component of the Revolution in Military Logistics and CSS transformation is a strategy of "designing out demand" when acquiring new and improved weapon systems. Weapon systems as currently designed and constructed require the deployment of test sets; large quantities of spare parts; tools to repair components that fail during deployment; personnel trained to conduct repairs; vehicles and communication assets to respond to repair requirements; and care, feeding, and protection of repair and other support personnel.

The mean time between failure of some critical components guarantees that systems will fail during a deployment. If components fail during combat, the weapon systems are rendered extremely vulnerable. Designing out the demand for support is essential to providing a strategically deployable force that retains its combat effectiveness on the battlefield.

Benefits of Designing Out Demand

There are several compelling reasons to design out demand for support by incorporating new technologies into future combat equipment—

- Deploying systems that require less support would enhance the Army's ability to meet the 96-hour, 120-hour, and 30-day deployment timelines. The critical components of combat equipment would not fail during combat and thus would need less support.
- The warfighter would not be encumbered with combat "downtimes" associated with his equipment's demand for logistics support.
- The number and types of logisticians, supplies, and equipment currently deployed from the continental United States to the intermediate staging base or battlespace to sustain and maintain combat equipment would be reduced dramatically.
- The family of future combat systems (FCS's) and other new combat systems would have significantly reduced life-cycle costs.

The family of FCS's is one of several planned modernization initiatives that must be designed and procured with vastly suppressed "demand" characteristics. Therein lies the opportunity for today's senior leaders to leave a legacy that could last 50 years. Combat systems dictate the operating tempo of logistics support and their ultimate life-cycle costs. The more often systems break, corrode, short-circuit, overheat, or run out of fuel or batteries, the more logistics support is required and the greater the final life-cycle cost. The development, design, and procurement of future combat systems that are more survivable and therefore have a dramatically reduced need for logistics support will leave a legacy of more reliable and sustainable systems and greatly reduced life-cycle costs. Combat capability will be enhanced, the logistics footprint will be reduced, savings will be realized, and overall logistics responsiveness will be improved.

Applying Science to Logistics

New sciences such as nanoscience and biomimetics have significant logistics application. Senior Army leaders should pursue these technologies aggressively as the transformation unfolds. While they probably do not fall into the category of "breakthrough technologies," many of them did not exist as recently as 5 years ago. Exploiting the opportunities and benefits emerging from advanced scientific research and development is essential and must be universal in its application.

The family of FCS's offers several opportunities to design out demand—

- ***Information***. System developers should design an on-board, real-time, self-reporting prognostics capability for FCS's. The scientific community has provided developers with a means to create "artificial intelligence," such as artificial neural networks that can recognize the signs of impending component failures while still oper-

ating within specifications and before an actual fault occurs. When this on-board artificial intelligence is integrated with an appropriate array of embedded sensors, it can warn of impending failures. This represents an opportunity to change the logistics paradigm from reactive ("It's broken, come fix it") to proactive ("It's going to break, come and replace this part"). Being proactive instead of reactive eliminates catastrophic failures that create collateral damage. Typically, collateral damage is more expensive to troubleshoot and repair than the original failed part.

- ***Power and energy.*** The distribution of power and energy on the battlefield is the most challenging of all logistics functions because fuel consumption rates of current combat vehicles are so high. Investing in the development of advanced nonhydrocarbon-based fuels and propulsion systems would reap significant benefits.

We have witnessed the evolution of propulsion systems from sails to steam engines, electrical engines, internal combustion engines, turbine engines, and nuclear power. What is the next generation of propulsion? The matter-antimatter theory, which has been demonstrated in laboratories, could eliminate completely the need to refuel on the battlefield of the future. (The matter-antimatter theory suggests that antiprotons and positrons could be slowed, trapped, and recombined to form a charged antihydrogen cluster. This cluster would form one part of the bipropellant fuel and ordinary hydrogen would form the other. The antimatter cluster would react with the ordinary hydrogen and would be converted almost completely to energy.) This theory may provide the basis for the next propulsion system, as well as a source of energy for on-board high-energy weapons such as electro-magnetic or particle-beam guns. At the same time, the theory would address the current problems associated with ammunition resupply on the battlefield. Clearly, our military needs an alternative to long lines of fuel trucks attempting to keep pace with the new, highly mobile fleet of future combat vehicles. This is currently the weakest link in our ability to prevail in extended conflict.

- ***Design.*** Metal surfaces that come together at right angles are "magnets" for condensation. Moisture continuously forming on a surface eventually will corrode that surface. The corrosion problem could be designed out by curving metal surfaces at joints. The significant funds expended annually to repair the damage caused by corrosion could be better spent on combat training or force modernization.
- ***Reliability.*** Combat-critical components of equipment must be designed and manufactured so the equipment's mean time between failure exceeds the anticipated length of deployments. Imagine the number of spare parts, test sets, mechanics, and tools that would not have to be deployed if the equipment's mean time between failure more closely matched deployment time. Imagine also the warfighter's renewed confidence in his weapon system's ability to perform at its peak the first time, every time.

Design out the demand for logistics support in FCS's, and the requirement to deploy supporting equipment to the battlefield is eliminated or reduced significantly.

Another example of the design-out-demand concept would be development of a soldier system that is self-sustaining for periods up to 30 days. There are technologies that would allow this to happen. For example, a dismounted soldier today requires a resupply of batteries on a daily basis. In an urban combat environment, the last thing warfighters want is to have logisticians moving on and off the battlefield many times a day. This friendly activity would serve only to highlight the warfighters' locations to the enemy. Fuel cell technology development is such that a soldier could be issued a half-dozen quarter-sized fuel cells that would power his global positioning system, radio, individual weapon, and computer for more than 30 days. This would eliminate the need for daily resupply.

These are just a few examples of how designing out the demand for support in future combat systems can contribute to achieving the goals of the Army Vision. The opportunity to design out the demand in future equipment is in the hands of the Army's senior leaders.

Modernizing our forces with a reduced demand for support is a challenge in a fiscally constrained environment. Advanced and emerging technologies provide opportunities to create a modernized force that is more deployable and more lethal, with the requirement for support designed out. The legacy is a significantly reduced life-cycle cost for the modernized Army, which will free up funds for field exercises, deployments, and other activities that hone the combat skills of our soldiers.

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Operational Architecture for Combat Service Support

by Captain James J. McDonnell

The Revolution in Military Logistics emphasizes speed over mass. Therefore, command and control systems must be developed that will permit rapid and accurate transmission of information exchange requirements.

The Information Technology Management Reform Act is offering new insights into how the Army provides combat service support (CSS). Passed by Congress in 1996, this legislation (also called the Clinger-Cohen Act in recognition of its authors, Representative William F. Clinger of Pennsylvania and Senator [later Secretary of Defense] William S. Cohen of Maine) defines acquisition and management practices necessary to build an information technology infrastructure.

In response to the Clinger-Cohen Act, the Army developed Army Enterprise Architecture, which encompasses operational, system, and technical architectures. This article will discuss only operational architecture.

Activity Modeling

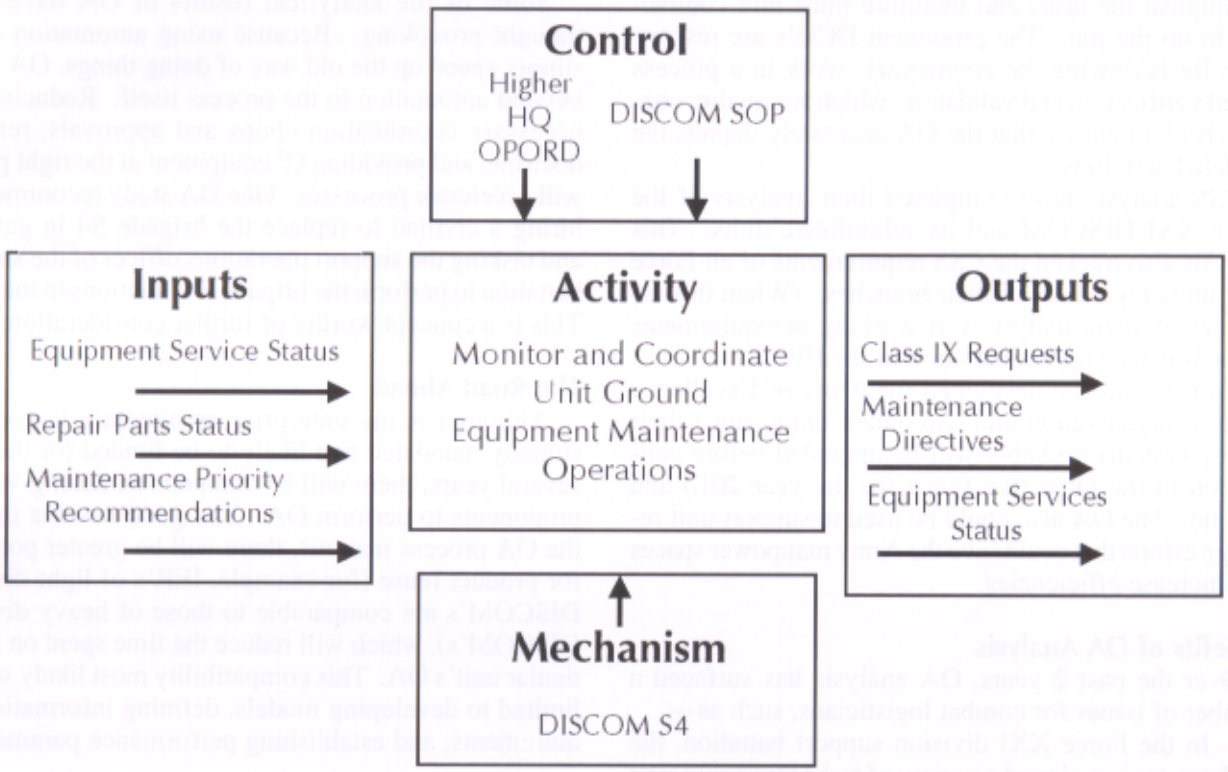
Operational architecture (OA) is a description of the tasks and activities, operational elements (such as commanders, staff, and frontline soldiers), and the quantity and quality of information flows required to support an operation. In other words, it describes who talks to whom and what they talk about. A graphical display of these information exchange requirements (IER's) yields myriad products, including an *activity model* (see chart at right). Activity modeling permits analysts to break down unit functions so they can be identified and entered into a data base for further analysis. Often such functions are taken for granted but, when scrutinized under the microscope of OA analysis, they reveal interrelationships and insights that otherwise could be overlooked.

Activity modeling is the Army-prescribed way of defining mission requirements to ensure that materiel solutions ultimately match user expectations. Through modeling, required information exchange requirements can be identified and effective command and control (C^2) systems can be established to permit the exchange of these information requirements.

One example of activity modeling is the Force XXI tasking to division support commands (DISCOM's) to "monitor and coordinate unit ground equipment in maintenance operations." Keep in mind that this particular task is a single component within the entire activity modeling process. This wartime activity examines the tasks that ensure that a maintenance company is ready to perform its mission with fully mission-capable equipment. Like any activity modeling, this process consists of four components—

- Inputs, which are resources that are changed or consumed by the process. Inputs in the DISCOM example would include maintenance status, repair parts status, and current maintenance priorities. In short, these are the items that a logistician normally would track.
- Controls, which are constraints on the operation of the process. Controls in the DISCOM example might be operation orders from division or higher headquarters that direct specific maintenance priorities different from normal procedure.
- Mechanisms, which perform or enable the process but are not consumed. In the DISCOM, the S4, who is responsible for monitoring the equipment status, could be a mechanism.

Activity Modeling Example



- Outputs, which are the end results of the process. In the DISCOM example, this could be repair parts requests, a directive that specific maintenance priorities be implemented, or a comprehensive status report of the maintenance services performed on unit equipment.

Development Process

Until recently, the Army executed its OA efforts through the Combined Arms Center and, more specifically, through the Army Training and Doctrine Command (TRADOC) Program Integration Office for Army Battle Command Systems, both at Fort Leavenworth, Kansas. This centralization permitted combat, combat support, and CSS elements to synchronize their efforts toward a common goal, such as establishing Force XXI units or interim brigade combat teams (IBCT's). Proponents are now responsible for developing their own operational architectures, which are integrated at the Architecture Integration Center (AIC), located at Fort Gordon, Georgia. By following a strict methodology, future warfighting capabilities and information flow requirements can be captured across the Army.

OA is designed to ensure that C^2 systems comply with the Clinger-Cohen Act. However, its development must start with an analysis of required warfighter functions. This process involves five labor-intensive tasks—

- Reviewing doctrinal literature, which can be cumbersome if the doctrine is not well established, such as with the IBCT. This phase also involves interviewing soldiers who perform the modeled tasks.
- Developing a node tree, which involves diagramming the command relationships and determining which operational facility rules apply. Operational facility rules are the current means of authorizing C^2 equipment.
- Developing activity modeling by employing the integrated definition-modeling.
- Establishing an IER matrix that lists the producer and the consumer of the information.
- Determining the performance parameters (precedence, speed of service, perishability, and cost of failure) of the IER's.
- Analyzing these data.

Over time, this process produces the data base used to determine requirements for doctrine, training, leader development, organizational design, materiel, and soldiers (DTLOMS).

The Directorates for Combat Developments (DCD's) in the proponent TRADOC schools and in the Army Combined Arms Support Command are tasked with per-

forming the OA mission (with oversight and direction provided by HQ TRADOC and the AIC). However, few of these directorates have the personnel needed to accomplish the tasks and therefore must hire contractors to do the job. The proponent DCD's are responsible for reviewing the contractors' work in a process called verification and validation, which is a quality control check to ensure that the OA accurately depicts the modeled activities.

CSS analysts have completed their analysis of the Force XXI DISCOM and its subordinate units. This analysis also tracked the CSS requirements of all Force XXI units regardless of their branches. (When this article was written, analysts were working on requirements of the brigade support battalion of the IBCT's.)

An OA must be developed for Army of Excellence table of organization and equipment units, since their legacy systems probably will be upgraded before conversion to the Objective Force for the year 2010 and beyond. The OA also could be used to support unit redesign efforts that could save the Army manpower spaces and increase efficiencies.

Benefits of OA Analysis

Over the past 2 years, OA analysis has surfaced a number of issues for combat logisticians, such as—

- In the Force XXI division support battalion, the truckmaster is assigned a variety of tasks that could take him away from the company vehicle operations center. This could prevent him from completing the IER's that are essential for mission accomplishment. The OA analysts recommended that a staff sergeant assist the truckmaster to ensure continuity of operations.
- The DISCOM headquarters and headquarters company has one nuclear, biological, and chemical (NBC) noncommissioned officer (NCO) to direct DISCOM NBC operations. To prepare and submit an NBC estimate, the sergeant first class serving as the NBC NCO must provide 16 separate inputs. OA analysts recommended that an additional sergeant be assigned to ensure that the company's NBC equipment is maintained properly.
- During the interview phase of their work, OA researchers learned that warrant officers were not trained adequately to operate the automation equipment they were required to use to transmit their IER's. The OA analysts recommended that school and center courses focus more on automation.
- The Force XXI DISCOM depends on automated equipment to transmit a large volume of IER's electronically. A breakdown in automated equipment would have a near-disastrous impact on operations. OA analysts determined that three high-mobility, multipurpose, wheeled vehicles (HMMWV's) in the CSS automation office—the organization tasked to provide software maintenance support—is insufficient and recommended adding two more HMMWV's to meet the anticipated maintenance needs of subordinate DISCOM units.

Some of the analytical results of OA have been thought provoking. Because using automation could simply speed up the old way of doing things, OA looks beyond automation to the process itself. Reducing unnecessary coordination chops and approvals, refining doctrine, and providing C^2 equipment at the right places will accelerate processes. One OA study recommended hiring a civilian to replace the brigade S4 in garrison and tasking the support operations officer of the support battalion to perform the brigade S4 functions in the field. This is a concept worthy of further consideration.

The Road Ahead

Although Army enterprise architecture is congressionally mandated and likely to be funded for the next several years, there will be competition among various proponents to perform OA. The good news is that, as the OA process matures, there will be greater potential for product reuse (for example, IER's of light division DISCOM's are comparable to those of heavy division DISCOM's), which will reduce the time spent on a particular unit's OA. This compatibility most likely will be limited to developing models, defining information requirements, and establishing performance parameters.

Because the Revolution in Military Logistics emphasizes speed over mass, it will be vitally important to develop C^2 systems that permit rapid and accurate transmission of IER's. This is a key goal of OA, because it feeds into systems architecture, where the required hardware and software are identified, and then into technical architecture, where specifications for the new systems are designed before their handoff to program managers. This ultimately will result in better, faster, and cheaper CSS. Couple that with improvements across the DTLOMS requirements derived from OA analysis, and the Army logistician will be prepared to meet the challenges of the future. **ALOG**

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The Certified Professional Logistician Program

by Lieutenant Colonel James C. Bates

Professionals take examinations to certify their competence whether they be doctors, lawyers, accountants, or physical therapists. The Army cannot be excellent in logistics without excellent logisticians. I encourage any Army logistician who considers himself or herself a professional to study for and pass the Certified Professional Logistician examination.

—Thomas J. Edwards
Deputy to the Commander
Army Combined Arms Support Command

Studying for the Certified Professional Logistician (CPL) examination increases a logistician's understanding of his field and helps keep him abreast of new developments and related terminology. It also provides a broad view of the entire supply chain from an overarching systems perspective. Logisticians who have attained the CPL designation have demonstrated a sound understanding of logistics fundamentals that will help them to make more informed recommendations and decisions.

The Certified Professional Logistician title is awarded by SOLE—The International Society of Logistics. Founded in 1966, SOLE is a nonprofit international professional society composed of individuals organized to enhance the art and science of logistics technology, education, and management. Currently, fewer than 2,500 logisticians worldwide have attained the CPL designation.

To be successful, a CPL candidate must have a thorough understanding of the mathematical concepts underlying statistics, reliability, maintainability, and the time value of money. Questions on the 8-hour exam are generic in scope, but they apply to the functions performed by logisticians around the world.

The CPL exam is given each year in May and November at proctored sites worldwide. To obtain the CPL designation, applicants must pass each of the exam's four sections: systems management, system design and development, acquisition and production support, and distribution and customer support. Each section has 100 multiple-choice questions and must be completed in 2 hours.

The systems management area addresses logistics terms and definitions; the life-cycle process; contingency and sensitivity analysis; management science and operations research methods; risk and uncertainty; present value; rates of return; discount factors; break-even analysis; reliability and maintainability planning; integrated logistics support plans; scheduling methods; source selection; management styles; and management by objective techniques.

The system design and development portion of the test covers conceptual design, preliminary logistics support planning, criterion modeling, functional analysis, technical manuals, logistics support analysis, principles of logistics, forecasting, system and equipment supportability, time value of money, and compatibility of prime equipment with that of logistics support elements.

The acquisition and production support part of the exam covers such topics as test and support equipment, cataloging, source coding, warranties, continuous acquisition and life-cycle support, materiel flow decisions, materiel requirements planning, storage requirements, maintenance data collection and analysis, failure mode effects and criticality, and inventory models and methods.

The last area of the test, distribution and customer support, examines the candidate's knowledge of distribution performance and evaluation, inventory management, computerized inventory control, order cycling, containerization, transportation, storage and warehousing, maintenance shop operations, hazardous waste management, and system disposal.

There are a number of CPL study groups around the country. At Fort Lee, Virginia, the Deputy to the Commander of the Army Combined Arms Support Command (CASCOM), Tom Edwards, has endorsed a CPL study course taught by the Fort Lee Graduate Center of the Florida Institute of Technology. CASCOM sponsors assigned military and civilian personnel who take the study course. Although no college credit is awarded for the course, it mirrors graduate-level work. The 15-week course is offered twice a year for a minimum of 10 students. Those interested in taking the course at Fort Lee should contact Dr. Lee Dewald at (804) 765–4665 or send an e-mail to dewaldl@ lee.army.mil. **ALOG**

Lieutenant Colonel James C. Bates is the Director of the Logistics Training Department at the Army Quartermaster Center and School, Fort Lee, Virginia. He recently earned the CPL designation.

Logistics-Over-the-Shore Operations

by Major Nathaniel R. Glover

The Army defines logistics-over-the-shore (LOTS) operations as the process of discharging cargo from vessels anchored offshore or in a stream, transporting it to shore or a pier, and marshaling it for movement inland. LOTS operations range in scope from bare beach operations to operations that supplement fixed port facilities and intratheater movements. Because they augment the theater's reception capability, these operations play an integral role in the theater commander's reception, staging, onward movement, and integration process. However, there are some limitations on ship discharge, beach selection and preparation, and shoreside cargo discharge that must be considered when conducting LOTS operations.

Ship Discharge Operations

One of the most important functions in LOTS operations is the discharge of cargo from an ocean-going vessel to lighterage (Army watercraft used as discharge platforms) selected to transfer the cargo from the vessel to the beach or port. The Army provides forces and equipment and conducts strategic vessel discharge operations to support theater development operations.

The primary limitation that exists in this operation is the sea-state level. Sea state is the force of progressively higher seas measured by wave height. Sea state levels are expressed on a scale of 0 to 4, with 0 being a moderately low wave swell and 4 being an excessively high wave swell. High sea state causes ships to oscillate and makes it impossible for them to discharge cargo onto the lighterage. Sea state is a critical limitation and one that cannot be controlled. However, it is important for logistics planners to understand that weather and sea conditions are not always conducive to conducting LOTS operations. Therefore, contingency plans must include an alternate means of theater reception.

Several types of lighterage are used to support strategic sealift discharge operations. Logistics support vessels, landing craft, amphibians, and causeway ferries, to name just a few, are essential to effective and successful LOTS operations. However, arguably one of the most important items of lighterage used in LOTS operations is the roll-on-roll-off discharge facility (RRDF). The RRDF is a floating platform constructed by connecting causeway sections together. The RRDF can be moored (with both anchors down or tied to a pier, an anchor buoy, or a mooring buoy) to a non-self-sustaining ship in sea states 0 and 1 or to a self-sustaining ship in sea states 0 to 2. The RRDF can be operated safely through sea state 2. Joint Publication 4–01.6, Joint Tactics, Techniques, and Procedures for Joint Logistics Over the Shore (JLOTS), identifies the principal elements of the RRDF as the roll-on-roll-off platform, the ship's fendering system, and a calm water ramp. The ramps of ships are opened onto the RRDF to allow roll-on-roll-off cargo to be driven from the vessel onto the RRDF and then ferried to shore.

The RRDF has several limitations. The ramp of a ship to be unloaded opens onto the deck of the RRDF, which is connected to the ship by the ship's hardware and an end adapter. Because the ship and the RRDF move constantly with the motion of the water, heavy dunnage (packing material) must be placed between the two to prevent wear and chafing.

Another difficulty encountered when using the RRDF is the various ramp configurations on vessels owned or contracted by the Military Sealift Command (MSC). An after-action report from a 7th Transportation Group exercise called Resolute Phoenix recommended a standard ramp configuration for ships that must hook up with Army lighterage, especially the RRDF. Each vessel has a different type of ramp, which increases the time needed to moor the RRDF to it. Also, the lack of standardization requires more test runs and coordination to ensure that each platform meets all requirements for a successful hookup.

Another problem encountered in ship discharge operations during Exercise Resolute Phoenix was the different sizes and styles of fenders used on MSC vessels and Army lighterage. Fenders are objects, usually made of rope or rubber, hung over the side of a vessel to protect it from damage caused by impact with wharves or other craft. Improper fendering can cause damage to vessels, rendering them unable to complete their current missions or unavailable for future missions. Time can be lost trying to figure out the proper fendering needed or, even worse, repairing damage to an improperly fendered vessel. Exercise Resolute Phoenix confirmed that there is no plan, field manual (FM), or guidebook that outlines how fendering should be configured when mooring to other vessels.

Terminal units should conduct ship-discharge-to-lighterage training from MSC vessels such as the large, medium-speed, roll-on-roll-off ship and the fast sealift

ship, since these are the vessels that will be used to deploy a force to an overseas theater.

Bare Beach Selection and Preparation

In many areas, existing port facilities are insufficient to support theater tonnage requirements. Coupled with the possibility of enemy insurgent activities, this deficiency can shift the emphasis in planning from large port complexes to widely scattered beach operations. The senior terminal commander in theater continually must look for new beaches to accommodate tonnages too heavy for in-theater ports or to avoid ports that an enemy could attack. Plans should include the proposed location and layout of the area, the type of lighterage to be used, and the task organization needed to attain the desired tonnage capacity. Additionally, the plans should include the route and method of moving to the area, identify construction and communications requirements, and establish procedures for follow-on logistics support.

A logistics support vessel uses a roll-on-roll-off discharge facility to transfer equipment from its cargo hold to lighterage alongside.

According to FM 55–60, Army Terminal Operations, the first step in planning bare beach LOTS sites is to locate the available beach areas. Sites being considered for LOTS operations should be examined closely to ensure that they meet the requirements or can be upgraded to acceptable standards. Area reconnaissance should be conducted as soon as practicable to determine the most suitable sites for operations. The degree to which LOTS sites can be spread out depends on the daily tonnage requirements and the size and layout of the assigned area.

According to the U.S. Transportation Command Joint Logistics-Over-the-Shore Exercise Planning Guide, one of the most important factors in selecting a beach area for LOTS operations is throughput capacity. Beach throughput is based on offload and clearance rates. Offload rate is the rate at which cargo is discharged from lighterage such as the RRDF. Clearance rate refers to the rate at which cargo can be moved from beach discharge points to inland staging and marshaling areas.

There are several factors that must be considered when selecting a LOTS operations area. Often, the capacity of the road from a beach to the principal inland areas limits the beach's usefulness to discharge and transfer supplies and personnel to inland destinations. FM 55–60 specifies that the usual capacity of the beach can never exceed the capacity of the road. Thus, if the road capacity is inadequate, new roads must be built.

Another consideration in selecting a beach site is the availability of a road or rail network, or the possibility of building one, to tie the beach exits to the main transportation network. If suitable roads exist, their exact physical characteristics should be determined. The availability of inland waterways also must be evaluated. FM 55–60 states that the strength and width of any bridges along the way are most important in evaluating the capabilities and limitations of a road network. The existence and need for telephone lines, radio stations, and power lines also must be considered when selecting a beach site.

Typically, beach locations for LOTS operations, particularly in undeveloped areas, will have a number of limitations. It is the beach reconnaissance officer's responsibility to identify and analyze these limitations and make recommendations for improvement.

Shoreside Cargo Discharge Operations

The importance of transferring cargo ashore effectively during LOTS operations cannot be overemphasized. Joint Publication 4–01.6 identifies the elevated causeway system (ELCAS) as one of the most important items of equipment for conducting shoreside cargo discharge operations. The ELCAS can deliver containers, certain vehicles, and bulk cargo ashore without the lighterage having to contend with the surf zone. However, there are potential problems that may affect ELCAS operations.

High surf and increased winds can reduce the stability of the ELCAS and hinder its ability to support cargo being discharged. ELCAS operations are reduced significantly when crosscurrents approach 1½ knots, wave heights are 3 feet or more, or winds are in excess of 20 knots.

Another problem identified in previous LOTS op-

A crane lifts equipment from a vessel positioned alongside an elevated causeway system.

erations is difficulty in transferring containers at the beach with some lighterage. For example, in order for an ELCAS 140-ton crane to unload all containers from a fully loaded LCU–2000 (landing craft, utility) the LCU must change positions so the crane can reach its outermost containers. Also, because of a problem in its design, a logistics support vessel cannot discharge containers onto an ELCAS unless the vessel is positioned very precisely by shifting from port to starboard and then starboard to port.

To ensure that ship-to-lighterage operations are conducted efficiently, terminal service units should become familiar with the characteristics of the various MSC vessel configurations. Additional training in this area will be very beneficial in getting the job done efficiently.

LOTS operations are conducted according to the requirements of the selected operational area. Different operational areas may require different types of lighterage, each with different kinds of equipment that require specific personnel to operate. The development of LOTS modules will allow LOTS planners to task-organize units and equipment effectively in preparation for LOTS operations.

Recommendations

To improve LOTS operations—

- A standing operating procedure should be developed to identify the procedures for configuring the RRDF for the ramps on different types of ships. This task could be performed best by the Army Transportation School in coordination with MSC.
- The Military Traffic Management Command Transportation Engineering Agency, in coordination with MSC and the Army Transportation School, should design fendering that will support both MSC vessels and Army watercraft. Familiarity with MSC vessel characteristics would help Army lighterage units to identify and overcome problems resulting from the incompatibility of equipment.
- A beach reconnaissance officer should be authorized on the terminal battalion modification table of organization and equipment. He should have extensive knowledge of LOTS operations. His primary duties would be to identify possible beach sites for LOTS operations, identify site limitations, recommend and coordinate site improvements, and recommend alternate sites when primary sites are not adequate.
- The Army Transportation School, in coordination with the terminal battalions, needs to develop LOTS operations modules. Since the requirements for conducting LOTS operations differ according to the operations area, the modules should be designed to include the equipment best suited for each environment and the personnel and military occupational specialties needed to operate the designated equipment. The compatibility and relationships of different types of lighterage should be considered when selecting equipment to support an operation. Initial LOTS planning should include a comparison of the selected LOTS operations area as determined by the beach reconnaissance officer and the LOTS module that best supports the area.

The Army must be capable of projecting combat and combat service support forces and their equipment anywhere in the world on short notice. Undeveloped ports and beaches will require LOTS operations. Our preparation and proficiency in conducting LOTS operations undoubtedly will help us deploy quickly to fight a war, or preferably, to deter one. **ALOG**

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Computing Requirements for a Changing Army

by John R. Millard

All of the Army's maintenance personnel rely on a readily available stock of durable and expendable supplies to sustain operations. To support them and ensure maximum equipment readiness, Army policies establish a series of stocks. At the unit level, a prescribed load list (PLL) is the authorized set of maintenance-significant organizational-level items from classes II (clothing and individual equipment), IV (construction and barrier materials), VIII (medical materiel), and IX (repair parts and components) that are needed for the unit's daily operations. Units that perform direct support (DS) and higher levels of maintenance are authorized two sets of items, shop stock and bench stock. The supply support activity has an authorized stockage list (ASL) that backs up unit-level and DS maintenance requirements.

To determine the depth and breadth of these stocks, the Army relies on previous experience. While this method may be adequate when conditions do not change, it is not satisfactory for the time of fundamental transformation facing today's Army. Accordingly, the Army Materiel Command (AMC) and the AMC Logistics Support Activity (LOGSA) at Redstone Arsenal, Alabama, are developing some new tools for computing requirements that will increase support to the user in changing situations.

Computing What Is Needed

Some common sources of change at the unit level are the introduction of new equipment, increases in operating tempo (OPTEMPO), and revisions in unit structure. Many recent Army deployments have used a task force organization that involves all three of these changes. A task force contains portions of several units, with selected equipment from those units or other sources, and a new support structure. In such situations, logisticians cannot rely only on their previous experience.

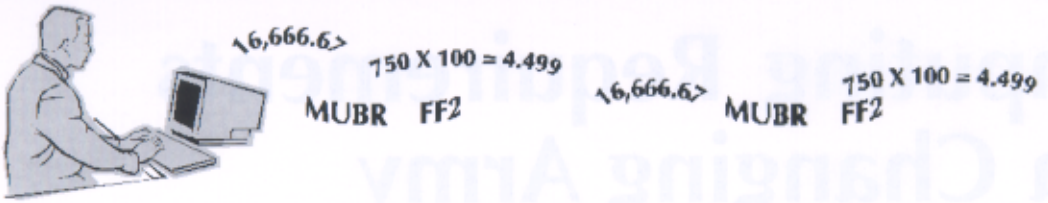
LOGSA is responsible for developing recommended stock lists for nonmedical equipment in support of these changes. LOGSA uses the information available in AMC's corporate data bases to compute support requirements tailored to fit the unit's operational scenario and equipment. The foundation of all LOGSA products is the provisioning data maintained by AMC's commodity commands. The Provisioning Master Record (PMR) contains all individual applications of a repair part on an end item and usually is built during the development and fielding of equipment to the Army. Each commodity command maintains a separate PMR for applications of their parts on end items. One end item therefore may have data for its repair parts in all of these PMR's.

Data in the PMR include maintenance information such as the source, maintenance, and recoverability (SMR) code and anticipated failure factors. Failure factors represent different OPTEMPO conditions. A failure factor is the number of failures expected for 100 end items operated for 1 year at a given OPTEMPO. Failure factor 1 (FF1) is the peacetime failure rate, while failure factor 2 (FF2) is the wartime rate. For various reasons, the commodity commands may not be able to revise the PMR failure factors after the initial load of an item is issued. This means that the PMR failure factors may represent assumptions made during the development phase of an item's equipment life cycle.

The Support List Allowance Master (SLAM) file is extracted from all of the PMR's and shows repair parts-related data maintenance tasks at the crew through depot levels on over 12,000 end items. LOGSA maintains the SLAM file to support automated requirements computation. The SLAM FF1 is used to compute peacetime recommended PLL's, ASL's, and candidate bench stock.

The SLAM file and an end item file derived from the SLAM file act as source files for the information contained in Supply Bulletin (SB) 38–101, Spare/Repair Part to End Item Application. This SB allows users to identify all end items that use a selected part and all parts used on a selected end item. Users can compare parts used on several end items and thus identify parts that are common to two end items and parts that are peculiar to each. The SB is especially useful for units changing models of equipment (such as replacing the M109A5 howitzer with the M109A6 version). The SB is published annually by LOGSA in CD–ROM format and is available through the Army publications system. (See related article on page 48.) The SLAM file is also the source of other LOGSA products involving end items and their associated repair parts.

AMC developed another data base called the Can-



didate Item File (CIF) to provide more accurate recommendations for supporting increased OPTEMPO scenarios. The CIF features a restricted range of parts for an end item and a different kind of failure rate called the mean units between replacement (MUBR). MUBR is the total removal rate for all applications of a part on a specific end item in terms of miles, hours, or rounds of operation. The CIF is developed by the commodity commands using automated and manual processes. It includes essential organizational and DS class IX line replaceable units and related parts needed during maintenance of the Army's major combat and combat support equipment (about 700 end items). A CIF MUBR is based on the best data available at the time it is calculated. Sources for MUBR include field exercise data collection, sample data collection, and retail demands.

AMC's Army Materiel Systems Analysis Activity (AMSAA), at Aberdeen Proving Ground, Maryland, developed an availability-based computer model, the Optimum Stockage Requirements Analysis Program (OSRAP). The OSRAP is used to compute parts needed by a deploying unit to sustain an end item until that unit's supporting supply and maintenance units are reestablished (that is, for 45 to 60 days). The OSRAP gives logisticians the ability to vary the parameters used in computating requirements. These parameters include—

- Availability goals.
- Percentage of end items in reserve.
- Resupply (is it available or not?).
- Order ship time (in-stock days and out-of-stock days).
- Days of support.
- Optimization method (by funds, weight, or volume).

The OSRAP uses a file called the Ready-to-Go CIF (RTG CIF) to compute requirements. The RTG CIF includes an FF2 based on MUBR from the CIF or an FF2 from the SLAM file when a CIF does not exist for an end item. The MUBR or FF2 is converted to a 15-day value for 100 end items. The RTG CIF derives the 15-day SLAM FF2 by dividing the SLAM FF2 (an annual value) by 24. The improved FF2 in the RTG CIF allows OSRAP to provide more accurate recommendations.

Only organizational parts are modeled for unit PLL's. Both organizational and DS parts are modeled for DS, area support group, or corps support group ASL's. The range of end items with CIF's, the accuracy of the FF2, and the range of parts included in the CIF directly affect the products provided to customers.

To understand the value of a CIF, we need to examine the difference between a failure factor and MUBR. As noted above, a failure factor is defined as the number of failures expected for 100 end items operated for 1 year. This is developed using an anticipated life for the part and an estimated usage rate for the end item. The initial failure factor in the PMR is calculated using these estimates during the provisioning process and may be revised as the commodity command gains demand experience. MUBR is defined as the total removal rate for all applications of a part on a specific end item in terms of miles, hours, or rounds of operation. MUBR can be computed at any time and is based on the best data available at that time. MUBR provides an experience-based value to use in place of an anticipation-based value.

Here is a simple example of how MUBR is computed. Let's assume that a unit has 10 M966 high-mobility, multipurpose, wheeled vehicles that were driven a total of 50,000 miles during a specified period. Also, let's assume that three starters were replaced on these vehicles during that same period. The starter's MUBR would be computed as follows—

$$\text{MUBR} = \frac{\text{End item usage (miles [mi])}}{\text{Quantity of parts replaced}}$$

$$\text{MUBR} = \frac{50{,}000}{3} = 16{,}666.67 \text{ mi between replacement}$$

The MUBR for this starter then can be converted into a failure factor using either expected usage from an equipment mission profile developed by the Army Combined Arms Support Command or from a planning scenario. For example, if the wartime mission profile for the M966 is 750 miles for 15 days, the FF2 is derived as follows—

$$\text{FF2} = \frac{\text{Expected usage per end item X 100 end items}}{\text{MUBR}}$$

$$\text{FF2} = \frac{750 \text{ X } 100}{16{,}666.67} = 4.499$$

Accumulation of actual usage and demand data allows computation of MUBR's that subsequently can be converted to failure factors for peacetime scenarios. LOGSA receives and stores both unit-level equipment

usage and repair part demand history. These data provide the basis for LOGSA's initiative to compute alternative FF1 values automatically for all usage-reportable end items. The FF1 will use total Army data or subsets of such data. The alternative FF1's will provide additional data sources to improve AMC's recommendations for PLL's and ASL's.

AMC's Plan for the Future

Today, recommended PLL's and ASL's are requested from LOGSA via message, e-mail, or telephone. LOGSA prepares the PLL's and ASL's and returns them to the requester using the same means. Although this process generally requires less than a day, several exchanges may be required for larger planning efforts. Planning for a large-scale deployment is an iterative effort and may consume a significant amount of valuable time.

Within the near future, LOGSA's Logistics Integrated Data Base (LIDB) will replace this slow and often cumbersome system with an on-line, user-initiated system. The user will select the type of product he desires through several graphical user interfaces, enter the equipment supported (both the quantity of the item and its national item identification number), and any other required parameters. The resulting products will be computed by the LIDB application and returned to the user's terminal for review or download. The LIDB uses automated routines, so turnaround times will be minimal. After review, the user can revise the equipment numbers and other parameters as desired and rerun the programs.

The LIDB will support other automated requirements computation processes of benefit to the user in the field. The first is an automated method of deriving revised failure factors. This process will analyze the data statistically and store those failure factors that vary from the PMR values for potential use within the LIDB application. The revised failure factor data also will be available for use by the commodity commands in maintaining PMR's. The number of end items that require usage reporting and the need for correct identification of demands for specific end items limit the scope of this effort.

The second process supported by the LIDB is an automated Deployment Stock Planner (DSP) for use by the field logistician or planner. The Army Logistics Integration Agency and AMSAA developed a prototype DSP as a planning tool for field use, and a manual prototype DSP was used to develop recommended stocks for planning the deployment of large units. In the LIDB environment, DSP will allow a user to determine a set of parts requirements for a planning scenario. These can be downloaded and, after review, loaded into the Standard Army Retail Supply System (SARSS) to adjust the requirements objective (RO). An increased RO causes SARSS to order and stock additional items before they are needed instead of reacting to increased needs during a deployment.

In addition to generating PLL's and ASL's, the LIDB and its graphical user interfaces will provide information currently available in SB 38–101 or obtained manually from LOGSA and will add new information. All of this information will be available on line to the user and will include—

- Parts used on a selected end item (by national stock number, end item code, or model).
- End items that use a selected part.
- Common/peculiar repair parts report. This report lists the parts used on each of two end items and the parts peculiar to each.
- Reverse Support List Allowance Card (SLAC) report. This report compares one end item to a list of end items and identifies those parts that are unique to that end item.
- Tailored Reverse SLAC report. This report allows the user to compare an ASL to an end item being removed and identify those repair parts no longer needed in the ASL.

AMC plans other initiatives to aid planners in the future. Expansion of the CIF, to include all needed supplies related to an end item, is being explored. This expansion could include, for example, nonpotable water; petroleum, oils, and lubricants (class III); and ammunition (class V) to support an M1 tank or other major end item. Additional CIF's for some nontraditional end items, such as a soldier (rations, water, and other supplies) or command post (barrier material and common table of allowances items such as tents or tables) also are envisioned. Including these items in the LIDB of the future will improve the scope of requirements developed in the DSP.

Today, requirements computation is manpower intensive, time consuming, and limited by AMC's capacity to modify PMR failure data to reflect actual experience. In the near future, the LIDB will support on-line user requests for recommended PLL's and ASL's that feature improved quality. The DSP will ease the planner's implementation of recommended stock requirements in a proactive rather than a reactive mode. These and other new tools will be available on line to users at all levels and will increase their capabilities as logisticians.

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Running on Empty—Hybrid-Electric Technology Offers Viable Fuel Options

Electric and hybrid-electric technology enables a vehicle to run on either fuel or electric motors that use batteries. Increasingly, this technology is being adapted for use in military vehicles because it boosts the vehicles' fuel economy and reduces the need to refuel them.

In fiscal year 1993, the Defense Advanced Research Projects Agency (DARPA) began funding a program to develop electric and hybrid-electric military vehicles. Collaborative research and development efforts involving several Federal and municipal agencies and private-sector manufacturers led to proof-of-concept tests of various vehicles designed for military use.

Government-Industry Partnership

Seven companies were selected competitively by DARPA to form a consortium to develop vehicles with electrical propulsion systems for the military. Between 1993 and 1998, this consortium collaborated with Government agencies on more than 300 projects. Pushing the limits of existing battery technologies was a key focus of those projects, but they also concentrated on developing hybrid-electric transmissions, auxiliary power units and motors, advanced battery and charger systems, flywheels to augment or replace batteries, and lighter materials to reduce vehicle weight.

DARPA transferred its Electric and Hybrid Vehicle Technology Program to the Department of Transportation (DOT) in fiscal year 1999, and the development projects continue under DOT's Advanced Vehicle Technologies Program. DOT, DARPA, and the Department of Energy have worked in partnership with the consortium to further the development of electric and hybrid vehicles. The Army Tank-Automotive Research, Development, and Engineering Center in Warren, Michigan, manages the hybrid vehicle program for the Army.

☐ **Two models of a hybrid-electric HMMWV in testing at the ATC's Churchville test site in Maryland.**

The Hybrid HMMWV

One of DARPA's goals was to develop a hybrid high-mobility, multipurpose, wheeled vehicle (HMMWV) that would average 25 to 30 miles to a gallon of fuel, compared to about 15 miles per gallon for a conventional HMMWV. DARPA also asked for a vehicle that could run up to 25 miles on full electrical power.

Two versions of hybrid HMMWV's were developed and tested for over 18 months at the Army Developmental Test Command's Aberdeen Test Center (ATC) in Maryland. Each of the HMMWV's tested has a 1.9-liter Volkswagen diesel engine instead of the 6.5-liter V8 engine of a conventional HMMWV and lead-acid battery packs that provide electric power to the motors. One model has two electric motors—one for each axle—and the other has four electric motors. The hybrid HMMWV's have alternators that recharge the batteries and provide propulsion power when the vehicles are powered by the diesel engine. When the engine is turned off, the vehicles can be operated in an all-electric mode.

To help the Army evaluate the vehicles' ability to avoid detection, ATC test engineers collected data on the vehicles' infrared heat signatures, noise, and electromagnetic characteristics when operating in electric and hybrid-electric modes. The tests also provided performance data on batteries, electric motors, vehicle handling, and other operational characteristics.

The JTEV

The joint tactical electrical vehicle (JTEV), which is a "purpose-built" hybrid reconnaissance or scout vehicle developed as a demonstration project for the Marine Corps in 1994, also was tested at the ATC.

AeroVironment, Inc., of Monrovia, California, designed the JTEV powertrain and control system, which the company integrated into a chassis custom-built by Rod Millen Motorsport. AeroVironment modified commercial off-the-shelf equipment so that it could withstand the shock and vibration of severe off-road driving. Diesel engines, electric motors, and batteries already used in the private sector were "ruggedized" so they could be used in a military environment.

The JTEV contains a 2.1-liter Peugot diesel engine and lead-acid battery packs that provide power to a magnetic drive motor on each axle. Manufacturers across the United States are working to develop lighter, more efficient batteries, and the JTEV is designed so the lead-acid batteries eventually can be replaced with improved battery packs. Using other, more exotic batteries, such as the nickel metal hydride (Ni-Mh) or lithium polymer (Li-Polymer), would decrease weight, increase payload capacity, and improve vehicle performance. Like the HMMWV's, the JTEV has an alternator that recharges its batteries and provides propulsion power when the vehicle is powered by its engine. When the engine is turned off, the vehicle can function in an all-electric mode.

☐ The joint tactical electrical vehicle underwent more than a year of testing at the ATC.

Hybrid-electric technology offers the Army a feasible option for increasing system capabilities and reducing fuel costs. Other potential adaptations of hybrid technology include the M2 Bradley fighting vehicle, the M113 troop carrier, the parallel hybrid electric-line haul truck, and a hybrid member of the family of medium tactical vehicles. **ALOG**

The Army Logistician *staff thanks Mike Cast of the Army Developmental Test Command Public Affairs Office at Aberdeen Proving Ground, Maryland, for his contribution to this article.*

E-Commerce Joins the Guard

by Jason M. LeMay and David W. Altom

One of the best-kept secrets in military logistics circles is nestled quietly in the thoroughbred horse capital of the world. In the Bluegrass State of Kentucky, you can find one of the most innovative and creative logistics and redistribution operations centers anywhere—and it is just a "point-and-click" away! It is the Kentucky Logistics Operations Center (KYLOC), located at the former Lexington Blue Grass Army Depot (LBAD) in Avon, Kentucky.

KYLOC's Genesis

Originally established in 1941 as the Lexington Army Signal Depot, LBAD was closed in 1995 as a result of a Base Realignment and Closure Commission recommendation. Following its subsequent lease by the Commonwealth of Kentucky, the installation was renamed Bluegrass Station and initially was the home of the Retrograde Europe Non-Rolling Stock (RETROEUR–NRS) Program. The program's mission was to receive, sort, and redistribute nonrolling stock that was surplus after the drawdown of forces in Europe during the early 1990's. More than 1,400 CONEX containers of stock valued at over $432 million were received from the Army's stockpiles in Europe and processed through RETROEUR–NRS. Ranging from uniforms and personal supplies to tools and heavy equipment (excluding vehicles), these items were cataloged, reclassified, and advertised on the Internet as being available for redistribution to military units in and outside of the continental United States. This reuse of existing military equipment and supplies eliminated the need to purchase $432 million worth of new items.

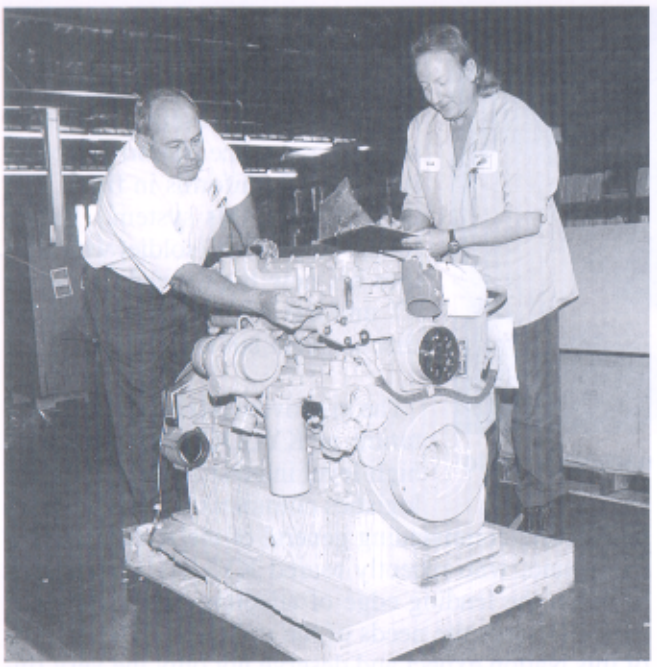
☐ **Bluegrass Station includes 110 buildings and is home to approximately 50 tenants.**

As the RETROEUR–NRS program wound down, Kentucky's Adjutant General took a leap of faith. Rather than see a successful operation and all of the lessons learned from it fade into history, he established the KYLOC and created an advisory board of State government and Army National Guard (ARNG) stakeholders to guide the development of its missions.

"Opportunity seldom knocks twice," said the Adjutant General, Major General John R. Groves, Jr. "We had a unique skill set available at a moment in time and an ideal location. We were fortunate enough to recognize it and to truly believe that we could take what we learned through the hard work and innovation of many people, sustain it, and make great things happen. I think the accomplishments of the KYLOC—both the clothing and class IX programs— speak for themselves. The KYLOC benefits Kentucky's citizens through more jobs but, more importantly, the program will eventually positively touch the life of every Army National Guard soldier in the Nation."

National Guard Materiel Management Center

KYLOC's first mission was in partnership with the National Guard Bureau (NGB). Together, they created the National Guard Materiel Management Center (NGMMC), which began as an experiment to provide ground and aviation repair parts to ARNG units across the Nation—all from surplus stocks. Like RETROEUR–NRS, KYLOC proved that computer communication and the Internet are essential in advertising supplies on hand. The Lands' End® type of real-time Internet catalog and ordering operation, which was unheard of in military circles, is the real key to the success of the logistics programs at KYLOC. For example, if a user needs an engine, he can go to www.ngmmc.com on the Internet, search for the engine by stock number, point and click, and the engine will be shipped to his unit. The best part is that it's all free issue to ARNG units.



☐ Inspectors at the NGMMC give the "white glove" treatment to a newly arrived 2½-ton truck engine.

The order is out the door of the NGMMC and on its way by United Parcel Service or another commercial carrier within 48 hours.

In the past, orders went to the depots through the state's U.S. Property and Fiscal Office (USP&FO), where the requested items may have been backordered. Meanwhile, at an installation two states away, there may have been 12 pallets of the same item about to be shipped to a Defense Reutilization and Marketing Office as excess.

The NGMMC provides a central inventory and a central listing. It has "earned its keep" with a $10 to $1 return on investment for the NGB through cost avoidance. Numbers like these have made Colonel Layne Walker, Director of Army Logistics for the National Guard Bureau, a true believer. "The NGMMC has saved the Army National Guard more than $25 million in just 3 short years. That kind of money demands respect, and their efforts allow us to apply those savings against other needs throughout the organization," said Walker.

A recent addition to the NGMMC mission is an organizational clothing and individual equipment redistribution system. This system operates basically the same way as the repair parts system by capturing excess clothing and equipment from within the ARNG system and redistributing it where it is needed.

One of the newest experiments underway at NGMMC is a partnership with the NGB to redistribute slightly used military clothing. Six states are shipping turned-in nonpersonal clothing items to the NGMMC. The items are inspected for compliance with Army standards and, if they pass inspection, they are laundered and redistributed as free issue to the states via the Internet ordering system. As an example, a "class A" all-weather coat that costs around $130 new can be redistributed through the NGMMC program as free issue, making the purchase of a new item unnecessary.

Central Clothing Distribution Facility

In another partnership with the NGB and the Defense Supply Center Philadelphia (DSCP), KYLOC distributes clothing to ARNG soldiers across the Nation. Until this partnership was formed, the USP&FO in each of the 54 states and territories kept a supply of clothing on hand to meet the needs of ARNG soldiers in the state. While anyone could go to the Internet, order clothing from a commercial vendor, and have it on his doorstep in 7 days, a soldier typically would find his uniform request winding its way up through the state system to the USP&FO and then back down through the system to him in a process that took as long as 45 days. On top of that, the uniform still would need patches and nametapes sewn on before it was ready to wear.

The clothing issue system obviously needed improvement, but no one was quite sure how to tackle it. As it turned out, the framing of the problem pointed to the answer. If customers could go to the Lands' End website, browse their catalog, order items on line, and have them shipped to their home in a matter of days, why couldn't the Guard create a similar system for its soldiers? Using their collective expertise, KYLOC, DSCP, and the NGB soon came up with a solution. The lessons learned from RETROEUR–NRS proved their value again, and the Central Clothing Distribution Facility (CCDF)—a "virtual prime vendor" of DSCP—was born.

☐ Clothing received for the NGMMC recycling program is inspected carefully and laundered before it is issued at no cost to state ARNG units.

Despite some initial concerns by the USP&FO's, the CCDF consolidated its inventories in 54 states and territories into one large stockpile and began receiving shipments from DSCP, which served as the wholesaler. Internet, e-mail, telephone, and fax ordering were set up. Now, within 10 days of ordering, a soldier can have clothing, complete with patches and nametapes sewn on, delivered to him at his unit. This innovative process simplifies life for the DSCP and is more cost efficient for the ARNG. The soldiers benefit from the faster turnaround and greatly improved ordering through a simple point, click, and ship process. Perhaps the most visible value added for the soldiers is that the uniforms already have the required patches and nametapes properly sewn on. Getting this done often proves a challenge for some troops, especially in more rural areas.

☐ **A CCDF employee sews a nametape onto a BDU blouse.**

This "kitting" concept—having everything a soldier needs delivered to him in one box, ready to go—was an earlier lesson learned that KYLOC was able to apply to the CCDF operation. The value of the improved service may be difficult to measure in dollars, but the concept means one less distraction from the mission for the soldier. The fiscal bottom line is important in today's military, but equally important to KYLOC is how its services benefit its customer—the warfighter.

Harry Veneri, DSCP virtual prime vendor program manager for the Clothing and Textile Directorate, knows firsthand the potential of this program. "We are estimating that the virtual prime vendor agreement with Kentucky and NGB will save Federal taxpayers over $10 million annually. Now states won't need to spend millions of dollars up front based on anticipated needs for clothing items that end up sitting on the shelves for several months," said Veneri.

Other KYLOC Projects

KYLOC also has embraced special-issue projects. Perhaps its most far-reaching effort will be the nationwide roll-out of the improved physical training (PT) uniform to ARNG soldiers as a result of a congressional funding add-on. The NGB will pass the funding to KYLOC, which will purchase in bulk from the DSCP and distribute directly to soldiers and units through its CCDF program. This will improve the NGB's ability to manage the roll-out; it also will centralize purchasing, accountability, and reporting rather than dividing the funding into 54 chunks for separate purchases from DSCP. A full one-third of ARNG soldiers across the Nation will be issued the PT uniforms in fiscal year 2001 through this system. Before long, every ARNG soldier who slips into his new high-speed, low-drag PT uniform will thank not only his first sergeant but also KYLOC.

The improvements and experimentation at KYLOC have generated high-level interest from the military logistics community. General John G. Coburn, commanding general of the Army Materiel Command, who recently toured KYLOC, considers it to be on the leading edge of adapting electronic commerce to serve the needs of the military. "The citizens of this Nation expect and deserve not only the very finest trained and equipped military force in the world but also the most efficient. Computer-based electronic commerce is transforming the way the world conducts business. We need to make every effort to adapt these innovations to more quickly and efficiently project supplies and equipment to where the warfighter needs them," Coburn said.

So where does KYLOC go from here? The NGMMC's repair parts project continues to save money, because there are still too many parts within the ARNG that are "washing out" of the system and forcing unnecessary new purchases. Under DSCP's virtual prime vendor program, the CCDF has begun distributing clothing to the Marine Corps Reserve. DSCP personnel, in conjunction with the CCDF, are making proposals to other reserve components. Electronic commerce has joined the Guard, and it is paying its own way with some $35 million saved by KYLOC since July 1997. With that kind of resumé, e-commerce is here to stay. **ALOG**

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The CSS Quick Reaction Force

by Captain Jason C. Mackay

It is 0315 near a U.S. brigade support area (BSA) in the Republic of Mojave. The Parumphian Paramilitary Group (PPG) commander thinks the lack of illumination is a stroke of luck as he gazes at the BSA perimeter through stolen PVS 7B night vision goggles (NVG's). The PPG begins its raid.

Lieutenant Williams, agitated, stares at the silent field phone. She can get no response from the listening post or observation post. Without warning, the sound of light machinegun fire rings out, and fighting position 2 disappears, obliterated by a rocket-propelled grenade. Panic fire erupts from the western perimeter. On the eastern perimeter, the PPG raiders hastily attach satchel charges to the 5,000-gallon fuel tankers that are parked on the outskirts of the perimeter.

Sergeant Jones has been on roving patrol for 3 hours when the shooting and explosions start. He starts running for his assigned position when he notices people sneaking around the fuel tankers. He radios this information to the company command post. As he brings his weapon to the ready, a single 7.62-millimeter round knocks him off his feet, taking his life. On the overlooking ridge, a PPG sniper lowers his rifle and resumes scanning with the stolen NVG's, thinking how much easier they make it for him to cover the raiders.

Captain Baker is trying to make sense of the situation: sporadic contact to the west and a vague spot report from a roving guard inside the wire. It occurs to him that the western contact is a ruse; there is an enemy presence inside his perimeter. The tankers! Baker quickly orders his executive officer, Lieutenant Martin, to take the quick reaction force (QRF) over to the tankers and investigate.

With the satchel charges armed and in place, the raiders stealthily slide out of the same gap in the perimeter (not covered by observation or fires) through which they had entered. The PPG patrol leader pulls rear security and shuffles backward, taking care to hop over the single strand of concertina wire as he exits the BSA.

Meanwhile, Private First Class Krantz and his comrades on the eastern perimeter are getting antsy. No information has come over the field phone, and no one is answering at the command post. Krantz thinks to himself: Where is Sergeant Jones? Someone needs give us the scoop! Krantz is beside himself.

Lieutenant Martin has lost control of the QRF's movement. QRF soldiers now are bobbing and weaving through the tankers. Private Krantz notices movement behind him, near the tankers. "Sappers!" he thinks, and takes aim. A fierce firefight rages between the equally surprised QRF and the defending soldiers, firing inside their own perimeter—each side unknowingly committing fratricide at a gruesome rate.

As the PPG leader counts his last raider at the objective rally point, he is distracted by distant U.S. weapons fire. "What is that all about?" he asks himself. Shaking it off, he accounts for everyone and detonates the satchel charges.

As the sun rises over the smoldering remains of the BSA, damage control teams move about. Captain Baker and his first sergeant wearily piece together what they know. The tankers have been destroyed; the QRF soldiers are all burned or dead; 10 soldiers on the perimeter are wounded or killed.

What happened? Many things went wrong—lack of situational awareness, a poorly trained QRF, no QRF employment procedure, weak defenses—and, in true Murphy's Law fashion, they went wrong in the worst possible sequence. It didn't have to happen, and with a certain amount of preparation and training, it won't happen to you. A properly trained, led, and used QRF is essential to the rear area commander and the combat service support (CSS) units the QRF protects. This article will discuss the QRF: what it does; what it does not do; how it works; when to use it; and how to prepare the QRF to accomplish its mission.

What the QRF Does

Simply put, the QRF is the commander's reserve. What it does is based on the known threat, doctrine, past operations, the scheme of defense, the mission and intent as defined by the commander, analysis of the mission and intent, and the composition of the QRF.

Threat. Threat potential plays a large role in the decision-making process. The key is to plan around reasonable threat scenarios. For example, it is unreasonable to assume that a CSS unit could counter a company-level air assault. On the other hand, countering squad- and team-level harassment, probes, infiltration, and raids is plausible. If there is a known threat, review the doctrine, past operations, and what is known about the potential enemy with your G/S2. If there is no known threat, you may reasonably assume that sappers, sympathizers, special-purpose forces, dismounted reconnaissance teams, rogue mounted reconnaissance, and heliborne infantry (up to platoon strength) will be your level I, II, and III threats. Also examine the bypass criteria of your maneuver units. This will tell you what

they are leaving behind. Know your enemies; it will serve you well in defending against them.

Scheme of defense. How your unit defends itself plays a large role in what your QRF will do. Pay careful attention to mission-essential vulnerable areas (MEVA's), the scheme of defense, the terrain, the mission at hand, and other assets available to the commander. MEVA's are those assets or facilities that, if destroyed, would jeopardize the mission. Where MEVA's are located will give you a good indication of where the enemy will go. The overall defense scheme also may indicate where the enemy will go. The enemy usually will work a perimeter to find seams and weak points, such as points at which fields of fire do not overlap, and sneak through dead space in an attempt to breach the perimeter. Terrain has the strongest influence on your defense. For example, if you are in the rear area operations of a small, heavily populated country, urban operations and protecting noncombatant evacuees will dictate a "die-in-place" defense. On the other hand, if you are in a desert with vast expanses of terrain that support secondary fighting positions, you probably can trade terrain for time. Also, combat assets available to your commander will dictate the response, size, and composition of your QRF. If an infantry platoon is attached to the BSA for security, your QRF may not have to be as large or as skilled.

Mission and commander's intent. The mission and intent of the commander are essential to the proper execution of an operation. A QRF is no different. A simple broad-brush task, purpose, and intent will do, such as—

- Task: On order, close with and destroy the enemy.
- Purpose: To re-establish the perimeter and retake key positions essential to the unit's mission.
- Intent: To move to contact stealthily and swiftly, locate the enemy, and destroy the enemy using controlled fires, surprise, and violent and methodical execution. The QRF members should have no doubt about what they are there to do.

Mission analysis. Now that you have a mission statement, you need to decide what tasks support it. This process closely resembles establishing collective tasks that support the unit mission-essential task list (METL). Focus on what is important and probable. Remember, most of what the QRF does is a battle drill. Mastering the basics will allow the QRF to improvise as needed. Command and control, trigger criteria, and correct use of the QRF are as important as training its members.

QRF composition. Understanding the mission, supporting tasks, and scheme of defense will help you determine your QRF's composition. You must decide how many people you need and what type of weapons they will use. However you compose your QRF, all implied and specified tasks must be assigned with a primary and alternate. QRF operations should be based on standing operating procedures and battle drills. There will be no time to stop and figure things out when the QRF is called on to act.

What the QRF Does Not Do

The QRF is not a "hey-you, ash-and-trash" detail. It is possibly the most misused entity in the CSS world. Some units have used the QRF for gate duty, enemy prisoner of war (EPW) searches, and general-purpose response to everything that goes bump in the night. As a result, those units bungled the genuine QRF missions, and the other soldiers in the units were not trained in basic soldier skills, such as how to search an EPW without masking each other's fire. Worse, soldiers and leaders lost confidence in their warfighting skills. Remember, this is the commander's reserve; no other missions should be assigned.

How and When to Use the QRF

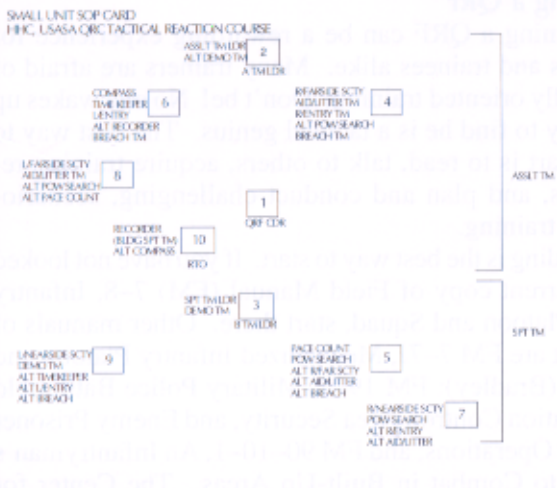
How the QRF executes its mission is critical. Tactical relief of a unit in contact with the enemy often can end before it starts. The QRF can get lost, orient on the wrong part of the perimeter, die in their trucks, and so on. Execution driven by trigger criteria, situational awareness, controlled fires, swift and violent execution of battle drills, restoration of the perimeter and battle hand-off to the owning unit, and extraction is essential to the success of the mission.

Trigger criteria. Trigger criteria are specific conditions that cause the base cluster operations center to employ the QRF. They set the QRF wheels in motion. The criteria should be defined and observable and should be determined based on the particulars of your battlespace to allow the QRF time to alert and move. One technique is to select probable enemy courses of action, plan backwards from the enemy end state, and plan an intercept based on the mission, enemy, terrain, troops, and time available and the QRF's reaction time. Reading the trigger criteria is a battle task for the staff or company command post that controls the QRF and must be trained and rehearsed.

Situational awareness. Maintaining situational awareness will do the most to prevent fratricide. Masking friendly fires, encircling EPW's while covering a search, and running around aimlessly are signs of poor situational awareness. Soldiers who are frightened because of poor situational awareness are more likely to shoot each other. When soldiers execute anything (not just QRF duties), they need to have the best possible picture of what they are doing, when and why they are doing it, and where friendly and enemy troops are. Without this, the QRF mission is doomed to failure and, worse, loss of life.

Controlled fires. These are critical to the success of the QRF because your QRF will operate inside the pe-

ORF SOP Card



A QRF standing operating procedure (SOP) card is given to each QRF team member. The card identifies each team member (represented by a box), his position (the number in the box), and his duties in that position. For example, the soldier in position 4 provides right side, far side security when crossing linear danger areas (R/FARSIDE SCTY), is a part of the aid and litter team (AID/LITTER TM) when dealing with casualties, enters a building through the opening on the right side during building clearing (R/ENTRY TM), is an alternate for the enemy prisoner of war search team (ALT POW SEARCH), and moves and disables obstacles as a member of the breach team (BREACH TM). Each person is assigned a number so he can cross-load duties and equipment in case of death or injury. The SOP card also illustrates the chain of command. In case the QRF commander (#1) is killed, the A Team leader (#2) takes charge. The QRF is broken into two teams: A Team, the assault (ASSLT) team, and B Team, the support (SPT) team. The arrangement of the boxes represents a squad column moving in traveling overwatch formation. Direction of travel is the top of the page.

rimeter where fratricide is more likely. There are two techniques to control fires on an individual level. One is to use "guns and eyeballs," and the other is to use "perimeter out." Regardless of technique, QRF members should identify targets positively before engaging the enemy, mass fires by teams as the terrain and friendly positions permit, and attempt to maneuver in such a way that their fires will head out of the perimeter.

"Guns and eyeballs" originated in military operations in urban terrain (MOUT) and means that the soldier has his weapon at the ready and can identify and engage without fumbling. He is prepared mentally as well as physically. When a team member crosses through his sector of fire, he points his weapon toward the ground to avoid fratricide.

The "perimeter out" technique is simple: all fires are outbound. No one on the perimeter turns and fires inward unless directly ordered to do so. At the same time, the QRF attempts to maneuver into a position so that its fires are outbound. As we all know, bullets do not stop until they hit something.

Neither technique relieves the leader's responsibility of controlling fires in his unit. Controlling fires is the first step to the successful battle drill and to the overall success of the QRF.

Battle drill. The QRF's programmed reaction is rehearsed and trained repeatedly. It starts when the QRF team members jump off their cots and ends when they conduct recovery after the mission. During a battle drill, the QRF should emphasize shock and speed on the initial engagement, the objective sweep, and the actions taken on the objective.

The QRF should rehearse bounding in teams while one team provides suppressive fires. Communication throughout the QRF is important to avoid fratricide. Yelling "up," "down," and other instructions is important to maintaining communication and situational awareness. This firefight should be one sided—for your side.

Actions on the objective. The sweep through the objective begins as the QRF closes the distance between itself and the enemy and regains terrain from the enemy. The QRF is at greatest risk at this time because it is operating in close quarters. This is the enemy's last chance to take someone with them. The QRF should be careful yet ruthless and quick; kick weapons away; squash resistance; and intimidate the enemy as much as the rules of engagement will allow. Members also need to stay in "lanes" during the sweep so they do not mask each other's fires. Lanes also make it easier to establish security after the objective is seized.

As security is established, the QRF commander tightens control and executes. The team leaders will assemble a LACE report—liquid (water), ammunition on hand, casualties (friendly only), and essential equipment (such as weapons). Red, amber, and green is a good status technique. As the LACE is coming in, the QRF commander needs to call out the specialty teams: demolition, EPW search, and aid and litter. The demolition team can collect enemy equipment. The recorder writes down items collected by the EPW search team. At this point, the QRF commander may need to arrange for a casualty evacuation for EPW and friendly casualties. To avoid chaos, your EPW team should have a kit containing long zip ties (handcuffs), EPW tags, and plastic bags (for EPW effects). The QRF, having secured the area, must continue resetting the defense, prepare for counter-

attack, and arrange for relief in place.

Restoring the perimeter. The priorities for restoring the perimeter are security, primary killing system emplacement, communications, and countermobility repairs. The QRF just kicked somebody out of its backyard. They may be determined to get back in. After all, the best place to make a hole is where something has been patched. The QRF must prepare for a counterattack. Security already is in place from the sweep on the objective. Instead of using individual weapons, the QRF commander emplaces any abandoned crew weapons that still have ammunition and puts crews on them. Any wire communication should be tested and restored if possible. While the QRF commander arranges for relief in place through the next higher commander, the assistant QRF commander determines which barriers on the perimeter need to be repaired first, and a team works on this until relief in place begins.

Relief in place and extraction. With relief in place, the objective is to replace the QRF with the sector personnel in a controlled manner that affords security, situational awareness, force protection, and speed. Replacing by buddy team is the best technique. The QRF buddy teams exchange information with the relieving buddy teams, to include principal direction of fire, sector sketches, and final protective-line orientation. As the QRF exits, the team members should move to a rally point for the movement back to the recovery site. The QRF commander remains in charge until all QRF team members have been relieved. Once the QRF commander exchanges information with the relief commander, battle hand-off is complete and the QRF can be extracted.

After-action review (AAR) and recovery. The mission is not finished after the extraction. How the team executed is not as important as how it can do better next time. The QRF must conduct AAR's as soon as tactically possible.

Two AAR's should take place. The first one, internal to the QRF, is to iron out any individual or collective issues before the centralized AAR is conducted. Pride and egos should be left at the door. During this AAR, team members can bring to the QRF commander's attention any issues involving command and control, the trigger criteria, and the order to execute.

The centralized AAR should be conducted among the QRF commander, a representative from the unit relieved by the QRF, and the S2/S3 (or applicable company-level personnel if this was not a battalion or larger operation). This AAR is intended to iron out coordination issues between units.

Recovery is essential to quick turnaround. During recovery, half of the QRF should clean weapons; the other half should readjust and repack gear and distribute new supplies from the supply sergeant. Once the soldiers complete their assigned tasks, they should switch, complete the other task, do preventive maintenance checks on the QRF vehicles, and then rest.

Training a QRF

Training a QRF can be a rewarding experience for trainers and trainees alike. Many trainers are afraid of tactically oriented training. Don't be! No one wakes up one day to find he is a tactical genius. The best way to get smart is to read, talk to others, acquire training resources, and plan and conduct challenging, scenario-driven training.

Reading is the best way to start. If you have not looked at a current copy of Field Manual (FM) 7–8, Infantry Rifle Platoon and Squad, start there. Other manuals of interest are FM 7–7J, Mechanized Infantry Platoon and Squad (Bradley); FM 19–4, Military Police Battlefield Circulation Control, Area Security, and Enemy Prisoner of War Operations; and FM 90–10–1, An Infantryman's Guide to Combat in Built-Up Areas. The Center for Army Lessons Learned has articles on the subject from time to time, and they are available on its website at http://call.army.mil.

Get out and talk to the units you support. The maneuver folks probably would be more than happy to help and may even offer to conduct train-the-trainer and officer professional development sessions for your unit.

Resources are hard to get. The quarterly training briefing is the time to pitch training to the commander and get resources such as ammunition, a multiple integrated laser engagement simulator, terrain, and time. The chart at right shows a 10-step training model. Use one like this to show the commander that you have thought your training objective through and meshed it with your METL assessment and that you are working your way up to it. If the resources are there, you will probably get them before commanders who have not prepared as well.

Planning. You must have a sound plan. In addition to doctrinal planning techniques, some other planning techniques include an operations and logistics synchronization matrix, built-in flextime, proofing of the event, and an integrated risk assessment.

Synchronization matrix. This is the key to the training event. All "showstopper" assets should be on there. For example, restricted terrain (lanes) and multiple operations were "showstoppers" in an exercise I conducted. The increments of time are up to you. My times were driven by fast-paced events followed by long dismounted movements. Unfortunately, things do not always go according to plan.

Time. How many times have you seen training events cut short due to time constraints, or observed soldiers smoking and joking because they finished early? Flextime can help. "Suddenly" free time can be used for retraining by the senior subordinate leader or the observer-controller. Lack of time can be an issue. Plan

Ten-Step Training Model

Assess METL
Rated as a "P" (practiced).
Collective tasks and individual tasks rated as "U" (untrained) or "P."

Plan Training
Review the METL during the base defense exercise.
Identify all collective and individual tasks to be trained.
Design the training according to proficiency level—crawl-walk-run.
Make course an eight-phase operation.
Prepare a logistics estimate and coordinate resources.
Conduct risk assessment.

Train and Certify Leaders
Select experienced personnel.
Conduct three train-up sessions.

Reconnoiter Site
Proof the course for "doability."
Train where you will fight.

Issue Plan
WARNORD (warning order) (specify date).
OPORD (operation order) (specify date).
Use a synchronization matrix.

Rehearse
Conduct rock drills and backbriefs.
Have rehearsals for demonstration teams.
Conduct a precombat inspection of all instructors.

Execute
Execute synchronization matrix.
Conduct interim after-action reviews (AAR's).
Continue risk assessment.

AAR
Conduct AAR's after each event.
Complete overall course AAR on the final objective before graduation.

Retrain
Conduct retraining as needed during hands-on portions.
Build time into the course to accommodate retraining.

Recover
Build recovery into the course as an actual phase to ensure orderly completion.
Include equipment, weapons, and personnel.
Include recommendations for awards.

more time to accommodate poor weather, fatigue, and unexpected setbacks such as a "cold" status from range control or a misplaced sensitive item. It is better to have too much time than not enough. Balancing the two can be figured out through proofing.

Proofing. Proofing the training event is simple. Time and distance checks should be conducted for all mounted and dismounted movements. All movements must be conducted under the same conditions trainees will experience, such as having to carry 60-pound rucksacks, making night movements using NVG's, and operating on restricted terrain. War-game tactical scenarios to get an idea of how long they will take. Do not forget the AAR's. Feed all that information back into the synchronization matrix. Use backbriefs and sandtable rehearsals of the synchronization matrix to double check it the same way combat units do. You should have a 90-percent solution (the synchronization matrix should be 90 percent correct) before you begin training.

Managing Risk. You probably will find something potentially dangerous during proofing. Integrate a risk assessment into the operation. Rest, terrain, weather, and tasks are just a few factors that need to be addressed in the risk assessment. Think it through, and show your assessment to the safety officer. Lack of sleep will lower a high assessment dramatically, so plan flextime for rest. Balance the benefits against the consequences, and act. Re-evaluate the risk assessment every 24 hours, or as conditions change, to keep it as real as possible.

Realism. Conducting realistic, scenario-driven training is the only way to get real results. Trained leaders also must evaluate training for review, retraining, and sustainment. Scenarios can come from past missions and probable enemy courses of action. They must be as real as possible for the soldiers participating in the training. Scenarios also should be as continuous as possible. If the soldiers do not buy into the exercise, they will not be ready for the real thing.

Observer-controller evaluation. Exercise control is nearly as important as realism. Observer-controllers must be ready to control, evaluate, and occasionally retrain participants. An observer-controller handbook can serve as a training aid. The handbook should have a synchronization matrix, event scenarios with tactical cartoons, task conditions and standards for each individual and collective task, rules of engagement, an extract from the signal operating index, and medical evacuation procedures.

A properly trained, led, and employed QRF is essential to the rear area commander and the CSS units they protect. As the commander's reserve, it is tailored to meet threat-driven missions. Its members must be realistically trained to execute with discipline, respond to set trigger criteria, and work with other assets. The importance of the QRF and rear area security is apparent as the Army executes operations other than war, such as those in Bosnia, Kosovo, and Somalia, and works through the shrinking availability of combat power. The CSS unit must be prepared to defend itself against enemy threats. **ALOG**

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Mobile F&E Shop

by First Lieutenant Michael D. Stealey
and Major Rory K. Tegtmeier

The fuel and electric (F&E) shop of a direct support unit (DSU) repairs small fuel and electric components of military vehicles. The fuel components it repairs include heaters of tanks and armored personnel carriers, fuel pumps for all types of engines, and fuel controls; the electric components include starters for all types of engines, alternators, and generators. The F&E shop is vital to the DSU in keeping the Army mobile. It must be able to accomplish the same work when deployed that it does in garrison. It must be able to move its entire operation when deploying, and it must be able to do so quickly. When the F&E shop is down, vehicles that may be critical to winning the battle cannot be repaired.

In the past, direct support (DS) F&E shops have been tied to fixed facilities because they had cumbersome, antiquated equipment that worked well in garrison but was a nightmare to deploy. If a DSU had to deploy with its F&E shop to support a heavy brigade or even a new intermediate brigade combat team, it faced a couple of questions: When would the DSU need to shut down its F&E shop to prepare it for deployment? And how long would it take to make the shop operational once it arrived in theater? For most DSU's, the answers to those questions are measured in days; however, for the 544th Maintenance Battalion, which is part of the 13th Corps Support Command (COSCOM) at Fort Hood, Texas, they now are measured in minutes.

Force XXI Division Redesign

In January 1999, Chief Warrant Officer (W–1) Gerardo Sotomayor assumed responsibility for the 544th

☐ In the top photo, the 500-amp test stand requires a large space and is difficult to move. In the middle two photos, the generator/starter test set is small enough to place on a counter in the working van, leaving workspace for completing repairs. In the bottom photo, the shop stock van is filled with storage cabinets.

Maintenance Battalion's 597th DS Maintenance Company F&E shop. Shortly after Chief Sotomayor took over, the Force XXI division redesign was hitting full stride with preparations to make the division lighter, more maneuverable, and faster to deploy. Part of the redesign was to move the F&E mission from the division to the COSCOM. So as the 4th Infantry Division (Mechanized) converted to the Force XXI structure, the 597th Maintenance Company picked up the division's F&E mission. The 597th F&E shop not only had to support twice as many customers and complete four times more jobs, it also had to overcome the problem of how to support the division during deployments. Efficiency, deployability, mobility, and the size of the F&E footprint on the battlefield became serious issues.

After looking at his shop's test equipment, Chief Sotomayor knew that preparing for any type of deployment would take days and possibly weeks. Fortunately, his predecessor had left behind a large amount of information and the seed of a great idea—to replace the standard Army issue test stand with a commercial test set. From this, Chief Sotomayor developed a proposal for creating a more efficient, mobile, and tactical F&E shop.

Problems with the Old Test Equipment

At that time, the Army was phasing out outdated 500-amp test stands and replacing them with "new" 400-amp test stands that, by commercial standards, also were outdated. The problem with the 400-amp system was that it was 6 feet high, 4 feet wide, and 8 feet long; required a 10-foot overhead clearance to provide a proper airflow; and weighed 4,400 pounds. It definitely was not an item that two soldiers could pick up and put in the back of a high-mobility, multipurpose, wheeled vehicle (HMMWV). The only way to transport this behemoth to the field was on the back of a flatbed trailer, and a 6,000-pound forklift was needed to load it, unload it, and move it into position. Finally—and definitely the worst feature of all—to begin operations in the field, the test stand had to be either placed in a fixed facility or held until a maintenance tent was erected. All of this took time; it normally took days to deploy and set up, and the F&E shop soldiers still would not know if the test stand needed repairs before they could begin operations.

The old test stands presented such a formidable obstacle that most divisions had pulled their F&E mission out of the forward support battalions (FSB's) and consolidated it with the main support battalion's F&E mission. This probably was done under the guise that consolidation provided efficiencies, which it did in garrison. But it was allowed to continue because the old test stands could not be relocated as quickly as the FSB. It took so long to move and set up the test stands that by the time they were operational, it was time for the FSB to move again.

Seeking a Solution

The 597th Maintenance Company had to decide if it should accept the status quo and do nothing, try to adapt the old test stands to the new requirements presented by Force XXI, or think "outside the box." The answer was to try to find something better. They found a commercial off-the-shelf (COTS) alternator, generator, and starter test set made up of Crumbliss models 2115-generator/starter tester, 2495-load tester, and 2485-power converter sold by Maxwell Products International in Dallas, Texas.

This COTS test set can do everything that the Army's 400- and 500-amp test stands can do and more without the size and weight problems. Model 2115, as sold by the manufacturer for civilian use, weighs just 600 pounds and can test almost all the generators in the Army inventory. A simple modification made by the manufacturer gives model 2115 the capability to test all generators in the Army inventory, including those in tanks and Bradley fighting vehicles that the old test stand could not handle. Starter test model 2485/2495 weighs approximately 200 pounds and comes ready to test all starters used in Army vehicles. It also does load-testing, which the old test stands cannot do.

Advantages of the COTS Test Set

In October 1999, Chief Sotomayor presented the idea of purchasing the COTS test set to the 544th's support operations officer, and they began a comparison of the COTS system and the standard Army test stand. It quickly became evident that the commercial test set was superior to the 400- and 500-amp test stands in every category. The commercial test set measures roughly 3 feet wide, 2 feet high, and 4 feet long and takes up only 24 cubic feet, compared to 192 cubic feet for the old test stand. The test set is 80 percent lighter than the test stand, weighing approximately 850 pounds versus 4,400 pounds for the old test stand.

The COTS test set is easier to configure and use to test both starters and generators, taking only minutes to convert from one type to another and only seconds more to conduct a complete test. It improves quality control because it is more accurate. Since the unit started using the test set, no repaired starter or generator has been returned.

Most important of all is the price. The new test set costs $17,000, compared to $122,000 for the 400-amp test stand. Given these advantages, it was clear that the unit should purchase the COTS test set.

Implementing the Plan

The 597th immediately sought approval from the Tank-automotive and Armaments Command (TACOM) to use models 2115 and 2485/2495 in lieu of the 400-amp machines. TACOM reviewed the equipment specifications and approved the new test set as an acceptable replacement. The 544th Maintenance Battalion had the consolidated F&E capabilities of three DSU's, so it purchased three test sets for a total of $51,000.

The next challenge was to take advantage of the test set's reduced size and weight in order to make the F&E shop more mobile and easier to deploy. The solution turned out to be remarkably simple. Permanently mounting the test set, tools, and shop stock in mobile shelters would eliminate any need for loading or unloading. Based on the volume of business generated by supporting a division, a COSCOM, and all of Fort Hood's nondivisional units, the unit chose to use M129A4 tactical transport semitrailer vans as mobile shelters.

A rough plan was drawn up to adapt two vans for use by each F&E maintenance team. One would be a "working" van to accommodate a test set, storage space for tools, and bench space for work stations; include environmental controls; and operate off either commercial or generator power. A second van was designed to store shop stock. The final designs also provided lights and air conditioning to ensure the equipment's serviceability. The 597th then obtained TACOM's approval to make the modifications to several M129A4 vans.

Once the power needs were solved, the unit focused on laying out workstations with workflow and weight distribution in mind. In the working van, a series of workstations was placed along each wall for the repair of unserviceable equipment, with the test equipment as the first and last stops. The placement of the test set near the rear door allowed the test set's weight to be centered over the rear dual wheels of the van, providing the smoothest ride and the greatest stability. To provide workstation space and tool storage, the unit purchased and installed Stanley Vidmar storage cabinets. The working vans were outfitted for $15,108 each.

To outfit the shop stock vans, the unit installed used cabinets that were already on hand. It would have cost about $23,000 to purchase and install new cabinets in the vans. The unit also saved $8,000 of the cost of environmental control units for both vans by obtaining them from the local cannibalization point and repairing them.

Reaction to the New F&E Vans

The soldiers quickly preferred the new test set to the old test stand. Shortly after the first pair of trailers—one for the test set and another for the shop stock—was completed, all of the soldiers preferred to work in the vans because the van setup made operations much easier and enhanced workflow.

One benefit of the new test set is that it can put a full 500-amp load on a generator, mimicking the actual draw of an operating vehicle. Another is that the starter tester has an actual gear mimicking a flywheel that engages the bendix to put a strain on the starter—a real safety improvement over the old method of placing a block of wood against the bendix as the starter was engaged.

A repair team can deploy with the two vans and begin repairs in the time that it takes to stop and put a 10,000-watt generator into operation. The equipment was field-tested with excellent results in May 2000 when two teams were deployed from Fort Hood to San Antonio, Texas, as a part of the Provide Tri-Echelon Exercise. After being transported 200 miles, the vans were set up and working in 20 minutes. The test equipment held up to the rigors of the move without breaking down. The teams completed over 300 jobs during the 10-day deployment.

Because of the improved capabilities and easier deployment and setup afforded by the new test set, the 544th Maintenance Battalion is more mobile on the battlefield and provides better customer support. Although the 597th elected to use M129A4 vans because of its large customer base, future configurations could fit easily in a shelter on the back of a family of medium tactical vehicles (FMTV) truck, thereby increasing the F&E shop's deployability even more. **ALOG**

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U.S. and Russian Engineers Find a Common Bond in Bosnia

by First Lieutenant Kevin R. Pennill and Staff Sergeant Daniel A. Read

The 1st Engineer Battalion, a mechanized combat engineer battalion of the 1st Infantry Division (Mechanized) at Fort Riley, Kansas, deployed to Eagle Base in Tuzla, Bosnia-Herzegovina, in August 1999. Once there, they provided engineer support for the 2d Brigade Task Force, 10th Mountain Division (Light Infantry), from Fort Drum, New York.

During the 4-month deployment, the 1st Engineer Battalion "Diehards" were fortunate to have the chance to train with engineers from other countries. They visited each other's base camps and conducted officer and noncommissioned officer professional development together as often as mission requirements permitted.

On one occasion, when a Russian separate airborne brigade (RSAB) engineer vehicle broke down, the Russians asked the 1st Engineer Battalion mechanics for help. This was an excellent opportunity for the Diehards to become familiar with the Russian engineers' equipment. The battalion immediately dispatched a maintenance team to Camp Uglevik—a 2-hour trip from Eagle Base—to help troubleshoot the vehicle.

At Camp Uglevik, Andre, the interpreter, told the maintenance team that the Russian engineers were eager to work with the U.S. mechanics on the equipment and were hoping to learn some new troubleshooting ideas as well as gain valuable mechanical advice. The Russians had no mechanics; the supervisor and crew of each vehicle were responsible for maintaining their own equipment.

Andre escorted the maintenance team to the motor pool, where they first saw the Russian vehicles. They were clean but appeared to be old. At the back of the motor pool was a large, tracked vehicle about the size of an M60 tank. It had a folding blade in the front and a telescoping crane on the top; on the crane's end was a claw used for grabbing bridge timbers and trees. Andre explained that this vehicle was a vital piece of equipment used to remove obstacles and install bridges. Yuri, the vehicle's operator, explained that the claw had malfunctioned and had been a constant problem. Because he did not have the proper manuals and tools, Yuri had spent many hours trying unsuccessfully to correct the problem.

The inside of the vehicle was a confusing maze of hydraulic lines and wires, and the floor was covered with a thick film of hydraulic fluid. After about an hour, the mechanics traced the problem to a faulty hydraulic control solenoid that acts as a switch. When electricity is applied to the solenoid, a valve opens within the unit, allowing hydraulic fluid to pass. The mechanics removed the valve and tried to repair it by cleaning the corroded electrical contacts, but they found that the valve was too badly corroded and would have to be replaced. Unfortunately, the part that was needed was not easily accessible and could not be manufactured on site. It would have to be ordered from Moscow and would take up to 6 months to arrive.

Following the trip to Camp Uglevik, the Diehards joined the RSAB engineers for several friendly sports competitions. The first, a volleyball match at Eagle Base, was a huge success. Both American and Russian soldiers enjoyed their time on the court and resolved to meet again for basketball.

Although it was almost impossible to communicate verbally, both Americans and Russians participated in team events. Through sportsmanship, the Americans and Russians found that they had much more in common than they thought. In addition to being engineers with similar missions, they enjoyed some of the same things.

The 1st Engineer Battalion redeployed to Fort Riley in December 1999. The time they had spent associating with, and learning about, the RSAB soldiers was a unique experience that emphasized the combined nature of the Stabilization Force–6 mission. **ALOG**

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Beep, Beep . . . Road Runner Returns!

by Lieutenant Colonel F. Keith Jones
and First Lieutenant Heather M. Graham

III Corps reinstates one of its most valuable teaching tools.

For 3 years, the III Corps at Fort Hood, Texas, was so involved in standing up the Army's first digitized division—the 4th Infantry Division—and in the 1st Cavalry Division's rotation to Bosnia that it had to cancel its annual Road Runner exercise. In the fall of 1999, with these events behind them, III Corps officials were able to start planning for Operation Road Runner 2000. The exercise would test the capabilities of III Corps headquarters to operate its essential communications systems and maintain command and control of its subordinate units while moving over long distances.

Originally, the exercise was to be a small-scale deployment of the corps' and divisions' tactical command posts. However, as the planning developed and concepts were discussed, the exercise took on a much larger dimension. The "Fighting" 49th Movement Control Battalion (MCB) was assigned responsibility for implementing the exercise. Enthusiasm grew among the battalion staff and personnel in the transportation detachments because a Road Runner exercise would give the participating movement control specialists (military occupational specialty 88N) an opportunity to perform duties very different from their daily jobs.

A second dimension also was added to this Road Runner exercise. For the first time, a computer simulation exercise using a corps wartime scenario would be executed simultaneously as forces deployed from Fort Hood.

Exercise Parameters

Initial plans for the Road Runner exercise called for units to move from their tactical assembly areas to attack positions. Brownwood, Texas, was chosen as the operation site because its distance from Fort Hood (90 to 150 miles, depending on which route was used) would be within the radius for which the corps is assigned responsibility in its operations plan. Likewise, the three convoy routes chosen for moving the tactical command posts and supporting units from Fort Hood to Brownwood replicated three of the routes cited in the operations plan.

Road Runner was becoming a major exercise, and the corps commander was taking a personal interest in planning the convoys and in moving and tracking his units from the tactical assembly areas to their attack positions. Adding a wartime scenario to the exercise would create even more anxiety for its participants.

Convoy Planning

Three months before the start of the exercise, personnel from the battalion's highway operations section conducted a map reconnaissance, followed by an actual route reconnaissance, in conjunction with the military police. The Texas Army National Guard approved the proposed routes the corps would use to convoy to Brownwood, and the next phase of the exercise—collecting movement information from the units—began.

Gathering detailed information from participants is the hardest part of any exercise, and Road Runner was no different. The biggest challenge was getting all the units participating in the exercise to submit a convoy request and information on the density of the vehicles included in their commander's order of movement.

Fort Hood regulations state that six or more vehicles moving on or off post constitute a convoy, so the corps transportation officer and the G4 applied this guidance to the Road Runner exercise as well. Armed with this information, units began planning their moves to Brownwood. During this phase, the highway operations section gathered information from the units on how many vehicles each would have in its advance party, the main body of its convoy, and the trail party. Some units required more than 1 day to move the main body of their convoys. Since this exercise simulated real movements in theater, many units had heavy lift requirements. This meant that heavy equipment transporters (HET's) had to be incorporated into the movements program. All of this information was consolidated into a Microsoft Excel spreadsheet that would produce movement tables for programming convoys and planning routes. The convoy commanders would use these tables to determine when the vehicles would arrive at the starting point for their convoy.

Sand Tables

To enable the soldiers to get a better perspective of exactly what their duties and responsibilities would be during Road Runner, the 49th MCB decided to build its

An NCO from the 151st Movement Control Detachment sets up a Spitfire at one of the exercise checkpoints.

own "sand table" layout of the exercise area. This was a big job that the unit had not done before. The task was given to the commander of the 151st Movement Control Detachment. Fortunately for the battalion, the Fort Hood Directorate of Logistics had some unused warehouse space that was large enough to lay out all of the routes and checkpoints in the exercise area. Once the area was reproduced on the ground, all of the checkpoints, cities, and route names were added.

The battalion S3 used the sand table during an overall briefing on the exercise scenario. Next, the highway operations officer briefed the concept of highway operations. He explained how the movement tables were organized and how the units were expected to move during the exercise. Then each detachment commander presented his concept of the operation and how he planned to position his highway regulating teams (HRT's) at various checkpoints along the routes.

After each detachment commander briefed, each HRT briefed the team's mission at its assigned checkpoints. Each team explained which convoys it would be monitoring, when it was scheduled to arrive at the checkpoints, how it would relay information on the convoys' progress, and what modes of communication it would use during the exercise. Some HRT's were responsible for manning two checkpoints, so they also briefed on how, when, and where they would move to their second location. They also provided a brief description of their contingency plans for events such as road closures, unprogrammed detours, and convoy interruptions. The soldiers paid close attention during the briefings, so there would be a common understanding of the mission and everyone involved would know the concept of the operation.

Detachment Planning

The detachments conducted various levels of mission analysis for the exercise based on routes, distances, personnel, and vehicles. Each identified the teams that would monitor each checkpoint, how it would communicate with the battalion tactical operations center, and how it would conduct around-the-clock operations over extended periods of time. Each detachment developed a basic HRT equipment list, which consisted of one high-mobility, multipurpose, wheeled vehicle, some form of communication, enough rations and water for 7 days, and fuel. They developed a resupply plan based on fueling requirements and the distance and time required to move from a checkpoint to the nearest tactical refuel point and back again. The detachments also considered how they would maintain coverage of their checkpoints during the time their vehicles were absent for refueling.

This was the first time many of the detachment commanders had been faced with these concerns; most of them had participated only in simulation exercises in the past, which did not provide this level of planning. In simulations, the focus normally is at a higher level, and most of the HRT's operate inside a simulation center where life support is not an issue. But Road Runner was different. Since the battalion would execute both a simulation exercise and a real-world troop movement, the detachment commanders had to plan for both.

Another area of concern that many of the detachment commanders had not focused on closely before was force protection. Most of them were familiar with some type of base cluster defense in the field. But for many, this was the first time they had to consider how to protect a one- or two-person team. Each detachment analyzed the type of threat it could encounter and how to protect itself from it. Their analysis consisted mainly of battle drills to prepare for sniper fire or some other type of aggressor activity. Each HRT was prepared to establish hasty fighting positions using sandbags, which also served to harden their vehicles against mines, and each team carried camouflage screening that they could use to conceal their vehicles during the exercise. Some HRT's camouflaged their locations so well that many convoys passed by checkpoints without realizing they were being monitored.

Communications training was a large part of the detachments' preparation for the exercise. Everyone was trained on how to set up and operate the AN/PSC–5 Spitfire communication systems that would allow the detachments to communicate over longer distances. Signal units established relays to cover most of the routes, but there were a few locations with no coverage, so those were the first to get the Spitfire systems. As planning continued, it became apparent that at least one Spitfire

was needed at both the start and release points to confirm that convoys had departed and arrived.

The units also learned how to use the Magellan GSC 100 (Global Satellite Communicator), which is a small handheld device that operates much like a global positioning system. It allows limited text messages, position information, and more to be sent worldwide using satellites. These devices allowed the units to communicate over the horizon and stay abreast of convoy movements. Each of the detachments had a Spitfire, a GSC 100, or a single-channel ground and airborne radio system (SINCGARS) to communicate convoy information along the routes and to provide status updates to the battalion tactical operations center.

Detachment Execution

As a lead-in to Road Runner, the battalion conducted a field training exercise (FTX) the week before the start of the exercise, which ensured that everyone would be read into the exercise and able to perform pre-combat checks and inspections. It also gave the HRT's an opportunity to rehearse what they would be doing at their checkpoints during Road Runner.

As part of the FTX, the detachments used the predeployment of the signal units and the corps support group at the end of the FTX to work out any problems associated with their methods of operation. The HRT's needed to have their procedures down pat, or they would not be able to relay information properly to the corps G3 (operations officer) or transportation officer when the exercise began in full.

Unlike in previous exercises, the detachments had to evaluate their vehicle load plans closely to make sure the loads were organized so they could be set up easily. The detachments also needed to know where everything was so they would not have to unload an entire vehicle to find what they needed. The exercise provided the detachments an excellent opportunity to validate their load plans or change them to reflect what they really needed.

Simulation

The simulation portion of Road Runner was designed to stress the units' movement tracking abilities by creating more notional convoys that would be involved in more hypothetical contingencies. However, the actual troop movements to Brownwood and back to Fort Hood were so complex and brought with them so much confusion that it was only as an afterthought that this element was added to the exercise. The simulation provided outstanding opportunities for senior leadership and their staffs to plan routes and prepare for contingencies, but it was the actual troop movements that enhanced lower level leadership and soldiering skills.

Lessons Learned

During the Road Runner exercise, the MCB learned that it was critically short of the communications equipment it would need to perform a wartime mission in a very large geographical area or in a mountainous region. Signal personnel agreed that if this type of operation had taken place in areas such as Bosnia or Korea, they would not have been able to establish enough relays or retransmission stations to allow radio communication over long distances.

One of the biggest communications assets during the exercise was the AN/PSC–5 Spitfire. This communication system permitted secure transmissions over long distances. But it has some drawbacks: it has no external speaker, it is difficult to transport because it cannot be mounted in a vehicle, and its antenna has to be set up each time the system is moved.

Another piece of very useful equipment was the GSC 100. This off-the-shelf-item passed its implementation test with flying colors. Its ability to provide over-the-horizon communication was a great asset during the exercise. An MCB must have this type of equipment if it is to be fully mission capable.

Operation Road Runner 2000 was an invaluable exercise for the 49th MCB and the other units involved. Convoy commanders learned the importance of convoy discipline; drivers learned the value of maintenance and the importance of highway regulations; and unit commanders learned the importance of accurate convoy planning. Senior leadership got an accurate picture of the challenges a corps faces in a massive unit movement. The hands-on experience that the MCB gained from this Road Runner exercise allowed it to validate its wartime mission requirements, making Road Runner a valuable teaching tool in the Army's quest for battlefield success.

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A New Approach to Training Management

Thanks to a new approach to training management, the Army has increased the efficiency of its sustaining base training (SBT) program. To date, this process has avoided over $25 million in expenses while consuming only $1 million in total operating costs. At the same time, it has helped training providers trim the SBT curriculum structure from a high of over 800 courses to the current level of just over 500 courses. If the new process was not in place, participants in the SBT management process believe that the projected total of SBT courses could now exceed 1,000. SBT includes all noncombat and non-MOS (military occupational specialty)-producing training provided for military and civilian members of the Army sustaining base.

The training management process that helped the Army achieve these results is operated by the Deputy Chief of Staff for Training at the Army Training and Doctrine Command (TRADOC), who acts as the Army's executive agent for SBT management. The process is based on two elements: participation by SBT providers across the Army and use of automation. These are the factors that set this corporate management process apart from other Army efficiency enhancement programs.

Before this process was created, SBT providers across the Army operated independently. They lacked the benefits of a central coordination process for training management that would allow them to communicate and collaborate on SBT issues and concerns. The new training management approach is working to correct this problem by combining the professional expertise of career program and field functional representatives (who represent training customers and managers) and the Army's SBT providers (who represent the sustaining base schoolhouses).

The forum that brings these professionals together is the sustaining base Training Management Review Board (TMRB). Each year, the TMRB conducts a comprehensive, systematic training analysis of courses in the sustaining base curriculum structure. Under a continuous review cycle, each course is reviewed every 3 years. The course analysis is designed to answer two fundamental questions—

- Why does the Army teach this course?
- Can this course be taught more efficiently?

The primary challenge at the outset was to enlist the voluntary, active participation and support of the non-TRADOC training providers. They comprise approximately 65 percent of the Army-wide SB training management process. To date—with a few exceptions—training providers at other major Army commands and Headquarters, Department of the Army, solidly support this effort.

The center of gravity of SBT is the SBT website, which permits the total process automation that is the other pillar of the new management process. The website can be accessed at the following address: http://www-dcst.monroe.army.mil/sbt.

In addition to providing key SBT process information, the website includes direct links to related Army, Department of Defense (DOD), and non-DOD websites. It also is linked with the SBT Excel data base. This data base lists over 500 sustaining base courses by training provider, course number, and title. It includes detailed training data on each course, such as student load, course description, target population, and functional and course proponents. The data base serves as both a viable training clearinghouse and a readily accessible source of training information.

The Army's SBT management process has shown meaningful results at the bottom line, by substantially reducing duplication and deleting courses no longer relevant to Army requirements. **ALOG**

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The Shenandoah Campaign: Logistics as the Objective

by Dr. Burton Wright III

One of the lesser known campaigns in the Civil War was the struggle for control of Virginia's Shenandoah Valley in 1864. What makes this campaign particularly interesting is that it was fought primarily for logistics objectives.

Control of the Valley offered the Union troops fighting to the east—around Petersburg, Virginia—no great strategic relief or tactical advantage. Instead, the Valley campaign was fought primarily for strategic logistics reasons. Union General Ulysses S. Grant acted to remove the Valley as a source of subsistence for the Confederates, and that eventually forced his Confederate opponent, General Robert E. Lee, to evacuate Petersburg and brought the war to a close.

In the summer of 1864, Grant faced a grim prospect. His Army of the Potomac was before Petersburg, fought to a standstill by Lee's smaller Confederate Army of Northern Virginia. The political pressure on the Lincoln Administration was growing as the casualty lists lengthened and there was no end to the fighting in sight. Grant had tried to overwhelm the opposition and had failed. As long as Lee's army remained in the field, Grant could not bring the war to a close. The entrenchments that Lee's thin and ragged veterans dug day after day around Petersburg produced a military stalemate.

Actually, it was Lee who showed Grant the means to end the stalemate. A military gambler of the first order, Lee took a small infantry corps from his meager numbers and launched it into the Shenandoah Valley to distract Grant and take pressure off the Petersburg front. The commander of this effort, Lieutenant General Jubal A. Early, succeeded far beyond Lee's somewhat modest expectations. After defeating Union forces in the Valley, Early moved on to threaten Washington.

Grant, who correctly viewed the Valley attack as an attempt by Lee to divert his attention, realized that there were indirect strategic benefits to stopping Early and holding the Shenandoah. Since he would have to keep considerable forces in the Valley to counter Early, why not put them to good use? Both Grant and his Western commander, General William T. Sherman, knew the value of logistics. They also knew that Lee's army remained in the field mainly because it was still being supplied with food and other essentials from two sources—the Deep South, particularly the state of Georgia, and the Shenandoah Valley. Sherman was attending to the former area with a vengeance. As Lee's supply source in Georgia was destroyed by Sherman, he was left with only the Shenandoah as a source of food.

Several railways from the Shenandoah to the Deep South connected with a rail junction near Petersburg and thus could continue to supply Lee's army with enough food to permit it to offer resistance. The Valley could supply a number of armies since it is nearly 165 miles long and has some of the finest farmland anywhere. Grant saw the wisdom of holding and then wrecking the last major "breadbasket" of the South. This alone could force Lee to give up Petersburg and move into open country, where Grant could bring him to battle.

The man eventually given command of this enterprise was Major General Philip H. Sheridan. Originally a commander of infantry, Sheridan had made himself famous by commanding cavalry. It took "Little Phil" a while to destroy Early's forces, but after the battle of Cedar Creek Sheridan had control of the entire Valley. It was then that he began a systematic destruction of the Valley's bounty using a cavalry force of nearly 10,000 men. They burned the Shenandoah Valley from end to end. Hundreds of farms and their crops, cattle, and other foodstuffs were lost to the Confederacy.

In April 1865, Lee was forced to abandon Petersburg. But by that time, his soldiers were subsisting on such meager rations that hundreds were simply too weak to continue marching. When Lee finally was cornered by the Army of the Potomac near Appomattox Court House, Virginia, there were only 25,000 "butternuts" left, and he had to surrender his army.

Grant showed that he understood the tactical and strategic importance of logistics. As long as Lee could shelter his Army behind fortifications, Grant could not defeat him without incurring prohibitive casualties. Since neither the U.S. Government nor the Army of the Potomac would support casualty lists in the numbers created in the battles from the Wilderness to Petersburg, Grant had to find a way to force Lee from his fortifications and out into the open, where the more powerful Army of the Potomac could destroy him.

The Shenandoah Valley campaign of 1864 demonstrates that sometimes attacking logistics support is the proper objective of military action. In the future, innovative commanders and their planning staffs may not seek to destroy or badly damage an opponent's military force as their first objective. Instead, they may strike first at the enemy's logistics support and industrial base. If such a strike is successful, then the outcome of the fighting will be much less of a gamble. As Lee painfully learned, lack of supplies and support can force an early surrender. **ALOG**

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Commentary

Soldiers: The First Level of War

by Colonel Christopher R. Paparone

With wisdom gained from Vietnam War, the Army introduced the operational level of war in the 1983 version of Field Manual 100–5, Operations. This level was inserted between the tactical and strategic levels. Perhaps at that same time, the Army forgot the *first* level—the *soldier level of war*. Military literature, both nonfiction and historic fiction, has instilled in me that the soldier level of war ultimately is what the other three levels are balanced upon.

Yet, as a society, we continuously move away from the "greater good" philosophy (an ancient Greek perspective on good citizenship) to the dominating "utilitarian" philosophy (with emphasis on efficiency, economy, bureaucracy, and technology). The latter stresses moral ambiguity and is reflected in the so-called "Generation X." This utilitarian value system has overwhelmed the "greater good" ideals almost completely. It is no wonder, then, that the soldier level of war is beyond the understanding of the Government, its people, and even military leadership.

Nor is it surprising that the Army had to create and publish a "laundry list" of values that had to be taught to its leaders before the leaders could inculcate them into their soldiers. This was an attempt to shore up the losing battle with utilitarianism that was evident in the Aberdeen Proving Ground sex scandal.

The Army Values list reads as follows: **L**oyalty, **D**uty, **R**espect (for others, not necessarily those of a higher rank), **S**elfless service, **H**onor, **I**ntegrity, and **P**ersonal courage. Together, they form the suspicious acronym **LDRSHIP**. I say "suspicious" because I wonder whether the clever, soldier-friendly acronym constrained the creators' development of the list. I am wary of the list for a couple of other reasons.

A finite list of values implies exclusion of other values that units—especially small units—could foster to create cohesion,. For example, note the absence of *discipline* from the list. Most experienced soldiers support creating a local command climate with discipline as the premier virtue. A need for military discipline was my primary reason for joining the Army, and I would bet many soldiers today join for the same reason. Perhaps disillusionment results when such a virtue is *not* listed as an Army Value.

The assumption that senior noncommissioned officers (NCO's) and officers needed a list of values was faulty. To publish such a list, institute mass chain-teaching, and pass out pocket-sized copies could be perceived by existing line-unit leaders as a slap in the face. Some units actually conducted a ceremony to magically "induct" soldiers and leaders into the new and improved value system! Had we really let the Army down by not modeling an existing, stronger values system? Were the events that occurred at Aberdeen Proving Ground so representative of the Army that the existing value system had to be discarded and replaced?

This is a systematic approach characteristic of utilitarianism—first, produce a list of values, then teach and remind soldiers of it (much easier with an acronym and pocket devices). How efficient! How thoughtless! How ineffective! The "greater good" values system that exists in our Army culture is something that first sergeants, platoon sergeants, and squad, section, and team leaders develop in themselves as they grow up in the Army and then instill in their soldiers. Officers set the climate in which soldiers have the freedom to develop. In the process, the officers learn more than a thing or two from the soldiers as well. Living under the inspiration of a values system learned through role-modeling produces results that an acronym cannot accomplish.

Reading war literature also helps immensely in understanding the soldier level of war. Stories are an important part of instilling values. C.S. Forester's "The Ship" artfully describes the values that gave the British Navy critical victory in the Mediterranean Sea against the Italian Fleet during World War II. The long journey of a young Marine Corps pilot from his home to Okinawa and back again in Samuel Hynes's "Flights of Passage" demonstrates how America sacrificed its youth in a war over values. In his "One Very Hot Day," David Halbertstam shows the reader how values might be empty, or at least undermined, without a chance of winning the war in Vietnam. Erich Maria Remarque's classic, "All Quiet on the Western Front," reminds us that soldiers continue to fight and die for their brothers in arms and their country, even if the "greater good" seems distant.

One of my finest first sergeants always told his soldiers, "Just do the right thing every day and you don't have to worry." He and his NCO's *showed* them the right things. Their soldiers began to act and think like they did and, together, they comprised my most disciplined and high-performing company. The ones that didn't "get it" (the values) were either shaped up or removed from the Army. I cannot list those values or "right things" on a pocket-sized card, but I know they were there and how powerful they were. A list is dysfunctional. Like a great Korean War veteran once told me, "Values were like oxygen and water to us. We never talked about them but we knew we needed them to survive." You have to *feel* values at the soldier level of war.

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