ARMY LOGISTICIAN

NOVEMBER-DECEMBER 1998

Contractors on the Battlefield–

See articles beginning on page 11

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ARTICLES

DEPARTMENTS

COVER

Contractors always have played significant roles in Army operations, primarily by providing base operations support on an as-needed basis. The increasing need for contractors on the battlefield presents new issues for the Army in determining when and where to employ civilians. Articles beginning on pages 11 and 14 address the need for doctrine to guide the Army in using contractors to augment military operations. (Photo courtesy of Brown and Root Services Corporation.)

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By Order of the Secretary of the Army:

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to the Secretary of the Army
05074

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- The Army's Introduction to Chemical Logistics
- A Medical Unit EXTEV
- Modularity: The Key to Army After Next Logistics
- Deployment and Civilians: What Incentives Do We Need?
- Contingency Contracting for the Special Forces Group
- Reducing Redundancy With A Unified Support Command
- The Korean Service Corps: Eighth Army's 3-D Asset
- Contingency Contracting: Strengthening the Tail
- A Multifunctional Maintenance Company
- Joint and Combined Theater Logistics: The Future Reality

Watch for *Army Logistician's* 30-Year Anniversary Issue! The issue will focus on the Revolution in Military Logistics.

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LOG NOTES

More on Prime Vendor Systems

I read Major Gust Pagonis' response to Major Kincaid's letter in the May-June Log Notes. Major Pagonis missed the point.

Major Kincaid expressed concern with the difficulty of interfacing SARSS with a medical prime vendor's system. Major Pagonis incorrectly assumes that the interface involves the Internet. Although some medical materiel is available on the Defense Logistics Agency's Electronic Mall, reached by Internet, the Defense Supply Center Philadelphia's Pharmaceutical Prime Vendor program entails the use of a prime vendor terminal or other dedicated input device located in the installation medical supply activity. The Theater Army Medical Management Information System (TAMMIS) electronically interfaces with the prime vendor's system. Its successor, the Defense Medical Logistics Standard System (DMLSS), probably will, too. The problem that Major Kincaid and the rest of the Army National Guard have is that their United States Property and Fiscal Office, which serves as the installation medical supply activity, has not been fielded TAMMIS and is not scheduled to be fielded DMLSS.

When Army National Guard elements are mobilized, they will be integrated into a system where Class VIII requests are handled electronically using TAMMIS/DMLSS. They will receive the same standard of support as existing Active component organizations. Until mobilization, however, they have a problem—largely attributable to two facts. First, the Medical Prime Vendor initiatives were designed to provide extremely responsive and low-cost support to the fixed medical facilities of the Department of Defense (DOD). Second, the impact of Prime Vendor on the reserve components was not considered when the system was designed.

As DOD moves to "best commercial practices," such as Medical Prime Vendor, it needs to do a better job of assessing both the positive and negative impacts across the total force.

Paul Krumhaus
Annandale, VA

Sustainment, Not Support, Units

Words can kill. One word that does more damage to the morale and fighting spirit of the U.S. Army is the word "support" as it is used in describing dozens of vital-to-victory units.

On the future nonlinear, urbanized battlefield, we will need every soldier's input as we will likely be fighting outnumbered in the 10-division Army. Although an ordnance unit's primary mission is to support an armor battalion, if an enemy overwhelms them they are expected to become infantry. However, if an ordnance officer is asked if he is prepared to pick up his M16A2 rifle and defend the supply convoy so that supplies do not fall into enemy hands, he most likely will say, "That's the infantry's job."

The solution is simple. Change the word "support" to "sustain." The word "sustainment" makes you think about its meaning. The word "support" implies "second fiddle."

Some might claim that the answer is not changing a word, but changing leadership and training. For example, if there is an issue with *esprit de corps* of soldiers in a support unit, then perhaps leadership and morale in that unit should be addressed. However, using the excuse that personalities are to blame is quick and easy. The Army needs to take action.

When an Army unit is one of the first to deploy for a dangerous peacekeeping and humanitarian relief mission, which Army units are those soldiers supporting? Consider how enlisted soldiers might react to the word "support" in this instance. Names can be discouraging, or they can be powerful motivators.

Too often in history it has been the soldiers from "support" units who have picked up their rifles, grenades, and rocket launchers to save the day. The Army has changed the names of dozens of things to reflect greater accuracy. It is time to change the "s" word from "support" to "sustain."

Mike Sparks
Fort Bragg, NC

Log Notes provides a forum for sharing your comments, thoughts, and ideas with other readers of *Army Logistician*. If you would like to comment on an *Army Logistician* article, take issue with something we've published, or share an idea on how to do things better, consider writing a letter for publication in Log Notes. Your letter will be edited only to meet style and space constraints. All letters must be signed and include a return address. However, you may request that your name not be published. Mail letters to EDITOR ARMY LOGISTICIAN, ALMC, 2401 QUARTERS ROAD, FT LEE VA 23801-1705; send a FAX to (804) 765-4463 or DSN 539-4463; or send e-mail to alog@lee-dns1.army.mil.

ALOG NEWS

SINGLE STOCK FUND MILESTONES SET

Milestone dates for phased implementation of the Army's single stock fund (SSF) concept have been set. The target date for Milestone 1 is October 1999. By that date, incorporation of installation, theater, and corps assets into the SSF will begin. In response to a challenge by the Chief of Staff of the Army to accelerate SSF implementation, Milestone 1A was added to merge the management of obligation authority below the Army level into the SSF by 1 October 1998. The Milestone 2 target date is October 2000. That is when the SSF will incorporate operations and maintenance (O&M) stocks above the division authorized stockage list (ASL) level. The Milestone 3 target date is October 2001. At that point, all O&M stocks above the prescribed load list and shop stock levels will be incorporated.

SSF is a seamless logistics and financial system that extends from the top through the division ASL's, creating a single, virtual supply and repair system. It represents one of the most sweeping changes to occur in the Army in two decades. Consolidation of all classes of supply currently in the Supply Management-Army (SMA) portion of the Army Working Capital Fund (AWCF) will eliminate the practice of selling the same part twice—once when it is sold from wholesale SMA to retail SMA, and again when the retail SMA sells the item to an O&M customer.

Among the significant changes to current logistics and financial processes and practices that will occur as a result of implementing the single stock fund include—

· National financial oversight of all Army-managed items (AMI) and currently owned non-Army-managed items (NAMI).

· Establishment of a national manager for all Army-managed, stock-funded secondary items. He will manage all stock-funded sustainment assets; be able to redistribute excess assets across the Army to fill shortages worldwide; accept materiel returns directly from the customer and apply credit for AMI in accordance with Army policies. Credit for NAMI will be according to the applicable policies of the national manager.

· Army integrated materiel management centers will have visibility of all AWCF-SMA requirements and stockage positions throughout the Army.

· Requisitions will continue to flow through existing Standard Army Management Information Systems.

· Nonreimbursable replenishment will be used to maintain existing ASL requirements and ensure that current support to soldiers is not degraded.

For more information, visit the SSF website at http://www.hqda.army.mil/logweb/docs, or send an e-mail to ssfpmo@hqda.army.mil.

TOTAL ARMY INTEGRATION PLAN RELEASED

In a White Paper released last June, Army Chief of Staff Dennis J. Reimer presented the Army's plan to integrate reserve components into the active Army. The White Paper, which was titled "One Team, One Fight, One Future: Total Army Integration," focused on four key issues: force structure, the institutional Army, infrastructure, and force modernization.

The paper included a proposal to place Army National Guard companies in selected active battalions. The first test of this proposal will be to place three Army National Guard companies into each of two light infantry divisions.

Two Army National Guard integrated divisions, each to be commanded by an active-duty major general, will be created. Three enhanced separate brigades will comprise each division. New, more capable integrated units will be created also, such as the Army Service Command-South and the 32d Army Air and Missile Defense Command. The Army also plans to create "dual-mission capable" units that will be capable of conducting traditional combat missions while continuing to perform other functions.

A proposed program, called "divisional teaming," will partner selected active and Army National Guard combat divisions that, together, will conduct planning, training, and readiness assessments. In another program, the "reserve associate support program," reservists will serve in active-duty units for a while before returning to their Army Reserve units.

"By constructing units with 'building block' capabilities, we will not only enhance [Total Army] integration, but we will also continue to develop adaptive

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ALOG NEWS

(Continued from page 1)

forces that are optimally suited to perform the myriad, complex security tasks the Army will undertake in the 21st century" said Reimer. "We are committed to these initiatives, because they chart the right course for building the right force for the 21st century."

TELEMAINTENANCE TESTED AT TOBYHANNA

A new method for repairing communications equipment using a computer and a small video camera was demonstrated successfully by the High-Tech Regional Training Center at Tobyhanna Army Depot, Pennsylvania; and its parent command, the Army Communications-Electronics Command (CECOM), Fort Monmouth, New Jersey.

The new method, telemaintenance, works very much like the telemedicine system used by doctors in the military and the private sector. It is a commercial off-the-shelf package that includes a small video camera and a modem with external probes for testing electronics. The system can be configured to use telephone lines or satellite connections to send a video of circuit cards or fault indicators to a designated service center. The probes send along data such as voltage measurements that tell service center technicians where to make adjustments to the failing equipment.

In the demonstration, technicians at Tobyhanna established a satellite connection with the acting service center, CECOM. They sent a video of an inoperable circuit switch, and technicians at CECOM provided Tobyhanna instructions on how to troubleshoot and repair it.

The telemaintenance test went well. "We basically proved the concept is viable," said Phil Merkel, a CECOM logistics assistance representative. "We can transmit video and voice in real time to repair electronics, but there is still further work to be done to make improvements."

After the improvements are implemented, the final telemaintenance system will be distributed to service centers such as Tobyhanna and to rapid-response units. Using the system will reduce the number of emergency repair teams deployed to the field and enable repairs to be made in hours instead of days.

BRAKE-TESTING MACHINE SAVES BIG BUCKS

A new brake-testing machine for military wheeled vehicles reduces testing and repair time from as much as 8 hours down to 5 minutes, saving $1.2 million annually at Fort Hood, Texas. The new machine is a joint effort of the Brake Testing and Evaluation Team in the Directorate of Logistics at Fort Hood; Hunter Engineering; the Army Tank-automotive and Armaments Command; and the National Automotive Center.

The new machine is an adaptation of a commercially available brake-testing machine. Vehicles are driven onto a set of plates and, in less than 5 minutes, the brakes are tested and a computerized diagnostics report is printed. If a problem is identified, the mechanic knows which wheel to pull and what repair is necessary to bring the brakes to standard. In the past, each wheel had to be pulled and the brakes visually examined.

Tailoring the brake-testing software and machine to military vehicles earned the Brake Testing and Evaluation Team Vice President Al Gore's Hammer Award.

A 2½-ton cargo truck pulls onto the brake-testing plates. In 5 minutes or less, its brakes will be tested and a computerized diagnostics report printed.

ONLINE LOGISTICS BIBLIOGRAPHY AVAILABLE

Over 1,500 abstracts of logistics-related articles are available on the Council of Logistics Management's website. The Online Logistics Bibliography contains

abstracts from the printed version of the Council's *Bibliography of Logistics Management* for the last 5 years. With the introduction of the online bibliography, the printed version is discontinued.

Users may perform basic or advanced searches, and the system will provide a list of titles that match the selection criteria and the first two lines of the abstract. Other features of the system include an extensive "Help" section and the names of points of contact for periodicals so users can contact them directly for reprints, back issues, or subscriptions.

The Online Logistics Bibliography may be accessed by selecting the appropriate link on the Council's website: http://www.CLMl.org. There is no charge for the service.

FINGERPRINT BIOMETRICS CARD TESTED AT FORT SILL

Based on the successful testing of a fingerprint biometrics card at Fort Sill, Oklahoma, the Army is exploring the expanded use of biometrics "smart card" technology for financial transactions in peacetime as well as during military operations in the future.

Since March, trainees at Fort Sill have been using a Stored Value Card (SVC) for purchases at the post exchange, barber shop, clothing sales store, and other on-post facilities. The card is issued to basic trainees as payment of their initial advance pay instead of cash or checks. To make a purchase, a soldier swipes his SVC through the cashier's reader and then places his index finger on a nearby scanner. The cashier's reader checks the soldier's fingerprint to ensure that it matches the one embedded on the card's microchip. The fingerprint requirement is an improvement over the personal identification number (PIN) that was used in a similar test last year at Fort Knox, Kentucky. In that test, soldiers sometimes forgot their PIN, which slowed down the checkout process.

If the outcome of the Fort Sill test confirms its success thus far, use of the fingerprint biometrics card may be extended to all training centers. The biometrics card provides a better quality of life for soldiers by reducing potential for cash theft in the barracks. And because the card cannot be used without the validating fingerprint, stolen cards will be useless. Using the card also cuts down on the need for vouchers and other paper and audit trails used in the past by the post exchange and Defense Military Pay Offices and reduces the cash flow on post.

By the end of the pilot, about 20,000 basic trainees at Fort Sill will have received their advance pay of $200 to $260 on the biometrics smart card. The card also will be used for the "exodus" program in December. Trainees who arrive on post in December will be given additional funds on their cards that they can use at the post travel office to purchase their travel tickets for the holidays.

Partners with the Army in the Fort Sill test are the Department of the Treasury, the Defense Finance and Accounting Service, and Mellon Bank. "The Government is leading the industry in development of biometrics smart card technology," says Ernest Gregory, deputy assistant secretary of the Army for financial operations. "We're the benchmark, and we're darn proud of that." Gregory predicts that the cards will be used someday in stores, automatic tellers, vending machines, phone booths, laundromat machines, and more.

IOC DEPOTS IMPLEMENT NEW WORK LOAD MANAGEMENT SYSTEM

The Army Industrial Operations Command (IOC), Rock Island Arsenal, Illinois, is implementing the Army Workload Performance System (AWPS), a powerful new management tool that allows depots to pull together current information on their work loads, workforces, and performance. AWPS already is running at IOC's five maintenance depots—Anniston, Alabama; Corpus Christi, Texas; Letterkenny, Pennsylvania; Red River, Texas; and Tobyhanna, Pennsylvania. The system will be modified to accommodate operations at ammunition maintenance and storage facilities and manufacturing arsenals to meet the IOC goal of command-wide implementation.

AWPS is one of the Army's efforts to meet a congressional directive to improve the balance of employment levels, missions, and work loads with budgets and personnel ceilings. Development of the system, which is based essentially on one used at Navy shipyards, was a team effort among the Army, the Booz-Allen and Hamilton consulting firm, and the Naval Sea Logistics Center.

Once in place, AWPS will give all managers, from the commanding general to first-line supervisors, a flexible, easy-to-use system that will display graphically information needed to make basic management decisions on resources and work loads. The system also will help managers justify workforce and budget levels, track performance, and plan for future work loads.

AWPS compiles data from a number of existing systems, including systems used for time-keeping, labor and cost reporting, and actual and projected production. Users get a comprehensive look at work load, workforce,

and performance data in one place, reducing the time and effort required to assemble the information from various systems. AWPS allows a manager to view the "big picture" by rolling up past, present, and future trends for an entire facility, an overall category of work load, or a production project. Using this information, he then can make decisions on how to allocate resources, schedule work, solve problems, and meet future challenges. The system also allows managers to "drill down" to specific divisions and cost centers, or to specific end items in a project, and isolate data for these areas. With this information, managers can identify trouble spots and address problems before they become major challenges.

The system is designed to provide the data needed to position personnel and resources where they are needed most. AWPS is a valuable tool for managers who must make tough decisions regarding downsizing or reorganization.

The IOC technical point of contact is Ken Sherman, (309) 782–7089, DSN 793–7089, or e-mail ksherman@ria-emh2.army.mil.

TECHNOLOGY SPEEDS ARMY FREIGHT

The newly developed Transportation Automated Measurement System (TrAMS), tested last June at Fort Bragg, North Carolina, is expected to expedite the movement of military vehicles and cargoes for the Military Traffic Management Command.

When a vehicle is driven, with or without a cargo, through an automated weight scale and light system, TrAMS instantly determines dimensions, weight, and center of balance—crucial factors for sea and air loading and movement. It achieves an accuracy of measurement within an inch and weight within 3 percent of the total.

☐ Light curtains and a segmented weighing platform that comprise the TrAMS provide faster and more accurate weight, dimensions, and center of gravity for a variety of cargoes.

An average of 60 vehicles an hour can be rolled through the weighing station at about 5 miles per hour without stopping. Formerly, it took six persons more than 10 minutes to determine the weight and dimensions of a single vehicle. Only one person is required to operate the TrAMS.

"This is a prototype," said David Jones, chief of the Business Planning Branch, Military Traffic Management Command. "This is not something off the shelf you can buy. We have to look at the prototype and select the things that make the most sense."

Accurate measurement is crucial for ship-loading exercises and actual deployments that involve hundreds of vehicles, said Jones. "When we load ships, the vehicles are lined up row upon row. In a contingency exercise, all the normal factors of loading are more acute."

If it receives final approval, TrAMS is projected to be located at over a dozen forward-projection military installations, such as Fort Campbell, Kentucky; Fort Hood, Texas; and Fort Bragg.

The Center for the Commercial Deployment of Transportation Technologies developed the $2 million TrAMS. The center is a consortium that includes the College of Engineering, University of Southern California; Parsons Brinckerhoff, Inc.; and Concurrent Technologies Corporation.

RECHARGEABLE BATTERIES NOW REQUIRED

Rechargeable batteries now are required for use in training and garrison operations. The Department of the Army rechargeable battery policy that went into effect 1 October 1998 prohibits use of nonrechargeable batteries, known as primary batteries, except during wartime operations, when temperatures exceed the rechargeables' operational temperature range of -4 degrees to 130 degrees Fahrenheit, or when less than 12 batteries are used per year. The battery policy was issued in a Department of the Army memorandum from the Deputy Chief of Staff for Logistics.

While rechargeable batteries initially cost more than primary batteries, notable savings will be realized with the reduction in replacement cost. The new batteries can be recharged a minimum of 225 times. Problems inherent in the nickel-cadmium (ni-cad) rechargeable batteries, such as short charge life and long recharge time, have been reduced with new nickel metal hydride batteries, BB–390A and BB–388 (national stock numbers 6140–01–419–8187 and 6140–01–419–8190). The

new batteries last two or three times longer than the old ni-cad rechargeable batteries. They also have a state-of-charge indicator that shows the percentage of charge remaining in them.

A new portable battery charger is available that reduces charging time from 10 hours to 2 hours and charges two batteries of the same kind at once. Adapters are needed to use the new charger. In a few months, a multistation charging adapter will be available. This will hold eight batteries, automatically charging two batteries at a time until all batteries attached are charged. The adapter will reduce the manpower required to charge large volumes of batteries.

For a copy of the new battery policy, contact the Army Communications-Electronics Command (CECOM) at (732) 532–4948, DSN 992–4948, or e-mail brockeld@doim6.monmouth.army.mil. For specific policy questions, contact Chris Cigal at the Army Combined Arms Support Command (CASCOM), at (804) 734–0040, DSN 687–0040, or e-mail cigalc@lee-dns1.army.mil. More detailed information is available on the CECOM website at www.monmouth.army.mil/cecom/lrc/lrc.html or the CASCOM website at http://www.cascom.army.mil/multi/materiel/power_sources_ict/.

UNIFORM, APPEARANCE POLICIES CHANGE

An enhanced hot weather battledress uniform (BDU) is one of several new clothing items authorized by changes to Army Regulation (AR) 670-1, Wear and Appearance of Army Uniforms and Insignia. The new BDU is made of 50 percent nylon and 50 percent cotton ripstop and replaces the BDU made of 100 percent poplin. Although the mandatory possession date of the new BDU is 1 October 1998, no wearout date for the old version has been established.

Women's overblouses are being replaced by tuck-in shirts in a heavier material. New shirts for men will have pleated pockets. The previous versions of both shirts are authorized for wear until 30 September 1999.

Women's slacks are being replaced with new-style slacks with belt loops that will be worn with a 1-inch black belt and a 1 1/8-inch yellow brass buckle. Mandatory possession date for the new slacks is 1 October 2002. No wear-out date has been established for the nonbelted slacks. They will be issued until supplies are exhausted and may be worn as long as they remain serviceable.

Class A uniforms are being replaced by comparable uniforms in a new shade of green, AG 489. The previous version of the uniform may be worn until 30 September 1999.

Additional uniform changes to be phased in over the next 4 years include a black windbreaker, new-style black oxford shoes for women, and a double-breasted, all-weather coat.

Policy changes to AR 670-1 include—

- BDU's may be worn off post unless prohibited by continental United States installation commanders, overseas major Army command commanders, state adjutant generals for the Army National Guard or the Army Reserve Command for the Army Reserve as an exception to the policy. BDU's are not authorized for wear in bars or for air travel except for deployment as part of a unit when the aircraft is being used exclusively by the military.
- Commercial backpacks may be worn over the shoulder while in uniform providing they are black and bear no commercial logos.
- Tattoos on the neck, face, head, or other areas of the body that are visible while wearing a class A uniform are prohibited. Tattoos that are prejudicial to good order and discipline are prohibited on any area of the body.
- Lipstick and nail polish in conservative colors are authorized for wear by female soldiers. Extreme colors such as purple, white, blue, and gold are prohibited.
- Earrings that comply with paragraph 1-14c may be worn by female soldiers while in uniform. No other attachments to or through the skin may be worn while in uniform or in civilian clothes on any military installation or other places under military control.

For more information on changes in clothing and individual equipment, visit the Forces Command home page at http://www.forscom.army.mil/ocie/.

DESULFATORS HELP MEET BATTERY USAGE GOALS

Battery desulfators, now available in the Defense Logistics Agency (DLA) Environmental Products (EP) Catalog, will help the Army meet its goals to reduce battery usage. Because they are solar powered, they also are environmentally preferable.

Batteries are considered to be the second most difficult and expensive item to dispose of, after tires. Desulfators can extend lead acid battery life, reduce the volume and cost of battery disposal, and re-energize "dead" batteries that were disabled due to sulfation. In these ways, use of desulfators can help units comply with the

Army battery policy. The Chief of Staff of the Army, General Dennis J. Reimer, has directed the Army to reduce battery procurement by 50 percent by fiscal year 2003 and, wherever possible, to use rechargeable batteries for all Army training.

Battery desulfators join the existing rechargeable batteries in the DLA EP catalog under a new category—Rechargeable Batteries and Battery Accessories. DLA's EP catalog is available in print or on CD-ROM from Defense Supply Center Richmond (DSCR). Call 1–800–345–6333 or DSN 695–5698 to obtain a copy. The catalog also is available on DSCR's website at http://www.dscr.dla.mil under "Catalogs With On Line Ordering."

DISC OFFERS IMPROVED ICE STORAGE CHEST

The Defense Industrial Supply Center (DISC) in Philadelphia, Pennsylvania, now offers an improved field feeding ice storage chest to replace the 200-pound ice chest currently used in mobile kitchen trailers and company-level field feeding kitchens.

The new ice chest is made of foam-insulated, high-impact plastic, which enables it to hold ice for days. It weighs only 69 pounds and has a 175-pound capacity. It has a hinged lid for easy filling and dispensing and a recessed faucet for easy draining. The commercially fabricated ice chest is durable, efficient, and costs less than half the price of the old chest. Optional wheels make transporting effortless.

For more information, call Tom Gordon at (215) 697–0935 or DSN 442–0935, or Ed Heaton or Roz Dossa at (215) 697–9283/3593 or DSN 442–9283/3593.

LASER CARD SAVES TIME AND PAPER

With information on a wallet-sized laser card, soldiers in the field now can monitor shipment of unit loads and know how many pallets are arriving and what type of vehicles will be required to move the cargo when it gets there. The Automated Manifest System (AMS) now uses a laser card to store approximately 1,200 pages of information. Using the card results in improved service at a lower cost by providing more information and eliminating paperwork. A prototype test showed that a unit can process receipts 66 percent faster with the laser cards than with conventional methods.

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Lift Missions in Bosnia

by Major Thomas C. Keith

The North Atlantic Treaty Organization mission in Bosnia marks the first time since World War II that American soldiers have deployed as part of an allied force on the European continent. While the mission is a political work in progress, it has proven to be a military success. For the 181st Transportation Battalion, the Bosnia mission has provided unprecedented opportunities. This is the story of two battalion missions.

Elements of the 181st were an integral part of the earliest Sava River crossing from Croatia into Bosnia in December 1995. Without the reliable transportation provided by the battalion, movement of the Implementation Force (IFOR) into Bosnia could have been slowed significantly. After a successful year supporting IFOR, the battalion redeployed to Mannheim, Germany, in December 1996. However, that was not the end of the battalion's work in Bosnia: in June 1997, two very important and politically sensitive missions passed to one of its units, the 377th Transportation Company (Heavy Truck).

As the only heavy truck company in V Corps, the 377th supports all heavy lift missions in the Central Region. It also currently maintains half of its heavy equipment transporters (HET's) at the intermediate staging base (ISB) in Taszar, Hungary; those 24 systems are available for supporting Task Force Eagle in Bosnia. In May 1997, the 377th resumed control of the HET's from the 6966th German Civilian Support Detachment (part of the 37th Transportation Group), which had supported Task Force Eagle heavy lift requirements since the 181st Transportation Battalion returned to Germany in December 1996.

Moving Russian Artillery

In early June 1997, the battalion received a request from the 1st Infantry Division (Mechanized) transportation officer to move five Russian artillery pieces from the Russian Airborne Brigade's base camp at Camp Uglivik in the Multinational Division North area to the Glamoc Firing Range in the southern part of the Multinational Division Southwest area. The 1st Battalion, 6th Field Artillery, had invited the Russians to participate in a joint live-fire exercise. This would be the first time that U.S. transportation assets hauled Russian equipment. Not many old "cold warriors" would have ever thought an operation in support of the Russian military possible. But permission to proceed was granted, in part to improve interoperability of our two countries' Stabilization Force (SFOR) units and to further good will.

U.S. trucks soon would be hauling Russian 2S9 artillery pieces. The soldiers executing the mission would come primarily from the 377th's HET detachment in the ISB, with additional HET's coming from B Company, 701st Main Support Battalion, and recovery assets from the 201st Forward Support Battalion.

The only route from Camp Uglivik to Glamoc is a treacherous road that runs through many towns and high mountain passes. This route had to be reconnoitered thoroughly to ensure that the bridges along the road would support the HET's and that the convoy leaders were fully aware of what awaited them. Following the reconnaissance, mission analysis, and a thorough risk assessment, the 377th was ready.

On 6 June, the convoy departed the ISB for the redeployment staging base (RSB) in Slavonski Brod, Croatia. After a night's rest, the convoy set off for Camp Uglivik, where it arrived at midday. One of the HET's carried an M2 Bradley fighting vehicle from the RSB to Guardian Base. In order to cross the Sava River at Slavonski Brod, the Bradley had to be downloaded because a HET with a Bradley exceeded the bridge's weight limit. Even empty, only one HET at a time could cross the bridge. This would be the case at nearly every bridge the convoy encountered.

The loading of the artillery pieces at the Russian base camp was a joint effort among Russian soldiers and the 377th drivers, and sign and body language became important communication tools. After loading the equipment, the American soldiers remained overnight at the camp with the Russians.

Early the next day the convoy rolled, with Russian equipment in tow and Russian soldiers riding in the cabs of the HET's. The main roads normally traveled by Task Force Eagle could not support the weight of a loaded HET, so the convoy was forced to travel a long and, in some respects, a more dangerous road that wound through the high mountain passes of southeastern Bosnia. Even though the numerous bridges on the route could support the HET's, some of them were so narrow that assistant drivers had to dismount and manually steer the HET trailers using the trailers' hand-operated hydraulic controls.

After a full day on the road, the convoy reached Glamoc. Once the 2S9's were downloaded, the drivers and their HET's moved to a British support base near the village of Kupres to await the return mission. Meanwhile, the Russian and American artillery soldiers conducted a successful live-fire exercise.

Assisting in Disarmament

For transporters, there rarely is time to sit back and rest. At almost the same time that the 181st Transportation Battalion was completing its Russian artillery mission, another mission—one that was very important politically—was being formulated at SFOR headquarters in Sarajevo, Bosnia. The Dayton Peace Accords called for all of the former warring factions in Bosnia to destroy most of their heavy equipment, including tanks and armored personnel carriers. So, with little notice, Task Force Eagle was directed to move nearly 60 tanks and armored personnel carriers from seven Bosnian Serb weapons collection sites located in northern and eastern Bosnia to four weapons destruction sites. This was a highly complex mission that would see the battalion's HET's traverse nearly all of northern Bosnia; it also would require coordination with the U.S. element in Multinational Division North, the Nordic and Polish Brigade, and—once again—the Russian Airborne Brigade.

The 377th Transportation Company maintains only enough personnel in its HET detachment at the ISB to handle limited missions, and those soldiers were already tasked to execute the Russian artillery support requirement. To support the new mission, soldiers would have to deploy on short notice from the battalion's base in Mannheim, fall in on the HET's stationed in the ISB, and then return to Mannheim once the mission was completed. Soon after the mission was approved, soldiers of the 377th were staged at Ramstein Air Base ready to load a C-130 transport for deployment to the ISB.

☐ Soldiers of the 377th Transportation Company (Heavy Truck) and Russian artillery soldiers inspect equipment before loading.

☐ The 377th Transportation Company's noncommissioned officer in charge inspects a heavy equipment transporter trailer with his Russian counterpart.

After falling in on their systems, performing operator maintenance, and getting mission briefs, the soldiers headed out in convoy to Camp Colt in the northern sector under the command of Task Force 1-77th Armor. At Camp Colt, they rendezvoused with additional HET and recovery vehicles and made final coordination with the Task Force Eagle movement control officer. Over the next 4 days, 377th trucks moved 54 T34 tanks and 20 armored personnel carriers over some of the roughest terrain and through some of the most congested cities and villages in the Multinational Division North sector. The mission was accomplished in what could have been a politically charged atmosphere, if Bosnian Serbs had objected to SFOR destruction of their heavy weapons.

The choreography was intricate: each movement required prior and continuous coordination with Serbian military and civilian officials to ensure that roads near the narrow entrances to the weapons collection sites were cleared. Because each movement crossed brigade boundaries, the mission commander and Task Force Eagle movement controllers had to ensure that the required escorts were present. This coordination was all the more difficult since it would be conducted with the Nordic and Polish Brigade and the Russian Brigade, as well as with Americans in Task Force 1-77's sector. Ef-

☐ **A Russian soldier guides an artillery piece onto a heavy equipment transporter trailer.**

fective cross-cultural communication was vital. Mission leaders also had to make absolutely clear to Serbian officials that equipment had to be staged at the proper location at the proper time so that the HET's could maintain their march credits, which were issued by the Joint Movement Control Center in Zagreb, Croatia.

The operation was flawless; the drivers of the 377th Transportation Company were ready and capable and had well-maintained equipment. During nearly 7,000 miles of driving from the ISB to the various weapons destruction sites and back to the ISB, there were no accidents or incidents.

With the Dayton Accords mission completed and the HET's ready to pack up and leave, one last mission awaited the drivers. To provide effective force protection while elements in Task Force Eagle deployed to the Tabor Falva Training Area in western Hungary, one tank company from Task Force 2-2d Infantry had to be repositioned from the Tuzla Valley to Camp Colt. So, before redeploying to the ISB, 15 of the 377th HET's moved in, picked up the tanks, and dropped them off at Camp Colt. Once again, the mission was completed without incident.

All through the summer of 1997, political tensions remained high in Bosnia, and any incident could have touched off a protest or road closure. The 377th Transportation Company's soldiers were up to the task. Their professionalism made several very important missions successful. They traveled roads never envisioned by HET designers, and they did it superbly. Russian and Nordic officers were very impressed by the sheer size of the HET's, but they were even more impressed with the 377th drivers' ability to operate such monsters in difficult Bosnian terrain. Once again, the 181st Transportation Battalion lived up to its nickname: the "Road Warriors." **ALOG**

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Measuring Joint Theater Distribution

by Major M. Barbara Pepper, Royal Australian Army

Strategy and tactics provide the scheme for the conduct of military operations; logistics provides the means therefor.

—Rear Admiral Henry E. Eccles
Logistics in the National Defense

The success or failure of any military campaign is directly related to the effectiveness and efficiency of the distribution pipeline that provides logistics support to the warfighter. Dr. Martin van Creveld has argued that "logistics make up as much as nine-tenths of the business of war" and that "the proportion of logistical support is a rough indicator of an army's efficiency—a low proportion representing a high efficiency." Throughout military history, vital strategic decisions that led to victory or defeat have been influenced by important logistics considerations of how to feed, move, and sustain the troops.

One of the major logistics developments of recent years has been the increasing provision of logistics support on a joint basis. Under the terms of the Goldwater-Nichols Act of 1986, the combatant commanders in chief (CINC's) can exercise directive authority over subordinate (including service component) commanders for logistics to meet their operational requirements. This has paved the way for distribution management activities to be conducted on a joint basis, as opposed to the previous stovepiped, single-service requirements basis. However, until now, there has been no doctrine, organization, or management procedure to facilitate joint distribution activities. That is changing, thanks to an initiative that will pinpoint problems in the joint distribution system and present solutions—the Joint Test and Evaluation of Joint Theater Distribution.

Distribution Management

Distribution management is the process of planning and coordinating the timely delivery of materiel, equipment, and personnel to and within an area of operations. Broadly described, distribution management is a function of three critical components: visibility, capacity, and control, all of which require accurate, reliable, and up-to-date information. Positive control, achieved through visibility of materiel flowing through the distribution pipeline, serves as a consistent indicator to joint force operators and logisticians that logistics support is focused, responsive, and working. Failure to achieve both visibility and control will result in unacceptable delays in executing critical logistics support to joint operations.

There is no shortage of knowledgeable people with firsthand experience who can tell you what is wrong with the current distribution system and how it should be fixed. A common factor in their constructive criticism is that each assessment of the weaknesses of the distribution system is based on subjective opinion and experience. But now the Joint Test and Evaluation of Joint Theater Distribution will quantitatively and qualitatively *measure* the current distribution pipeline. By taking objective measurements and developing a predictive model that creates an accurate representation of the workflow—including the physical network, flow of information, and management processes—an objective analysis of distribution system chokepoints can be performed and steps can be taken to rectify the mistakes that so often have characterized military history.

Joint Test and Evaluation

A joint test and evaluation (JT&E) is a nonacquisition program managed, directed, and funded by the Under Secretary of Defense for Acquisition and Technology. Because it originates at the Department of Defense (DOD) level, a JT&E has an independent status that minimizes any service bias. A JT&E program consists of three phases: nomination, joint feasibility study, and the JT&E proper. In June 1997, the Army was assigned to be the lead agent in conducting a JT&E of joint theater distribution and recommending fixes to problems that continue to plague joint force logisticians. The JT&E is being conducted by the Army Combined Arms Support Command (CASCOM) at Fort Lee, Virginia.

The JT&E will focus on intheater distribution operations, but it also will study end-to-end distribution operations where applicable. The test will examine the flow of sustainment cargo, from both military and commercial sources, destined for all service components and delivered through surface and air lines of communication. It will include analyses of representative transi-

tion nodes, such as intermodal, in-storage, in-process, and in-transit nodes, where the configuration of cargo and its mode of transportation may be subject to change.

Four key issues were selected for the JT&E after extensive consultation with the combatant CINC's J4 staffs and selected service representatives—

- ***Issue 1***: How can the physical distribution processes and procedures of joint theater distribution be improved?
- ***Issue 2***: How can the flow of information supporting the physical distribution and management activities of joint theater distribution be improved?
- ***Issue 3***: How can the management processes of the armed services improve joint theater distribution?
- ***Issue 4***: How can the physical distribution of assets, the services' information flows, and management processes be integrated to enhance joint theater distribution?

It was originally thought that the JT&E should be conducted using a series of existing joint and service exercises. But the primary beneficiaries of the JT&E products—the unified command J4's—requested that the analysis and subsequent recommendations for improvement focus on their more realistic, day-to-day distribution operations. It was mutually agreed that fixing the day-to-day problems with the current distribution processes would go a long way toward fixing any potential distribution problems that might occur in exercises or wartime.

Improving the Joint Distribution Pipeline

Each of the four issues will be analyzed and possible improvements tested using a series of mini-tests. The mini-tests will culminate in a field test that will integrate the findings gained from analyzing issues 1 through 3. Then an efficiency model will be developed and tested a final time under field conditions; that model will be used as the basis for quantifying improvements against existing DOD standards and revising distribution goals based on the performance of improved processes.

The JT&E will be conducted over 3 fiscal years using a team of contractor and service personnel. Initially, it will focus on data collected from the U.S. European Command pipeline. Then it will shift to the U.S. Pacific Command pipeline to U.S. Forces Korea. Data will be collected on the physical, information flow, and management processes and procedures that occur within the aerial port of debarkation, terminal transfer units, trailer transfer points, hubs, and the customer. These data will be analyzed, and treatments will be applied to improve the processes. The findings of the analyses from issues 1, 2, and 3 then will be integrated into issue 4, modeled and tested, and a final model of the distribution pipeline will be prepared.

The final product from the JT&E will be a quantitative and qualitative analysis of the theater distribution pipeline. A series of recommendations will be provided to improve the physical distribution network, information flows, and business and management processes. The modeling tool and associated analytical data developed throughout the JT&E process will be used for future training in logistics management courses; they also will be used as a resourceful contingency planning tool when combined with existing DOD requirements models. The results of this JT&E will be valuable in validating and justifying future resource expenditures in support of improved joint distribution.

Joint Vision 2010 describes Focused Logistics as "the imperative of technological advantage; the need for faster, more reliable and integrated logistics systems; and instilling 'confidence' in the warfighter that critical supplies will be in the right place, at the right time, and in the right quantity." This scientific approach to analyzing the joint theater distribution system through a JT&E will be a soul-searching exercise that is likely to reveal deficiencies, duplication, and stovepipes under the current single-service arrangements for theater distribution. But the end product not only will recommend significant improvements to the physical, information flow, and management processes, but it will satisfy the tenet of Focused Logistics for Joint Vision 2010. Furthermore, the JT&E will provide the platform for the warfighting CINC's to exercise directive logistics authority clearly in their performance of future missions.

Future military contingencies are likely to require forces to be committed with short notice to potentially hostile and austere environments for an unknown duration. Support of these contingencies will be limited by decreased defense expenditures and organizational downsizing. For these reasons, logistics support of future military operations must be streamlined into a distribution-based, velocity-over-mass system that ultimately will eliminate the historical precedence of building "iron mountains" to sustain the warfighting troops.

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Enhancing the Survivability of the 21st-Century Land Warrior

by Lieutenant Commander Tony Davidson, Royal Australian Navy

The lethality of the man-portable weapon systems under development today and foreseen for the 21st century demands that complementary soldier systems be designed and fielded to take advantage of the increased capabilities. Research on the survivability of the 21st-century land warrior should result in a balance of protection versus mobility. Mobility contributes to survivability on the battlefield, just as it does to defeating the enemy. Individual mobility will allow soldiers to apply their firepower where and when required.

A popular saying in the armed forces of many countries is that their most important asset is their people. The value of soldiers is reflected in their pay and allowances and the quality of housing available to them. But their value also must be recognized by providing them the best protective clothing and equipment money can buy to ensure their survivability on the battlefield. The value of the soldier on the battlefield will increase rapidly as his lethality increases. The loss of a single American soldier will be a significant loss of available firepower. In addition, it will mean a significant investment in training to equip another soldier to take his place on the battlefield.

Situational Awareness

The 21st-century land warrior will have an enhanced level of situational awareness and superior individual and squad mobility. He will depend on compact and toughened digital technology to survive the rigors of the battlefield. This digital technology will provide him with secure communications, a video imaging link within the unit and up to the next level of command, enhanced helmet-mounted image intensification for target recognition and acquisition, and a target designation and hand-off capability for calling in indirect fire.

The key to this ensemble will be a battlefield-hardened, miniature computer that will provide the soldier, his squad, and section leaders with a digitized image of the battlefield. This image will provide terrain and force disposition data, both friendly and adversarial, and a real-time image of the developing battlefield. Battery technology will have advanced to a stage where the power requirements for this equipment will be contained within a D-sized, ultra-long-life battery. Development and integration of these technologies will take the Force XXI soldier into the realms of Army After Next. Further adaptations will be made as new and improved technologies are developed.

New-Generation Weaponry

The soldier of the 21st century will be equipped with a completely new generation of weaponry that significantly enhances the level of lethality already acquired by digitization. This weaponry may use electro or electro-thermal ammunition for compatibility with the Army After Next concept of a single power source on the battlefield. Individual combat weapons will weigh 10 pounds or less and will be integrated with the soldier's individual battlefield computer and helmet-mounted image intensifier that provide indirect fire information. These weapons will have the capability to disable the enemy in circumstances where maximum force is not required. When maximum force is required, they will have a bunker-bursting, anti-armor capability.

Embedded Diagnostics

The soldier on the battlefield of the future will be supported by a number of subsystems within his personal ensemble. These subsystems will include health-monitoring and diagnostic systems linked to the soldier's personal computer and digitally linked to his squad leader and combat medic. These systems will enable higher level commands to monitor the health status of units, withdrawing and replacing them when performance parameters are below optimum.

Sustainment

The 21st-century soldier will carry an enhanced water purification system with an advanced polymer filter that allows him to draw water from any source and use it immediately. Rations still will be provided in the traditional way if the combat situation allows. The concept of palatable energy tablets and nutrient patches will be studied to allow soldiers to embark upon prolonged

periods of combat without having to carry the bulky rations necessary for sustainment. Tailored nutrition will be a concept introduced to the Army After Next, with specific rations and their calorific content matched to the expected activity of the soldier. Meals, ready to eat (MRE), will remain, but they will be refined to reduce the size, weight, and amount of packaging. The MRE's may be even more acceptable to the palate.

Streamlined Load

Regardless of the technological improvements and innovations that will be available to the 21st-century land warrior, he still will be required to carry some sort of load into battle. The load-bearing system of the future will need to adopt technologies similar to those adopted for the uniform the warrior wears, so the attributes of the uniform are not offset by the load-bearing system. The load-bearing system of the Army After Next soldier will afford easy access to equipment, be streamlined in design, be easily donned and taken off, and have sufficient capacity to carry the lightweight, high-tech accoutrements that will equip the warrior for survival. It will not limit the soldier's mobility.

Hazard-Resistant Uniform

The uniform that the soldier of the Army After Next wears into combat will be one piece, and it will cover his head, hands, and feet. It will conform to the soldier's physique and will contain a miniaturized climate-control system tailored to the metabolic rate of the individual soldier. It will contain biomedical sensors to gauge the health and well-being of the soldier, and it also will house external sensors to detect nuclear, biological, and chemical (NBC) contaminants. The fabric of the suit will be impenetrable to all known NBC hazards. The suit will be completely waterproof and will give the soldier the ability to breathe while completely submerged for a number of minutes.

The form-fitting suit, made of an advanced polymer, will afford ballistic protection from most calibers of small arms by instantaneously changing the molecular makeup of the suit to stiffen the immediate area of impact. This will be done by embedded micro-sensor actuators. Although the impact of a round cannot be mitigated entirely, the suit will not be penetrated. The suit will afford protection from shrapnel, but it will not reduce the effects of an artillery round or hits by other large-caliber weapons. The soldier will not be invincible, and a hit by a small-caliber round, while not fatal, may be partially incapacitating.

Detection Devices

Signature reduction will be a factor for the soldier of the 21st century as sophisticated detection devices are fielded. The soldier's advanced polymer suit will be made of radar-absorbent material and will prevent his detection by heat sensors. The soldier's overall ensemble will be designed for stealth and noiseless movement. Hearing and optical protection will be afforded by an acoustic-damping helmet, and a tinted faceplate will provide hearing and optical protection.

The Promise of Biotechnology

Does this vision of the 21st-century soldier sound like science fiction? Or is it within the realm of possibility? Only time and ongoing research will tell. Biotechnology is a rapidly developing field of scientific research that incorporates the characteristics and capabilities of living organisms in useful products. One of the primary military applications of biotechnology research has been in the field of advanced composite materials used in aerospace technologies. Applications to individual soldier systems likely will be an offshoot of this research, which is primarily looking at developing extremely strong yet lightweight materials.

There are three branches of biotechnology: biomimetics, bioprocessing, and biosynthesis. Biomimetics, or biological mimicking, is the study of naturally occurring systems so they can be duplicated to develop new designs and materials. The primary focus of biomimetics is to improve significantly the versatility and capabilities of synthetically produced materials and structures. Nature has an uncanny ability to produce, from relatively weak and unstable constituent materials, composite structures that combine the properties of toughness, strength, stiffness, minimal weight, and chemical resistance.

Bioprocessing converts biologically derived polymers into composite structures. For example, chitin, which forms the exoskeleton of an insect, could be used as the fiber component of a thermoplastic matrix composite of natural polymers. These biological polymers could be blended with synthetic polymers to benefit from their unique characteristics. Bioprocessing is the field that ultimately will blend all other biotechnologies into useable industrial products.

Biosynthesis is the process of genetically engineering natural compounds, especially protein polymers, that science so far has been unable to duplicate. By synthesizing nature, scientists hope to duplicate these natural polymers to take advantage of their remarkable qualities. One of the most remarkable natural polymers is silk and, in particular, spider silk.

As long ago as 1881, the tough and protective qualities of silk were recognized. That year, George Goodfellow, a physician in Tombstone, Arizona, recorded his observations following a fatal gunfight. When examining a penetrating wound to the deceased gun-

fighter's chest, he discovered that, after passing through his outer clothing, the bullet had impacted with and pushed through the flesh a folded silken handkerchief. The bullet was encased within the handkerchief, and not one layer of the handkerchief had been penetrated. Goodfellow recorded this observation and others in a document called *Notes on the Impenetrability of Silk*. Another incident he recorded was a case of a bullet actually deflected from a man's neck by a silk scarf.

The silk involved in these incidents and others recorded in Goodfellow's record was derived from the domesticated silkworm. For a number of years, scientists have been examining silk obtained from a number of other sources. Spiders produce a variety of silks for different purposes. Drag-line silk provides the framework for the spider's web and also enables a dangling spider to free-fall down to snare its prey. Drag-line silk is lighter and has proven itself in many ways superior to Kevlar, the strongest synthetic polymer. It is stronger than steel and has the ability to stretch and rebound from approximately 15 percent of its original length. The military applications for men and machinery are obvious. Scientists have embarked upon a program of research designed to produce spider silk in quantities suitable for use in domestic and military applications.

Will we see spider-silk-suited infantry soldiers in the Army After Next? It is a distinct possibility. The commercial possibilities of a material with the qualities of spider drag-line silk are limitless.

Smart Materials

Complementary to the work of biotechnologists is the research being conducted into "smart" technologies. Smart technology engineers the atoms or molecules of materials in such a way that the structure at the micro level is embedded with sensors, actuators, and control mechanisms. This allows the structure to sense and respond to external stimuli in a determinable and programmable way.

Advanced polymer research will allow the electrical and mechanical properties of advanced polymers to be altered when influenced by a specific stimulus. These smart technologies may have applications for the infantry soldier of the 21st century. Scientists visualize a photochromic ability (colors adjusting to match the surrounding spectrum) for advanced polymers. Some call it invisibility; perhaps ultra-low visibility is more accurate. The ability of an infantry soldier and his equipment to be nearly invisible has obvious advantages. Smart technologies also may provide advanced polymers with stress-sensitive molecules capable of monitoring damage and redistributing stresses, an appropriate quality for ballistic protection if it can be achieved instantaneously.

Robots

Worthy of consideration is a concept that has been discussed from time to time within the Air Force—replacing humans with robots. In the future, human-assisted platforms with onboard intelligence will be able to navigate terrain, observe enemy positions, and engage them when necessary. Systems will be monitored from stations far enough removed from the real battlefield that the danger to humans is almost totally removed.

Situational awareness could be maintained at a location remote from the battlefield while human-assisted platforms undertake the dangerous and deadly work on the battlefield. Only after the threat of the enemy has been effectively removed from the battlefield would the human warriors move in to hold the ground in concert with the robot troopers.

The argument against this proposal in Air Force circles generally has been that the situational awareness necessary to operate a high-performance aircraft and deliver precision-guided munitions can only come from a human in the cockpit. This belief may be true; however, digitizing the land warrior of the 21st century will provide him with a quantum leap in situational awareness that may take a generation of soldiering to embrace fully. Perhaps this is a vision for the "*Army After* the Army After Next."

Whatever the case, the question to ask is, "Will the Army After Next field a soldier similar to the one described above?" He ultimately may not look precisely the way I have described, and the smart technologies may not produce the advanced polymers needed to bring the land warrior's battlefield ensemble to fruition. However, the efforts of the Natick Research Laboratory and the Soldier Systems Command in Natick, Massachusetts, the lead exponents of enhanced survivability of soldiers on the battlefield, must continue to foster technological innovation and research by the nation's academic and research institutes in the field of soldier survivability. The U.S. Army must continue to push research endeavors to improve soldier survivability, recognizing that the soldier is still a valid and valuable component of the Army After Next. **ALOG**

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Institutionalizing Contractors on the Battlefield

by Joe A. Fortner and Ron Jaeckle

New Army doctrine will help determine the services contractors will perform on the battlefield.

Lessons learned throughout our country's history up through recent military operations, such as Operations Desert Shield and Desert Storm, demonstrate that contracting and outsourcing can be effective force multipliers. Contracted capability can increase or decrease available support resources quickly in response to changing requirements. It can extend existing military capability, provide alternative sources of supplies and services, or provide capabilities for which no military capability exists. The Army may obtain substantial advantages and economies through contracted support.

Contracting for services is not new; the Army has been doing it since the American Revolution. Contracting is a widespread and routine method for obtaining services today. For example, the Army uses contractors for a variety of base operations (BASOPS) support activities, for common use functions such as transportation, and for special applications such as publication development and publishing.

Except for Logistics Civil Augmentation Program (LOGCAP) contracts, the Army's use of contracted support typically has been focused on individual contracts developed as required. Now, for the first time, the Army is beginning to look at institutionalizing contracts and using contractors on the battlefield for routine military operations. With support from the Combined Arms Support Command (CASCOM), the Army Training and Doctrine Command (TRADOC) is developing a field manual for contractors on the battlefield. This doctrine will provide the basis for determining what functions contractors can (or should) perform on the battlefield, where on the battlefield they should provide contracted services, and how the Army should employ them to perform the services.

Basic Principles

Using contractors to provide support and services to military operations is not without risks or costs. Accordingly, institutionalizing their use by incorporating contracted services in military doctrine requires observing certain governing principles. These principles are not absolutes, but they provide a guide for evaluating the desirability of using contracted support to military operations. Some of the principles are—

- Contractors do not replace force structure. They augment Army capabilities and provide additional options for meeting support requirements.
- Contractors may, subject to mission, enemy, terrain, troops, time available, and civilian considerations (METT-TC), deploy throughout the area of operations (AO) and in virtually all conditions. In violent conditions in an echeloned theater, they generally will be assigned duties at echelons above division (EAD). In less violent circumstances, they may be employed throughout the theater depending upon the operational and tactical situation.
- Commanders are legally responsible for protecting contractors in their AO's.
- Contractors must have a sufficient number of employees available who have appropriate skills to meet potential sustained requirements.
- Contracted support must be integrated into the overall support plan.
- Contingency plans must accommodate service continuation if a contractor fails to perform.
- The user community should be unaware that a specific service was provided by a contractor. Links between Army and contractor automated systems must not place any additional burdens on soldiers.
- The Army must remain capable of performing required battlefield functions to provide critical support before contractors arrive in the theater or in the event contractors do not deploy or cannot continue to provide contracted services.
- Although contractors can provide flexibility at the macro level, commanders must remain aware that, within a given operation, contractor use may decrease flexibility. Changing contractor functional activities to meet shifting operational requirements may require con-

tract modifications, and some battlefield tasks cannot be assigned to contractors.

The basic principles above provide a framework for developing doctrine for using contractors on the battlefield. They will be applicable to contractor efforts on the future battlefield. The remainder of this article addresses important aspects of contractors and their potential functions supporting military operations.

Types of Contractors

The Army generally uses two types of contractors to support military operations. They are system contractors and contingency contractors.

System contractors typically provide support to specific weapon systems or to specified sets of components. Their most common functions are sustainment maintenance and item management. They tend to perform very specific and precisely defined activities, and they serve during both wartime and peacetime.

Contingency contractors provide a variety of support services primarily during operations. While some of them are capable of providing the same type of services as system contractors render, they usually provide more generic logistics support. There are two types of contingency contractors.

The first type of contingency contractor provides prearranged LOGCAP services. Under the Army Materiel Command's (AMC's) LOGCAP support contract, contractors provide prioritized contingency planning for logistics augmentation and engineering and construction services. The planning requirements are determined by the commanders in chief (CINC's) and the Army service component commanders (ASCC's) in the affected AO's. Prioritized contingency planning permits the affected CINC's and ASCC's to develop pre-arranged theater contracts, which can be negotiated in advance. This permits integrating contractor support into the support plans for anticipated contingencies.

The second type of contingency contractor is the operation-specific contractor. These contractors can provide many, if not all, of the same services that LOGCAP contractors perform. The significant difference is that these contracts are negotiated after the planning has begun for a specific contingency. In fact, they frequently are negotiated in theater during predeployment activities or during actual deployments. Operation-specific contractors provide services under circumstances not previously arranged due to unanticipated requirements or conditions. They are typically negotiated by contracting officers of the ASCC and must be integrated into the overall support plan as they are developed.

Role of Contractors on the Battlefield

Contractors can provide substantial support for combat service support (CSS) and some combat support (CS) functions on the battlefield. Some of those functions and the contract support associated with them are—

- Maintenance support. System contractors can perform sustainment maintenance on specified weapon systems, including subsystems. These contracts typically extend over long time periods encompassing both peacetime and wartime. They normally require the contractor's presence on the battlefield and direct contractor interface with soldiers. Contingency contractors can provide equipment maintenance support, not system specific, and usually in benign circumstances. These contracts, which are executed only during the contingency, normally focus on providing routine maintenance support.
- Transportation support. System contractors normally will not provide transportation support except as part of direct vendor deliveries in benign environments. Contingency contractors frequently perform selected transportation functions as METT-TC permits. They provide nontactical movement of personnel and equipment by all modes of transportation. Contracted stevedore and longshore capabilities frequently augment militarily significant water port operations.
- Supply and services. System contractors can perform item management, stockage, and direct delivery for selected system-specific components. They also may provide management, stockage, and delivery for specific ammunition items. They can manage high-value munitions and munitions requiring close control or relatively high levels of continuous maintenance or security. Contingency contractors can, as determined by METT-TC, provide field services such as laundry and bath facilities and clothing repair to augment quartermaster units. They routinely provide BASOPS-type support, to include constructions and real estate management and maintenance, to deployed military forces in austere AO's. They frequently perform necessary services for which no U.S. military capability exists, such as sewage treatment and disposal. They also can provide technical expertise and assistance for supply, maintenance, surveillance, demilitarization, transportation, safety, and accountability of munitions and hazardous materials.

Location on the Battlefield

While the functions contractors can perform and the support they can provide are fairly straightforward, the locations where they perform them are somewhat less so. Subject to METT-TC and to specifically limiting terms and conditions in the contract, the commander may employ contractors throughout the AO in a wide variety of circumstances.

Command and Control

Direct supervisory authority for contractor person-

nel normally resides with the contractor. This does not, however, deprive the commander of control. He can exercise indirect control of contractor personnel through contract terms and conditions, employer assimilation of command directives into employer-employee agreements, and attachment (with special reporting procedures) into specific military units. The commander can direct a subordinate unit to provide administrative accountability of contractor personnel. Moreover, contractor personnel must adhere to all guidelines and obey all general instructions issued by the commander. Violations may result in limited access to facilities or revocation of any special status the employee enjoys. In extreme cases, the commander can direct removal of an employee from the AO.

Support to Contractors

When the Army uses contractors to support its operations, it must provide certain support services to them. The Army will provide or make available, on a reimbursable basis, support services commensurate with those provided to deployed Department of Defense civilians to the extent permitted by law. Such support must be considered during the negotiation and drafting of any contract that requires employment or deployment of contractors. Contractor support requirements include, but are not limited to, life support, protection from enemy action, transportation, and issuing personal arms.

Deployment of Contractors

To perform their services supporting military operations, U.S. contractors and their personnel must deploy to the AO. Certain issues must be considered in planning for contractors and in contract negotiations. Some of them are—

- Contractor personnel must meet physical and health requirements appropriate for job performance in the area of operations.
- Contractor personnel must meet legal and administrative requirements associated with international travel and working in foreign countries, to include passports and, in some cases, in-country clearances.
- Contractor personnel normally will be processed through Government deployment processing facilities to ensure that they meet required standards.
- Contractor personnel must meet specific training or qualification requirements to perform in the AO. These include, but are not limited to, vehicle licensing, nuclear, biological, and chemical qualification, weapons qualification, and other requirements in preparation for overseas movement.

Other Issues

There are other, less easily defined issues that affect the use of contractors on the battlefield. Some of these are—

- Responsiveness of support. While it is intuitively obvious that a contractor must be able to provide the services for which he has contracted, his responsiveness to a specific performance requirement may be subject to circumstances beyond his control. Contingency contractors are particularly sensitive to such considerations.
- Legal status. There are numerous aspects to contractor legal status. They range from the laws of land warfare to federal and international laws, status of forces agreements, and local laws within the AO. The contractor and the Government must comply with all applicable laws. Accommodating these sometimes conflicting requirements is an implicit function of contract development and negotiation.

While contracting for services is nothing new for the Army, incorporating contracting into doctrine as an essential element of force application is. As the Army gets ever smaller and it becomes ever more focused on deployment from the continental United States rather than forward stationing, deployable contractors will provide an increasing source of military functional capability. The concepts and considerations noted in this article represent significant steps toward doctrinally institutionalizing the use of contractors on the battlefield. Other agencies within the Department of the Army currently are developing policy and establishing the administrative requirements for contractors (or contracting) on the battlefield. Their efforts, though closely related and parallel to the doctrinal actions described in this article, are outside its scope. They undoubtedly will be topics for future articles. ALOG

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Contractors on the Battlefield: What Doctrine Says, and Doesn't Say

by Major James E. Althouse

Civilian contractors on the battlefield have been documented as far back as the 16th century. Martin van Creveld notes in his book, *Supplying War*, that early commanders realized the need to furnish their armies with supplies beyond what they could plunder. They did this through the use of sutlers, who were paid to bring supplies to the army.

The U.S. Army has used contract civilian service from its beginning. Since the Revolutionary War, it has relied heavily on contract transportation to move troops and supplies. Civilians have played a major role in engineering projects, such as the construction of the Cam Rahn Bay facilities during the Vietnam War. The military has placed heavy emphasis on civilian support of communications, from Civil War telegraphs to modern satellite communications. All facets of general logistics support have been contracted at one time or another during this century, including food, laundry, sanitation, shower service, security, recreation, translator service, terminal and base camp operations, water and power production, and medical service support. Perhaps the most complex and controversial issue today is contractor involvement in maintenance. As systems become more sophisticated, the need for technicians to be close by has never been greater. This puts civilian contractors at far greater risk of direct involvement in conflict.

During World War II and the Vietnam War, one civilian supported every six soldiers. According to Katherine Peters, in her article "Civilians at War" (*Government Executive*, July 1996), the ratio changed to 1 to 50 for the Persian Gulf War, then fell to 1 to 10 in Bosnia. While these numbers appear to reflect a reduced civilian presence on the battlefield, using them to compute the overall risk of danger to civilians in a theater would be misleading. Because of the increased range of our adversaries' weapons and the disappearance of the linear battlefield, civilians working in theater are "on the battlefield" more than ever before.

The challenges of modern warfare, and logistics support in particular, have grown exponentially, but our doctrine has not kept pace. Many issues about the presence of contractors on the battlefield need to be addressed, but perhaps the most important are—

- How do we decide when the use of contracting is appropriate?
- Once the decision is made to contract for combat service support (CSS), how do we integrate civilians into the military system?
- What factors must we understand when defining the status of civilian contractors on the battlefield?

Is Contracting Appropriate?

When the Army needs a support service, it should look first to its sister services and then to any allies with which it may be operating. This would keep the required action within the force structure, minimize costs, and reduce civilian exposure on the battlefield. If joint or coalition service is unavailable or inadequate, however, the Army must look to civilian contractor support.

In a *Landpower Essay Series* article published in 1995 by the Association of the United States Army, the authors stated that defining issues of civilian use will help the Army develop doctrine governing their place in Force XXI. This, by extension, will form the basis for the civilian contractor's role in the Army After Next. An article from an October 1994 issue of *Federal Times* noted that the House Armed Services Committee believes that there are 10,000 Department of Defense (DOD) military support jobs that can be "civilianized." Reflecting this same line of thought, TRADOC Pamphlet 525-53, Combat Service Support, states that—

> [Civilians] . . . will provide an ever-increasing number of capabilities in support of future Army operations. Use of these support personnel will require their integration into the battle command environment and into the CSS framework, as well as mission training for the civilians involved.

The key to supporting the Force XXI Army is a seamless logistics support system covering the whole spectrum of logistics, from the strategic to the operational to the tactical level. Although the tactical level usually is seen as the location of a direct contractor presence on the battlefield, decisions must be made about contractor involvement at each level to determine what, if any, support is needed in the field. Strategic logistics deci-

sions involve determining support requirements and coordinating with the industrial base. Operational logistics ties the strategic and tactical levels together through preparation of the theater and establishment of the support base. Tactical logistics decisions establish who is going to work where on the battlefield. Contractor involvement must be considered in all of these decisions.

Several reasons for Government contracting of services are listed in *Contracting Out in Government,* by John A. Rehfuss. The most obvious reason is to save money. If a private firm can perform a service for less than the Government can, this makes perfect sense. Often, the cost of training troops to perform a task exceeds the cost of contracting with someone who already performs that task on a routine basis.

Contracting can be used to obtain one-time help, to capture technological advances, or to help establish benchmark costs. It also helps in sticky political situations. Bosnia offers an example of this. Political constraints have limited troop numbers in Bosnia, so support functions have been performed by contractors who were not counted against force totals.

Other factors are becoming more important in deciding if we choose contracting. One is outsourcing, which is being pushed to privatize functions that can be performed outside of the military. Another is technological advances, which create a growing dependence on sophisticated maintenance support. Finally, reductions in forces require the Army to conserve fighting strength by contracting out noncombat jobs performed by uniformed personnel.

The answer to determining if the Army should contract rests, in part, with the type of contractor needed. The two types of contractors that may be found on the battlefield are system contractors, who primarily support a weapon system or set of components, and contingency contractors, who support primarily a particular operation.

The role of system contractors needs to be addressed throughout the life cycle of a piece of equipment. As systems become easier to operate, yet more difficult to maintain, a contractor presence will be required wherever the equipment is fielded, and during training as well as deployments. Life-cycle models must include planning for contractor involvement, as well as the funding for follow-on support for personnel and equipment. Development of highly complex systems is relatively new, and the risks of exposing technical support personnel to hazardous conditions have not been addressed in depth by current doctrine. If systems contractors are expected to work in a potentially hostile theater, then their exact role must be defined.

The role of contingency contractors has been partially addressed by the Army. AR 700-137, Logistics Civil Augmentation Program (LOGCAP), describes the LOGCAP program funded by the Department of the Army (DA) and managed by the Army Materiel Command (AMC). This portion of the Army's doctrine on using civilians is fairly thorough.

Operation-specific contracts are contracts negotiated for operation-specific services. They are ad hoc arrangements made during the predeployment or deployment process. Since, unlike the LOGCAP program, there is no established system for monitoring these contracts, responsibility for monitoring performance falls on the contracting officer or his representative. If a contractor performs poorly or not at all, usually only the threat of modification or termination of the contract will get him to comply. The disadvantage in this situation is that, because of the hectic nature of deployments and the myriad tasks and contracts associated with them, contracting officers or representatives often find themselves spread too thin to monitor performance effectively until the deployment is completed and the theater matures.

Given the infinite number of situations that might require contingency contracting, it would be very difficult to write specific doctrine to cover each scenario. However, given the high level of responsibility a combatant commander already has in his area of operation, some authority should be vested in him to take appropriate action if the contractor's poor performance or failure to perform is detrimental to the welfare of his troops. At present, the only recourse open to the combatant commander is to have the contracting officer direct a contractor to remove an employee who does not conform. (Contractor personnel with U.S. forces are subject to military law only during a declared war.)

Becoming Part of the Team

Once the decision is made to contract logistics services in a theater of operations, the next challenge is integrating the contractor personnel into the total force. Several laws and regulations that provide basic guidance are in place, but they tend to cover the issues involved only in broad terms or cover only certain categories of personnel.

Title 10, section 129a, of the U.S. Code authorizes the Secretary of Defense to use civilian contracting if it is financially beneficial and consistent with military requirements. DOD Directive 1100.4, Guidance for Manpower Programs, in effect since 1954, specifically directs that "civilian personnel will be used in positions that do not require military" personnel. (There are a number of valid reasons for this.) DOD Directive 1404.10, Emergency-Essential DOD U.S. Citizen Civilian Employees, governs the emergency essential program, which designates how overseas DOD civilians, or civilians to be sent overseas in an emergency, can be called up for deployment.

Army supplemental guidance to this last directive is DA Pamphlet 690-47, DA Civilian Employee Deployment Guide, and AR 690-11, Mobilization Planning and Management, which provide a formal process for identifying and preparing Government civilians for deployment. This regulation also directs that installation civilian personnel offices plan to expand civilian employment at existing facilities in the event of a mobilization. One key issue that these regulations fail to address is preparing non-DOD employees (i.e., civilian contractor personnel) for deployment. According to a study performed for the Army by the Rand Corporation in 1994, there has never been a central policy for deploying contract employees, and it was only after the Persian Gulf War that the Army Mobilization Operations Planning and Execution System was modified to include some references to deploying contract personnel.

Two entities have been created to help fill the void in dealing with civilian contractors: LOGCAP and the CONUS [continental United States] replacement center (CRC) concept. According to AMC Pamphlet 700-30, LOGCAP "is the U.S. Army initiative for peacetime planning for the use of civilian contractors in wartime and other contingencies." LOGCAP is a true force multiplier in that it uses already developed logistics contingency contracts to provide rapid and responsive support within a theater. It can be used in joint, coalition, or multinational missions, and overseas or stateside, if necessary.

As Major Camille Nichols noted in her article on LOGCAP in *Military Review*, the one great advantage to the program is its flexibility. However, LOGCAP is limited in several areas. Depending on the contingency scenario, certain details of the contract must remain classified. This prevents open discussion and possible refinement of the plan until it is put into use; by then, improvisation rather than anticipation may be needed to correct faults. LOGCAP also calls for the contracting officer to include all wartime requirements in the contract when war is declared, which can lead to last-minute scrambling and limited responsiveness. Its use is somewhat limited in underdeveloped theaters, and no matter where it is used, some type of surveillance program must be put into place to monitor the contractor's performance.

All aspects of LOGCAP involve putting people in a potentially hostile environment, yet the only mention of preparing personnel for such duty is a brief paragraph in AMC Pamphlet 700-30 explaining what relevant issues should be addressed in contracts and instructing major Army commands to evaluate each situation for risk.

The CRC concept was approved by the Vice Chief of Staff of the Army in 1987 and was used first during Operation Desert Shield. Its purpose is to receive individuals at specific sites and certify them for deployment. These non-unit-related personnel (NRP) include contract civilians. CRC's can stand up for any level of mobilization, from selective to total. It is the Total Army Personnel Command's responsibility to control the flow of NRP, and the availability of aircraft and NRP seats are based on the theater commander's priorities for using aircraft. While processing through CRC's, NRP are supposed to receive dental screening, a medical examination, deployment briefings, financial and religious services, specialized clothing and equipment, and weapons and familiarization training as required by the theater commander. The main problem with the CRC concept during the Persian Gulf War was that, when the Army asked its contractors to send their personnel through the CRC's, not everyone went. Some chose not to, but some could not go because of constraints imposed by their business obligations.

While both LOGCAP and CRC's are steps in the right direction, some issues still need to be worked out. Accountability is necessary in everything the Army does, but some contracted employees feel they are only accountable to their firms and bypass the military system. This not only puts them in potential danger; it also can jeopardize other civilians and soldiers, who would have to work in close proximity to those not briefed on the theater's hazards or inoculated against certain viruses or diseases. The rules for processing for deployments must be rigid enough to maintain a standard, yet flexible enough to be workable for industry.

Finally, when civilian contractors are uprooted from their usual places of business and sent overseas to live and work while facing adverse conditions and possible death on a daily basis, they like to know what to expect. They also deserve to know they will be taken care of. Duties and responsibilities need to be clearly delineated. Another paper done by Rand after Desert Storm noted that some personnel who deployed to Southwest Asia did not know what their jobs would be until after they arrived in country, while others were assigned extra duties that were way out of their line of work. Many found that their living conditions were not what they expected and were totally unprepared to deal with the harsh desert and austere military environments.

The military should adopt a system that motivates personnel to volunteer and perform well. Using civilians depends on volunteerism, for both DOD civilians and contractor employees alike, because only in a fully declared war can anyone be ordered to deploy—and then only certain categories of DOD civilians. Volunteering is encouraged by many possible incentives. Ensuring that all deployed contractor employees, as well as their families, are covered by medical, dental, and life insurance; providing legal and family assistance; providing

the same notification procedures and mortuary services as the military receives—these are just a few of the incentives that are used. (At this time, entitlements for family members are limited to family support groups.)

Information is key: civilians need to know what to expect from soldiers, and vice versa. Subordinate commanders must know what roles the civilians accompanying their units will play, and they must take the time to teach their soldiers what to expect and what their responsibilities toward the civilians are. Political sensitivities must be considered when dealing with civilians other than U.S. nationals. Host nation and third country support frequently can be used, and local cultures and customs must be respected.

Factors Defining Contractor Status

The status of a contractor performing in a war zone is another issue. The two most important factors in defining contractor status are the 1949 Geneva Convention, relative to the treatment of prisoners of war, and the Uniform Code of Military Justice.

Dr. Ivan S. Kerno, former United Nations Secretary General in charge of the legal department, has written that the Geneva Convention of 1949 was an important accomplishment in international law, in part because it protects civilians in time of war. It distinguishes between foreign nationals on the territory of a party to a conflict and the population of occupied territories. DA Pamphlet 690-47 states that the Geneva Convention, in conjunction with the Hague Convention of 1907, declares that both combatants and certain other persons are entitled to prisoner of war status, provided they carry the mandatory DA Form 489 (Geneva Convention identification card for persons who accompany the Armed Forces).

While most civilians are considered noncombatants, their jobs in support of U.S. weapon systems may be seen as active involvement in hostilities, which may make them subject to direct or indirect attack. Of course, it is the armed services' job to protect them, and the commander of the unit to which the contractors are assigned is legally responsible to provide that protection.

The Army has developed a new DA pamphlet (715-16) that deals with the issue of arming civilians for self-defense purposes. The pamphlet states that weapons may be issued to a contractor on the authority of the theater commander, that those weapons must be military type-classified standard "A," that they may be used only for self-defense, and that they may be distributed only in accordance with the policy of the contractor's parent company. The contractor does not have to accept the weapon.

The problem with a contract employee carrying a weapon is that, even if it is intended only for self-defense, its very appearance may make him subject to attack. Of course, the mere presence of a civilian contractor in the vicinity of a weapon system could be construed the same way. The point is that civilians should know what to expect if they are attacked and captured. Not enough has been done in recent years to clarify the status of contractors on the battlefield, although this probably is more an issue of international law than Army doctrine.

During a 1993 research study by Rand, it was discovered that some field commanders wanted to gain some type of legal authority over civilians in order to either compel them to deploy as originally intended or remain on station until they are relieved properly. As stated earlier, the only time a civilian can fall under the Uniform Code of Military Justice is in the event of a congressionally declared war. Placing a civilian under the Uniform Code of Military Justice on any other occasion would be a fundamental violation of that person's constitutional rights. The drawback is that the field commander's hands are tied to some degree, and the only recourse in the case of a non-performing civilian is to have the contracting officer modify or terminate the contract. Perhaps another penalty or censure might be devised.

Civilian contractor personnel will continue to play larger roles in logistics support of the Army in the years ahead. They will take on support roles that once were held exclusively by soldiers as the Army downsizes and concentrates its power on warfighting. Their presence will become more commonplace on the battlefield as weapon systems become more complex. Current doctrine that addresses the contractor presence has not kept pace with recent developments and the conditions under which the Army deploys. Consideration of the role of contractors must begin at the very start of a product life cycle, and decisions about their participation and involvement must be made at every level—strategic, operational, and tactical. Just as it always will be the Army's role to protect contractors, it also is the Army's decision on when and where to use them. That will require sound decision making in doctrine development.

Major James E. Althouse is working on an M.B.A. degree with a concentration in logistics through Florida Institute of Technology at Fort Lee, Virginia. He wrote this article in partial fulfillment of the requirements for graduation from the Army Logistics Management College's Logistics Executive Development Course.

A Unique Unit With a Unique Challenge

by Chief Warrant Officer (W–3) Paul Hodson

Nestled on the banks of the James River in the westernmost part of the Army Transportation Center and School at Fort Eustis, Virginia, sits an old, unassuming cinder block building with a picturesque view of the river below. Inside this old warehouse, soldiers of the 558th Transportation Company Supply Support Activity (SSA) download and process class IX repair parts. OK—no big deal—this activity goes on day in and day out at SSA's across the Army. So what's so special about the 558th?

The 558th Transportation Company, 6th Transportation Battalion, is an integral part of a larger organization, the 7th Transportation Group, the most deployed of all organizations in the active Army. Operational readiness is a vital responsibility of all active Army units. But it is imperative for the 558th Transportation Company because it is the only active Army unit that is responsible for the operational readiness of a *fleet of boats.*

Although the 558th is not a maintenance company by title (the battalion commander often refers to it as three units in one—transportation, maintenance, and supply), it has the distinction of being the only direct and general support (DS and GS) company in the Army with the mission of providing service and support to the Army's inventory of watercraft. This sets the 558th Transportation Company apart from any other company. It also presents many challenges to its soldiers and officers.

"Marine-Peculiar" SSA

Berthed on the James River just off Fort Eustis are seagoing Army vessels such as landing craft, utility (LCU), landing craft, mechanized (LCM), logistics supply vessels (LSV's), small tugboats, large tugboats, and a floating machine shop, just to name a few. One of the many challenges for the 558th is providing repair parts to support the organizational maintenance program of four separate battalions as well as its organic DS and GS missions.

The SSA looks very much like any other small, nondivisional retail SSA. There are rows of small and medium storage cabinets with small, medium, and large drawers, each one a location for a specific stock-numbered item. There are also floor-to-ceiling steel warehouse bin assemblies that are used to store larger and heavier items. The SSA has three distinct working elements—stock control, storage and issue, and reparable exchange—each with its own tasks, yet working together in close coordination to accomplish the overall mission. In the offices of each working element is a Standard Army Retail Supply System (SARSS) workstation that ties into the SARSS-1 server.

It is when you take a materiel release order to a specific stock location that you find something you more likely would expect to find at a naval supply center instead of an Army SSA—boat parts! Boat parts, or "marine-peculiar" repair parts, are a separate class of their own; unfortunately, they are not classified as such. Most of the marine-peculiar repair parts stocked at the 558th SSA have national stock numbers (NSN's); however, over half of them are either very limited in depot supply or not stocked at all at wholesale levels. This creates long lead times for critically needed repair parts as well as a management challenge to the retail stock account.

Sixty-five to seventy percent of all marine-peculiar repair parts associated with our vessels are not available in the Army supply system or through Department of Defense (DOD) agencies, and most do not have assigned NSN's. Because of this, organizational and DS and GS maintenance managers are forced to buy repair parts through local sources, which presents yet another management challenge—capturing demands effectively so that someday both the retail and wholesale levels of supply support may stock these items in sufficient quantities. Although there are systems in place locally to capture these demands, there is no interactive process through SARSS for entering demand history data.

A 35-page (and growing) list of manufacturer's part numbers, their associated nomenclature, and the corresponding vessels has been compiled as a working document that is also a helpful guide and an archive for both maintenance and supply managers. A marine part is classified as "class IX common," with no distinction from its counterpart in rolling stock other than a subclassification of "Q." Although 95 percent of the ma-

☐ **Soldiers of the 558th Transportation Company process receipts using the latest electronic scanning devices.**

rine-peculiar repair parts stocked at the 558th SSA are unique to watercraft, only a small percentage of these are subclassified as such, making it difficult to distinguish between rolling stock and watercraft demand data without hours of research.

Maintaining an Aging Fleet

In August 1997, the 558th SSA was tasked to support all class IX requirements for units assigned to the 7th Transportation Group instead of only marine repair parts. Complicating this small retail operation is low-density usage of like-item marine repair parts. Because there is no distinction between marine and wheeled vehicle repair parts, retention and addition criteria are the same—3 demands in 180 days to retain on the authorized stockage list (ASL) and 9 demands to add to the ASL. Fifty-three percent of the 558th SSA's ASL are not demand supported but command directed. Because over half of what the 558th SSA stocks is not available at higher levels of supply, retention levels, zero balance information, and replenishment are intensely managed.

Some of the Army's fleet of watercraft are aging and require more attention. The small tugs are of early 1950's vintage, and the floating machine shop was built in 1956. As the Army's seagoing vessels age, a growing concern of the command is how we are going to continue to maintain them to standard. Marine parts for our older vessels are increasingly difficult to find, and high cost is an issue. Many parts for both our old and new vessels must be fabricated because manufacturers simply don't make them. Maintenance managers are relying more and more on the Internet to track down and obtain hard-to-get parts they need.

DS and GS work orders have averaged nearly 1,200 per year for the past 2 years, while operational readiness has been maintained at an astonishing 87-percent average. This is a tribute to the innovative, imaginative, and supply-disciplined soldiers and officers of the 558th Transportation Company. Despite the obstacles, 558th SSA managers have been able to maintain a high level of performance by Department of the Army and velocity management standards. Zero balance has averaged only 4 percent or better over the past year. Order and ship time was its lowest in February of this year at 8 days, and request processing time averaged 1.2 days over a recent 4-month period.

Although the soldiers and officers of the 558th Transportation Company are faced with increasingly difficult challenges, they will prevail because of their spirit, pride, professionalism, extraordinary skills, tactics, technical expertise, and downright ingenious ways of getting their job done. **ALOG**

Chief Warrant Officer (W–3) Paul Hodson is an instructor with the Warrant Officer Division, Logistics Training Directorate, Army Quartermaster Center and School, Fort Lee, Virginia. When he wrote this article, he was the accountable officer for the 558th Supply Support Activity, 6th Transportation Battalion, 7th Transportation Group, Fort Eustis, Virginia. *Mr. Hodson thanks Lieutenant Colonel Gregory Reid, Commander of the 6th Transportation Battalion, for his assistance with this article.*

EAGLE—Improving National Guard Logistics

by Colonel Charles M. Bechtel, PAARNG

The EAGLE is a committee of senior logisticians that serves as the voice of the field in developing Army National Guard logistics policies.

When the Army National Guard's Chief of Logistics needs advice on a difficult issue, or when one of the state or territorial National Guards faces a challenging logistics problem, they can turn for help to the EAGLE. For logisticians unfamiliar with the structure of the National Guard, that's the Executive Advisory Group for Logistics Excellence.

Besides acting as a senior-level advisory group to the National Guard Chief of Logistics, the EAGLE also assists the chief by ensuring that experienced logisticians in the field are available to work with his staff on hot items that require a concentrated effort and a wealth of technical knowledge.

One of the great benefits of the EAGLE is the bridge it can provide between logistics staff officers at the National Guard Bureau (NGB) and National Guard logisticians in the field. This connection is needed because of personnel turnover at the NGB. There is a statutory requirement that 60 percent of the staff officer positions at the NGB be filled by active duty officers. But the officers serving in these positions tend to change every 2 years. By contrast, the National Guard logistics officers in the field are usually military technicians who remain in the same position much longer than their active duty counterparts. So, while the individuals on the NGB staff change, the ongoing relationship between the EAGLE members and the staff helps to maintain continuity in logistics policy.

Structure

The EAGLE represents all 54 states and territories that constitute the Army National Guard. To accomplish this, the EAGLE is organized on a regional basis: the United States is divided into four geographic regions (see chart at right), and the voting members of the EAGLE include a director of logistics (DOL), a surface maintenance manager (SMM), and a supply management officer (SMO) from each of the four regions. Each of these primary positions must be filled by an officer from a different state or territory. In addition to these 12 members, the NGB Chief of Logistics selects a chairman to serve for 2 years. Other voting members include a defense movement coordinator (DMC) and an installation transportation officer (ITO). These EAGLE members generally are highly experienced colonels who are well qualified to represent their functional specialties as well as the logisticians in their respective regions.

Colonel Ray Crocker, who founded the EAGLE while serving as the NGB Chief of Logistics, envisioned a committee that could forward thoroughly staffed recommendations to the Chief of Logistics for approval. So the committee also includes a cross-section of the typical state headquarters staff. These members, who do not vote, include a United States Property and Fiscal Officer, a human resources officer, a facilities management officer, a plans, operations, and training officer, and a chief of staff. (See EAGLE membership chart at right.)

In accordance with the EAGLE charter, the chairman may establish special subcommittees as required.

EAGLE Regions by State

Region 1		Region 2		Region 3		Region 4	
CT	NJ	AL	NC	AR	MO	AK	ND
DC	NY	FL	PR	IA	NE	AZ	NV
DE	PA	GA	SC	IL	NM	CA	OR
MA	RI	KY	TN	IN	OH	CO	SD
ME	VA	MS	VI	KS	OK	GU	UT
MD	VT			LA	TX	HI	WA
NH	WV			MI	WI	ID	WY
				MN		MT	

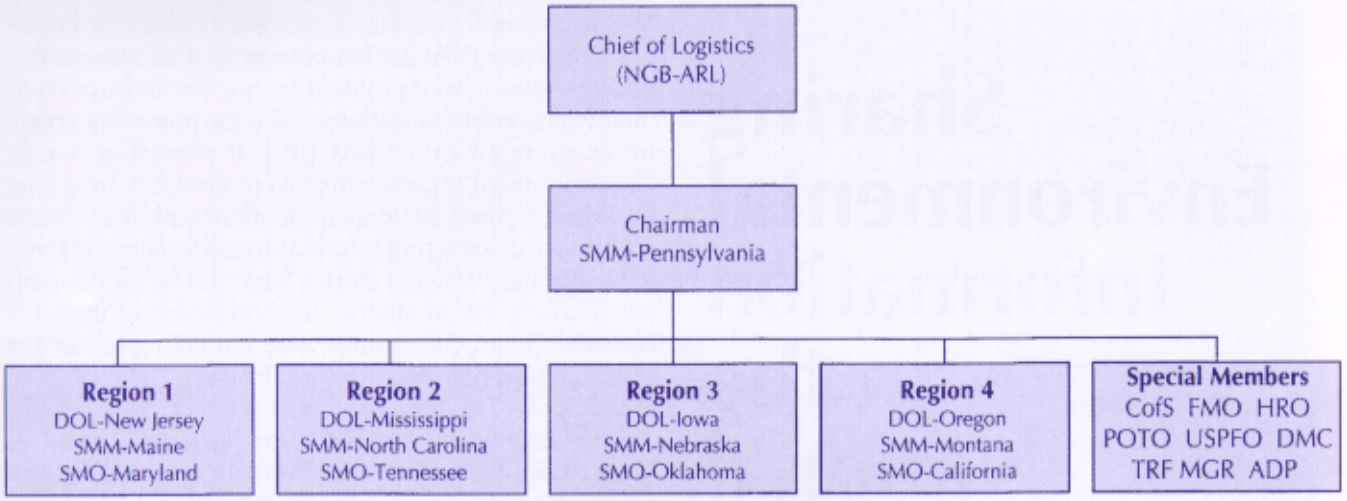
☐ The EAGLE includes state or territorial representatives from each of these four geographical regions.

The EAGLE currently has a subcommittee for environment and another for logistics systems—both areas critical to successful logistics operations. Only the subcommittee chairmen attend the regular meetings of the full EAGLE committee.

The chairman of the EAGLE, with the approval of the Chief of Logistics, may establish process action teams consisting of both EAGLE members and NGB staffers. The teams also may include functional area experts from the field who do not hold permanent positions on the EAGLE.

Operations

The EAGLE meets at the National Guard Readiness Center in Arlington, Virginia, about every 4 months. But the real key to its success in solving complicated



☐ This chart shows the membership of the EAGLE as of 23 April 1998. Note that no state has more than one voting member at a time.

logistics issues is the constant coordination and communication that takes place via phone, fax, e-mail, and video teleconferencing.

To ensure proper coordination at NGB headquarters, each functional area of the EAGLE, such as maintenance, has a point of contact on the NGB staff (usually a major or lieutenant colonel). The regional representatives facilitate the flow of information both up and down the chain of command. Logisticians at the state level may contact their regional representative with a potential issue. Similarly, if a particular state or territory is having difficulty meeting a deadline to the NGB Logistics Division, the regional representative will try to facilitate the timely and accurate flow of data to NGB. This regular lateral communication often leads to states assisting each other; for example, by exchanging information, or by hosting visits by a new state DOL or SMM who is trying to learn the ropes.

Issues for the EAGLE and NGB staff can be generated by the NGB Chief of Logistics or submitted from a state to the EAGLE. States are required to send potential issues through their regional representatives in a standard format. The representative may know that the EAGLE is working on that issue already; or he may encourage the individual submitting the issue to attempt to resolve it in an informal manner, especially if the issue does not have nationwide concern.

The voting members of the EAGLE decide whether to accept or reject an issue. All issues accepted by the EAGLE are entered on the "Issues Register." The register lists the date the issue was accepted, the originator and his DSN telephone number, the EAGLE or NGB point of contact, and the latest status of the issue. Anyone can request a copy of the register by contacting Lori McCarthy at (717) 861-8987 (DSN 491-8987) or Chief Warrant Officer Jack Morgan at (717) 861-8542 (DSN 491-8542), or e-mail to smmpa@pa-arng.ngb.army.mil.

To date, the EAGLE has worked on 30 issues, 10 of which have been closed. The resolution for some issues is rather straightforward, such as having the NGB Chief of Logistics sign a policy letter that will be forwarded to the states and territories for implementation. Other issues require a long-range approach, such as rewriting an existing Army regulation.

The EAGLE serves as a force multiplier for the NGB Chief of Logistics by assisting him in getting the logistics message to the field while at the same time representing the field's concerns in the formulation of logistics policy. Anyone desiring more information on the EAGLE can contact the chairman at (717) 861–8592 (DSN 491–8592) or by e-mail at bechtelcm@pa-arng.ngb.army.mil. ALOG

Colonel Charles M. (Chuck) Bechtel is the Director of the Surface Maintenance Program for the Pennsylvania Army National Guard and serves as the Chairman of the EAGLE. He is a graduate of the Army War College and the Associate Logistics Executive Development Course at the Army Logistics Management College. He holds an M.B.A. degree from Pennsylvania State University.

Sharing Environmental Information in the National Guard

by Major Patrick T. Dye, TXARNG

The need to protect the environment and prevent pollution has become a major enterprise affecting virtually every segment of American society. The Army is no exception to this trend. The Army logistics community, in particular, has an interest in environmental developments because logistics activities such as maintenance have the potential to be major sources of pollution. The Army National Guard has long recognized the need for an integrated information support system capable of providing pollution prevention information to its widely dispersed units and activities. Now a solution is at hand—the Pollution Prevention Internet Initiative (P2I2).

On line and fully operational since May, P2I2 is a virtual data base that stores and maintains all pertinent information on environmental protection activities and operations. It is accessible to all those who need such information, with access provided through the World Wide Web.

National Guard Pollution Prevention Website

http://www.pollution.org

Creation of the P2I2

In 1997, the Environmental Subcommittee of the Army National Guard's Executive Advisory Group for Logistics Excellence (EAGLE) discovered that the number one non-resource-related problem facing the logistics community was communications. [See the preceding article for an overview of the EAGLE.] It seemed as though National Guard organizations were always reinventing the wheel in their attempts to do more with less. Some states were discovering solutions to environmental problems, but their success stories were not being disseminated effectively to others. In short, those of us in the National Guard community were not taking advantage of our number one resource—each other. Thus was born the P2I2.

The Director of Logistics at the National Guard Bureau (NGB), Colonel Charles Baldwin, initiated the web project by providing the required funding. The Texas Army National Guard was directed to implement the program by purchasing the necessary hardware and software and providing the computer programming talent.

To develop the P2I2, a college student was hired to build a seamless, interactive, on-line decision support tool. This student was supported by a stipend funded by the NGB and received an appointment to the Postgraduate Environmental Management Participation Program at the Army Environmental Center. This program is administered by the Oak Ridge Institute for Science and Education through an interagency agreement between the U.S. Department of Energy and the Army Environmental Center.

Accessing the P2I2 Website

Access to most of the P2I2 website is granted without the need for passwords. There are one or two areas that require access approval; only National Guard personnel are able to retrieve information from restricted data bases. This system enables Guard personnel to reap the full benefits of the data contained in the site while allowing outside agencies or private individuals access to beneficial information.

The site is not browser specific, so any shop or office with a computer and a modem running Netscape version 3.0 or higher or Microsoft Internet Explorer version 3.0 or higher should be able to access the site easily.

Infrastructure

When the P2I2 began, surveys were sent to the heads of all logistics, maintenance, and environmental branches for all 50 National Guard states and 4 territories. Of the 300 surveys distributed, 50 were returned. The results indicated that 68 percent of the respondents had access to the Internet. Many states responded with actual data that they wanted to have included in the website. This material covered a wide range of issues and provided

valuable content for building the site. An overwhelming number of respondents (94 percent) indicated that training and education were the most important information they needed to assist their pollution prevention efforts.

The development of the P2I2 project began with a nationwide collection of data from field personnel—the very customers P2I2 seeks to serve. As a result of this effort, the website includes data bases of product information and process innovations, personal success stories, interactive areas for submitting information about ongoing issues, and contract data for networking National Guard personnel.

The infrastructure is in place for expanding product and process data bases as well as automatically updating contract data. Future expansion of on-line materials for training and conferences has been discussed, as have plans to add international information.

Users submit materials for the website on line or by mail to the Adjutant General's Department, Texas Army National Guard, ATTN: AGTX-EV, P.O. Box 5218, Austin, TX 78763-5218. Those materials then are organized and standardized into searchable data base formats. It is anticipated that the gathering of information will continue for the life of the project, as will upkeep of the point of contact (POC) data bases and maintenance of the website user interface.

Searchable Topics

The website allows users access to the following topics—

Search. Allows the user to search the data base for the information he needs.

Regulation and standards. Provides general information on the main regulations governing pollution prevention. Covers Federal and military regulations and lists additional sources for obtaining further information.

Process. Describes actions, procedures, operations, and functions of successful National Guard pollution prevention initiatives.

Case studies. Presents descriptions of actual cases involving the application of National Guard pollution prevention initiatives in the field.

Manufactures. Lists all manufactured products that are mentioned in any area of the website.

Discussion areas. Provides a forum for the exchange of ideas among states. Users can ask a question, provide an answer, add a comment, or share their successes with their peers.

What's new. Offers a quick reference to the latest information about pollution prevention from around the world.

Help. Provides guidance on how to use the website.

Calendar. Lists current information on pollution prevention events across the Nation.

About. Describes the purpose and offers a brief history of the Pollution Prevention Resources Center.

Contacts. Provides a data base of National Guard pollution prevention representatives and experts from across the Nation.

Awards. Summarizes pollution prevention-related awards and application information. Application examples from past winners are included.

Money matters. Describes ideas on how to overcome financial barriers to successful pollution prevention.

Other links. Lists top pollution prevention websites for users seeking related information.

The website also offers a trivia game called PIG (Pollution Information Game). PIG Trivia is a game that can be used as an educational training tool. Players accumulate points for correct answers and are penalized points for incorrect answers. In addition, the game has a tracking option to facilitate competition between players.

As every manager knows, information on how to solve problems is the key to long-term success. P2I2 offers an informative framework to assist in eliminating the shortcomings that customers face. If, for example, the shop supervisor of an organization maintenance shop in the Arkansas Army National Guard wants to reduce the amount of solvent that his shop is using for washing parts, he can check the website for information on parts washers. Here he will read about the success other states have had with various products. He also will be able to discuss how these products work in other shops by asking questions through the discussion area.

When it comes to environmental problems generated by maintenance or logistics operations, all branches of the Army share the same problems. P2I2 is an information exchange system that allows the Army National Guard to share the solutions with everyone. See you at http://www.pollution.org. ALOG

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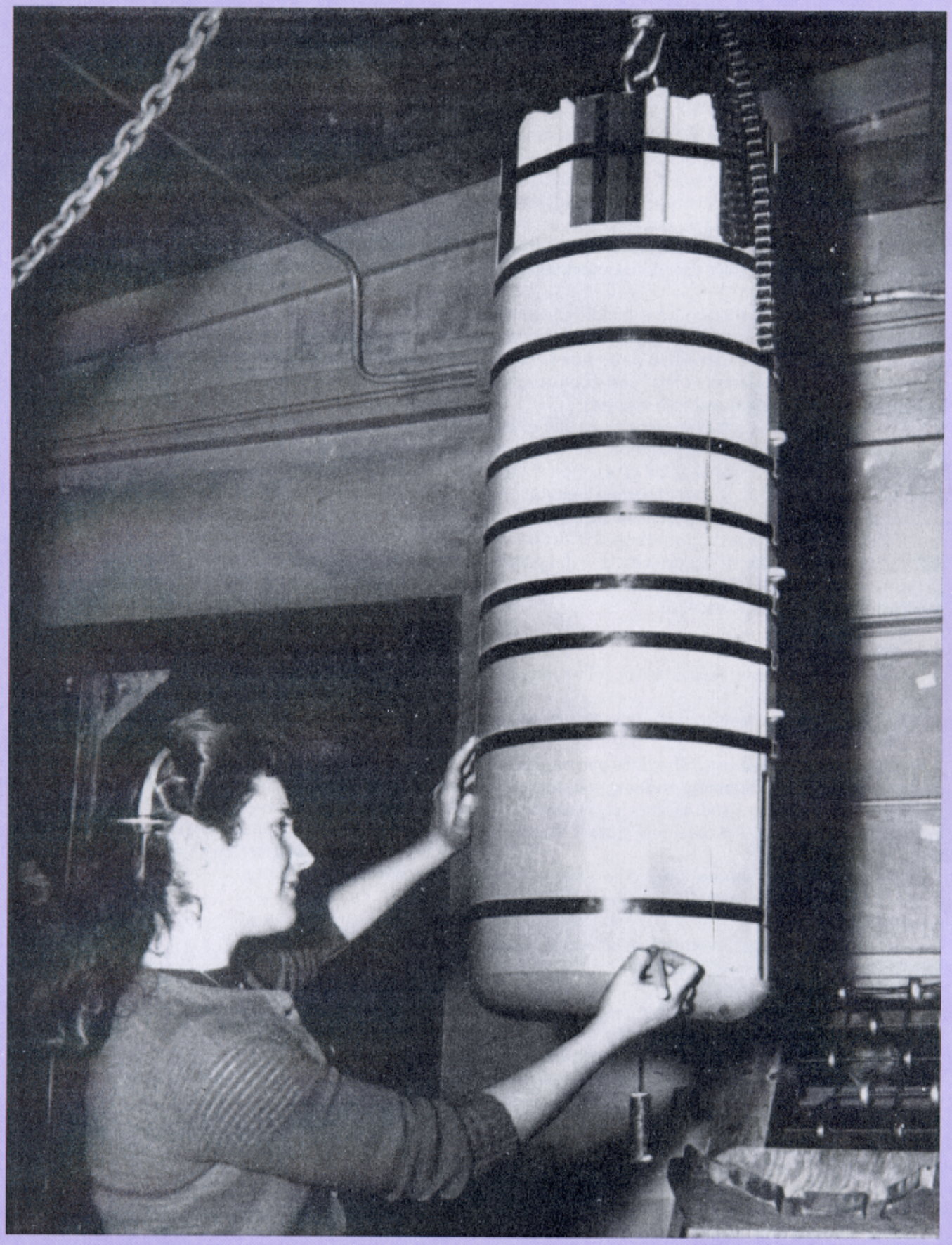


The Chemical Warfare Service Prepares for World War II

by Dr. Burton Wright III

The Army's chemical branch built its strength as the possibility of U.S. entry into the war grew.

Many historians have concluded that the U.S. Army on the eve of World War II was an organization unprepared for the titanic combat ahead. While this might have been true in a broad sense, parts of the Army had begun to get ready for war well before Pearl Harbor plunged the Nation into the conflict. That was the case with the Chemical Warfare Service (CWS), and its prewar preparations proved invaluable in enabling it to meet the challenges of world war.

The Army was not blind to the war clouds building over Europe in the 1930's. But until 1938, it did not have the money to begin any type of preparation. When Congress, seeing the coming danger, appropriated the funds needed to prepare for war, the Army got right to work.

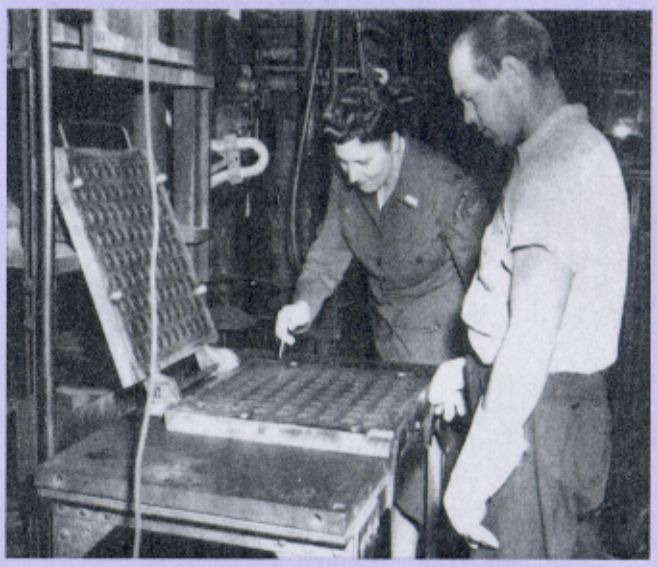
Efforts had been made during the years between the world wars to maintain the Army's capability for chemical and biological combat. The CWS had survived the Army Chief of Staff's attempt to disband it at the end of World War I in 1919. While the CWS did not thrive in a postwar environment characterized by efforts to ban chemical weapons, it attempted, like the rest of the Army, to use what it had to keep in fighting trim. These efforts were based on the experiences of the CWS during World War I; the Army's chemical personnel did not forget the lessons of that terrible conflict.

Interwar Plans and Problems

The National Defense Act of 1920 made the Assistant Secretary of War responsible for peacetime industrial mobilization. Mobilization for World War I had taught the Army that, in order to create a force of the size and scale needed for such a war, it needed to maintain a close relationship with industry. The Army also learned that development of a base of supply was essential—a base of supply that could sustain the Army in the opening weeks of a conflict so there would be time to mobilize industry for war work.

To create the necessary base of supply, the Army set up a Procurement Division in the fall of 1921. It was divided into two branches: procurement and planning. The division supervised the procurement, storage, and distribution of war materiel, including chemical and biological items. On 9 December 1921, the Assistant Secretary of War approved a "shopping list" for the CWS that included toxic agents, smoke and cloud gas materials, and chemical engineering equipment.

The materiel initially used to provide the base of supply consisted of leftovers from World War I. Funds would be spent to add to, but not replace, this materiel.



☐Two workers at the Acushnet Process Company in New Bedford, Massachusetts, remove 18-inch M3 hose tubes from a mold.

For planning purposes, the procurement program was based on an Army strength of 100,000 men. However, during the interwar years from 1921 to 1938, the Army's stockpiles were not increased but actually went down. By 1938, the Army estimated that it needed $507,000,000 to make up shortfalls in critical items, including CWS materiel, needed for mobilization.

What supplies there were had to be used in the event

☐An inspector with the Chemical Warfare Service's New York Procurement District writes a birthday greeting to Adolf Hitler on a cluster of M50 incendiary bombs at the Unexcelled Manufacturing Company.

☐M3 hose tubes are inspected on hose-tube air testing machines at the Acushnet Process Company.

of mobilization to provide for the Regular Army, the organized reserves, and, if necessary, the Navy. The supplies then on hand would not have gone far. So in the mid-1930's, when Europe and other parts of the world began to show distinct signs of approaching war, it was obvious that some action had to be taken.

Preparing as War Approaches

By 1937, mobilization was no longer based on the concept of a 100,000-man army. According to the new Protective Mobilization Plan (PMP), the initial mobilization target was 400,000 soldiers, which would rise to 1,000,000 in only 4 months and then peak at 4,000,000. (This was close to the level mobilized during World War I, but it would prove to be far fewer than the 10,000,000 actually mobilized in World War II.) As a result of the PMP, the CWS had to estimate what it would take to supply a force of that size, both with chemicals for possible offensive use and with equipment for chemical defense (particularly protective masks, which were not in plentiful supply).

During World War I, the CWS had relied on both Government factories and private industry for the manufacture of chemical equipment. But during the period 1920 to 1939, the chemical industry, upon which the CWS depended for much of its toxic materials, shied away from producing lethal chemicals.

During the mid-1930's, the CWS sought to develop a chemical stockpile and was funded by the Army to do so. However, while the CWS estimated that it would need at least $15,000,000 for the period 1939 through 1942 to develop a stockpile (and that figure was based on the assumption that there would be no war), it was allocated only $6,000,000. The amount of money was increased only after the fall of Poland to Germany in October 1939. That military development naturally made Congress and the Army very nervous.

The problem throughout this prewar planning period was that those entrusted with the planning made some incorrect assumptions. They assumed that mobilization would be slow and orderly, apparently forgetting the chaotic mobilization of World War I. And they completely failed to understand the global nature of World War II. The United States had never fought a war of such magnitude. Of course, most of the rest of the world did not appreciate the emerging scale of the war, either.

Building the Chemical Infrastructure

As the possibility of war approached, the Army and the CWS increased their efforts to prepare. First on the agenda was the increased development and manufacture of protective masks. This meant re-opening plants used to make masks during World War I and building new facilities. Contracts had to be awarded for the acquisition of materials to make the masks and for their transportation to the factories being opened.

The second item on the CWS agenda was developing a chemical munitions program, as directed by the Army in June 1940. For fiscal year 1941, the CWS budget rose to a whopping $2,091,237. But under the growing

realization that U.S. entry into the war was a definite possibility, President Franklin D. Roosevelt sought a supplemental appropriation that would vastly increase the budget of the Army, including the CWS. On 16 May 1940, Roosevelt signed the supplemental Military Appropriations Act, and the CWS received $60,000,000 in new funding—enough to finally begin serious preparation for mobilization. Those in the CWS who had survived the "lean" years after World War I must have thought they had died and gone to heaven.

The early beneficiaries of this huge funding increase were existing facilities. For example, Edgewood Arsenal, Maryland, the principal CWS facility in World War I and thereafter, was given a $34,000,000 facelift that included a new research and development facility, a new Chemical School building, and massive new depot facilities.

In a second supplemental appropriation to the fiscal year 1941 appropriations act, passed on 9 September 1940, the CWS received funds to erect plants for private industry to run. This was done simply to expedite production. Time was of the essence. Funds were allocated to develop and build charcoal and Welerite [used for decontamination] plants, which were constructed at Niagara Falls, New York; Fostoria, Ohio; Midland, Michigan; and East St. Louis, Illinois. The CWS and the DuPont Company joined forces to build chemical plants that incorporated new and innovative systems in their designs. This was, in many ways, the forerunner of today's close and positive cooperation between industry and the military.

However, some plants were operated solely by the Government. Impregnated clothing plants were built at New Cumberland, Pennsylvania; Columbus, Ohio; Kansas City, Missouri; and Ogden, Utah. These plants were deliberately spread across the country rather than placed in one geographical area. This was done to distribute employment among local work forces without exhausting any one area's local talent pool or available local raw materials. The CWS would need a sound, robust industrial infrastructure because more responsibilities were on the way.

Producing Incendiary Weapons

In the summer of 1941, the Chief of Staff of the Army, General George C. Marshall, placed the entire program for developing and procuring incendiary bombs under the CWS. The Army and much of the rest of the world had little experience with this type of weapon. So the CWS began to learn.

A pilot plant was constructed at Edgewood in the fall of 1941, and a completely new facility, based on the design of the pilot plant, was built at Pine Bluff, Arkansas. (Pine Bluff is still a chemical facility today.) The combined cost of the plant at Pine Bluff and the pilot plant at Edgewood was $151,156,748.

Managing Procurement and Production

In World War I, one of the shortcuts used to speed procurement was decentralized management of manufacturing through the use of what were called procurement districts. This system was used again in World War II, and it worked well. In 1941, these procurement districts began letting contracts to private industry for 4.2-inch mortar shells, gas mask components, and smoke devices. Contracts were awarded to the lowest bidder.

The continued massive increases in procurement forced the Office of the Chief Chemical Officer to change the organizational structure of the CWS. In early 1940, a separate Procurement and Supply Division was added, followed by an Industrial Service Division in 1941. The latter organization quickly set up district offices to handle the expected large requirements for chemical and biological materials. However, a small problem intervened: the age-old factor of supply and demand.

Any mobilization consumes a great deal of available raw materials, which have to be diverted from civilian use. As in World War I, the Government established allocation agencies that handled the disbursement of precious raw materials. The CWS had a relatively low priority for those materials and consequently had to battle hard for its share.

The CWS also had to compete for raw materials with the British and, until their surrender to the Germans in June 1940, the French. The British and the French had placed large orders for raw materials, as well as finished goods, when the war began in September 1939. Moreover, the United States began to acquire other allies, such as the Soviet Union (after it was attacked by Germany in June 1941) and European governments in exile.

All of these factors caused inevitable delays for the CWS in building plants and starting production. Delays were particularly acute in the critical area of machine tools. The critical materials for which various agencies, the Allies, and the CWS were competing included, but were not limited to, aluminum, nickel, manganese, chlorine, rubber, copper, steel, cotton duck, and webbing.

The CWS took action to overcome these delays and shortages by doing what the Germans had done during World War I, when the British blockade deprived them of similar raw materials. The Germans began to look for possible substitutes. So did the CWS in 1941.

Ensuring Quality

Another nagging problem for the CWS was the lack

☐ Women made a valuable contribution to the manufacture of chemical materiel.

of trained inspectors. Since the Civil War, the military had insisted that private industry and Government plants alike meet military specifications for the products they supplied the Army. To ensure that the quality of these products was up to military specifications, inspectors were needed on site. Because of the small industrial base of the CWS during the years between the wars, it did not have enough trained inspectors to handle the vastly increased procurement and production of chemical materials needed for World War II. So the CWS used what experienced inspectors it already had to teach new inspectors the tricks of the trade.

Inspection of finished items became so important that a new office, called the Statistical, Inspection, and Specifications Section, was created in 1940. By July 1941, a separate Inspection Division was created within the CWS.

Storing Chemical Items

The final area of preparation was storing chemical items resulting from the increased production so they could be efficiently distributed. The CWS had to build a huge number of storage facilities. These facilities were already planned for under the Victory Program of 1941. The CWS estimated that it needed up to $12,000,000 to create new facilities to handle the chemical materiel then coming off the production lines.

At Edgewood Arsenal alone, 6 new warehouses, 13 magazines, 6 igloos, 2 sheds, 1 toxic gas yard, and 1 office were created. Those new facilities totaled 360,000 square feet of storage. Additional storage was built at the new arsenals at Pine Bluff and Huntsville, Alabama. (The latter formed the basis for the current space facilities and Army Aviation and Missile Command headquarters in Huntsville.)

Because the CWS initiated procurement and distribution policies in the 2 years before the United States entered World War II, it was able to meet the increased needs of that war, but barely. It is nearly impossible to overcome 2 decades of neglect overnight, and that is one of the lessons we should learn from this period. If you reduce the industrial infrastructure that supports a larger military force, it takes time to rebuild it for a massive war effort. Other things may come and go, but it seems that this problem will always remain for the Army: managing the seemingly inevitable boom and bust cycle in available resources. **ALOG**

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Knowledge-Based Logistics

by Captain Curtis D. Taylor

The author proposes replacing the hierarchical structure of the current Army maintenance management systems below division level with a knowledge-based network that hyperlinks all critical logistics data in one seamless data base.

Perhaps one of the most exciting aspects of the Army's Force XXI initiative is the emphasis placed on the total reengineering of current doctrine and processes to take advantage of new technology. In the past, we simply sought ways to accelerate the performance of current systems through automation. Now we are attempting to revolutionize those systems completely to take full advantage of new technological realities. Nowhere is this reengineering needed more than in the management of logistics information systems. Although almost two decades have elapsed since the advent of the personal computer and the beginning of the digital revolution, the Army still manages critical logistics information in fundamentally the same way it did during World War II. If a mechanic needs a part, he contacts his prescribed load list (PLL) clerk, who passes the request to the support battalion, which passes the request to the division materiel management center (DMMC), and so on. We certainly have accelerated this process by automating it, but the process itself has not changed much.

In an article entitled "Log Internet" (*Army Logistician,* March-April 1996, page 6), Colonel Merle D. Russ provides a profound and insightful assessment of the process-oriented flaw I have just described. In his article, he advocated a shift away from the hierarchical logistics system currently in place to a "knowledge-based" network that immediately matches customers with suppliers and provides users at all levels visibility of a virtually limitless data base of information. He suggested that the hyperlinked architecture of the current World Wide Web serves as a model of what the Army needs.

Definition

To avoid ambiguity, it is important to define precisely what is meant by "knowledge-based network." A network is simply a set of activities that relate to each other in some way. This can apply to computer terminals, phone lines, or business contacts. Most networks are designed with a strict protocol controlling the flow of information through the various activities. The intent of this protocol is to maximize efficiency and ensure a consistent operating procedure. A knowledge-based network does not rely on a consistent protocol but instead links different activities together for specific tasks. The World Wide Web is an example of this type of network. Activities (or web pages) are linked together not through a rigid procedure, but according to the contents of the page and the intent of its designer. As a result, a user has the ability to navigate easily through mountains of data.

Information protocols in the Army's logistics network generally mirror the chain of command. Information passes through battalion, brigade, and division levels of support. This made sense from a practical standpoint for two reasons—

- It ensures that commanders and staffs at every level can maintain control and adjust the logistics priorities within their units.
- Historically, lines of communication have followed the supply lines, forcing information for the rear areas to flow through each echelon of support.

The first of these reasons remains as important today as it was 50 years ago. The second, however, is no longer a legitimate constraint. The success of logisticians in Task Force Eagle in Bosnia demonstrates that critical

logistics traffic can be blasted to and from forward areas of the battlefield without the physical movement of personnel. A knowledge-based design for logistics must, therefore, account for the continuing validity of the first reason while reaping the benefits from the obsolescence of the second.

Velocity Management

The velocity management concept adopted by the logistics community provides an excellent tool for understanding the requirements of a knowledge-based network. Velocity management is founded on three basic tenets—

- Improved flow of materiel in terms of both speed and accuracy.
- Substitution of velocity for mass.
- Elimination of functions that do not add value.

Perhaps the greatest contribution of a knowledge-based network will be in relation to the third tenet of velocity management—the elimination of functions that do not add value—particularly below the division or installation level.

The two major information management systems that operate between the battalion and division level are the Standard Army Retail Supply System-Objective (SARSS–O) and the Standard Army Maintenance System (SAMS). Both systems are overrun with information redundancies stemming primarily from the hierarchical nature of the system itself.

As SAMS passes information from one echelon to the next over a period of hours or days, we experience a steep decline in accuracy at increasingly higher echelons. This is particularly true during critical training events such as a gunnery exercise, where vehicles are breaking and being fixed around the clock. The net result is a reconciliation nightmare. Managers at all levels spend inordinate amounts of time simply resolving conflicts between status reports generated at the battalion, brigade, or division level. In most units, the weekly brigade maintenance meeting is devoted almost entirely to reconciling the SAMS-2 C026 (not mission capable) report with the "ground truth" in the motor pool or on the gunnery range.

The same is true of SARRS–O, the system that tracks all unit-level requisitions and status. All requisitions processed on the Unit Level Logistics System-Ground (ULLS–G) computers at the battalion are compiled into an automated document control register (DCR). Each day, new requisitions are passed from the ULLS–G to the SARRS–O computer by diskette or telecommunications, depending on unit policy. As with any human activity, mistakes occur. Disks get dropped in the mud or phone lines fail to connect. As a result, the unit DCR and the DCR at the SARRS–O site no longer agree. This generates yet another reconciliation problem. The current solution is a once-a-month manual reconciliation between the ULLS clerk and the SARSS–O clerk.

Single Data Base

If the Army were to adopt a truly knowledge-based system as Colonel Russ advocates, the redundancies would disappear. Instead of providing repetitive and conflicting versions of the same information, we could capitalize on telecommunications technology and create a single data base with information provided by users at all levels. The ability to input information to the consolidated data base would be limited solely to value-adding functions at each level. For example, a clerk at the battalion could deadline a vehicle or order a part, but he could not modify the status of his documents. Meanwhile, a SARRS–O clerk could modify status but could not open or close a customer document. All users would access the same data base with unlimited visibility but with limited ability to edit the data. There would be no more redundancy, because all data would originate from a single point.

Indeed, the World Wide Web has provided us an ideal off-the-shelf information protocol for handling this type of system. Using the standard hypertext markup language (HTML) found on any Internet web page, we could generate a powerful tool for leaders from the company level on up. With a data base maintained at the Logistics Support Activity, Redstone Arsenal, Alabama, users could log on from remote sites all over the world and input appropriate information. Of course, some may object to the idea of maintaining such critical data at a remote site. We could circumvent this problem by requiring backups on local hard drives and maintaining interconnected servers at all echelons. The physical location of the data storage is not nearly as important as its seamless integration into a single data base available to all users.

The Power of Information

The old adage that "information is power" is never more relevant than in the area of logistics management. A seamless logistics data base will push that power down to the level where maintenance is performed and requisitions are generated. For example, a tank company commander could log on to his unit's web page and see all the information the Army maintains on the status of his vehicles. If he finds that the laser rangefinder he is waiting for is not available on post, he may decide immediately to cross-level the part from another deadlined vehicle so the crew can complete their gunnery exercise the following morning.

Even greater benefits are possible if we link this information data base with the best the Army has to offer in terms of maintenance and supply expertise. Alert messages could be hyperlinked to out-of-date stock num-

bers to warn customers before they process an order. Safety-of-use-messages, maintenance advisory messages, and ground precautionary messages could be hyperlinked to relevant stock numbers.

Units could submit supply discrepancy reports electronically, giving item managers instant visibility on specific discrepancies found and the origin of the faulty parts. A project manager concerned about the performance of a new vehicle could review the maintenance worksheets (Department of the Army [DA] Forms 5988-E) for all vehicles of that type to see what faults were being reported across the Army.

With any of these applications, users in the field would have a much better sense of what is going on at higher levels, and logistics managers would have a better picture of what the issues in the field are. These data are already out there in electronic form. They just need to be linked in a manner that allows them be useful.

Perhaps one of the greatest difficulties in the supply management business is ensuring that a stock number or nomenclature actually matches the part. Currently, our only effective way of matching a stock number to a part is by looking up that part in a manual. Again, automation in the form of electronic technical manuals (ETM's) may have accelerated this process, but it has not changed it fundamentally. Imagine, however, if every stock number listed in the consolidated data base were hyperlinked to a FEDLOG data base containing not only manufacturing specifications but also a complete image of a part. The emerging virtual reality markup language (VRML) technology already in use on the Internet provides exciting opportunities in this area. Users at all levels then could have an instant picture of what a part actually looks like and could use that information to confirm that the part is in the warehouse and labeled correctly. Further, users could determine if a unit machine shop is capable of fabricating a critical item.

Unlimited Applications

This knowledge-based approach to information management, once proven in the maintenance and supply arena, could expand to assist in a boundless variety of management areas. Awards, personnel and pay records, and evaluation reports could be managed similarly.

In the days of decreased fiscal resources, budget tracking has become a high priority for units down to the company level. Whether or not a unit received a part they were billed for is now an issue of major concern to the commander burdened with doing more with less. SARSS–O was not designed for this environment. Parts are billed to a customer unit the instant that the SARSS–O terminal identifies the part as available for issue. The actual transfer of the part to unit personnel does not affect the automated billing process. The clerk's manual signature on a materiel release order (MRO) is the only way to verify that the transfer occurred. The obligation of funds occurs whether or not the MRO is signed.

Fortunately, the Army already has provided us with a potential solution to this dilemma. The new military identification card (DA Form 2) includes a bar code on the back. This allows us to identify the card's owner with the same technology used to scan bar codes on the MRO. An ULLS clerk signing for parts could use the remote scanners already in use at the warehouse to scan each part as he picks it up and then scan the back of his ID card to indicate his receipt of those parts. The computer would verify his name as among those authorized on the signature card to pick up parts for the unit and immediately bill the unit for the transaction. This would save both customers and support units the endless frustration of reconciling billing errors through supply discrepancy reports and denials. More importantly, using the computer to document receipt and prepare billing for repair parts would tighten the chain of custody of the parts while they are en route to the using unit.

Information Management Tool

The current process-oriented, hierarchical system is a byproduct of a previous era, when the Army moved slowly and carried mountains of supplies with it as it marched. Information in the form of hand-written requisitions moved to and from forward units along established supply routes, and asset visibility across brigade boundaries was unknown. The telecommunications revolution has brought that era to a close. The Internet has demonstrated that a knowledge-based system can be an excellent information management tool that is available using current technology. Already we have established the capability for tactical units to access global information networks from forward locations. At a time when the Army is increasingly pressured to do more with less, the efficient management of information is of paramount importance. A knowledge-based network will accomplish this and, like the Internet over the last decade, continue to evolve as rapidly as we can develop new ways to use it. ALOG

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Training the Force XXI Multicapable Mechanic

by Major Diana E. Lizotte

The author presents ways to make Force XXI multicapable mechanics more technically proficient without increasing Army spending.

The Force XXI maintenance concept calls for eliminating redundancy at various levels of support to decrease costs. One way to accomplish this is to combine organizational and direct support mechanics at the forward support company of the forward support battalion into "multicapable" mechanics. New multicapable mechanics will have to be more technically proficient than current Army mechanics. Not only will they have to perform organizational and direct support tasks, but they also will have to deal with more complex material. As the Force XXI maintenance concept predicts, "future equipment will become so complex that mechanics and technicians will require extensive training or college-equivalent education to maintain weapon systems," and "maintaining skill proficiency will become increasingly more difficult."

Doing More With Less

In his book, *A Soldier Supporting Soldiers*, the late General Joseph M. Heiser, Jr., former Army Deputy Chief of Staff for Logistics, cautioned that cutting the number of support troops requires the remaining ones to be more proficient. He said that, during World War II, "the Army had to place notices in the newspapers for civilian specialists willing and able to train quickly so they could support troops ready for combat" because active duty troops were not capable.

During the Soviet-Afghan war in the 1970's, the Soviet Union attempted to use poorly trained mechanics, with disastrous results. The Soviets were forced to abandon millions of dollars worth of equipment because their forward repairmen were poorly trained, ill-equipped, and unable to complete repairs. To prevent this from happening to the U.S. military, the Army must attract smarter recruits, train them to be multicapable, and then keep them.

To ensure that Force XXI multicapable mechanics are technically capable, the Army should provide the right recruiting practices, training programs, and retention incentives. Maintenance technology enablers being fielded now and those that will be acquired within the next 5 years will make these three areas more important than ever. Not only will Army multicapable mechanics have external diagnostic equipment like tactical interactive ground equipment repair (TIGER), but within the next 5 years fielded tactical equipment will include embedded diagnostics. Embedded diagnostics will tell mechanics what equipment is on the verge of breaking and what repair parts to order. To prepare for this new technology, the Army must make mechanics smarter without increasing spending.

Recruiting

The first step toward smarter mechanics is recruiting mechanics who have completed vocational or technical (VOTEC) school. This practice is recommended in the draft Force XXI maintenance concept, and it is already a requirement of the Australian Army.

According to Lieutenant Colonel David McGahey of the Australian Embassy in Washington, D.C., recruited mechanics sign a 9-year contract with the Australian Army. For the first 4 years, the mechanics attend a technical college. After they pass a national standardized test, they serve in the Army for an additional 5 years. The Australian Army also requires mechanics to be multicapable. Each multicapable Australian mechanic is trained on every piece of a maneuver battalion's equipment, a process that takes 4 years. The Australian Army has taken most of the maneuver commander's organizational mechanics out of the maneuver battalion and moved them to a forward support battalion (FSB). Colonel McGahey said that, on the surface, the new concept is successful, but the maneuver commanders aren't comfortable with it yet. To assuage their fears, the Australian FSB's rely heavily on replacing parts or even small end items, such as radios. This replacement requires a responsive distribution system.

The major advantage of the Australian program is that it attracts quality recruits by offering civilian accreditation for the 4 years of technical training and 5 years of military experience. The accreditation makes the soldiers more marketable if they leave the Army.

However, there are several drawbacks to the Australian system. First, the Army has to pay for the 4 years of technical training. Second, the soldier is out of the tactical Army for 4 years while he is counted against Army end strength. Third, the Australian Army often loses mechanics to civilian industry because their skills are so marketable.

One way to eliminate the costs of a 4-year training program is to recruit potential mechanics from VOTEC high schools. This is how many American vehicle service centers recruit apprentices. Tim Tharpe, an automobile service center manager in Colonial Heights, Virginia, hires only apprentices from VOTEC high schools for two reasons. The first is that these schools produce higher quality mechanics than do general studies high schools. The second is that VOTEC high school graduates have their own toolboxes, which are valued at about $850.

Mechanics recruited from VOTEC high schools already are grounded in physics, electronics, and basic mechanical skills, which are essential since the Army doesn't pay for the required technical training. In fact, the draft Force XXI maintenance concept advocates selecting recruits from VOTEC schools because operational and sustainment costs then shift from Army institutions to the private sector and graduating students must meet a national industry standard.

Training

The draft Force XXI maintenance concept states that "mechanics who require update training due to technology infusion attend specialized courses lasting from 2 days to 2 weeks." According to Mr. Tharpe, a week of civilian specialized training costs $570, including salary. By contrast, an average week at Army advanced individual training for a wheeled vehicle mechanic costs approximately $1,535, including travel and pay. The Army can reduce this cost greatly by recruiting VOTEC graduates and then using distance learning technology to update their training.

Distance learning is based on computer interaction between the trainee and a college or other educational institution. Like the current system of centralized training, it produces well-trained students and has two major advantages: It decreases costs and is accessible to anyone with a computer. This method saves the Army over $1,000 a week per trainee and can reduce both indirect costs and the number of instructors required at Army schools. For instance, one instructor can train more students by using the computer instead of a classroom. Because the students remain at their home stations, the school can decrease its indirect costs by scaling down onsite medical support, housing, and administrative support, including personnel and finance in-processing.

In spite of lower costs, there is no degradation of quality in distance learning. Test scores of students taught by distance learning are comparable to those of students trained in the classroom. Furthermore, the physical classroom limits the number of students who can be trained, while the "virtual classroom," available by computer, is nearly limitless. Universities across the country are using distance learning to allow students living in other states or countries to take classes. The only drawback is that once the class is over, the student no longer interacts with the instructor. This type of computer training is useful as a replacement for formal training, but multicapable mechanics will need continued access to technical experts as they face tasks they have never performed before. Telemaintenance offers one means of filling this gap.

Telemaintenance is a relatively new concept for re-

pairing equipment that involves interaction between the repairman in the field and a technical expert or supervisor through a computer and a small video camera. It is similar to a concept called telemedicine that is used by the health care industry. Telemedicine saves millions of dollars annually by reducing paperwork costs, eliminating duplication of costly equipment, and cutting the time and expense of transporting patients. Army maintainers can realize comparable savings with telemaintenance. The Department of Defense Tactical Missile Repair Center (TMRC) at Letterkenny Army Depot, Pennsylvania, uses telemaintenance between the depot and a forward repair activity at Fort Bliss, Texas. Technical experts at TMRC guide less-experienced repairmen at Fort Bliss through complicated diagnosis and replacement procedures. By keeping the experts and test equipment at Letterkenny, the depot saves $1,000 per temporary duty trip, plus millions of dollars in potential duplicate test equipment.

However, cost savings are not the only benefit of telemaintenance. It also provides an open link between the mechanic in the field and the technical expert. David Goodman, Director of Tactical Missiles at the TMRC, stated that telemaintenance "will enhance the future maintenance concept by allowing some tasks to be moved to the organizational level with assistance obtained [from the depot] via telemaintenance." The TMRC uses a personal computer and Sharevision PC 3000 to perform telemaintenance. The total cost is the cost of a computer plus $200 to $500 for the Sharevision PC 3000 system. Sharevision PC 3000 is a teleconferencing system that easily lends itself to real-time maintenance.

Retention

The final element to ensuring that multicapable mechanics are highly trained, successful, and stay in the Army is to provide them with incentives. An obvious incentive would be higher wages or bonuses. However, there are three other incentives that can attract and keep multicapable mechanics. The first is to give them their own tools to keep; the second is to give them civilian accreditation for on-the-job training (OJT); and the third is to give them promotion points when they attend advanced or new technology training.

Mr. Tharpe says he rarely hires Army mechanics because they don't have their own toolboxes, and they don't know how to use some of the basic tools his mechanics use. In his words, "It costs too much to hire a mechanic without his own toolbox." If the Army gave each soldier a toolbox, it would make them more marketable and attract higher quality recruits. The more high-quality recruits the Army attracts, the more will remain on active duty. To encourage proper safeguarding of tools, Mr. Tharpe suggested that each mechanic be required to put a security deposit on the toolbox issued him by the Army. At the end of the soldier's initial service obligation, the cost of any missing tools is deducted from the security deposit. If all tools are accounted for, the entire security deposit is returned.

Civilian accreditation for OJT would make Army mechanics more marketable by converting military experience into civilian accreditation equivalents. Also, it would provide them with an incentive to update their technical skills. To implement a civilian accreditation program, the Army Ordnance Center and School would have to coordinate with a national accreditation agency, such as the Institute for Automotive Service Excellence (ASE), to set Army OJT standards for ASE accreditation.

The final incentive is to offer promotion points for advanced, new technology, or civilian training. Often, noncommissioned officers are not interested in furthering their technical education, because the current Army promotion system doesn't offer promotion points for civilian certificates of training. The Army needs to provide promotion points for civilian training to keep proficient mechanics in the Army and give them incentives to keep their skills current. This also will ensure that the Army promotes the most highly trained mechanics.

The multicapable mechanic of the Force XXI Army must be more technically capable than the mechanic of today. The Force XXI maintenance concept will require the Army's multicapable mechanic to operate under dynamic conditions. If a multicapable mechanic in a hostile environment comes under enemy fire while trying to replace a part on a damaged vehicle, he must be able to do the job quickly. A solid technical foundation and open communication with experts at the technical base through telemaintenance will ensure success, even for unfamiliar procedures.

Improved recruiting practices, training programs, and retention incentives are integral parts of the imminent revolution in logistics, and they have the potential of saving millions of dollars. The Army should implement them to ensure the success of the multicapable mechanic. **ALOG**

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ULLS Gunnery

by Major Brian K. Vaught and
Captain Gerhard Schröter

An exercise at the National Training Center ensures that the automated logistics systems of deploying units are connected properly.

Success in the field requires that units be able to obtain and transmit logistics information. When they cannot do so because their automated systems are not connected, their operational readiness rates and combat power are reduced. This has been demonstrated by units training at the National Training Center at Fort Irwin, California, where the following observations were recorded—

RSOI ULLS Gunnery not adequately resourced; minimal planning and command emphasis.

TD [Training Day] *0—Brigade has not rehearsed and validated its CSS automation connectivity.*

TD 04—Many units in the brigade combat team do not show on the C026 report.

TD 03—The entire brigade combat team has no status on any parts at the ULLS box.

TD 10—Shop office has no repair parts status on the AHN-006 report [SAMS-1 Shop Section Summary].

All of these problems occurred because the units failed to do one thing: they did not validate the connectivity of their combat service support (CSS) automation assets before they departed the NTC's initial staging area. To help avoid such problems, all units at the NTC now are required to conduct an exercise, known as ULLS Gunnery, to validate their CSS automation connectivity among the Unit Level Logistics System (ULLS), Standard Army Retail Supply System (SARSS)-1, and Standard Army Maintenance System (SAMS)-1.

The need for ULLS Gunnery is not unique to the NTC. A force-projection Army must be prepared to use many of the same techniques embodied in ULLS Gunnery at Camp Doha, Kuwait (the location of Army Pre-positioned Set-5), with our pre-positioned fleet (Army Pre-positioned Set-3), and in other deployments around the world. Today's contingency deployments require the Army to task-organize an ad hoc theater structure from units that normally do not work together on a daily basis. These mission-tailored organizations must be able to operate together for extended periods. They also must be able to obtain and transmit logistics information through supporting SARSS-1 and SAMS-1 sites so they can manage normal class IX (repair parts) and maintenance operations. Our logistics automation systems are very flexible, but they must be established and validated properly so soldiers and their leaders know that they are connected and can "talk" to their supporting systems, particularly under the austere conditions often encountered in overseas deployments.

At the NTC, ULLS Gunnery takes place during the reception, staging, onward movement, and integration (RSOI) phase of each brigade's rotation. RSOI is scheduled for the 5 days before the brigade deploys on maneuvers. The NTC coaches ULLS Gunnery as part of RSOI because that is the logical time during a deployment to validate systems connectivity. ULLS Gunnery preparations begin on D-8 (8 days before the brigade deploys on maneuvers and 3 days before RSOI begins), when units draw the rotational direct support unit authorized stockage list (ASL) and SARSS-1 computer. ULLS Gunnery normally ends at D-1 (the day before deployment, and the last day of RSOI), after the brigade's automation connectivity has been validated.

A Four-Phase Test

ULLS Gunnery is a four-phase operation designed to verify that CSS automation and parts distribution systems are "zeroed and boresighted" to produce the accurate maintenance and supply information a brigade needs to rapidly build and sustain combat power. In order to validate this ability, each unit in the brigade must clearly demonstrate that it can—

- Deadline equipment in ULLS.
- Create a maintenance disk and transfer the data on that disk to the C026 report through the maintenance shop office SAMS-1 site. (The C026 report is formally titled "SAMS-2 Equipment Deadlined Over XXX Days by Battalion.")
- Create an automated requisition in ULLS.
- Create an ULLS supply disk.

- Transfer the data on the supply disk into the supply system via the SARSS-1 site at the forward supply battalion's (FSB's) class IX supply support activity (SSA).
- Receive parts status on ULLS supply requisitions and post them to the C026 report.
- Ensure that the brigade's class IX distribution system works, from the main SSA to the customer parts bin.
- Ensure that customers know where to pick up their parts.
- Demonstrate that ULLS clerks are able to close not-mission-capable (NMC) faults.
- Transmit closed NMC information into SAMS to remove the NMC system from the C026 report.

The primary responsibility for conducting ULLS Gunnery normally rests with the brigade S4 and the FSB's support operations officer. This is appropriate because ULLS Gunnery tests systems connectivity between the organizational and direct-support levels.

An essential element of a successful ULLS Gunnery is coordinating the draw of the prescribed load list (PLL) early in RSOI. This ensures that units are ready to execute ULLS Gunnery on D-3 (which is also the third day of RSOI, or RSOI-3) and can begin operating unit ULLS hardware (colloquially referred to as ULLS boxes) in the staging area.

Preparations

Phase 0 is the planning and preparation phase. During this phase, the ULLS Gunnery execution plan is developed, coordinated, published, and rehearsed. We recommend identifying an officer in charge (normally the support operations office's [SPO's] maintenance officer), who will be the brigade point of contact and will execute the plan put together by the FSB support operations officer and the brigade S4.

This phase begins with the draw of the rotational ASL on D-8 and the draw of unit PLL's and trucks on D-6. The NTC issues laptop ULLS-Ground computers to units when the units arrive. On D-5, ITT contractor personnel work with the unit ULLS clerks to upload live NTC Department of Defense activity address codes (DODAAC's) for use during the rotation by each company-level unit within the brigade. Each ULLS box also will be uploaded with data on equipment in the draw yard assigned to that unit.

On D-3, all assets and equipment are set up to ensure that the ULLS Gunnery process can be executed smoothly and completed rapidly. Units can establish their ULLS, SAMS, and SARSS computers at their respective unit locations in the RSOI staging area, or they can consolidate their systems in one location under the control of the ULLS Gunnery officer in charge. We recommend consolidating the computers in one location, using a supporting small extension node (SEN). Consolidating all systems in one place expedites the numerous disk transfers among units required in ULLS Gunnery; it also enables the officer in charge to validate that all units can transfer automated CSS data, understand the disk submission process, and have walked through the parts distribution and receiving system.

One critical part of this phase that often is overlooked is establishing the SEN that actually will support the SARSS I site during the campaign. Phase 0 is complete when the brigade is ready to execute the three primary phases of ULLS Gunnery.

Phase I

Phase I of ULLS Gunnery normally is conducted on D-3 (RSOI-3). In phase I, units verify that *all* ULLS boxes are able to deadline equipment, requisition parts from the supporting SARSS-1 site, and create a maintenance inoperative transfer disk to use in transferring data to the C026 report through the supporting SAMS 1 site. Properly loading all units' DODAAC's, unit identification codes (UIC's), class IX data, and maintenance support units is critical to this phase.

During phase I, the ULLS clerks build the task organization for each unit as directed in the brigade's operation order. When the clerks arrive at NTC, an equipment "set" is loaded in each unit's ULLS computer. The ULLS clerks then transfer systems in and out of their computers to build the final task organization for each ULLS unit. To accomplish this arduous work, an ULLS clerk must download information on each individual piece of equipment, with all of its historical data, onto a disk, and another clerk then must upload those data into another unit's ULLS computer.

Once the units are task-organized in the ULLS computers, each unit must deadline a reportable piece of equipment and requisition that part. In order to differentiate an ULLS Gunnery test fault from an actual fault, we recommend establishing an NMC fault of "test" and requisitioning a 5-cent washer, which is available from the main SSA. (Units may use real NMC vehicles and their associated requisitions, though this method is cumbersome and more difficult to track.)

The ULLS clerks then create a supply disk and a maintenance disk. The supply disk containing the requisition for the washer is submitted to the supporting SARSS-1 site for transmission into the retail supply system. The maintenance disk containing the NMC system data is submitted to the supporting SAMS-1 site. The SAMS-1 site then transfers the data either by disk (a manual operation) or mobile subscriber equipment (an automated transmission) to the SAMS-2 site at the FSB SPO. (Mobile subscriber equipment is the pre-

ferred method.) The SPO produces the brigade's C026 report containing all of the test NMC systems. The SPO maintenance officer verifies that all units appear on the C026 report with the test NMC system. Phase I concludes when we have verified that all ULLS computers are able to—

- Deadline equipment.
- Create a maintenance inoperative transfer disk.
- Transfer the inoperative information to the C026 report via the supporting SAMS-1 site.
- Create an automated requisition.
- Submit an automated requisition into the retail supply system via the supporting SARSS-1 site.

Phase II

Phase II verifies that all units are able to receive status on their requisitions and post that status on the C026 report. Receiving a supply status disk from the SARSS-1 site and loading it back into the ULLS computers are critical to this phase. Once the ULLS clerks receive the disk from the SARSS-1 site, they load that status into their ULLS boxes and post it to their document control register. The status should be either "BA" (materiel release order cut from supporting SSA and ready for customer pickup) or "BM" (part not available at supporting SSA and requisition forwarded to next higher source of supply).

The ULLS clerks then create a maintenance inoperative transfer disk for the supporting SAMS-1 site. This disk contains information on the NMC system and the corresponding requisition with status; it provides requisition status to the C026 report. The SPO maintenance officer produces a C026 report and verifies that all units are able to receive parts status from their supporting SARSS-1 sites and can post that status to the C026. This phase concludes when all units have posted the test NMC system part requisition status to the C026.

Phase III

Phase III verifies that—

- The parts distribution system functions from the supporting or alternate SSA to the customer bin.
- Customers know where to pick up their parts and actually pick them up.
- ULLS clerks are able to close NMC system faults.
- ULLS clerks can transmit the closed NMC fault information into SAMS to remove the NMC system from the C026.
- The brigade possesses the ability to produce an accurate C026 report to assist in building and sustaining combat power for the duration of the operation.

Phase III commences once units pick up their parts from their customer bin at the supporting SSA and return to the unit maintenance collection point. The mechanic installs the part on the system, bringing the system back to a fully mission capable (FMC) status. He then notifies the ULLS clerk that the part is installed and the vehicle is FMC. The ULLS clerk ensures that the part is posted in the ULLS computer as "received and installed" and closes the NMC fault. After the fault is closed, the ULLS clerk produces a maintenance inoperative disk for the supporting SAMS-1 site.

The SAMS 1 site receives the ULLS maintenance disk and transfers the information to the SAMS-2 site, which closes and removes the NMC system from the C026 report. The SPO maintenance officer produces a C026 and ensures that all units have closed and removed the test NMC system from the report.

The critical elements of this phase are ULLS clerks knowing where to pick up parts and closing NMC systems at the unit level. This phase concludes when all units have—

- Received the deadlining part.
- Posted the part as received and installed and changed the NMC system's status to FMC in ULLS.
- Successfully closed the system in SAMS, so the NMC system no longer appears on the C026.

The foundation of a viable brigade supply and maintenance management system that builds and sustains combat power is the seamless connectivity of its CSS automation infrastructure (ULLS, SAMS, and SARSS) and synchronization with the brigade signal plan. This four-phase set of tactics, techniques, and procedures was developed at the NTC to assist brigades in applying a simple, organized approach to accomplish the complex task of preparing their CSS automation systems to support the maneuver commander's plan. ALOG

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Using Bar-Code Technology With ULLS

by Captain Douglas S. Sutter

The author proposes an enhancement to the Unit Level Logistics System that could lead to reduced repair time, increased inventory accuracy, and a boost in combat power.

Imagine you are a tank company commander in northern Kuwait, somewhere near the Iraqi border. You have 10 M1A1 Abrams tanks and 4 M2A2 Bradley fighting vehicles ready to spearhead your battalion's attack into Iraq in less than 12 hours. One of your tank's laser rangefinders is inoperable. The vehicle can still fight, but at an impaired level. Your maintenance team chief tells you that the new rangefinder should arrive anytime now. You think, "Yeah, right. I've heard that before."

On the horizon, you see a single dust trail coming toward you. As it gets closer, you identify it as your battalion maintenance technician's vehicle. Minutes later, he pulls up to your command post with the precious laser rangefinder in hand. You ask, "How did you get it here so fast?" The maintenance technician holds up what looks to be a small laptop computer with a pen-light scanner on it and says, "This little thing saved the day for your tank. I was able to identify the part right away and get it to you pronto. Good luck and good hunting!"

This story has a happy ending. But all too often, the tank company would go into battle with a tank that is not fully mission capable. This problem can be mitigated to some extent by adding bar-code scanning capability to the Unit Level Logistics System (ULLS). As most maintenance personnel know, ULLS is basically a data base that uses a personal computer to automate parts requests, parts inventories, unscheduled and scheduled maintenance, and vehicle maintenance histories. This system is eons ahead of the "stubby pencil" system the Army used 15 years ago. By adding bar-code scanning capability, we could decrease repair time dramatically and increase combat readiness throughout the Army.

Bar codes, combined with handheld scanners that can download certain portions of the ULLS software, would save a great amount of time in-processing repair parts, maintaining an accurate prescribed load list (PLL) inventory, and getting the right part to the right place at the right time. Bar-code scanning technology can go a long way in mitigating the current challenges of using ULLS.

In-processing Parts

One of the challenges of ULLS is in-processing parts. Currently, a battalion picks up its parts at its forward support battalion (FSB), which provides logistics support for its brigade. All of the battalion's parts are brought to the motor pool (during normal garrison operations) or to the unit maintenance collection point (UMCP) (during tactical operations). The five company clerks (one from each PLL) head out to the truck that has arrived with the parts. They sort through the parts, looking at the shipping documents to figure out where each part goes. After each clerk gets the parts that were ordered for his company, he hauls them back to his ULLS computer to in-process them. He again pulls out the shipping document and keys in the document number (an eight-digit number that designates a particular requisition) and the part number for each part. A good clerk can complete this process in about a minute. During an intense training event, the average company receives 30 to 45 parts a day. When you add up the time that it takes to unload the parts at the motor pool or UMCP, carry them to the computer, in-process them, and send them on to their final destination, it totals about an hour of time consumed daily.

Priority of Parts

The second challenge of ULLS is the priority of repair parts. The Army has three different priorities for ordering repair parts: 02 for a part that renders a system not mission capable; 05 for a part that either deadlines a vehicle or promises to fail very shortly; and 12 for a part that is not mission essential. Parts usually are kept in a bin, not sorted by priority or company. The FSB does not have the time or resources to sort them. Most battalions make sure that the clerk who picks up the parts has a copy of the deadline report, so he can do an initial sort of the 02 priority parts. However, this takes time, and even if the clerk sorts the parts at the FSB, the process has to be repeated after they arrive at the motor pool or UMCP. Sorting is a major problem: A wasted 45 minutes with an 02 part could mean that a vehicle is not combat ready in time for battle.

The priority problem is coupled with a proximity problem. The scenario outlined above is the doctrinal scenario; that is, all supporting activities are located on the battlefield according to doctrine. If a vehicle needing a part is not transferred to the UMCP, the "doctrinal" distance from the vehicle to the UMCP is estimated to be 5 kilometers. The distance from the UMCP (where the ULLS computer is located) and the FSB (where the parts are picked up) is 10 to 15 kilometers, according to doctrine. In the real world, however, the distance between the ULLS computer and the FSB is sometimes up to 90 kilometers. Under the current system, parts must make a stop at the UMCP before they are delivered to the vehicle, adding time and distance traveled.

Maintaining PLL Inventory

Another time-consuming function of ULLS is maintaining the PLL inventory. The PLL is a 14-day supply of repair parts that is supposed to sustain a company for 2 weeks of combat. The current system encourages undisciplined, inaccurate inventory maintenance and uses clerks' time inefficiently.

On a normal day in the motor pool, a vehicle crew identifies a vehicle fault and brings it to the attention of a mechanic. If the mechanic cannot fix the fault, he probably determines that a part needs to be ordered. On the appropriate form, the mechanic passes a request to the clerk, who enters the part number into his ULLS computer. If the part is in stock on his PLL, the clerk receives a prompt on his computer screen telling him which bin contains the part.

Once again, the proximity issue comes into play. In everyday operation, the PLL is uploaded on a vehicle that can be deployed quickly. The clerk's computer is usually in an office in the motor pool. Depending on the priority of the part needed, the clerk may wait until he has several requests for items before he goes to his truck. Often, when the clerk returns from his truck with a needed part, some other crisis has happened, and the clerk forgets to register in his ULLS computer that the part has been issued. The result is an inaccurate inventory of the PLL. This leads to inaccurate resourcing when that part is needed somewhere else. The maintenance technician thinks he has the part on his PLL, only to find, about 45 minutes later, that the part is not on hand. This 45-minute waste of time can be compounded by the time and distance factors to the FSB, security issues of getting a vehicle safely to the FSB, and the availability of transportation to the FSB.

An age-old problem of the maintenance technician is maintaining an accurate listing of the five PLL's in his battalion. The technician usually carries a paper copy of all five PLL's with him. However, these lists are accurate only when they are printed. Getting new copies printed is often difficult, due to the frequent movement of the UMCP and the problem of operating printers in harsh environments. The maintenance technician spends a good deal of time in his vehicle moving among broken vehicles, driving to maintenance meetings, and sometimes running forward recovery assets during a battle. It is difficult to sort through five eight-page PLL listings while getting jostled around in a moving vehicle.

Implementing a Bar-Code Solution

Now that we see how using bar-code scanning with ULLS could help resolve parts in-processing and PLL inventory problems, how do we implement it?

The first issue that needs to be addressed is software. The FSB that issues parts to the battalion would have to include on the shipping document or materiel release order a bar code that could be scanned. This issue is easily solved. Free software for printing bar codes is available on the World Wide Web. It would be easy to download that software and incorporate it in the application the FSB uses to process incoming parts.

The next issue to be resolved is the hardware needed to scan bar codes and interface them with the ULLS computer. Something like the small, portable personal data assistant (PDA) used by United Parcel Service drivers to track delivery of packages would be ideal. It should have secondary power and be able to hold the equivalent of 15 to 20 megabytes of information. The entire ULLS with data is habitually backed up on 40-megabyte magnetic tape, and the two portions of the ULLS application that would be loaded on the PDA would make up about one-tenth of the entire system.

Computers that use a "pen system" scanner already exist. Two of the best models have 486 processors, and one has an option of upgrading to a 166-megahertz Pentium. Both models can accommodate up to 32 megabytes of random-access memory, run Windows 95 as an operating system, and have bar-code scanning capability.

The third issue that needs to be considered in integrating a bar-coding capability into ULLS is interfacing the PDA software with the ULLS computer. The PDA would need the ULLS software to run the document control register (DCR, a list of all outstanding requisitions) and the PLL. The easiest way to incorporate these capabilities would be to load a partial ULLS application on the PDA. Then the only interface between the PDA and the ULLS computer would be data straight from the data base. This would require minimal adjustment of the existing ULLS software—just creating a smaller version.

An optical character reader would have to be incorporated into ULLS so it could read and translate bar codes. Again, software already exists and, with mini-

mal adjustment, it could be made to fit the Army's needs. ULLS needs to be set up to read two different bar codes. One would contain document and part numbers for repair parts being processed; the other would contain just the part number and would be used to maintain the PLL's. Again, this would be only a minor challenge that could be overcome with an ULLS software upgrade.

Another change that could be added to the software in the PDA is a way to download the PLL information into an ASCII file. This would allow every battalion on post to e-mail its current PLL to every other unit on post daily. This would be used primarily during garrison operations, but could be converted to work with the e-mail already existing in the enhanced position location reporting system.

Using bar-code-enhanced ULLS could lead to the following scenario: It is time to make a "parts run" to the FSB. One clerk with a PDA goes around to each computer and uploads DCR and PLL data into the PDA. The PLL is downloaded on the maintenance technician's PDA, so he has an accurate, real-time inventory of his five PLL's. The company clerks head out to the FSB on their parts run. As they pick up the parts, they scan them with the PDA and receive data on the vehicle needing the part and the part's priority. High-priority parts are identified immediately, and decisions are made on how to deliver them as quickly as possible. Other parts are similarly processed and marked for final destination before the clerks leave the FSB. The clerks deliver the parts directly to the units without wasting time at the UMCP. When the clerks return to the UMCP, they download the disk into their ULLS computer, and their systems are brought up to date in a nanosecond.

Costs Versus Benefits

A cost-benefit analysis would be needed to determine if incorporating bar-code scanning technology into ULLS is indeed a viable undertaking for the Army. The costs can be categorized as hardware costs, software costs, and training costs. Benefits, however, are a little less tangible. They can be categorized roughly as time saved and accuracy gained.

The cost for a single PDA system would be approximately $2,000. A mechanized infantry or tank battalion would need six devices (one for each company and one for the battalion maintenance technician), totaling $12,000 per battalion. I would suggest only fielding them to maneuver (combat) units in mechanized or armored divisions because of the increased intensity of maintenance operations in those units. With 10 infantry or armored battalions, 3 artillery battalions, and 1 cavalry squadron per division, the cost for hardware to equip one division would be approximately $168,000. (To put this cost into perspective, the laser rangefinder mentioned earlier costs around $70,000.)

The cost for software would be barely discernible. The Army already has technicians in every division who work with ULLS. These technicians could adjust the ULLS software to meet the needs of the PDA–ULLS interface. Free software for printing the bar codes is available on the Internet, and if that is not suitable, the Army has enough technicians to do the software conversion "in-house."

Training cost is minimal. The Army has new equipment training teams that could develop a program of instruction for clerks when the equipment is fielded, as is now done for ULLS software upgrades. If the Army did not want to dedicate soldier resources to conduct this training, they could outsource it, or perhaps solicit help from local logistics assistance representatives.

Time benefits are hard to quantify. There would be a saving of at least 1 hour a day for clerks processing parts during normal garrison operations. That is 1 additional hour the clerk could spend making sure other portions of his ULLS systems are up to date. During tactical operations, vehicle repair time could be decreased by approximately 2 hours per repair job. But if this process returned one vehicle to a battle in time to fight, that single event would be worth the entire cost of the venture.

PLL accuracy would increase Army-wide by at least 10 percent with the introduction of bar-code scanning. An even greater benefit would be the maintenance technician's increased ability to determine PLL availability accurately, quickly, and with greater ease while on the move. This would give him a great management tool that would allow him to make resource decisions for repairs not only in his battalion, but also in other battalions across the brigade.

Bar-code scanning technology would give the Army a low-cost, feasible option for decreasing repair time, increasing accuracy in the maintenance system, and boosting combat power in time for a fight. **ALOG**

Captain Douglas S. Sutter is an assistant professor of military science at Duke University. He previously served as commander, A Company, and as battalion maintenance officer of the 3d Battalion, 7th Infantry, 3d Infantry Division (Mechanized). He is a 1989 graduate of the U.S. Military Academy.

Arctic Maintenance Battle Drills

by Captain Michael A. Baumeister

Without question, the Army's 172d Infantry Brigade (Separate) at Fort Wainwright, Alaska, and Arctic Support Brigade at Fort Richardson, Alaska, have unique maintenance requirements. The 98th Maintenance Company, Special Troops Battalion, Arctic Support Brigade, is split-based and stationed at both forts. It provides direct-support maintenance and repair parts supply to the Arctic Support Brigade and backup maintenance and repair parts supply to the 172d Separate Infantry Brigade.

Key to the success of every contingency in the U.S. Army Pacific area of responsibility, which includes the Korean Peninsula, are two maintenance battle drills that must be rehearsed and executed under severe arctic weather conditions.

The first, and possibly more important, drill involves erecting a maintenance tent to standard and equipping it with heat and lights. It is difficult for soldiers who have served only in the "lower 48" to understand the importance of erecting a structure quickly in the winter months in Alaska. From November through February, there are almost 24 hours of darkness each day, and temperatures frequently dip below -30 degrees Fahrenheit. A maintenance tent must be erected, broken down, packed, and relocated with each brigade support area displacement. The goal is to repair a piece of inoperable equipment and return it to the customer as quickly as possible while keeping efficiency and safety paramount. Soldiers in the 98th can conduct this battle drill to standard in 90 minutes while wearing bunny boots, arctic trigger-finger mittens, and two layers of arctic overgarments.

A heated maintenance tent keeps not-mission-capable equipment from becoming completely "cold-soaked" and impossible for a mechanic to work on. The tent also provides a warming area for soldiers. In addition, erecting the tent keeps soldiers busy and helps them avoid concentrating on the ever-present arctic conditions.

A second critical battle drill involves erecting an improvised maintenance tent using a large cargo parachute. Some maintenance support teams actually prefer a parachute tent for repairs that take only a few hours. A parachute can be unfolded, held up with camouflage supports, secured with stakes or snow, and placed directly over a disabled vehicle engine or a complete trailer-mounted generator. The 98th's automotive section can set up a large cargo parachute over a broken-down 2½-ton truck, crank up a kerosene heater (called a "bullet" heater because of its shape) for warmth, and add a few drop lights for illumination—all in 15 minutes. For instance, during a field training exercise last winter, a two-person crew changed a head gasket on a 2½-ton truck in 3¼ hours with temperatures near 0 degrees Fahrenheit outside. One bullet heater kept the temperature inside the parachute at almost 30 degrees. Smaller cargo parachutes also can be set up quickly over a 30-kilowatt generator for direct-support maintenance. A parachute with a bullet heater inside can warm a cold-soaked piece of equipment to a workable temperature with little effort.

☐ For quick repair jobs, a large cargo parachute can be set up over a disabled vehicle.

Also important to arctic survival and maintenance are the leadership and teamwork skills that all arctic maintenance soldiers develop while rehearsing and executing these battle drills. Quite often, temperatures or conditions are so severe that first-line leaders must rotate soldiers to a warming vehicle or tent every 20 minutes. Because of this, every soldier must know these battle drills inside and out so they can step in and complete the drill to standard quickly.

As is true with combat arms units, the success of the 98th Maintenance Company's wartime mission depends on the execution of battle drills. Maintenance tent battle drills ensure that our maintenance soldiers in Alaska are arctic tough and combat ready. **ALOG**

Captain Michael A. Baumeister commands the 98th Maintenance Company (Direct Support), in Alaska. He has a B.S. degree in environmental engineering from the U.S. Military Academy and an M.A. degree in management from Webster University. He is a graduate of the Ordnance Officer Basic Course, the Combined Logistics Officer Advanced Course, and the Combined Arms and Services Staff School.

Distribution Management Field Studies Program

by Thomas A. Reichert

Food Lion Distribution Center, Reynolds Metals Company, Mazda Motors Parts Distribution Center, Ingram Book Company, and Wal★Mart are just a few of the stops ALMC students make as they complete the Defense Distribution Management Course.

In the hallways at the Army Logistics Management College (ALMC), Fort Lee, Virginia, civilian and military students occasionally may be overheard talking about a trip to Food Lion or Wal★Mart. But they are not necessarily discussing a weekly shopping outing. More than likely, they are talking about their participation in ALMC's distribution management field studies program (FSP).

The FSP is designed to give students a "hands on" look at private-sector distribution management operations. So, you may ask, what is distribution management? In essence, distribution management is the discipline of moving material from the point of production (factory) to the point of consumption (customer). This significant component of logistics can determine the success or failure of the entire logistics cycle.

The purpose of the FSP is multifaceted. Touring a variety of private-sector distribution centers offers students the opportunity to observe the many similarities and differences between Department of Defense and commercial distribution operations. Students can compare and contrast a variety of operating systems while identifying the private sector's best business practices. The field studies opportunity gives life to classroom topics such as "distribution system flexibility," "core competencies," and "distribution partnerships." Focusing on a few of the commercial distribution centers in central Virginia may give you a better idea of how the FSP supports the teaching objectives of ALMC's Defense Distribution Management Course.

Our first stop along the way is the Mazda Motors Parts Distribution Center (PDC) near Richmond International Airport. This facility is the second largest in the Mazda network. Peter Weismuller, PDC manager, expresses to students his straightforward philosophy, "It's about support to our customers. As a company, we are always looking for ways to be more responsive to our customers. Distribution is about being flexible and being receptive to new ideas." Mr. Weismuller views the field studies program as a win-win situation. "It broadens the students' understanding of distribution management by observing commercial practices. Furthermore, it challenges our staff as we reflect on student questions and observations. This exchange of ideas encourages us to review our operations and consider ideas that could make our system even better."

A stop at the Wal★Mart distribution center (DC) in Sutherland, Virginia, introduces students to the distribution operations of the number one discount retailer in the country. It is clearly evident, as students tour the facility equipped with state-of-the-art automation and mechanization, how this distribution infrastructure contributes to the dominance of Wal★Mart in the retail world. Through "selecting to lights technology," a digital/numeric lighting system that enhances the stock selection process, or "cross-docking," a distribution process that eliminates the need for traditional warehousing, Wal★Mart's distribution efficiencies significantly contribute to its very successful marketplace presence. Jeff Williams of the Wal★Mart DC echoes his company's commitment to the FSP. "It's Wal★Mart's opportunity to support a very worthwhile education mission and our opportunity to give something back to the community."

We continue our tour with a stop at Ingram Book Company in Petersburg. There, human resources manager Patrick Olynick explains that his company's success "is due to an extraordinary commitment to customer service." This is evident through real-time receipt processing, bar-code technology applications, strict shipment processing time standards, and use of contract carrier transportation services. Ingram Books, an industry leader, is the largest book distribution company in the United States.

The FSP is not limited to companies in central Virginia. Recently, distribution management students from

☐ **Bill Nelson, Assistant Facility Manager, American Honda Motor Parts Distribution Center, describes storage and warehousing practices to FSP students.**

the Defense Distribution Depot San Joaquin, California, were provided the opportunity to tour the American Honda motor parts distribution center in French Camp, California. According to William Nelson, the assistant facility manager, "We welcome tours to our PDC. We are proud of our performance record and are quite willing to share our experience with students of distribution management." One of the more noteworthy aspects of the Honda facility is its multidisciplined work force. All employees are cross-trained to work in all facets of distribution operations. Training is an inherent part of the Honda corporate culture. Coupled with this is an intriguing management perspective regarding workplace mistakes. According to Nelson, "It is okay for an employee to make a mistake as long as the individual learns from it and moves onward." Nelson stresses that a multidisciplined employee promotes organizational effectiveness: "Supervisors have the confidence that wherever they assign an employee, they know that the job will get done. However, the benefit is even more significant. This multidisciplined work force contributes to keeping our costs down and, most importantly, supports our efforts to provide timely and consistent support to our customers."

The FSP took on a different dimension when it sponsored ALMC's first industry panel on third-party logistics. This unusual approach was used in an effort to convey to students and staff the magnitude of this emerging distribution management business that allows companies to outsource their distribution operations to third-party logistics providers. Consisting of participants from five major companies, the panel created an atmosphere that encouraged audience enthusiasm, interest, and significant dialog. This information exchange clearly presented the thinking behind third-party logistics, which focuses on a logistics industry component that provides a variety of distribution services. From basic warehousing to information services and transportation management, these companies provide core competencies designed to reduce a customer's distribution costs while providing prompt and reliable customer support. Tom Dyer, director of distribution and logistics at Reynolds Metals Company and the panel moderator, focused on the successes of the panel discussion, stating, "I feel that the students learned a great deal about third-party logistics. In addition, it was worthwhile for all panel members as it provided them an opportunity to exchange ideas with ALMC students and staff and other industry colleagues."

ALMC's distribution management field studies program continues to be successful for one very important reason: It is based on a common bond of furthering education. This win-win situation not only supports the education mission of ALMC but at the same time provides a rewarding experience for distribution industry participants. This support from industry is not isolated or short lived. To the contrary, the field studies participants are representative of a distribution industry that holds in high regard continuing education for members of this high-visibility logistics component.

Students at ALMC who talk about Food Lion and Wal★Mart may not be talking about their experiences in retail stores but instead may be sharing information about wholesale logistics. The distribution management FSP ensures that information sharing is part of the continuing education process. **ALOG**

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SYSTEMS

The information presented in Army Logistician's ALOG Systems *is compiled, coordinated, and produced by the Army Combined Arms Support Command (CASCOM), Information Systems Directorate (ISD). Readers may direct questions, comments, or information requests to Lieutenant Colonel Shay Nyunt by e-mail at nyuntt@lee-dns1.army.mil or phone 804-734-1207 or DSN 687-1207.* –Editor

GCSS-ARMY UPDATE

Single CSS System Envisioned. The General Officer Working Group (GOWG) for the Global Combat Support System (GCSS)-Army provides program guidance for the Army's next generation of combat service support (CSS) information systems. The GOWG envisions GCSS-Army as integrating functions from numerous Army logistics systems and interfacing with joint systems to provide users with a single, seamless CSS system for Army XXI and the Army After Next. The use of prognostic and diagnostic sensor data is an integral part of the anticipatory logistics capability of GCSS-Army. The objective is to develop a set of standards that enable various sensor-based systems to enter data into GCSS-Army with minimal human intervention. Sensors on selected weapons platforms could serve as source data between forward battle command brigade and below ($FBCB^2$) systems and GCSS-Army. There are several possible interfaces and protocol sources for establishing standards: weapons platforms equipped with $FBCB^2$ systems, sensor input converted into the joint variable message format, and data transmitted from user interaction with the interactive electronic technical manuals (IETM). The Army Combined Arms Support Command (CASCOM) is tasked to develop requirements for each interface method, as well as to address non-$FBCB^2$-equipped systems. Electronic Data Interchange and the Defense Logistics Management System will be addressed in the future.

Reserve Component GCSS-Army PAT. The majority of GCSS-Army users will be members of the reserve components (RC's). To ensure that RC issues are addressed, a process action team (PAT) has been formed to serve as the conduit for requirements, training, and fielding coordination. The PAT consists of representatives from CASCOM; the Army National Guard; Office of the Chief, Army Reserve; Army Reserve Command; Army Materiel Command; Program Executive Officer, Standard Army Management Information Systems; Deputy Chief of Staff for Logistics (DCSLOG), Department of the Army (DA); Program Manager, Integrated Logistics Systems (PM ILOGS); Army Reserve Readiness Training Center; and Program Manager, RC Automation Systems.

Regional Fielding Concept to Support GCSS-Army Fielding to RC's. DA DCSLOG, along with the Army National Guard, the Army Reserve, and PM ILOGS, has established a GCSS-Army 3-year fielding strategy that is based on regional training sites (RTS)-maintenance. The fielding will start in fiscal year 2000. This regional strategy calls for the training of a cadre of systems instructors of RTS-maintenance who, in turn, will train soldiers from RC units.

GCSS-Army Frequently Asked Questions Going on the Web. A list of "Frequently Answered Questions" (FAQ's) and answers has been added to the GCSS-Army portion of the CASCOM home page. This should provide new members of the GCSS-Army community answers to basic questions on GCSS-Army programs. The CASCOM web address is http://www.cascom.army.mil. Click on the "Automation" icon, then on "GCSS-Army."

ULLS-S4 USAR FIELDING

The PM ILOGS and the Army Reserve will complete fielding of the Unit Level Logistics System (ULLS)–S4 by the end of second quarter of fiscal year 1999. The fielding strategy is regional and centered around regional training sites-maintenance. New equipment training for ULLS–S4 is multimedia based and requires fewer instructors. Systems training CD's will be issued to users for use in their home stations for sustainment training.

MULTIMEDIA TRAINING

The Joint Visual Information Services Center, Tobyhanna, Pennsylvania, will replicate and distribute the following training packages:

Relationships of CSS Automation
ULLS–G Mid-Level Manager Training
ULLS–G Operator Training
ULLS–S4 Operator Training,
ULLS–S4 Mid-Level Manager Training
SARSS–1 Operator Training

Orders may be placed by sending an e-mail to vibuddy@ptd.net or by calling Donna Dudley at (717) 895–7283 or DSN 795–7283.