ARMY LOGISTICIAN

SEPTEMBER-OCTOBER 1996

Palletized Loading System—Concept Becomes Reality

–Pages 14 - 23

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ARTICLES

DEPARTMENTS

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Disclaimer: Articles express opinions of authors, not the Department of Defense or any of its agencies, and do not change or supersede official Army publications. The masculine pronoun may refer to both genders.

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COVER

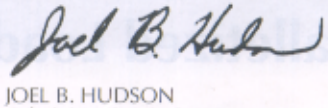
Three stories in this issue (pages 14 through 23) relate to the Army's palletized loading system (PLS). The cover design depicts the PLS progression from a concept to reality. The Army, which had been looking for a better load-handling and transporting system, selected the PLS as a nondevelopmental item in 1990. The 1st Cavalry Division at Fort Hood, Texas, became the first unit equipped with the PLS in February of 1994. The PLS provides today's Army with a modern, fast, tactical vehicle for load-handling and resupply missions.

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

By Order of the Secretary of the Army:

DENNIS J. REIMER
General, United States Army
Chief of Staff

Official:



JOEL B. HUDSON
Administrative Assistant
to the Secretary of the Army
02183

Coming in Future Issues—

Special Section on Bosnia Logistics in November-December–

- LOGCAP Contracting for CSS
- Road Warriors in the Balkans
- Deploying for Joint Endeavor
- Food for Operation Joint Endeavor
- Task Organization for Bosnia
- Ghostbusters–Then and Now
- DLA's Bosnia Operations
- Supply Pipeline to Bosnia
- Maintaining the Fleet in Bosnia

- Is Battlefield Distribution the Answer?
- Rail Support of Logistics Operations
- Medical Support for AMC's Work Force
- Force Projection in Action
- Velocity Management–Ahead of Its Time at TACOM
- Multilinear Warfare
- Logistics Task Force Mentality
- New Tools for Army Data
- Pollution Prevention in Logistics Units
- Developing a Base Defense in Korea
- Retrograding Equipment From Panama
- Improving the Environment Through HAZMIN

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ALOG DIGEST

AFTER ARMY XXI, WHAT NEXT?

At the direction of the Chief of Staff of the Army, General Dennis J. Reimer, the Army Training and Doctrine Command (TRADOC) is studying what capabilities the Army will need after Army XXI. This project is known as the Army After Next (AAN).

"The Army After Next is the one that will follow Army XXI, with capabilities to serve the country after 2010," according to General William W. Hartzog, the TRADOC commander. "The [AAN] project will conduct broad studies of the likely development of warfare till about 2025."

The future battle directorate of TRADOC leads the effort. The AAN team is headed by Colonel Michael Starry, who is also director of future battle under TRADOC's deputy chief of staff for doctrine. The team eventually will consist of about eight officers and four civilians. Their initial focus will be on future developments in four areas: geopolitical realities, human and organizational behavior, military art, and technology. TRADOC will sponsor workshops and seminars throughout the year, with each trying to assess what will happen in one or more of the areas of concern.

The AAN team will have access to the efforts of the other armed services, other Government agencies, and private think tanks and laboratories that are also trying to divine the future. All information gathered by the team, as well as studies conducted by team members, will be synthesized into an annual white paper, which will be delivered to General Reimer each summer.

The other major annual AAN event will be a winter war game, to be held at the Army War College at Carlisle Barracks, Pennsylvania. According to General Hartzog, "The ultimate goal is to produce an Army that wins wars, not just individual battles on specified battlefields. This broadens considerably the scope and depth of AAN research and invites multiservice participation at every opportunity. Winter war games will therefore be global in scope, replicate the spectrum of warfare from strategic-political to tactical, and be fundamentally joint in nature."

Current AAN work includes cooperation with the Advanced Research Projects Agency and the Defense Science Board (DSB). "One DSB project drawing attention is the revolution in military affairs and its effects on small unit operations," notes Starry.

Although its work is related to the Force XXI process, the AAN project will not be tied to restrictions imposed by the Army's annual budget program. The AAN team will raise issues about possible future developments, and if General Reimer thinks they may be of significant value, he will task TRADOC to investigate them more fully.

DLA TESTS DIRECT BUY SINGLE POC's

The Defense Logistics Agency (DLA) is testing a new method for buying DLA-managed repair parts directly from manufacturers. The test, which began on 15 May and will conclude on 15 November, uses single points of contact (POC's) for obtaining parts under the direct buy agreements for the UH-60 Black Hawk helicopter and the heavy, expanded-mobility, tactical truck (HEMTT). Direct buy agreements are noncontractual arrangements DLA has made with weapon system manufacturers to obtain deadlining repair parts when all other procurement methods fail.

The single POC's for the test are—

- For the UH-60 helicopter: Defense Industrial Supply Center, which can be contacted at (215) 697-2336/4042 or DSN 442-2336/4042; fax (215) 697-5726; or e-mail disoce@disc.dla.mil.
- For the HEMTT: Defense Supply Center, Columbus, Ohio, which can be contacted at (614) 692-2271/3191 or DSN 850-2271/3191; fax (614) 692-1374; or e-mail esoc@dcsc.dla.mil.

The procedures being tested apply only to high priority, not mission capable supply requisitions for DLA-managed items. Units pay Army master data file prices for parts procured during the test.

Under the test procedures, a unit that has submitted a high priority requisition and received an unacceptable estimated ship date can contact the appropriate POC. The POC then will contact the appropriate DLA supply source; if the status has changed, the managing DLA inventory control point (ICP) will contact the unit to see if the changed status satisfies the unit's requirements. If not, the ICP will notify the POC to initiate a direct buy procurement.

The POC then will contact the manufacturer to see if the item is available and if filling the requisition will affect production line operations. If the item can be obtained without affecting the production line, the POC will direct the ICP to procure the item from the manufacturer and ship it to the unit. If the item is available but its release will impact the production

line, the POC will contact the Army weapon system manager for approval to procure the item. If the item is not available from the manufacturer or if its release is not granted by the Army, the POC will inform the unit and the ICP of the status.

For more detailed information, contact Lieutenant Colonel Stephen Thomas at DLA, (703) 767-1547 or e-mail stephen_thomas@ccgw1.hq.dla.mil; Lieutenant Colonel Marcia Enyart at Department of the Army, (703) 697-2261 or e-mail enyarmm@hqda.army.mil); or Sharon Dunfrund at Department of the Army, (703) 614-6753 or e-mail dunfrsa@hqda.army.mil.

SINGLE PROCESS INITIATIVE REAPS BENEFITS

The Department of Defense single process initiative, announced by Secretary of Defense William Perry in December 1995, is making progress in effecting major acquisition reform. The single process initiative was designed to encourage the use of common processes and performance specifications in existing Defense contracts. When a modification becomes necessary on one contract, an effort will be made to standardize processes, specifications, and standards on all contracts at the facility. This acquisition reform effort is expected to make contract administration easier for the Government and the contractor, reduce environmental impacts, and create savings for taxpayers.

The first two contract changes under this initiative were signed in April. Both modifications affected 770 contracts with Texas Instruments, Dallas, Texas. First, Texas Instruments' single process specifications for alternative coatings in the metals fabrication process were substituted for four different military specifications. The change resulted in a 40-percent reduction in environmental emissions. Also, a Texas Instruments standard procedure replaced 19 different military or service-specific specifications, which simplified and accelerated an assembly process.

ARMY PLANS USE OF SPACE SYSTEMS

Logisticians of the future will rely more on space capabilities to support Army operations. Enhanced satellite communications and sensors will make split-based logistics a reality. Satellite systems will track consumption of supplies in the combat theater so that logisticians can deliver what and how much is required when and where it is needed. Sensors on weapon systems and vehicles will monitor and report use of ammunition and fuel so that resupply can be "just-in-time."

Recognizing the need to plan for optimal use of space systems, the Army Training and Doctrine Command's (TRADOC's) Space Division organized the Army Space Action Officers Working Group. The working group met in April to begin identifying the Army's space capabilities and needs. The meeting centered on development of the Army's vision statement for space utilization. The working group also will help with updating TRADOC Pamphlet 525-60, Space Support to the Land Force.

The Department of Defense is preparing for the inevitable. Major General Robert S. Dickman, space architect for the Department of Defense, predicted, "As people get more comfortable with space being part of the force structure, then the seamless integration of space in the battle labs and the Army is just going to happen."

NATIONAL GUARD TO BE RESTRUCTURED

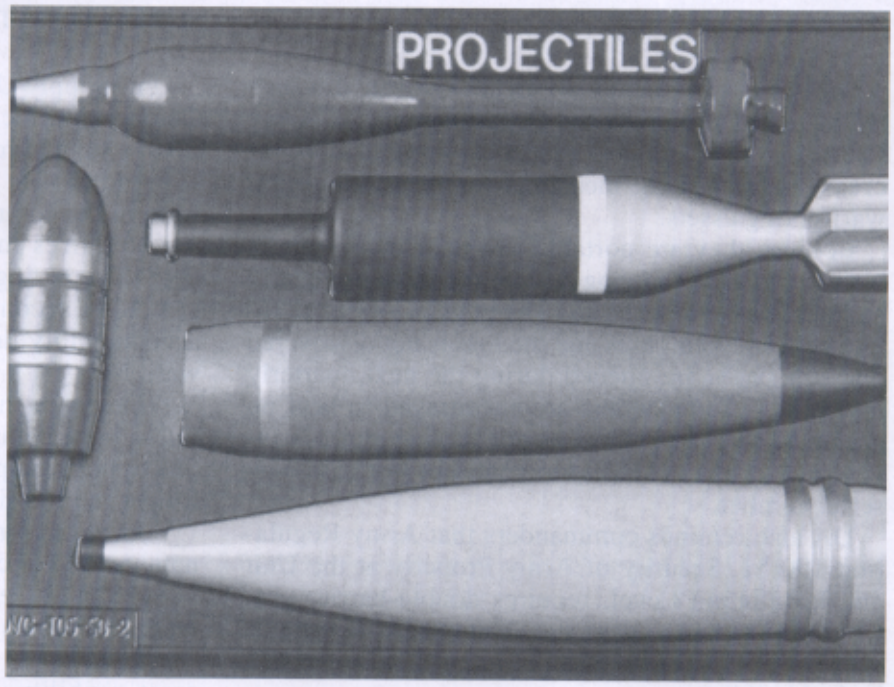
Army officials have approved a proposal from the Army National Guard (ARNG) to restructure its divisions. If the plan is approved by the Department of Defense, two composite divisions and six composite brigades will be formed by converting existing combat brigades to combat service and combat service support units. Of the 15 enhanced (separate) brigades, 3 would be embedded into ARNG divisional structure, 6 would fall under active Army headquarters for testing, and 6 will remain as they are. "[The restructuring] will solve the Army's shortfall in combat support and combat service support," said Lieutenant General Edward D. Baca, chief of the National Guard Bureau.

The Guard's redesign plan affects five of eight divisions. Three would remain as they are now organized. In three divisions, one brigade would be inactivated and replaced by an enhanced brigade. Enhanced brigades receive more intensive training and more resources to enable them to deploy with any active-duty division.

The redesign will be tested by the Army Training and Doctrine Command, Fort Monroe, Virginia. The test will consider several factors, including doctrine, organization, training, and mobilization. According to General Baca, until the test is completed, it would be premature to say how much effect the redesign will have on the enhanced brigades. If the redesign occurs, those enhanced brigades that remain outside the Army management umbrella will receive the same training and resources they do now, he said.

ORDNANCE RECOGNITION TRAINING AIDS DEVELOPED

Unexploded ordnance and mines proved to be more deadly than direct enemy gunfire during Operation Desert Storm and other conflicts. To help reduce future casualties, the Army Ordnance Missile and Munitions Center and School and the Army Missile Command, Redstone Arsenal, Alabama, worked together to develop collective training programs to increase soldier recognition of unexploded ordnance. Special display boards (example at right) were developed for use by soldiers who might be unable to attend the training programs. The plastic, vacuum-formed, two-dimensional, and inexpensive recognition boards show actual dimensions and ordnance color codes.



Seven ammunition recognition boards (item DVC-T 05-50) and four mine recognition boards (item DVC-T 05-51) display realistic examples of unexploded ordnance and mines. The boards may be requested through unit training support centers.

TACMIS SUPPORT PROVIDED IN BOSNIA

A commercial off-the-shelf (COTS) and nondevelopmental items (NDI) maintenance team from Tobyhanna Army Depot, Pennsylvania, is in Bosnia repairing automatic data processing equipment (ADPE) used in tactical management information systems (TACMIS). Team members are experts in electronic repair and are capable of repairing TACMIS and office ADPE that support Operation Joint Endeavor.

The Army Missile Command (MICOM), Redstone Arsenal, Alabama, has the logistics and maintenance support mission for the Project Manager, TACMIS, at Fort Belvoir, Virginia, who manages tactical computer systems throughout the Army. Tobyhanna has the mission of actually repairing the COTS and NDI ADPE both in peacetime and contingency operations.

MICOM teamed with Tobyhanna to establish forward repair activities (FRA's) that provide maximum support for all TACMIS computer systems under the "best maintenance concept." In addition to the team currently in Bosnia, FRA's are strategically located and are operational in Germany, Korea, and Panama, as well as at Fort Bragg, North Carolina; Fort Hood, Texas; and Tobyhanna. There are three deployable mobile FRA vans and three S-280 shelters kept in a "go to war" status at all times that stay at Tobyhanna in peacetime.

James R. Law, MICOM's equipment specialist who is the point of contact for maintenance of the TACMIS COTS and NDI ADPE, said, "Teaming with other commands reduces labor, transportation, life support, and other overhead costs incurred in a contingency operation. The FRA worked well in Haiti and is working smoothly in Bosnia."

The Bosnia FRA team uses mail, e-mail, telephone, and FAX to keep up the information flow and to request repair parts from Tobyhanna. The MICOM Emergency Operations Center gets daily reports from Operation Joint Endeavor and forwards them to appropriate action officers. COTS and NDI ADPE repair parts are shipped from Tobyhanna to Bosnia according to priority and urgency of request, with urgently needed parts being shipped by the Defense Logistics Agency using commercial carriers.

In a contingency, the Army Materiel Command's logistics support element calls for the mobile FRA's to deploy. Then MICOM, in conjunction with Tobyhanna, determines the number of vans and shelters to deploy.

INCREASED SECURITY URGED FOR NVD's

Increased pilferage of night-vision devices (NVD's) has prompted the Department of the Army (DA) to issue a request that local commanders increase safeguarding measures for these important warfighting assets.

Because they are portable and their quick sale is virtually guaranteed, goggles are the most frequently stolen night-vision device. The goggles often are removed from their cases and the loss is not discovered until the cases are opened during the next quarterly inventory. Commanders are encouraged to beef up accountability procedures by conducting monthly inventories of the actual equipment (not just cases) by serial number.

DA also reminds commanders that Army Regulation 190-51, Security of Army Property at the Unit and Installation Level, requires double-barrier protection of sensitive devices. This means that items such as NVD's must be stored in a locked room in a locked building.

SKO SUPPLY CATALOGS AVAILABLE IN CD-ROM FORMAT

Paper copies of sets, kits, and outfits (SKO) supply catalogs (SC's) may soon be a thing of the past. The Army Materiel Command Logistics Support Activity (LOGSA), Redstone Arsenal, Alabama, developed a prototype process for production and distribution of SKO SC's in compact disk-read only memory (CD-ROM) format. The Army Ordnance Center and School, Aberdeen Proving Ground, Maryland, initiated this process as part of "Project Retool," an effort to improve the Army's management of tactical tools. Program Manager (PM)-Soldier, Fort Belvoir, Virginia, funded the prototype disk and data base development through the soldier enhancement program.

The prototype CD, called Army SKO, contains eight SKO SC's, the picture library for tools, and the Army master data file (AMDF) elements specific to SKO SC's. When fully implemented, the electronic catalog will provide approximately 500 SKO SC's on one disk. The disk will become the tool authorization document, and hand receipts and modified hand receipts will be electronically produced from the disk.

In addition to rapid availability of information, the benefits of the electronic SC's include more frequent updates, reduced cost to reproduce and distribute, and less bulk weight for soldiers during deployment and maneuvers. The Army Ordnance Center and School estimates that $25 million will be saved in 5 years.

SUPPLY UPDATE 15 DUE FOR RELEASE

Unit Supply Update 15 is scheduled for release in October and includes the following changes to AR 710-2, Supply Policy Below the Wholesale Level—

- Adds policy for internal control checklists in the form of the command supply discipline program.
- Requires more frequent and more extensive CBS-X reporting.
- Adds accounting policy for ensuring property accountability during military operations other than war.
- Increases the threshold from $100 to $300 for self-service items related to information management processing equipment, such as toner, developer cartridges, and similar items.
- Introduces readiness-based sparing as an alternate method of computing requisitioning objectives.
- Excludes certain small arms parts from consideration as bench stocks.
- Establishes definitive policy guidance for total asset visibility, radio frequency tags, and the integrated logistics analysis program.

Plans are underway to make AR 710-2 and AR 735-5, Policies and Procedures for Property Accountability, available on CD-ROM.

DIGITAL RADIO TO REPLACE EPLRS

The Army has announced plans to develop a new digital battlefield communication system that will replace the enhanced position location reporting system (EPLRS), a data radio now being used for bri-

ROWPU IMPROVEMENTS MADE

The Army Energy Office, an element of the Office of the Deputy Chief of Staff for Logistics, continues to seek enhancements to existing reverse osmosis water purification systems (ROWPU's). Working with Army commands such as the Training and Doctrine Command, the Combined Arms Support Command, and the Aviation and Troop Command, the Energy Office began fielding the first 6 second-generation 3,000-gallon-per-hour ROWPU's in May. An additional 131 systems will be delivered according to the Army's materiel fielding plan. At the same time, plans are being modified continuously to incorporate new equipment designs that take advantage of the latest tech-

gade and below tactical data communications. The near-term digital radio provides a low-cost, high-performance system that can readily adapt to the new digital battlefield requirements and can accept the latest commercial technology as it becomes available.

A contract for $10.7 million was awarded by the Army Communications-Electronics Command, Fort Monmouth, New Jersey, to a team led by the International Telephone and Telegraph (ITT) Aerospace Communications Division, which includes Lockheed Martin Sanders, BBN Designs, Motorola, SICOM, and Group Technologies. They will produce 200 radios, installation kits, and network management terminals and provide training, installation, engineering, and logistics support. An option for up to 950 more radios could boost the total contract cost to $23.4 million.

ARMY'S MAINTAINERS RECOGNIZED

The Army Chief of Staff presented Army Awards for Maintenance Excellence to the following winning units in a June ceremony at the Pentagon—

Active Army MTOE Units

Light. 188th Military Police Company, Eighth United States Army, Camp Walker, Korea.

Intermediate. Headquarters and Headquarters Troop, Support Squadron, 11th Armored Cavalry Regiment (OPFOR), Army Forces Command, Fort Irwin, California.

Heavy. 1st Battalion, 6th Field Artillery Regiment, U.S. Army, Europe, Bamberg, Germany.

Army National Guard (ARNG) MTOE Units

Light. Headquarters and Headquarters Detachment, 540th Quartermaster Battalion, North Carolina ARNG, Lenoir, North Carolina.

Intermediate. Headquarters and Headquarters Detachment, 728th Main Support Battalion, Pennsylvania ARNG, Lock Haven, Pennsylvania.

Heavy. 3637th Maintenance Company, Illinois ARNG, Springfield, Illinois.

Army Reserve MTOE Units

Light. Headquarters and Headquarters Company, 322d Civil Affairs Brigade, U.S. Army Pacific, Fort DeRussy, Hawaii.

Intermediate. Company C, 411th Engineer Combat Battalion (H), U.S. Army Pacific, Fort DeRussy, Hawaii.

Heavy. 824th Quartermaster Company (Air Delivery), Army Forces Command, Fort Bragg, North Carolina.

Active Army TDA Units

Light. Pusan Storage Facility, Eighth United States Army, Pusan, Korea.

Intermediate. Headquarters Support Command, 751st Military Intelligence Battalion, Army Intelligence and Security Command, Camp Humphreys, Korea.

Heavy. 1st Battalion, 29th Infantry Regiment, Army Training and Doctrine Command, Fort Benning, Georgia.

Runners-up in each of the 12 categories were also recognized at the ceremony.

nology available. Under consideration are a 1,500-gallon-per-hour ROWPU that takes up no more space than the current 600-gallon-per-hour unit and a lighter weight water purifier.

In a separate action, the Defense Logistics Agency has developed ROWPU sustainment packages that contain chemicals, such as chlorine, polymers, and cleaning agents, and other items such as the filters needed to operate the water purification units. The sustainment packages will be managed by the Defense Supply Center in Richmond, Virginia. Ordering the packages will be much less cumbersome for ROWPU operators than ordering each item separately. For more information on ROWPU modernization or sustainment packages, contact the Army Energy Office at (703) 695-2669 or DSN 225-2669.

☐ The Army relies on ROWPU's such as this one to provide potable water for soldiers in the field.

ALOG EMPHASIS

TF XXI TESTS INITIATIVES

Next March, when Task Force XXI conducts its advanced warfighting experiment, it is expected that 20 of the experiments tested will be combat service support (CSS) initiatives. Eight of the 20 concern materiel fielding and include the SAMS, SARSS-O, and ULLS automated systems; the tactical quiet generators; the palletized loading system company organization; and a contact maintenance truck prototype. Other initiatives being developed for testing involve medical support and include an armored ambulance, telementoring, teleconsultation, a medical digital assistant, radio frequency tags and interrogators, prisoner of war information tags, and the personnel service support control system. Three remaining initiatives being developed will address religious support, wireless connectivity to the standard Army management information systems, and CSS functionality.

AMC BECOMES LOGCAP MANAGER

The Army Materiel Command (AMC) will assume program management of the logistics civil augmentation program (LOGCAP) from the Army Corps of Engineers on 1 October. Under LOGCAP, the Army develops plans to augment its forces in wartime by using civilian contractors to perform selected services. The Corps of Engineers has administered an Army-wide, umbrella contract with Brown and Root Services Corporation for the last 4 years. The Corps will continue to administer this contract until the last option year ends in August 1997 and through any close-out actions. AMC is expected to award a new LOGCAP contract by the second quarter of fiscal year 1997. The Office of the Deputy Chief of Staff for Logistics, Department of the Army, will continue to act as proponent for LOGCAP.

ARMYLOG USERS GET HELP

The Army Materiel Command Logistics Support Activity (LOGSA) at Redstone Arsenal, Alabama, has a way to assist users who note discrepancies in essentiality codes for items in the Army master data file (AMDF) and listed on ARMYLOG. The discrepancy reporting (DIREP) system automatically routes the suspected discrepancy by electronic mail to the appropriate data maintainer for correction. Results of the review are provided to LOGSA who, in turn, notifies the customer of the results of the analysis and the effective date of corrective action if necessary. ARMYLOG is a compact disk-read only memory (CD-ROM) that contains supply management data required to order parts and equipment. It replaces the former AMDF microfiche. For more information, call the DIREP point of contact at (205) 955-0793 or DSN 645-0793. The e-mail address is direp@logsa-emh2.army.mil.

(Continued on page 48)

ALOG EMPHASIS

(Continued from page 1)

CARGO HANDLERS TO BE REBUILT

Approximately 90 rough terrain cargo handlers will be restored to "almost like new" condition under the Army Reserve's partnership with industry program with Caterpillar, Inc. Under the program, a local Caterpillar dealer picks up a cargo handler and completely rebuilds it in 60 days or less. Before the program began, cargo handlers were out of commission for up to 5 months when a depot-level repair or rebuild was needed. Each rebuilt cargo handler has an improved appearance and performance, a 2-year warranty, and a 10-year increase in life expectancy. The program is expected to reduce acquisition expenses, costs of repairs, and maintenance time for the Reserve.

SHOCKING NEWS ABOUT RATIONS

Army and private-sector scientists are collaborating on a project to use electrical currents to extend the shelf-life of bulk rations. Under a 3-year, $1.5 million contract awarded by the Army Soldier Systems Command (SSCOM), Natick, Massachusetts, to PurePulse Technologies, Inc., of San Diego, California, the CoolPure™ cool pasteurization process will be applied to Army rations. Under this process, bulk foods are exposed to very short bursts of high-intensity electrical current; this controls the growth of microbes and thus extends the food's shelf life. Preliminary evaluations and taste tests indicate that foods treated in this way compare favorably with fresh foods. SSCOM scientists believe that the CoolPure technology will have "far-reaching effects in both military field feeding and commercial production."

DOL CONFERENCE ANNOUNCED

A worldwide directorate of logistics (DOL) working conference will be held 19 to 21 November. The Commanding General, Army Combined Arms Support Command, will sponsor the conference, with the Army Logistics Management College, Fort Lee, Virginia, acting as host. The conference is open to all interested logistics personnel and will address topics proposed by the attendees. Sufficient time will be allocated for the discussion of problem areas and the development of recommended solutions. Address inquiries to—Army Logistics Management College, ATTN ATSZ LSN I, 2401 Quarters Road, Fort Lee, VA 23801-1705 (e-mail address: pawlowsa@lee-dns1.army.mil), or call (804) 765-4304 or DSN 539-4304.

ATTACHÉ JOBS AVAILABLE

The Defense Attaché System is recruiting active duty noncommissioned officers (NCO's), grades E5 through E7, to represent the Army and the Defense Intelligence Agency in diplomatic assignments all over the world. Joint service staff assignments are available at American Embassies in more than 80 locations. Prerequisites, application procedures, and assignment locations can be found in AR 611-60. For more information, call Sergeant First Class Gale at (410) 677-1240 or DSN 923-2134, extension 2633,

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LEARN ABOUT GENERATORS

A videotape, "Power Generation: Setup and Operation—60 KW Tactical Quiet Generator (TQG)," can help reduce damage to generators due to improper operation. When field reports indicated increasing generator repair requirements, Lieutenant General Johnnie E. Wilson, who was then Deputy Chief of Staff for Logistics, requested production of an instructional tape. The videotape was produced by a team from the Army Combined Arms Support Command, Fort Lee, Virginia, and the Ordnance Center and School, Aberdeen Proving Ground, Maryland. The tape, TVT9-312, PIN #710844DA, is available at unit training offices, reserve training centers, and visual information libraries.

FM 10-23 IS REVISED

Revised FM 10-23, Basic Doctrine for Army Field Feeding and Class I Operations Management, incorporates changes resulting from recent Army studies and field trials. The comprehensive reference also includes automation alternatives for class I request and issue functions in the field based on the Army's total distribution study. The field manual includes food menus and checklists for use by food preparation personnel. Other concepts covered are site selection criteria and equipment descriptions and instructions.

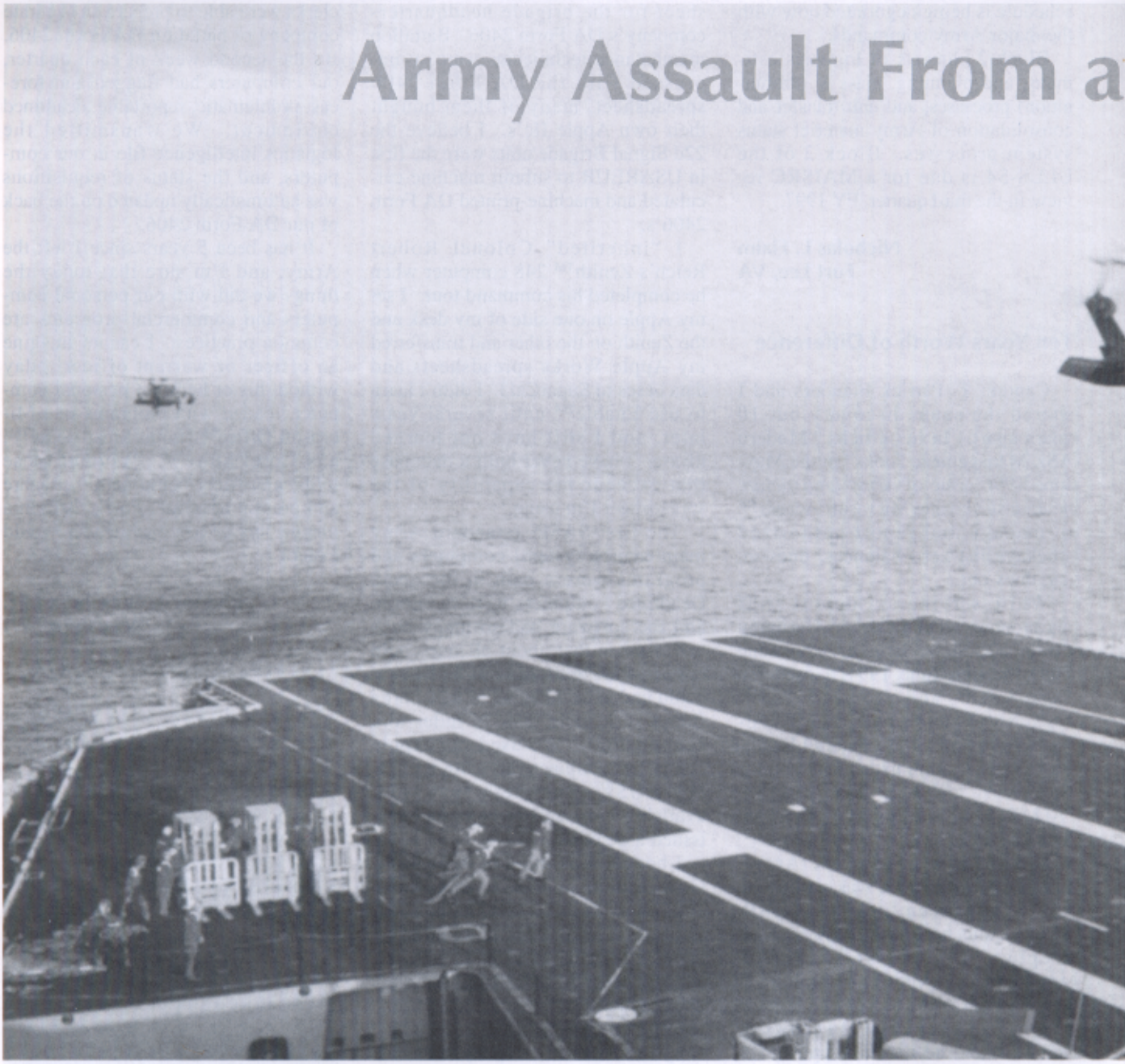
PLS STUDIES AVAILABLE

A bibliography of studies on the palletized loading system is available to authorized persons. Write to—USALMC, ATTN Director DLSIE, 2401 Quarters Road, Fort Lee, VA 23801-1705, send e-mail to jkirklan@almc-lee.army.mil, or call (804) 765-4007 or DSN 539-4007.

CHANGES MADE IN AR 638-2

Army Regulation 638-2, Care and Disposition of Remains and Disposition of Personal Effects, is a new, separate regulation that updates and supersedes AR 600-8-1, chapters 17 through 36. Many revisions were made to procedures for disposition of remains and for determining eligibility for benefits.

Army Assault From a



Joint operations became more than an exercise when soldiers and sailors prepared to sling-load equipment aboard the *USS Eisenhower* in support of the Haiti invasion force.

Navy Carrier

by Captain Sean C. McGovern

One Black Hawk lifts off from the *Eisenhower* as another approaches the deck to pick up another load.

The U.S. occupation of Haiti to restore the government of exiled Haitian President Jean-Bertrand Aristide turned out to be a permissive-entry operation. But until a last-minute diplomatic breakthrough led to the peaceful departure of the Cedras regime that had ousted Aristide, it looked like U.S. forces would have to make a forced entry against Haitian resistance. That possibility resulted in an historic Army-Navy collaboration: preparations for launching a major Army air assault from the deck of a Navy aircraft carrier. I was privileged to participate in the logistics support of that operation, where I watched soldiers and sailors work together, often in novel ways, to prepare the invasion force to execute any orders received from the National Command Authorities.

Getting Ready for Haiti

I was S2/3 of the 10th Forward Support Battalion (FSB), which is part of the 10th Mountain Division (Light Infantry) at Fort Drum, New York. Elements of the division began boarding the aircraft carrier *USS Eisenhower* at Norfolk, Virginia, on 12 September 1994 in preparation for the forced-entry operation, Restore Democracy. (Operation Restore Democracy became Operation Uphold Democracy following the peaceful Cedras departure.) These troops would spearhead the proposed Haiti invasion force.

The plan called for the 1-87th and 2-22d Infantry Battalions, along with 1st Brigade Headquarters, to lead the air assault in conjunction with elements of the 10th Aviation Brigade. The 10th FSB, in turn, would go ashore to provide the infantry with all the logistics support they would require until logistics bases were established at the Port-au-Prince airport and seaport and the Haitian American Sugar Company's facility.

Racing Against Time

For 60 hours, men, machines, and supplies flooded onto the carrier. The *Eisenhower*'s aft hangar bay (hangar bay 3) was selected for vehicle and equipment staging. It quickly filled with 25 high-mobility, multipurpose, wheeled vehicles (HMMWV's); 3 trailers; and numerous Army supplies in various sizes and shapes. Ammunition continued to arrive and was uploaded into the *Eisenhower*'s magazines in the early morning hours just before the ship's departure from Norfolk.

Since an air assault of such proportions had never before been conducted from an aircraft carrier, there was no plan for transforming a jet aircraft hangar bay into an intermediate staging base for a light infantry invasion force. Nor had Army and Navy liaisons been appointed to direct such a transformation. As the time for departure closed in on the participants like an ever-tightening noose, equipment and supplies were loaded into hangar bay 3 as quickly as they arrived at the dock. Little consideration was paid to prioritizing the equipment in the order in which it would depart the ship; indeed, a prioritization plan did not yet exist. The primary logistics concern governing our actions was clear: the *Eisenhower* would

sail at 0800 on 15 September, and all equipment that was earmarked for the initial air assault had to be on board before then.

Army Meets Navy in Hangar Bay 3

Somewhere in the overcrowded, artificially illuminated confusion of hangar bay 3, I met Navy Lieutenant (junior grade) Dennis Piton. He looked as bewildered as I felt, and I quickly learned that the hangar bays were his area of responsibility. Hangar bays 1 and 2 would be used to stage helicopters and infantrymen, respectively, and posed few concerns for us. But hangar bay 3 was crammed from end to end with Army materiel; careful orchestration would be required if we were to prioritize equipment for helicopter sling-load delivery to Port-au-Prince.

"Couldn't you have brought a bigger aircraft carrier?" I joked. "This is as big as they come," he replied as we began discussing our plight. All of the Army vehicles, trailers, supplies, and odds and ends would have to be sling-loaded off the ship's deck during the assault. We needed a plan for prioritizing all of these items and ensuring that they were staged near the carrier's two monstrous aft elevators in descending order of priority. Each load would have to be placed onto an elevator by a forklift, raised topside, and then moved by forklift onto the ship's fantail for pickup by Army Black Hawk helicopters. Each sling load would have to be weighed, inspected, and labeled so that each aircraft's crew chief could identify the load's destination.

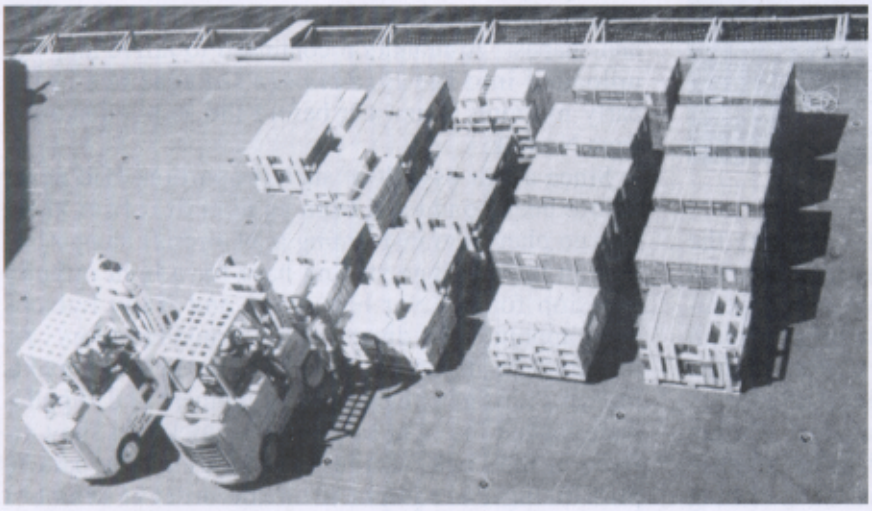
I proposed to Lieutenant Colonel Joseph Lewis, the commander of the 10th FSB, that we volunteer for the mission of sorting out the confusion in hangar bay 3. Since the FSB would depart the ship after the infantrymen and aviators, we were the natural choice for such a mission: we could tie up any loose ends and see the job through to completion. Colonel Lewis agreed, and he had little difficulty in securing the mission from the 1st Brigade commander. I was charged with preparing hangar bay 3 for the assault.

Sling-Load Preparations

Lieutenant Piton and I established ourselves as self-appointed liaisons. I would assemble the prioritization list based on the infantry and aviation commanders' intent. Lieutenant Piton would determine the best method of implementing the load plan based on the ship's capabilities.

With the assistance of the Army units on board the carrier, we drove our vehicles into hangar bay 2. The owning units had already rigged their vehicles for sling-loading. The 10th FSB's sling-load inspection team checked each vehicle and corrected faulty chain link counts, twisted sling legs, and other deficiencies. Each vehicle then was weighed by a Navy forklift fitted with a special scale attachment. Weights were recorded directly onto the vehicles for easier identification.

We discovered that several vehicles had weights exceeding the lift capacity of the Black Hawk helicopters, so we called the aviation brigade headquarters for help. What was the absolute maximum weight that the aviators would attempt to lift with their Black Hawks? This was a delicate question, but one that needed answering. An error on the side of safety meant that vehicles critical to the infantry's mission would not be sling-loaded off the ship. An error in the other direction could result in a load being dropped into the ocean and possibly even the



Forklifts arrange ammunition on the *Eisenhower*'s elevator 2 (above). Sailors hook a pallet to the bottom of a hovering Black Hawk helicopter (right).

loss of an aircraft and crew. The Army aviators quoted several maximum weights to us but finally decided that they would attempt to lift anything we put on the ship's fantail. The ship's commander offered the use of a Navy CH-53 Sea Stallion helicopter to assist in transporting the exceptionally heavy sling loads.

After the vehicles and trailers were weighed, they were parked in descending order of priority by elevator 4. The infantry's 18 HMMWV's and 2 M149 water trailers had first priority, followed by the aviators' 8 HMMWV's and 2 trailers. Note that the M149 water trailer was not designed to be sling-loaded while full of water. However, the harsh Haitian climate dictated that the infantry be supplied with as much water as possible, and the commanders of the infantry battalions were determined to use every asset at their disposal.

Once all of the vehicles and trailers were prioritized on the port side of hangar bay 3, the soldiers began preparing and prioritizing all of the remaining equipment on the starboard side. This equipment consisted primarily of individual soldiers' rucksacks and dufflebags; class IV packages of lumber, concertina wire, and sandbags; water resupply packages; and large mobility containers used to store helicopter repair parts and toolkits.

The infantrymen prepared cargo nets for their rucksacks and dufflebags, but they didn't realize that the Navy had no way of lifting the completed nets and transporting them to the elevator and onto the ship's fantail. Wherever a cargo net is prepared is generally the spot from which it is sling-loaded. Forklifts cannot slide under a net without damaging the nylon webbing. Another plan was required.

Lieutenant Piton offered us the use of as many huge, triwall cardboard boxes as we required. We lined the triwall boxes with cargo nets and then placed the rucksacks and dufflebags inside the nets. The boxes kept their form, and the Navy was able to lift the triwalls with forklifts and move them around the hangar bays and out onto the flight deck.

The soldiers of the aviation brigade designed an innovative, field-expedient means of sling-loading class IV materials. These items were placed on an Air Force 463L pallet and secured. Sling legs then were attached to the four corners of the pallet. Since this type of pallet has no lifting points and was not designed to be used as a platform for sling-load operations, the sling legs were fitted snugly around the corners of the pallet. As the helicopter lifted the pallet by the four sling legs, inward pressure exerted by the weight of the load held the chains fast in place.

Water for the Invasion Force

Water resupply was handled in several ways. Two 250-gallon pillow tanks were placed on wooden warehouse pallets and then rigged in cargo nets. The pillow tanks extended over the edges of the pallets, so we were concerned that the tanks might burst when they were lifted by a helicopter. Fortunately, this did not happen. At lift-off, the shape of the pillow tanks was distorted by the uneven pressure exerted by the cargo nets, but the tanks did not burst.

We also used a forward area water production supply system. The 710th Main Support Battalion had attached a water team to the 10th FSB. This team had two 500-gallon water blivets prepared for sling-loading. On the day of the assault, the team's three soldiers and their pump and hoses were loaded onto a Black Hawk helicopter. The helicopter lifted off, picked up one water blivet, and headed ashore. The second blivet followed on a second lift.

The infantry battalions had their own plan for water resupply. In addition to using M149 water trailers, they also prepared cargo nets filled with dozens of 5-gallon water cans. In their rush to get ready for the coming assault, however, the infantrymen filled the cans with water from the ship. This practice inadvertently created a potential health problem. The ship's drinking water is nothing more than condensed steam; because the *Eisenhower* provides a ready supply of fresh drinking water and water-borne illnesses are nearly nonexistent, the ship's engineer generally does not add chlorine to it. But the water the soldiers placed in the 5-gallon cans would sit for at least 5 days in the hot, humid hangar bay; without chlorine, it would spawn a potentially dangerous level of bacterial growth. We had to make special arrangements with the ship's engineer to have chlorine added to one of the ship's water lines. This ensured that all water taken ashore by the infantrymen in any container larger than a canteen would be chlorinated.

Moving Out

Hangar bay 3 was tightly packed. The vehicles, equipment, and sling loads were prioritized and staged in the order in which they would be moved off the *Eisenhower*. We informed the infantry and aviation commanders that because of the lack of maneuver space in the bay, it would be nearly impossible to alter the order of flow once the operation kicked off.

Early on the morning of 19 September, the air assault operation began. All 18 of the Black Hawk helicopters were used initially to ferry troops ashore. The first 2 HMMWV's were staged on the *Eisenhower*'s fantail while an additional 12 vehicles were staged on elevator 4. After the first wave of infantrymen were ashore, two helicopters were dedicated to sling-load operations.

Lieutenant Piton and I decided that we could best

A Black Hawk lifts off from the *Eisenhower*'s deck with a container.

manage the operation if we split up. He remained in hangar bay 3 and controlled the flow of cargo onto elevators 3 and 4. I positioned myself on the flight deck near elevator 3. As the cargo arrived on the flight deck, I directed it onto the fantail for pickup. I assembled a sling-load hookup team of three soldiers to assist me.

Lieutenant Piton loaned me a Navy handheld radio so that we could communicate. The Black Hawks drowned out the radio most of the time, but between launches we could update one another on our respective situations. Ideally, I would have used a helmet with a built-in headset, but these were not available in sufficient quantities to provide me with one.

Lieutenant Piton also had to scrounge up "float coats" for me and the Army sling-load team. Navy safety regulations require that all personnel working on the flight deck wear these inflatable overcoats, which contain a cylinder with pressurized gas that inflates the coat upon impact with the water. These coats were in short supply, so it required quite a bit of wrangling before Lieutenant Piton was able to obtain some for us.

Teaching Sailors the Army Way

Some confusion ensued over who would perform the sling-load hookups: soldiers or sailors? We argued that the sailors had no experience with Black Hawk sling-load operations. The sailors argued that it was their ship and they were responsible for all aspects of flight operations. Reluctantly, we gave in.

Our soldiers gave the sailors a bare-bones class on Army hookup procedures. The sailors were astonished to hear that they would have to stand directly beneath a hovering helicopter and manually attach the sling-load's apex to the helicopter's lift hook. This defied all Navy safety principles. The CH-53 is the helicopter used for Navy sling-load operations. Generally, a CH-53 pilot will set his aircraft down on the deck and cut his engines. A telescoping lift hook is then attached to the load, the pilot restarts his engine, and the helicopter lifts off with the load. The sailors had never heard of a static discharge probe! Fortunately, they were quick learners.

Another service incompatibility problem we encountered concerned hand and arm signals. The sailors were familiar with the "hover," "approach," and "take off" commands; but, since they rarely hook up sling loads to hovering helicopters, they were rusty on other hand and arm signals. Where the hand and arm signals were lacking, the helicopter crew chiefs improvised.

One by one, the HMMWV's were lifted off the deck and ferried to the shore. The pilots would lift a vehicle off the flight deck and hover for 10 to 15 seconds. In some cases, the weight of a vehicle exceeded the helicopter's lift capability. When this occurred, the pilot would lower the vehicle back down to the deck and the crew chief would disengage the sling load. The Navy CH-53 helicopter was used to haul some of these heavier loads; the aviation brigade also identified its strongest Black Hawks and dedicated them to lifting the heavier loads.

By the end of the first day, both infantry battalions and the majority of their equipment were ashore. The sling-load operation would last for 4 complete days, drawing to a close on the afternoon of 22 September. During its course, 204 sling loads were transported ashore without a single loss. Army and Navy cooperation had gotten Operation Uphold Democracy off to a smooth start. **ALOG**

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Aviation Maintenance From the Trenches

by Chief Warrant Officer (W3) Ronald W. Durant

The Army must reassess its training for aviation maintainers to provide reliable aircraft maintenance in combat.

Deployment for military operations other than war (MOOTW) is no longer a subject of speculation for the 10th Mountain Division (Light Infantry), Fort Drum, New York. It has been a reality three times within the last 4 years, as the division has deployed to Florida (Hurricane Andrew), Somalia (Operation Restore Hope), and Haiti (Operation Uphold Democracy). Because the intervals between these deployments were short and most soldiers participated in two, and sometimes all three, missions, division personnel had many opportunities to acquire and share valuable information. A look at lessons learned from the three deployments reveals several common aviation maintenance problems, all pointing to deficiencies in how the Army trains its aviation maintainers.

Task Force Composition

As was demonstrated in Somalia and Haiti, aviation units that have never worked together before sometimes may comprise a task force. A relieving unit may have to use another unit's equipment or support unfamiliar aircraft. Mechanics in the task force must be able to adapt quickly but still uphold rigid Army standards for basic aircraft maintenance. How well they do this is directly related to their units' maintenance training programs.

Most training provided to mechanics at the unit level emphasizes the tactical objectives of their unit's mission. Our maintenance soldiers can pack up, deploy, and defend a perimeter anywhere in the world. Unfortunately, they may not know how to properly maintain the deployed aircraft. A form of "culture shock" settles in as mission work loads intensify. Maintenance support becomes an inconsistent variable with huge gaps in reliability, causing aviation commanders to avoid maintenance support rather than rely on it.

Rank Versus Skill

Soldiers often are presumed to have the skills necessary to accomplish their mission because they have completed advanced individual training or have attained a particular rank. However, many soldiers are promoted without ever achieving competence in their basic technical skills. It is not uncommon to see a staff sergeant with less mechanical experience than a specialist. It is also assumed that an aviation intermediate maintenance (AVIM) company is capable of more extensive repairs than an aviation unit maintenance (AVUM) company. However, AVIM companies in garrisons often rely on civilian contractors to handle the "tough jobs." As a result, the necessary skills and experience required to accomplish the maintenance mission in combat often are not acquired by our soldiers. This lack of experience significantly decreases reliability and proficiency of the AVIM companies in combat. However, experience confirms that AVIM companies must outperform their AVUM customers once deployed.

Mission Training Plans

Review of the mission training plans for AVUM and AVIM companies reveals a number of inadequacies. Army Training and Evaluation Program (ARTEP) 1-933-30-MTP, Mission Training Plan for Aviation Intermediate Maintenance (AVIM) Company, Division Support Command (DISCOM), is a good example. At this level, it would be logical to expect the majority of training to focus on mainte-

☐ The Army paid approximately $800,000 per aircraft to a civilian contractor to maintain UH-60 helicopters redeployed to the United States from Somalia.

duties. Ideally, the field training exercise (FTX) and contributing situational training exercises (STX's) suggested in the ARTEP should reflect this focus.

However, only one of the STX scenarios in the ARTEP involves the direct performance of aviation maintenance. Of the 21 tasks required to perform that STX, only 9 apply directly to maintenance. And the specific events and standards pertaining to those 9 are unclear. For example, one of the tasks required in the STX is "perform avionics and electrical repairs." This task is not specific enough to develop a proper assessment. Theoretically, if one avionics repairer tests one radio during the FTX or STX, the standard is met. Time limits for the total task (preparing a work order, identifying and requisitioning parts, using manuals, shipping the component, and inspecting and accepting the completed job) are not specified.

The gravity of the aviation maintenance problem is supported by data compiled by the Aviation and Troop Support Command in St. Louis, Missouri. Completion times for maintenance services are tracked and then averaged for all Army aircraft. The UH-60 Black Hawk helicopters must undergo a comprehensive inspection every 500 flight hours. The average Army-wide completion time for this inspection, which is known as preventive maintenance services-2 (PMS-2), is 117 days. (PMS-1 is an abbreviated inspection completed after 10 flight hours or every 14 days, whichever comes first.) Management of PMS-2 dictates a flight-hour interval between aircraft to allow a staggered entry into PMS-2. (The basic rule is 500 hours divided by the total number of aircraft assigned.)

The 22 helicopters that deployed to Haiti with the 10th Mountain Division flew 2,000 hours in the first 2 months of deployment. Taking into account the hours already logged on the aircraft before deployment, one UH-60 began PMS-2 every 2 weeks or less. Consider the dilemma that a 117-day PMS-2 completion schedule posed for the aviation commander faced with that scenario. If the time to complete PMS-2 had been 60 days, or even 30 days, maintenance still would not have kept up with the mission requirements. This problem was not exclusive to the UH-60 helicopters; all Army aircraft have similar scheduled maintenance service and inspection requirements. When the commander factored in necessary unscheduled maintenance, any chance of sustaining mission requirements was lost.

Total Unit Performance

It appears that many square training pegs have been hammered into round maintenance holes for quite some time. We need consistent standards for all aviation maintenance companies. Instead of another classroom examination of individuals, we need collective, all-encompassing maintenance training followed by detailed evaluation of total unit performance. Can a unit perform PMS-2 on a UH-60 Black Hawk helicopter in 2 weeks and simultaneously support unscheduled maintenance and night operations? Can the same unit perform an aerial recovery of a downed helicopter and, at the same time, support split operations 50 kilometers away? Most importantly, can a unit placed in this type of scenario perform proper daily maintenance and crew chief tasks? Un-

fortunately, as the condition of aircraft returning from deployments reveals, the answer is "No."

Although the UH-60L helicopters returned from Somalia were relatively new, they were in such poor condition that an extensive Somalia aircraft refurbishment program was initiated. In this program, work was performed by civilian contract teams at a cost of approximately $800,000 per aircraft. Most maintenance performed was not to repair battle damage but to repair the effects of corrosion and neglect. The neglect was not deliberate; it was the result of an undertrained, underequipped maintenance force that focused on day-to-day minimums. The AVUM and AVIM maintenance forces in the United States were apparently no better trained or equipped than those in Somalia, because Army soldiers weren't tasked to repair the aircraft after they were returned. Did the aircraft really require maintenance that was beyond the AVUM and AVIM companies' capabilities?

Similar aviation maintenance problems existed during the Haiti deployment. Fortunately, due to the shorter duration of deployment, the effects were not as dramatic. However, it was decided that PMS-2 services would not be performed in Haiti on UH-60 helicopters because of unreliable supply channels and undesirable extended downtime of aircraft. Instead, the helicopters were held with 30 flight hours remaining until PMS-2, which was enough time for the aircraft to fly back to Fort Drum for maintenance. This compounded the maintenance problem, because the nonavailability of these helicopters accelerated the remainder of the fleet to their PMS-2. As a result, 9 of the 22 returning aircraft required PMS-2 upon arrival in the United States. Of those nine, only two were serviced by Army mechanics. Though the financial impact was not as great as with aircraft returning from Somalia, the Army still paid approximately $250,000 per aircraft to a civilian contractor to maintain the remaining seven helicopters. Imagine the impact if that money had been paid to upgrade Army maintenance capabilities at the divisional level!

The deployments to Florida, Somalia, and Haiti show that the view from the maintenance trench is starting to look somewhat bleak. If we are to provide viable maintenance options to the aviation commander, the Army must reassess its aviation maintenance goals. We must develop realistic, comprehensive training for aviation maintainers. Standards must reflect the level of maintenance that a commander can expect during combat and MOOTW. Consistent standards for aviation maintenance forces will ensure efficient integration of units during task force assignments and reduce our dependence on civilian contractors. Dedicated maintainers with improved skills are essential for the future of our aviation forces. Without them, total mission failure may loom in the not-so-distant future. **ALOG**

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BSA Defense in Cap-Haitien

by Captain Robert A. Elmore

The Army's deployment to Haiti did not involve combat, but security was still a major concern. A forward support battalion found that, even in a nonhostile environment, defending a brigade support area requires planning, creativity, flexibility, discipline, and leadership.

From day one, soldiers are taught that their highest priority in any mission is security. The recent Army operation in Haiti required soldiers to pay constant attention to detail. But the daily monotony of their routine duties and growing familiarity with their surroundings tempted soldiers to let their guard down and become complacent. Leaders at all levels had to monitor their troops continuously and remind them that, while there was no combat threat, there was an element of danger in their mission. The key to maintaining security in Haiti was a good brigade support area (BSA) defense plan.

I was S2/3 of the 10th Forward Support Battalion, 10th Mountain Division (Light Infantry), at Fort Drum, New York. When we deployed to Haiti, we occupied the port facility in Cap-Haitien, a city on Haiti's north shore. We initially occupied the site with a special Marine ground task force (MAGTAF). The Marines did not plan to remain in Cap-Haitien for long, so their defense plan was simple: a single strand of concertina wire combined with an overpowering show of force. However, this technique would not work for defending our BSA. We didn't have the number of soldiers or the firepower of the MAGTAF.

Our collocation with the Marines lasted for approximately 2 weeks, which gave us time to develop a working defensive plan. The Cap-Haitien port facility was a small piece of land surrounded by water on three sides (north, east, and south). The shoreline was edged with large boulders that made installing concertina wire very difficult. A wall bordered the port facility on its west side and continued around the north shore about 30 feet off the shoreline. A pier extended off the south shore, and several hardstand structures were located within the port facility.

Controlling Local Access

Our most difficult task in establishing a BSA defense was controlling local nationals who worked at the port. We first had to set a limit on the access of these workers to the port facility. We decided that an existing road that separated the pier from the rest of the port facility would be the access boundary: Haitians would be permitted access to the pier, but they would be allowed to work within the BSA across the road only under the supervision of an armed guard.

To create the boundary, we ran triple-strand concertina wire along the road. This was not accomplished easily. To get the concertina to stay in place, we drove the pickets into an existing drainage-cover grate that ran the entire length of the road. The pickets were then tied off to the grate. Stakes were driven into the road surface, and the concertina was secured to the stakes. We also constructed two guard posts at designated breaks in the concertina barrier, at the exit and entrance to a service road. These guard posts controlled local access as well as the flow of traffic into and out of the BSA.

Our next task was to install concertina along the north and east shorelines. We had to do this in order to control local nationals who docked their boats on the rocks and tried to come ashore. Once again, securing the concertina was not an easy task. We had to employ methods like those we used along the road, except that we added a triple row of barbed-wire tanglefoot along the shore. However, the concertina-and-barbed-wire barrier didn't stop the Haitians; it only slowed them down enough for soldiers from the quick reaction force (QRF) to get to the location of the breach.

QRF, MILVAN's, and Roving Patrols

The QRF is always an important factor in protecting a BSA. The soldiers located in a BSA are generally from a forward support battalion, and their

primary job is to provide logistics support to a brigade. They can't always spend a lot of time on the perimeter pulling guard duty. To ease demands on the logisticians, a QRF is employed. The role of a QRF is to respond to any BSA security breach that a normal roving force or guard position can't handle. The QRF that we used in Cap-Haitien was comprised of three teams. The BSA was divided into three sections, and each QRF team was responsible for a section.

We constructed fighting positions along the inside of the wall on the west side of the port facility. Several fighting positions were designated and built within the port facility as secondary fighting positions, and key personnel were identified to occupy them.

We also built fighting positions atop several structures within the port facility. These positions were manned with crew-served weapons at times of increased security demands. Each had a specific field of fire. This particular position was designed for an M2 .50-caliber machinegun and afforded an excellent view of the northeastern part of the city of Cap-Haitien. Along the wall and outer perimeter, we built five guard towers using the MILVAN's with which we deployed. The MILVAN's provided an excellent base for guard towers.

Security along the pier was a major concern, because the reverse-osmosis water purification unit (ROWPU) was set up there and was somewhat isolated from the rest of the BSA. After several weeks during which the soldiers of the water team maintained their own security from the Haitians working on the pier, we built them a MILVAN wall. This wall provided security, made the pier easier to defend, and kept the Haitians working on the pier from getting near the ROWPU.

The last measure used in the defense of the BSA was roving patrols. There were five patrols of two or three men each, and they walked the entire perimeter of the BSA nightly. The roving patrols were used to monitor activities outside the BSA and to alert the QRF when necessary.

Convoy Security

The situation in Cap-Haitien required BSA tenant units to pick up supplies at the Cap-Haitien airfield, which was 6 miles by road from the port facility. This requirement meant that we needed to use convoys for resupply and pay attention to convoy security. The BSA standing operating procedure called for each convoy to consist of no fewer than three vehicles. Two convoy vehicles were designated as "gun ships" for security; all other convoy vehicles were used for cargo pickup or delivery.

Each of the two "gun ship" vehicles in a convoy was manned by five soldiers: the vehicle commander, a driver, two soldiers to operate a crew-served weapon, and one additional soldier for security. All vehicles used for transporting supplies were required to have a vehicle commander and driver. So the minimum number of personnel required for a minimum 3-vehicle convoy was 12.

These manning requirements soon taxed our available personnel. We quickly determined that using the same vehicles and personnel on a daily basis was more effective than routinely switching them. Using the same personnel also had intelligence benefits: the soldiers could observe the local nationals and monitor the local scene outside the BSA on a daily basis and recognize if anything was out of the ordinary. However, we were required to rotate some personnel on occasion.

We also had to designate a convoy commander for each convoy. Besides supervising the convoy, the convoy commander was responsible for two other key tasks: ensuring that each member of the convoy was given a convoy safety briefing, and presenting a convoy debrief to the battalion S2.

A debrief was given to the S2 whenever a convoy was sent to a new location and on a routine basis for established convoy routes. The information gathered from the debrief would be used to alert personnel to any trouble or dangers encountered or suspected along a new route and any changes along known routes. This information was passed through S2 channels to the brigade S2. Convoy security in Haiti did not present a threat to any member of the battalion. However, there were a few occasions when Haitians in the streets broke contact between convoy vehicles; a major effort then was needed to link the split convoy together again.

The need for major defensive resistance within the BSA did not materialize, but the need to be prepared never diminished and the requirement for security and safety was never downplayed. Within 72 hours of our deployment, the foundation of BSA defense was in place. Improvements continued until the day the battalion redeployed. If the need had arisen, we were confident that the BSA could have defended itself. **ALOG**

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Palletized Loading System:

He marveled at the clarity of the thermal image in front of him. On the screen of the driver vision enhancer, he could see the white-hot silhouette of the waiting heavy, expanded mobility, tactical trucks (HEMTT's) against the dark backdrop of the treeline. The squad of palletized loading system (PLS) trucks he was leading pulled off the road and into a small clearing near the waiting trucks. He pressed a key on the keyboard in front of him. The coordinates on the dimly lit movement tracking system monitor confirmed that his trucks had arrived at the right spot. Almost at once the eight drivers of the PLS trucks pulled their control levers. Fifteen minutes later the squad pulled back onto the road, leaving 6,000 gallons of water, 24,000 gallons of fuel, 30 tons of ammunition, 3 days' supply of food, 2 M2 Bradley fighting vehicle power packs, and 2 generators behind them. The press of another key told the company dispatcher 75 kilometers away that the cargo was delivered, and the squad was on the way home.

This story reads like a logistician's dream: a transportation platform that can deliver large amounts of cargo to off-road locations in foul weather or pitch darkness and provide real-time information to unit operations centers by satellite. The exciting thing is that *this is no dream.* The enhanced palletized loading system (PLS) is making this scenario a reality.

The PLS consists of a truck (M1074 or M1075), a trailer (M1076), and two demountable cargo beds, or "flatracks" (M1077). A self-contained, hydraulic load-handling system in the body of the truck loads and unloads flatracks from both the truck and trailer, eliminating the need for any type of materials-handling equipment at either origin or destination. Each flatrack can carry 16.5 tons of cargo, for a total capacity of 33 tons per system. Those specifications, combined with a 500-horsepower engine, 10-wheel drive, and central tire inflation system, give the PLS an unmatched combination of capacity and mobility.

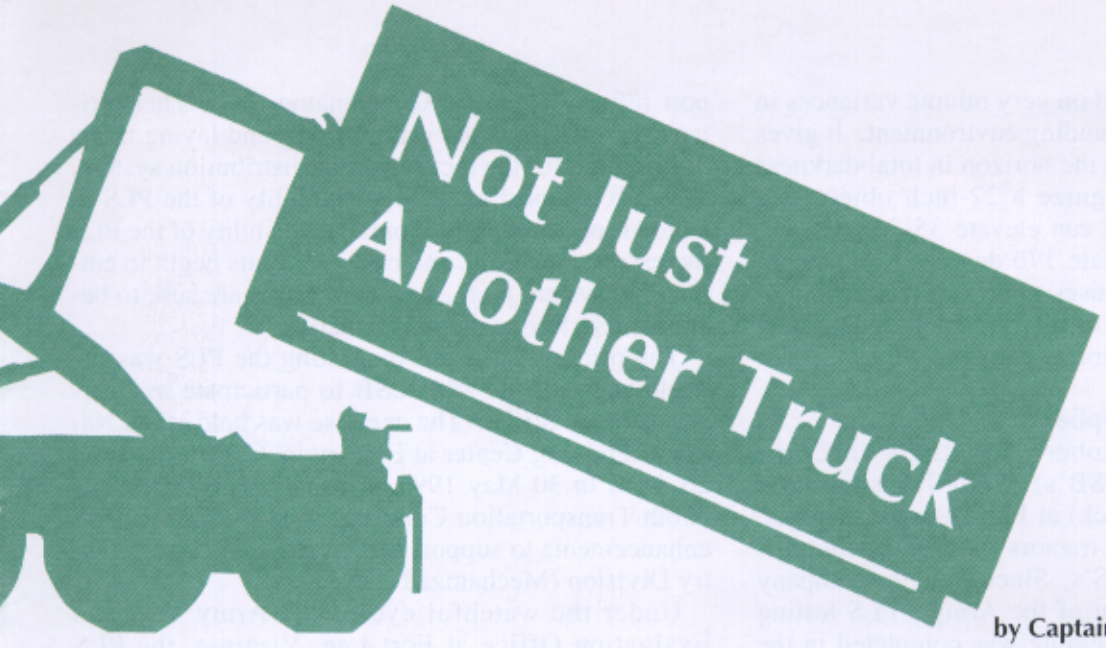
Concept and Enhancements

The PLS concept was born from a need to improve the efficiency of the Army's maneuver-oriented ammunition distribution system. Its self-loading capability and hefty payload capacity made the PLS an excellent platform for transporting ammunition anywhere on the battlefield.

The basic PLS flatrack has an 89- by 227-inch steel cargo deck with tiedown points, cargo straps, and International Standards Organization (ISO) twist locks to secure a standard 20-foot container. Logistics planners quickly realized that, with several modifications of the basic flatrack, the role of the PLS could be expanded to include transport of general and containerized cargo. As a result, engineers developed various enhancements to the basic flatrack to allow the PLS to accommodate specific types of cargo (for example, liquid, containerized, or breakbulk).

The simplest enhancement is a set of sideboards that can be mounted on the basic flatrack. Constructed of plywood and steel, the sideboard kit transforms the standard flatrack into a 24-inch-tall box to support all types of breakbulk cargo except ammunition.

The half-height container is another enhancement that increases the potential uses of the PLS. As its name suggests, the half-height container is a 20-foot shipping container that is only 4 feet tall, instead of the usual 8 feet, and has no roof. It comes equipped with a tarpaulin and a set of bows to cover cargo.



by Captain Peter M. Haas

The half-height container is used to transport combat-configured loads of ammunition, especially tube artillery. Because it is ISO compatible, the half-height container conceivably could be loaded in a continental United States depot, shipped overseas, and transported to a corps ammunition supply point by PLS without additional handling.

The M1 enhanced flatrack offers the same cargo space as the basic M1077 with the added benefit of ISO compatibility. Basically a 20-foot container without sides or roof, this flatrack's two end walls can fold down to facilitate loading. It can hold many types of cargo, including small wheeled or tracked vehicles, and can be stowed aboard ship with other flatracks or containers. As with the half-height container, cargo on an M1 enhanced flatrack can be moved directly onto a PLS without additional load-handling equipment.

The Marine Corps' "six cons" system adapts the PLS to transport liquid cargo. Six cons is a modular system of 900-gallon tanks for either fuel or water and a 125-gallon-per-minute pump. One PLS flatrack can carry up to three 900-gallon pods and a pump. The six-cons modules are self-contained and stackable. This makes establishing a retail water or fuel point as easy as unloading a single flatrack from its truck.

The container lift kit (CLK) is useful for uploading individual containers. The CLK is a device attached to the loading arm of the PLS that locks onto one end of a container at the top and bottom corners. The truck then pulls the container on board as if it were a basic flatrack. The CLK allows the PLS to transport a 20-foot container weighing up to 16.5 tons without using a flatrack at all, substantially reducing the need for container-handling equipment on the battlefield. This enhancement promises to be very useful in the medical community, where it can be used to load deployable medical shelters aboard the PLS for transport anywhere on the battlefield.

Two enhancements that will have a major impact on operational and tactical transportation are the movement tracking system (MTS) and the driver vision enhancer (DVE). While neither system will be unique to the PLS, both will help logisticians exploit other strengths.

The MTS is an adaptation of a system used by several large commercial trucking companies. The system combines the Army's global positioning system with a commercial satellite communications system. MTS enables units to monitor transportation assets using vehicle-mounted hardware and commercial satellites. The system features an onboard terminal in the cab of a truck as well as a terminal positioned in a command and control center, such as a company or battalion operations center. Two-way communication by satellite gives unprecedented control over critical transportation assets. It provides automatic position updates to facilitate asset tracking. En route dispatching, rerouting, and diverting of shipments all become routine actions with this system. The MTS also enables operators to ask questions and report relevant incidents to commanders in real time. Movement controllers linked into the system will also have intransit visibility of cargo. Combined with a platform as versatile as the PLS, MTS could revolutionize transportation on the battlefield.

The DVE is a thermal imaging system capable of operating in degraded visibility conditions such as fog, dust, smoke, and darkness. In conditions of reduced visibility, the DVE allows a vehicle to maintain speeds up to 60 percent of those attained during normal daylight operations. Unlike traditional night-vision devices that magnify ambient light, the DVE

generates a picture based on very minute variances in temperature in the surrounding environment. It gives the operator visibility to the horizon in total darkness and the ability to recognize a 22-inch object at a distance of 360 feet. It can elevate 35 degrees, depress 5 degrees, and rotate 170 degrees in either direction. The DVE promises to be an invaluable tool for combat service support forces, which traditionally lack sufficient night-vision equipment.

Testing a Combat Multiplier

From August to October 1994, the 87th Corps Support Battalion's (CSB's) 396th Transportation Company (Medium Truck) at Fort Stewart, Georgia, replaced its aging M915 tractors and M872 semitrailers with a fleet of 48 PLS's. Since then, the company has been at the forefront of the Army's PLS testing program. As soon as fielding was completed in the fall of 1994, testing of both the basic PLS (truck, trailer, and flatracks) and enhancements began. These enhancements included sideboard kits, half-height containers, M1 enhanced flatracks, MTS's, DVE systems, "six cons," and CLK's.

The 396th Transportation Company's first real-world mission involving PLS was Operation Uphold Democracy, which came almost immediately after fielding. During preparations for operations in Haiti, the 396th Transportation Company employed the PLS in a line-haul role for the first time. The unit deployed 17 PLS's carrying various loads and almost all classes of supply to Homestead Air Force Base in Florida to support an intermediate staging base for the planned invasion.

Later, two PLS vehicles deployed to Cuba to support refugee camps at Guantanamo Bay. Their primary mission in Cuba was carrying and laying miles of hose line for the tactical water distribution system. This job demonstrated the adaptability of the PLS to a broad spectrum of missions. As visibility of the PLS increases in the field, and customer units begin to employ the system more, such novel uses are sure to become more frequent and productive.

The primary occasion for testing the PLS was the deployment of the 87th CSB to participate in Exercise Mojave Strike. The exercise was held at the National Training Center at Fort Irwin, California, from 26 April to 30 May 1995. During this rotation, the 396th Transportation Company used the PLS and its enhancements to support the 1st Brigade, 24th Infantry Division (Mechanized).

Under the watchful eye of the Army Test and Evaluation Office at Fort Lee, Virginia, the PLS trucks performed a total of 86 missions in which they moved over 670 tons of cargo. Sixty-seven of the missions involved using at least one enhancement. Transport of class IV, V, and IX supplies (construction materials, ammunition, and repair parts) accounted for 51 of the 86 missions. The PLS was also key in helping evacuate unserviceable equipment from unit maintenance collection points. Missions moving class I, II, and III(P) supplies (subsistence items, clothing and individual equipment, and packaged petroleum, oils, and lubricants) rounded out the remainder of the PLS taskings.

Results

Overall, the PLS proved itself a highly capable and reliable transportation platform. In their evaluation of

The PLS consists of a truck, a trailer, and two demountable cargo beds, or "flatracks."

A self-contained, hydraulic load-handling system in the body of the truck loads and unloads the flatracks from both the truck and trailer.

the 24th Infantry Division's rotation, observer-controllers at the NTC commented that never before had such a robust countermobility plan as the 1st Brigade's actually been implemented. The observers were most impressed with the ability of the PLS to deliver numerous loads of combat-configured class IV directly to the planned obstacle sites.

In addition, the performance of several of the PLS enhancements was especially noteworthy. The sideboard kit increased the utility of the basic M1077 flatrack and was used in a variety of missions. The one drawback of this enhancement is that two soldiers are required to install the sideboards.

The half-height container proved a versatile tool in a variety of missions, from moving general cargo to hauling trash. It was also useful in transporting hazardous materials. While not designed for or tested in this role, its enclosed cargo space does offer some spill protection for leaking hazardous materials containers.

Testing of the MTS at the NTC served to whet the appetites of transporters throughout the 396th Transportation Company and the 87th CSB staff. Its ability to provide two-way communication between the operators and their command centers, regardless of distance or terrain obstacles, promises to be a windfall for logisticians across the entire spectrum of combat service support operations. This system could double or triple the utility of motor transport assets, because trucks could be dispatched from one mission to another without having to return to their units.

The DVE added yet another dimension to the PLS's versatility. During testing at the NTC, one PLS truck became known among the company's ranks as the "Midnight Express" because it operated almost exclusively at night using the DVE. During the course of the exercise, "Midnight Express" logged 1,145 miles in total darkness.

Although the MTS has been returned to the contractor for testing elsewhere, the 396th Transportation Company soldiers at Fort Stewart have continued to train with the basic PLS, six prototype DVE's, and other enhancements. In September 1995, the company loaded 26 PLS trucks aboard ship for deployment to Egypt, where they tested the mettle of this promising new transporter in Exercise Bright Star '95.

The palletized loading system represents the greatest innovation in military land transportation in decades. Its unequaled mobility, payload capacity, and versatility, together with its enhancements, make it a combat multiplier on the combat service support battlefield. The utility of the PLS is limited only by the dimensions of its cargo and the imagination of the combat logistician who employs it. It has been fielded across the Army and is ready to assume its role as the combat transporter for Force XXI. It is definitely not just another truck. ALOG

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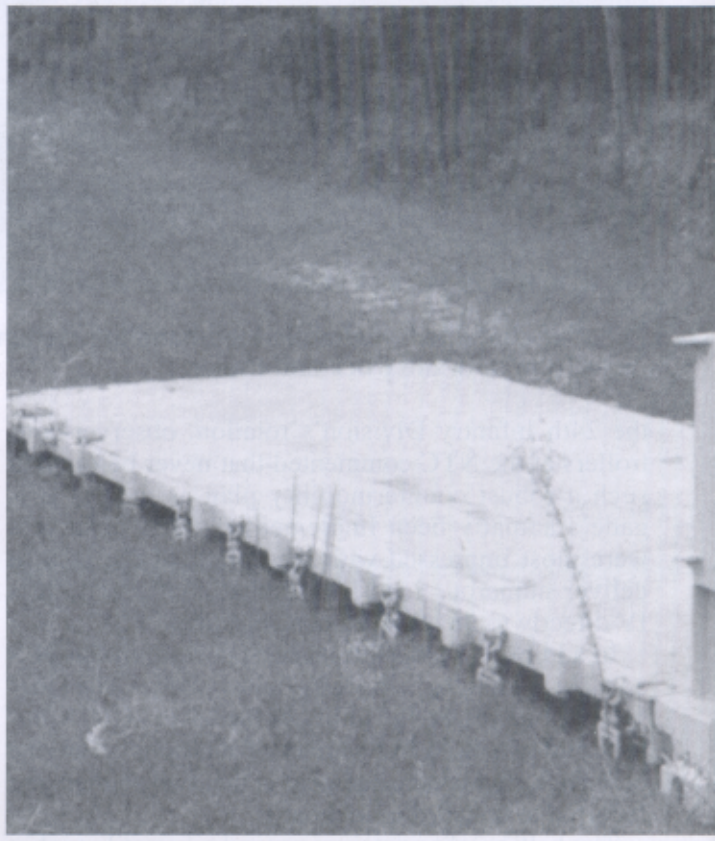
Accountabili

There is currently no universal method of accounting for palletized loading system flatracks. The author presents several options for consideration by commanders.



In the 1970's, Great Britain and other North Atlantic Treaty Organization allies recognized the need for a transportation system that could move ammunition from the rear area to forward units in a theater of operations using trucks equipped with removable cargo beds. Twenty years later, this requirement has been met by the palletized loading system (PLS).

The system consists of a 10-wheel-drive truck, a 6-wheel trailer, and a demountable cargo bed, or "flatrack." The flatrack is 8 feet wide and 20 feet long (see photo above) and has a capacity of 16.5 tons. The truck's hydraulic lift loads or unloads the flatrack. A PLS truck and trailer with one operator can discharge 33 tons of cargo on 2 flatracks in a matter of minutes. The operator can then pick up two empty flatracks and depart to pick up another load.

ty for PLS Flatracks

by Captain Kathryn A. Katz

The PLS demountable cargo bed, or "flat-rack," (at left) has a capacity of 16.5 tons and is compatible with the British, French, and German palletized loading systems.

Accounting Procedures

The flatracks, which cost approximately $6,900 each, have been issued to various transportation, ordnance, and field artillery units. Each unit has a different mission and may manage their flatracks differently. Department of the Army policy, as stated in Army Regulation 710-2, Organization Supply Operations, does not require PLS flatrack property book accounting by serial number. However, when deemed necessary, a commander may impose such stringent accountability measures. Commands whose missions dictate a free flow of flatracks with cargo through the supply system should manage their flatracks the same way they manage semitrailers in a trailer transfer system (by total number on hand rather than by individual serial number).

The PLS was developed to support the ammunition delivery system called the maneuver-oriented ammunition distribution system (MOADS). PLS's that are assigned to self-propelled field artillery units are equipped with a materials-handling crane to move individual pallets of ammunition.

The greatest strength of the PLS is that it increases force mobility and productivity. It can move flatracks quickly anywhere on the battlefield and is as tactically mobile as the units it supports. It reduces cargo transloading requirements and the numbers of support personnel, drivers, materials-handling equipment, and trailers and trucks needed to haul cargo. In addition, U.S. Army flatracks are compatible with the British, French, and German palletized loading systems.

In a single theater of operations, as many as 25,500 flatracks could be needed to support requirements for ammunition distribution for the MOADS. In wartime, a theater's ammunition normally is shipped from the continental United States to seaports, airports, or logistics-over-the-shore operations in a theater. Once in a theater, the ammunition (containerized or breakbulk) is shipped to the theater storage area, corps storage area, or ammunition storage or transfer point and on to the using unit. Ammunition may be configured on flatracks, or the flatracks may be stacked and shipped to the theater to initiate the MOADS.

Two major factors currently affect how we account for flatracks in a theater. The first is how the PLS is used. Originally, the system was developed to haul ammunition. However, because of its ability to cross all types of terrain in any kind of weather, the PLS is being used to haul other types of cargo, such as spare parts, bridging equipment, and medical supplies.

The other factor affecting accountability is the Army's shortage of flatracks. Based on requirements stated in current doctrine for ammunition distribution, there are not enough flatracks available to support a

theater of operations successfully in a war. Currently, flatracks are considered theater and strategic intermodel assets.

With the problem of accountability for the flatracks comes the problem of responsibility for maintaining flatrack roller guides and tiedown straps. Since the system is fairly new, each individual user is now responsible for flatrack maintenance. This issue must be addressed in the future by the organization assigned ultimate responsibility for the flatracks.

Accountability Candidates

There are several organizations that logically could account for flatracks in a theater of operations. They are: the Army Materiel Command (AMC) in Alexandria, Virginia; the Military Traffic Management Command (MTMC) in Falls Church, Virginia; the theater army movement control agency (TAMCA); and the using modification table of organization and equipment (MTOE) units. Each organization has an interest in the flow of ammunition and supplies throughout a theater of operations but does not have total asset visibility of all units using the flatracks.

AMC is the single item manager for ammunition. Their MOADS-standard Army ammunition system (MOADS–SAAS) could be modified to account for flatracks.

MTMC is the accountable agency for common-user assets such as military-owned, demountable containers (MILVAN's). Common-user flatracks could be located at or near ammunition supplies, and MTMC could manage them according to draft revisions of AR's 56-4, Management of Army Intermodal Container Systems, and 55-1, CONEX/MILVAN Equipment Control, Utilization and Reporting.

The TAMCA is in charge of common-user assets in a theater of operations. Its freight division allocates transport capability and use of controlled highways through a computer system called the Department of the Army movements management system–redesign (DAMMS-R). If the distribution flatracks were dedicated to intertheater MOADS, TAMCA could manage the flatracks just as they now manage MILVAN's, container express (CONEX), and commercial containers.

Another option for flatrack accountability is unit-level supply accounting. Each unit could be responsible for flatracks as a table of organization and equipment item. According to AR 710-2, Organization Supply Operations, unit property book officers have the option of accounting for any item by serial number if they feel it is necessary. They could elect to account for flatracks by serial number on DA Form 581, Request for Issue and Turn-in of Ammunition, which would facilitate return of excess flatracks to the ammunition system. This would expedite movement of flatracks through MOADS, but accountability would require a closely monitored one-for-one exchange system. The individual flatrack sometimes would not be visible in the system; only the total number of flatracks in a particular area would be accounted for.

Recommendations

How we account for flatracks should depend on how we use the PLS. If flatracks are used to haul ammunition, the flatrack manager should be AMC, since that command has total asset visibility over ammunition.

However, if the PLS is used for other types of cargo, flatracks should be considered a common-user item and controlled in the same way that we now account for other common-user items. Overall supervision for common-user flatracks logically should be TAMCA. Individual units would be responsible for the quantity of flatracks assigned and issue them on a one-for-one exchange basis, but TAMCA would track the flatrack through the system during delivery and return. The using MTOE units would be responsible for maintaining all flatracks under their control.

Future Uses of PLS

Other uses of PLS under consideration are movement of medical shelters; barrier material; aviation maintenance tools, sets, kits, and outfits—also unit mobility and resupply; bulk water and fuel distribution; and recovery and evacuation of all classes of supply. Just as commercial industry has modified containers to accept various kinds of cargo, the PLS flatrack can be modified for command and control, logistics, and other mission-support functions. Future system designs will reduce the number of vehicles required, decrease maintenance requirements, and increase mobility. Achieving synergy among mobility, sustainment, and mission enhancement is the key to fulfilling the potential of the palletized loading system. **ALOG**

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Determining Truck Unit Capability

by Joe A. Fortner and Michael F. Byrd

For the first time, the Army has a set of analytically determined task vehicle availability rates that can be used to calculate truck unit capabilities.

Trucks are the backbone of Army logistics. No aspect of Army operations or logistics sustainment can function for very long without truck support. This truth is reflected in the Transportation Corps' unofficial motto, "Nothing happens until something moves."

The Army's truck capability is organized in typical military unit configuration: companies, platoons, and detachments. Each truck unit has a doctrinal capability to move military cargo. One of the critical factors determining a truck unit's capability is the task vehicle availability rate (TVAR). Let's examine TVAR and see how it impacts truck unit capability. Although the TVAR applies to all types of truck units, we will focus only on the medium truck companies that transport general cargo and ammunition in the corps and at echelons above corps (EAC).

Definitions

For clarity, let's define a few terms. *Trucks* are the vehicles that a unit uses to perform its cargo-hauling missions. Not included in this definition are the unit's command and control or administrative vehicles. The number of trucks in a unit varies with the type of truck unit. For example, a medium truck company (cargo) has 60 tractor-semitrailer combinations (up to 2 1/2 times as many semitrailers as tractors). The number of tractors is the limiting factor in calculating truck unit capability. A medium truck company (palletized loading system [PLS]) has 48 PLS trucks and 48 PLS trailers.

Load is the average weight a truck carries on a single trip. This is usually expressed in terms of tons, which refers to the standard short ton of 2,000 pounds. Other common measures of load include containers (in numbers) or gallons (of bulk liquid cargo). We will concentrate only on tons of general cargo and ammunition.

Trip refers to a round trip (from origin to destination and return) performed by a single truck. In doctrinal line-haul operations (around the clock), each truck makes one trip per operating shift (12 hours), or two trips per day.

TVAR is the average percentage of task vehicles that reasonably can be expected to be available to accomplish the mission. It accommodates all the factors that can prevent a truck from transporting cargo, such as maintenance deadline or lack of a driver. The TVAR is never interpreted as a performance standard or goal. It is related to, but not the same as, operational readiness and operational availability. If the TVAR for a specific type of truck unit is 80 percent, on some days more than 80 percent of the trucks will be available to carry cargo; on other days, less than 80 percent will be available. But, over a period of time, 80 percent will be the average TVAR for that type of unit.

Using the terms defined above, daily capability of a truck company can be expressed algebraically as:

$$\text{Capability} = \text{Trucks} \times \text{TVAR} \times (\text{Load} \div \text{Truck}) \times (\text{Trips} \div \text{Truck} \div \text{Day})$$

This is the basic algorithm for computing a truck unit's capability. It determines the capability statement in part I of all truck unit tables of organization and equipment (TOE's). The algorithm highlights the TVAR's significance; however, it is one of only four critical factors that determine the capability of truck units.

Evolution of the TVAR

The TVAR concept has an interesting history dating back to the first military use of motorized vehicles by the Allied Expeditionary Forces in World War I. One of the earliest quantitative references to the

TVAR is in a World War II manual. It states that planners should "assume that 70 percent of the fleet vehicles can be considered operating vehicles." This manual also attributes vehicle nonavailability solely to maintenance-related issues.

The TVAR percentage varied over time until the late 1960's, when it was established at 75 percent "for advanced planning" purposes. This value remained the Transportation Corps' standard until 1992.

In recent years, "downsizing" has become a simple fact of Army life. Resource reductions have led to precise scrutiny of the factors that drive force structure requirements. Because the TVAR is used to determine truck unit capability and truck company requirements in the Army, it also has been scrutinized. In response to repeated challenges to the long-standing, but analytically unsubstantiated, 75 percent TVAR, the commander of the Army Combined Arms Support Command (CASCOM) at Fort Lee, Virginia, directed in May 1992 that the TVAR for all truck companies be increased to 90 percent. This value was not analytically substantiated either. In fact, for over 50 years, the TVAR has been derived from "theater experience." The 90 percent TVAR simply reflected more recent perceptions of "theater experience."

In September 1994, the Army Chief of Transportation, Major General David A. Whaley, requested the Training and Doctrine Command (TRADOC) Analysis Center-Fort Lee (TRAC-Lee) to analytically determine the TVAR. TRAC-Lee used the extended combat sustainability (ECS) model developed by the Army Materiel Systems Analysis Agency (AMSAA) at Aberdeen Proving Ground, Maryland, to analyze the TVAR. ECS is a repair shop simulation model designed to perform relatively quick comparisons of candidate systems over a sustained period of time. It is sufficiently responsive to permit agile analysis and flexible enough to permit sensitivity analyses of the various components of the TVAR.

Type Unit	Average TVAR (Percent)
Medium Truck Company EAC (Cargo)	87.5
Medium Truck Company Corps (Cargo)	84.7
Medium Truck Company Corps (PLS)	90.5

An average TVAR for each type of unit is obtained by using the ECS model.

Type Unit	TVAR	
	ALO 1	ALO
Medium Truck Company EAC (Cargo)	87.5	82.8
Medium Truck Company Corps (Cargo)	84.7	80.1
Medium Truck Company Corps (PLS)	90.5	86.8

Model Parameters

As configured for this study, the ECS model has a number of limitations and internal functions that impact TVAR analysis. Two of its limitations are particularly important: the model does not allow drivers to repair trucks in the field (it focuses on repair facilities), and it does not accommodate combat loss or damage to trucks. Also, it always generates optimistic TVAR results. The model uses the following parameters—

MMBOMF: mean miles between operational mission failures. This measures the frequency (in miles) at which a particular truck experiences any incident or malfunction that prevents it from performing a designated mission-essential function.

Drivers: the number of drivers in the unit who are available to drive task trucks. The number is prescribed in AR 570-2, Manpower Requirements Criteria (MARC), and, for most truck companies, equals 2 drivers per truck. Each driver works one 12-hour shift in each 24-hour day. When a truck goes into organizational maintenance, its drivers go with it; but if a truck goes to direct support or higher maintenance, its drivers are available to drive other trucks in the unit.

Mechanics: the number of mechanics available (at organizational and direct support levels) to maintain task vehicles. These data come from the Army MARC maintenance data base.

Part delay time: the average waiting time, in hours, if a required part is not immediately available.

Mission profile: doctrinal line-haul operations. In line haul, each truck makes one round trip per operating shift. The one-way distance is determined by mission, enemy, terrain, troops, and time available (METT-T) but, for planning purposes, is usually considered 90 miles. Each truck operates for 10 hours of each 12-hour shift for a total of 20 hours of rolling time per day. Drivers perform operator maintenance and services, and the trucks are loaded and unloaded during the 4 hours of nonrolling time per day.

(Percent)	Difference
ALO 3	(ALO 1 - ALO 3)
75.3	12.2
72.2	12.5
79.3	11.2

Type Unit	Daily Capability (Tons)		
	ALO 1	ALO 2	ALO 3
Medium Truck Company EAC (Cargo)	737	698	634
Medium Truck Company Corps (Cargo)	487	460	415
Medium Truck Company Corps (PLS)	1,911	1,833	1,675

The impact of reduced strength levels on TVAR's is shown above left. The chart at right shows unit daily line-haul capability at different strength levels. Data are for short tons of noncontainerized general cargo except for the PLS company, where data are for short tons of noncontainerized, combat-configured loads of ammunition. Doctrinally, PLS companies carry only ammunition.

The TVAR analysis subjected the transportation medium truck companies to multiple ECS model runs and averaged the results for each type of unit. The chart at the bottom of page 22 summarizes the results.

Interpreting the Results

Using the average TVAR shown (remember that it is optimistic) as a starting point, the results were subjected to various sensitivity analyses. Each analysis focused on one of the major factors used to determine the TVAR. Three of those factors are sensitivity of the TVAR to changes in MMBOMF; mission distance and duration; and driver availability.

MMBOMF changes. In the most sensitive case, increasing MMBOMF by 30 percent increased the TVAR by 2.9 percent; decreasing MMBOMF by 20 percent reduced the TVAR by 3.4 percent.

Mission distance and duration. Doctrinal line-haul operations assume a distance to which a truck can make two round trips per day. For planning purposes, this is 90 miles one way, or 180 miles per truck per operating shift, or 360 miles per truck per day. The TVAR is moderately sensitive to increasing mission distance. In the most sensitive case, increasing the distance by 30 percent, to 234 miles per truck per 10-hour shift, decreased the TVAR by 4.6 percent. If mission duration is increased from 10 hours to 12 hours per shift (operating each truck 24 hours a day for a total of 432 miles), the most sensitive case drops the TVAR by about 8 percent.

Driver availability. You will recall that the MARC for drivers is 2 per truck. This means that, in line-haul operations, one driver drives for 12 hours in a day and the other drives for the other 12 hours; therefore, nonavailability of a single driver results in the loss of one shift for one truck. Like most companies in the Army, truck company TOE's are designed with three authorized levels of organization (ALO's). ALO 1 is fully capable; ALO 2 reduces the company's strength and capability to approximately 90 percent of full capability; and ALO 3 reduces strength and capability to approximately 80 percent of full capability. The chart at left (above) shows the impact of reduced strength levels on the TVAR. The chart at right shows how reduced strength levels affect each type of unit's daily line-haul capability (in tons of breakbulk general cargo).

Recalling the opening paragraph of this article—that trucks are the backbone of Army logistics—the data in the chart at right become even more significant. Most of the Army's active component truck companies and a sizable number of its reserve component truck units are structured at ALO 2 or ALO 3. Considering the TVAR's sensitivity to ALO, the impact of reduced strength levels on the Army's ability to sustain military operations becomes apparent.

This analysis confirms that the TVAR is a significant determinant of truck unit capability. TRAC-Lee's study provided the Army a set of analytically determined, TOE-specific TVAR's that can be used with confidence to calculate TOE capability statements. They are now being incorporated into transportation doctrine and into TOE's for truck units. Ultimately, TVAR's will be used to develop new allocation rules for Total Army Analysis, the Army's process for determining the force of the future. **ALOG**

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Michael F. Byrd is an operations research analyst at the TRADOC Analysis Center-Fort Lee, Virginia. He has a bachelor's degree from Mississippi State University and over 17 years of Army military and civilian experience.

Users' Guide to ITV

by Larry D. Johnson

Intransit visibility will allow the Department of Defense to maximize the power of the information age.

There is a lot of discussion today concerning "intransit visibility (ITV)." Since many people do not understand that high-tech jargon, I will attempt to explain, at a user's level, the ITV concept, terminology, and technology.

What Is ITV?

ITV is the capability to trace, from origin (depot or vendor) to destination, the identity, status, and location of Department of Defense (DOD) unit and nonunit cargo during peace or war. The system is also used to track passengers, medical patients, and personal property. However, in this article I will focus only on nonunit sustainment cargo.

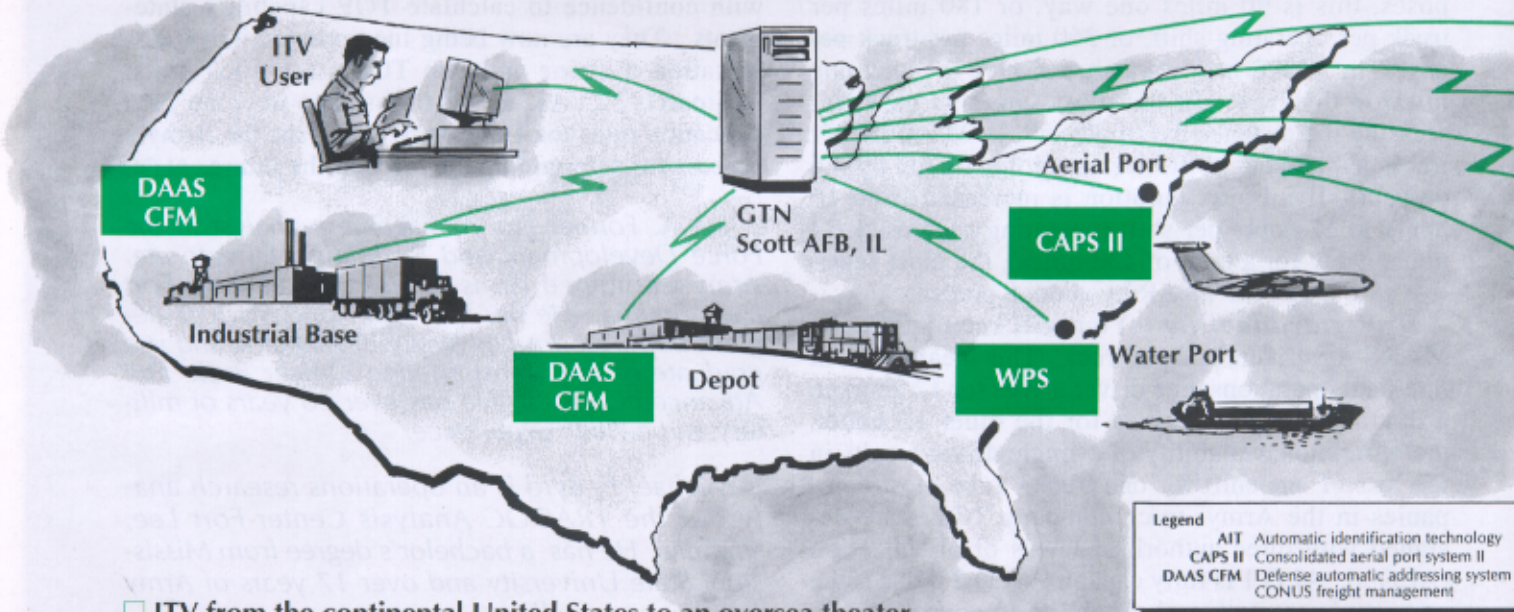
In the past, the military services were able to build large supply stockpiles and push them forward in anticipation of where they might be needed; asset visibility was not a significant consideration or planning factor. Now, with reductions in both forces and materiel inventories, asset visibility has become essential. As DOD moves from an industrial base to a power-projection force, it is maximizing the power of the information age with concepts like ITV.

The ITV capability is under executive direction of the U.S. Transportation Command (USTRANSCOM) at Scott Air Force Base, Illinois. Their global transportation network (GTN) provides a prototype ITV capability to access intransit data on shipments within the Defense transportation system. An approved user can access the GTN with a personal computer (PC), modem, and phone line. The GTN can be accessed in remote areas through the international maritime satellite system. The GTN will provide access to ITV data during peace and war. Its mission will be to bring together timely commercial or military data bases and tracking systems into an integrated network. It will be a one-stop "ITV information highway."

Three important features comprise the foundation of ITV: source data input, automatic identification technology, and electronic data interchange.

Source Data Input

Accurate source data is key to the success of ITV input and requires standard formatting of supply and transportation data for each shipment. In other



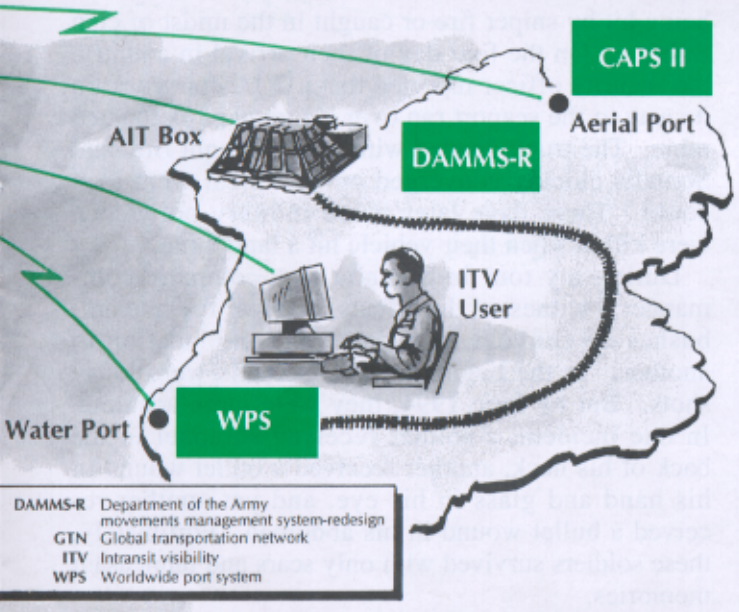
ITV from the continental United States to an oversea theater.

words, we need to know what is "in the box" (in-box visibility). If we know which box, multipack, or pallet contains an item and that data are transmitted back to GTN on a real-time basis, we will have complete visibility of that item.

Automatic Identification Technology

A commercial technology that appears promising for recording a large volume of source data is the optical laser card system. This system doesn't require a large investment in hardware; it consists of an optical writer-reader and a PC and uses laser cards that are the size of a credit card. The laser cards are reusable and cost only $3 to $4 each. Each laser card has memory for up to 1,200 pages of data—enough to record the necessary line-item data on hundreds of requisitions within a box, multipack, or pallet. Ultimately, this information is used to prepare an automated manifest. The laser card is attached to the box's exterior and must be removed to be read. It is updated at transfer points and expedites receipt processing. The laser cards are durable enough to withstand the effects of shock, surface damage, vibration, water, and extreme temperatures.

After source data have been recorded, the user needs to know where the shipment is physically located within the pipeline. This is performed by automatic identification technology (AIT), which provides automatic, real-time visibility updates on a shipment. The radio frequency (RF) tag system appears to be the most versatile AIT. This system uses RF tags, interrogators, a burn station, and a host PC. Information about an item that is being tracked is passed along by radio wave transmissions. The RF tag, which is attached to the exterior of an air pallet, large container, or major piece of equipment, has a memory capacity of up to 128,000 characters or 300 pages of data. The initial supply and transportation source data are transferred to the RF tag. The tag also has a read or write capability so it can be updated at transfer points. It is weatherproof and can be used in environments with excessive dust, moisture, or poor visibility.



The interrogators can be either fixed or handheld and are positioned at the point of origin, key transfer points, and the final destination. They transmit power bursts that "awaken" the tag and allow it to be read from as far away as 300 feet in any direction. The interrogators can read all data on the RF tag but, for ITV, normally read only the tag identification number. The interrogators then pass the data back to the host PC, which handles all data management at its location. Various AIT media will eventually update GTN through organic automated identification system (AIS) assimilation and transmission, and numerous users can access GTN to extract ITV data.

There are currently 11 AIS's that record supply and transportation data on millions of nonunit cargo shipments every year from over a thousand transportation offices. Among those that will be used to input source and intransit data to the GTN: The Defense automatic addressing system will input cargo source supply requisition data; the continental United States (CONUS) freight management system will input cargo source transportation data; the AIS for cargo at the sea ports of embarkation (POE's) and ports of debarkation (POD's) will be the worldwide port system; the AIS for cargo at the air POE's and POD's will be the consolidated aerial port system II. A joint theater AIS still must be developed. In the interim, cargo movement updates will be provided by the Department of the Army movements management system-redesign.

Electronic Data Interchange (EDI)

EDI allows all commercial or military data bases and tracking systems to transmit data into the GTN. Standardized EDI will be required for all computer systems wishing to "talk" with the GTN.

ITV should be fully implemented by the year 2000. It is a complex undertaking, but one that is critical for a power-projection Army. **ALOG**

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Convoy Lane Training

by Captain John P. Lawson

The company commander in a reserve component unit faces time and resource constraints in training his soldiers. Lane training offers a good way of training to standard for such tasks as convoy defense.

Training for war is the Army's most important peacetime task. The majority of our time, energy, and resources must be dedicated to ensuring that our soldiers are well trained for the battlefield and, increasingly, for peacekeeping operations. One of the most important tasks associated with peacekeeping operations is the tactical road march. The key to successful training for this and many other tasks in reserve component units is "lane training," and the challenge for unit leaders is finding the resources and time to accomplish that training.

Lane training, as described in FM 25-101, Battle Focused Training, is a technique for training company-, platoon-, and section-level units in selected soldier, leader, and collective tasks using a specific situational training exercise. If you are a company commander, it provides you with a means of assessing your unit's performance on a series of tasks under established conditions.

A lane training program gives you a detailed, all-inclusive, single-source document that you can use to train your unit in a cost-effective manner. The greatest benefit of this program is that it allows you to concentrate on actual training rather than on time-consuming planning for training.

Convoys Can Be Dangerous

A peacekeeping mission usually requires the deploying force to establish a secure environment in which humanitarian relief can be delivered safely and efficiently. The deploying force often will have to convoy into a designated area to secure it. With the growing importance of peacekeeping operations, sooner or later all of us will need to conduct a tactical road march.

In an article published in *Army Times* in 1994, a unit executive officer described a perfect example of what can result if the standard battle drills, techniques, and procedures for convoy defense are not followed. Fortunately, this episode was only a training exercise, and no real injuries were inflicted. The executive officer characterized what happened to his unit as a small mistake that snowballed into a disaster: he found himself learning the hard way how much death and destruction a handful of lightly armed militiamen can inflict on a convoy. His losses were 17 killed in action and 53 wounded—and all because the lead elements and the rest of the convoy failed to follow the proper convoy defensive procedures.

In an article in *Soldiers* magazine, the commander of a corps support group in Somalia described several incidents that also demonstrate how important it is to follow the proper convoy defensive procedures. He observed that soldiers were constantly in danger of being hit by sniper fire or caught in the midst of clan fighting. On the first day of their arrival in country, the security officer reported that a 2 1/2-ton truck on its way to the seaport ran over a command-detonated mine. The truck, loaded with cargo, caught fire, and Somalis quickly converged on it to steal what they could. Three days later, three military policemen were killed when their vehicle hit a land mine.

During my tour in Somalia as a company commander, I witnessed the effects of sniper fire and ambushes on convoys traveling from one location to another. In the beginning, the Somalis were lousy shots. But by June 1994, they were more accurate. In one incident, a soldier received shrapnel in the back of his neck, another received a bullet wound in his hand and glass in his eye, and yet another received a bullet wound in his abdomen. Fortunately, these soldiers survived with only scars and unpleasant memories.

Convoy defensive procedures are an important aspect of nearly every mission a unit performs when it is required to move from one location to another. In Somalia, tactical proficiency was more than a standard; it was a way of life, and reacting to situations was second nature.

There is no such thing as a simple convoy. Your ability as a commander to communicate, make sound decisions independently, and react to developments is vital to your unit's success. Training and executing demonstrated battle drills are critical. The ability of your soldiers to react as they have been trained could mean the difference between life and death for them, and for you.

Lane Training

Reserve component leaders and soldiers must understand the importance of convoy defensive procedures. Here is a methodology that will assist you and your chain of command in defending your convoy.

This process is not limited to convoy defense; it can be applied to any combat arms, combat support, or combat service support lane training exercise. If the primary objective is training a tank platoon to conduct a hasty attack as part of a company operation, the methodology can be applied step by step by changing the collective tasks from *prepare to move, conduct a convoy, react to road blocked or road not blocked, react to mines and booby traps,* and *defend against indirect fire and sniper fire* to *prepare for tactical operations, conduct hasty attack,* and *perform consolidation and reorganization activities.* The process provides guidance in preparing for, conducting, and evaluating lane training and should be considered when developing a lane training exercise.

Tasks and Battle Drills for Convoy Lane Training

1. Prepare to move.
   - **Reconnaissance party conducts a route reconnaissance.**
   - **Platoon prepares vehicles and equipment.**
   - **March commander organizes convoy.**
   - **March commander and platoon and section leaders conduct premovement inspections.**
   - **March commander briefs convoy personnel.**
   - **Platoon prepares to cross starting point.**
2. Conduct a convoy.
   - **Platoon crosses starting point.**
   - **March commander provides convoy information.**
   - **Platoon maintains march discipline.**
   - **Platoon conducts scheduled halts.**
   - **Platoon conducts unscheduled halts.**
   - **Trail party recovers disabled vehicles.**
   - **Company conducts a night convoy.**
   - **Platoon conducts convoy through an urban area.**
   - **Platoon crosses release point.**
3. Convoy reacts to road blocked or road not blocked.
   - **Battle Drill 1**
     ARTEP 55-719-30-Drill
4. Convoy reacts to mines and booby traps.
   - **Battle Drill 2**
     ARTEP 55-719-30-Drill
5. Convoy defends against indirect and sniper fire.
   - **Battle Drill 4**
     ARTEP 55-719-30-Drill

Preparation for lane training should begin at the end of your unit's annual training, when you develop the training calendar for the next year. The yearly training calendar is the one document that locks in key events leading to lane training execution. Your thoughts about your unit's abilities, strengths, and weaknesses should guide the plan for the next year's lane training. Determine the goals for your unit for the next fiscal year and the tasks for its upcoming lane training. Once the goals are determined, you can use the backward planning process to lay out a road to success.

I have identified eight steps that you can use in planning, preparing, executing, and evaluating a good convoy lane.

Step One

Determine the type of lanes to be conducted and identify the collective training tasks for the lanes. The tasks to be accomplished should be based on your unit's current wartime mission, its mission-essential task list (METL), an evaluation of the training assessment model, and published training guidance. Consider the missions to be conducted in the lane and the collective tasks and battle drills to be evaluated. I am using convoy lane training as an example because it is not limited to specific military occupational specialties and can be applied to all units. A sample of tasks for convoy lane training is found in the chart at left.

Step Two

Ideally, lane training is supported, resourced, and evaluated by an outside organization. Readiness groups, field exercise brigades, and regional training brigades are available to reserve component units to provide assistance in validating unit leaders; they also can resource all or part of the requirements for observer-controllers and an opposing force (OPFOR). Because lane training is so resource intensive, reserve component units must consider seeking the assistance

of these types of organizations before trying to support lane training themselves.

Sometimes, a reserve component unit may want to conduct self-supported lane training because the resources for lane training during inactive duty training (IDT) are not available. In such cases, the unit should train at the squad and section levels and assign roles at those levels. The platoon leaders and platoon sergeants can serve as the observer-controllers for each exercise. The company readiness noncommissioned officer (NCO), operations sergeant-truckmaster, and first sergeant can serve as the resource managers, and the company commander can act as senior observer-controller and evaluator to validate the lanes.

Resource managers must consider several items in their planning. Ammunition; pyrotechnics; training areas; the OPFOR; training aids, devices, simulators, and simulations (TADSS); the multiple integrated laser engagement system (MILES); vehicles; communications; subsistence; medics; evaluators—all are critical to the success of the lane and must be resourced and incorporated into the plan.

Step Three

You need to develop a sound observer-controller program to train your unit's leaders in their roles and responsibilities. Consider all travel requirements for the validation of observer-controllers and plan for them in your budget; this must occur at least 9 months before you execute lane training. The observer-controller program can be broken down into four phases.

Phase I. The observer-controllers must review the selected tasks from the appropriate mission training plans (MTP's) and other related training publications and review FM 25-101. This can be done on IDT weekends and must be locked into the training schedule to avoid training distracters. This training and self-study program can and should be integrated into officer and NCO professional development programs.

Phase II. Working with your key unit leaders, you must develop scenarios using the MTP, battle drills, and other related training publications. Keep in mind the availability of training areas when developing these scenarios. The MTP's are excellent sources of information and provide descriptive, performance-oriented training guides to help leaders train their units. They provide examples of situational and field training exercises, predeveloped scenarios, time lines, and resources needed to conduct the training events.

Phase III. Discuss the observer-controllers' roles and responsibilities using sand tables to identify the actions convoy personnel will undertake against ambushes (blocked and not blocked) and sniper fire and when traveling on main supply routes (MSR's) suspected to have mines or boobytraps. The use of sand tables will enhance and reinforce the review of doctrinal guidance and will provide the critical link in the observer-controllers' learning process by providing them with performance-oriented instruction. Sand tables also are an effective way to standardize tactics, techniques, and procedures as well as troop-leading procedures.

The OPFOR is a vital training enhancer and must be used. Discuss how and when the OPFOR will be employed to make the lane realistic. Keep in mind that your unit must be able to conduct the task to standard before you raise the intensity of the lane.

Phase IV. The observer-controllers need to practice everything they have learned by performing the task. This will help pull everything together and identify areas that need more emphasis.

While the observer-controllers are doing their collective training, your squad leaders should conduct training on individual skills and squad battle drills that support the selected lane.

Step Four

Develop a lane training handbook for each observer-controller that contains the following information—

- Your initial evaluation of selected METL tasks before the unit executes lane training.
- The training schedule and sequence of events list.
- Observer-controller responsibilities.
- A lane sketch.
- The operation order.
- The list of tasks to be conducted and the appropriate training and evaluation outlines.
- A safety annex.
- A risk assessment.
- A consolidated task list of proficiency (including evaluation of company, platoon, squad, and section proficiency after an iteration of lane training), to be turned in at the completion of the iteration with the observer-controllers' detailed training evaluation.
- An after-action review outline.

Give copies of the training and evaluation outlines to each squad leader performing the lane.

Step Five

Squad rehearsals and training. The platoon leaders and platoon sergeants are the observer-controllers for their squads. This will give each platoon leader an accurate picture of his platoon's ability to perform the lane. It also provides him with the opportunity to become the trainer for tasks that were not conducted to standard.

Tips for Successful Lane Training

1. Coordinate partnership with readiness group for assistance.
2. Pick lanes and identify tasks to be evaluated early.
3. Develop and implement a leader and observer-controller training program.
4. Provide copies of all information needed (operations order, lane scenario, training and evaluation outlines) to the appropriate user level.
5. Train up during inactive duty training (IDT) weekends.
6. Validate leaders and observer-controllers on tasks to be performed.
7. Train and retrain soldiers before they conduct lanes for record.
8. Set soldiers up for success and increase the level of difficulty as appropriate.
9. Select only a few tasks and train them to standard, rather than train several tasks not to standard.
10. Perform oral and written after-action reviews.
11. Ensure leaders are safety conscious. Train safe, train smart, and train to the Army standard.

The platoon leaders need to teach and retrain their soldiers until they accomplish the task to standard. Do not dismiss substandard task execution by having an after-action review and then moving on. The task must be done and redone until it meets the standard. Explain the task using sand tables and then help the soldiers conduct rehearsals. When a squad has perfected the techniques, have it execute the task to standard. If you enforce performance-oriented training, each squad will improve its performance.

Train as if you are at war. What we do not practice regularly in peacetime, we will not do well in war. Soldiers should wear the Kevlar® helmet, load-carrying equipment, and armored vest during training. They need to get in the habit of wearing the prescribed uniform, which saved many lives in Somalia.

Rehearse battle drills extensively. These drills are collective tasks selected to achieve success on the battlefield and are initiated on a moment's notice, such as in response to a terrorist action or by order of the leader. An error on the part of a driver or mechanic, no matter how inconsequential, can jeopardize the lives of an entire convoy. That's why it is vital to dispel any doubts and fears by the soldiers and leaders by conducting battle drills.

Step Six

In the month before conducting your lane, you should retrain and revalidate your observer-controllers. This will allow the squads and squad leaders to practice their skills before conducting the lane for record.

Step Seven

To ensure an accurate evaluation of the tasks for the lane, rotate the observer-controllers. This will provide you and your platoon leaders with an impartial assessment of each squad.

Step Eight

Leaders should conduct a quality after-action review immediately after each event. Each soldier must understand what was supposed to happen, why it happened or did not happen, and how it can be done better next time. Focus on the training objectives and encourage soldiers to discover important lessons from the training event. You should review Training Circular 25-20, A Leader's Guide to After-Action Reviews, and FM 25-101, chapter 5. The after-action review allows you to be a facilitator and draw out the training strengths and weaknesses of your unit.

Set your company up for success. Start now for next year's lane training. Ensure you have effective resource managers, because they are the key to success in your lane. Commanders have the ability to conduct this type of training.

Lane training gives you the opportunity to consider possible solutions to tough problems. I have found during my service as a platoon leader, company commander, and readiness group advisor that lane training develops basic tactical doctrine as well as branch-specific doctrine.

Remember, when doctrine is lacking in detailed guidance and resources are few, a detailed and well-thought-out plan, coupled with imagination and initiative, will be the key to success for a convoy lane.

Training for war and military operations other than war is our most important peacetime task. If we train to standard, no soldier will lose his life because he was not properly trained. The lessons of our experiences are clear. Your ability to react on a moment's notice must be second nature. We must train in peacetime as if our lives depend on it. If we start now, we will be prepared for tomorrow's deployment. **ALOG**

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DPAS—DOD's Property Accountability System

by Bradley E. Carson

The Department of Defense (DOD) has identified real and personal property accountability and financial reporting of property as a "high risk area" of its operations. Reviews of the problem with DOD logistics and financial managers determined that the best means of resolving the risk was by integrating physical and financial accounting data through a single, DOD-wide property accountability system. That system, the Defense property accountability system, or DPAS, is now in place, and logisticians should know how it works and what it means to them.

The DPAS was written and is maintained by the Industrial Logistics Systems Center (ILSC), which is located at Letterkenny Army Depot in Chambersburg, Pennsylvania. The ILSC was the prime systems developer and maintainer of the Army Materiel Command's (AMC's) installation equipment management system (IEMS), which was the AMC standard property accountability system. The DPAS is an outgrowth of IEMS.

The DPAS is a Government-designed and -owned system. The program manager is the acquisition and logistics systems integration directorate in the Office of the Under Secretary of Defense (Comptroller). The Defense Finance and Accounting Service Financial Systems Activity, Columbus, Ohio (DFAS-FSACO), provides program management and implementation support to the DPAS.

Technical Aspects of the System

The DPAS is an interactive, real-time system currently running on an HP I70 computer at the Defense Mega Center at Wright-Patterson Air Force Base, Dayton, Ohio. DPAS runs on a UNIX operating system using the SUPRA relational data base.

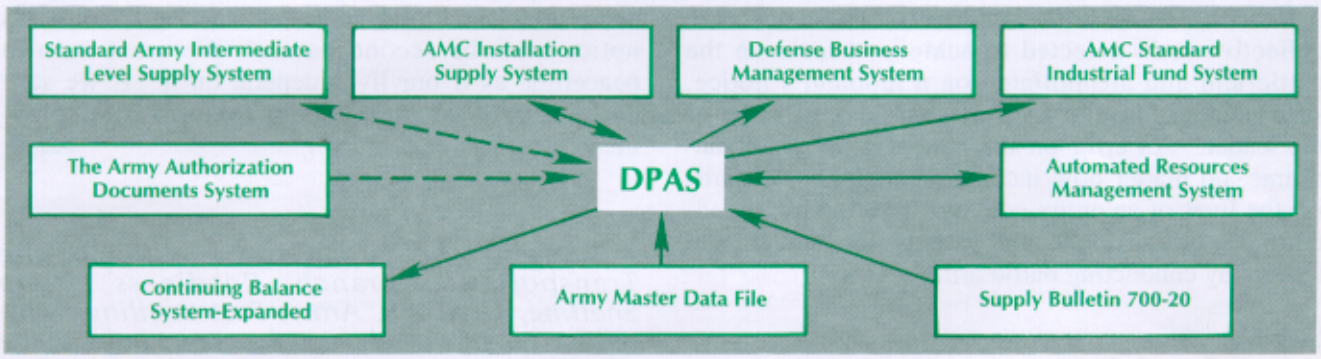
Data inquiries are done using the query tool "XEASY." The user can create customized reports by using the query report writer tool. The mechanized on-line report distribution system is used to send reports from the Defense Mega Center to any printer or computer at the user's installation for local printing. The DPAS has received a "C2" security designation, which is a level just below "classified." Each property book officer has the ability to grant or deny access to components of the system.

System Capabilities

The DPAS is made up of seven modules: catalog, authorization, document register, hand receipt holder, property book, financial, and maintenance and utilization. Systems that have an automated interface with DPAS are listed in the chart below; this list is sure to expand as new customers are introduced to the DPAS.

Catalog. This module is capable of tracking assets by national stock number, manufacture code or part number, and management control number. Detailed manufacture data, such as the vendor's name, can be maintained for each catalog number. The automation resources management system data are maintained for each piece of automatic data processing equipment. An automated interface exists with the Army master data file (AMDF) as well as with Supply Bulletin 700-20 supply data.

Authorization. The authorization module is op-



The DPAS has automated interfaces with these Army and DOD systems.

tional within the DPAS. The authorization programs allow the user to track required and authorized quantities of assets by authorization control number. This authorization information is matched to the property book data to ensure that the user does not exceed authorized quantities. An automated interface to The Army Authorization Documents System (TAADS) was fielded in April.

Document register. The document register module also is optional within the DPAS. This module allows the user to create requisition, turn-in, and status documents and miscellaneous supply transactions such as cash collection actions and reports of survey. The DPAS currently has an automated interface with the AMC installation supply system (AMCISS). The DPAS and the AMCISS pass transactions back and forth to ensure that supply actions stay current. As of April, the DPAS interfaces with the standard Army intermediate level supply system (SAILS).

Hand-receipt holder. The hand-receipt holder module provides individual hand-receipt holders with the capability to enter and change information for any asset that has been assigned to them. With release of version 3.0 in April, the hand-receipt holder will have the ability to sub-hand receipt assets down to a sub-hand receipt holder. This change will give hand-receipt holders more flexibility in managing their assets without requesting assistance from their property book office.

Property Book. The property book module is used to process the bulk of a user's day-to-day business, such as routine receipts, turn-ins, price adjustments, mass changes of information, and other miscellaneous actions. This module has a key interface with portable data collection devices (bar-code readers). The system will allow the user to conduct inventories with bar-code readers, upload that information, and reconcile his property records with speed and accuracy.

Financial. The financial module allows the user to enter finance and accounting information. The information entered in this module, along with related property book data, feeds into various finance and accounting systems. The DPAS currently interfaces with the Defense business management system and the AMC standard industrial fund system. Transactions are automatically passed each day from the DPAS to the other financial systems. Several reports are available within the DPAS to allow local Defense accounting offices or operating locations to reconcile property data to the general ledger.

Maintenance and utilization. The maintenance and utilization module is optional within the DPAS. It allows a user to track labor hours and the cost of maintaining equipment. It also tracks equipment utilization information such as "miles driven" and "hours of use." Warranty and service contract information are also maintained. The module generates reports that notify the user of service contract expiration dates so he can schedule maintenance before the end date of the contract. The module maintains the last 5 quarters of cost and utilization data, as well as total life cycle information.

DPAS Training and Implementation

The ILSC, along with personnel from the DFAS-FSACO, provides training and implementation support. The DPAS training session lasts from 3 to 5 days, depending on which modules the user will need in his operation. Each installation is provided onsite assistance as well as followup visits and telephonic support.

Current and Future Enhancements

Each user can participate in the system enhancement process by submitting system change requests. These requests are evaluated and their cost estimated, and then they are included in a priority schedule for future releases. The DPAS is not a static system. It changes as user needs change and as both financial and logistics policies change within DOD. The DPAS system designers are currently planning for automated interfaces with other supply and financial systems to meet the needs of new customers as they are brought onto the system.

The DPAS provides state-of-the-art, on-line, real-time data processing. It will run on any UNIX platform from a personal computer to a mainframe. The relational data base structure of the DPAS provides instant access to information through on-line queries and the ability to customize reports unique to any mission or operation. The DPAS complies with all DOD property regulations and fully supports the Defense business operations fund's directives. Systems support is provided 24 hours a day by a "help desk" at the Defense Mega Center in Dayton and by direct contact with the ILSC design and support staff.

The DPAS is now the DOD migratory system for real and personal property accountability. It is an invaluable tool for the logistician in managing and accounting for his activity's property. **ALOG**

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Systems and Skills: What Do You Do

by Captain Stephen E. Reynolds, USMC

Training focused on logistics systems rather than logistics skills could p and logistics commanders who lack a solid foundation in combat servic and their execution in combat.

The relentless march of technology has never been lost on the U.S. military and often has been the cause for dramatic revision and occasional wholesale scrapping of military doctrine. Students of military history enthusiastically debate which innovation has had the most profound effect on warfare. Was it the breech-loading rifle, which allowed a soldier to reload his weapon from the prone position? Or was it the machinegun, which eliminated the need for single-shot accuracy by providing a blistering volume of fire? It may even have been the helicopter, which required the development of new tactics for vertical assault because of its ability to shower the landing zone from above with combat-ready troops.

Someday in the distant future, however, historians may review the annals of conflict and conclude that the most resounding change to the manner in which war is waged was caused by that unimposing device sitting on your desk: the computer. Twenty years of hardware and software development have brought exponential growth in computer technology, and the military has done well to capitalize on that growth. In general, a computer does things faster, more efficiently, and with greater accuracy than does a human with a pencil, a slide rule, and a pocket protector. A computer doesn't sleep, doesn't eat, doesn't complain, and, for the most part, never forgets. Volumes of information can be stored in minimal space. A computer can nestle in the nose cone of a missile, guiding it with precision to a target as small as the third-story window of a specific building, and it can store the lift data of an entire corps in its memory banks.

The military has embraced, invested in, and, perhaps unwittingly, sold its soul to the computer. Blinded by amazement over the computer's miraculous capabilities, we often overlook a lingering question: Can we ever fight again without it?

Technological Trends

Awestruck logisticians may have been led down a tenuous path by the misapplication of developments and the misinterpretation of their benefits. As a result, I see three technological trends in today's combat service support (CSS) community, each one a natural, harmless thing in itself, but potentially destructive when combined.

First, we have replaced "manual logistics" with technology. Gone are the days of number crunching and bean counting; systems do this for us now, and they do it faster and better. Computers have automated the loading of ships and planes, the requisitioning of supplies and equipment, and the tracking of transportation assets across the globe. Information systems have even begun to quicken the materiel acquisition process. Logisticians can save valuable time and money by using accurate estimates based on sound data that have been integrated and manipulated by a computer. In the combat environment, a well-founded estimate virtually ensures the right support at the right time at the right place.

The second technological trend in today's CSS community is the tendency of staff officers and commanders to make operational decisions based on computer-generated information. Of all the technological innovations, the availability of real-time information has had the most dramatic effect on the decisionmaking process. Commanders and staff officers now are able to quantify many battlefield unknowns and incorporate these figures into immediate decisions and future plans. In his July-August 1995 *Army Logistician* article, "Pipeline Vision for Force XXI," Major General Thomas W. Robison, then commander of the Army Combined Arms Support Command, wrote that, "Digitization will provide each logistics echelon with situational awareness of the maneuver commander's location and logistics re-

When the Computer Crashes?

roduce a generation of staff officers
e support principles

quirements. The logistics community will be able to forecast where logistics supply distribution points and CSS facilities need to be in 24 to 48 hours." Current, accessible, and accurate information at the fingertips of planners will enhance the precision and economy of CSS.

The third technological trend in the CSS community is a natural follow-on to its predecessors: The training environment focuses increasingly on the system operator's proficiency at his keyboard tasks. With every leap in software capabilities comes the need for complementary skills in personnel. A system without a qualified operator is useless. The military's training emphasis must be placed first on teaching operators basic computer literacy, competency in operation of a particular system, and skill at higher levels of data manipulation. This training must occur within the limits of shrinking budgets and diminishing school seats. Then the military's training focus should shift to teaching the logistician how to make an information system work for him and to take action based on the output of that system.

Computers, however, might not be the panacea we've built them up to be. They are sensitive, vulnerable machines, easily susceptible to incidental and battlefield damage. They require a substantial and constant power distribution system and a communications network capable of transmitting data from the fighting field, across the communications zone, to the continental United States. The whims of nature can disable an entire system with heat, cold, dust, or moisture. An advanced enemy may have the ability to embed viruses in a network, causing infections at every node.

Perhaps the most frustrating of all vulnerabilities, however, is the computer's reliance on human input. A computer system accepts bad information as readily as accurate information. Heavy reliance on computer technology in planning and execution can be exacerbated by a heightened training focus on logistics systems rather than logistics skills. This inevitably leads to a costly result: a vulnerable support network managed by a generation of staff officers and logistics commanders who lack a solid foundation in CSS principles and their execution in combat. Outside the sterile environment of battle labs and simulation exercises, undertrained logisticians may find themselves at the mercy of their computer screens. The heated cauldron of warfare is no place to scramble about in ignorance when those screens go blank.

The Price of Technology

I believe that the CSS community's headlong rush to integrate computer technology into all potential aspects of support at the expense of developing skilled logisticians may leave us open to two dangerous possibilities.

First, we are threatened with *timidity*. Gone will be the courage to act boldly on an instinct that comes from a leader's close contact with the tempo of battle.

The computer will select a course of action and tell us where to place our support and when to take action. If most of our faith is placed in the system and not in the skill, we will defer to the computer.

Consider, for example, the combat service support control system (CSSCS) discussed by Lieutenant Colonel Michael P. Kelley in his article, "CSSCS Proven in Support Operations," in the July-August 1995 issue of *Army Logistician.* With 17 CSSCS computers operating throughout the brigade, division support command, and division staff, this system is designed to process and disseminate critical logistics information from the brigade combat team all the way to echelons above corps. The CSSCS can maintain asset visibility, produce automated reports, manage transportation assets, and improve situational awareness. When fully functional, CSSCS will digitize the battlefield dramatically, and could "revolutionize" staff procedures and planning cycles.

But what would happen if those previously discussed vulnerabilities rendered the system ineffective, or a wily enemy capitalized on a breach in security? In the event that CSSCS goes down, even for a moment, logistics leaders must be capable of instantaneously shifting to an alternate means of maintaining seamless support to the combat commanders. Failure to do so would violate continuity, a vital logistics principle. The closer one gets to the fight, the more imperative continuous support becomes. If the logistician pins his hopes on a system, and that system crashes at the crucial hour, his only fallback will be his skills and those of his team members. Repeatedly taught, well-honed logistics skills will compensate for the loss of a system's capabilities. Fundamental, proven skills can combine with a deliberate understanding of the battle tempo to ensure continuity and uninterrupted support.

If leaders fail to teach, sharpen, and test such skills in peace, the skills will be tragically lacking in war. Creative logistics strategies and the strength of character to employ them will become things of the past. Tenacity, innovation, and the courage to take risks will fall victim to a blinking cursor. If logistics leaders do not develop strong, capable, and open minds in their subordinates, they will have discarded the finest weapon in our wartime arsenal.

The second potential hazard of imprudent integration of technology is a *dwindling sense of leadership and accountability.* If there is already a tendency to let the computer fight the battle and make critical decisions, then the computer has been given a disproportionate role in the hierarchy of command. If judgments are made based on information analyzed and manipulated by a system, it will be human nature also to blame that system for poor decisions or plans gone awry. A combat logistician who allows his tactical life to be dictated by a video display terminal has abdicated his responsibility as a leader. Instead of attempting the difficult or suggesting the unpopular, he can point to the computer and state with conviction that he acted in good faith and that the *system* let him and the unfortunate foot soldiers down.

The burdens of leadership and command must not be delegated to a system or a network. These responsibilities must be borne squarely on the shoulders of the leader. Accepting them involves the logistician in what is at stake, personalizes his recommendations to the commander, and makes him ultimately responsible for his words and deeds. There can be no compromise in this; warfare is far too deadly an endeavor for anything less than absolute leadership.

Judicious Integration of Technology

At this point, it may seem that my "technophobia" would dictate that the only acceptable weapon system for our arsenal is a smooth stone in a rawhide sling, but that is is not true. The benefits of technological innovations are undeniable. These innovations should be integrated wisely into military doctrine. But this integration must occur with respect for the skills it enhances, never at the price of replacing them. We teach hand-to-hand fighting in case the rifle jams; similarly, we must teach logistics skills in case the computer crashes. To neglect either of these fundamentals is to leave our people unprepared for combat, and that is a mortal injustice.

Technology must be incorporated with patience and wisdom. Its impact on the battlefield must be dissected and examined and its deficiencies exposed and overcome in peacetime. Personnel must be thoroughly versed in "the old way" of doing business before they can appreciate and benefit from a new system. Leaders must be developed in the most demanding and arduous of environments. Their hearts and minds must be molded and tempered for the brutal stresses combat will inflict upon them. Technology, no matter how amazing its capabilities, will never replace leadership, never outdate the rigid posture of command, and never replace the man who can think for himself. **ALOG**

Captain Stephen E. Reynolds, United States Marine Corps, is the operations officer of the combat service support element of a special-purpose Marine air-ground task force, which is experimenting with new concepts, tactics, and equipment. Captain Reynolds is a graduate of the Army Logistics Management College's Combined Logistics Officer Advanced Course.

Using CO_2 for Maintenance Cleaning

by Major Darrel A. Williamson

An environmentally safe system uses carbonated beverage-grade carbon dioxide instead of hazardous chemicals for cleaning.

In the last two decades, the Department of Defense and industry have undertaken many initiatives to reduce or eliminate the use of materials that harm the environment. The Resource Conservation and Recovery Act, passed by Congress in 1976, lists many materials used in production, maintenance, and other industrial operations that become hazardous waste when spent, discarded, abandoned, or spilled. Among these are solvents such as trichloroethane, ketone, and acetone, which are used by the Army for cleaning and degreasing mechanical and electrical equipment. Disposal of these materials is governed by regulations for handling, storing, and transporting hazardous waste. Some maintenance operations, such as cleaning large quantities of equipment before returning it to pre-positioned storage after use, generate large amounts of hazardous waste. In such cases, enforcing the mandated disposal requirements represents a significant cost for the installation conducting maintenance.

Research is underway to find new cleaning methods and systems that eliminate the use of solvents and do not pollute the environment. One of the new technologies being tested for the replacement of hazardous solvents is the use of carbon dioxide (CO_2) pellets as a cleaning medium.

A Safe, Effective Alternative

Under contract to the Air Force Space and Missile Systems Center, the Lockheed Martin Astronautics Company in Denver, Colorado, has developed a CO_2 cleaning process that, when used with a robotics system, improves the cleaning of the 10-foot-diameter payload fairings on Titan IV missiles. (A fairing is a structure that reduces air resistance on the missile's payload.) This process greatly reduces cleaning time and eliminates the hazardous waste normally resulting from chlorinated solvents. Tests conducted on a 12- by 86-foot Titan IV payload fairing validated the capabilities of the system to meet cleanliness requirements without causing formation of excessive condensation or damage to the fairing during the cleaning process.

A portable cleaning system (PCS), useful for cleaning smaller items for which the larger robotics system would not be feasible, was developed and tested by Alpheus Cleaning Technologies Corporation of Rancho Cucamonga, California. The PCS cleans, degreases, and removes paint from smaller assemblies that require more flexibility and precision than a robotics system can provide.

Process

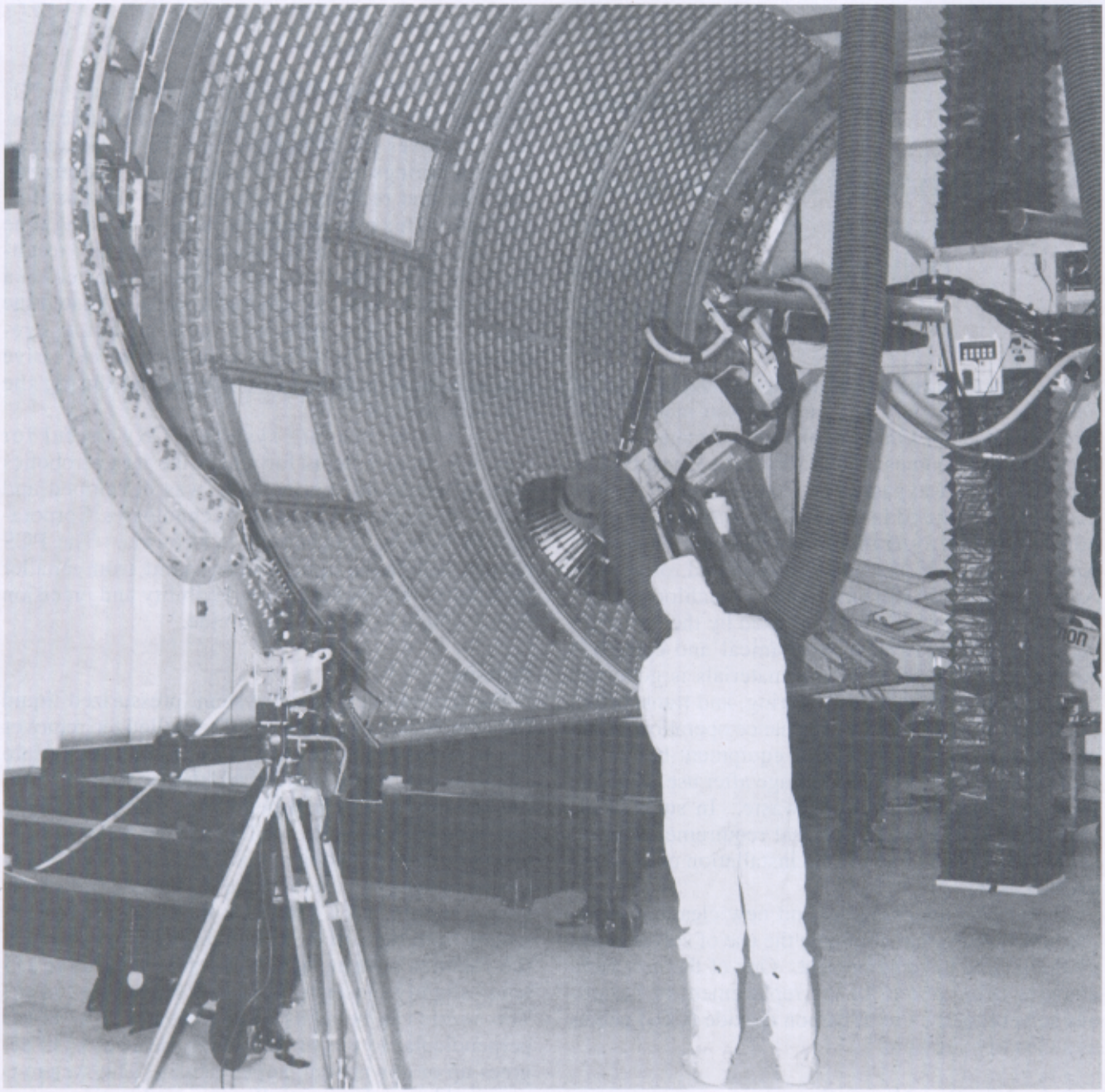
For the robotics-driven system, pressurized liquid CO_2 feeds into a pelletizer. The pelletizer removes the pressure, which results in the liquid turning into "CO_2 snow." The pelletizer then compacts and presses the "snow" into pellets 1/8 inch in diameter and 1/4 inch long. The pellets are fed into the CO_2 cleaning system, and compressed air is introduced to create a blast pressure of 70 to 75 pounds per square inch. The nozzle is held at a distance of about 10 inches from the surface being cleaned. The hood of the robotics system, which contains a vacuum, extends slightly closer to the surface than the nozzle. The nozzle can be adjusted to spray the CO_2 pellets perpendicular to the surface being cleaned or 30 degrees up or down from perpendicular. The system is operated by a robot controller at a workstation.

A CO_2 system rack collocated in the control room area monitors the flow rate and the blast pressure of

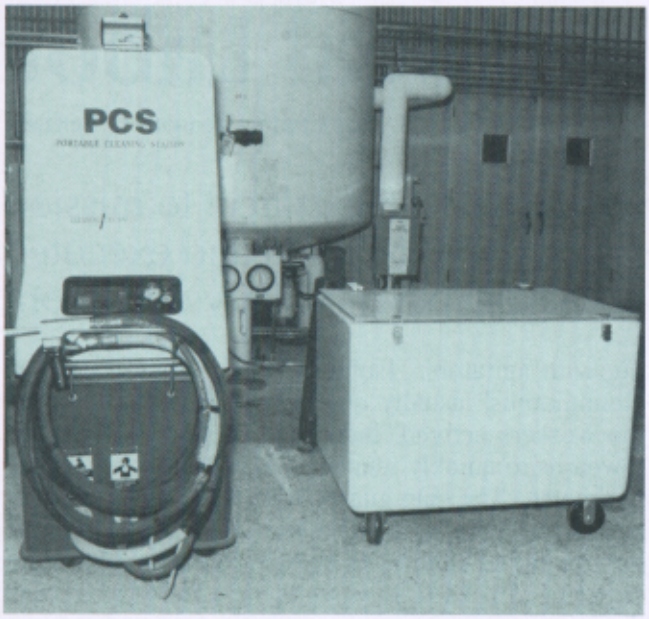
the pellets. The pelletizer controls the liquid CO_2 feed pressure, which, in turn, determines the quantity of pellets being produced, the CO_2 pellet feed pressure, and the blast pressure.

The pressurized frozen CO_2 pellets are sprayed against the surface of the article to be cleaned. The pellets vaporize on impact, removing any dirt, oil, or grease in the area. The CO_2 returns to a gaseous state and is vented to the atmosphere. The contaminants removed are collected by the vacuum system in the hood. This system is ideal for an assembly-line type of operation where repetition is necessary and a higher level of cleanliness is required.

The PCS uses the same principle as the robotics system, but relies on manual operation of the nozzle. The CO_2 pellets are collected from the pelletizer and manually fed into an internal storage hopper, where they are supplied to the nozzle by a feed pressure. The blast pressure from the nozzle can be adjusted up to 125 pounds per square inch. The contaminants



Cleaning Titan missile payload fairings with the CO_2 system saves approximately 4,900 man-hours per fairing when compared to the previous cotton-swab cleaning method.



The portable cleaning system is suitable for cleaning smaller items that require more flexibility and precision than the larger robotics system can provide.

removed are confined to the immediate cleaning enclosure.

Test Results

Several tests were conducted with both the PCS and the robotics cleaning system to determine their capability to meet cleanliness standards. The CO_2 systems achieved cleanliness levels for the removal of contaminants equal to or better than the levels achieved by hand-cleaning with solvents. Panels contaminated with a mixture of WD-40 and Boe-Lube, amounting to more than 200 milligrams per square foot, were cleaned to a level of less than .2 milligrams per square foot. The robotics system was used to clean Titan IV payload fairing trisections with various pressure settings, nozzle angles, ambient room temperatures, and levels of humidity. Contamination levels before each test generally exceeded 200 milligrams per square foot. Measurements taken after the third, fourth, and sixth passes showed contamination levels reduced to approximately 1.6 milligrams per square foot, 1.09 milligrams per square foot, and .53 milligrams per square foot, respectively.

Tests to determine the impact of the CO_2 pellets on various nonmetallic materials, such as harness insulation, seals, and tapes that may be on an article being cleaned, were also conducted. Results showed that direct spraying of the CO_2 pellets caused little or no damage to the softer materials.

To test its versatility, the system was used to clean an engine block, remove rust from tools, prepare surfaces for painting, and even remove the meat from chicken bones! The demonstrations showed not only how efficient the system is for many different cleaning requirements but also how quickly cleaning can be accomplished without the need for hazardous chemicals.

The CO_2 system has been installed at the John F. Kennedy Space Center in Florida for cleaning the Titan payload fairings after shipment from the manufacturer and at Vandenberg Air Force Base in California for cleaning the fairings in preparation for launch. Cleaning the fairings with the CO_2 system saves approximately 4,900 man-hours per fairing when compared to the previous cotton-swab cleaning method.

The CO_2 cleaning system works as well or better than solvents for removing contaminants. The amount of effort required to remove paint varies according to the type of paint used. When used to remove oil and grease, the CO_2 cleaning system generates significantly less waste than conventional cleaning methods.

The CO_2 cleaning system's greatest advantage is that it uses pellets made of carbonated beverage-grade carbon dioxide for cleaning instead of hazardous chemicals. Only the contaminants from the surface remain as residue instead of a mixture of residue and water from steam cleaning. The quantity of waste generated is smaller and requires less storage space.

The robotics system is less manpower intensive than conventional cleaning methods and is well suited for production-line uses such as depot operations. The PCS is suitable for use on a smaller scale by direct-support or general-support maintenance units. The CO_2 system or similar technology can help prevent pollution on military installations and is safer to human health than conventional methods of cleaning.

Major Darrel A. Williamson (USAR) is an individual mobilization augmentee assigned to the Army Materiel Systems Analysis Activity, Aberdeen Proving Ground, Maryland. He is employed by Lockheed Martin as a test engineer. Major Williamson has a bachelor's degree in space science and a master's degree in systems management from the Florida Institute of Technology, Melbourne, Florida. He is a graduate of the Army Logistics Management College's Logistics Executive Development and Materiel Acquisition Management Courses and the Army Command and General Staff College. *The author would like to thank Scott Compton, a test engineer with Lockheed Martin, for his assistance with this article.*

Hiring Local Labor

by Captain Leonard E. Verhaeg

The services provided by local civilians are often critical to mission accomplishment, so hiring must be as carefully planned and executed as any other military operation.

As the S4 for the 210th Forward Support Battalion, 10th Mountain Division (Light Infantry), Fort Drum, New York, while it was deployed to Cap-Haitien, Haiti, I was in charge of hiring local labor for the battalion. This was a logical extension of my duties as contracting officer and sometimes camp commandant.

Since the battalion provided its own convoy security and a large portion of the perimeter security in Haiti, manpower was scarce. Many of the work details required to maintain health and welfare at the camp were time- and labor-intensive and could not have been completed without the help of local civilians.

For the benefit of others who may be assigned a similar task during a future deployment, I will highlight several issues that I feel are important when contracting local labor.

Security

The presence of foreign nationals in a military encampment presents many security and logistics problems. To ensure the security of both the camp and the workers, the Haitians worked in groups and only in designated areas. Each group worked under the constant observation of a guard.

Because forged passes were common, we followed our division support command's lead and issued each worker a highly visible reflective belt. Together, the passes and belts ensured that access to the work areas was granted only to authorized workers.

An unforeseen security challenge was the problem of crowds around our gates. Haitians seeking employment congregated outside our camp and almost always rushed the wire gates when vehicles passed through. The groups were usually small and easily controlled, but this was not always the case. On several occasions, the crowds became upset that more people weren't hired and attempted to rush the gates in large numbers.

Either the S4 noncommissioned officer (NCO) in charge or I was present at least 30 minutes before hiring to support the area guard force. We encouraged the guards to be proactive and forceful in dealing with agitators. Isolating and removing the few "loudmouths" usually quieted the crowd down. As the workers arrived, their green reflective belts allowed us to quickly identify and escort them into the perimeter. The gate guards were equipped with pepper spray which, as a last resort, was a very effective but nonlethal means of crowd control. The mere sight of the cans was usually a very effective deterrent.

Payments and Contracts

There must be a clear understanding of exactly what work is to be done and how compensation is to be made before formalizing contracts with local workers. It is very difficult to attempt to renegotiate a contract after work has begun. The local finance support team, legal officer, and contracting representative can make sure you proceed within the limits of your authority and according to Army regulations.

You must clearly and accurately discuss methods and amounts of payment with workers. It is imperative that all units in the area pay their workers equally for the same jobs. You must also decide which currency will be used, and whether each worker will be paid individually or if a foreman will receive a lump sum to distribute to the work force.

In Haiti, we paid our local workers individually in American dollars. The workers had little faith in Haitian currency, so the influx of American dollars into the local economy was beneficial in many ways, especially public relations. The morale of workers and local vendors seemed to increase after they realized American dollars were being used.

Local Customs And Culture

Perhaps the most important planning consideration is the culture of the people you are hiring. Their customs and culture greatly influence the work they are willing to do and the way they will do it. It may be difficult to learn much about local customs before deployment, so as soon as you arrive, seek out personnel who have contact with the local populace. Chaplains, civil affairs personnel, and special forces members may have insight into local customs and

Many time- and labor-intensive tasks could not have been completed at Cap-Haitien without the help of local civilians.

culture. Also be observant of the work habits of the people outside your immediate area so you will know what to expect of those you hire. Make sure work force guards are sensitive to the culture and customs of the workers and that they treat them with dignity and respect.

Civilian workers must be provided with the same safety gear and tools that would be issued to a soldier to accomplish the same task. Personal hygiene stations and potable water must be readily available.

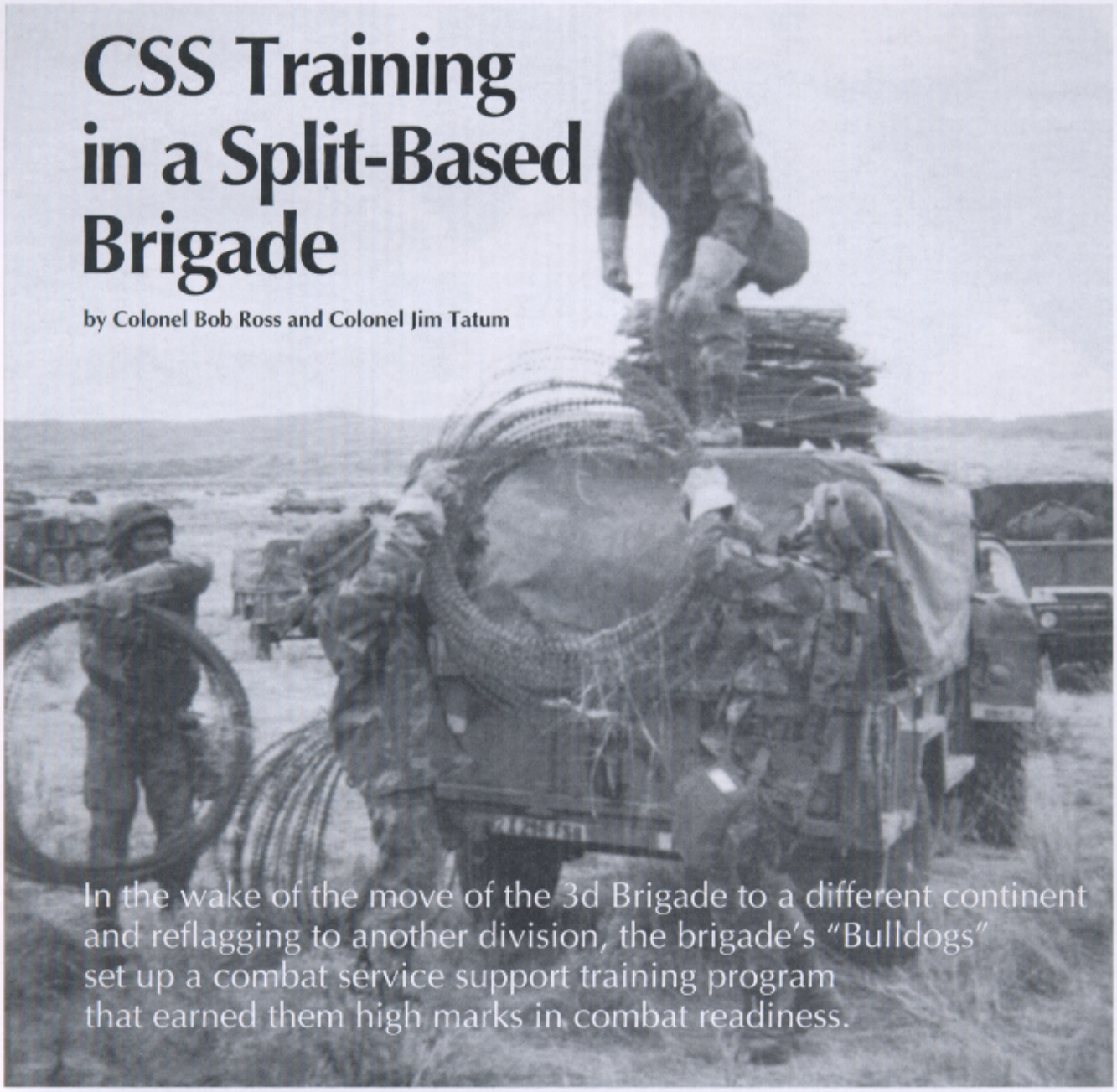
Exhibiting a personal interest in the local workers fosters an attitude of mutual loyalty and confidence that helps ensure that they will not be easily compromised by outside influences. In Haiti, our soldiers showed a genuine concern for the civilian workers in our area and often gave them personal items from their care packages. We were very fortunate that the workers hired by our battalion also possessed high self-esteem and a strong work ethic.

Hiring local labor must be as carefully planned and executed as any other military operation. Personnel responsible for hiring local labor should be identified before deployment so they can seek assistance from support agencies in the deployment area. Close coordination with the battalion S2/S3 and labor control NCO also will help ensure the smooth integration of civilian workers into the unit's manpower pool. As was the case in Haiti, the services provided by local labor are often critical to mission accomplishment.

Captain Leonard E. Verhaeg commands the Headquarters and Headquarters Detachment, 548th Corps Support Battalion, 10th Mountain Division (Light Infantry), Fort Drum, New York. He is a graduate of the State University of New York College at Brockport, the Armor Officer Basic Course, and the Quartermaster Officer Advanced Course. Captain Verhaeg was a tank platoon leader during Operations Desert Shield and Desert Storm.

CSS Training in a Split-Based Brigade

by Colonel Bob Ross and Colonel Jim Tatum



In the wake of the move of the 3d Brigade to a different continent and reflagging to another division, the brigade's "Bulldogs" set up a combat service support training program that earned them high marks in combat readiness.

☐ Members of the 3d Brigade Combat Team remove the triple-strand concertina wire that had secured the brigade support area during their training rotation at the National Training Center at Fort Irwin, California.

It's tough to deploy any brigade from one continent to another and still provide the training needed to maintain its proficiency. But moving the 3d Brigade, 1st Armored Division, and associated slice units from Mannheim, Germany, to Fort Lewis, Washington, presented special challenges.

Army reorganization plans called for restationing the 3d Brigade from its parent division in Bad Kreuznach, Germany, to Fort Lewis and reflagging it as the 3d Brigade of the 2d Infantry Division, headquartered in Ouijonbu, Republic of Korea. However, when the move was completed in September 1994, the 4,000 3d Brigade soldiers (known as the "Bulldogs") were separated from their new parent division. As a result, they had to organize as a split-based brigade combat team (BCT) with mechanized infantry, armor, artillery, engineer, and forward support battalions (FSB's), as well as an air defense artillery battery and a chemical platoon. Since no division was stationed at Fort Lewis, the brigade would

not have the support of a division support command (DISCOM) headquarters, division materiel management center, or main support battalion (MSB).

Concurrent with restationing, brigade commanders and staff identified unresourced requirements and, with assistance from senior headquarters, worked to establish an organization that could meet their echelons-above-brigade support requirements. The result was an augmentation table of distribution and allowances for a brigade materiel management center (MMC) staffed by 33 materiel managers and 88 mechanics, medics, and supply soldiers. A heavy equipment transporter (HET) platoon from the newly activated 233d Truck Company at Fort Bliss, Texas, was also assigned to the 3d BCT.

Training the Bulldogs

After 14 months of preparations in Germany, moving to Fort Lewis, and establishing operations there, it was time to resume training. Soldiers have training in their veins, and the Bulldogs were anxious to get on with theirs.

In the wake of the move and reflagging, the brigade's training began with a full BCT "shake down" and tank, infantry fighting vehicle, and howitzer gunnery at Fort Lewis' 323,00-acre Yakima Training Center. Support soldiers teamed up in the brigade support area (BSA) for 6 weeks of training in Yakima's wind-blown sand. During a 2-day commanders' "sand table," FSB and field train commanders practiced setting up a BSA, establishing an internal traffic flow, and conducting counterreconnaissance and defense. The BCT then sharpened maneuver skills at platoon, company, and battalion levels.

The BCT devoted most of the summer of 1995 to training Reserve Officer Training Corps cadets and reserve component units, fielding new equipment (the palletized loading system, HET, and single-channel ground and airborne radio system), and integrating new soldiers into the Bulldog team. Battalions were task-organized, and a light infantry battalion was attached to the BCT. In August 1995, the BCT returned to Yakima Training Center for sustainment gunnery training.

Back to the Field

Late in 1995, I Corps deployed 9,850 Fort Lewis soldiers 175 miles to the Yakima Training Center for Exercise Cascade Sage. This exercise integrated the 3d BCT and nine other corps brigades for 10 days of force-on-force field training. It was a premier opportunity for all participants to perform "as advertised," and many junior leaders learned tough lessons that simulations cannot teach.

The 593d Corps Support Group (CSG) organized like the DISCOM slice that would support the 3d BCT in combat. The CSG's 80th Ordnance Battalion was split five ways. The 44th Corps Support Battalion performed without the benefit of its headquarters, which was deployed to Haiti. The CSG completed and rehearsed plans, deployed forward elements, opened accounts, and established support bases.

Cascade Sage Lessons Learned

Exercise Cascade Sage produced a number of logistics successes and a few sobering realities. Soldiers never lacked for food, but repair parts didn't flow through the division support area and BSA fast enough. Refueling of ground and air fleets went smoothly, but the number of non-mission capable vehicles rose dramatically. Through observation and thorough after-action reviews, soldiers and leaders alike learned how to improve technical skills and judgment.

The personnel in the BSA grew tactically, too. Their crowning success came during the second week of training, when soldiers in an M1A1 tank that was in the BSA for maintenance used the tank's thermal sights to spot attacking infantry. The soldiers sounded an alarm, and the threat was destroyed. Leaders at every level recorded lessons learned and drilled their teams when they returned to their home stations.

The 296th FSB conducted a major rewrite of its tactical standing operating procedure (SOP) in the 3 weeks following the exercise. At the same time, the FSB conducted rail operations, maintained its transportation fleet, and prepared assigned soldiers for additional training that would follow 1 month later at the National Training Center (NTC) at Fort Irwin, California.

Payoff at the NTC

At Fort Irwin, the 593d CSG again configured itself as a DISCOM slice by incorporating the 3d BCT's MMC and preparing to receive and support the brigade. In two well-executed night moves, the 296th FSB deployed from Fort Irwin's "dust bowl" to the BSA it would occupy throughout the ensuing 10 days in the field. The 1-23 Infantry and 1-33 Armor Battalions, along with 5-20 Infantry (Light) and 1-37 Field Artillery Battalions, took to the field for both live fire and force-on-force training. Leaders applied lessons learned from Exercise Cascade Sage, and it showed.

Detailed maintenance meetings identified equipment problems and the repair parts needed to correct them. As each of four daily logs arrived in the BSA from the DSA, FSB soldiers quickly routed supplies

to the supported units and to combat trains. FSB mechanics pretested major assemblies to detect faulty ones, which saved valuable installation time. Just as important, broken assemblies were returned to the DSA as rapidly as they had been delivered.

Liaison officers from the MSB slice, the FSB, and the brigade headquarters were a great help to the BCT. The MSB managed transportation for the BCT and delivered up to five shipments per day into the BSA (three ground and two air). MSB supply managers also relied on the Army Materiel Command's logistics assistance representatives and several wholesale commodity managers to expedite critical parts.

By any measure, the 3d BCT had a successful rotation at the NTC. Leaders and subordinates emerged more qualified in the military profession than when they began, and there were no serious injuries. Tactically, the BSA achieved a particularly high level of security during the 10-day encampment by installing continuous triple-strand concertina wire around the entire BSA perimeter. The culminating support achievement was the extremely high combat power rates the BCT sustained throughout the exercise. (Combat power rates reflect the readiness of all vehicles, including those with "circle-X" faults. The latter are vehicles with deficiencies [which their operators have indicated by marking an X in the appropriate space in the preparations checklist] that the commander has deemed fit for limited use [denoted by a circle drawn around the X on the checklist].) The M1A1 tanks posted a 92 percent combat power rate and M2 Bradley fighting vehicles a 96.3 percent rate, and M109 howitzers provided steady fires from 22 of 24 guns, a 92 percent rate.

Why the Success?

The 3d BCT isn't the only split-based brigade in today's Army, and certainly not the only heavy outfit to traverse the NTC's sands. So what is notable about the 3d BCT's experience? What contributed most to their successful restationing and subsequent combat service support (CSS) training?

Junior leaders and soldiers. First and foremost are the BCT leaders and the soldiers who serve with them. Despite demanding, back-to-back field exercises that lasted up to 95 days (ending on Christmas Eve 1995 for some), morale remained high.

Planning. Planning for the brigade restationing and follow-on training of its soldiers was also crucial. It properly began with a vision of overall CSS requirements and synchronizing those requirements according to the time and distance factors of the exercises. Staff planners examined every maintenance commodity and class of supply, as well as each mode of transportation, and established relationships between supported and supporting units. They reviewed SOP's, changed them when necessary, and developed procedures when none existed. Detailed orders and annexes conveyed the support plans to both the experienced and the apprentice.

Flexibility. CSS for the 3d BCT is uniquely organized, which means there is no textbook for how to do it best. The CSS leaders at Fort Lewis evaluated past performance and examined proposed changes. The 593d CSG was allowed flexibility to rearrange its units to best support and train the BCT. The group commander, having both heavy division and nondivisional experience, evaluated a number of recommendations before approving the DISCOM slice he accompanied to Fort Irwin.

Training. When support soldiers are well schooled in their tactical tasks, it is easier to sustain a high operational tempo on a battlefield. The 296th FSB had had over 12 weeks of quality training at the Yakima Training Center before their field training at the NTC. The vastness of the Yakima Training Center permitted support and tactical movement over near-doctrinal distances. FSB soldiers often commented that preparatory training was easier than training at the NTC.

Although rehearsals often get squeezed out of busy schedules, leaders recognized the importance of rehearsals and made time for them. Map drills on a conference table, rock drills in the sand, and field training exercises were all conducted to familiarize junior and senior warriors alike with desired outcomes and how to achieve them.

The secrets to the successful restationing and train-up of the 3d BCT aren't secret at all. As in any successful operation, the "secrets" are hard-working members of hard-working teams; soldiers who make the most of schools, exercises, and other training; soldiers who learned from experiences in Operation Desert Storm, Kuwait, Somalia, Haiti, and Guantanamo Bay; units that are ready to deploy to any theater, conduct any combat or CSS mission assigned, and return intact to do it again. Such are the soldiers of the Bulldog brigade. **ALOG**

Colonel Bob Ross is the G4 for I Corps, Fort Lewis, Washington, and a former commander of the 2d Infantry Division Support Command.

Colonel Jim Tatum commands the 593d Corps Support Group at Fort Lewis. He was the senior commander of the logistics slice units that supported the 3d Brigade and accompanied it to the National Training Center.

ALOG LOG NOTES

EAPU's Pay Off

External auxiliary power units (EAPU's) have recorded true success stories of their use in Operation Joint Endeavor by 1st Armored Division units of Task Force Eagle.

EAPU's provide electric power to the M1A1 Abrams main battle tank and the M2/M3A2 Bradley fighting vehicles. The EAPU's maintain the vehicles' battery charge and allow operation of the vehicles' electrical systems without running the vehicles' engines. The EAPU is an externally mounted, 1-cylinder, diesel engine that drives a 28-volt DC [direct current] generator. It has a fuel system independent of the vehicle's fuel system. Currently, the EAPU is mounted only on M1A1 Abrams main battle tanks.

1st Armored Division units of Task Force Eagle operated 16 checkpoints throughout the task force sector. The checkpoint missions are to ensure compliance with provisions of the Dayton Accord. Abrams tanks and Bradley fighting vehicles are the armored vehicles of choice for these checkpoint missions. To maintain power in the vehicles, the crews normally run the vehicles' turbine engines. Idling these engines for long periods can cause premature failure of engine components. EAPU's provide an economical alternative and ensure the rapid response capability of the vehicles. The EAPU, at a cost of $10,787 and operating expenses estimated at $2 per hour, more than pays for itself by reducing engine failures.

After 4 months of deployment operations, Task Force Eagle has had to replace only two M1A1 engines, both of which were reparable at the direct support-plus activity in the main support battalion. By having the EAPU, tank crews run the turbine engine only during daily preventive maintenance checks and services and then transfer the electrical work load to the EAPU. The Army should consider putting the EAPU on all Abrams tanks and Bradley fighting vehicles as a readiness enhancement and a cost avoidance measure.

MAJ Jeffrey K. McGee
Bosnia

Reserve Training Opportunity

The Army's "downsizing" has affected not only active duty soldiers but also reservists of the Army National Guard and Army Reserve. There must be many reserve soldiers who want to continue their military careers, earn retirement points, attend annual training, and further their promotion opportunities.

By using relatively new technologies, like the Internet and World Wide Web, a Fort Lee, Virginia, reserve unit—the 1047th Reinforcement Training Unit (Logistics)—has found a way to break the bounds of geographical location and offer continued training to reserve soldiers. The 1047th is accepting applications from soldiers in all combat service support career fields.

If there are logistics reserve soldiers among your many readers who are looking for a unit with which to train, they can contact me for further information. Write—Commander, USACASCOM and FL, ATTN: ACofS USAR, 3901 A Avenue, Suite 100, Fort Lee, VA 23801-1805, or call (804) 734-0244 or DSN 687-0244; or send e-mail to bradshaj@lee-dns1.army.mil.

SGM James W. Murphree
Fort Lee, VA

The ULLS Questions

I am soliciting *Army Logistician*'s help to get information on the fielding of the new ULLS [unit level logistics system]. I am a supply sergeant in the 10th Special Forces Group (Airborne), and it has come to my attention that the old ULLS-S4 software and hardware finally may be getting a facelift. This will change the lives of all supply sergeants.

The information I have is, project managers are Nick Flaim, DSN 687-7689, and Russ Carter, DSN 687-6060, and the new ULLS-S4 will be fielded with software and hardware.

If your magazine could get the details and publish them for those of us who are "in the weeds," we would greatly appreciate it. Several questions—What interface is there with SPBS-R [standard property book system-redesign]? What are the component listings? What are the system specifications? and What is the "new look" of the hand receipts?—remain unanswered.

Thank you for your help.

SFC Ronald D. Burke
Fort Carson, CO

Thank you, Sergeant Burke, for asking questions we're sure many people in supply would like to have answered. We asked Nick Flaim to give you—and us—a status report. Here is Nick's response.—Ed.

The ULLS-S4 Answers

ULLS-S4 is a standard application of the overall unit level logistics system. It is being developed in two blocks. Block 1 consists of property accountability, supply, expenditure accounting, and utilities communications processes. Project Manager, ULLS, received authority to field this block from an Army major automated information system review council (MAISRC) on 6 May 1996.

The system will be fielded beginning with contingency corps units in this quarter of this fiscal year (FY)—FY 1996. It will be fielded as a total package—hardware, software, training, and documentation. A fielding

schedule is being negotiated now with the major Army commands.

Block 2 consists of logistics estimates and planning, class V (ammunition) processes, and unit transfer and consolidation of Army materiel status system processes. Block 2 of the ULLS-S4 is due for a MAISRC review in the third quarter, FY 1997.

Nicholas L. Flaim
Fort Lee, VA

Ten Years Worth of Difference

Captain T. Patrick Flanders and I shared the same discovery but 10 years apart. In his article, "Modern ASL Management Tools," in the May-June 1996 issue of *Army Logistician,* he described using Microsoft Access™ to manage and report authorized stockage list zero balances, dues-in, and dues-out.

While serving as support staff maintenance technician in Germany for the 22d Signal Brigade, from June 1981 through June 1991, I used the SuperCal™ and Lotus 1-2-3™ spreadsheets to prepare each battalion's DA Form 2406, Materiel Readiness Report; administer and monitor the Army oil analysis program (AOAP); and manage the prescribed load list (PLL).

During this time, U.S. Army, Europe (USAREUR), was putting its ground equipment into the AOAP, and I would spend 2 to 3 days a week keeping vehicle serial numbers straight and inspecting oil samples. I happened to complain to our brigade electronics maintenance technician, and he said I needed a computer. A computer in a motor pool was unheard of then, and a maintenance technician could more easily get a $20 gold piece.

I ordered a Commodore 64™ through the PX, but it was back ordered, so I changed my order to an Apple IIc™. The first thing I did was build an Apple Works data base of the brigade's AOAP enrollments. Next came a consolidated brigade PLL for V Corps headquarters. After that, I bought additional RAM [random access memory] and began formatting and using an Apple Works spreadsheet for the brigade headquarters company's DA Form 2406. Battalion maintenance technicians were so impressed with the DA Form 2406 spreadsheet, many of them bought their own Apple IIc's. I believe the 22d Signal Brigade units were the first in USAREUR to submit machine-calculated and machine-printed DA Form 2406's.

I "inherited" Colonel Robert Reich's Zenith™ 248 computer when he completed his command tour. I set my Apple on one side of my desk and the Zenith on the other and transferred my Apple Works spreadsheets and data bases to SuperCal3. I didn't learn to use Enable™ until several years later, and I still have not learned dBase. I have never built a data base that exceeds the capability of the spreadsheet I'm using.

The first SAMS [standard Army maintenance system] computers and programs were a pain in the neck. Deadlined computers were the norm, and the software had so many bugs and patches that about all one could expect was "garbage out." I never could understand having to transport a floppy disk more than 25 miles to a support unit. We used our Apple computers conjunctively with the few MS-DOS® computers that were available until each motor pool was issued a Zenith.

I bought a Zenith 248 through the Government purchase program in 1985 and "bored it out," much like Captain Flanders recommended. I increased the RAM to 16 megabytes, added a second hard drive and floppy drive, a mouse, and a modem. With it, I prepared and proofed spreadsheet templates for each company in the brigade.

SuperCal3 was a good spreadsheet, but it lacked macro capability. To get the reports we wanted required long, repetitious formulas. Several officers assigned from the states were proficient in using Lotus 1-2-3. With their help, we switched to Lotus. Our locally prepared dBase and Lotus programs were instrumental in the brigade's successful fielding of mobile subscriber equipment before and during Operation Desert Storm.

Our greatest accomplishment was automating the DA Form 2406. Shop clerks were able to prepare an accurate company or battalion DA Form 2406. By the second week of each quarter, our computers had flagged and forecast problematic, reportable, deadlined equipment. We transmitted the logistics intelligence file in our computers, and the status of requisitions was automatically updated on the back of our DA Form 2406.

It has been 5 years since I left the Army; and I'm sure that today the things we did with our personal computers and commercial programs are common practices. I cannot imagine an officer or warrant officer today without his or her own personal computer, loaded with programs like Microsoft Office™, Lotus Smart-Suite™, and Corel Suite™. Without these tools, an officer could hardly prepare and present accurate, timely data in a manner his or her commander would expect.

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