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Getting to the Fight

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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:

PETER J. SCHOOMAKER
General, United States Army
Chief of Staff

Official:

JOEL B. HUDSON
Administrative Assistant to the Secretary of the Army
0316916

Cover: The success of Operation Iraqi Freedom has been due in part to the ability of U.S. forces to adapt to changing scenarios and improvise where necessary to get the job done. The article on page 24 tells how the 180th Transportation Battalion devised a plan to move heavy equipment when rail lines were inadequate to the task. On the cover, a soldier from the 4th Infantry Division drives an M88 recovery vehicle off the military transport ship *Cape Victory* at the port of Ash Shu'aybah, Kuwait, while other soldiers board the ship to offload other equipment (inset).

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ALOG NEWS

LOGISTICS SYSTEM STRAINS BUT SUCCEEDS IN OPERATION IRAQI FREEDOM

According to logisticians in the theater, improvements in logistics since the Gulf War of 1990 to 1991 were key to the rapid offensive movements that characterized Operation Iraqi Freedom. As Brigadier General Jack C. Stultz, deputy commander of the 377th Transportation Support Command, noted, with the combat troops of Iraqi Freedom moving at a faster pace than ever before, the ability of logisticians to keep them supplied was taxed but never was in danger of breaking down.

Stultz observed that the biggest problem was keeping up with the warfighters. "It was not so much being able to supply them, but to locate where they were moving to," Stultz said. "That tended to be a challenge for us as we moved out convoys across the desert."

Lessons learned from Operation Desert Storm helped logisticians improve the support they provided in Iraqi Freedom. Unlike Desert Storm, where logisticians built up 60 days' worth of supplies, logisticians in Iraqi Freedom had only 5 to 7 days' worth of supplies on hand. "We didn't build mountains, we moved it and smoothed it out much like you do in civilian business," Stultz said.

A rough terrain cargo handler unloads ammunition at Kuwait Navy Base during logistics-over-the-shore operations. Photo by Photographer's Mate Third Class Aaron Pineda, U.S. Navy, provided to *Army Logistician* by Captain Bobby Hart, 143d Transportation Command, U.S. Army.

The technology available today helped make this possible. Computerized ordering and in-transit visibility allowed logisticians to get the job done. They could track supply orders and adjust deliveries as

(ALOG NEWS *continued on page 44)*

LOG NOTES

Dear Editor:

I read with great interest the article in the January-February 2003 issue, "Logistics Lessons Learned by Lieutenant Grant in Mexico," by Lieutenant Colonel Kevin J. Dougherty. I was particularly interested in the notion that, under certain conditions, freedom of maneuver can be augmented by operating independent of a fixed supply line. The last paragraph of the article makes the suggestion that an experienced combat service support [CSS] commander could set the conditions where a maneuver commander could cut his supply lines in order to achieve maximum freedom of maneuver.

In my mind, the next step is to study the dynamics in order to determine what specific set of criteria must be met for a CSS commander to evaluate a situation and recommend to the maneuver commander that cutting the tail is a sound logistical decision. This type of audacity is in line with operating in a nonlinear environment and may be required in order for enhanced freedom of maneuver to become viable. I envision a situation where it becomes incumbent on the CSS commander to recommend to the maneuver commander that he cut his fixed supply lines in order to maximize effects on the enemy when these criteria are met.

Thank you for putting together a great professional journal.

Captain Michael P. Warrington
ORARNG
Portland, Oregon

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Sustaining Expeditionary Joint Forces

BY MAJOR GENERAL TERRY E. JUSKOWIAK AND COLONEL MICHAEL WILLIAMS, USA (RET.)

Evidence from current operations, including joint and service wargaming exercises, clearly shows that the operational environment has changed. Joint, interagency, and multinational (JIM) operations are now the norm. New organizational structures and mobility and distribution platforms provide new opportunities for deploying, employing, and sustaining operational capabilities. Tactical, operational, and strategic lines have long been blurred in the sustainment arena, and now joint and service planners can contemplate a similar blurring of the functional lines of deployment, employment, and sustainment. Effects-based sustainment will complement the emerging Effects-Based Operations concept of the U.S. Joint Forces Command (JFCOM).

Operation Iraqi Freedom confirms that future operations will be jointly executed, with each service component lending its unique and important capabilities to the joint battle plan. Army warfighting and sustainment concepts must be developed within a JIM environment.

This new environment requires different sustainment command and control (C2) organizations and continuing improvements to critical sustainment enablers. Joint sustainment C2 organizations for regional combatant commanders and a joint national logistics command also will be required. Further technological enhancements, an increased logistics common operating picture capability, and improved mobility and distribution assets will be needed to achieve a more rapid and agile joint distribution network.

This spring, the Army and JFCOM cosponsored a wargame, Unified Quest 2003, that provided glimpses of future conflict and military requirements. Evidence from the wargame clearly shows that joint sustainment C2 and enhanced technologies that lead to improved distribution management processes are critical to supporting future joint operations. This article addresses issues emanating from Unified Quest 2003.

Unified Quest

Unified Quest 2003 (UQ 03) was conducted at Carlisle Barracks, Pennsylvania, from 27 April to 2 May. The theme was "Expanding the Power of Coherent, Joint Operations." It was the first of a series of transformational wargames cosponsored by JFCOM and the Army. UQ 03 employed a demanding scenario—a major contingency operation in a total JIM environment—that allowed joint and service planners to work in the environment envisioned for future operational-level warfare. Army sustainment concepts were played in support of JFCOM's Joint Operations Concepts (JOpsC).

Joint and Army sustainers were involved in operational planning, exercise assessment, and game and information systems analysis. Participating Army personnel came from the Office of the Deputy Chief of Staff, G–4, Headquarters, Department of the Army (DA); the Army Materiel Command; the Army Forces Command; the Army Special Operations Command; and the Army Training and Doctrine Command (TRADOC). Each participant brought unique and valuable experience to the exercise. Broad Army participation will help ensure that sustainment insights and issues captured during the wargame will be integrated into ongoing development of Combined Arms Support Command (CASCOM) and Army Objective Force sustainment concepts and doctrine.

Two overarching themes surfaced during the game. First, we observed that what had been three distinct functions—deployment, employment, and sustainment—are merging into one continuous operation across a distributed battlespace. Second, we identified critical components needed to achieve successful joint sustainment: a logistics common operating picture; distribution and sustainment enablers; and joint distribution management.

These emerging themes give rise to two questions—

- Within the JIM environment, what is the best joint sustainment management process?
- Under an appropriate joint sustainment management process, what are the requirements for a logistics common operating picture, physical enablers, and distribution management?

The JIM environment and the evolving operational concepts will determine potential solutions to the first question. It therefore is important to understand the operational framework before trying to frame an appropriate joint sustainment management process.

Future Operational Framework

The Chairman of the Joint Chiefs of Staff (in Chairman Directive CM–907–03) tasked JFCOM to develop a coherent joint process and operational

structure that captures the complexities, opportunities, and realities that the joint commander and his service components will encounter in future conflicts. The operational requirements and the resulting supporting concepts developed during UQ 03 provide a clear understanding of what will be required from joint force sustainers.

The Deployment, Employment and Sustainment (D, E&S) operational framework is a maturing JFCOM concept that recognizes the changing complexity and interdependence of what had been three separate and distinct operational actions. Coherent operations are achieved when the functions of deployment, employment, and sustainment are coupled into one operational process and not developed as distinct individual actions or separate phases of an operation. In the end, D, E&S will result in a coherent joint process.

The conflict in Iraq and the wargame experience in UQ 03 demonstrate that the future battlefield will be characterized by multiple and simultaneous operations across the full spectrum of missions. Operations over extended distances and the frequent absence of secure lines of communication throughout a distributed battlespace will be the norm. Rapid, decisive operations, coupled with simultaneous stability and support operations capability and humanitarian operations, will challenge joint sustainers. Extended joint operational areas and multiple task forces will challenge existing deployment and sustainment systems.

The nature of future conflict makes the current approach of conducting distinct deployment, employment, and sustainment operations unacceptable. The history of Operations Desert Shield and Desert Storm demonstrated that logistics processes do not have distinct strategic, operational, and tactical levels. Early indications are that the same change is occurring for the functions of deployment, employment, and sustainment in current and future operations.

Army Objective Force and joint operational concepts are based on the concepts of operational maneuver from strategic distances (through multiple unimproved points of entry) and simultaneous and disparate operations. CASCOM's early Objective Force concept work determined that operational maneuver from strategic distances means deployment equals employment. D, E&S takes this concept to the next level, where sustainment occurs simultaneously with deployment and employment throughout the operational spectrum. This evolving operational framework requires a different joint sustainment management process and C2.

Sustainment Management Command and Control

To achieve this end state, joint sustainment C2 organizations will be required to synchronize, prioritize, integrate, coordinate, and direct sustainment operations across all JIM capabilities available to the joint force commander.

Joint sustainment C2 should create joint sustainment effects from separate service component and JIM capabilities. During UQ 03, current sustainment C2 was not adequate to support the full range of joint operational plans. Sustainers were challenged to integrate unique component capabilities to craft functional plans that produced joint sustainment. While initial operational planning produced coherent force packages, sustainment challenges surfaced after operations began that required a more functional C2 organization than a single staff element could provide. Simultaneous multiple task-force operations required a unified sustainment effort to a much greater degree than in previous wargames. Component support and sustainment organizations, when appropriately integrated, can provide synergistic, effective, and efficient support to the regional combatant commander (RCC) and the joint task force commander.

Combatant commanders have suites of operational concepts, systems, and capabilities they can use to integrate component warfighting capabilities to conduct successful operations. Perhaps the best example is the air tasking order (ATO) developed by the joint force air component commander. The ATO integrates all air capabilities that are available from the service components and multinational sources. The ATO ensures "air" unity of effort. However, there is no similar joint or service process that allows sustainers to generate a similar level of joint sustainment to support joint operations.

Combatant commanders also have directive authority for logistics and exercise that authority through the J–4 and joint boards and staff elements. While individual service sustainment and support planning is effective for each service component, there is no evidence that these individual plans and operations are generating the most effective and efficient joint sustainment effects for the joint force commander.

To meet joint force sustainment requirements, the services and civilian agencies provide a wealth of capabilities and resources. However, they operate with service-centric and stovepiped organizational structures—a condition that in some cases fosters duplication of effort, competition for the same resources, and waste of materiel and manpower. It is difficult to achieve either effectiveness or efficiency under current organizational arrangements.

Providing joint sustainment requires a centralized management process, under a single command or activity, that has oversight of both requirements and assets and provides the combatant commander with a single point of focus for sustainment. This process

begins with service functions and organizations designed for joint operations. An effective joint sustainment process can remove seams and gaps between the services and their strategic systems and integrate warfighters, component support, and logistics capabilities with national support elements such as the Defense Logistics Agency (DLA) and the U.S. Transportation Command (TRANSCOM).

Joint sustainment management does not require a single sustainment corps, but it does imply a more direct and centralized approach. Joint sustainment management, by including the services, civilian organizations, and contractors working within a joint structure, will enhance effectiveness and facilitate efficiencies in generating sustainment for simultaneous operations. At the joint force level, the same dynamics are occurring in the design of and relationships among service support structures. Working closely with JFCOM, we agree that a requirement exists for a joint-level functional component support command. A joint support component command (JSCC) on a par with land, air, and sea components supporting across the JIM force is required. The JSCC, working for the RCC, would be in a position to leverage the full range of sustainment and support capabilities across all JIM partners to support all maneuver operations. The establishment of a JSCC organization would facilitate the setting of priorities for strategic and operational support across all components, similar to what the JFACC accomplishes with the ATO today.

Within the Army, significant changes are required in sustainment C2. TRADOC and CASCOM are developing new organizations and refining existing structures as part of a DA-directed Echelonment Study. An important part of this effort is redesigning the theater support command (TSC).

The current TSC has served the Army well, but it is not deliberately organized for joint and multinational support and multiple simultaneous operations throughout the RCC's area of responsibility (AOR). By design, the TSC is an Army- and ground-centric organization. The JOpsC calls for the full integration of joint, interagency, and multinational partners, and the concept of focused logistics requires the same integration of joint sustainment capabilities. This means that the Objective Force TSC must be a joint organization capable of supporting from strategic distances across the services. While the TSC is designed to accept joint liaisons, it does not have joint billets and therefore is ad hoc by nature, which is insufficient to support JIM operations. From the joint perspective, the current TSC also does not have the integrated information systems needed to interface routinely across the JIM environment. Specifically lacking is visibility of the entire, end-to-end joint distribution system. Finally, today's TSC design does not accommodate flexible C2 arrangements. The TSC needs greater C2 capability and flexibility to support the Army service component commander in executing the spectrum of operations, meeting administrative control and Army support to other services responsibilities, and integrating JIM capabilities.

Generating joint sustainment centers on leveraging support and sustainment capabilities across the components and JIM partners. At the strategic level, we envision continuing an unbroken joint sustainment chain, starting with an enhanced TSC, with providers such as DLA and TRANSCOM executing strategic responsibilities and component organizations such as the Army Materiel Command and the Air Force's Air Logistics Command executing traditional Title 10 responsibilities. This support continuum will be joint, integrated, and linked from the national level to tactical formations.

Logistics Common Operating Picture

An effective joint sustainment management process addresses the first question for the UQ 03. The second question—under an appropriate joint sustainment management process, what are the requirements for a logistics common operating picture, physical enablers, and distribution management?—concerns the specific means of generating sustainment. Joint sustainment is developed by means of logistics information and data, physical assets to accomplish sustainment operations, and a distribution management process and system that plan for and oversee distribution execution.

A logistics common operating picture (LCOP) is a joint requirement that can provide visibility of data and decision-support tools needed to manage an end-to-end joint distribution system. Significant progress has been made in the past few years in achieving joint total asset visibility (TAV). However, visibility alone does not provide all that is needed to execute sustainment operations at the component level or, even more critically, at the joint level. Actionable information and data must be coupled with sound operational understanding and integrated architectures to provide joint and component sustainers with solid information. Component management systems cannot provide the data required for joint sustainment.

The Battle Command Sustainment Support System (BCS3) is the foundation for the Army LCOP. The Global Combat Service Support-Army (GCSS-Army) integrated into the joint GCSS provides joint interfaces. The right information presented and analyzed in the right operational context (LCOP) can bring predictability, speed, and precision to sustainment. This information and data structure, with decision-support aids, can provide the tools for effective joint

sustainment C2. Satellite-based communications systems, with single-entry data points and multiple users and purposes and that are not limited by geography or distance, are required. For example, this capability can provide for dynamic rerouting and retasking vital to sustainment operations across the future battlefield.

Sustainment Assets

Also critical to sustainment are physical resources. During UQ 03, technological enablers, especially deployment systems and advanced mobility and distribution capabilities, suggested new warfighting opportunities. Increasing the speed of deployment, and thus employment, at multiple entry points reduced force vulnerability. Joint force planners and commanders also saw the opportunity to enter into decisive operations earlier than in the traditional deploy-and-employ framework. The D, E&S operational framework focused on this issue.

However, mobility and deployment enablers required for early, rapid operational employment also are required for early-on and continuous sustainment. The challenge is complicated by the fact that operations are conducted simultaneously. This leads to what can be described as the "enabler paradox:" while enhanced enablers provide improved operational opportunities and capability, an improved operational capability will demand even more enablers. Generating sustainment will require dual-capability mobility and distribution platforms, a much greater integration of operations and sustainment than ever before across the joint force, and, finally, a process that can sense and react to dynamic battlefield conditions and the natural tension between operations and sustainment requirements.

Joint Distribution Management Process

Joint distribution management must blend transportation and supply functions successfully into an end-to-end distribution system. The Objective Force distribution system encompasses both force and sustainment requirements within a seamless, end-to-end distribution system.

Distribution management is a circular, not a linear, concept that begins when requirements are generated and ends when requirements are satisfied. It is based on prediction, speed, and precision; relies on various service, national, and multinational assets and capabilities; and is controlled by a joint process that seeks the greatest efficiency practical.

The distribution management system's design has to overcome the tyranny of time and distance and, when properly organized, must manage scarce resources, eliminate excess, and generate efficiencies in support of operational effectiveness.

The Army's sustainment organizations and capabilities must be designed and built to operate in support of joint operations across the JIM environment and within the D, E&S operational framework. The current TSC, with modifications, can provide the Army service component commander with robust and capable sustainment C2; when appropriately restructured, it can provide the RCC with joint sustainment C2. Joint capability at one echelon and not another will not work. RCCs need an unbroken joint sustainment C2 structure throughout the AOR and back into the strategic base. It is time to start developing a National Logistics Provider.

Enabling information and data technologies and mobility and distribution platforms will continue to support new joint operational and sustainment concepts. A common operating picture is a fundamental requirement for an effective joint sustainment management process on a distributed, noncontiguous battlefield. However, a common operating picture is only relevant if the physical means are available to execute sustainment at the right place and time. A delicate and very difficult balance will be required in developing and fielding both operational and sustainment capabilities so that neither is marginalized by a shortfall, or an enhanced capability, in the other.

Army sustainers are joint sustainers. The Army, while inherently joint, is the sustainment force of choice for combatant commanders. Army organizations, units, and capabilities are designed for sustained land combat. Army capabilities, combined with those of other components, can generate joint sustainment. As concepts mature and operational ideas crystallize, Army sustainers will continue to lead joint sustainment efforts. **ALOG**

Major General Terry E. Juskowiak is the Commanding General of the Army Combined Arms Support Command and Fort Lee, Virginia. He has a bachelor's degree in political science from The Citadel and a master's degree in contract and acquisition management from the Florida Institute of Technology. He is a graduate of the Infantry Officer Basic Course, the Quartermaster Officer Advanced Course, the Logistics Executive Development Course, the Army Command and General Staff College, and the Industrial College of the Armed Forces.

Colonel Michael Williams, USA (Ret.), works for Anteon Corporation supporting the Combat Service Support (CSS) Battle Lab at Fort Lee, Virginia. His last active-duty position was Deputy Director of the CSS Battle Lab.

Building Blocks of Focused Logistics

Two initiatives—Logistics Transformation and the Future Logistics Enterprise—will lay the foundation for achieving focused logistics.

Focused logistics is the Department of Defense's (DOD's) concept for providing global sustainment to warfighters operating in joint, interagency, and multinational (JIM) environments under Joint Vision 2020. This second article in *Army Logistician's* series on the Focused Logistics Campaign Plan—the roadmap to focused logistics—discusses the two initiatives that constitute the building blocks of focused logistics: Logistics Transformation and the Future Logistics Enterprise. Together, according to the plan, they "represent a shift from supply-based logistics to a leaner, more agile distribution-based logistics system."

Logistics Transformation

The Logistics Transformation initiative is targeted at correcting two huge obstacles to achieving focused logistics: the lack of an integrated logistics information system and the lack of a source of accurate, real-time information needed to support such a system.

When military thinkers and planners talk about such desirable characteristics of a force as agility, mobility, and flexibility, they basically are talking about speed. As we have seen in Operation Iraqi Freedom, speed wins. But combat speed cannot be sustained without support that also is speedy, or, more accurately, timely. This is what logisticians mean when they repeat the mantra: getting the right support to the warfighter in the right place, at the right time, and in the right quantities. No combat force will maintain its speed if it runs out of fuel, ammunition, food, repair parts, medical supplies, or the other commodities furnished by logisticians.

This is why information is so important, and why advances in information technology are providing rich opportunities for logisticians to support the warfighter as never before. In the Information Age, victory will go to the force that has the right information at the right time. The right information will give the warfighter the situational awareness he needs to make the right decisions that will lead to victory. But the warfighter cannot be truly aware of his situation on the battlefield without real-time logistics information. The provision of real-time information will increase the warfighter's confidence in his support and in his logisticians.

Logistics Transformation lays the foundation for the awareness the warfighter needs by—

- Adopting the best logistics business practices available.
- Moving to a logistics system open architecture that can provide integrated logistics information that can be acted on by decisionmakers.
- Improving logistics responsiveness to the joint warfighter.

To achieve these capabilities, Logistics Transformation will rely on four fundamental changes to logistics practices—

- ***Customer wait time (CWT).*** This is a metric used to assess the effectiveness of the supply chain. It will measure the time from the moment when a customer's requirement is documented in the supply system to the moment when the customer reports he has received the material he ordered.
- ***Time-definite delivery (TDD).*** Implementation of the TDD concept will assure customers that their requests will be filled within a specific time frame for a specific geographic area. TDD will use a simplified priority ordering system and will be based on standards now under development. TDD will represent a significant change to existing requisition and distribution practices.
- ***Total asset visibility (TAV).*** TAV gives users visibility of materiel throughout the supply chain, whether it is being purchased, undergoing maintenance, in storage, or in transit. Fixed and deployable automatic iden-

tification technology (AIT) placed at critical locations in the supply chain collects and reports data that can be used as the basis for decisionmaking.

• ***Web-based, shared-data environment.*** The World Wide Web provides the technological means to take the mass of data collected by automated systems and make it available in real time to warfighters and logisticians. Real-time information means real-time situational awareness.

CWT, TDD, TAV, and the Web together create a new customer-oriented logistics environment—new business practices, new technologies, new responsiveness to customers, and new decisionmaking power for warfighters. The result will be a new logistics system that is no longer supply based (no mountains of iron as amassed in the past to make sure plenty of materiel was available to meet any contingency) but distribution based (capable of responding to customer needs with speed and agility).

Future Logistics Enterprise

DOD's process of achieving Logistics Transformation will move through the Future Logistics Enterprise (FLE). The FLE is the mid-term vision for transformation, to be realized during the years 2005 to 2010. According to the Focused Logistics Campaign Plan—

> The primary objective of the FLE is to ensure consistent, reliable support that meets warfighter requirements through enterprise integration and end-to-end customer service. The FLE builds upon and accelerates specific, ongoing [military] service and [Defense] agency initiatives to meet the requirements of the Quadrennial Defense Review and the National Defense Strategy.

The FLE will feature six initiatives—

• ***Depot maintenance partnership.*** This initiative is designed to increase the use of public-and-private partnerships in the operation of DOD's depots. While DOD will continue to have a depot maintenance capability, the partnership initiative should increase private-sector investment in depot infrastructure, foster better, more efficient management of depot workers and facilities, and improve depot business practices.

• ***Condition-based maintenance+ (CBM+).*** The CBM+ initiative covers a variety of technological and business changes designed to create a new maintenance environment in DOD. Projected changes include "enhanced prognosis [and] diagnosis techniques, failure trend analysis, electronic portable or point of maintenance aids, serial item management, [AIT], and data-driven interactive maintenance training." The goal is to improve the operational availability and readiness of weapon systems throughout their life cycles and at reduced cost.

• ***Total life cycle systems management.*** This initiative primarily targets DOD program managers. It seeks to establish the accountability of program managers to acquire systems in a timely fashion, meet warfighter requirements for system performance throughout a system's life cycle, and integrate sustainability and maintainability considerations into the acquisition process.

• ***End-to-end distribution.*** The goal of this initiative is to improve the flow of materiel to the user and synchronize deployment and sustainment efforts. It will produce an integrated, streamlined system of distribution that will provide warfighters with the materiel, and the information about that materiel, that they need. End-to-end distribution will be achieved only by instituting new mechanisms that span function and organization boundaries.

• ***Executive agents.*** This initiative will create a formal process for aligning the designation of executive agents with warfighter requirements identified from the National Defense Strategy. It will produce executive agent assignments that will support the warfighter "across the full spectrum of operations, including support on an end-to-end basis and rapid response to all deployments."

• ***Enterprise integration.*** As its name indicates, this intiative will bring together information technologies needed to implement new logistics business practices. Building on activities within the military services and the Defense Logistics Agency, enterprise integration will use "commercial off-the-shelf tools [to develop] modern, integrated solutions to complex information requirements across the DOD logistics enterprise." Enterprise integration will provide access to the near-real-time, actionable information required for achieving focused logistics.

Logistics Transformation and the Future Logistics Enterprise together will enable DOD "to progress from Web-based logistics processes to network-centric logistics to our ultimate goal of collaborative logistics planning and execution."

Based on the foundation of Logistics Transformation and the Future Logistics Enterprise, focused logistics will take concrete form through eight initiatives: joint deployment/rapid distribution; joint theater logistics management; agile sustainment; operational engineering; information fusion; multinational logistics; force health protection; and joint logistics experimentation. These initiatives will be the subject of the next article in this series, in the November-December issue of *Army Logistician*. **ALOG**

—Story by Robert D. Paulus

DESEX to Go Virtual

BY CHIEF WARRANT OFFICER (W–4) RONALD S. MAILHIOT

This new system will be "virtually" all that is needed to answer a soldier, sailor, airman, or marine who asks, "Where's my stuff?"

Advanced telephone technology is a popular and powerful way for today's savvy consumers to check bank balances, order merchandise, or update personal information on accounts. Department of Defense (DOD) personnel have a similar tool at their fingertips—the Defense Supply Expert System, or DESEX.

DESEX is a telephone and Web-based system that accesses mainframe computer-based data sources to provide customers the most current data available. Users can obtain DOD asset information or check the status of a requisition by telephone, Internet, or email. They also can create or modify requisitions by telephone or by email through the Internet. While the preferred method for ordering or modifying requisitions is to use the Standard Army Management Information Systems, DESEX is a viable option when traditional means are compromised or unavailable.

DESEX was introduced in June 1991 to improve customer service support within the Defense Logistics Agency (DLA) emergency supply operations centers by automatically processing routine customer inquiries. Between 1992 and 1995, the system was fielded throughout the services' inventory control points (ICPs). In January 2000, the Defense Logistics Information Service (DLIS) accepted responsibility for managing DESEX.

System Upgrade

DESEX currently is used at 15 ICPs and depots. Each location has its own telephone number and access to specific inventory information based on national stock numbers (NSNs) or commodity responsibility. When a customer requires help, DESEX routes the transaction to a representative at one of the 15 sites. The system operates 24 hours a day, 365 days a year, to support every customer.

In September 2002, the DESEX Program Management Office announced plans for Virtual DESEX. The virtual system will improve the features of the existing system by consolidating the 15 sites into one central location and offering a single telephone number for all callers to use. It will be able to access the appropriate data source based on the stock number or document number provided by the caller. Virtual DESEX will serve customers within the continental United States and abroad. The current system will continue to operate until the new version is fielded.

The major benefits of Virtual DESEX are—

- Upgraded interactive voice recognition.
- Consolidation of 15 DESEX production sites into 1.
- Reduction of telephone numbers from 15 to 1 toll-free commercial number and 1 DSN (Defense Switched Network) number.
- Computer-telephone interface (calls will be directed to the appropriate contact center by telephone).
- User authentication.
- Continuous speech recognition.

DESEX-LAN Interface

Virtual DESEX will have a router between the local area network (LAN) and the DESEX server to prevent non-DESEX LAN traffic from interfering with the DESEX server. The LAN connection to the data sources will pass through the firewalls using the Nonsecure Internet Protocol Routing Network (NIPRNET). The production site server will format user queries created by Virtual DESEX. The business rules in the system will route the queries to the appropriate data sources to retrieve the desired information.

The DESEX server then will convert retrieved data to voice and transmit results to the caller.

Continuous Speech Recognition

The Virtual DESEX interface and dialog design will create an environment in which users can navigate the system easily, with guidance offered by voice menus and prompts. Voice recognition will provide enhanced accuracy in both quiet and noisy environments. Customers will be able to communicate their data entries vocally without pausing between characters. Initially, DESEX will translate only in English.

Consolidated Call Processing

Consolidating the telephone numbers of the 15 production sites to support a single number will allow the system to use intelligent network software to reroute and deliver calls to the appropriate DESEX system based on the stock number or document number the customer provides. This process will give customers the most current and accurate logistics data available.

Each of the military services will have a contact center and call representatives. If a caller needs more information, the system will transfer his call to the appropriate contact center representative.

Computer Telephone Integration

As part of the computer telephone integration (CTI) design, a record, or "data packet," will be displayed on the contact center representative's screen. The data packet will contain the customer's identity and actions performed within Virtual DESEX. The data packet may contain single items of information, such as a stock number or document number, or, in some cases, multiple numbers or other identifying data. The system will keep the caller linked to his associated data packet, and the contact center server will determine the location of the appropriate contact center representative. When transferring the call to the representative, the CTI software will format and display customer data on the representative's pop-up screen. A link from the pop-up screen will provide information about additional queries conducted during the call. This technology will reduce customer wait time and eliminate the need for the customer to supply information twice. DLA will be the first organization to implement CTI; the military services will follow after a system architecture review and any necessary technology changes are completed.

User Authentication

Virtual DESEX will require authentication to validate user access by telephone and on the Internet. To assist with Army user authentication and keep the system user friendly, DLIS and the Army are collaborating to find ways to access the system using a single sign-on approach, possibly through the Army Knowledge Online portal. For Web access, the system may use methods such as a public key infrastructure or a common access card system. (Public key infrastructure is a value provided by a designated authority that can be used to encrypt messages and digital signatures.) Oracle or a similar database technology will validate users outside of their own portal, and the system will manage user accounts and authorization information. The user authentication database will validate users, notify them of required password changes, and determine access rights into DESEX.

To ensure that customers receive the most current defense-related information on asset visibility and requisition data, the DESEX Program Management Office is building interfaces with systems such as DLA's Business System Modernization, the Army's Logistics Modernization Program, the Navy's Enterprise Resource Planning system, and the Defense Reutilization and Marketing Service. There are plans to link DESEX to FEDLOG, which will enable customers to place requisitions after researching their catalog data.

Implementation

Virtual DESEX will be implemented in phases, with the first release scheduled for early in fiscal year 2004. Initially, the system contractor will develop a prototype and conduct user acceptance testing. Then Virtual DESEX will begin operating at the DLA ICPs to ensure the system is working properly. Fielding to the Army and other service sites will follow.

Virtual DESEX will provide customers with enhanced support using state-of-the-art telecommunications technology. The new system will be "virtually" all that is needed whenever a soldier, sailor, airman, or marine asks, "Where's my stuff?"

To learn more about the current program and for updates on the fielding of the virtual system, visit DESEX on the Web at https://www.desex.com. **ALOG**

Chief Warrant Officer (W–4) Ronald S. Mailhiot is a logistics systems analyst at the Defense Logistics Information Service in Battle Creek, Michigan. He is a graduate of the Warrant Officer Basic and Advanced Courses and the Warrant Officer Staff Course. He has a bachelor's degree in human resource management from Upper Iowa University and is currently pursuing a master's degree in organizational management from Spring Arbor University in Michigan.

What Army Logisticians Should Know About the Air Force

BY LIEUTENANT COLONEL JAMES C. BATES, USA (RET.)

In a similarly titled article in the July–August issue of *Army Logistician*, I presented a brief overview of how the Marine Corps conducts logistics, with specific emphasis on its logistics structure and doctrine. This follow-on article provides a brief look at the Air Force and its role within the joint warfighting community, with a specific focus on Air Force logistics.

Without question, the Army and Air Force complement each other across the full range of military operations. The Army depends on the Air Force for rapid strategic airlift of Army forces and equipment. During contingencies, the Army and Air Force frequently collocate at forward airfields. These airfields offer tremendous advantages to both ground and air forces. They serve as debarkation points for ground and air units, supplies, and equipment and support a multitude of logistics functions of both services. They are ideal sites for fuel storage facilities, petroleum and water pipelines, hydrant systems, electrical power generators, rail links, road networks, and flat, dry storage.

When Army and Air Force elements are situated together at an airfield, opportunities for logistics cooperation abound. As a result, Army logisticians who understand the organizational structure, joint warfighting roles, and logistics methods of the Air Force will be in a better position to streamline logistics-related operations across a full range of military operations under the control of a joint task force commander.

Defense Chain of Command

The Department of the Air Force was created in 1947. Before that time, air operations had been under the purview of the Army. The Department of Defense Reorganization Act of 1958 established the unified commands as the chain for operational command. The military departments of the Army, Navy, and Air Force were then tasked to organize, train, equip, and support combat forces for the unified commands, which today are categorized as either geographic or functional. Geographic commands are the U.S. European Command, the U.S. Pacific Command, the U.S. Southern Command, the U.S. Northern Command, and the U.S. Central Command. Functional commands include the U.S. Special Operations Command, the U.S. Transportation Command, the U.S. Strategic Command, and the U.S. Joint Forces Command. The Goldwater-Nichols Department of Defense Reorganization Act of 1986 streamlined the operational chain of command, defining it as extending from the President to the Secretary of Defense to the unified commanders.

Air Force Organization

Today's Air Force has approximately 359,000 airmen on Active duty, 107,000 in the Air National Guard, and 74,000 in the Air Force Reserve. This compares to the Army's 480,000 soldiers on Active duty, 350,000 in the Army National Guard, and 205,000 in the Army Reserve.

The Air Force is organized into 9 major commands, 35 field operating agencies, and 4 direct reporting units. The major commands are the—

- Air Combat Command, headquartered at Langley Air Force Base (AFB), Virginia.
- Air Education and Training Command, headquartered at Randolph AFB, Texas.
- Air Forces in Europe, headquartered at Ramstein Air Base, Germany.
- Air Force Reserve Command, headquartered at Robins AFB, Georgia.
- Air Force Space Command, headquartered at Peterson AFB, Colorado.
- Air Force Special Operations Command, headquartered at Hurlburt Field, Florida.
- Air Mobility Command, headquartered at Scott AFB, Illinois.
- Pacific Air Forces, headquartered at Hickam AFB,Hawaii.
- Air Force Materiel Command, headquartered at Wright-Patterson AFB, Ohio.

The major commands are organized on a functional basis in the United States and on a geographic basis overseas. These commands organize, administer, equip, and train their subordinate elements to accomplish assigned missions. In descending order of command, the elements of major commands include numbered air forces, wings, groups, squadrons, and flights. (See chart at right.)

A major command consists of three or more numbered air forces, which, in turn, consist of two or more wings each. A wing, normally commanded by a brigadier general, is the Air Force's prime warfighting

This B–52 Stratofortress, loaded with 46,630 gallons of fuel and 12 joint direct attack munitions, heads toward Iraq to provide close air support for coalition troops stabilizing that country.

instrument. Composite wings operate more than one kind of aircraft and may be configured as self-contained units designated for quick air intervention. However, most wings operate a single type of aircraft and are ready to join air campaigns worldwide. Each wing has from 1,000 to 5,000 personnel. Usually, each wing has an operations group, a logistics group, and a support group. A group, normally commanded by a colonel, typically consists of two to four squadrons and a group headquarters staffed with 500 to 2,000 personnel. The logistics group, generally the largest group in the wing, includes supply, transportation, contracting, maintenance training, and intermediate-level maintenance functions and provides various logistics data products. A squadron, usually commanded by a lieutenant colonel, normally consists of two or more flights and has 50 to 750 personnel.

Over the past few years, the Air Force has transitioned to an Expeditionary Aerospace Force that comprises 10 air expeditionary forces (AEFs). Each AEF is made up of approximately six squadrons of fighter and bomber aircraft; C–130 Hercules transports; refueling aircraft; search and rescue personnel; intelligence, surveillance, and reconnaissance forces; and the expeditionary combat support elements needed to support and operate expeditionary bases. In total, each AEF contains about 175 aircraft, some of which are deployed forward. Other aircraft, such as the F–117 stealth fighter and the B–2 stealth bomber, are on call at home stations. Each AEF is on a 90-day call status at least once during a 15-month period. The on-call designation applies to Reserve component units as well and allows airmen an opportunity to provide advance notice to their employers about pending deployments. Integrating the Reserves into the AEFs has eased some of the demands placed on the Active forces.

ELEMENT	SUBORDINATE ELEMENTS
Air Force	9 major commands 35 field operating agencies 4 direct reporting units
Major command	3 or more numbered air forces
Numbered air force	2 or more wings
Wing	3 or more groups
Group	2 or more squadrons
Squadron	2 or more flights

Air Force Logistics Elements

The Air Force Materiel Command (AFMC) (www.afmc-mil.wpafb.af.mil) is similar to the Army Materiel Command. The AFMC has three subordinate air logistics centers (ALCs): the Ogden ALC at Hill AFB, Utah, the Oklahoma City ALC at Tinker AFB, Oklahoma, and the Warner Robins ALC at Robins AFB, Georgia. The ALCs provide depot-level repairs and modifications of major end items and spare parts and components. Each ALC is responsible for specific aircraft and engines.

Of the Air Force's 35 field operating agencies, the one most relevant to Army logisticians is the Air Force Logistics Management Agency (www.aflma.hq.af.mil) at Gunter Annex, Maxwell AFB, Alabama. The Air Force Logistics Management Agency publishes a quarterly periodical, the *Air Force Journal of Logistics,* that provides timely analysis and discussion of Air Force logistics issues. Many of the articles are germane to Air Force and Army logisticians alike.

Two of the four direct reporting units, the Air Force Doctrine Center at Maxwell AFB and the U.S. Air Force Academy at Colorado Springs, Colorado, have the greatest logistics roles. Field operating agencies and direct reporting units report to Headquarters Air Force. Each is assigned a specialized mission that is more restricted in scope than that of a major command.

The Headquarters Air Force Deputy Chief of Staff for Installations and Logistics (USAF/IL) (www.il.hq.af.mil/index.cfm) is similar to the Department of the Army's Deputy Chief of Staff, G–4. The USAF/IL develops policies and provides resources that deliver effective agile combat support across the full spectrum of the Expeditionary Aerospace Force.

The Air Force also maintains an overarching contract that calls for civilian support during contingencies. The Air Force Contract Augmentation Program (AFCAP), which is very similar to the Army's Logistics Civil Augmentation Program (LOGCAP), is structured to provide a full range of civil engineering, logistics, and service functions, excluding mortuary affairs.

Air Force Airlift Assets

Air Force aircraft include bombers (B–1, B–2, B–52), fighter and attack aircraft (A–10, AC–130, F–15, F–16, F–117, and the future F–22 and F–35), reconnaissance and surveillance aircraft (E–3 Sentry, E–8 Joint STARS [Surveillance and Target Attack Radar System], OC–135, U–2, and unmanned aerial vehicles known as the Predator and the Global Hawk), Special Operations Forces aircraft (MC–130, EC–130 Commando Solo, HH–60G helicopter, MH–53 helicopter), tanker aircraft (HC–130N/P, KC–10, KC–135), strategic transport aircraft (C–5, C–17, and the soon-to-be-retired C–141), and tactical transport aircraft (C–130). This list is not all-inclusive.

The C–5 Galaxy's maximum cargo capacity, known as the "allowable cabin load," is 270,000 pounds. It can carry as many as 36 463L pallets. The maximum load for a single 463L pallet (88 inches by 108 inches) is 10,000 pounds. The C–17 Globemaster III's maximum cargo load is 170,000 pounds, and it can carry 18 463L pallets. The newest version of the C–130 Hercules, the C–130J–30, has a maximum cargo capacity of 46,812 pounds and can carry 8 463L pallets.

Airlift or Sealift?

One disadvantage of using airlift instead of sealift is that, when airlifted, supplies and equipment must be packed as breakbulk cargo on 463L pallets. This means that carefully balanced loads must be built from the bottom of the pallet up, sometimes as high as 8 feet. The loaded pallets then must be constrained with cargo nets or chains and, usually, enclosed with a waterproof plastic wrap, a process that can be time consuming.

Containerization, which is used in sealift, involves the use of containers that are 20 feet long, 8 feet high, and 8 feet wide. Each can accommodate about 40,000 pounds of supplies and equipment. Locked containers can be moved from a unit location to the port of debarkation and on to the deployed tactical assembly area.

Ammunition and Fuel Management

The Air Force's two largest sustainment needs are ammunition and bulk fuel. To assist with ammunition resupply, the Air Force funds three chartered pre-positioned ships to transport and store backup munitions for combat operations around the globe. Together, these ships contain approximately 52,000 tons of munitions stored in 5,000 ISO (International Organization for Standards) containers. Although these ships are dedicated to the Air Force, all of the services share many of the assets required to move and store large quantities of ammunition.

Deployed forces can often purchase subsistence, fuel, construction and barrier materials, and water locally or from allied forces. However, this is not the case with most ammunition, especially precision ammunition. In most cases, ammunition must be transported by air or sea from the continental United States or from forward ammunition depots. Ammunition is heavy, requires special handling at ports, and must comply with local government-imposed restrictions on the types and net explosive weight that can be stored and moved. Army and other service logisticians assigned to joint task force planning staffs must consider the limited ammunition storage and hauling resources available from a joint perspective when they develop ammunition distribution plans and establish priorities. During joint task force operations in Afghanistan, Kosovo, and Iraq, for example, the air campaign required ammunition in large quantities much sooner than the ground campaign did.

Like ammunition, fuel represents a critical supply requirement for both the Air Force and the Army. The Air Force prefers to use a fuel known as "JP–8+100" in its fighter aircraft and some C–130 aircraft. This fuel consists of JP–8 with an additive (known as +100) that increases the stability of the fuel at higher

operating temperatures. (The high limit of the thermal stability of JP–8 without the additive is 325 degrees; however, this increases to 425 degrees with the additive, hence the "+100" designation.) JP–8+100 significantly increases aircraft engine life and reduces maintenance. The downside of JP–8+100 is that it disables the coalescing filters that collect and remove water and other impurities from the fuel. The Army does not use JP–8+100 because of this negative effect and because there is no field test that can determine the concentration of +100 additive in fuel.

If necessary, Air Force aircraft can use other fuels, such as Jet A–1, JP–8, JP–4, Jet B, and JP–5. JP–4 and Jet B are highly volatile fuels that require special handling. JP–5 is less volatile than JP–8, which is the Army fuel of choice.

JP–8 contains fuel system icing inhibitor (FSII), corrosion inhibitor, and static dissipating additive. Commercial aircraft use Jet A–1 worldwide. Because most Army and Air Force aircraft do not have heaters to warm their internal fuel tanks as civilian aircraft do (heaters add unwanted weight to military aircraft), FSII must be added when Jet A–1 is used in military applications to prevent minute quantities of water, which are ever present in fuel, from freezing and potentially causing engines to malfunction.

Although the Defense Energy Support Center (DESC) attempts to provide the Army and the Air Force with JP–8 fuel, there will be locations where only Jet A–1 is available. In those cases, either DESC or the services themselves have to blend the required additives into the fuel. (Note: In a 24 February 2003 joint memorandum of agreement, the Air Force agreed to avoid using JP–8+100 additive for aerial refueling and during contingency operations because of the joint fuel interoperability requirements of deployed forces. As an exception to this agreement, the Air Force is allowed to use JP–8+100 fuel in its own deployed aircraft when practicable.)

The chart above provides an indication of the magnitude of the Air Force fuel requirements. To put these data into perspective, note that the fuel from one 53,000-gallon storage tank could fill either one C–5 Galaxy or 2,120 high-mobility, multipurpose, wheeled vehicles (HMMWVs).

VEHICLE OR AIRCRAFT	FUEL TANK CAPACITY (In Gallons)
HMMWV	25
M2A2 Bradley	175
M1A1 Abrams	505
UH–60 Black Hawk	362
CH–47A Chinook	621
A–10 Warthog	1,644
C–130 Hercules	6,662
C–17 Globemaster III	27,042
KC–135 Stratotanker	31,200
B–52 Stratofortress	46,630
KC–10 Extender	52,000
C–5 Galaxy	53,083

Agile Combat Support

Logistics operations, especially fuel and ammunition operations, are of vital concern to warfighters. While the Army's joint logistics transformation strategy is called Focused Logistics, the comparable strategy within the Air Force is called Agile Combat Support, the intent of which is to reduce the forward logistics footprint. Other key emerging Air Force operational concepts include the Global Strike Task Force, the Global Response Task Force, and the Global Mobility Task Force. The Global Strike Task Force responds rapidly to joint operational areas when enemies attempt to deny access to U.S. ground forces. The Global Response Task Force works with Special Operations Forces and the other services to respond to incidents of global terrorism. The Global Mobility Task Force helps ensure that rapid and effective air mobility support is provided to regional combat commanders across the full spectrum of operations.

Like the Army and the rest of the Department of Defense, the Air Force is transforming itself into a more lethal and deployable force. Army logisticians with insight into the Air Force organization and its logistics methods will be better able to make maximum, mutually beneficial use of limited logistics resources in deployed environments. **ALOG**

Lieutenant Colonel James C. Bates, USA (Ret.), is a former Army logistics officer who works for Alion Science and Technology Corporation. He currently serves as a sustainment planner for the U.S. Joint Forces Command, J–9 Transformation Office, in Suffolk, Virginia. He can be reached via email at batesj@je.jfcom.mil. *The author wishes to thank Colonel Ben Barnard, USAF (Ret.), Lieutenant Colonel Bill Quiones, USAF, of the Joint Forces Command, J–9 Transformation, Joint Logistics Transformation Office, and Del Leese of the Army Petroleum Center for their assistance in writing this article.*

Movement Control on a Nonlinear Battlefield

BY LIEUTENANT COLONEL ROBERT W. PETRILLO AND MAJOR DANIEL W. CARPENTER

On 7 June 2002, an 11-soldier advance party from the 330th Transportation Battalion (Movement Control) arrived at Karshi-Khanabad Air Base in Uzbekistan after a long trip from Fort Bragg, North Carolina. Our mission was to establish a movement control center (MCC) for Combined/Joint Task Force 180 (CJTF 180) operating in Afghanistan. Although CJTF 180 was built around the XVIIIth Airborne Corps, this operation definitely would not be a doctrinal corps movement control battalion (MCB) mission.

First, the CJTF 180 was a direct subordinate of U.S. Central Command (CENTCOM), so the MCC would have to fulfill both theater movement control agency and corps MCB missions. Second, the 330th would be working in a theater that relied almost solely on two modes of transportation—military air and commercial truck. Finally, rather than being part of a traditional corps support command structure, the MCC would be assigned to CJTF 180's Joint Logistics Command

Thousands of tons of cargo were carried by air. Here, Army and Air Force personnel load a C–130 Hercules transport at Bagram Air Base.

Principles of Distribution
(FM 100-10-1, Theater Distribution)

- Centralize management.
- Optimize infrastructure.
- Maximize throughput.
- Minimize forward stockpiling.
- Maintain continuous and seamless pipeline flow.

(JLC) and would be a subelement of its Distribution Management Center (DMC).

Establishing a Movement Control Center

Although our planning went through many phases and changes of direction, our focus remained on the DMC organizational structure and how the 330th could best fit into it. We felt that fully integrating materiel management, movements, and contracting under the control of a single commander would be the best way to ensure success.

The DMC's mission was to act as the distribution management support element for the JLC and provide staff supervision for the materiel management center and the MCC. The DMC also supervised the planning and coordinating of the time-definite delivery of units, materiel, equipment, personnel, and soldier support to, within, and from the combined/joint operational area (CJOA).

Procedures for setting up movement control operations on a nonlinear battlefield are a bit more complicated than those found in movement control doctrine. Field Manual 55–10, Movement Control, details the mission of corps MCBs and lays out the tactics, techniques, and procedures for establishing and managing movement control operations in the corps rear. The doctrine assumes that the predominant assets will be military trucks operating on a linear battlefield as part of the common-user land transportation pool, along with some Army rotary-wing aircraft and Air Force fixed-wing aircraft. Quite clearly, that would not be the situation in the CJTF 180 area of operations (AOR). The MCC and its subordinate movement control teams would operate in an AOR that was almost completely nonlinear and in which air operations, rather than line-haul operations, would dominate.

All of our planning and decisionmaking leading to the establishment of the MCC was based on the distribution principles found in FM 100–10–1, Theater Distribution.

MCC Operations

The three main transportation nodes in the AOR—Bagram, Kandahar, and Karshi-Khanabad—operated multimodal port activities. The two primary modes of transportation to the AOR were fixed-wing coalition aircraft (primarily U.S.) and commercial containerships. High-priority sustainment shipments and all units moved by air in the landlocked AOR. The vast majority of sustainment materiel moved by commercial container shipments to commercial ports or railheads, where it was loaded on commercial trucks for delivery to its final destination. The few military trucks in the AOR were used almost exclusively at the tactical level (brigade and lower).

Since the mission was nondoctrinal and we were not relieving another unit, we had to make our best guess when choosing the proper structure for the MCC. We did not want to underestimate the complexity of the mission but, at the same time, we wanted to avoid deploying more soldiers than we needed. As a starting point, we referred to the joint movement center structure outlined in Joint Publication (JP) 4–01.3, Joint Tactics, Techniques, and Procedures for Movement Control, and organized the MCC into three sections—Air Movements; Surface Movements; and Plans, Programs, and Requirements.

Thirteen more soldiers joined the advance party in July, for a total of 24. We committed to conducting a review of our manning after the first 30 days in operation and every 30 days thereafter. We figured that we would become more efficient as we gained expertise and set up systems. This indeed was the case. Our first review indicated that our efforts to establish management systems had borne fruit, and we could realign and reallocate personnel. The final MCC structure consisted of 18 soldiers—14 on the ground at Karshi-Khanabad, and 2 each at the air bases at Rhein-Main, Germany, and Incirlik, Turkey.

More With Less

As a part of the JLC, we were able to reduce our footprint significantly. Rather than deploy the entire 330th Transportation Battalion Headquarters and

Movement control center personnel at work in a Force Provider tent they share with the materiel management center.

Headquarters Detachment (51 people), we were able to rely on the JLC and its supporting corps support group for S–1, S–2, S–4, S–6, and legal functions. We were able not only to complete the mission with fewer personnel, but also to field more movement controllers through judicious use of dual hatting. For example, the chief of our Surface Movements Section was also the battalion S–4. He would revert to the S–4 role as required to support our logistics needs at Karshi-Khanabad or the requirements of our subordinate teams.

We also made ample use of cross-trained personnel. Although we had no S–1 or personnel administrative center (PAC) deployed with us, we did have one sergeant from the battalion PAC who cross-trained as a traffic management coordinator (military occupational specialty 88N) and worked in our Surface Movements Section. When needed, she handled the seemingly endless flow of evaluations, awards, and other personnel actions generated as units were attached to and detached from the battalion.

As the MCC for a CJTF, we operated simultaneously at three levels—strategic, operational, and tactical.

Strategic-Level Functions

On the strategic level, we coordinated changes to the time-phased force deployment data with the CJTF staff and CENTCOM and worked directly with the U.S. Transportation Command (TRANSCOM) to redirect strategic lift as the situation changed. Although CENTCOM had a joint movement center at Prince Sultan Air Base in Saudi Arabia, its focus was on intratheater air transportation, which left us to deal directly with CENTCOM's Strategic Movement Center, TRANSCOM, and the Air Mobility Command's Tanker Airlift Control Center on any issues concerning strategic lift.

Operational-Level Functions

At the operational level, we assumed missions usually performed by a theater movement control agency and took full responsibility for coordinating personnel and materiel movement into, within, and out of the CJOA to properly support the CJTF. We planned and coordinated the reception and redeployment of units according to priorities set by the CJTF CJ–4, maintained information on the status of shipments received in the theater, and facilitated delivery of the shipments to their proper destinations. We also coordinated with sister-service movement control organizations and TRANSCOM or its components as required.

As the senior movement control organization in the AOR, the MCC managed the transportation flow by keeping track of resources that were passing through the nodes and by maintaining a constant status of movement capabilities. To meet the needs of the command more effectively, we established a system for tracking shipments that were deemed critical. A "track, trace, and expedite" spreadsheet was posted on our Web site and updated as new information came in. The spreadsheet became a tool used by both logisticians and warfighters in and out of CJTF 180 who needed up-to-date information on the status of critical shipments. We also developed movement control procedures for the CJTF and, in coordination with the CJ–4, drafted the policies needed to make the most efficient use of transportation assets and supporting infrastructure in the CJOA.

Tactical-Level Functions

At the tactical level, the 330th had command and control of movement control teams at Bagram, Kandahar, and Karshi-Khanabad. Through these subordinate teams, we coordinated with supported units and transport operators. The teams played a critical role in planning and executing the reception and redeployment of personnel and equipment, and each node ran model marshaling and staging operations adapted to the physical limitations of their respective areas.

The teams were also the key links for managing, tracking, and reporting on the thousands of intermodal containers that moved in and out of the base camps. The teams' daily supervision and reporting, combined with constant interface with the logistics task forces that ran the base camps, enabled us to establish control over inbound containers. Our ability to provide positive inbound clearance of containers enhanced anticipatory and predictive logistics planning and improved force protection.

The teams also managed container detention and provided daily reports that gave us the data needed by the Military Traffic Management Command (MTMC) to adjudicate carrier detention claims. (Detention results when a shipper or consignee holds containers beyond a reasonable period for loading, unloading, obtaining forwarding directions, or any other reason.)

Force Structure

Our initial mission analysis indicated that we needed a port movement control team at each location. However, when we first hit the ground, the structure we inherited consisted of a port movement control team and a cargo documentation team at Bagram, the 101st Airborne Division's movement control team at Khandahar, and, at Karshi-Khanabad, a five-soldier ad hoc team deployed from the 330th Transportation Battalion earlier in the year. Fortunately, we had been involved in the planning cycle early enough to influence subsequent requests for forces, and, by the end of July, we had port movement control teams at all three nodes.

Each node also had a platoon (-) from a cargo transfer company that worked both the airfields and the container yards. In Khandahar, the platoon was placed under the command and control of the port movement control team commander. This worked so well that the JLC commander issued instructions to make the same command and control arrangements at all three nodes. When the full structure was deployed, we had a port movement control team, a platoon (-) from a cargo transfer company, and a cargo documentation team at each node to handle air and surface (intermodal containers and breakbulk truck) shipments. Over the course of the mission, a total of 12 different teams and platoons from both the Active and Reserve components were attached to the 330th.

Lessons Learned

The soldiers of the 330th Transportation Battalion (Movement Control) learned a number of valuable lessons during the 8 months they spent supporting operations in Afghanistan, many of which they were able to pass on to their fellow 330th soldiers deployed to Operation Iraqi Freedom—

• ***Distribution management center.*** Our experience supporting CJTF 180 as the "movements piece" of a DMC confirmed the value of this concept in making the Logistics Transformation a reality. Although there is no official organization for a DMC, the basic components—movements, materiel, and a coordinating cell—are the same regardless of echelon. Again and again, our ability to anticipate and predict requirements, to "see" what was in transit and on hand, and to redirect or redistribute shipments saved both money and, more importantly, time.

• ***ITV and TAV systems.*** We made constant use of a variety of in-transit visibility (ITV) and total asset visibility (TAV) systems, including the Global Transportation Network (GTN), Joint Total Asset Visibility (JTAV), radio frequency automatic identification technology (RF AIT), the Global Decision Support

System (GDSS), and the Single Mobility System (SMS). Later, we began using MTMC's Intelligent Road/Rail Information Server (IRRIS) to obtain data on the contents of intermodal containers inbound to the CJOA.

As we received attached movement controllers from across the Army, it became apparent that training on GTN and JTAV is spotty among traffic management coordinators and transportation officers, and knowledge of the Air Force systems (GDSS and SMS) is almost nonexistent. We were fortunate that MCC soldiers had been using these systems almost daily in the XVIIIth Airborne Corps Operations Center and that all deployed soldiers had passwords for every system, classified and unclassified. Our experiences and initial reports from soldiers participating in Operation Iraqi Freedom highlight the continued need for movement controllers to be skilled in using these systems.

Feedback from our teams deployed to Operation Iraqi Freedom also indicates that the lines between the different types of teams have been blurring and that our area and highway regulation teams have been used interchangeably with each other and with port teams. This makes it critical that soldiers serving on all types of teams, as well as those in an MCC, are familiar with these systems and that commanders develop training strategies that will keep all users current.

• ***Computers, computers, computers!*** In the 21st century, an MCC lives and dies by its computers and reliable connectivity. We relied on computers for access to ITV and TAV systems and for the majority of our secure and nonsecure communications. Our needs were enormous. The 14 soldiers at Karshi-Khanabad kept 14 machines (7 secure and 7 nonsecure) occupied almost full time. As an example, the Air Movements Section, manned by two soldiers during the day shift, had three computers assigned to it—two secure and one nonsecure. All intratheater air requests, load plans, and email moved on one secure terminal. The second secure terminal was used to operate the GTN and GDSS, and the single nonsecure terminal was used for SMS and other unclassified systems. The MCC commander and deputy commander/operations officer had both secure and nonsecure terminals on their desks since message traffic moved by both means. Movement control units preparing for this type of mission will find that they can't have too many computers.

• ***ITV and TAV shortfalls.*** Our ITV and TAV systems have come a long way from the days of Operation Desert Storm, but they still have a long way to go. We experienced varying levels of success with ITV and TAV systems. In general, both JTAV and GTN gave reliable answers about air shipments. There were occasional problems; for example, GTN sometimes showed a shipment as being in Dover, Delaware, or Ramstein, Germany, when it was actually sitting in the cargo yard at Bagram. However, almost all of those incidents could be traced to human input error. GIGO (garbage in, garbage out) rules.

The story was much different for intermodal containers. In July 2002, we spent a whole day searching via the GTN and JTAV systems to find out how much transportation and content information was available on containers inbound to the CJOA and how accurate it was. The results were not impressive. Of the 691 containers that MTMC provided information on (via emailed spreadsheets), we found that only a handful were entered in the GTN or JTAV systems and none had content data. Eleven years after the lessons of Desert Storm, we still could not tell the commander what was in the boxes.

To make the DMC concept work as advertised, we had to be able to tell the commander exactly what was en route to the AOR from the continental United States, Europe, and the Persian Gulf. With the failure of existing ITV systems, the Surface Movements Section developed an elaborate system of work-arounds to gain visibility of container shipments destined for the base camps in the CJTF 180 AOR. This system consisted of getting the vendors and the Defense Logistics Agency (DLA) to transmit container packing lists directly to the Surface Movements Section and establishing a "call-forward" procedure to ensure a flow of materiel from the ports that would reasonably correspond to base camp requirements. The call-forward procedure required constant telephone and email communication with commercial freight forwarders in Pakistan and Uzbekistan and involved manually updating spreadsheets that became more and more unwieldy as the volume of containers increased.

A redeploying unit's equipment awaits air mission assignment in the staging area at Kandahar.

A number of organizations, most importantly MTMC and DLA, have now begun a variety of initiatives to improve content visibility of surface shipments by addressing both infrastructure (more RF read-and-write stations and use of RF identification tags by all services) and business practices (MTMC will not move a container until the shipper has provided the information, including the detailed content information needed to populate ITV systems).

The DMC concept cannot realize its full potential until this kind of information is readily available through a single ITV system to users in the field. We must conquer this challenge if the "stockpile in motion" is to become more than a good bumper sticker and justification for further cuts to combat service support forces.

• ***Liaison teams.*** The corps support group that originally opened Karshi-Khanabad placed representatives at two critical nodes outside the AOR, and we continued that practice. We established what we called "movement control liaison teams" at the Incirlik and Rhein-Main Air Bases.

Incirlik was a key sustainment hub for daily C–17 Globemaster and commercial L–100 Hercules flights to Bagram and Karshi-Khanabad. The Incirlik team was staffed by a staff sergeant and a sergeant who were responsible for interacting with the Air Force air mobility squadron to maintain visibility of CJTF 180 "thru" cargo, alerting the MCC and the movement control teams about this cargo, and expediting selected cargo as directed by the MCC. They also assisted selected CJTF 180 soldiers transiting Incirlik and helped soldiers who were departing the CJOA on emergency leave.

A first lieutenant and a sergeant first class from the MCC and two soldiers from the Karshi-Khanabad logistics task force manned the Rhein-Main Air Base movement control liaison team. Their functions were similar to those of the Incirlik movement control liaison team, except that their primary role was to facilitate unit movements through Germany into and out of the CJOA; Rhein-Main was the primary passenger hub. They also coordinated with the U.S. Army Europe Movement Control Team at Ramstein Air Base to maintain visibility of CJTF 180 cargo and expedite selected items. While these teams were nondoctrinal and movement control organizations are not staffed to provide them, they were the natural solution to the shortcomings of the ITV systems and the desire to have more control over what was flowing into the AOR. Although we enjoyed great relationships with other nodes and received fantastic support from the staff at most of them, most notably Dover Air Force Base in Delaware and Camp Snoopy in Qatar, we would have put teams at every one of our cargo nodes if we had had enough personnel. Even with all of the ITV and TAV systems and the wonders of email, there is still no substitute for having a set of boots from your organization on the ground.

The 330th's experience as the MCC for CJTF 180 was both challenging and rewarding. The unique aspects of this mission thrust young officers and noncommissioned officers into situations not usually encountered until much later in a transporter's career. Our night shift air chief was a second lieutenant who dealt directly with the Air Force colonels at the Tanker Airlift Control Center, negotiated changes to strategic air mission routing, and coordinated additional missions to get the best possible support for the combatant commander. The Surface Movements Section chief, who developed and established the system that gained us control and visibility over surface shipments in the face of ITV systems failure, was promoted to captain while deployed. This very young team answered the call and put into place the structure and processes needed to manage and track the movement of thousands of tons of cargo carried in over 6,000 aircraft missions and thousands of intermodal containers. They also managed the movement of a volume of personnel that equaled moving the entire 82d Airborne Division eight times. The hard lessons they learned and the important initiatives they began served as the catalyst for changes that are currently paying great dividends in the support provided to U.S. forces in Operation Iraqi Freedom, many of whom are 330th veterans of Afghanistan and Uzbekistan.

On 31 January 2003, after 8 months, the 330th Transportation Battalion redeployed to Fort Bragg, leaving the MCC in the capable hands of the 257th Transportation Battalion (Movement Control) from Gainesville, Florida. The MCC structure no doubt will continue to evolve as the missions and situations change. **ALOG**

Lieutenant Colonel Robert W. Petrillo is the Commander of the 330th Transportation Battalion (Movement Control) at Fort Bragg, North Carolina. He has a bachelor's degree in political science from Syracuse University. He is a graduate of the Armor Officer Basic and Advanced Courses.

Major Daniel W. Carpenter is the Executive Officer of the 330th Transportation Battalion (Movement Control) at Fort Bragg. He has a bachelor's degree in history from Northern Illinois University and master's degree in public affairs from the University of Alabama at Huntsville. He is a graduate of the Armor Officer Basic and Advanced Courses.

Tactical Employment of a Forward Command Post by a Corps Support Group

BY MAJOR DANA C. HECK, AZARNG

In Operation Iraqi Freedom, the 24th Corps Support Group (CSG) (Forward) provided combat service support to 3d Infantry Division (Mechanized) and other V Corps elements during the drive from the Kuwaiti border to Baghdad. Providing combat service support in multiple locations over great distances was a challenge that required a fresh look at the CSG's use of command posts—specifically, the forward command post.

The concept of support developed for the 3d Infantry Division's drive to Baghdad called for the 24th CSG to build two forward logistics bases (FLBs), one near An Nasiriyah in southern Iraq to provide bulk refueling and one near An Najaf, about halfway to Baghdad, to provide bulk refueling and ammunition resupply. It also called for establishing a logistics support area (LSA) near Baghdad to provide a full range of logistics to the division. As the division moved forward, other CSGs were tasked with accepting battle handover (assuming command and control) of the FLBs and building the FLBs' capabilities into LSAs for follow-on forces.

Challenges to Developing the Concept of Support

The initial mission analysis revealed that the division's plan required rapid movement and that the 24th CSG could not predict when another CSG would be prepared to accept battle handover. In addition, movement across the border into Iraq was strictly controlled and the maneuver plan would not allow the group to move its entire main command post with 3d Infantry Division maneuver elements.

The distance involved in the group's multiple moves precluded the use of organic communication methods. The group was not stationary long enough to use mobile subscriber equipment, and the distances involved were too great for a Single-Channel Ground and Airborne Radio System (SINCGARS) to bridge. The 24th CSG plan for command and control of the logistics nodes would have to take into account the rapid movement, the great distance, and the group's inability to predict when other CSGs would be prepared to accept battle handover of the FLBs.

Developing a Plan

According to Field Manual (FM) 54–30, Corps Support Groups, CSGs establish command posts to serve as command and control centers from which to plan and supervise logistics. Doctrinally, the main command post maintains command and control of current operations and plans future support operations. Generally, the support operations section establishes the logistics operations center as a cell of the main command post. FM 54–30 discusses the use of a tactical logistics operations center forward or an alternate command post to overcome problems created by rapid movement and loss of communication with subordinate elements.

The group commander determined that the center of gravity for the group was each FLB that provided classes III (petroleum, oils, and lubricants) and V (ammunition) for the 3d Infantry Division. Therefore, it was imperative that a command and control element with more authority than a tactical logistics operations center forward be present at each FLB.

The alternate command post is usually the command post of a subordinate battalion; however, that would not place the key group decisionmakers at the center of gravity. For that reason, the group commander determined that the only viable solution was to create a forward command post using personnel and equipment from the group's main command post.

Creating the Forward Command Post

The forward command post was tailored around a core party with a minimal number of key personnel from each section. During Operation Iraqi Freedom, this included the group commander and group command sergeant major with drivers; group support operations representatives from maintenance, transportation, and supply and services; an assistant S–3; the nuclear, biological, and chemical (NBC) noncommissioned officer (NCO); an S–2 NCO; the unit judge advocate general (JAG) officer; two representatives from S–6; a representative from S–1; and a representative from the headquarters and headquarters company maintenance section. The support operations section provided representatives of the critical commodities being issued at that location. The S–2 NCO ensured awareness of enemy activity in the area, and the assistant S–3 controlled tactical movement and maintained awareness of the friendly maneuver situation. The S–6 representatives provided emergency troubleshooting capability, and the maintenance section representative provided limited onsite –20-level maintenance support.

The forward command post was moved on one palletized load system flatrack and a 5-ton truck. The flatrack carried two quadruple containers, two generators, sandbags, wire, and pickets. Inside one container was a tent equal in size to two frame tents. The second container held tables, chairs, field desks, map

boards, and office supplies. The environmental control unit was moved on an M105 trailer behind the 5-ton truck that carried the field sanitation equipment, rations, water, cots, and personal bags.

Once the composition of the forward command post was determined, the group developed a plan for echeloning the forward and main command posts. Since the group was limited in the number of vehicles it could move immediately behind 3d Infantry Division maneuver units, the group commander decided that the forward command post would move to An Nasiriyah and establish the first FLB. This location was critical because it was designed to become the bulk fuel supply source to support all V Corps forward maneuver. About 12 hours after the forward command post moved out, the main command post would move north to An Najaf to establish the second FLB.

When the forward command post could hand off the An Nasiriyah FLB to another CSG, it would move north and temporarily link up with the main command post. This linkup was planned to last only about 12 to 24 hours and was designed to allow the staffs of both command posts the opportunity to exchange information. When that information exchange was complete and the forward command post had resupplied itself, it would move to the outskirts of Baghdad to set up the LSA that would support the cordoning of Baghdad by the 3d Infantry Division. With the planning complete, all that was left was to execute the plan.

Executing the Plan

Despite the plan for the forward command post to cross the border 12 hours before the main command post, they both crossed the border into Iraq on 21 March immediately behind 3d Infantry Division maneuver elements, though in separate movement serials. After a 158-kilometer tactical road march, the forward command post arrived at the first destination on the morning of 22 March and established an FLB near An Nasiriyah. This FLB began as a bulk fuel distribution point and grew into a full LSA providing class I (subsistence), III, V, and maintenance support. The main command post arrived about 12 hours later. After a short stop to take on additional fuel, the main command post moved out to establish the second FLB near An Najaf.

After being halted by enemy contact further along the route, the main command post established the next FLB on 24 March. After about 24 hours in An Nasiriyah, the forward command post handed off operation of the LSA to another CSG and conducted a 164-kilometer tactical road march to a linkup with the main command post. This FLB would provide bulk fuel, ammunition, class I, and water to 3d Infantry Division units for about 5 days and to all echelons-above-division units in the area for approximately 14 days. The forward command post fell in on the main command post about 24 hours after the main command post was established.

On 1 April, the forward command post conducted a tactical road march to an interim location about 50 kilometers north of An Najaf and collocated with the division rear command post. The forward command post remained in that location for 3 days waiting to continue its movement. On the morning of 4 April, the forward command post conducted an 89-kilometer tactical road march to a location on the outskirts of Baghdad and established an FLB. This FLB ultimately provided the full range of logistics, including classes I, III, V, VII (major end items), and IX (repair parts), maintenance, and field services, to the group's customer base. After conducting a battle handoff with another CSG of the An Najaf LSA on 6 April, the main command post moved to link up with the forward command post.

Elements of the group also established convoy support centers at each FLB location and a stand-alone convoy support center near As Samawah. The convoy support centers provided retail fuel and a maintenance contact team to support transportation assets.

Although the fog of war caused the execution to be slightly different from the plan, creating a forward command post gave the 24th CSG commander greater flexibility to command and control logistics support to the 3d Infantry Division. Ultimately, as the Army moves to a lighter, more rapidly deployable force, logistics units may be able to provide support with the force on hand rather than with the full complement of capability.

Likewise, as in Operation Iraqi Freedom, on a fast-moving or asymmetrical battlefield, it may be necessary to have simultaneous command and control presence at multiple locations, which a tactical logistics operations center or alternate command post cannot provide. A forward command post can provide that presence without adversely affecting the ability of the group as a whole to command and control logistics operations. **ALOG**

Major Dana C. Heck, AZARNG, is the operations officer for the 258th Rear Area Operations Center at Glendale, Arizona. He served as the S–3 of the 24th Corps Support Group (Forward) during Operation Iraqi Freedom. He is a graduate of the Armor Officer Basic and Advanced Courses, the Junior Officer Maintenance Course, the Military Intelligence Officer Transition Course, and the Combined Arms and Services Staff School.

COMMENTARY

Iraqi Freedom: Triumph of Precision-Guided Logistics

BY GENERAL WALTER KROSS, USAF (RET.)

In early attempts inside and outside of the Pentagon to assess the lessons learned from Operation Iraqi Freedom, attention has turned, quite correctly, to such areas as the demonstrated quality of our joint operations, the extraordinary caliber of our fighting men and women, the incredible efficacy of heavy armor, the impact of Special Forces as part of joint operations on the battlefield, and the success of precision-guided weapons of all kinds. Predictably lost in the buzz over celebrating such watershed developments as the Air Force's movement from sorties-per-target to targets-per-sortie is what I view as perhaps the most profound lesson of Iraqi Freedom: the emergence and near-seamless execution of what some have termed "precision-guided logistics."

Perhaps this is as it should be. War logistics, when truly working, should be transparent to the warfighter. Logistics is not glamorous, but it is critical to military success. FedEx, UPS, and other commercial logistics giants have shown the military that we can and should expect to have total asset visibility (TAV). Logisticians and commanders should be able to know "what is where" as well as what is on the way and when they will have it. Such visibility, across the military services, should be a given in military operations by now —in 2003. Only it has *not* been up to now. We have gotten continuously better over the last decade, but Iraqi Freedom represents a watershed event in our progress.

The "First" Gulf War

As the Director of Operations and Logistics of the U.S. Transportation Command (USTRANSCOM) during the "first" Gulf War in 1990 and 1991, I was part of a team that was charged with managing the largest movement of manpower and materiel since World War II. While we accomplished this daunting task, I can tell you that it was seldom pretty. We didn't have the tools or the procedures to make it efficient. In essence, we were masterful "pushers" of people and assets to the theater.

In contrast to the precision-guided logistics that we saw in Iraqi Freedom, the Gulf War was really the epitome of "brute force" logistics. The notion of having Iraqi Freedom's asset visibility—in transit, from factory to foxhole—would have been, for us, beyond the pale.

During the Gulf War, we simply did not have good information on almost anything. We did not have good tracking; we had no real asset visibility. Materiel would enter the logistics pipeline based on murky requirements, and then it could not really be tracked in the system. When it got to the other end of the tube, we had to deal with the consequences.

We had situations where the supply sergeants up front were really working without a logistics plan to back up the war plan. We lacked the necessary priority flows to understand where and when things were moving. It was all done on the fly, on a daily basis, and the U.S. Central Command would decide, given the lift they had, what the priorities were. Although we eventually made some progress in extending our load plans to 24, 48, and even 72 hours, often whatever got into the aircraft first was what was loaded and shipped to the theater. It truly was brute force.

Even when we were able to prioritize aircraft or shipping loads, we still had no visibility. Although it is difficult to grasp today, consider that we would load a ship and then mail a floppy disk in country. Whether that floppy disk got where it was going before the ship got there was an open question. We had ships arriving without the recipients in the theater knowing what was on them.

Generally speaking, if front-line commanders weren't sure of what they had or when it would get there, they ordered more. There weren't enough people to handle this flow, and, in the end, we sent far more materiel to the theater than we needed. In contrast to Iraqi Freedom, it was definitely a "just-in-case" approach to logistics. When the war ended, we had so highly spiked the logistics pipeline that we had 101 munitions ships on the high seas. Again, it was brute-force logistics at its finest.

The result was the oft-referenced "iron mountains" of shipping containers. We had too much, and, worse yet, we did not know what was where. This led, inevitably, to being forced to open something like two-thirds of all of the containers simply to see what was inside. Imagine the difficulty in finding things if you shipped your household goods to your new house using identical unmarked boxes. Since we had a great number of individual users, imagine that the household goods of all of your neighbors also were arriving at your new address, and in the same identical boxes.

The Seeds of Precision-Guided Logistics

That we had this brute force dilemma in the Gulf War was no secret. There just wasn't any other way around it. We did the best that we could with the technology that we had.

We conducted the Desert Storm deployment using 286-processor technology with very slow transfer rates,

without the Internet, without the Web, and without encrypted satellite information. We basically used telexes and faxes. We didn't really use emails much back then. Worse, we had never operated any of our limited automation technology on a massive scale. There were no "business rules." And there was no "buy-in" from all of the critical players.

This was an era of green computer screens, when it took 18 key strokes just to get to the main screen. When we got the right screen up, the data were missing or highly suspect—"not actionable," in today's terms. In contrast to today, there were no data coming in from netted data bases, and there was no software to reconcile things. There were no radio frequency identification tags.

In fact, nothing being shipped was tagged. Every shipment basically had a Government bill of lading attached to it, or there were five or six different items that together had one bill of lading; when those items inevitably got separated, the materiel was essentially lost from accountability.

Faced with this logistics nightmare, and knowing that there was often a critical need to get particular things to a particular place at a particular time, we had to make our system work, at least in part. That was the advent of precision-guided logistics. We established a "Desert Express": two C–141 transports that transited daily from Charleston, South Carolina, to the theater of operations. When it absolutely, positively had to be there overnight, we had a means to make that happen. In essence, what we did was establish a precision-guided "capillary" in this brute force circulatory system for a very limited amount (less than one-half of 1 percent) of our materiel.

Although these C–141s seldom carried an optimal load and thus were less than fully efficient, they did provide us with a nascent precision-guided logistics capability. The challenge that emerged from the Gulf War was to make our entire logistics enterprise operate with the same degree of information, assurance, and visibility.

The Application of Technology

As a result of our experience in the Gulf War, the Department of Defense (DOD) for the last 12 years has been refining its technologies and testing them through military joint exercises and deployments and contingencies in such places as Bosnia, Kosovo, and Rwanda. Specifically, DOD has focused on the issue of logistics management and tracking and on how technology can provide a force multiplier in this mission area. TAV and the Global Transportation Network (GTN) have vastly improved our capabilities.

DOD has improved its logistics management and tracking through policy directives and by engaging with innovative companies like Savi Technology in the development and leveraging of technical solutions.

The fact is that last time, during the Gulf War, we did most of our logistics tracking on paper. This time, with improvements like Savi tags and readers as the linchpins of information and software systems that create holistic solutions at the strategic and tactical levels simultaneously, in-transit visibility (ITV) of things that were moving was available to certified users—right on the Web.

DOD now has clear knowledge of when things are actually moving—the planes, the ships, what's going to be on them, and what needs to be moved. TRANSCOM has gone digital, and that represents a quantum leap in capability and efficiency from the first war in Iraq. Our operators now get "ground truth" at ground zero—and everywhere else. We now have the technology to absorb, manage, and precisely guide materiel.

As noted by General Paul Kern, Commander of the Army Materiel Command, at the April 2003 Association of the United States Army Logistics Symposium, DOD took the lessons learned 12 years ago and implemented action. "We now have a policy, DOD-wide, that says that everything that moves must be tagged." Talking about the effectiveness of the technology, Kern asserted that recent operations suggest that "we have it down pretty good."

As for the ITV and TAV challenges for DOD and industry emerging from the Operation Iraqi Freedom experience, General Kern noted that more must be done to leverage the efficiencies of the technology throughout the force: "We have driven industry to develop this. Now we have to have the discipline to ensure that we use it universally." With respect to the enabling technology, Kern noted that "the next generation is not here yet" and charged industry with improving upon its successes.

Just as the emergence of precision-guided weapons between the Gulf War and Operation Iraqi Freedom allowed U.S. military forces to do much more with much less, the emergence and maturation of precision-guided logistics between the conflicts allowed for much more effective logistics management during Iraqi Freedom. This was a key to success of the engagement. DOD should sustain its successful efforts in partnership with industry to automate and improve logistics tracking as a force multiplier. Welcome to the era of precision-guided logistics. It's about time.

General Walter Kross, USAF (Ret.), was the Commander of the U.S. Transportation Command and served as its Director of Operations and Logistics during the Persian Gulf War. He is President and Chief Executive Officer of Flight Explorer, an Arlington, Virginia-based software company.

The Iron Horse Express

BY LIEUTENANT COLONEL DAVID G. COTTER

Preparing equipment for a HETs-only convoy.

In late January 2003, Task Force Iron Horse prepared to deploy to Turkey during the early stages of Operation Iraqi Freedom. The task force was charged with opening a northern front through Turkey for operations by the U.S.-led multinational coalition in its efforts to disarm Iraq.

Task Force Iron Horse was built around elements of the 4th Infantry Division (Mechanized) at Fort Hood, Texas. Because it would be a stand-alone force, the task force enlisted help from an enhanced logistics package anchored by the 64th Corps Support Group (CSG), which is part of the 13th Corps Support Command, also at Fort Hood. Included in the 64th CSG are the 180th Transportation Battalion, the 544th Maintenance Battalion, and the 553d Corps Support Battalion. All three battalions enjoy habitual relationships with the 4th Infantry Division (4ID).

Change in Plans

Establishing a northern front through Turkey quickly became a politically unworkable option, so, in late March, the Secretary of Defense diverted Task Force Iron Horse to Kuwait. The 4ID and its attached units quickly shifted their attention south and deployed to Kuwait, while ships loaded with the task force's equipment moved from the Mediterranean Sea through the Suez Canal, the Red Sea, around the Arabian Peninsula, and up the Persian Gulf to Kuwait. On arrival in Kuwait, the task force was directed by the V Corps commander to get into the fight immediately. However, task force leaders faced an operational dilemma: They needed to figure out a way to move more than 20,000 soldiers and all of their attendant combat equipment quickly into the battlespace. Time was of the essence because the battle for Baghdad was underway, and the corps commander needed Task Force Iron Horse's considerable combat power without delay.

From 31 March through 16 April, soldiers arrived by air at Kuwait City International Airport, while their equipment arrived by sea at the port at Ash Shu'aybah in Kuwait. Both ports of debarkation were over 450 miles from the task force's tactical assembly area (TAA), which was immediately south of Baghdad.

The usual way to move heavy combat gear is by rail, but the rail infrastructure in Iraq was essentially nonexistent and the rail lines that did exist were inadequate to the task. However, two good, usable highways ran the length of the corridor to the TAA and could be used as main supply routes. With good security, these roads could serve as avenues to the front line. On 13 April, the Assistant Division Commander for Support asked the commander of the 64th Support Group if the 180th Transportation Battalion could move the task force into the fight quickly. After checking on the availability of heavy equipment transporters

Extraordinary means were required to move an extraordinary quantity of equipment in support of Operation Iraqi Freedom.

(HETs), the support group commander gave the 180th Transportation Battalion a warning order to be prepared to move the task force from its marshaling areas to the TAA on HETs.

Extraordinary Measures for Extraordinary Times

A HET move of this magnitude had not been carried out before, but the urgency of the situation demanded unorthodox measures. Approximately 1,500 tracked combat equipment vehicles and other outsized engineer equipment in the task force had to be moved. As soon as the warning order was received, the 180th began to prepare to receive every HET unit in V Corps. The battalion S–3 took the lead, not just in planning the operational aspects but also in resourcing and coordinating everything from living space and life support for more than 1,000 soldiers in the battalion to providing fuel at critical points along the route. The battalion staff had only 2 days to come up with a plan for assuming attachment or operational control of eight HET units.

The 2d, 11th, 287th, and 377th Transportation Companies (HET) were attached to the 180th for the HET move. The 96th and 233d Transportation Companies (HET) were placed under the operational control of the battalion. The 217th and 253d Transportation Companies and a platoon of Army HETs, operated by civilian contractors, augmented the battalion throughout the operation. These units were spread out across the corps area, and it took up to 48 hours for some of them to rally at the marshaling areas at Camp New York, Kuwait.

More than 375 HETs were assigned to the 180th for the mission. Organizing a battalion of this size so it could come together at Camp New York in a very short time and begin operating immediately in a contingency environment required strict, centralized control. Each arriving unit was given a specific area to occupy, but every other aspect of the operation was executed at battalion level. As individual HETs became ready to move, they were put into the flow with little regard for unit integrity—the 4ID was needed desperately in the fight for Baghdad.

Maintenance "Pit Stop"

As the units flowed into Camp New York, initially and after each mission, they passed through a consolidated maintenance "pit stop" that accounted for the vehicles and provided fuel and quick-fix maintenance so they could join or return to the fight quickly. The battalion executive officer was the maintenance linchpin for the HET move. He often made all-night runs to the rear for parts and tires. Trailer tires were the biggest challenge—each HET trailer has 40 tires. More than 100 new tires were needed each day to replace those that succumbed to the heavy loads and hot weather. Compounding the maintenance difficulties was the immaturity of the theater and the 4 to 6 weeks it took for repair parts to begin flowing into the theater for the arriving units.

Vehicles that passed the maintenance quality check at the pit stop moved back into their unit lines. Vehicles that failed the maintenance inspection were fixed by the maintenance team or moved onto deadline row, and the vehicle crews moved on to the ready line for their next missions.

A view of a HETs-only convoy.

The trip to the marshaling areas at Camp New York from the seaport of debarkation at Ash Shu'aybah was about 100 miles, and the distance to Baghdad from the marshaling areas in Kuwait was another 368 miles. Seventeen of the 368 miles were on "Iron Horse Trail," a rutted, dusty tank trail that led from the marshaling areas out to Kuwait Route 80. Once on Route 80, the roads were all multilane, paved roads except for a 4-mile stretch across the Kuwait-Iraq border, which was a single paved lane through the outskirts of Safwan, Iraq.

The 4ID concept for the operation was a unique combination of organization and security. The mission was to be treated not as a transportation mission but as a unit move—of a very big unit. The convoys would be built in unit serials with the uploaded HETs interspersed among other wheeled vehicles. To mitigate the risk to the drivers of the HETs, the Assistant Division Commander for Support and the Division Transportation Officer developed a plan to put an extra soldier in the cab of each HET. The purpose of the third soldier was to provide an alert assistant to the driver while the relief driver slept in one of the two bunks in the HET cab.

In a radical shift from normal peacetime procedure, the combat vehicle crews would stay aboard their vehicles after they were loaded onto the HETs to man the crew-served weapons on the vehicles, thus providing an elevated level of force protection for the convoys. That deterrent plan worked very well; for the first time, the HET convoys were not subjected to the intermittent harassing fire that had been commonplace in the early days of Operation Iraqi Freedom. An M1 Abrams tank with a system enhancement package (M1 SEP), even a trailer-mounted one, makes a powerful statement. Using these techniques, most of the 1st Brigade, 4ID Headquarters, and the 3d Brigade flowed into the TAA over the next 9 days.

Driver Safety

The turn-around time for each cycle, or "flip," of the convoy was approximately 48 hours. The HET operation achieved a deliberate battle rhythm, and the division's equipment was delivered with some predictability. At the 180th Transportation Battalion, the main concern was for the drivers. No truck driver is capable of indefinite nonstop operations. Exacerbating the situation was the fact that many of the participating units had been moving at a breakneck pace since January. For the first few flips, the nonstop operations worked well. As the flips accumulated, however, the drivers began to show signs of dangerous levels of exhaustion, and it became apparent that a plan was needed that could speed the division to the TAA and still provide some rest for the drivers.

Two mitigating measures emerged as potential solutions. The first was to add a 6-hour break at the end of each flip to give the drivers time to sleep. The second was to convince the 4ID to run only HETs in order to lessen the flip time. Fully loaded HETs could travel safely at 40 to 45 miles per hour on Iraqi roads instead of the 20 to 25 miles per hour that was typical for other tactical vehicles. Shorter flips would give the drivers more time to rest.

However, before a decision could be made on the convoys, the 4ID mission was abruptly halted because the V Corps commander wanted to move the 3d Armored Cavalry Regiment (ACR) into western Iraq to face an emerging threat. The HETs would have to stop moving the 4ID and start moving the 3d ACR.

3d ACR Move

The 3d ACR arrived in the middle of the 4ID move and, after observing how well the HETs-only convoys were working, the 3d ACR commander decided he wanted his regiment moved the same way. The 180th began moving the 3d ACR on 25 April and moved approximately 544 pieces of combat equipment in the next 5 days. With HETs-only convoys, there was a 30-percent drop in flip times.

The regiment moved west on 1 May to accomplish its mission, and the 180th turned its attention back to the 4ID mission. The 2d Brigade, the rest of the division troops, and an entire engineer brigade still had to be moved. The Division Transportation Officer had watched the regiment's move and, because it went so well, suggested moving the remaining units by HETs-only convoys also.

By 6 May, all of Task Force Iron Horse had been moved to the TAA. The 180th Transportation Battalion had moved two large combat formations—Task Force Iron Horse and the 3d Armored Cavalry Regiment—and over 1,750 pieces of combat equipment in only 21 days. Truly, as every transporter knows, "nothing happens until something [or in this case, everything] moves!" **ALOG**

Lieutenant Colonel David G. Cotter is the Commander of the 180th Transportation Battalion, 64th Corps Support Group, 13th Corps Support Command. He has a bachelor's degree from Brown University in Rhode Island, a master's degree from the University of Massachusetts, and is a graduate of the Army Command and General Staff College. Previously, he was assigned in the office of the J–5, U.S. European Command.

Logistics at Yama Sakura 43

BY SERGEANT MAJOR JOHN J. BLAIR

Each year, the United States and Japan conduct a simulated training exercise in Japan. The exercise, known as Yama Sakura, is designed to improve the working relationship of the U.S. and Japanese military organizations. The Yama Sakura Command Post Exercise 43 (YS43) was held last January and February at Camp Higashi-Chitose on Hokkaido, the northernmost of Japan's four major islands. Yama Sakura is an annual joint and combined, simulation-driven training exercise designed to improve combat readiness of unit commanders and their staffs. The exercise also is designed to foster professional and personal bilateral relationships between the United States military and the Japanese military.

Each year, different organizational elements of the Japanese Army participate in Yama Sakura. This year's participants included the U.S. Army's I Corps and the U.S. Marine Corps' III Marine Expeditionary Force and the Japan Ground Self-Defense Force (JGSDF) Northern Army (NA). The logistics side of the exercise gave U.S. Army Quartermaster units the opportunity to learn about Japanese supply and maintenance.

The exercise was driven by the Joint Training Confederation of Models and included the corps

battle simulation, the air warfare simulation, the joint intelligence model, and tactical simulation. The commanders and staffs of the training units operated from tactical operations centers at field locations in Higashi-Chitose. Site support was the responsibility of Logistics Task Force 35, which comprised elements from U.S. Army Japan (USARJ) and the JGSDF NA. From setting up a cybercafe for sending emails home to providing fuel for tent heaters, this element provided excellent service and support.

Exercise controllers from USARJ and JGSDF NA replicated forces above, below, and adjacent to the headquarters of participating units. Controllers guided the course of the battle and the operational tempo to create opportunities for staff interaction and decision-making that supported the unit commanders' training objectives. Active Army, Army National Guard, and Army Reserve units supported the primary units logistically. The major logistics units were the 9th Theater Support Command, 301st Area Support Group, their support units, and notional players (fictional units that were computer simulated for the exercise). For these supply and transportation units, YS43 created a realistic training environment for exercising operational and tactical combat service support (CSS) theater distribution concepts.

Theater Distribution

A relatively new logistics system was tested in the YS43 exercise. The goal of theater distribution is to project power with the most capable forces at the decisive time and place. The cumbersome vertical system that was based on functionality was replaced by a distribution-based system—the functional phase of logistics, which includes all actions of dispensing materiel, personnel, facilities, and services to, from, and within the theater.

YS43 showcased a CSS system that is responsive, flexible, and precise. Focused CSS provided rapid responses, tracked and redirected assets en route, and delivered tailored CSS packages directly to all levels of operations. An effective and efficient theater distribution system integrated the efforts of the many elements of the distribution structure throughout the operation. In this computer-based arena, being an "Excel guru" or "PowerPoint ranger" was a greater asset than being an expert rifleman.

Logistics units at YS43 exercised many theater distribution principles. Communications zone distribution functions are intrinsically joint and may be multinational. Organizations that operate within the distribution system resource network worked together in the exercise. Distribution management facilitated the fusion process that allowed CSS commanders and staffs to synchronize distribution functions and focus support within an area of operations. CSS functions that until recently were rigid, vertical ("stovepipe") organizations proved that they have incorporated the information technologies needed to transform to a distribution-based system. Service and Defense agencies and Active and Reserve component CSS forces all worked together.

Host Organization

The JGSDF NA is headquartered in Sapporo, Hokkaido, Japan. Sapporo is a city of nearly two million people located at the same latitude as Vladivostok, Russia, and Detroit, Michigan. It has similar low temperatures and heavy snow. The NA's mission is threefold: to defend Hokkaido, to provide disaster relief (the majority of which is searching for missing persons and providing emergency medical transportation), and to provide international cooperation (the latest example is the deployment of engineers to East Timor). The NA consists of 4 divisions and 47,000 soldiers. It is the largest army contingent in Japan, stationed in 38 camps on the island of Hokkaido.

NA logistics consists of 3 general support battalions, 3 transportation units, and 14 direct support battalions. The NA headquarters is organized into seven departments, one of which is the logistics department. The logistics department has four divisions that are broken down into sections. The logistics operations division has two sections: logistics planning and transportation. The equipment division has six sections: equipment management, arms, vehicles, ammunition and chemical, engineer equipment, and signal equipment. The quartermaster division has three sections: quartermaster; petroleum, oils, and lubricants; and subsistence. The

Japan Ground Self-Defense Force personnel train on cross-country skis.

The worksite was so ice covered that some soldiers created a point system to score slips and falls: a slip where one recovered—one point, fall to one hand—two points, fall to both hands—three points, and so on.

engineer division has three sections: plans and administration, construction, and facilities engineering.

The strength of JGSDF NA logistics is that it is backed by Japan's strong economic base. Its weaknesses are its vulnerability to attack, the disruption to efficient logistics flow caused by Japan's mountainous terrain and population centers, and its dependence on other nations for numerous resources.

USARJ and JGSDF NA complement and strengthen each other as partners in peace. Like the U.S. Army, the JGSDF is implementing logistics reforms with the goals of achieving improved unit integration of mechanics and field maintenance, organizing along functional lines, and enhancing the unification of supply and maintenance.

YS43 Living Conditions

To provide optimum training, living conditions mirrored exercise conditions. Snow and rain were present every day. Tents served as the work areas for the long hours of logistics play.

I Corps established the dining facilities. Soldiers were provided either fresh food prepared in the dining facility—A-rations (As)—or prepackaged combat rations—meals, ready-to-eat (MREs). The ration cycles were A–MRE–A for the day shift and MRE–MRE–A for the night shift. Many soldiers added to the standard military fare with food from JGSDF post exchange facilities, meals from noodle shops and Friendship Hall (a place to relax and interact with other American and Japanese soldiers), and rare off-post dinners before and after the exercise.

Showers and sinks were limited, so many soldiers used the ofuro—a traditional public bathing area.

Socialization

Each year USARJ organizes a home visit program (HVP), in which Americans are invited into Japanese homes for dinner and socializing. HVP is not designed solely for the soldiers' entertainment, even though this is one of the benefits of this unique experience. The objective of the HVP is to improve the cross-cultural knowledge of both Japanese and American participants and to establish and improve relations at the grassroots level.

The JGSDF and U.S. forces held two socials at the beginning of the exercise and one social at the end of the exercise.

The realism and timing of the exercise could not have been better for the participating logisticians. Three units received deployment orders and another received warning orders during the exercise. This year's successful Yama Sakura exercise and bilateral military interaction improved the skills of participating soldiers, enhanced the readiness of the U.S. joint forces, and strengthened existing relationships between the two longtime allies. YS43 proved, and improved, the professional and personal relationships between the two nations' militaries. By far, the most important benefit was the friendship and trust that Americans and Japanese built through working and socializing together. **ALOG**

Sergeant Major John J. Blair is the noncommissioned officer in charge of the Supply and Maintenance Directorate of the 9th Theater Support Command at Fort Belvoir, Virginia.

Training Logisticians in the Objective Force

BY CAPTAIN MARTINE S. KIDD

Future conflicts will take place on an asymmetrical and noncontiguous battlefield, requiring increased agility, lethality, and survivability. One of the stated Army Transformation objectives is to reduce the combat service support (CSS) footprint needed to support this smaller, more mobile, and more rapidly deployable force. Consequently, future logisticians must support the full spectrum of military operations with greater efficiency than ever before. The Objective Force will require precise, distribution-based, focused logistics and better educated, highly trained logisticians, whose technical and tactical competence will become a decisive factor in fighting and winning our Nation's wars. A careful analysis of current training doctrine, compared to the future training concepts for the Objective Force, is needed to clarify the differences and understand where Army training is now versus where it needs to go in the future.

A lot of attention has been given to the materiel solution and the associated research, development, and fielding of equipment for the Objective Force and Army Transformation. However, the complexities of training have not been addressed fully. Objective Force training models are based on theory and concepts that deal only with how training will be done and not what that training will include.

Two central questions to be considered are: How will the Army train and verify the critical skills and proficiencies of its soldiers and leaders? Given the immutable nature of war, are there certain immutable skills that are required of logisticians?

The Objective Force Training Plan

In October 1999, the Chief of Staff of the Army unveiled his Transformation Campaign Plan, which outlined seven force characteristics: responsive, deployable, agile, versatile, lethal, survivable, and sustainable. These characteristics provide a context that has many implications for the CSS community.

How will we prepare Objective Force logisticians to master the anticipated changes in the battlespace, combat systems, communications architecture, and maneuver support plan? Training and evaluation is the answer. The Army Training and Doctrine Command (TRADOC) has identified three core professional military education domains that define the learning experiences of soldiers and leaders during their careers: institutional, operational, and self-development.

The ***institutional*** domain includes initial-entry training and all other forms of education and training offered on location at various TRADOC-sanctioned schools and by TRADOC mobile training teams.

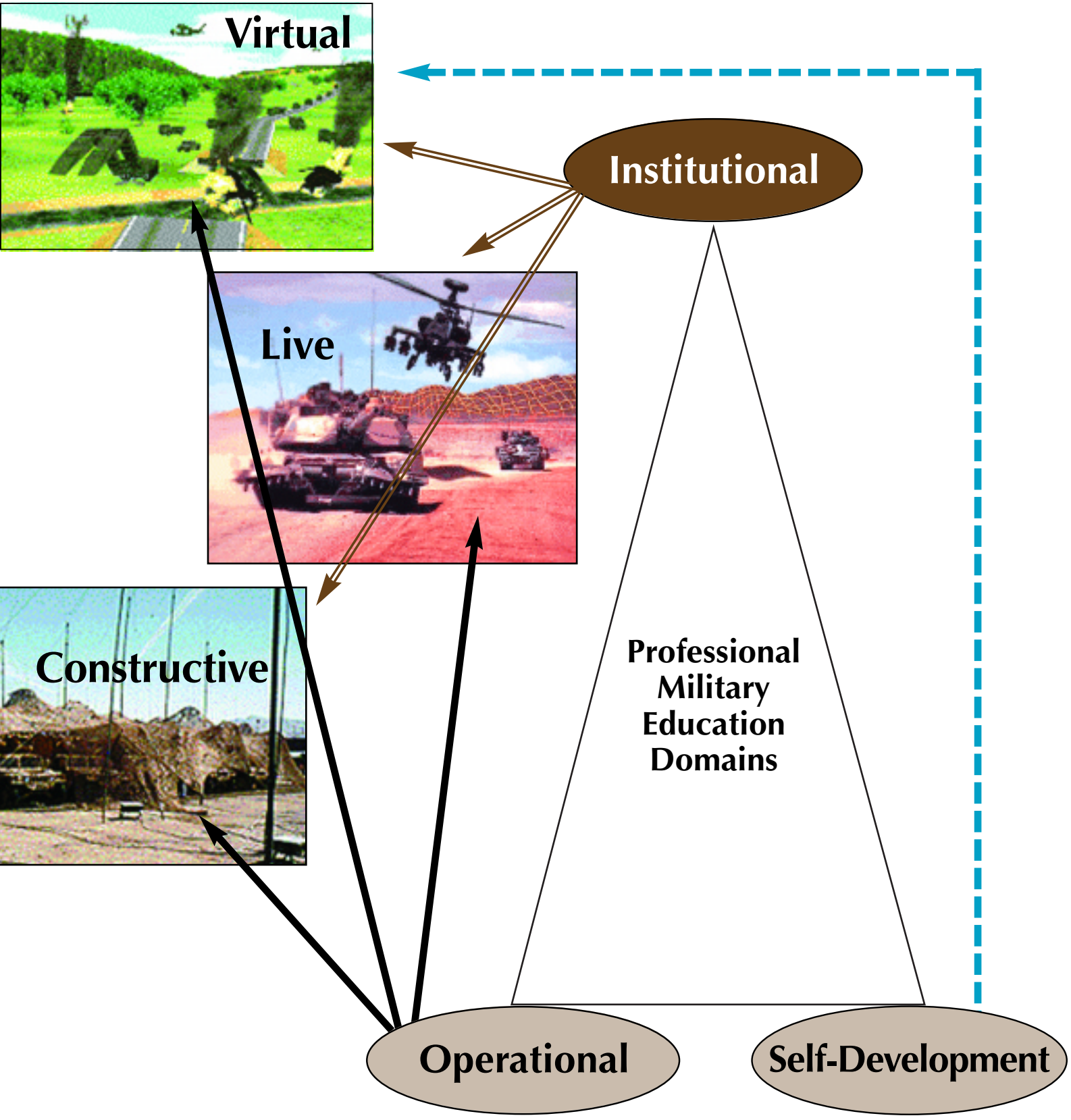
The ***operational*** domain includes all learning accomplished during a soldier's assignments and while in the field, including rotations to the combat training centers, locally conducted training exercises, and operational deployments.

The ***self-development*** domain includes those courses of instruction a soldier pursues during his off-duty hours through distributed learning venues such as Web-based courses. Leaders support and monitor the development of each soldier's self-development program.

The training environment in which these domains will function has three components—live, virtual, and constructive.

Based on the current plan, most training will come under the operational domain, requiring unit commanders to plan, resource, and execute the training of their soldiers. The institutional training will be shorter in most cases, and the self-development domain will take on a more dominant role through required virtual, simulated, or embedded training simulations and correspondence courses that will be taken through distributed learning facilities and portals.

In response to the vision provided by the Chief of Staff of the Army and TRADOC, the Army Combined Arms Support Command (CASCOM) has drafted the CSS Transformation Training Strategy for



The Objective Force training plan comprises three educational domains that function in virtual, live, and constructive training environments.

Objective Force 2010. This strategy is an overarching initiative that encompasses the materiel, organizational, and training requirements envisioned for the CSS community of the Objective Force. A portion of the plan stresses flexibility and includes learning strategies and learning concepts that are nested with the professional military education domains and the training environments mentioned above. The learning strategies are—

- ***Tacit learning management.*** CASCOM defines this as "explicit or 'first-hand experience' from the broad-based environment . . . [gained] out of experiences that have not been scripted into the training scenario or plan." CASCOM emphasizes that tacit learning experiences need to be captured and managed for use as lessons learned by all Army personnel.
- ***Knowledge management.*** This is the management of explicit and tacit knowledge, which is filtered through some form of information technology to improve the decisionmaking process of warfighters. Simply put, the Objective Force soldier and leader will be overwhelmed by data. A knowledge management system will break information into smaller, more manageable pieces, including the most critical information, and then turn it into knowledge that can be acted on.
- ***Knowing how to think, not what to think.*** This involves teaching the Objective Force CSS leader to be mentally agile and not fixed on solutions driven by routines or doctrine. This strategy is coupled with knowledge management in the expectation that leaders will be exposed to more information that they will have to act on more quickly and more decisively than in the past.
- ***Adaptive leadership.*** This is the cumulative result of the other learning strategies. It includes officers, warrant officers, and noncommissioned officers (NCOs), who train together in a virtual or constructive environment using reconfigurable modules that encourage a shared understanding of each others' roles and how to operate in battle-focused and execution-based scenarios.

Finally, CASCOM has identified specific leadership competencies that are critical to the CSS transformation process. These include digital proficiency, branch and battlefield operating system technical skills, battlestaff skills, and joint planning skills. These competencies will enable leaders to function better in an ambiguous environment.

Analysis of the Objective Force Training Plan

I have several concerns about the proposed Objective Force training concepts, including the reduction in institutional training time (commensurate with an increased reliance on operational experiences) and the conflict between self-development and tacit learning management.

Reduction in institutional training. Institutional training provides students with expert instructors who manage the rate of instruction and use proctored examinations and observation of skills learned to ensure that students understand what is being taught. The reduction of institutional training presupposes two things. The first is that units will have time available to provide the additional training needed to ensure the proficiency of their soldiers. This assumption seems completely out of touch with the concept of a right-sized Objective Force. An ever-increasing amount of data suggests that the operating tempo and requirements placed on units today are already degrading the training time available to units. Now the Army will have even fewer soldiers and units, and the new training requirements would only exacerbate the ripple effect that the reduction in soldiers and units is having on the increased operating tempo—to do more with less.

The second assumption is that these lesser trained soldiers will come to their units with the ability to make meaningful contributions to the units' missions. Again, assuming the Objective Force will be smaller, the contribution of every soldier will become more significant. How long can the Army wait for a soldier to become proficient?

Conflict between self-development and tacit learning management. Recall that tacit learning occurs from "explicit or 'first-hand experience' from the broad-based environment . . . [gained] out of experiences that have not been scripted into the training scenario or plan." Is this not simply on-the-job learning? Tacit learning, if totally unscripted, would have no goals and consequently no measurable conclusion. Furthermore, tacit learning can include learning the bad habits or incorrect techniques of others, who either do not know better or are in willful noncompliance with established standards.

Self-development, while partially unscripted, has as its goal a certain set of learning objectives. This domain will rely on virtual and distributed learning as its primary techniques. Some people working in the training and development arena consider distributed learning a "flop" because of the low enrollment rates across the Army. Making enrollment mandatory would improve participation, but the lack of interest to date suggests that soldiers are not interested in distributed learning as an educational technique or that the training community has not developed and fielded effective distributed learning methods and materials.

Current Versus Objective Force Training

Currently, the Army bases its training on pillars that

are the same as or similar to those proposed for the Objective Force: institutional, operational, and distributed learning. Training in these three areas inlcudes individual, collective, and mission-essential task list training events driven by soldiers' manuals, common task testing, and the Army Training and Evaluation Program (ARTEP) mission training plans and external evaluations in conjunction with combat training center rotations. Most of these training enablers will be retained in the Objective Force, but how training will be conducted is going to change.

The Objective Force will transition from traditional educational experiences provided in the institutional domain and place a much heavier reliance on operational experience, distributed learning, and virtual or Web-based training applications. The problem not fully addressed is how to bridge the gap between the standardization offered through the institutional framework while shifting the bulk of training to the operational domain. How will the Army ensure that this decentralized training process is managed against a centralized standard if unit commanders are expected to provide the bulk of a soldier's training and educational experience?

Training Management

Written nearly 20 years ago, Army Regulation (AR) 350–1, Army Training, is amazingly relevant to the question of how to train soldiers in the Objective Force—

> The Skill Qualification Test (SQT) is the principal diagnostic tool for evaluating individual training and the ARTEP is the principal diagnostic tool for evaluating unit training.

Today, both the Air Force and the Navy use a testing method similar to the SQT as a means of qualifying soldiers for promotion, but the Army discarded this technique in the early 1990s. The elimination of this test and evaluation program reduced the individual soldier's responsibility for his own advancement. Although other measures are taken into account when considering a specialist (E–4) for promotion to sergeant, promotion points he earns reflect only the very basic soldier skills taught in basic training, not technical military occupational specialty (MOS) competency. The Army physical fitness test and marksmanship are the only two semitactical skills considered when awarding points to a soldier for promotion to sergeant. Even less stringent are the requirements for promotion from E–1 through E–4, which are based on time in grade, time in service, and the approval of the chain of command. No skill proficiency testing is required.

The Objective Force cannot afford this lackadaisical approach to individual proficiency. Placing some of the burden to achieve proficiency back on the individual soldier is in keeping with the self-development domain proposed for training in the Objective Force. This also will ease the load on our senior NCOs, who are increasingly dissatisfied with the level of dedication demonstrated by junior NCOs and soldiers.

If SQT testing were reintroduced to the Army training management system, a method to track the educational progress of junior enlisted soldiers and junior NCOs would be needed to monitor their development before each SQT examination. Again, AR 350–1 provides a solution—

> Noncommissioned officers are the principal trainers of individual soldiers. Each NCO (and junior officer) must be capable of performing every task required of his or her immediate subordinates and understand the relationship between individual job requirements, SM [soldier's manual], SQT, and job books.

Job books fell out of favor in the Army in the early 1990s. When fully implemented, these books allowed a soldier's entire chain of command to keep track of his proficiency on a wide range of technical and tactical tasks. A job book was developed for each soldier, at each grade, in each MOS, with a template of critical skills provided by each branch proponent and approved by TRADOC. The local commander could supplement the job books to include unit training requirements and areas of emphasis.

Junior officers need to be equally proficient. One cannot assume that the next higher headquarters will be able to make decisions for a battle being fought in a noncontiguous battlespace. Junior officers will have to make many critical decisions, so their proficiency and understanding of the technical and tactical skills required of them will be crucial. Job books, or similar mechanisms, could provide this for company-grade officers. Although job books usually were not maintained for officers in the Army of Excellence, the Objective Force will demand more of our junior leaders, and their proficiency will require management, development, and tracking.

Standardization

Unquestionably, AR 350–1 has maintained its relevance throughout the past generation. As the Army of Excellence transitions to the Objective Force, the reality of the digital battlefield requires that this regulation be updated to include the training concepts for our future forces. However, the simplicity of this regulation should be maintained to retain its status as an enduring guide for establishing training standards.

As Army Transformation continues, the importance of standardization will become more evident because

the Objective Force will see increased decentralization of a large portion of Army training. Finding a way to standardize the evaluation of decentralized training will be critical to enabling the distributed learning environment and operational educational domain of the Objective Force to maintain the razor-sharp edge needed to fight and win on the digitized battlefield.

The standardization program's goal, according to AR 350–1, is to "identify those basic tasks that can and should be performed in the same manner and to the same standard in like units throughout the Army." These basic skills are partially identified in the basic combat training program of instruction and in the programs of instruction for the various advanced individual training courses. Are the skills and tasks adequately identified?

At the beginning of the article, I asked: Given the immutable nature of war, are there certain immutable skills that are required of logisticians? The answer to this question is yes! Logisticians of all branches and MOSs do need some common skills. However, logisticians must gain greater proficiency in their tactical field skills. Some examples of individual and collective skills that must be rigorously trained and assessed for proficiency include—

- Navigating from point to point while mounted.
- Providing convoy security and reacting to ambush while mounted.
- Calling for direct and indirect fire support.
- Preparing and implementing a fire support plan.
- Conducting defense by platoon.
- Implementing force protection measures.

These tasks are not new, nor do the various mission training plans, soldier's manuals, common task training testing requirements, or the Army's universal task list ignore them. The proficiency and the standardized implementation of the training of these tasks deserve additional emphasis because they are vital to the survivability of logisticians on the battlefield—especially when soldiers are trained on these tasks in conjunction with the digitized battlefield technology.

I propose that these skills be taught in advanced individual training, the basic NCO course, and the basic officer leadership course (formerly the officer basic course). Teaching these skills will produce technically and tactically proficient logisticians who are better able to protect, and improve the survivability of, already limited CSS assets on a larger and less secure noncontiguous battlefield. Using the above methods to provide technical and tactical training for logisticians would ensure adequate allocation of training resources. It also would provide an environment that could be controlled and altered to ensure that the lessons learned by the field Army could be translated immediately into standardized training across the Army.

Tough, realistic, and demanding training has never been as critical to the Army and to the protection of the citizens of the United States as it is today. The Objective Force undoubtedly will have the technological and materiel advantage over any potential adversary. The battlespace, however, will be different from any other faced by the American soldier. It will be larger, asymmetrical, likely staged in urban areas, and occupied by an enemy that is harder to find and harder to destroy.

The challenge of training for this battlespace will be difficult to manage. Training must produce adaptive, highly educated, and highly skilled soldiers and leaders who are proficient in their jobs and in their field skills. As the Army transforms, its logisticians also must transform. Army logisticians must be highly proficient in their technical and tactical skills in order to maintain uninterrupted support to the combatant commanders. CSS soldiers and leaders must be able to provide the focused logistics needed to sustain the warfighter, to fight to protect themselves when necessary, and to communicate across the battlespace while maintaining connectivity with the common operating picture as fluid combat situations develop.

How the Army conducts training also is transforming, and a greater emphasis on training management will ensure that our soldiers and leaders are prepared to meet the challenges that lie ahead. The SQT, job books, and additional tactical training taught at our institutional facilities would provide some of the steppingstones to a successful transition between the Army of Excellence and the Objective Force.

Although training for the Objective Force requires additional development, the foundation is solid, and the initiatives are truly groundbreaking. Change is coming, and with flexible, adaptive, and enthusiastic leaders, the Objective Force will be the responsive, deployable, agile, versatile, lethal, survivable, and sustainable force envisioned by the Army Chief of Staff. **ALOG**

Captain Martine S. Kidd is working toward a master's degree in logistics management at the Fort Lee, Virginia, campus of the Florida Institute of Technology. She has a bachelor's degree in communications and mass media from Methodist College in North Carolina and is a graduate of the Quartermaster Officer Basic Course, the Combined Logistics Officers Advanced Course, the Support Operations Course, and the Army Logistics Management College's Logistics Executive Development Course, for which she completed this article.

Combat Health Support in an Arctic Environment

BY CAPTAIN BRETT H. VENABLE

The landing skis on the 68th Medical Company's aircraft facilitate landing and take-off in snow.

Extreme cold weather environments threaten the success of military operations and present specific challenges to combat health support planners. Cold weather operations can severely constrain field medical treatment and evacuation. The incidence of disease and nonbattle injury also increases in an arctic environment. In parts of Alaska, temperatures routinely drop to 50 degrees below zero during the winter months, which provides a perfect environment for the 172d Infantry Brigade (Separate)—the Snow Hawk Brigade—at Fort Wainwright, Alaska, to practice special tactics, techniques, and procedures for evacuating and treating casualties in an arctic environment.

Medical Treatment

Treating seriously injured casualties in extreme cold weather conditions is very difficult. Medical personnel on the front lines must balance the casualty's need for medical stabilization against the risks of hypothermia and frostbite. Medics in maneuver battalions must assess a patient without removing the casualty's

clothing, because removing clothing in subzero temperatures can lead to further injury to the patient.

Another challenge for the arctic medic is intravenous (IV) fluid replacement. Veins constrict in extreme cold temperatures, which makes establishing an IV line difficult. Exposing the patient to the cold may lead to hypothermia, and the IV line will quickly freeze if left exposed to the outside air. Once a medic stabilizes a casualty, he must rapidly evacuate the casualty to a warm treatment tent, where an IV line can be established if needed.

One technique used by the Snow Hawk Brigade to keep casualties warm is to place them in military evacuation bags. Lined with 13 pounds of insulating material, the military evacuation bags were designed for moving injured soldiers in an extreme cold weather environment. Double zipper openings allow easy entry and exit of casualties.

The 172d Infantry Brigade's medical company keeps incoming casualties warm in a heated triage tent. As casualties are unloaded from a ground or air ambulance, they are moved immediately to a heated general purpose (GP) medium tent, which is heated by two medium space heaters (H–45) or arctic space heaters. Both heaters run on diesel fuel and are used with attached thermoelectric fans that circulate heat down to the tent floor, improving heat distribution and conserving fuel. The use of a triage tent allows the triage officer to remove the casualty's clothing to assess injuries without further injuring the patient because of exposure to the cold. Once triaged, the casualty can be moved into the treatment tent for treatment by a physician.

Another major concern for combat health support planners in arctic conditions is keeping medical supplies and equipment from freezing. IV fluids and liquid medications are of no value when they are frozen, and many medications become unusable even if they are thawed later. Essential medical equipment such as blood analyzers will not operate when frozen. Medical logisticians must ensure that medications and medical equipment are stored in heated areas of vehicles and tents at all times to prevent freezing.

Ground Casualty Evacuation

Evacuating casualties from the points of injury to casualty collection points (CCPs) is a challenge in an arctic environment. The first hurdle is finding the casualties on the arctic battlefield. Since soldiers usually are dressed in camouflage whites, casualties blend in with the snow and can be difficult to find. Alaska's ice fog and lack of daylight during the winter months can further impede search efforts.

Generally, the use of standard litter bearers is not feasible in deep snow because movement is slow and litter bearers fatigue quickly. This puts the soldiers at risk for overexertion and potential cold weather injury. Therefore, units in the 172d Brigade use both the Skedco litter and the ahkio (Alaskan sled) for casualty evacuation.

The Skedco litter, which is found in most light infantry units, is made from a special plastic that is both flexible and durable. The casualty is placed on the Skedco litter and dragged through the snow by a litter team. The litter also is equipped for hoist by helicopter, which may be essential when maneuver battalions are operating in restrictive terrain.

When conducting operations in deep snow, the ahkio is the best platform for manual casualty evacuation. The ahkio is a fiberglass sled designed to carry up to 200 pounds of equipment for an infantry squad. Normally, an arctic infantry squad uses the ahkio to carry their 10-man tent, stove, fuel, water, and other equipment. The sled weighs 38 pounds, measures 88 inches by 24 inches by 8 inches, and has three rails on the bottom that help keep the sled moving in a straight line. When used to evacuate a casualty, the top of the ahkio is padded with one or more sleeping mats. The

The small unit support vehicle is used for off-road movement in snow.

A litter team uses a Skedco litter to evacuate an injured soldier.

casualty is placed in an evacuation bag or sleeping bag before being positioned on the ahkio. A poncho or other suitable vapor barrier then is placed on the outside of the casualty's sleeping bag to prevent heat loss. The litter team evacuates the casualty by dragging the ahkio through the snow. The ahkio is small enough that it can be loaded into a small unit support vehicle (SUSV) or helicopter if necessary.

Evacuating casualties from a CCP to a battalion aid station or from the battalion aid station to the medical company also can be a daunting task. On the arctic battlefield, infantry soldiers often are dismounted, on skis or snowshoes. Therefore, CCPs may be located in very restrictive terrain that is unreachable by most wheeled vehicles.

In the Snow Hawk Brigade, medical units overcome this challenge with the help of the SUSV. The SUSV is a lightweight tracked vehicle specifically designed for off-road movement in the snow. It is capable of evacuating four litter patients or eight ambulatory patients at a time. Each infantry battalion medical platoon is authorized four front-line ambulances and four SUSVs that are used to evacuate casualties from company CCPs back to battalion aid stations. In the 172d Support Battalion, C Company is authorized 12 front-line ambulances and 7 SUSVs. These vehicles are used for evacuating casualties from battalion aid stations to the medical company in the brigade support area. For medical evacuation operations on unimproved roads, front-line ambulances equipped with tire chains are used. For medical evacuation operations in deep snow and off-road terrain, however, the SUSV is the vehicle of choice.

The subzero temperatures in Alaska greatly increase ambulance maintenance requirements. Ambulance engines often are left running to avoid freezing, which increases fuel consumption. In addition, the ambulances require special arctic lubricants and a special grade of fuel called diesel fuel arctic. Maintenance on the patient compartment heaters is an important part of command maintenance. In extremely cold weather, heaters are essential to en route care of a casualty; an ambulance without a functional patient-compartment heater must be deadlined.

AEROMEDEVAC Operations

Medical evacuation by air (AEROMEDEVAC) is the preferred method of evacuating critically injured casualties from forward ambulance exchange points to the medical company in the brigade support area. When conducting AEROMEDEVAC missions in an arctic environment, soldiers must take special precautions to minimize "whiteout" when establishing a landing zone. ("Whiteout" is a term used to describe blowing snow caused by the rotor wash of a helicopter when it is landing or taking off.) When establishing a landing zone, soldiers must attempt to find a spot with firmly packed snow that is free of obstacles.

For the litter team on the ground, visibility can be severely restricted by whiteout during a helicopter landing. Litter bearers should wear goggles to protect their eyes from flying debris caused by the rotor wash. In addition, there is always a risk of frostbite from the wind chill produced by the helicopter's rotating blades. When loading a casualty into a helicopter, no part of his skin should be exposed for any length of time under the rotor blast of a helicopter. Exposed skin can freeze in seconds and result in unnecessary cold weather injuries.

Mastering combat health support operations on the arctic battlefield requires special training and equipment. In Alaska, the 172d Infantry Brigade (Separate) conducts realistic training each winter in an arctic environment. Medical units in the Snow Hawk Brigade have proven that they are "arctic tough" and up to the challenge. **ALOG**

Captain Brett H. Venable is the commander of C Company, 172d Support Battalion, 172d Infantry Brigade (Separate), at Fort Wainwright, Alaska. He has a bachelor's degree in biology from Old Dominion University in Virginia and is a graduate of the Army Medical Department Officer Basic Course, the Medical Logistics Management Course, and the Combined Logistics Captains Career Course.

A Redefined DMMC for the Objective Force

BY CHIEF WARRANT OFFICER (W–3) CHRISTOPHER A. FERGUSON

As the Army moves toward the Objective Force, logistics leaders are taking a close look at the way materiel management centers (MMCs) are configured within the Army structure. Reducing the logistics footprint while supporting a lighter, more mobile force will require some changes in how MMCs do business.

MMCs provide echeloned support to theater commands. Forward-positioned forces, such as U.S. Army Europe and U.S. Army Pacific, have a theater support command materiel management center (TSC MMC), corps materiel management centers (CMMCs), and division materiel management centers (DMMCs). The projection force, which is positioned in the continental United States, has a similar structure, with the exception of an activated TSC MMC.

The DMMC manages all classes of supply except class VIII (medical materiel). Most DMMC functions are replicated by the CMMC, which manages materiel for an entire corps.

The CMMC provides the interface between the DMMC and the TSC MMC, the Army Materiel Command (AMC), the Defense Logistics Agency, the General Services Administration, and the national inventory control points. In addition to standard division-level management, the CMMC is responsible for management processes that are exclusive to the corps level. These include management of the Standard Army Retail Supply System-2AC/B, the operational readiness float for the corps, class VII (major end items) redistribution and excess management, and corps logistics automation management. The CMMC serves as the gateway between the wholesale and retail levels for logistics data and is the final stop for supply requisitions at the tactical level.

The TSC MMC provides support similar to CMMC support; however, it is primarily a nontactical echelons-above-corps entity. Its chief missions are to provide logistics support from the theater of operations communications zone, provide general support (GS)-level maintenance support, and provide reinforcing support to the CMMC at the theater level. The TSC MMC sustains the deployment of MMCs at the corps level and below into the theater of operations.

Effects of Transformation

With the introduction of Army Transformation, revolutionary changes have emerged throughout the Army's logistics processes. Improved logistics information systems and commercial Web-based applications have simplified logistics management. Access to information has been enhanced significantly. This enhanced access has resulted in an informal decentralization of management. Direct support (DS) units now are empowered and encouraged to eliminate the intermediate managers at the DMMC for the sake of directly influencing responsiveness and time-sensitive support. Although users are becoming more and more willing to forego the DMMC by directly influencing the management of their own logistics support, all retail-level logistics management processes still culminate at the CMMC level since most logistics interface occurs there.

CMMC Versus TSC MMC

Some might argue that the CMMC could be eliminated because the TSC MMC could easily perform CMMC functions but not vice versa. However, if the Army were to deploy into a full theater of operations with multiple corps, the Standard Army Management Information Systems (STAMIS) hardware platforms could not support the workload and the emerging platforms would be overwhelmed by the communication and bandwidth requirements.

Perhaps a more logical approach would be to strip out certain functions where a clear duplication of effort exists and place those into the parent organizations. For example, at the theater level, some functions are performed at the TSC MMC and duplicate functions are performed at the support operations section. Since the MMC is the implementation arm of support operations, duplicated functions such as aviation management, maintenance management, and distribution could be integrated into the theater support operations section.

Effects of the Single Stock Fund

The Army Single Stock Fund (SSF) transition is another compelling argument for redesigning the DMMC. SSF is an Army initiative designed to meet the Army Chief of Staff's vision of a Revolution in Military Logistics by integrating and simplifying the supply process to improve warfighter support. SSF consolidates the wholesale and retail elements into a single fund that is managed at the national level by AMC. A key component of this initiative is the integration of the current fragmented logistics automated systems into a single, streamlined logistics system. Under SSF, AMC will capitalize all Army inventory down to the DS level. These changes will make the DMMC irrelevant under the Objective Force.

Objective Force Requirements

According to a July 2002 Army Chief of Staff briefing, "the Objective Force is a future full-spectrum force that is manned, organized, equipped, and trained to be strategically responsive, deployable, agile, versatile, lethal, survivable, and sustainable across the spectrum of operations." The Army's vision is to rapidly deploy brigade combat teams anywhere in the world within 96 hours, a division in 120 hours, and five divisions in 30 days, with a reduced sustainment footprint. The Objective Force calls for a single information technology system for maneuver, maneuver support, and maneuver sustainment.

The Interim Force concept attempts to meet the logistics requirements of the Objective Force by reorganizing the division support command (DISCOM) structure. The new structure removes the support operations (SPO) section from the S–2/3 and establishes it as a multifunctional staff section that is accountable directly to the DISCOM commander. This new concept also integrates the movement control office into the MMC, creating a distribution management center. The traditional DMMC functions fall under the SPO; however, its functionality remains virtually unchanged. [The Army recently changed the term "Interim Force" to "Stryker Force."]

The DISCOM headquarters and headquarters company redesign pulls the majority of logistics support personnel from the maneuver brigades and infuses them into the DISCOM. Under this Interim Force redesign, the DISCOM personnel authorization increases from 3,219 to 4,297. Although this change reduces the logistics footprint at the brigade level, it creates a more robust DISCOM and DMMC than those in the Current Force (previously known as the Legacy Force).

A true revolution in logistics at the DISCOM level would eliminate commodity managers from the DMMC and incorporate their responsibilities into the CMMC. Key coordinating responsibilities would remain at the DISCOM SPO. This proposed shift of resources would create a leaner DISCOM and allow the more cumbersome day-to-day DMMC operations to be handled at the corps level. This initiative would achieve the Objective Force's goal of reducing the logistics footprint as far back as the DISCOM.

The Objective Force DMMC

The Objective Force's primary feature is its ability to deploy rapid-response brigades in response to a threat in an asymmetric theater of operations. The Stryker brigade, because it is a lighter force, aids this transition and reduces the logistics footprint at the maneuver level. The proposed interim division concept reduces the logistics footprint in the division support area by integrating the DMMC in its current configuration with the DISCOM SPO.

Capitalization of all retail assets under milestone III of the Single Stock Fund initiative will transfer ownership of those assets to AMC. The Defense Logistics Agency is spearheading similar initiatives to capitalize wholesale stocks. Ultimately, all Army wholesale materiel managers will be accountable for supplies down to the DS level and therefore will be responsible for managing those supplies, to include supply automation systems. This transfer of responsibility will eliminate the need for commodity or item managers at the DMMC. A support relationship between the corps SPO and the division SPO will preserve the corps and division support relationship. New technology that provides in-transit visibility and stock visibility will enable the division staff to perform materiel management to the extent that a lighter, more flexible DISCOM will be possible.

Under the Objective Force concept, a division-level MMC is no longer needed. Most DMMC functions should and could easily be integrated at the corps level, with a few critical functions remaining at the division level. Traditional Army of Excellence doctrine requires echeloned MMC support at the division, corps, and theater support command levels. Most routine MMC functions are duplicated at each level. With the Army capitalizing retail stocks under the Single Stock Fund and transferring ownership to the wholesale-level managers, only the tactical-level materiel management center is needed. This should be at the CMMC.

Emerging information technologies and other reengineering methodologies, such as Distribution Management, facilitate this revolutionary concept. To stay consistent with the Army's vision of efficiency and a reduced logistics footprint, the role and structure of the DMMC should be redefined. The current proposed changes for the Stryker Force simply reorganize control of the DMMC without any innovative or significant changes to the structure. Pushing the replicated DMMC functions back to the CMMC will allow the DISCOM to undergo a true transformation that is conducive to realizing the Objective Force. **ALOG**

Chief Warrant Officer (W–3) Christopher A. Ferguson is pursuing a master's degree in logistics management at the Florida Institute of Technology. He has a bachelor's degree in business management from the University of Maryland and is a graduate of the Army Logistics Management College's Logistics Executive Development Course, for which he wrote this article.

Trucks Made the Difference at Verdun

BY MAJOR ERIC MANKEL

From 21 February to 19 December 1916 — during the third year of World War I—the French Army endured a battle of attrition of enormous magnitude in the vicinity of the ancient fortress city of Verdun. At the end of the Battle of Verdun, the French emerged victorious, though at a huge cost in human lives and materiel. The logistics support of such a long, costly battle had been very challenging. One of the keys to the French success in stopping the German offensive at Verdun was the use of a fairly new technology on the battlefield: motor vehicles. Never before had trucks and other motor vehicles played such a large and influential role in military operations.

French trucks are lined up as they move to the front along the Sacred Way.

Plans for Taking the Offensive

As the year 1915 drew to a close, the belligerents on both sides of the war were planning large-scale offensives for the following year. The Entente Powers (France, Great Britain, Russia, and Italy), in conference at the headquarters of General Joseph Jacques Joffre, the Chief of the French General Staff, agreed to take the offensive the following summer. They selected the Somme front in Picardy as the area for a French-British offensive because that was where the French and British sectors of the Western Front joined.

Their German opponents also decided to strike along the Western Front. The German offensive would take place in the Fortified Region of Verdun, a sector that had remained one of the quietest on the whole Western Front until that point.

General Erich von Falkenhayn, the Chief of the German General Staff, devised the plan dubbed Operation *Gericht* ("place of execution"). The objective of Falkenhayn's plan was not to seize any vital point, disrupt communications, or encircle any French armies. His objective was simply to inflict massive losses on the enemy, an objective commonly chosen for a defensive operation. The Germans therefore would attack a point that the French would be compelled to defend by using every man available. This goal of attrition in the offense was distinctly different from the classic German offensive objective of rapidly destroying the enemy force. Falkenhayn recommended Verdun, on the heights of the Meuse River, as the point for the attack. The terrain surrounding Verdun supported his requirements for a killing ground. By reputation, it was the strongest fortress in the world. Most importantly, however, the French, for reasons of national prestige, would defend their great fortress of Verdun regardless of the cost. If Falkenhayn's plan was successful, it would draw the French into a battle of attrition that would, as Robert B. Bruce observed in a Summer 1998 *Army History* article, "slowly bleed the French Army to death, inflicting such punishment that neither the French Army nor the French nation would survive Verdun."

Pétain to the Rescue

The German offensive began on 21 February 1916 with a 9-hour artillery attack, the greatest bombardment

The titanic World War I Battle of Verdun is best known for its unprecedented carnage. But the battle also featured a logistics innovation: the first extensive use of motor vehicles for military supply and transportation.

yet seen in warfare. In response to the unfolding German attack, General Henri-Philippe Pétain assumed command of the French forces in the Verdun sector at midnight on the night of 25 to 26 February. His hand soon was felt everywhere; Verdun became his battle. Pétain's first challenge was to secure logistics support, particularly supply and transportation. The French were not prepared to provide logistics support to a force of the size they quickly were assembling at Verdun.

The transportation challenge had the most significant impact on logistics operations at Verdun. The established mode of transporting ammunition, supplies, and replacements to armies occupying the front line was the railroad. Narrow-gauge rail lines were built from existing or newly constructed main rail lines and from stations and railheads up to the trench lines. Trucks were employed in very limited quantities, usually in emergency cases. Horse- or mule-drawn wagons were still in widespread use. French transportation operations during the Battle of Verdun would change this, legitimizing the use of motor transport for large-scale sustainment operations.

German Rail and Horses and French Trucks

The system of using railroads and horse-drawn conveyances worked for the Germans. The German Fifth Army built 10 new rail lines into the Verdun sector, with 24 new stations. They had no less than seven narrow-gauge rail lines for transporting ammunition and supplies up to their trench lines in the sector. To supply their initial bombardment, the Germans stocked 6 days' supply of ammunition near their 1,220 guns. This supply totaled more than 2.5 million shells, transported on 1,300 ammunition trains. All of the artillery pieces were in place by 1 February. This incredible move cost the Fifth Army Artillery 30 percent of its horses.

For the French, however, railroads were not an option. The two major French rail lines into Verdun could not be used. One passed through the German lines, and the other was shelled continuously. Pétain had only a narrow-gauge rail line and the second-class (dirt) road from Bar le Duc, 75 kilometers away, where the nearest usable railhead was located. Pétain had to use the narrow-gauge rail line to transport food for men and fodder for supply animals. Out of necessity, he had to rely on motor transport operations to sustain the French Second Army, which was deployed and engaged in the Verdun sector, with reinforcements, replacements, and munitions.

The Sacred Way

A general overview of logistics requirements shows that Pétain found himself having to support a force of 500,000 men and 170,000 animals. No army of this size had ever been sustained and supported logistically by road. Each horse alone required 40 pounds of fodder and 8 gallons of water a day.

Maurice Barrés, a French writer, named the road from Bar le Duc that Pétain used *La Voie Sacrée*, "the Sacred Way." Employing the fledging *Service*

The appalling destruction wrought by the Battle of Verdun can be appreciated in this post-battle view of the village of Étain, near Verdun.

When he was appointed to command the French defense at Verdun, General Henri-Philippe Pétain pledged, "They shall not pass!" He was able to make good on his promise, in part because of his logistics innovations.

Automobile dans l'Armée Francaise, Pétain initiated the largest use of motor transport for logistics sustainment yet seen in warfare. An Engineer officer was responsible for transportation to Verdun. He was delegated complete authority by Pétain for operations on the Sacred Way. The Sacred Way was divided into six cantonments. Each cantonment had its own workshops for servicing and repairing vehicles and its own crews of pioneers for servicing and repairing the road. The road was to be reserved for motor vehicles; all marching troops were to keep to the sides of the road. Any trucks that broke down were to be immediately pushed off the road into the ditch. By the time Pétain took over command of the Second Army, a fleet of 3,500 assorted vehicles had been assembled. In June, at the peak of operations, 12,000 vehicles of varying types and sizes were employed on the Sacred Way. One vehicle passed every 14 seconds. At its peak, the operation accrued approximately 650,000 miles weekly.

On 28 February, a drastic thaw set in. Within a few hours, the frozen dirt road thawed and turned to mud, 18 inches deep in some places. The Engineer officer summoned all available Territorials (a reserve force) to assist in repairs. He lined them up almost shoulder to shoulder along the road and had them begin shoveling gravel nonstop under the wheels of the trucks as they passed by. When Pétain was apprised of the situation, he telephoned the Engineer officer and asked him if the road would hold. The response: "The road will hold." "Good" replied Petain. The road held. During the week beginning 28 February, more than 25,000 tons of supplies and 190,000 men arrived in Verdun over the Sacred Way.

Gravel and Tires

To ensure that another crisis did not cripple the Sacred Way, Pétain employed the equivalent of over a division of men in repairing the road full time. Pétain was able to get several rock quarries along the route opened. He then set up relay teams to move the gravel from the quarries to sites along the road. The repair teams shoveled nearly 750,000 tons of gravel onto the road during the 10-month battle. The continuous traffic flattened the gravel and thus firmed up the road. Through this effort, Pétain was able to overcome the greatest threat to his logistics efforts at Verdun.

The continuous application of gravel solved the problem of the softening road. However, it brought on another problem. The gravel began to gouge holes in the hard rubber tires of the trucks, and the bumpier rides that resulted led to an increase in the number of mechanical breakdowns. The head of the *Service Automobile* came up with a solution. He set up hydraulic presses in each of the workshops along the route, which stamped out new tires for the vehicles.

By its successful execution of motor transport operations on the Sacred Way, the French Army validated the use of motor transport as a legitimate means of providing logistics support to a large army in the field. The French successfully supported the battle by transporting men, ammunition, and other classes of supplies. They also made sound use of trucks returning from the sector by evacuating casualties as retrograde cargo.

General Erich Ludendorff, Germany's First Quartermaster General, was very impressed by the French Army's use of motor vehicles. As Ludendorff commented in his autobiography years later—

> The enemy, backed by his enormous industries, found it easier and easier, not merely to move his reserves quickly in lorries [trucks], but also to use them on an increasing scale for bringing troops up from billets to the line and taking them back again, thus achieving an important economy of physical and moral strength. We had to be content if we could find [trucks] enough for troop movements in cases of the greatest urgency.

Without the successful implementation of motor transport operations, the French would not have been able to defend the Verdun sector successfully. Although the cost in human lives was fearful, the innovative use of motor vehicles saved the day for the French at perhaps the greatest battle in history—Verdun. **ALOG**

Major Eric Mankel is a logistics instructor in the Department of Logistics and Resource Operations at the Army Command and General Staff College. He has a bachelor's degree in geography from Middle Tennessee State University and is pursuing a master's degree in American Revolution Studies from American Military University. He is a graduate of the Army Command and General Staff Officer Course and the Military History Instructor Course.

Today's Hybrid Interns Will Be Tomorrow's Logistics Leaders

BY JAMES J. CLARK

Logistics interns work together on a practical exercise.

As the Army transforms to the Objective Force, the civilian workforce structure also is transforming. Currently, the Army is developing a Strategic Army Workforce that will provide more capable, multifunctional, and multifaceted civilian leaders (Senior Executive Service and GS–12 to GS–15) to support the Objective Force. The Strategic Army Workforce positions will be centrally managed in a manner similar to the management of Army officers and Foreign Service personnel.

Recognizing the need for well-trained, motivated logisticians in the Strategic Army Workforce, the Army has revised the Department of the Army Logistics Intern Training Program (DALITP). The Army Logistics Management College (ALMC) at Fort Lee, Virginia, began an updated logistics intern program this year.

DALITP trains highly motivated college graduates to become Army logistics managers. The 2-year program develops technical, leadership, and interpersonal skills through extensive classroom training and meaningful on-the-job training (OJT). The program provides rapid promotions for interns as they train for future assignments. Students enter the intern program at the GS–07 level and progress to GS–11 on completion of the program and placement in an existing job vacancy.

DALITP begins with 24 weeks of instruction at ALMC that includes the Intern Leadership Development Course and parts of the—

- Army Logistics Introductory Course.
- Army Maintenance Management Course.
- Army Secondary Item Management Course.
- Commodity Command Standard System Functional Course.
- Defense Distribution Management Course.
- Decision Analysis for Logisticians Course.
- Defense Demilitarization Program Course.
- Defense Hazardous Materials/Waste Handling Course.
- Logistics Management Development Course.
- Manpower and Force Management Course.
- Major Item Management Course.
- Retail Supply and Maintenance Systems Course.

Other topics covered in the training portion of the program include courtesies and customs of the Army, military and civilian rank structures, oral and written communication, briefing techniques, resumé writing, and interview techniques.

OJT provides a broad understanding of the overall Army mission through planned, challenging work assignments that help the interns develop competencies and prepare for increased responsibilities. OJT assignments include overseas locations such as Germany and Korea and may be within organizations such as the Army Forces Command; Headquarters, Army Training and Doctrine Command; the Army Corps of Engineers; and Army Materiel Command major subordinate commands.

Upon graduation, interns will be classified as GS–0346, logistics management specialists, but they may be assigned in the future as equipment specialists, supply specialists, item managers, combat developers, or logistics assistance representatives. Their ultimate jobs will be located in several major Army commands, but most interns will eventually work for the Army Materiel Command.

Openings for logistics intern positions are usually announced in September and April. Training programs begin in January and July. Those interested in applying for an intern position should visit the Army Civilian Personnel homepage at www.cpol.army.mil and follow the prompts for Employment, Army Vacancy Announcements, and Entry-Level Civilian Careers.

Fort Lee is only a training location for most of the logistics intern positions. Very few of the permanent positions are located at Fort Lee. Therefore, potential interns must sign a mobility agreement before being accepted into the program.

DALITP is managed by the Logistics Management Proponency (LogPro) Office within the office of the Army's Deputy Chief of Staff, G–4. For more information about the program, call the LogPro Office at (804) 765–4139, (804) 765–4778, or (804) 765–0616 or visit the LogPro Web site at www.logpro.army.mil.

ALOG

JAMES J. CLARK IS THE DIRECTOR OF THE LOGISTICS MANAGEMENT DEVELOPMENT COURSE AT THE ARMY LOGISTICS MANAGEMENT COLLEGE AT FORT LEE, VIRGINIA. HE HOLDS A MASTER'S DEGREE FROM CENTRAL MICHIGAN UNIVERSITY.

ALOG NEWS

(continued from page 1)

needed to ensure they arrived where they were needed. Fast-sealift ships (FSS) made deliveries from the continental United States, and large roll-on-roll-off ships were quickly unloaded by stevedores, thus improving the speed of the supply process. C–17 transports brought equipment into the theater, and C–130s delivered parts, food, and medical supplies to warfighters.

"From the sealift side, the FSS and LMSRs [large, medium-speed, roll-on-roll-off ships] proved invaluable," Stultz said. "The FSS because we could turn those between here and the United States on a very quick timetable and the LMSRs because of their speed of discharge, where we could discharge approximately 1,800 to 2,000 pieces of equipment in 24 to 36 hours."

The need for rapid turnaround and discharge was magnified because of the scarcity of suitable ports in Kuwait. Coalition forces had access to only one major port, the commercial port of Ash Shu'aybah, and Kuwait Navy Base, which is not designed to handle extensive dockside operations. Equipment, ammunition, and troops were discharged in stream during ship-to-shore operations at Kuwait Navy Base.

Logisticians have now turned their emphasis to sustaining the forces. They have established logistics centers in Tallil, Baghdad, and Tikrit to maintain the more than five divisions in Iraq.

FUTURE COMBAT SYSTEMS ADVANCES

The Army's Future Combat Systems (FCS) program has been approved by the Defense Acquisition Board for transition to the second phase of the development process, system development and demonstration (SDD). The FCS is the centerpiece of Army Transformation.

In the $14.92 billion SDD process, the Army and the Lead Systems Integrator, a Boeing Company and Science Applications International Corporation team, will award contracts to subcontractors to begin designing FCS elements. The FCS development process will follow the new Department of Defense model of spiral development, which will permit developers to insert new technology as the systems develop.

The FCS, which the Army characterizes as a "networked system of systems," eventually will replace the M1 Abrams tank and the M2/3 Bradley fighting vehicles with 18 manned and unmanned ground and air vehicles and an array of sensors connected by an advanced communications network. The ground vehicles will weigh between 18 and 22 tons so they can be moved on C–130 transports.

FCS prototypes should be ready for testing by 2007, with fielding of production versions of the FCS to follow in 2008 or 2009.

STRYKER BRIGADE COMPLETES OPERATIONAL EVALUATION

The certification process for the Army's Stryker Brigade Combat Teams (SBCTs) moved forward with the successful completion of Exercise Arrowhead Lightning II at Fort Polk, Louisiana, in May.

For the exercise, soldiers of the 3d Brigade, 2d Infantry Division—the Army's first SBCT—deployed to the Joint Readiness Training Center (JRTC) at Fort Polk from the National Training Center (NTC)

A Stryker command vehicle—one of 10 planned Stryker variants—manuevers during Exercise Arrowhead Lightning II at Fort Polk, Louisiana. The SBCT participating in the exercise currently has 8 of the 10 variants. The mobile gun system and the nuclear-biological-chemical reconnaissance vehicle are still being developed.

at Fort Irwin, California, where they had participated in Arrowhead Lightning I in April. At Fort Polk, they operated against an unconventional enemy, including terrorist and sniper attacks, over forested terrain. The two phases of Arrowhead Lightning demonstrated the ability of the SBCT to deploy over long distances by rail, air, and sea, conduct early-entry operations, and undertake missions against conventional and unconventional opponents in a variety of terrains.

The SBCT, based at Fort Lewis, Washington, moved from Fort Irwin to Fort Polk by railroad, C–17 and C–130 transports, fast sealift ship, and logistics support vessel. The SBCT is the first unit to conduct maneuvers consecutively at the NTC and the JRTC.

The two phases of Arrowhead Lightning and the deployments from Fort Lewis to Fort Irwin to Fort Polk constitute the operational evaluation of the SBCT, designed to lead to certification of the SBCT's initial operational capability. The commander of the Army Forces Command will submit a report on the exercise's results to the Secretary of Defense, who then will certify to Congress that "the design of the SBCT is operationally effective and suitable." The evaluation process is required by Public Law 107–107, the National Defense Authorization Act for fiscal year 2002, which says that "procurement of SBCTs beyond the first three SBCTs is limited and deployment of the SBCT outside the United States is prohibited (without a Secretary of Defense waiver) until 30 days after the date his report is received by Congress." The Army plans to field six SBCTs.

MULTILINGUAL LOGISTICS TOOL AVAILABLE

Multinational logistics is easier now with a new multilingual compact disk (CD) developed by the Defense Logistics Information Service (DLIS). The CD contains the North Atlantic Treaty Organization (NATO) Supply Classification Handbook and the NATO Item Directory. Information on the CD is available in English and French—the two official NATO languages—and in Czech, Dutch, German, Hungarian, Italian, Polish, and Spanish. Users choose the language they wish to use and can navigate between languages.

The CD will be published semiannually in April and October. It is available to military, Government, and private industry customers around the world and can be ordered through a military publications account, a foreign military sales case, or by direct purchase from DLIS. Further information is available on the DLIS Web site at www.dlis.dla.mil/cdrom.asp.

ARMY TO AWARD PROMOTION POINTS FOR CIVILIAN CERTIFICATIONS

Army automotive mechanics and electronics repairers soon will earn promotion points for attaining technical certifications directly related to their trade. Soldiers currently are promoted to junior-grade noncommissioned officers based on a scoring system in which they can earn points for education, awards, special achievements, and performance. However, this promotion system does not consider how proficient a skilled technician is in his job.

Under the new system, soldiers who want to learn a new technical skill can attend nationally accredited training and earn professional certifications free of charge (the Army pays for certifications up to $2,000 per certification). For each certification earned, the Army will award 10 promotion points, up to a maximum of 50 points. Soldiers will benefit by being promoted more quickly, the Army will benefit by getting more proficient technicians, and, ultimately, civilian industry will benefit by getting better-qualified technicians when the soldiers return to civilian life.

The new system is scheduled to go into effect in October. Most of the technical fields affected by the new policy are in the Ordnance Corps. They include electronics technicians, automotive mechanics, and allied trades such as welders, machinists, and HVAC (heating, ventilation, and air conditioning) repair specialists.

BUREAU CHIEF OUTLINES GUARD TRANSFORMATION PLAN

In a meeting on 18 May, National Guard leaders from the 50 states, the District of Columbia, Puerto Rico, Guam, and the Virgin Islands endorsed Lieutenant General H Steven Blum's plan to transform the National Guard. Blum, Chief of the National Guard Bureau in Arlington, Virginia, wants to consolidate functions and responsibilities in order to organize and operate the National Guard Bureau according to Joint doctrine. His proposals include—

• Consolidating the 162 state headquarters organizations (3 in each of the 50 states; the District of Columbia, Puerto Rico, Guam, and the Virgin Islands) into 54 and creating a single joint force headquarters in each state for all Army and Air Guard activities. Personnel and cost savings resulting from consolidation would be invested in readiness.

• Task-organizing 10 National Guard chemical, biological, radiological, nuclear, and explosive enhanced-response force packages (1 in each of 10 Federal Emergency Management Agency regions) capable of responding to state governors, the U.S. Northern Command, or any other combatant commander who requests assistance. These task forces are envisioned to include a National Guard civil support team; an enhanced division medical company with the capability to decontaminate or treat 150 persons per hour; an enhanced engineer company with specialized search-and-rescue equipment; and a task-trained combat arms unit to support law enforcement.

• Creating National Guard reaction forces by assigning dual missions to existing units and training their members. These forces will be trained in both combat and homeland security duties and will be available to State and Federal Governments and any combatant commanders who request their assistance.

• Expanding the Guard's involvement in ground-based missile defense, starting in fiscal year 2004 in Alaska.

Blum ordered the National Guard Bureau to become joint by 1 July and asked the states to follow suit by 1 October. Currently, the bureau consists of a joint staff and separate directorates for the Army and Air Guards.

By transforming the National Guard Bureau into a joint force and instilling jointness into each state, Blum thinks the Guard will be viewed and understood by the Active components as more reliable, ready, and accessible. In a joint environment, service members will be able to train the way they will operate in the future. "We fight jointly, and we need to train and operate on a daily basis in a joint environment so we can make the transition [from citizen to soldier] very quickly," Blum said.

He emphasized that the Guard is not walking away from its traditional warfighting role. "Homeland defense is the National Guard's most important priority. Make no mistake about that. We have been performing that mission since 1636, and the American people expect no less of the National Guard during these trying times."

OBJECTIVE FORCE WARRIOR BEGINS DETAILED DESIGN

The Army's Objective Force Warrior took a significant step toward reality with the selection of a lead technology integrator. Eagle Enterprise Inc., a division of General Dynamics, was awarded a $100 million contract to prepare the preliminary and detailed designs of the systems over a 25-month period.

The Objective Force Warrior program brings Army Transformation to the level of the individual soldier. The goal of the program is to field a soldier who is lethal and survivable; integrated into information networks that provide unprecedented situational awareness; and able to fight across the full spectrum of Army and joint operations. This will be achieved by equipping the soldier with a range of weapons and self-protection gear and completely integrating him into fire support and command, control, communications, computer, intelligence, surveillance, and reconnaissance (C4ISR) systems. The Objective Force Warrior soldier will be the centerpiece of the Future Combat Systems unit of action, but he will carry a physical load approximately 50 percent lighter than today's combat soldiers.

The next phase of Objective Force Warrior development, also to be executed by Eagle Enterprise, will be a prototype development and demonstration to be accomplished over 15 months. It will be followed by system development and demonstration. The Army plans to demonstrate the revolutionary Objective Force Warrior in 2006.

ARMY NAMES FIRST UNIT TO USE UNIT MANNING INITIATIVE

The Army has chosen the third Stryker brigade combat team (SBCT)—the 172d Separate Infantry Brigade, U.S. Army Alaska—to be the first Army unit manned under the Unit Manning Initiative. The goal is a trained and ready Alaska SBCT that is deployable by the summer of 2005, the projected timeframe for the third SBCT to achieve initial operational capability.

Unit manning synchronizes the assignment of soldiers with the life cycle of their unit. This decision transforms the Army from an individual soldier replacement system to a unit manning system that keeps trained soldiers, leaders, and commanders

together longer, thereby improving warfighting and maximizing the capabilities of Army units.

Unit-manning the 172d SBCT will provide the Army with an important opportunity to develop and implement evolving personnel policies tailored to building and regenerating SBCTs. Department of the Army G–1 officials have identified approximately 175 other personnel policies and procedures that may be changed to support the unit manning initiative and lessen personnel turbulence.

Experience gained from the 172d SBCT will give the Army important insights for unit-manning Objective Force units in support of Army Transformation. Unit manning will enable the Army to convert current units into Objective Force units in conjunction with fielding of the Future Combat Systems.

The Unit Manning Task Force Web site, https://www.unitmanning.army.mil, provides the history and an overview of unit manning, current events, products, and feedback.

USTRANSCOM HAS FREE HOTLINE FOR CUSTOMERS AND PARTNERS

Customers and commercial partners of the U.S. Transportation Command who need to speak with planners about strategic mobility operations can call the Joint Mobility Operations Center's free hotline at 1–866–622–2875. The hotline is manned 24 hours a day, 7 days a week.

USTRANSCOM provides air, land, and sea transportation for all of the military services, the other combatant commands, and numerous Federal agencies during peace and war.

DETROIT ARSENAL SOLVES EXCESS GAS CYLINDER PROBLEM

The Detroit Arsenal recently completed a 5-year project to locate and dispose of 338 excess gas cylinders that had been accumulating at the arsenal for more than 10 years. The Army-owned cylinders, which the arsenal no longer needed, were in various sizes and conditions—some in poor condition, some missing caps, some empty, some half or completely full of materials of questionable quality—and contained a variety of gases, such as argon, acetylene, oxygen, and nitrogen.

Typically, as part of their pollution-prevention program, the arsenal hazardous materials management program would have contacted other facilities to see if they could use the products in the cylinders. However, because of the condition of the cylinders, the arsenal decided to send them to the Defense Distribution Depot Richmond, Virginia, for reuse or recycling.

After coordinating with the Richmond depot, the arsenal contracted with Old Dominion Freight Lines to transport the cylinders to the depot. ICI, LLC, a logistics contractor, and the HAZMART supervisor coordinated the loading of the cylinders. (HAZMART is a centralized storage area where hazardous materials are procured, received, bar-coded, and stored before delivery to the customer.) Organizations involved included—

- ***Security.*** Security personnel isolated a parking lot with barricades to ensure no privately owned vehicle could be parked in the vicinity of the gas cylinder loading effort.
- ***Fire Department.*** The fire chief was notified of the effort so the department could be prepared in case of an explosion or fire during the loading process.
- ***Safety Office.*** Safety personnel worked with the ICI environmental health and safety manager to ensure the safety of everyone involved.
- ***Environmental Management Office's hazardous materials/hazardous waste (HM/HW) manager.*** As the contracting officer's technical representative, the HM/HW manager was on site during the loading process.
- ***Contracting Office.*** The contracting officer ensured that a qualified transportation carrier was contracted.

For more information, contact Gary M. Voss at (586) 574-5154 or by email at vossg@tacom.army.mil.

FIRST STRIKE RATION DESIGNED TO MEET SOLDIERS' ENERGY NEEDS

Soldiers on the move soon will have a lightweight packet of food designed to give them the energy boost they need to do their jobs. The Army Soldier Systems Center at Natick, Massachusetts, is developing a single-package, high-energy, no-utensils-required ration intended to substitute for the three packages of meals, ready to eat (MREs) that soldiers now carry. Called the first strike ration (FSR), it is intended for use by

forward-deployed troops in the first 72 hours of combat.

Soldiers going into combat usually remove unwanted items from their MREs to lighten the load. In so doing, a day's worth of MREs totaling 3,600 calories is shaved to between 2,200 and 2,500. Each FSR provides about 2,300 calories and is almost half the weight and volume of the MREs. The FSR fits the Army's goal of becoming lighter, leaner, and more mobile as it transitions to the Objective Force.

The current FSR prototype contains two shelf-stable pocket sandwiches (a third is being added), two flavors of miniature HooAH! bars, two servings of energy-rich, glucose-optimized (ERGO) beverage mix, a dairy bar, crackers or bread, cheese spread, two sticks of beef jerky, a package of dried fruit, a modified version of applesauce called "Zapplesauce," a Ziploc bag, and an accessory packet.

The center is working on a quick energy booster gel called "Power Fuel" to add to the FSR. The gel is designed to deliver performance-enhancing natural food elements to troops in the field. The gel contains a mixture of glucose and maltodextrin—a complex carbohydrate—along with fat and a trace of protein. Current flavors are mixed berry, apple cinnamon, cherry vanilla, and mocha. The gel ingredients include juice concentrates, various carbohydrate types, unsaturated fats, and gums; the mocha gel also has caffeine.

The FSR is scheduled for fielding in 2007.

FMTV CONTRACT AWARDED

The Army recently awarded Stewart and Stevenson (S&S) Tactical Vehicle Systems, LP, of Sealy, Texas, a 5-year, multimillion-dollar contract to produce 2.5- and 5-ton Family of Medium Tactical Vehicles (FMTV) trucks and trailers. The award of the contract was the second phase of a two-phase competitive rebuy program. Changes to the FMTV system's specifications generated by user requirements created the need for the rebuy.

In the first phase of the program, S&S and Oshkosh Truck Corporation of Oshkosh, Wisconsin, integrated manufacturer-proposed changes into Government-owned vehicles to meet the new specifications. In the second phase, a source selection board evaluated the proposed vehicles to determine which company would receive the contract.

The fixed-price contract covers the production of 7,063 FMTV trucks and 3,826 trailers and program support. Several option clauses in the contract allow for the purchase of 11,000 more vehicles for other services or for foreign military sales. The base-year award is for $95.4 million, with a 5-year total of $1.1 billion and a potential cost of $2.3 billion if all options are exercised.

The contract includes 15 types of trucks that can carry payloads from 2.5 to 7.5 tons and adds a new 5-ton expansible van truck variant. Other variants include a 2.5-ton standard cargo truck and trailer, a 2.5-ton covered van, a 5-ton fuel tanker, a 5-ton long-chassis trailer, a 5-ton tractor, and a 5-ton dump truck. The new designs reduce life-cycle costs; feature increased ruggedness, durability, and reliability; and use the latest Caterpillar diesel engine technology to meet 2004 Environmental Protection Agency emission standards.

A CH–46D Sea Knight helicopter from the* USNS Arctic*, a Supply-class combat support ship, delivers supplies to the* USS Theodore Roosevelt*, a Nimitz-class aircraft carrier. The* Arctic *and* Roosevelt *are two of the many ships supporting Operation Iraqi Freedom in the Mediterranean Sea area.

Writing for *Army Logistician*

If you are interested in submitting an article to *Army Logistician*, here are a few suggestions that may be helpful. Before you begin writing, review a past issue of *Army Logistician*; it will be your best guide. Keep your writing simple and straightforward (try reading it back to yourself); attribute all quotes; avoid footnotes (*Army Logistician* is not an academic journal); and identify all acronyms and technical terms. *Army Logistician's* readership is broad; do not assume that those reading your article are necessarily soldiers or that they have background knowledge of your subject.

Do not worry too much about length; just tell your story, and we will work with you if length is a problem. However, if your article is more than 4,000 words, you can expect some cutting.

Do not submit your article in a layout format. A simple Word document is best. Do not embed photos, charts, or other graphics in your text. Any graphics you think will work well in illustrating your article should be submitted as separate files. Make sure that all graphics can be opened for editing by the *Army Logistician* staff.

Photos are a great asset for most articles, so we strongly encourage them. Photos may be in color or black and white. Photos submitted electronically must have a resolution of at least 300 dpi (.jpg or .tif). Prints of photos may be submitted by mail. Please try to minimize use of PowerPoint charts; they usually do not reproduce well, and we seldom have the space to make them as large as they should be.

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