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Voice for the Army—Support for the Soldier

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Delivering Materiel Readiness

From “Blunt Force” Logistics to Enterprise Resource Planning

Our mission is to develop and deliver global readiness solutions to respond to what Soldiers need on the battlefield.

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Redstone Arsenal, Alabama,
8 March 2016

Introduction

The 21st century security environment—volatile, uncertain, complex and ambiguous—presents enormous challenges to the joint force. Future trends forecast a continued migration of the world’s populations to urban areas and megacities, a reemergence of nationalistic and religious fervor, a direct or indirect transfer of technology from governments to terrorist organizations and an extension of conflict into cyber and space domains. Ensuring national security continues to require a whole-of-government approach involving not only the military element of power but also economic, diplomatic and informational elements.

One of the unique game-changers that America possesses is the capability and capacity to sustain campaigns worldwide in multiple theaters. Key to this sustainment is a national-level visibility of assets and resources together with a strategically responsive system and infrastructure for delivery. For the joint force to be effective requires national-level materiel readiness that facilitates the force’s agility, adaptability and versatility. The U.S. Army currently provides approximately 40 percent of the sustainment contributions to the joint force. Consequently, the Army’s materiel readiness is a critical component of the ability of the joint force—and thus the nation—to protect the vital interests of the United States.

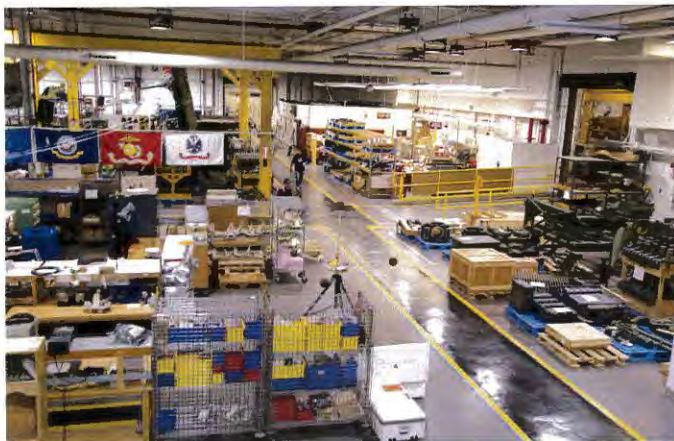
To meet these challenges, the Army must possess capabilities that are tailorable, scalable and rapidly deployable to provide the nation’s leadership with multiple options for the projection of U.S. power. Readiness of the current force is the first priority, not only at the tactical level but also at the operational and strategic levels of operations. Army logisticians are challenged as never before to equip and sustain expeditionary U.S. forces and provide overmatch capability in some of the world’s most inaccessible regions. For example, the Pacific is especially demanding, given



its vast distances, the length of the supply chain and the technological advancements and access-denial capabilities of current and potential adversaries.

As the Army provides and sustains materiel readiness for the joint force, it does so in an era of unprecedented fiscal austerity. To remain agile, adaptive and efficient, Army senior logisticians must reengineer industrial and sustainment operations, beginning with the Army’s organic industrial base (OIB), to preserve critical government manufacturing capabilities and enable the rapid buildup of combat power.¹ The Army is transforming its OIB by embracing enterprise resource planning (ERP) as a sustainable and cost-effective alternative to the previous “order, then expedite” approach. Its deployable logistics modernization program (LMP) is the centerpiece of efforts to achieve asset visibility and accountability at the national level. This lays the foundation for developing two critical capabilities for the future—the ability to erect small, expeditionary manufacturing and fabrication facilities much closer to the battle space and the ability to repair/refit/manufacture critical equipment and weapons on a smaller scale—to reduce the length and cost of the Army’s supply chain. The next step is for the Army to effectively and efficiently enhance asset visibility and, therefore, the capacity to be strategically responsive now and in the future.

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Background

From 1977 until 2007 the Army relied on two systems—the Commodity Command Standard System (CCSS) and the Standard Depot System (SDS)—to manage logistics operations at the national level and to supply critical equipment and repair parts to deployed forces. Intended to provide interface between the systems employed by the Army to manage its classes of supply, CCSS and SDS essentially proved to be stand-alone systems. The programming for CCSS and SDS employed extensive and intricate processes: 22 million lines of Common Business Oriented Language (COBOL) and 2,500 interfaces. The Army quickly developed a complex web of “work-around” solutions to improve integration of some \$24 billion in inventory.²

The Army confronted many challenges in the early 2000s, including available War Reserves and the need to replace legacy systems. Prior to the 11 September 2001 terrorist attacks on the U.S. homeland (9/11), War Reserves were at one of the lowest points in recent history—only 24 percent of authorized levels (resulting from the perceived “peace dividend” of the previous decade.) Additionally, in the aftermath of 9/11, the Army faced the immediate challenge of war and a timetable that did not permit the launching of a massive effort to create a customized software solution. Despite these challenges, the Army still provided world-class materiel and sustainment to globally deployed forces in the post-9/11 world. During Operations Enduring Freedom and Iraqi Freedom, this involved meeting the rapidly expanding materiel demands for new equipment and keeping deployed equipment current. As these requirements continued to expand, however, the need to increase the integration of the five additional stand-alone systems to manage different commodities—supply, ammunition, maintenance, logistics and property book—became clear.

To address this issue, the Army reached out to vendors for commercial off-the-shelf solutions. *Systemanalyse und Programmentwicklung* (SAP), widely recognized as an industry leader in ERP systems, emerged as a critical partner in creating a common logistics operating picture.

The Vision for a Single Army Logistics Enterprise

In 2004, in collaboration with SAP, the Army developed and piloted the Single Army Logistics Enterprise (SALE, conceived in the mid-1990s) and began implementation in 2007. SALE enables an across-the-board, end-to-end, integrated enterprise resource planning capability. This capability provides complete asset visibility and accountability and enables relevant parties across the logistical enterprise to access the same data in real time. This data includes equipment condition, available materiel and supplies, location, transit time and cost. The implementation of SALE represents one of the largest, most fully integrated supply chain and maintenance, repair and overhaul solutions ever attempted by either a government or a private-sector entity.

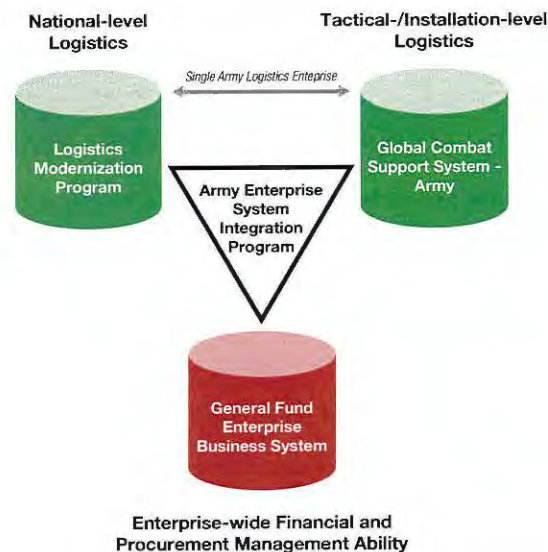
ERP, however, is much more than software and automation. Lessons learned over the past two decades of ERP implementation reveal that ERP works best as a holistic system that incorporates customers, products, services, processes, suppliers, the workforce and corporate culture.

The Integrated Components of SALE

SALE consists of three SAP-designed systems that provide complete financial integration across the Army:

- Logistics Modernization Program (LMP) – National-Level Logistics;
- Global Combat Support System—Army (GCSS-A) – Tactical and Installation-Level Logistics;
- General Fund Enterprise Business System (GFEBS) – Personnel Management and Financial Accountability.

These three systems communicate and interconnect through the Army Enterprise Systems Integration Program (AESIP), which manages data on materiel for customers and vendors and acts as an interface and translator with trading partners.



Source: Headquarters, US Army Materiel Command



The Logistics Modernization Program

The LMP is a critical component of SALE, enabling the development, acquisition, integration and management of enterprise-wide financial and procurement data. These capabilities will support and enhance core Army business capabilities, including the lifecycle management of weapon systems and the management of services and materiel supply. LMP will replace CCSS and SDS at the national level and provide the Army with integrated logistics management capability, enabling the management of supply, demand, asset availability and distribution.

LMP integrates more than 80 Department of Defense (DoD) systems and manages more than 18 billion dollars' worth of inventory and 50,000 vendor transactions. The Army deploys LMP to more than 50 industrial operations sites and currently has more than 20,000 users.³ With its capability to provide full cost reporting of goods and services, LMP is expected to produce auditable financial statements by September 2017, enabling the Army to meet the statutory requirements set forth in the 2010 National Defense Authorization Act (NDAA). LMP functions include:

- Ammunition Management;
- Depot Maintenance Planning and Execution;
- Supply/Inventory Management;
- National-level Supply Support;
- Requisition Processing;
- Financial Management;
- Services, Spares and End Item Procurement;
- War Reserves;
- Item Introduction/Total Package Fielding; and
- Depot Repair Mission Support.

Global Combat Support System—Army

The GCSS-A will fundamentally change the Army's management of the global supply chain by integrating Army legacy property, supply and maintenance functions into a single system. Eventually, GCSS-A will operate in all Army

Supply Support Activities, warehouses, supply rooms, motor pools and property-book offices throughout the Total Army—active Army, Army National Guard and Army Reserve—making it the largest ERP system in DoD.⁴

General Fund Enterprise Business System

The first Enterprise Resource Planning structure to fully deploy within the Department of the Army, GFEB is the Army's new web-enabled financial, asset and accounting management system that standardizes, streamlines and shares critical data across the Total Army.⁵

Significant Challenges and Lessons along the Way

As the Army continues its implementation of ERP and LMP Increment 2, two challenges emerge: managing the Army's supply chain while transitioning from "blunt force" logistics to demand forecasting; and creating a culture of collaboration and understanding.

From "Blunt Force" Logistics to Demand Forecasting

Initially, the task of supporting the materiel demands of the post-9/11 world and repairing or replacing damaged equipment placed a severe strain on the Army's supply chain. Limited asset visibility together with the challenge of integrating processes prevented a clear picture of the demand for supplies and end items, resulting in duplications, delays and shortages. Additionally, unscheduled orders sent from other DoD organizations consumed resources earmarked for Army priorities. Ultimately, the practice of delivering materiel into the theater without priority—order then expedite, or "blunt force" logistics—emerged. Fortunately, the deployment of LMP Increment 1 greatly improved logistics management integration; however, other critical areas, such as comprehensive supply chain and human capital strategies, were in need of further development.

In response, the Army created a supply chain transformation team within the OIB to address these concerns. This team developed and deployed a comprehensive supply chain strategy across the enterprise that was enhanced by the implementation of LMP and Complex Assembly Manufacturing Solution (CAMS) software. This strategy enhanced communication throughout the supply chain, improving overall capacity and materiel requirements planning and scheduling.

Building upon these developments, the Army's Lifecycle Management Commands (LCMCs) now participate in monthly sales and operations planning meetings to discuss anticipated changes in future requirements and known resource constraints. These management reviews help mitigate potential supply chain risks, especially as unforeseen events arise.

Regrettably, additional supply chain challenges surfaced. First, during the implementation of CAMS, Army depots

The fielding of LMP occurred in three phases between 2003 and 2010. Despite the different sets of materiel requirements demanded by operations in Iraq and Afghanistan, Increment 1 still provided enhanced visibility, depot-level maintenance and new capabilities in purchasing and managing repair parts. LMP Increment 2, Waves 1 and 2, began deployment in 2013. They address specific business requirements associated with materiel readiness, including modernization of War Reserves, maintenance and recapitalization of equipment. The Army successfully introduced LMP Increment 2, Wave 3, and its Complex Assembly Manufacturing Solution (CAMS) software to three pilot sites in June 2015. The Under Secretary of Defense for Acquisition, Technology and Logistics, approved full fielding of

LMP Increment 2, Wave 3 functionality across the OIB in March 2016 with plans to make it fully operational shortly thereafter.

Wave 3 provides shop floor automation within the OIB, creating electronic work instructions, improving capacity planning and scheduling and supporting Enterprise Equipment Master, Plant Maintenance and Item Unique Identification capabilities. The Ammunition Automatic Identification Technology solution replaces current legacy functionality and is designed to fully leverage the Enterprise investment in Extended Warehouse Management. Wave 3 also provides expanded maintenance capability to workload Army installation Logistics Readiness Centers for maintenance and repair of materiel.

LMP Increment 2 Capabilities that Address Specific Army Business Requirements and Deployment Timelines

Army Business Requirement	LMP Increment 2 Capability	Expected Users	Timeline
Enterprise Resource Planning System Integration	Enhanced interchange of data with other Army and Defense Logistics Agency systems	Technical upgrade; no new users	December 2013–July 2014
Non-Army Managed Items	Replace last of Commodity Command Standard System that supports Non-Army Managed items	36 item managers at U.S. Army Tank Automotive Command	August 2014–November 2014
Army Prepositioned Stocks (APS)	Modernize manually intensive War Reserve planning done outside of LMP	100 users that manage APS	August 2014–November 2014
National Maintenance Program	Integration of Increment 1 work loading with GCSS-A to execute below-depot maintenance at Army installations	200 users at Lifecycle Management Commands	May 2015–September 2016
Extended Ammunition	Improve national-level process to receive, store, survey and issue ammunition and eliminate current multisystem approach	1,500 users in the Joint Munitions and Lethality Lifecycle Command	May 2015–September 2016
Extended Industrial Base	Shop floor automation that is currently done manually with data collection on paper	12,200 users at 17 Organic Industrial Base sites	May 2015–September 2016

Source: Headquarters, U.S. Army Materiel Command

Capabilities Enhanced Through Implementation of Increment 2 to LMP

Lifecycle Management Commands	Industrial Base Plants, Depots and Arsenal
Forecasting	Capacity Planning (ability to meet changing demands)
Budgeting	Materiel Requirements Planning (ordering and scheduling)
Sourcing (new work)	Master Production Scheduling (short-range production plan)
Depot Workloading	Delivery Schedule (performance to promise)
Procurement (purchasing) in Advance	Materiel and Labor Cost Collection
Inventory Management	Carryover

Source: Headquarters, U.S. Army Materiel Command

discovered that insufficient access to needed technical data led to inaccurate and unsynchronized lists of parts (also known as bills of materiel) for engineering, procurement and repair. Second, modifications that were made to manufacturing processes as tactical operations evolved and equipment was upgraded were not always captured in the bills of materiel and assembly “routes.” Over time, this produced bottlenecks and delays. Third, systematic errors prevented the AESIP database from displaying orders and information on bills of materiel. This, too, resulted in production delays and inventory shortages.

LMP, especially Increment 2, Wave 3, is addressing these issues. The Army is moving away from minimum performance standards and lowest bids and transitioning into strategic sourcing and resource management. By establishing longer-term relationships with industry partners to create open dialogue and synergy, the Army is improving supplier performance. Technical data are continually reviewed, updated and verified, allowing the Army to reduce inventory levels and divest unneeded real property. Reduced inventory—along with newly discovered production efficiencies from increasingly accurate bills of materiel and routes and purchases of newer manufacturing machinery—is enabling the OIB to reduce the size of its footprint. As the Army divests unneeded real property, energy and water consumption and their associated costs decline accordingly. Ultimately, strategic sourcing promises to lower the cost of materiel and equipment and improve performance for the warfighter.

Creating a Culture of Collaboration and Understanding

Previous methods of managing requirements often resulted in minimal coordination across business areas. As ERP and LMP are implemented, leaders within the OIB are now gaining a more comprehensive understanding of the entire business process. This broader understanding allows them to make accurate, analysis-based decisions and to anticipate potential second- and third-order effects.

Return on Investment

LMP is providing critical benefits to the Army at a reasonable cost. According to the Army’s 2012 Economic Analysis, the fielding cost of LMP Increment 1 was approximately \$1.4 billion from 2002 to 2012. During the same period of time, LMP produced approximately \$750 million

Organic Industrial Base Numbers (2013–2015)

Metric	Result
Demand forecasting	50% reduction in error; \$920 million in cost savings
Inventory	14% reduction
Performance on promise	9.65% increase
Capital investment – Organic Industrial Base	\$2 billion (since 2003)
Facility restoration and modernization	\$42.63 million (FY14–15); \$17.2 million (FY16)
Divestiture of obsolete facilities	115 facilities eliminated at a cost of \$2.9 million (FY15) 75 facilities to be eliminated at a cost of \$2 million (FY16) 70 facilities to be eliminated at a cost of \$2 million (FY17) 250–300 facilities to be eliminated at a cost of \$25 million (FY18–22)
Energy	Implemented \$33 million in Energy Savings Performance Contract task orders; projected cost savings of \$60 million
Continuous process improvement	\$4.07 billion saved (\$7.4 billion in savings since 2010)
Workforce	Reduced workforce by 10,000 without involuntary separation.
Quality work environment	\$541.7 million invested; 616 of 843 quality work environment findings closed; \$1.1 million slated for FY16
Safety	Accidents reduced by 21%; costs reduced \$11 million
Workers’ compensation	Reduced \$4.4 million

Source: Headquarters, U.S. Army Materiel Command

in cost-saving offsets, including inventory reduction and partial retirement of legacy systems.

Increment 2 is expected to cost the Army an additional \$730 million through 2026, which brings the Army’s total LMP investment at \$2.13 billion. The total financial benefit associated with LMP Increment 2 through 2026 is estimated to be \$1.37 billion, making the total projected financial benefit of LMP \$2.12 billion.

In a November 2013 report, the Government Accountability Office evaluated Army capabilities that are being enhanced through the fielding of LMP Increment 2. The improved ability of LCMCs to forecast demand, plan materiel requirements, schedule workload and manage inventory is resulting in improved quality, availability and speed.

The Way Ahead

Despite the successes of the ERP and LMP, the present era of fiscal austerity still poses significant challenges to the Army’s materiel readiness. It is critical that investments are made in the areas of facilities divestiture, energy contracts, laboratories and public-private partnerships.

- **Divestiture.** The OIB is currently executing an aggressive divestiture strategy. In Fiscal Year (FY) 2015, 115 facilities were divested at a cost of \$2.9 million.



Seventy-five facilities are programmed for elimination in FY 2016 at a cost of \$2 million, subject to funding availability. An additional 70 facilities are scheduled for divestiture in FY 2017 at a cost of \$2 million, followed by 250–300 facilities from FY 2018 to FY 2022 at a cost of \$25 million. The Army has identified another 1,000 buildings that may require demolition at a cost of \$60 million. The Army expects the accompanying savings in real property maintenance, energy and water consumption to total millions of dollars over the next few years.

- **Energy Saving Performance Contracts (ESPCs).** In FY 2015, ten OIB sites invested in ESPCs with utility providers. The Army expects the return on investment to approach \$60 million in energy cost savings. Future investments in ESPCs are expected to generate significant savings.
- **Army laboratories.** The Army budgeted \$2.2 billion for Science and Technology in FY 2016 to execute more than 700 funded programs directly aligned to Army warfighting challenges. This funding, however, does not address the upgrades needed for the Army's seven laboratories. New and modernized facilities and equipment are necessary to support research, development and testing of new technologies, including weapons, electronics, communications and other materiel for the Soldiers of Force 2025.
- **Public-private partnerships.** As the Army implements ERP and LMP, it is also engaging in public-private partnerships with private industry and academia. In FY 2015, the Army participated in 288 active partnerships that generated \$260 million in additional revenue for the government. In addition, the Army awarded over \$9.2 billion



in contracts to small businesses in FY 2015. The goal for FY 2016 is to generate more than 400 partnerships. The academic and business communities have benefitted from access to government facilities and capabilities. The Army has gained invaluable insight into manufacturing techniques and strengthened its supply chain. Continued resourcing and support for these partnerships will enable the Army to leverage academic expertise and private-sector capabilities in materiel and supply chain management for years to come.

History is replete with examples that demonstrate the necessity of well-planned and well-executed sustainment. In an era of unprecedented complexity and fiscal austerity, ERP and LMP are proving to be sound investments. These processes enable the Army to efficiently supply and sustain its forces with materiel and equipment that is tailorable, scalable and rapidly deployable to achieve overmatch capability—in short, materiel readiness. It enables the Army to project power, defend the nation's interests and, when required, defeat potential adversaries anywhere in the world. In sum, materiel readiness is a prerequisite for Total Army readiness.

¹ For more information, see "The Army's Organic Industrial Base: Providing Readiness Today, Preparing for Challenges Tomorrow," AUSA Torchbearer Issue Paper, December 2013, <http://www.ausa.org/publications/ilw/DigitalPublications/Documents/tbip-acib/index.html>.

² Government Accountability Office, "Defense Logistics: Actions Needed to Improve Implementation of the Army Logistics Modernization Program," April 2010.

³ Program Executive Office-Enterprise Information Systems, "Logistics Modernization Program (LMP) Increment 2 Overview," U.S. Army Website, 2015.

⁴ For more information, see "Strategically Responsive Logistics: A Game-Changer," AUSA Torchbearer Issue Paper, October 2015, <http://www.ausa.org/publications/ilw/DigitalPublications/Documents/tbip-g4/index.html>.

⁵ *Ibid.*