ARMING THE FORCE Future Class V Sustainment

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S THE UNITED STATES fights the wars in Iraq and Afghanistan, a workforce of dedicated professionals diligently plans and labors to supply and sustain our warfighters. Even as the U.S. military transforms, innovative weapons systems, equipment, supplies, arms, and munitions continue to be developed. Within the classes of supply, the one most taken for granted is Class V—ammunition.



This article describes the Army's programs to transform Class V logistics to better support readiness. Army Materiel Command (AMC) oversees supply and sustainment, providing all types of equipment and supplies to our forces. Subordinate to AMC are the life-cycle management commands, one of which is the Joint Munitions and Lethality Life-Cycle Management Command (JM&L LCMC). It is responsible for integrating the acquisition, logistics, and technology communities to create a strategic direction for supply, sustainment, and distribution of munitions. Its staff also develops strategies to attain a modern and balanced organic and commercial industrial base. Joint Munitions Command (JMC) is the major subordinate command under the JM&L LCMC that does most of the producing, storing, shipping, maintaining, surveillance, and demilitarizing of munitions. The command manages all munitions except strategic missiles and rockets; however, it does provide logistical support—storage, inventory control, transportation, and demilitarization—for tactical missiles.

The task is immense. Joint Munitions Command provides ready, reliable, and lethal munitions for the warfighter worldwide. Moreover, the command is the logistics integrator for life-cycle management of ammunition, providing on-site technical support to frontline units.¹

The Munitions Challenge

After Operation Desert Storm, readiness reports on munitions were inaccurate. Inadequate funding made it impossible to perform required maintenance and conduct surveillance inspections on the vast stockpile of munitions, and the long lead time necessary to upgrade the munitions prohibited a rapid response or quick issue in time of need. The terrorist attacks on 9/11 and the subsequent War on Terrorism confirmed that our munitions stockpile had to be ready at all times; nevertheless, the munitions situation continued to worsen after 9/11.

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PHOTO: SGT Joseph Sullivan uses a portable inductive fuse setter to activate rounds to be fired from an M-777 howitzer during a training exercise on Forward Operating Base Salerno, Afghanistan, 28 February 2008. Sullivan is an ammo team chief with the Army's 3d Battalion, 321st Field Artillery Regiment, 18th Field Artillery Brigade. (U.S. Army, SPC Micah E. Clare)

As a 2005 JMC report noted, "Immediately after 11 September 2001, DA [Department of the Army] decision makers had to contend with potential ammunition shortages. The true impact of condition codes E, F, K, and N was that ammunition DA leadership thought was available could not be used for combat without inspection and maintenance"² In May 2002, the immensity of the problem was expressed by Major General Wade H. McManus during an Operations Support Command briefing. He said, "Resources in the POM [Program Objective Memorandum] could buy about 45% of the shortfall items. However, due to the atrophying of the ammunition base [production and logistics] in the 1980s and 1990s, surge operations could affect only 10% of the go-to-war shortfalls."³ Planning for the War on Terrorism revealed that the ammunition community could not produce the necessary munitions in the time available-it would take several laid-away plants 18 to 24 months to activate. Moreover, available serviceable ammunition had competing demands.

According to McManus, "the stockpile was intended to support two major regional contingencies (MRCs). However, it was questionable if the inspected and maintained stockpile could support even one MRC plus multiple small-scale contingencies."4 The reports focused on availability of training ammunition rather than actual readiness of the ammunition for warfighting.⁵ Furthermore, requirements were not well defined, making it impossible to articulate current needs. Regardless, it was evident that there was a shortage of certain munitions. The readiness reporting system needed to be redesigned to provide senior leaders an accurate status of munitions. Moreover, the readiness report needed to include the status of the production capability of the industrial base and distribution system.

The Munitions Readiness Report

Two days after 9/11, Army Chief of Staff General Eric K. Shinseki directed Operations Support

Command (now Joint Munitions Command) to develop "a system for munitions that will portray the Army's ability to support contingency operations."⁶ Readiness status of munitions tracked by DA was predominantly based on available tonnage and its location. This method did not always show an accurate tally of serviceable munitions. Clearly the ammunition community needed a new readiness report for munitions based on condition and availability weighed against requirements.

Assessing readiness. Joint Munitions Command developed and implemented the Munitions Readiness Report (MRR) to assess munitions readiness so that DA would have the necessary information to prioritize funding and production effort.

The MRR Integrated Process Team, which includes representatives of the major commands, provides status reports and forecasts requirements for the report. By projecting future requirements and ascertaining on-hand quantity, quality, serviceability, and production capacity, the readiness report identifies when the manufacturing base needs to increase production. The report depicts the overall status of each ammunition item and family, projecting the readiness status for the following 6 to 24 months. The readiness report determines readiness ratings for two separate resource areas-availability of assets-the S rating-and reliability of assetsthe R rating. The S ratings are determined for both war reserve and training requirements, separately and combined.

This analytical reporting tool identifies munitions with joint-service applications, taking into account both conventional munitions and missile data. It also evaluates global status of individual munitions categories, such as artillery, small arms, and bombs. A JMC publication states, "in each category each specific ammunition item is tracked. For example, in the small arms category the MRR tracks 5.56-mm, 7.62-mm, .50-caliber, etc. in every configuration. Newer items of munitions, not yet transitioned to the National Inventory Control Point, are included as well."⁷

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A U.S. Marine assembles .50-caliber ammunition onto a link belt, 2002.

In addition to forecasting ammunition requirements, the MRR is used to prioritize funding for essential ammunition components and other critical items. Such foresight permitted the munitions command to secure extra funds to service and repair on-hand stocks.

Readiness updates. Based on the MRR, the Army G-3/5/7 provides a monthly ammunition readiness update to Army senior leadership during the Army Operations Center balcony briefing every month. The status is based directly on the analysis conducted using the readiness report and, according to a JMC information paper, key participants include the secretary of the Army, undersecretary of the Army, chief of staff of the Army, and vice chief of staff of the Army.⁸

The Munitions and Logistics and Readiness Center, and the Program Executive Office—Ammunition (PEO-Ammo) and its program managers provide acquisition information via a dedicated chart in the readiness report that supports this briefing and is available worldwide to those having access. As the information paper notes, the DA G-3/5/7 munitions management office uses the information to build a condensed version referred to as the "one voice" chart. The chart is used as a quick reference guide to answer questions during the balcony briefing.⁹

Supporting other services. The MRR has great potential to expand and support other services. Joint Munitions Command's strategic enterprise partner, PEO-Ammo, is the single manager for conventional ammunition (SMCA) executor, and JMC is the SMCA field operating activity. The SMCA manages the day-to-day operations of conventional ammunition. Joint Munitions Command is currently working to leverage MRR analysis capability to provide theater-specific views as well as a worldwide readiness assessment. In 2006, JMC began working with the U.S. Marine Corps to develop a distinct Marine readiness reporting system that integrates key characteristics of the Army reporting system.

The MRR is a vital tool to give Army leaders an instant view of ammunition readiness posture. The report could merge with those reports of the other military services and eventually become an allinclusive U.S. system. The Department of Defense should consider expanding the MRR across the services to raise the standard of excellence for total munitions reporting.

Integrated Logistics Strategy

Joint Munitions Command, with George Group contractor support, charted a new course with the employment of the Integrated Logistics Strategy (ILS). The strategy focuses on "now and into the future" strategic logistics to support Joint warfighter readiness. It will provide continuous assessment of the logistics operational base and will map out a dynamic course for situational changes and future requirements. The strategy seeks to attain operational symmetry among a warm-base (ready-to-use facilities and equipment) inventory and out-load (packaging, loading, and transport) capabilities. Using data-driven decision tools, the logistics strategy will improve the efficiency and effectiveness of future ammunition operations at installations and depots.

The ILS assessment document contains three parts:

• Issues and constraints.

• Integrated Logistics System framework depot network, positioning, and transition strategies.

• Implementation and ongoing management (metrics and governance).

Issues and constraints. Key issues and constraints limit the speed or impact of ILS.¹⁰ These key issues serve as the multiyear strategic agenda for improvement. Joint Munitions Command will resolve some

Integrated Logistics Strategy... focuses on "now and into the future" strategic logistics to support Joint warfighter readiness. of the issues internally, while others may require assistance and funding from higher echelons.

Integrated Logistics System framework. The framework includes three distinct strategies that form the nucleus of the ILS:

- Depot network strategy.
- Positioning strategy.
- Transition strategy.

If we align and synchronize all three strategies correctly, the overall strategy will support warreserve stock and out-load and training support requirements (Figure 1).

Depot network strategy. This strategy is designed to determine the optimum number of installations and capabilities and realign stocks accordingly. It has three components—regional optimization, outload capacity, and storage capacity—and takes into account the logistics capabilities needed to support conventional ammunition and missile operations at a national level.

For JMC, planning a strategic realignment of the national stockpile to achieve the optimal number of installations and capabilities is a significant undertaking. The United States is divided into distribution regions based on the correlation between fixed costs and transportation costs. On a few installations, fixed costs are low but transportation costs are high; however, most installations are located close to customers, so transportation costs are low but fixed costs are high in some cases. Joint Munitions Command is looking for the optimum number of regional distribution centers with the lowest combined costs (Figure 2).

A sufficient out-load capacity satisfies a component commander's 16-week time-phased ammunition requirement. The goal is to have the optimum number of installations, nationwide, with the current infrastructure and staff available to support the requirement.¹¹

Efficient storage capacity has the most advantageous number of facilities needed to store war reserve, training, and other ammunition for the services. Logisticians code ammunition for various functions, such as training, war, transfer, maintenance, and demilitarization; Class V must be stored until its life cycle is complete. Storage capacity is critical—if facilities fill to capacity or overcapacity, a decrease in efficiency and velocity of ammunition management can occur.



Figure 1. ILS strategies.

Positioning strategy. An efficient positioning strategy balances the workload at the various facilities. In times of crisis, it helps determine requirements for accelerated munitions production.

Positioning strategy focuses on types of munitions and configurations. Specific decisions on how much to position in which location depend on expected demand patterns. Ammunition stocks are further segmented based on "training-unique," "training-standard," and "war reserve." As an example, with knowledge of ammunition demand patterns, training-unique ammunition can be optimally stored closest to the recurring demand. This minimizes second-destination transportation costs. Within the regional concept, munitions are positioned in proportion to demand by region.¹²

Under the Centralized Ammunition Management concept, which is covered in more detail below, munitions are positioned at the depot that regionally best supports life-cycle capabilities and is in proximity to demand-concentration sites.



Figure 2. Regional optimization cost factors.

Additional considerations for placement include the type and purpose of munitions, amount of excess, and demilitarization.

As a JMC executive summary explained, "training standard ammunition takes on the characteristics of both training unique and war reserve. A certain amount should be stored to support the recurring demand; however, an additional amount could be centrally stored to support contingency outload."¹³ It further explained, "War reserve ammunition can optimally be stored at more centralized locations. This ammunition normally ships via containers in support of contingency operations. It does not have a recurring demand."¹⁴

War-reserve positioning necessitates efficient out-load capabilities, storage capacity, maintenance and demilitarization capability, a ramp-up capability, and an east/west (U.S.) split of stocks. The regional concept for war-reserve stocks calls for facilities that mirror training stocks within the constraints of storage and out-load capacity.

Demilitarization and deep storage of munitions is also considered for all Department of Defense Identification Codes.

Transition strategy. The transition strategy facilitates changing from the current situation to the best network positioning by eliminating imbalances through programming, budgeting, and execution decisions. Imbalances include demand misalignment-when available ammunition in an installation cannot support the region's training requirement. This results in second-destination transportation costs.¹⁵ Another imbalance is storage misalignments, when there is insufficient space to store the ammunition needed to support recurringtraining demands or contingency operations. Finally, capability mismatch happens when stocks are incorrectly positioned within the facility, thus hindering maintenance, surveillance, testing, and demilitarization.

Implementation and ongoing management metrics and governance. Integrated Logistics System implementation rests with two entities—the ILS cell and the ILS execution committee—both essential for managing ILS. To ensure continuity and integration, the cell drives the day-to-day ILS management and execution. The execution committee bridges execution between the cell, installations, and the other military services.



An ammunition igloo storing 2,000 pound bombs at McAlester Army Ammunition Plant, McAlester, OK, 2005.

Joint Munitions Command is committed to optimizing solutions in implementing ILS. The solutions are only as good as the information in the analyses. However, personnel at JMC understand the support necessary for supplying munitions to sustain training and contingency out-loading requirements. The command's goal is to provide the best possible integrated munitions and logistics answers and to help its customers understand ILS and its implications. We are likely to achieve optimum results with additional funding allocated to modernize the industrial base.

Centralized Ammunition Management

As Allen Marshall has noted in his article "JMC Managing the Munitions Stockpile through CAM Initiatives," "Managing the munitions stockpile became a concern after the 1990s because of the drawdown. At the end of fiscal year 2002, an initiative was instituted to address those concerns. That initiative is Centralized Ammunition Management."¹⁶

In 2002, U.S. Army Forces Command challenged JMC to take on Centralized Ammunition Management as a transformation task. Army leaders realized they had to have visibility of stocks down to the individual ammunition supply point should the need arise to use those stocks for operational requirements.

Joint Munitions Command currently supports 78 ammunition supply points in the continental

United States in support of units from all major Army commands, Special Operations Command, the Army National Guard Bureau, Multinational Force and Observers-Sinai, the Air Force, the Marine Corps, and Navy training at Army installations. The management process begins and ends with the warfighter. It focuses on training and contingency out-load support and ensures delivery of ammunition from the traditional wholesale sites to posts, camps, stations, and supply points across the United States.

Centralized Ammunition Management is a revolutionary concept that anticipates the needs of each training region. It automatically replenishes supply points with training and mobilization requirements every 90 days via a process in which logisticians assess training authorizations and basic load necessities against on-hand stocks and authorized stockage levels. Other functions of Centralized Ammunition Management include cross-leveling inventory, prioritizing stock levels, and assigning stock locations. This is transparent to users because the ammunition is ready to use. The process provides total asset visibility by tracking each document from the time it enters the system until the customer receives the order. All levels within the supply chain have this visibility.

Centralized Ammunition Management ensures stock rotation, reduces transportation time and costs, and improves management. Shipments are consolidated, there are more dedicated routes, and there are fewer trucks on the road, which reduces public exposure to explosives.¹⁷ As the Munitions and Logistics Readiness Center 2006 Annual Historical Summary notes, "With visibility and control of assets at the Ammunition Supply Points and at our wholesale activities, the stockpile management and transportation for training requirements has been streamlined to become more effective and efficient."¹⁸

Logistics Modernization Program

The Logistics Modernization Program is another initiative instituted by Army Materiel Command to improve ammunition management. The program replaces the obsolete 30-plus year-old logistics management systems. All classes of supply and the logistics required to support the commodities are converting to the modernization program. When complete, it will provide the Army Materiel Command a single, integrated, commercial off-the-shelf enterprise resource planning solution to manage its logistic missions.¹⁹ The program's integration allows the use of a single set of master data for each item owned and used by the enterprise, eliminating redundant data entry, thus reducing data errors and providing for seamless integration with other enterprise resources. The aim is to increase efficiency and reduce cost by eliminating unnecessary interfaces and systems. Joint Munitions Command has sought to modernize its logistics supply chain and create an integrated system from factory to foxhole.20 Business process re-engineering, continual improvements, and innovative answers are transforming legacy systems into a modernized program. This transformation has made it possible for the munitions command to identify the primary ammunition business processes necessary for enhanced operation of the ammunition industrial base and reform legacy-system business processes into the best commercial business processes.

The Future of Joint Munitions Command

Joint Munitions Command transformation is staying on track with the Army's plans for the future and with Air Force, Navy, and Marine Corps equipment. It has charted a course to keep pace with modernized firearms, weapons systems, and other equipment that fire or drop munitions. The command will continue to support the warfighter with munitions for the new weapons of tomorrow.

Ammunition is produced through commercial producers as well as government-owned, contractor-operated; and government-owned, governmentoperated facilities. Each sector is critical in meeting warfighter demands. Objectives identified for the industrial base include establishing a right-sized munitions base, maximizing effectiveness and efficiency, and focusing the industrial base to support the future-year defense program and surge, while relying on the commercial sector to the maximum extent practicable. To sustain requirements, we must maintain government capabilities and core competencies to mitigate risk, provide capabilities that the commercial sector does not have, and establish a flexible, modern supplier base with a high degree of production process control.

Joint Munitions Command is modernizing and consolidating its government-owned munitions plants and evolving into a leaner, more efficient organization. As an AMC publication notes, "Upgrades in the JMC industrial base are done for a number of reasons: to sustain an existing capability, to increase productivity, to save money, to increase reliability, to increase capacity, to increase quality, or to establish—per the terms of Army Transformation policy—a totally new production capability."²¹

Production of ammunition and explosives requires exceptional care; producers must exercise great restraint in making devices designed to explode. Modernization will make ammunition plants safer and allow the industrial base to keep pace with requirements. Brigadier General James E. Rogers has set JMC on a course to do just that. In coordination with Armament Research, Development and Engineering Center (ARDEC), the munitions command is working multiple projects, mapping a strategic direction, and finding topquality solutions to strengthen the ammunition community through renovation of infrastructure, new equipment, enhanced technologies, and precise and safe methodologies. However, the primary reason for installation modernization is to maintain the production capabilities and capacities needed to increase production when called upon.²²

The Future of Class V

Ammunition production and operational enhancements have significantly progressed since September 2001. Joint Munitions Command and its manufacturing plants and depots have increased production and enhanced delivery capability while consolidating several facilities under the ongoing base realignment and closure. The command is on track for keeping U.S. forces supplied with munitions during transformation.

New munitions—such as the Excalibur extended range 155-mm projectile; the Intelligent Munitions System with its sensors-communications system; and smart munitions, using infrared, global positioning system, and seeker technology—give the



U.S. Army Soldiers of 321st Field Artillery, 4th Brigade Combat Team, 82d Airborne Division, test fire an Excalibur artillery round on Forward Operating Base Salerno, Afghanistan, 28 February 2008. The Excalibur round is a precision-guided global positioning system round.

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warfighter precision-strike and other capabilities. Fire-and-forget munitions are the premier munitions of the future with advanced, shaped-charge warheads suitable for the challenges of tomorrow.

The future force will have new weapons and munitions that provide innovative capabilities to defeat the enemy. Munitions project managers are pioneering new ammunition designs and futuristic devices to defeat enemy armor and equipment. Developing, producing, and fielding "smart" precision munitions is a collective Army priority.

New developments in munitions emerge as advances in enemy armor technology and capabilities challenge us. This trend will continue into the foreseeable future. Joint Munitions Command maintains situational awareness of new enemy upgrades in technology and stays informed of ARDEC improvements to use enhanced technologies to produce, store, and deliver new munitions wherever they are needed. However, armor is not the only target on the modern battlefield. Personnel, trucks, and structures are also targets, and destruction is not necessarily the only option in each engagement. Nonlethal responses are an increasingly important component in the developing arsenal. Changes in strategy and tactics will always require alternate means to defeat the enemy.

Joint Munitions Command has initiated changes to its organization to continue to supply and sustain the force with required logistics and lethality, while never losing sight of our customers, the warfighters. **MR**

NOTES

1. Tim Kennedy, "U.S. Army Joint Munitions Command, Ensuring Reliability," Army Materiel Command 2007 Edition, 2007, 86.

2. Army Field Support Command/Joint Munitions Command History Office, "Transforming Logistics for the Global War on Terrorism," Command Publication, May 2005, 2-3. Condition codes (CCs) represent the availability of stock for issue, not just on hand. CCs A, B, and C can be issued. However, CCs E and F need light or extensive maintenance. CC J is suspended either due to a known problem or simply because two or more scheduled inspections have been missed. CC K means that items have been returned but never inspected to determine serviceability (many Desert Storm returns remained in this category). CC N means items can be issued for emergency combat use only. See FM 4-30.13, Armmunition Handbook: Techniques, Tactics and Procedures for Munitions Handlers (Washington, DC: U.S. Government Printing Office (GPO), 1 March 2001).

3. MG Wade H. McManus Jr., "Ammunition Support Issues and Challenges," OSC briefing presentation, May 2002, 4, 16.

- 4. Ibid., 3-4.
- 5. AFSC/JMC History Office, 2-3.

6. BG James Rafferty, Cindy Lenger, and Jay Sloat, "New Stockpile Management Tools Support Army Readiness," *Ammunition Quarterly* 11, no. 1 (Winter 2005): 12.

7. AFSC/JMC History Office, 3-4.
8. Jay Sloat, "Army's New System: Munitions Readiness Reporting," JMC

information paper, 8. 9. Ibid., 9. War-Reserve items are rated green if they have sufficient servicesupply"; a green rating is based on 150 days of supply, an amber rating is determined as from 120 to 149 days of supply, and a red rating is assigned for items with serviceable assets of less than 120 days of supply on hand. These ratings are also adjusted downward one notch if depot levels of the assets are less than 90 days. For items with both war-reserve and training requirements, the worse of the two ratings is the overall rating.

 Dave Harris, Joint Munitions Command, Integrated Logistics Strategy (ILS), (JMC pamphlet, 29 January 2007).

11 Dave Harris, "Joint Munitions Command, Executive Summary Integrated Logistics Strategy," command information paper, 2006, 2.

13. Ibid.

14. Ibid.

 Allen Marshall, "JMC Managing the Munitions Stockpile through CAM Initiatives," ca 2002-2004, 1. 17. Ibid., 7.

 AFSC/JMC History Office, "Munitions and Logistics Readiness Center (MLRC) FY2006 Annual Historical Summary," FY 2006 AFSC/JMC Annual Command History vol. II, November 2007, 7.

19. Colonel David W. Coker, Diane O'Connor, and Larry Asch, "U.S. Army Logistics Modernization Program, LMP 201: Myth Busters," information paper, undated, 1.

 Paul Capelli, "Logistics Modernization Program, SAP," U.S. Army Materiel Command information paper, undated, 2.
Tim Kennedy, "U.S. Army Joint Munitions Command, Ensuring Reliability,"

21. Tim Kennedy, "U.S. Army Joint Munitions Command, Ensuring Reliability," Army Materiel Command 2008 Edition, 2008, 88.

22. Ibid., 90.

able assets to meet the war-reserve requirement. These items are rated amber if assets exist only sufficient to meet the critical war-reserve requirement. Items with serviceable assets that do not meet either war-reserve or critical war-reserve requirements are rated as red. Training unique items are measured in "days of

^{12.} Ibid., 3.

^{15.} Ibid., 4.