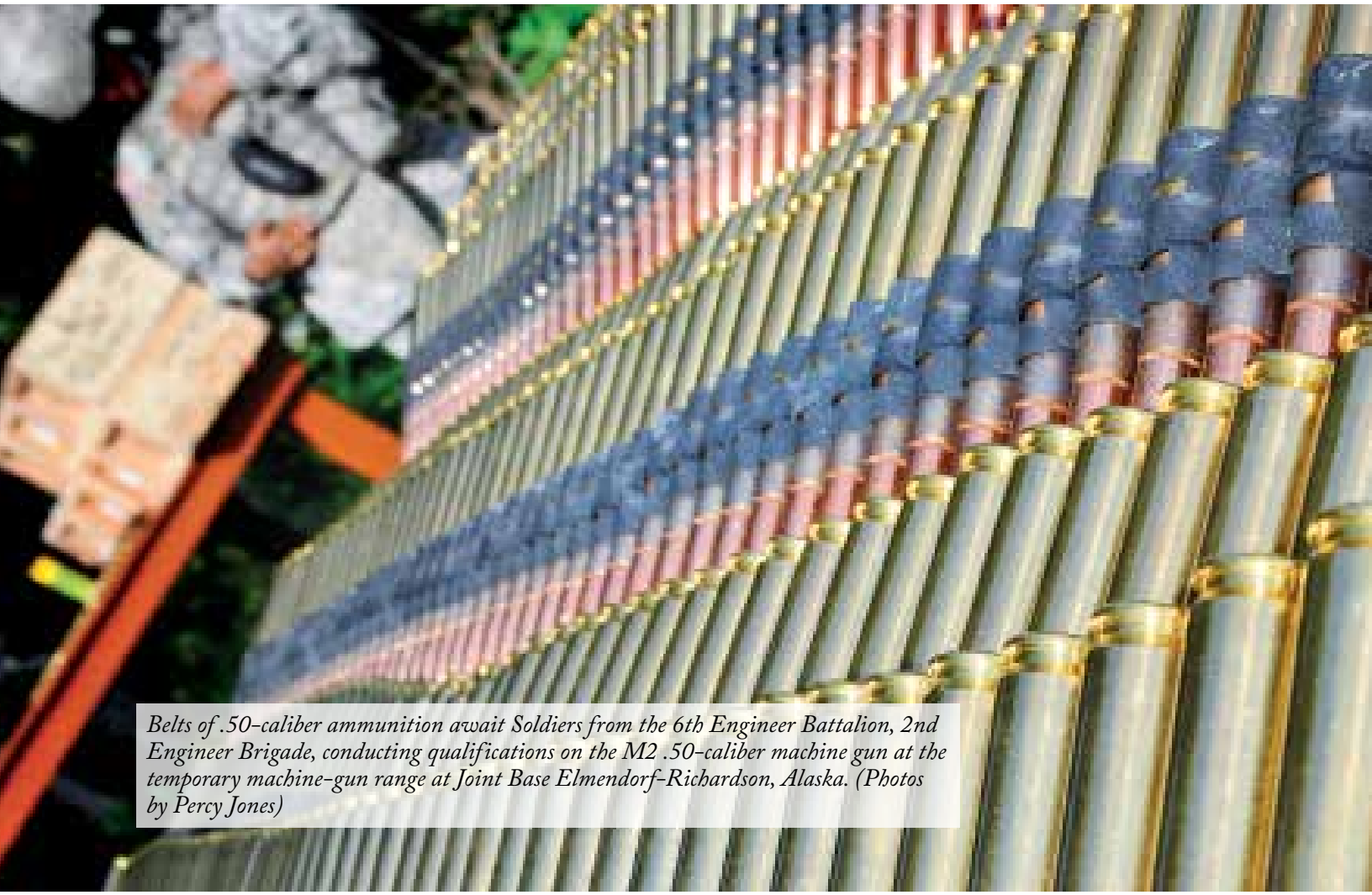
Insights and Challenges of Web-Based Ammunition Management

The Army has taken steps to improve ammunition management but more still needs to be done. This article highlights Total Ammunition Management Information System functions and enterprise modernization challenges.

■ By Lt. Col. (Ret.) Bob Torche

The Army is seeking a better connected, more agile munitions enterprise capable of meeting operational requirements now and into the future. Headquarters, Department of the Army personnel, project officers, developers, and munitions experts have established process action teams, committees, and workgroups in pursuit of a more robust and capable munitions enterprise. Despite high-profile discussions, hundreds of briefings churned out by oversight bodies, and countless articles in publications, Army teams have mostly produced vague promises and incomplete plans.

The Army G–3/5/7 (operations and plans) Munitions Management Division participates in these integrated sessions to ensure that the outcome



Belts of .50-caliber ammunition await Soldiers from the 6th Engineer Battalion, 2nd Engineer Brigade, conducting qualifications on the M2 .50-caliber machine gun at the temporary machine-gun range at Joint Base Elmendorf-Richardson, Alaska. (Photos by Percy Jones)

aligns the munitions requirements process and the Total Ammunition Management Information System (TAMIS). Most ammunition managers would consider TAMIS successful, but without a modern and reliable inventory management system at Army ammunition supply points, TAMIS and the larger ammunition enterprise cannot reach their full objective.

TAMIS Functions

TAMIS executes essential functions of the munitions enterprise by calculating, developing, and prioritizing billions of dollars worth of training, combat, and test ammunition requirements and managing authorizations for the total Army—Active, National Guard, and Reserve. TAMIS's functions include forecasting ammunition requirements; preparing, processing, validating, and routing electronic requests for munitions; and recording and calculating expended munitions.

TAMIS supports the Army and ammunition managers by ensuring that requirements, authorizations, and expenditures are accurate, visible, available, and usable when needed. It allows users to forecast and request ammunition and to access information without wait time for processing and dissemination.

The TAMIS framework is scalable and hierarchical. It is a Web-based application in which each command manages its ammunition independently of other commands. Its centralized management and decentralized execution result in a common operational picture and improved flexibility throughout the command hierarchy.

Updating the Standard Army Ammunition System

As the drawdown looms, the importance of ammunition management has never been greater. The Army faces tough choices in a fiscally constrained environment that has many information technology infrastructure challenges. Committees of functional and technical munitions experts must determine how best to update the legacy warehouse munitions system—the Standard Army Ammunition System.

This effort is essential to creating an optimized and interoperable munitions enterprise. Initially, this legacy system was to be included in an overarching logistics modernization effort involving the implementation of an Enterprise Resource Planning (ERP) application. Today, however, the Army is seeking a less expensive and more tailored solution.

Although ERP applications such as Global Combat Support System–Army and the Logistics Modernization Program are best for coordinating and managing enterprise-level processes, detached systems sometimes work best for specific functions. Calculating, prioritizing, requesting, and managing ammunition requirements under various operational scenarios require specialized features and agility that are better managed through decentralized, Web-based operations. Whether similar decentralized operations should be extended to Army ammunition supply points remains undecided.

The path forward for the new or updated ammunition warehouse system must include improved interoperability with TAMIS. Achieving a high level of interoperability requires an innovative and proactive approach. Interoperability challenges will only become harder to manage as the Army's systems grow more complex and interconnected.

The G–3/5/7 munitions office embraced a Web-based strategy for TAMIS more than 12 years ago. The office delivers ever-increasing updates and enhancements by using an agile process aimed at reducing the time and resources needed to respond to rapid changes in operational requirements. Could the same approach work for a Standard Army Ammunition System service life extension or a commercial off-the-shelf application? Or, maybe the Army should consider a stand-alone Systems, Applications, and Products in Data Processing system for ammunition supply points. As the Army gears up to spend millions more on software over the next several years, questions persist while Soldiers struggle to maintain a legacy system.

Network Reliability

The success of any Internet-delivered application is only as good as its network and data center. Accessibility, availability, and network performance are paramount. Too many times over the last few years, TAMIS users experienced outages directly caused by poor data center management, network operation center disorder, and even installation information managers interrupting connectivity in the process of administering installation networks. Data centers and network managers must improve reliability, response time, and diagnostics for mission-essential systems that rely solely

Pfc. Crystal Campbell, 56th Engineer Company (Vertical), 2nd Engineer Brigade, carries .50-caliber ammunition to a gunner during the 10-meter familiarization course at the temporary machine-gun range at Joint Base Elmendorf-Richardson, Alaska.

on the network for mission success.

Web-based applications can increase productivity, cut costs, and enable the Army to operate more efficiently. But as surely as fast-moving Web applications can accelerate military operations, slow-moving applications can bring a force to its knees. If applications do not consistently function quickly, securely, and reliably, user satisfaction will plummet along with mission success.

To help improve its Nonsecure Internet Protocol Router Network (NIPRNET) performance, TAMIS relies on the Defense Information Systems Agency (DISA). DISA's introduction of the Global Content Delivery Service (GCDS) improves network performance for all users reaching TAMIS via NIPRNET. The GCDS serves as a NIPRNET traffic cop, accelerating and routing traffic more efficiently than the Internet does on its own. Every externally-facing, Web-based Army application should consider using GCDS.

Unfortunately, DISA does not provide a total network solution yet. Users who access TAMIS from home computers, on the road, or away from a NIPRNET connection need similar performance. Until DISA allows commercial Internet traffic to cross over onto GCDS, application owners should consider commercial acceleration and performance optimization services to improve content delivery.

System Security

Users must also be aware of the growing cyberthreat. GCDS and Akamai Technologies, the TAMIS commercial vendor, provide TAMIS with an in-depth defense capability by determining attack patterns and implementing countermeasures to stop them.

While the Army and Department of Defense establish a workforce to address cyberthreats, system owners and information technology managers should seek ways to build security into their applications early in the acquisition life cycle. One way to accomplish this is to ensure that contracts address requirements for secure code, software risk analysis, and an independent security review that includes both static and dynamic application analysis.

Embedding software assurance in the software development life cycle is the best approach. Security reviews help to contain, remove, and prevent vulnerabilities by minimizing the risk of possible exploitation. The TAMIS project team embraced automated tools for software assurance. Although these tools are not foolproof, they are cost effective and continue to improve. It is far cheaper to build security into the application than to diagnose and fix it later.

Project Management

The project manager plays a key role in ensuring the design and implementation of secure applications. As custodian of the work breakdown structure, the project manager identifies and defends the nonfunctional requirements needed to build security into the application. He protects the integrity of the secure software development life cycle from those who would seek to compromise the application for short-term budget and time considerations.

TAMIS is overseen by the G–3/5/7 munitions office and governed by Army Regulation 5–13, Total Army Munitions Requirements Process and Prioritization System, but munitions managers also influence the system's development as members of the TAMIS advisory group. This group

provides a forum for user feedback on system operations and process improvement. The G–3/5/7 munitions office routinely incorporates this feedback to improve user experience.

TAMIS captures Army force structure data and combines it with weapon and platform combat-load factors and approved training strategies from Department of the Army Pamphlet (DA Pam) 350–38, Standards in Training Commission, or STRAC, in order to establish the foundation for most training and operational requirements.

Inside TAMIS, the 2012 DA Pam 350–38 became eSTRAC, more flexible and capable than ever before. The eSTRAC is easier to use than the paper version and displays event level detail by unit. Updates and changes to eSTRAC are simplified, and its annual publication is now only a click away.

The Training and Doctrine Command's approved programs of instruction, class schedules, and student tallies account for the remaining requirements. Ammunition managers validate these requirements by adjusting equipment on hand, Soldier availability, deployments, training schedules, and the number of courses planned.

Validated requirements are submitted in TAMIS to the G–3/5/7 munitions office for resourcing. Errors and misalignments in modified table of organization and equipment and table of distribution and allowances documents, together with outdated and incorrect programs of instruction, cause discrepancies in ammunition calculations, requiring managers to spend a disproportionate amount of time correcting requirement calculations. Greater amounts of automation impose stricter processes that result in more precise calculations and easier validation but only after source data is cleansed.

Improvements Made and Needed

Army Test and Evaluation Command (ATEC) and Army Materiel Command (AMC) managers who conduct ammunition tests or require ammunition in testing submit and manage their requirements in TAMIS. ATEC and AMC test requirements are validated and prioritized for resourcing in TAMIS. Although the management of ammunition used by testing activities has improved, managers must become more familiar and compliant with prescribed ammunition practices.

TAMIS must provide greater flexibility for ATEC and AMC so that all test ammunition, munitions components, and part numbers are manageable in the same system and independent of traditionally procured Army ammunition. Even items not acquired through traditional acquisition channels, such as foreign ammunition, should be managed in a single system.

TAMIS modifications are underway, yet ATEC continues to pursue an internal ammunition system to interface with TAMIS. ATEC should abandon its internal system and fully support and adopt TAMIS.

After validating Armywide requirements in TAMIS, the G–3/5/7 munitions office, in conjunction with the Army G–4 (logistics) munitions division, passes resources to each command in the form of electronic authorizations. Each command level in TAMIS passes the authorizations to its subordinates based on approved requirements. Subordinate units, identified as the UIC (unit identification code) level in TAMIS, forecast their munitions to the ammunition supply points where they intend to pick up ammunition.

Ammunition is loaded in an M2 .50-caliber machine gun as part of a training exercise at the temporary machine-gun range at Joint Base Elmendorf-Richardson, Alaska.

TAMIS guides the user through the forecasting process and aids the user in determining how much ammunition is needed for scheduled training. But more still needs to be done to improve forecasting accuracy. Units overestimated how much training ammunition they needed by 49.3 percent in 2011 and by 51.9 percent in 2012. An upcoming TAMIS release contains an additional forecasting feature that should improve forecasting accuracy.

TAMIS's forecasting and handling of cartridge-actuated devices

(CADs) and propellant-actuated devices (PADs) needs improvement. Because CADs and PADs are flight critical and have a limited lifespan, efficient management sometimes requires units to use offline spreadsheets before identifying the requirement in TAMIS.

Improvements are now within reach. Scheduled updates to TAMIS include adding CAD and PAD lot numbers and installation dates to aircraft type and tail numbers. Integrating this data with better aircraft management and forecast procedures should simplify and advance CADs and PADs management in TAMIS.

Preparing Ammunition Requests

When it is time for units to prepare an ammunition request, users again turn to TAMIS. Army regulations require users to submit electronic requests unless network connectivity is unavailable. TAMIS enables the preparation, validation, and routing of electronic, digitally-signed requests to the ammunition supply point. The entire workflow is automated, and users receive an email detailing the status. Each month, users create more than 5,000 electronic requests for ammunition in TAMIS.

Combat and other operational ammunition requirements are calculated based on weapon platforms and Soldiers' weapons. Units engaged in operational missions use TAMIS to select, request, and manage authorizations. Managing ammunition during war or conflict poses a particular challenge when units fall in on theater-provided equipment (TPE) and try to account for ammunition manually.

TAMIS adopted the TPE structure and captures issued ammunition from the Standard Army Ammunition System. However, recording expenditures remains a manual process, and reporting features in TAMIS such as DA Form 4949 went idle when a key leader guiding its implementation rotated back to the continental United States. Without a better connected, more agile munitions architecture these problems will persist.

TAMIS has expanded to support Army transformation and continues to advance as the munitions office focuses on supporting a broader range of ammunition functions online.

TAMIS Training

Training is critical for improving operational support. The TAMIS project office conducts training for more than 1,000 users annually and receives nearly 500 help desk requests per month, most of which are system or ammunition related. TAMIS training is delivered in traditional classrooms, as computer-based training (CBT), or through distance learning.

Because most beginning users have little experience with ammunition management, instruction includes both TAMIS training and some ammunition management fundamentals. The high level of interaction between the instructor and students suggests that introduction to TAMIS is best delivered in traditional classrooms.

CBT offers many benefits, such as allowing the user to select specific training modules of interest whenever time is available. The challenge is in keeping updated and engaging TAMIS CBT courses within budget. Training at distance learning sites is best suited for small class sizes, but student-instructor interactivity is problematic. TAMIS training involves constantly making trade-offs. Accordingly, to improve comprehension of Web-based ammunition management, additional instructor-led ammunition training seems appropriate.

Mobile Device Capability

The use of mobile devices, such as smartphones and tablets, is fundamentally changing the digital landscape. TAMIS must support any device, including personally-owned devices, from anywhere at any time. Because managing munitions on personally-owned devices poses challenges, Army agencies are pursuing a variety of pilot projects that could potentially lead to more options for requesting and managing ammunition.

The big risk with mobile devices is data leakage out of the network. Because most existing mobile devices lack hardware-based security such as the Trusted Platform Module, TAMIS must seek alternative encryption to support data protection. The project team's initial approach with TAMIS is to establish a virtual environment where the session occurs on the TAMIS server rather than on the device—essentially, not storing any data on the device. Making TAMIS more mobile and interoperable remains a top priority.

TAMIS has expanded to support Army transformation and continues to advance as the munitions office focuses on supporting a broader range of ammunition functions online. Project officers and munitions experts must ensure the ammunition enterprise aligns with the G–3/5/7 munitions office's requirements-generation process and TAMIS if the Army is to attain better connected and more agile ammunition management architecture.

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