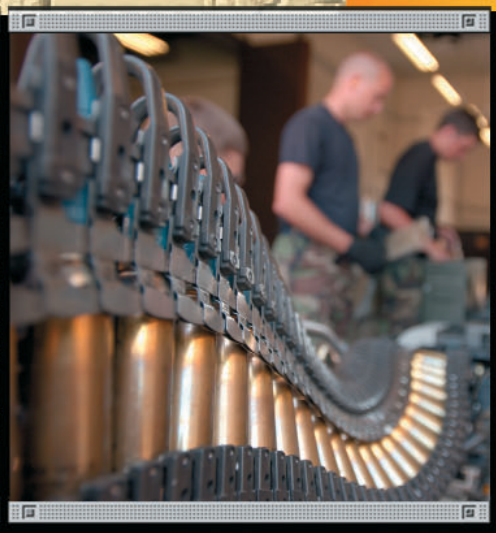
Defense Standardization Program

Journal

July/September 2004

Warfighter Support



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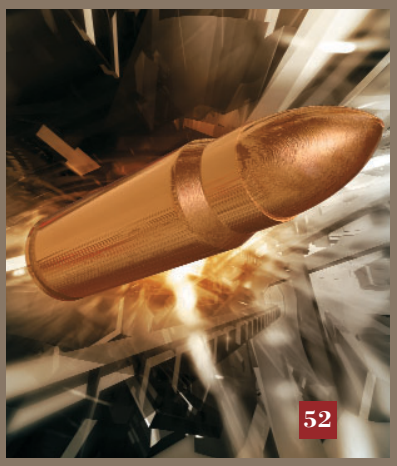

Departments

Front cover: Some images courtesy the Department of Defense (U.S. Army, U.S. Air Force, and U.S. Navy).

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Standardization– A Warfighter Story

The story of the warfighter and standardization are inextricably linked. The needs of the warfighter have driven standardization, while standardization has improved the warfighter's capabilities, fighting conditions, and odds for success.

Although examples of standards and standardization can be traced back to biblical times, the concept of standardizing on a national scale has its roots in the 18th century with the convergence of military demands for equipping large national armies and the beginnings of the industrial revolution. The idea of using interchangeable parts is generally credited to a French gunsmith, Honore Le Blanc, who in 1785 proposed making gun parts from standardized patterns.

Unfortunately for Le Blanc, the gunsmith guilds of Europe saw standard gun parts as a job threat and opposed the idea, and thus, he remains an obscure historical figure today. In contrast, Eli Whitney's proposal to use standardized gun parts received a much warmer reception in the United States. In 1796, a contract given to Whitney to make 10,000 muskets using interchangeable parts made him the historically recognized father of mass production standardization that transformed both military and commercial manufacturing.

The enormous logistics demands of the warfighter have often provided a standardization boost to the commercial sector. In the 1850s, the United States had a fledgling ready-made clothing industry, which struggled in part because of the diversity of sizes. The onset of the Civil War, however, created an immediate and huge ready-made clothing market. In order to outfit the millions of Union troops, standard sizes for men came into being for the first time, which commercial clothing manufacturers continued to use after the war. It's interesting to note that because a similar warfighter catalyst for standardization did not exist for women's clothing in the 1860s, women would have to wait until 1941 for similar body measurement data to be collected for them. Some people might argue whether true standard clothing sizes exist even today, but because of the ongoing work of the Air Force's Computerized Anthropometric Research and Design Laboratory, a perfect-fitting standard suit is in your future.

Warfighter demands have also led to the creation of new standards committees or even new non-government standards bodies. When the United States entered World War I in 1917, an immediate concern of the Army warfighters was the lack of a standard truck. General Pershing's Mexican campaign in 1916 had proven to be a logistics nightmare for the Army warfighters when they had to support a patchwork collection of commercial trucks from different manu-

Gregory E. Saunders
Director, Defense Standardization Program Office

facturers, all with different parts. In an effort to avoid a similar situation in Europe, Quartermaster General Henry Sharpe asked the Society of Automotive Engineers in July 1917 to form new committees from a cross section of the truck industry to develop standards quickly to ensure parts interchangeability for what was to be called the "Standard B Truck" or "Liberty Truck." These committees met constantly until their task was done, and by April 1918, the first Liberty Trucks rolled off production lines. Warfighter demands today continue to drive the formation of new committees as witnessed by the creation of a nanotechnology standards working group by the Institute of Electrical and Electronics Engineers, whose kickoff meeting last November was keynoted by the chief scientist of the Office of Naval Research.

In 1951, Senator Ralph E. Flanders from Vermont, who had also been the president of the American Society of Mechanical Engineers from 1934 to 1936, wrote an article for *Atlantic* magazine that provided many examples of the importance of standardization to the warfighter in World War II. Senator Flanders concluded that "American mass production, made possible by standardization, was our number one weapon in that war." Sadly, Senator Flanders also told of disastrous consequences for the warfighter from not having standardization and lamented that "we cannot possibly estimate the loss we suffered in men and money, in time and resources, because of the lack of standards."

Senator Flanders' point, which he hoped would not be lost on future generations, was that standardization and standards are vital to the success of the warfighter, and indeed to the nation. I think Senator Flanders would be pleased to see from the articles in this issue of the *Defense Standardization Program Journal* that standardization and standards continue to serve the needs of our warfighters.

Standard Parts Are the "Right Item" for the Warfighter

By David Moore, Robert Evans, and Samuel Merritt

More than ever before, the warfighter depends on complex military weapons systems to achieve mission success. Optimal system performance is essential if our warfighters—whether marines and soldiers in personnel carriers and tanks; airmen in fighters, bombers, helicopters, and cargo planes; or sailors aboard aircraft carriers and support ships—are to achieve our national defense objectives.

Today's complex systems are dependent on hundreds of subsystems, and those subsystems are dependent on thousands of parts and components, all of which must be of high quality and reliability to get the job done. Standard parts are integral to supporting the performance and missions of these systems and the warfighters that depend on them.

Standard parts and their associated specifications are developed under the auspices of the Defense Standardization Program and represent a collaborative effort among the military departments, the Defense Logistics Agency, and the parts and equipment manufacturing industry to provide standard devices—the "right item"—of the highest quality and reliability that will function in the most demanding operational environments.

The Defense Supply Center Columbus (DSCC) has the role of Preparing Activity, Qualifying Activity, and Lead Standardization Activity in these key programs for electronic and hardware parts. The payoff from these engineering standardization efforts for the warfighter is significant. When our weapons systems share standardized components, less time is needed to repair them, because parts are usually on hand, and technicians spend less time figuring out how to solve individual problems such as obsolescence. Operational effectiveness is improved, resources are conserved, and costs are avoided when equipment is kept in operation. Use of standard parts simplifies logistics support and enhances substitutability, because fewer parts must be procured, stocked, and tracked. This also translates into reducing the logistics footprint, because less space is needed for spares and fewer parts have to be transported to theater.

The standard parts programs were integral to the successful conduct of the conflicts in Afghanistan and Iraq in that the programs' focus is on designing standard parts that can be used to support hundreds of military systems in a variety of applications, including land, aerospace, and maritime. Today, standard parts are in use in all critical weapons systems, most notably, the following:

- Nuclear aircraft carriers (e.g., *Nimitz* class, *Enterprise*)
- Abrams tank and Bradley fighting vehicle
- F-117, F/A-18, F-15, F-16 and F-14 fighters
- B-1B, B-2 and B-52 bombers
- Tomahawk, TOW, and Patriot missiles
- Apache, Blackhawk, and Cobra helicopters
- KC-135 tankers, C-141, C-17, and C-5 cargo planes
- Airborne Warning and Control System and Global Hawk.

In the last 12 months, four standard parts specification programs have provided significant support to the logistics pipeline that keeps our military warfighters going: microcircuits, semiconductors, high-reliability passive and electromechanical components, and hardware components.

Microcircuits

The microcircuit program consists of two military performance specifications—MIL-PRF-38535 (monolithic microcircuits) and MIL-PRF-38534 (hybrid microcircuits)—with more than 3,000 standard microcircuit drawings and associated qualified manufacturers lists (QML-38535 and QML-38534). The program provides standard complex microcircuits of the highest quality and reliability for the military customer. These programs represent a partnership effort between the military and industry. Today, 62 companies are on the QMLs, and more than

5,200 standard microcircuits are in the DoD inventory system. Over 300 military systems depend on these standard microcircuits. In the last 12 months, the microcircuit programs generated considerable activity to support the military warfighter. Approximately 199,000 requisitions for standard microcircuits worth $2.3 million were received from our military customers for spares to keep critical military systems up and running.

Semiconductors

The semiconductor program is covered by MIL-PRF-19500 and its associated QML (QML-19500). Today, 20 companies are qualified to the program, and approximately 2,700 standard military grade semiconductors are in the inventory system. Critical items covered include transistors and diodes. Over 500 military systems depend on these standard semiconductors. In the last 12 months, for the semiconductor program, DSCC received approximately 540,000 requisitions representing $2.9 million in sales from our military customers for spare parts for repair and maintenance of military systems.

High-Reliability Passive and Electromechanical Components

The specifications programs for high-reliability passive electronic and electromechanical parts have a dramatic impact on military weapons systems. Among the standard military grade components covered by this program are resistors, capacitors, filters, relays, and connectors. Today, approximately 60 specification programs are covering these types of high-reliability parts. Four specification programs are highlighted for discussion: MIL-PRF-39016 (relays), MIL-PRF-39003 and MIL-PRF-39006 (tantalum capacitors), and MIL-DTL-38999 (circular connectors). These programs have associated qualified products lists (QPL-39016, QPL-39003, QPL-39006, and QPL-38999), more than 29 companies are qualified, and over 100,000 standard parts are available in the inventory system for military customers. Table 1 summarizes the impact of these programs on the military customer over the last 12 months.

Hardware Components

Also critical to the support of the warfighter were three hardware specification programs: MIL-DTL-27267 (hydraulic hoses), MIL-DTL-27272 (fittings), and MIL-DTL-25579 (hose assemblies), along with their associated QPLs (QPL-27267, QPL-27272, and QPL-25579). These hardware components are used in demanding high-temperature fuel, hydraulic, pneumatic, and other fluid-handling applications. Eighteen companies are qualified to these programs, and approximately 2,700 standard parts for military applications are in the inventory. During the last 12 months, DSCC received more than 237,000 requisitions worth $3.9 million from our military customers to support fielded systems. Today some 200 military systems depend on these standard hardware components.

Summary

To achieve mission success, the warfighter must have military systems that are reliable and can meet demanding military environments. From the primary weapons system through its various subsystems and thousands of parts, it is essential that the right item be provided. The standard parts programs are a proven method for assisting the warfighter with achieving their mission. The

TABLE 1. Estimated Requisitions, Sales, and Number of Systems Using High-Reliability Passive and Electromechanical Components

Program	Requisitions	Sales	Military systems
MIL-PRF-39016	>31,000	>$1 million	>250
MIL-PRF-39003	>48,000	>$340,000	>250
MIL-PRF-39006	>38,000	>$679,000	>300
MIL-DTL-38999	>176,000	>$5.8 million	>450

parts covered in the specifications are of the highest quality and reliability. In addition, economies of scale are achieved in these specification programs in the procurement process by buying cost-effective, high-reliability, and quality parts in large quantities for use in hundreds of systems. Over the last year, the DSCC specification programs discussed in this article supported some 500 military systems and affected over 1.2 million requisitions and $16.9 million in sales.

About the Authors

David Moore, Robert Evans, and Samuel Merritt work at the Defense Supply Center in Columbus, OH. Mr. Moore is the chief of the Document Standardization Unit. His organization has Preparing Activity responsibilities for a program that has more than 10,000 various standardization documents.

Mr. Evans is the chief of the Sourcing and Qualification Unit. His organization has Qualifying Activity responsibilities for a program that has 266 qualified products lists and qualified manufacturers lists.

Mr. Merritt is the chief of the Standardization Unit. His organization has Lead Standardization Activity responsibilities for 64 federal supply classes, as well as parts management and item reduction responsibilities.

Why Data Standardization and Architecture

By Fred Allen and Ken Harvey

On a recent business trip to Alabama, I stopped at a small local grocery store to get a cold drink. Having grown up in New England, I politely asked the older gentleman behind the counter for a tonic. He looked at me inquisitively and pointed me toward an aisle. As I walked to the end of the aisle, I found no cold drinks, or tonic, but did find several bottles of hair tonic!

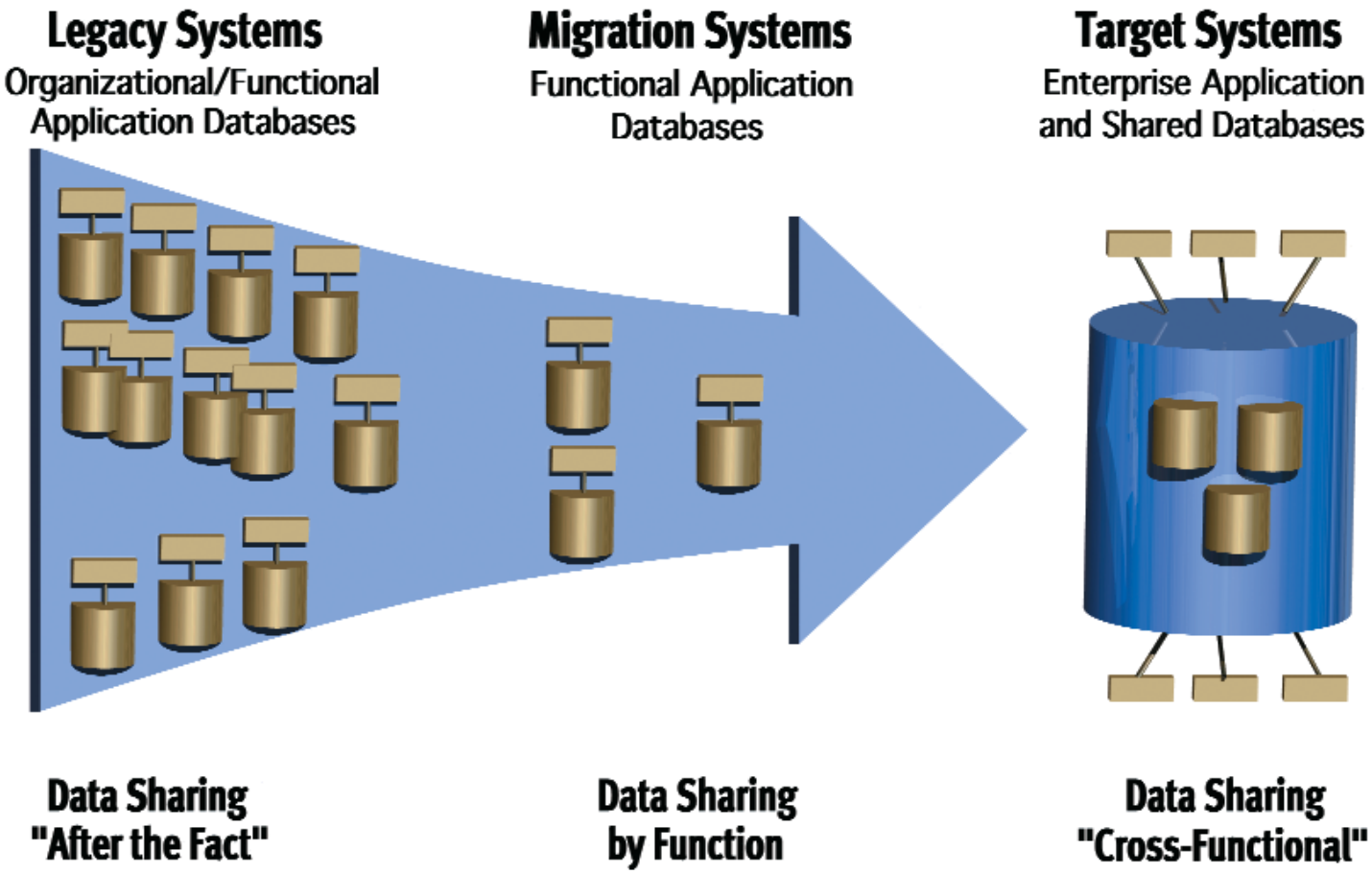
This story about the lack of communication is similar to the data interoperability issue we have throughout DoD. In this instance, the entity TONIC is not standard throughout the United States. In New England, the entity name for COLD DRINK is tonic; in the South, pop; and in the West, soda. As can be seen by the lack of communication on my trip to Alabama, a person wanting a soft drink could, without translation, end up with something very different.

This lack of communication or data interoperability is compounded within the federal government with the numerous departments, agencies, and systems that conduct business processes required to support and defend the United States. For example, if a government agency wants to act on a person, the entity PERSON might be interpreted as LAW-BREAKER by the information system at the Federal Bureau of Investigation, SPY by the Central Intelligence Agency, ILLEGAL ALIEN NAME by the Immigration and Naturalization Service, MOLE by the National Security Agency, and TAX DODGER by the Internal Revenue Service. In this example, a query for a PERSON across all five information systems would return no information because PERSON is not standardized across the federal government enterprise.

Similarly, without department-wide standards, the military services and DoD agencies cannot import, process, and display data with integrity using real-time discovery mechanisms supported by authoritative data and repeatable processes from the business domain. In today's environment of right-sizing and limited resources, DoD continues to become more efficient by reducing the number of systems maintained to support warfighter requirements. This is being accomplished through developing a Net-Centric Enterprise Services (NCES) capability for ensuring access to the end user regardless of where he or she is in the DoD enterprise. The new capability will also reduce the number of systems and databases reprocessing information. The goal is to reduce the number of databases even further with the implementation of shared databases supporting multiple applications rather than a separate database supporting each application, as is the case today (Figure 1). The shared databases will be developed using standard data.

To ensure data standardization and departmental interoperability, the Office of the Assistant Secretary of Defense (Networks and Information Integration) issued a new DoD data strategy (Figure 2) for supporting NCES requirements.

FIGURE 1. Reduction in Databases

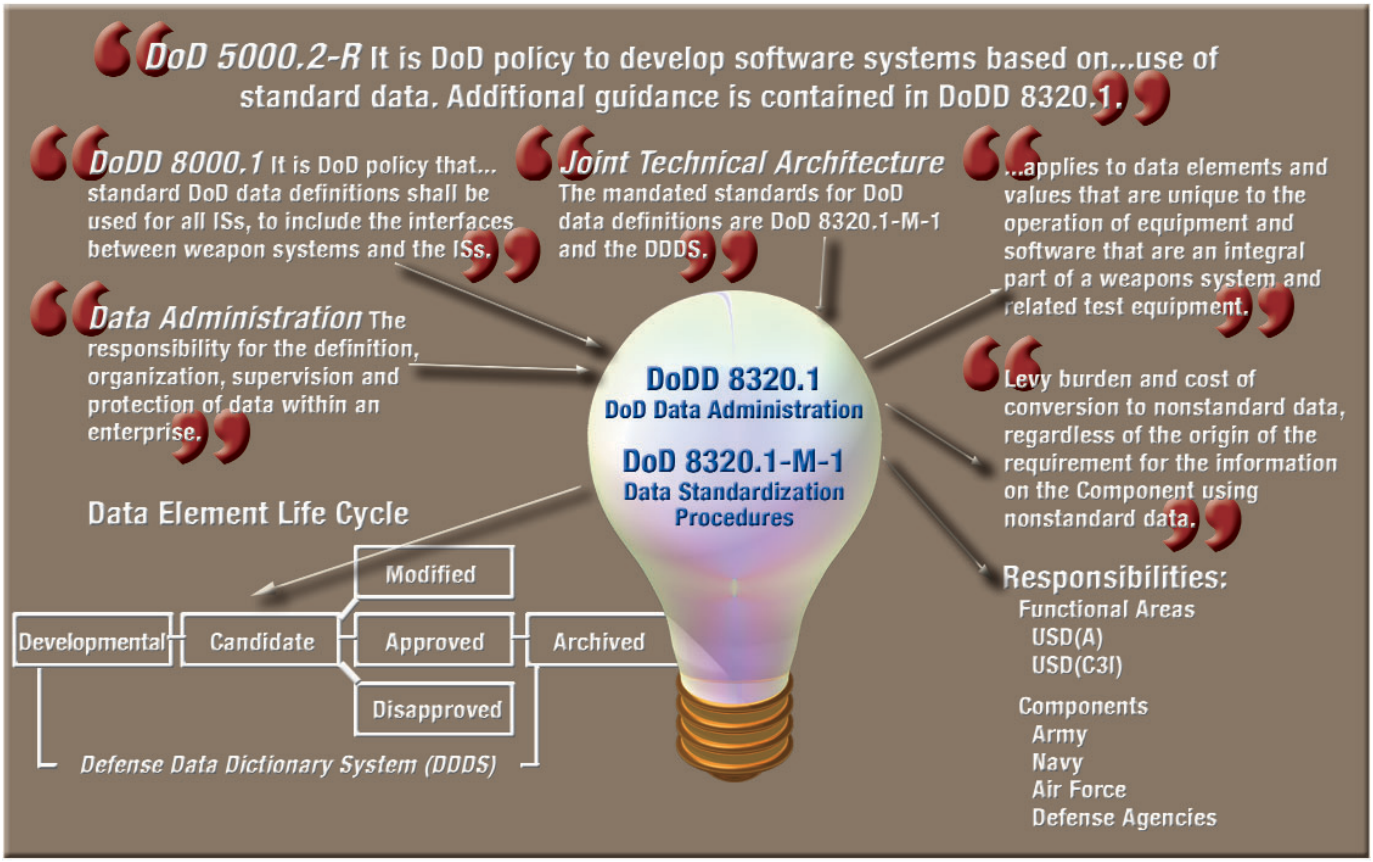


Although there has been a lot of effort to make department information systems interoperable, there has been little success. Common approaches used thus far to make data interoperable rely on translators, data mapping, or some type of Interface Definition Language such as Extensible Markup Language (XML), thus attempting to avoid the basic and often daunting task of standardizing data. We must remember that tools like XML only help functional personnel efficiently implement and execute solid business processes supported by policy and doctrine. These approaches achieve specific needs but sacrifice efficiencies by adding unnecessary overhead.

The Focused Logistics road map calls for increased visibility, accessibility, and responsiveness in order to project logistics resources across the commercial and DoD enterprise. For the logistics community, successful transformation depends on the ability to implement interoperable logistics business processes, both horizontally and vertically across the community, for supporting joint operations with the integrity required to effectively and efficiently accomplish the mission across the battle space. The need for timely, accurate, and actionable information is universal and applies to all U.S. government agencies. DoD, as part of its transformation goals, has clearly stated that information interoperability is a premier tenet as it guarantees information superiority leading to the ability to make faster decisions. The key to this transformation is the ability to transform the logistics enterprise to an open logistics architecture that provides access to interoperable, real-time information. To achieve this immense objective, the military services and defense agencies are required to build integrated interoperable capabilities rather than maintaining separate stovepipe capabilities.

The Global Combat Support System (GCSS) Capstone Requirements Document was developed to help the services and agencies meet warfighter informational requirements. GCSS will help to bring about logistics information interoperability and will link this important logistics process with operations and intelligence communities to provide a fused, integrated, real-time, multidimensional

FIGURE 2. Data Standardization Mandates



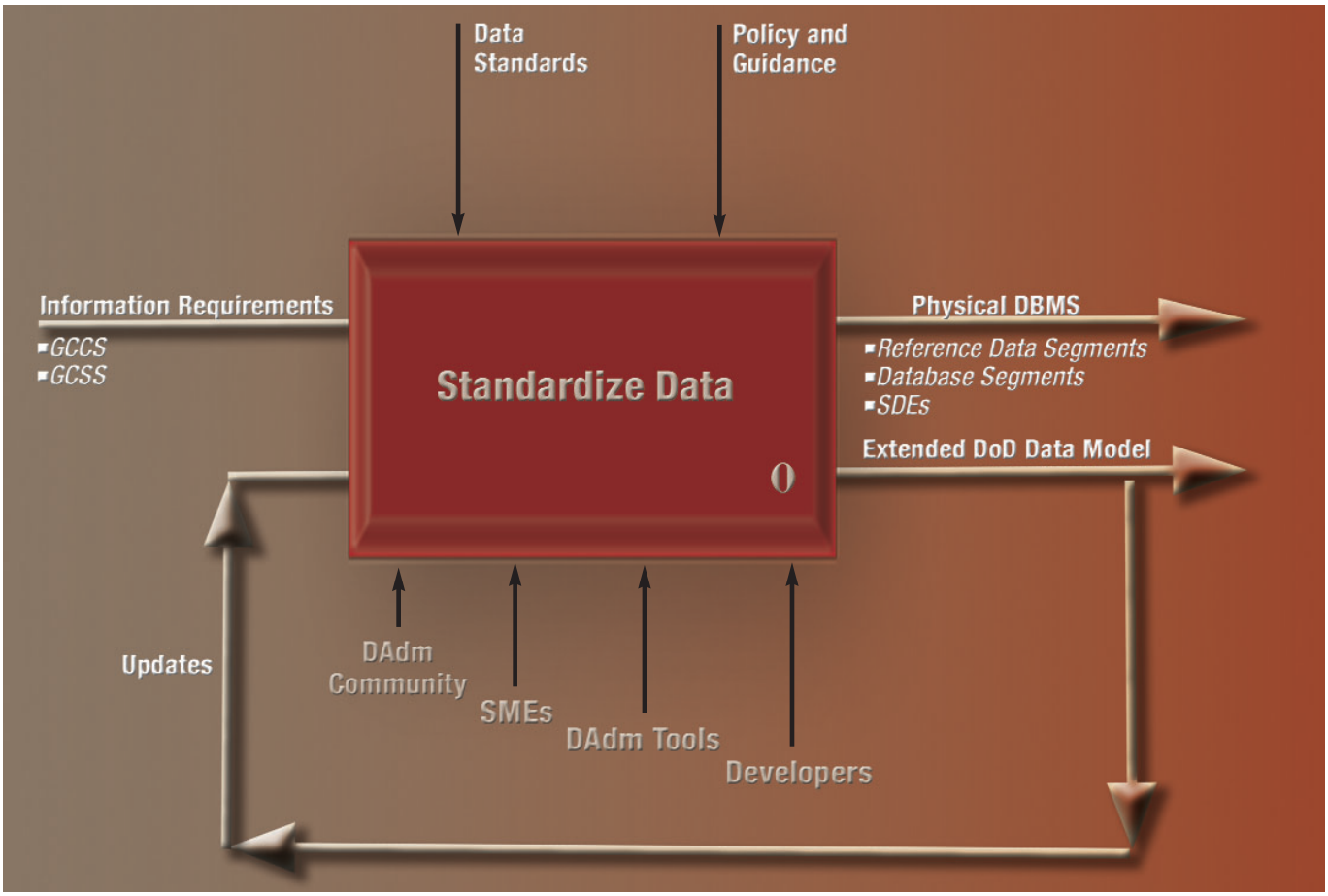
view of combat support and combat service support, required to support the combatant commanders' (CoComs') information requirements. This capability will greatly increase the ability of the CoComs and joint warfighting components to develop notional courses of action to achieve information and decision superiority within the decision cycle.

To achieve the GCSS goal of real-time interoperable and actionable information from authoritative sources, data elements must be mapped to a common data representation and understood by everyone within the NCES. Further, GCSS Family of Systems (FoS) members must meet three key performance parameters: compliance, security, and interoperability. In addition, information exchange requirements have been established to ensure relevancy/concurrency, responsiveness, and availability of data required to support warfighter operational requirements. Success will be achieved when data are separated from applications, normalized and placed into an information technology data cloud, and applied to current and developing user requirements. CoComs will then have direct access to actionable information instead of being forced to use large numbers of separate applications supported by numerous batch processes. Answers to CoComs' informational requirements will be developed using transformed business processes along with state-of-the-art technology to ensure that information on military business objects is accurate, current, and in real time with referential integrity.

To ensure data standardization within the GCSS FoS, data elements supporting the CoCom 129 have been mapped to standard data elements (SDEs) currently maintained in the Metadata Repository at the Defense Information Systems Agency. That Metadata Repository defines requirements when the data elements are registered, using standards and procedures specified in the DoD Discovery Metadata Specification.

To help meet GCSS data requirements, a modified Integrated Defini-

FIGURE 3. Integrated Definition Modeling Method



tion modeling method will be applied using the model shown in Figure 3.

During phase one, the GCSS Functional Requirements Office personnel identified approximately 2,937 SDEs used more than 95,000 times to support the eight GCSS FoS joint logistics operational elements consisting of transportation (mobility and movement), supply, maintenance, engineering, personnel, force health protection, acquisition, and finance. The DoD Metadata Registry (formally called the Defense Data Dictionary System) was used to do the following:

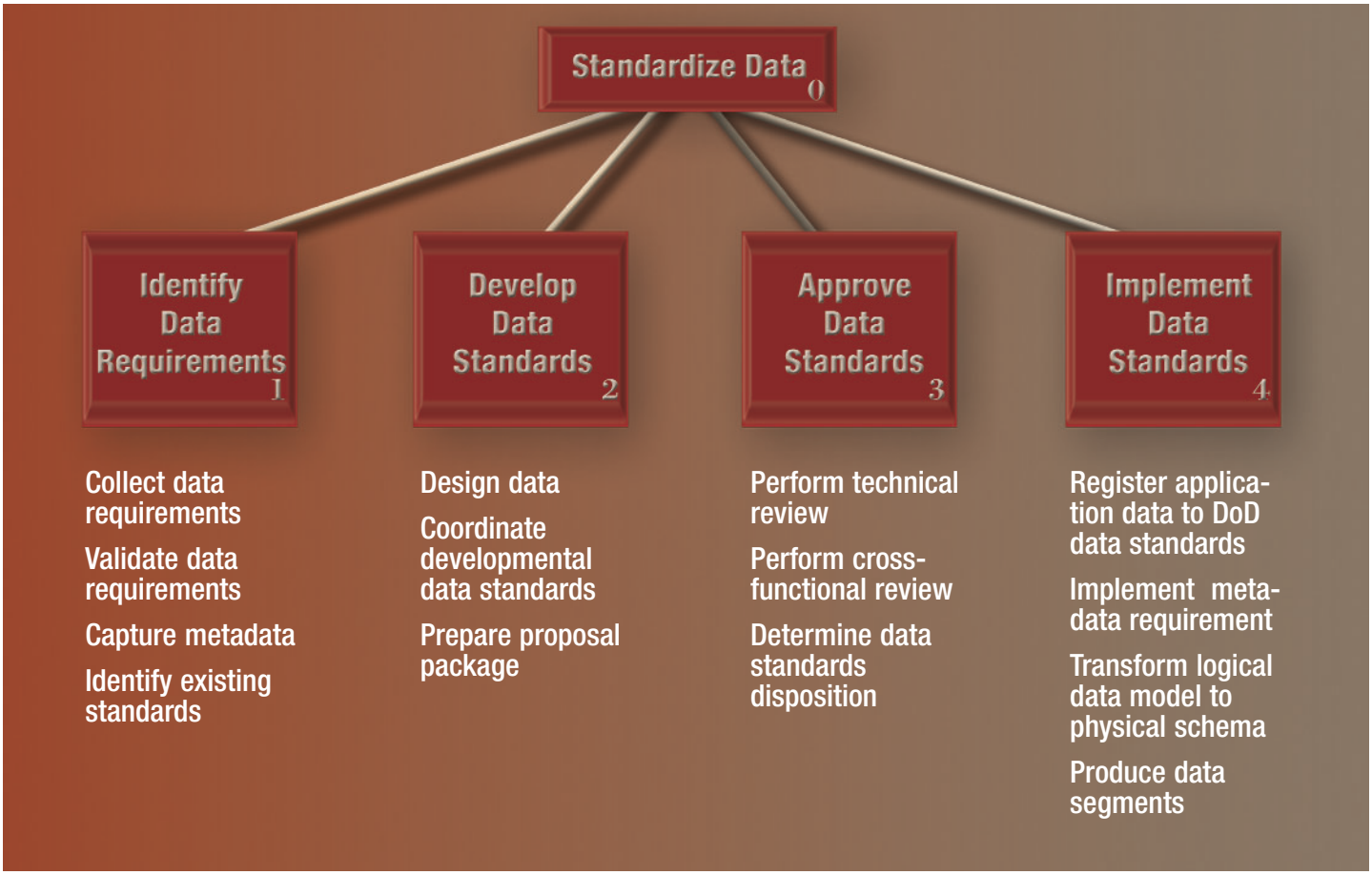
- Determine if standard data exist to support a specific CoCom 129 requirement
- Identify those data elements needed for common data representation across the DoD enterprise to support warfighter requirements with actionable information
- Directly link the GCSS tool to the current and projected service/defense agency information systems, applications, and capabilities needed to meet warfighter logistical requirements.

Figure 4 illustrates four data standardization activities, presented in an Integrated Definition node tree.

Identifying data requirements includes the development of a logical data model and the capture of associated metadata. Once data requirements have been captured, they are assessed to determine if data standards exist that can support the requirements. If data standards do not exist, requirements need to be documented in a proposal package and submitted for approval via the appropriate principal staff assistant responsible for that particular business area. Before the package is submitted, the requirements should be coordinated with all appropriate organizations to ensure that they are not duplicates of other standards and that they support all requirements.

Once the data requirements needed to support CoCom 129 have been

FIGURE 4. Data Standardization Activities



identified, the next task is to develop a logical data model. This model will provide the framework for GCSS FoS program managers to design and develop a normalized data environment to support warfighter requirements with actionable information on demand.

Everything in the DoD data administration program is based upon a data model. A model is a picture or blueprint of something and provides a framework to gather and assess requirements to determine if they are complete, accurate, and worth implementing. Architecture products (NetReady Key Performance Parameters) provide a framework for production by capturing the functional requirements. These products do not require a lot of time or money to define requirements and determine whether it is prudent to build the real thing, be it a system or product. The little time and money it takes to develop a model saves a lot of time and money on building a product that does not meet the users' needs. It costs pennies to model, but big bucks to build.

In addition, models provide a graphical way to identify areas where data sharing and exchange are required. This promotes an interoperable environment by facilitating data sharing and finding ways to share cost with other users. It also facilitates data standardization to ensure that data required to be shared are available and structured so all can use and understand the data. Models facilitate the identification of other organizations or data that must interface to accomplish the activities and define the business requirements and the framework for the physical design when requirements are implemented into systems.

There is absolutely no shortcut to managing data synchronization and interoperability when supporting the DoD enterprise. To effectively provide logistics information with speed, accuracy, and efficiency, DoD must continue working to socialize the community and move it toward net centricity using the new DoD data strategy. The GCSS FoS must continue to push for executing data supported by business policies expressed in DoD policies, directives, and applicable capability and requirement documentation. In addition, the Joint Staff should continue to use the joint capability integration and development system process, the DoD data strategy, and applicable architecture products for delivering a capability to support the warfighter's unquenchable appetite for logistical information as expressed in the CoCom 129.

About the Authors

Fred Allen has more than 35 years of experience in logistics application and process development. His current duties entail evaluating requirements documents to ensure that GCSS key performance parameters are addressed and that data and systems interoperability is available across the logistics enterprise. He identifies data requirements and works closely with the OSD Data Strategy Working Group and others to support the CoCom 129 logistics requirements.

Ken Harvey has more than 28 years of experience in program management, acquisition logistics, maintenance management, and field logistics. In his current position, he is responsible for mapping common data representations throughout the DoD enterprise for meeting CoCom requirements and for normalizing and integrating data to established data and configuration management standards to the GCSS data elements.

Net-Centric Warfare Is Changing the Battlefield Environment

By Lt. Gen. Harry D. Raduege Jr.

The following article was published in the January 2004 issue of *CrossTalk, The Journal of Defense Software Engineering.*

U.S. military forces today are creating and executing plans using capabilities that were not available as recently as Operation Desert Storm. This is due to net-centric warfare and the information transfer and sharing that is made available by the Internet. Today, the nation's armed forces, armed with superior technology, gain power from information, access, and speed. This article presents these new capabilities and outlines how the Defense Information Systems Agency's contributions to net-centric warfare span across all areas of the Department of Defense.

Net-centric warfare is not just about technology; it is an emerging theory of war and the next art and science of warfare to be exploited. Net-centric warfare involves a cultural change in relationships that includes networking over the Internet among large groups of people. America's armed forces are now creating and executing plans using capabilities that were not available 12 years ago during Operation Desert Storm in Iraq when the military advantage still came from numbers of platforms and people in the battle space. Today, our nation's military forces, armed with superior technology, gain power from information, access, and speed.

Air Force Gen. Dick Myers, chairman of the Joint Chiefs of Staff, identified "the application of force, using forces in an integrated way, and having the eyes, ears, and command and control to carry it off" as the most important factors in Operation Iraqi Freedom (OIF). This is also the core of net-centric operations.

Net-centric warfare combines a powerful military force with information superiority, giving American service men and women greater awareness of our own forces, the enemy, and the battlefield environment. America now has a smaller, more lethal deployed military force. Net-centric operations permit forces to focus on specific tar-

gets, protecting the lives of American and coalition forces, as well as countless non-combatants.

"With less than half of the ground forces and two-thirds of the air assets used 12 years ago in Desert Storm, we have achieved a far more difficult objective…. In Desert Storm, it usually took up to two days for target planners to get a photo of a target, confirm its coordinates, plan the mission, and deliver it to the bomber crew. Now we have near real-time imaging of targets with photos and coordinates transmitted by e-mail to aircraft already in flight. In Desert Storm, battalion, brigade, and division commanders had to rely on maps, grease pencils, and radio reports to track the movements of our forces. Today, our commanders have a real-time display of our armed forces on their computer screens," said Vice President Richard Cheney.

Much of the United States' success during OIF is due to tremendous advancements in the world of information sharing and situational awareness, for both U.S. and coalition forces. This enables essential command, control, communications, and intelligence components. Such technology advancements, many of which the Defense Information Systems Agency (DISA) developed and/or supported, include the following:

- The DISA-operated Defense Information System Network (DISN) carries the vast majority of the Department of Defense (DoD) telecommunications; as such, the DISN provides global classified and unclassified voice, data, video, and transmission services through predominantly commercial assets supplemented with military value-added features. Those military features provide greater global reach, security and encryption options, interoperability, and high levels of reliability. These features ensure that U.S. forces are not denied access to critical information, geography, or battle space. In Operation Enduring Freedom (OEF) in Afghanistan in 2001 and OIF, there was a literal explosion in the demand for bandwidth by deployed forces. More than 50 times more bandwidth was used per person in OIF than in Desert Storm. Greatly expanded bandwidth, voice, and data capacity combined with an impressive set of early net-centric capabilities allowed Army Gen. Tommy Franks and his battle staff to collaborate, plan, and execute their mission with a smaller footprint forward with virtual support from rear assets. When full-up hostilities began in the U.S. Central Command (USCENTCOM) area of operations, deployed forces had what they needed to support the myriad of systems military commanders used to control forces on land, sea, and air. Through advanced planning, U.S. forces also had the requisite bandwidth for voice, data, and imagery.
- The Global Command and Control System (GCCS) provided a Common Operational Picture (COP) across military service lines for near-instantaneous command. Since the global war on terrorism started, and has continued through OIF, DISA has successfully upgraded the GCCS software 27 times. Those upgrades were accomplished while the system remained fully operational, serving the needs of all nine combatant commanders. In response to a request from the commander, USCENTCOM, DISA also accelerated the delivery of a key intelligence capability several months early. In OIF, the improved intelligence and imagery capability and availability of Army ground force information on the network provided truly joint situational awareness for the first time that included all military services, red, blue, Special Operations Forces, and intelligence information for the warfighter. These COP and Common-Intelligence

Much of the United States' success during OIF is due to tremendous advancements in the world of information sharing and situational awareness...

Picture capabilities provided a crucial enhancement to the sensor-to-decision-maker-to-shooter requirements. GCCS Version 4.0 is on track for delivery in 2004. About 25 percent of GCCS is web-enabled today. That will increase to about 50 percent with the GCCS 4.0 upgrade. DISA is also partnering with U.S. Joint Forces Command to transform the joint deployment process.

- DISA's Joint Staff Support Center installed GCCS terminals for both the secretary of defense and the chairman of the Joint Chiefs of Staff. Both the secretary and the chairman used GCCS reports to brief the president on operations and force locations in and around Iraq. This marked the first time a common operational picture was available at all levels from the president down to the task force commanders.

- The Global Combat Support System (GCSS) is another success story. A DoD public key infrastructure-enabled service and portal environment, GCSS provided feeds from a variety of logistics systems and was integrated with GCCS. USCENTCOM directed that all materiel resources flowing to the theater be monitored through the In-Transit Visibility (ITV) system. In support of OIF, DISA installed a network guard that moved unclassified information to the Secret Internet Protocol Router Network (SIPRNET). Queries that had previously taken hours were available in minutes—including ITV information—on the command and control network. GCSS queries increased more than 17 times from about 175 queries per month in September 2001 to more than 3,100 queries per month during OIF.

- Extensive collaboration was another huge new global war on terrorism initiative. DISA supported USCENTCOM's major command and control business process reengineering effort with a variety of collaboration capabilities. The USCENTCOM commander and his staff used DISA-provided secure video teleconferencing (VTC), as well as desktop collaboration with the Defense Collaboration Tool Suite (DCTS) at unprecedented levels and on a 7x24 basis. VTC, a huge consumer of bandwidth, proved to be a significant driver behind theater bandwidth upgrades in support of OEF and OIF. Deployed forces used the whiteboard, chat, and shared file capability in DCTS extensively. USCENTCOM discouraged desktop VTC, however, to reduce the impact on limited SIPRNET bandwidth.

- The Enhanced Mobile Satellite Service (EMSS) experienced exponential growth during the global war on terrorism and OIF. EMSS provides 7x24 global satellite phone and data coverage. Since Sept. 11, 2001, the number of users increased by 344 percent and usage increased by 4,800 percent to more than 2.57 million call minutes per month. This system

Operation Iraqi Freedom Successes

- First installation of fiber optics into Southwest Asia—138x increase to 555 Mbps.
- Ubiquitous commercial satellite communications (SATCOM) to supplement military SATCOM—10x increase to 3200 Mbps.
- Data network expansion—6x increase to SIPRNET and NIPRNET to 130 Mbps.
- First all-service, Special Operations Forces, red, blue, and intelligence fused picture.
- Extensive coordinated use of unmanned aerial vehicles to include supporting Command, Control, Communications, Computers and Intelligence networks.
- First real-time in-transit visibility plus logistics queries in minutes instead of hours.
- First use of interoperable desktop collaboration tools for C2.
- First widespread use of VTC as a C2 system in wartime—22x increase in conferences since 9/11.
- Extensive coalition information sharing.
- First use of record copy traffic with attachments.
- 39x increase in voice (Defense Switched Network) and 5x increase in Defense Red Switch Network.

allowed Special Operations Forces to call in air strikes from horseback in Afghanistan by permitting instantaneous communications in areas without any infrastructure whatsoever.

Net-centric warfare's effectiveness has greatly improved in 12 years. Desert Storm forces, involving more than 500,000 troops, were supported with 100 megabits per second (Mbps) of bandwidth. Today, OIF forces, with about 350,000 warfighters, had more than 3,000 Mbps of satellite bandwidth, which is 30 times more bandwidth for a force 45 percent smaller. U.S. troops essentially used the same weapon platforms used in Operation Desert Storm with significantly increased effectiveness.

DISA's contributions to net-centric warfare span across all areas of the DoD. When the president needs to talk with anyone in the world, at any security level, the White House Communications Agency is with him at all times every day of the year. When someone searches the web for information on a particular piece of military equipment, chances are they are looking at a page from the Defense Technical Information Center. If a non-commissioned officer deconflicts frequency spectrum issues in Iraq or Afghanistan among the military services and their equipment, that officer probably works at DISA's Joint Spectrum Center. When a Navy F-14 flies up to an Air Force KC-10 and talks to the boom operator, DISA's Joint Interoperability Test Command already ironed out any wrinkles associated with multi-service communications connections. Obviously, these DISA organizations have a unique and essential role in America's defense.

Although DISA's focus remains the warfighter, it has received taskings to facilitate command, control, and coordination between DoD and non-DoD elements. The Defense Red Switch Network (DRSN), a secure voice capability, was established more than 10 years ago to support the White House, Joint Staff, combatant commanders, and other critical command and control (C2) users. It is now being expanded to include 18 additional federal government agencies in support of numerous homeland defense security initiatives. During the space shuttle Columbia recovery operations, U.S. Northern Command required immediate VTC to coordinate actions between 23 sites on a Saturday morning. Team DISA was able to respond to the situation and provided needed service during the emergency operation.

At DISA, we take our warfighter support job very seriously. We recognize we cannot rest on past successes so we are also preparing for the future—integrated information on demand. Products and services provided by DISA in support of OIF and OEF demonstrate that we clearly understand that we must be able to surge the backbone and deliver joint and interoperable services globally and on demand. We are focused on that path of support. We recognize the significant challenges we face in information networking and providing power to the edge. We have developed a strategy to continue transforming DISA to meet the transformational demands of revolutionizing warfare. Air Force Gen. Ralph E. Eberhart, commander of NORTHCOM, has noted those challenges. He recently said, "We are usually pretty good at sharing information vertically. But we need technology that can share information horizontally."

The stove-piped systems of today with limited interoperability must be replaced with a secure, robust, intelligent, and interconnected nodal network of tomorrow. Power, in the form of quality information for individual warfighters on the front lines—wherever they are—must be made available to provide a synchronized, real-time vision of the battle space with lightweight web-based tools to facilitate planning and execution.

A representative sample of some of our efforts include support of the Transformational Communications Study (TCS), the Standardized Tactical Entry Point (STEP) migration to DoD Teleports, Global Information Grid Bandwidth Expansion (GIG-BE), GIG Enterprise Services (GIG-ES), and Joint C2.

A robust, integrated telecommunications infrastructure is a must for future warfare. The TCS seeks to architect the future communications satellite constellation by removing bandwidth as a consideration and moving to a seamless, end-to-end network information sharing environment supported by high-speed, high-capacity, and interoperable communications. DISA has had and will

continue to have a major role in the TCS effort. In addition to providing requirements analysis and architectural engineering support, DISA also performs the challenging task of transition analysis.

STEPs were used extensively during OIF. Tomorrow's DoD Teleports will far exceed today's STEP capabilities.

The DoD Teleport program, initiative to increase DISN capability, allows deployed forces to connect through teleports to a multitude of commercial satellite frequencies. DoD teleports will be telecommunications collection, access, and distribution points that provide deployed warfighters with multi-band, multimedia, and worldwide reach-back capabilities that far exceed current capabilities. To meet today's combatant commanders' immediate needs, DISA has accelerated the fielding of DoD teleports with IOC being reached last summer.

The GIG-BE will create a trusted ubiquitous bandwidth-available environment to improve national security intelligence, surveillance, reconnaissance, and command and control information sharing. The GIG-BE initiative brings high-speed bandwidth to numerous key locations globally, and will connect approximately 102 key intelligence, command, and operational locations with a state-of-the-art optical mesh network. DISA is currently working with the military services, combatant commands, and agencies to ensure that the resources provided by GIG-BE are optimized.

GIG-ES is an exciting new arena for DISA. It is envisioned as the virtual place where information can be integrated to make net-centric warfare possible. GIG-ES will provide us with a new way of thinking about and providing transformational C2 services to joint forces. GIG-ES will replace legacy platform-centric systems with net-centric concepts using a web-enabled, data-centric power-to-the-edge construct. It builds upon the Defense Information Infrastructure Common Operating Environment (DII COE) to provide a tailorable services approach built upon a robust communications capability.

Just as the DII COE is morphing to GIG-ES, we expect a similar transformation for GCCS to Joint Command and Control (JC2) transformation. JC2 will employ a secure, collaborative, web-enabled and tailorable command-and-control architecture and capability packages that provide decision superiority as well as vertical and horizontal interoperability. We expect JC2 to take advantage of GIG-ES services as they mature. Users will access fused information sources through common IP-based network services, common data representations, and common catalogs/directories using intelligent, thin, and ubiquitous (e.g., wireless, personal decision assistant-type) clients. The JC2 Operational Requirements Document made its way through the Joint Requirements Oversight Council last year. We anticipate heavy DISA involvement in the JC2 Analysis of Alternatives.

The DISA team is very proud of its warfighter support over the past two years. But that will never be good enough. There are many challenges ahead: new technology, new business processes, and expanded partnerships. With a foot firmly in the present to sustain and improve operational capability, we have put our transformation foot forward as we move to net-centric warfare developments of the future.

About the Author

Lt. Gen. Harry D. Raduege Jr. is director, Defense Information Systems Agency, Arlington, VA. As director, he leads a worldwide organization of more than 8,200 military and civilian personnel. This organization engineers, develops, acquires, and provides integrated command and control and information networks to serve the needs of the President, Secretary of Defense, Joint Chiefs of Staff, the combatant commanders, and other DoD components under all conditions ranging from peace through war. Lt. Gen. Raduege is also responsible for operating the most complex and far-reaching military information networks in the world. He entered the Air Force in 1970 through the Air Force Reserve Officer Training Corps program at Capital University, Columbus, OH. Prior to assuming his current position, he was the director of command control systems, Headquarters North American Aerospace Defense Command and United States Space Command, and director of communications and information, Headquarters Air Force Space Command. He also served as the chief information officer for all three commands.

Supporting the Warfighter with Chemical Protective Gloves

By Algie Manuel

One of the most critical life-and-limb items for warfare support is the chemical protective glove set. When worn with chemical protective suits and outfits, these butyl rubber gloves provide protection from hazardous chemicals. The gloves, available in three different thicknesses, were issued to troops deployed in Afghanistan and Iraq as protection against a possible biological or chemical warfare attack.

Because of their special nature, the gloves are made strictly in accordance with military specification MIL-G-43976, Gloves and Glove Set, Chemical Protective. Currently, two manufacturers, Guardian Manufacturing Company and North Safety Products, supply the gloves to all branches of the military services. In this sense, the gloves are standardized, because gloves from either supplier will meet the rigorous chemical and physical tests stipulated in MIL-G-43976.

Butyl chemical protective gloves were the standard hand protection into the early 1990s. At that time, the Joint Services Lightweight Integrated Suit Technology Program was forecasting a state-of-the-art replacement. The military services had significant inventories with a relatively long shelf life remaining and decided to discontinue purchasing the product, opting to wait for the next-generation glove. The plants that had produced the gloves were specifically designed for the product and could not be retooled for commercial protective hand wear. Absent of production requirements, the plants would have been dismantled, and the buildings used for other purposes. In concert with industry, the Defense Supply Center Philadelphia (DSCP) and Defense Logistics Agency (DLA) determined that it would take, at the time, $50 million and 2 years to rebuild the capacity. In addition, there was no guarantee that new facilities would receive Environmental Protection Agency licensing.

In early 2000, new gloves still had not been introduced, the inventories were being depleted, and the remaining stock was running out of shelf life. Moreover, after the events of September 11, 2001, demand increased. In response, DSCP has been requiring the two manufacturers to operate 7 days per week. Today, the average annual sale for the gloves is about $2 million.

To ensure that the warfighter is properly protected, 200 gloves are randomly selected from each manufacturer's lot of approximately 5,000 gloves and are tested at govern-

ment laboratories. Each sample lot tested represents only one thickness. (The gloves also undergo government inspection and contractor testing at the manufacturers' facilities.)

Because a private laboratory could not keep up with the demand for testing each lot of gloves, two government laboratories have been tasked with testing them:

- The DLA's Product Testing Analytical Unit—a state-of-the-art laboratory located in Philadelphia, PA—tests the gloves for porosity, or leakage. To meet the demand of testing 200 gloves from each lot, the lab recently expanded its capacity from one to four testing units. In addition to porosity tests, the lab performs many other tests of the quality of each lot of gloves manufactured.
- The Aberdeen Testing Center in Aberdeen, MD, tests the gloves for their resistance to chemical agents.

Together, these two government laboratories are ensuring that the warfighter is properly protected.

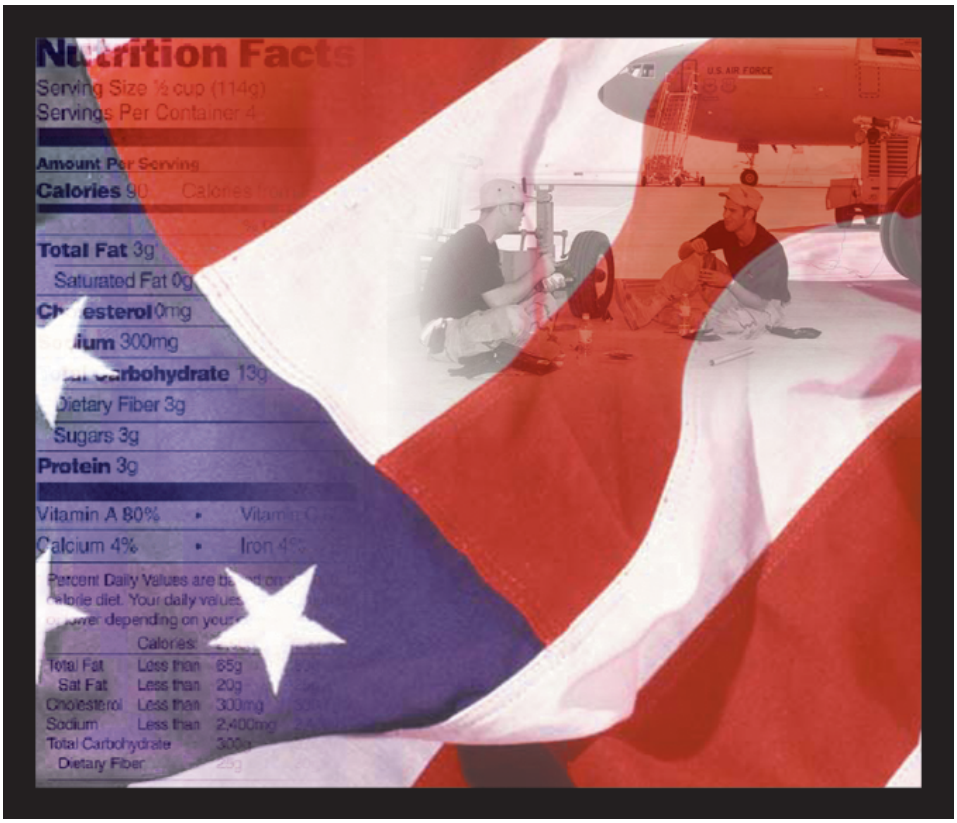
About the Author

Algie Manuel is the manager of DLA's Product Testing Analytical Unit in Philadelphia, PA. Throughout his more than 40-year career with the federal government, he has worked on all aspects of the testing and quality assurance functions associated with clothing, textiles, and personnel equipment.

Battlefield Nutrition: Meal, Ready-to-Eat

The evolution of combat rations in the last 20 years reflects strides in nutrition and technology.

By Joe Zanchi, John Woloszyn, and Joe Zanolle



Background

To understand where we are today with military rations and how we arrived there, it is important to look at where the journey started. The evolution of military rations changed little from the Revolutionary War through World War I. The basic military ration consisted of three dietary staples—meat, bread, and beans. In fact, the first Army ration established by congressional resolution on November 4, 1775, specified that

> a ration consists of the following kind and quantity of provisions: 1 lb. beef or 3/4 lb. pork, or 1 lb. salt fish per day; 1 lb. bread or flour, per day; 3 pints of peas or beans; 1 pint of milk per man per day, or at the rate of 1/72 of a dollar; 1 half pint of rice or one pint of Indian meal, per man per day; 1 quart of spruce beer or cider per man per day, or 9 gallons of molasses per company of 100 men per week; 3 lbs. candles to 100 men per week, for guards; 24 lbs. soft or 8 lbs. hard soap, for 100 men per week.

Soldiers generally received their allowance of 1 to 4 days' rations at one time. The rations were typically prepared individually, and any portion not immediately consumed was carried in a rucksack or saddlebag until the next meal. Changes were few during this period; coffee, tea, seasonings, and potatoes were available periodically during the Civil War, and some canned foods were added during World War I.

This article gives an overview of military rations and then focuses on

Typical Nutritional Information on MRE Items

Nutrition Facts

Serving Size (227g)
Servings Per Container

Amount Per Serving

Calories 210 Calories from Fat 60

	%Daily Value*
Total Fat 7g	**11%**
Saturated Fat 2g	**10%**
Cholesterol 30mg	**10%**
Sodium 1420mg	**59%**
Total Carbohydrate 17g	**6%**
Dietary Fiber 0g	**0%**
Sugars 3g	
Protein 34g	

Vitamin A 40% • Vitamin C 6%
Calcium 2% • Iron 20%

*Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs:

	Calories:	2,000	2,500
Total Fat	Less than	65g	80g
Saturated Fat	Less than	20g	25g
Cholesterol	Less than	300mg	300mg
Sodium	Less than	2,400mg	2,400mg
Total Carbohydrate		300g	375g
Dietary Fiber		25g	30g

Calories per gram:
Fat 9 • Carbohydrate 4 • Protein 4

the Meal, Ready-to-Eat (MRE) ration that has been the staple for U.S. forces for nearly 20 years.

Current Environment

The development of modern rations began in 1934, when the Quartermaster Corps launched an effort to replace the WWI vintage emergency ration. This replacement, subsequently designated the D Ration, was developed by the predecessor agency of the Subsistence Research Laboratory in Chicago, later the Quartermaster Food and Container Institute for the Armed Forces. Between 1941 and 1945, numerous rations and ration supplements were developed, including the D Bar, C Ration, and K Ration.[1]

Although the essential military nutritional requirements of individuals have changed little throughout history, our knowledge and approach to satisfying those requirements have changed dramatically. The warfighter is the centerpiece of America's military, and the MRE individual combat ration is the fuel that sustains the warfighter. The MRE, which replaced the canned Meal, Combat Individual (C Ration) in the early 1980s, is arguably the finest individual military ration in the world. Its design centers on a flexible and highly versatile polymeric retort pouch. The MRE has 24 nutritionally interchangeable meals and 24 menus to prevent menu fatigue and increase the warfighter's satisfaction. The ration is primarily used to sustain individuals during operations that preclude organized food service, but where resupply is established or planned.

Intensive research, development, and design innovations have made the MRE lightweight, modular, compact, easily opened, and capable of withstanding a parachute drop from 1,250 feet or from a helicopter at 100 feet with no parachute, enduring inclement weather, and surviving temperature extremes from –60°F to 120°F (–51°C to 49°C). Its shelf life—the duration that the ration can be stored without losing nutritional value, wholesomeness, or quality—is a minimum of 3 years at 80°F (27°C) or 6 months at 100°F (38°C). The MRE also has several other important attributes, including universal acceptance, wholesomeness, low cost, and self-heating capability.

Nutritional Value of MREs

The MRE is designed to meet the Office of the Surgeon General's (OTSG's) nutritional standards for operational rations (NSORs), established in Army Regulation (AR) 40-25.[2] The NSORs, except for fat and sodium, are minimum nutrient content standards at the time of consumption and are not adjusted to compensate for storage losses or varying bioavailabilities of different forms of a nutrient. In effect, they are prescriptions for the nutrient content of operational rations targeted for military personnel engaged in moderate or heavy physical activity in the field.[3] Operational rations are designed to be nutritionally complete for military personnel in a wide variety of operations and settings, and suitable for long-term consumption over prolonged time periods.

The standards in Table 1 are derived from the Military Dietary Reference Intakes (MDRIs), which are the recommended nutrient intake for healthy, physically active military personnel. MDRIs are based on input from the Food and Nutrition Board of the National Research Council. This board also establishes the Recommended Dietary Allowances (RDAs), nutritional guidelines for the general American public. For some nutrients, MDRIs have a higher requirement than RDAs, because soldiers are typically more physically active than their civilian counterparts.

The basic macronutrient content of an MRE for a full day of rations is 3,600 kilocalories (kcal) energy (with less than 35 percent from fat), 91 grams protein, and 494 grams carbohydrate. An MRE is a nutritionally balanced, complete food unit consisting of approximately one-third of the

TABLE 1. Nutritional Standards for Operational Rations

Nutrient	Unit	Rations
Energy	kcal	3,600
Protein	g	91
Carbohydrate	g	494
Fat	g	≤35% total kcal
Vitamin A	µg RE	1,000
Vitamin D	µg	5
Vitamin E	mg	15
Vitamin K	µg	80
Vitamin C	mg	90
Thiamin (B_1)	mg	1.2
Riboflavin (B_2)	mg	1.3
Niacin	mg NE	16
Vitamin B_6	mg	1.3
Folic acid	µg DFE	400
Vitamin B_{12}	µg	2.4
Calcium	mg	1,000
Phosphorus	mg	700
Magnesium	mg	420
Iron	mg	15
Zinc	mg	15
Sodium	mg	5,000–7,000
Iodine	µg	150
Selenium	µg	55
Fluoride	mg	4.0
Potassium	mg	3,200

Source: U.S. Department of the Army, Headquarters, *Nutrition Standards and Education*, AR 40-25/25/BUMEDINST 10110.6/AFI 44-141, June 15, 2001, Table 2-2.

Notes: DFE = dietary folate equivalent, NE = niacin equivalent, and RE = retinol equivalent.

prescribed daily requirements of a ration. A combination of any three meals constitutes a ration.

The MRE may be consumed as the sole ration for up to 21 days, with other rations or food sources included in the daily mix of rations after that period. These guidelines are based on extensive biomedical evaluations of soldiers consuming MREs for 30 days during field training. When the MRE is the sole ration, units are encouraged to provide supplements and enhancements (such as bread, milk, and fresh fruit) whenever feasible.

Each meal, which can be eaten hot or cold, contains an entrée, starch/fruit, crackers, a spread (cheese, peanut butter, jam or jelly), a dessert/snack, beverages, condiments, an accessory packet, a plastic spoon, and a flameless ration heater. Each meal weighs approximately 1.5 pounds, provides an average of 1,300 kcal (12 percent protein, 35 percent fat, and 53 percent carbohydrate), and meets one-third of the NSOR with key components nutritionally fortified. Selected ration components are fortified if their flavor, aromatics, and texture attributes are not adversely affected by the added nutrients (see Table 2). As an example, recent increases in NSOR carbohydrate requirements have resulted in fortification of MRE applesauce and beverage base with maltodextrin, because it is easily digestible and a convenient source of energy. Fortification information is included on MRE packaging, along with specific nutritional information so soldiers can make educated selections regarding their eating habits and nutrition.

Soldiers are encouraged to eat some of each MRE component to ensure that they receive balanced nutrition and energy. An additional 200 kcal are provided (12 percent protein, 33 percent fat, and 55 percent carbohydrate) when MREs are supplemented with pouch bread. The OTSG approves all meals in the ration platform.

Nutritional labeling is required for all MRE components. Currently, three contractors produce MRE entrées, starches, and fruit. Each contractor submits formulation and nutrition information electronically to Natick Soldier Center. This information is critical for food technologists to design menus and ensure that rations provide adequate nutrition as mandated by OTSG. For commercial MRE items, nutrition information is obtained from the U.S. Department of Agriculture's nutrient database and company nutritional information. That information includes macro- and

TABLE 2. Nutrient Fortification in MRE

Ration component	Vitamins								Minerals		
	A	C	B_1	B_2	Niacin	B_6	D	E	Calcium	Zinc	Folate
Beverage base		●									
Cocoa base	●	●	●			●			●		
Cheese spreads	●	●	●			●					
Peanut butter	●	●	●			●					
Crackers			●	●	●	●			●		
Dairy shakes							●		●		
Wheat snack bread			●	●	●	●			●		
Fruits		●									
Hooah bar		●	●	●	●		●	●	●	●	●

Source: U.S. Army Research Institute of Environmental Medicine, *Nutrition for Health and Performance: Nutritional Guidance for Military Operations in Temperate and Extreme Environments,* Technical Report TN-00/4, May 2001.

Notes: B_1 = thiamin, B_2 = riboflavin, and B_6 = pyridoxine.

micronutrients as specified in the NSOR. This practice results in significant savings in both time and money over tedious, expensive, and time-consuming nutritional analyses. More important, it ensures that soldiers receive a ration that meets the requirements of AR 40-25 for maximum health and performance.

Product Improvement

Through its Fielded Individual Ration Improvement Program, the Natick Soldier Center, Combat Feeding Directorate, works continually to improve the MRE. The Joint Services Operational Rations Forum (JSORF) Integrated Product Team—comprising representatives from the services, the Army Center of Excellence for Subsistence, the Defense Supply Center Philadelphia, the Deputy Chief of Staff for Logistics, Headquarters Army, and Natick Soldier Center—meets annually to review and approve all proposed changes to the ration. The following are some of JSORF's accomplishments:

- Since 1993, approved more than 141 new items
- Through MRE XXIV, eliminated about 50 items
- Increased the number of menus from 12 to 24 and included four vegetarian meals (two each in cases A and B)
- Included a flameless ration heater in each meal bag
- Adopted new easy-open meal bags with commercial-like color and graphics
- Added nutritional labels.

Summary

The MRE program is the most customer-focused ration development program in the world today. All items undergo extensive evaluation in both the laboratory and the field, and numerous changes are the direct result of user feedback, suggestions, and recommended improvements. Extensive ration evaluation and testing is conducted during field training exercises by teams of food technologists and scientists, in conjunction with medical research scientists and behavioral scientists, to ensure nutritional adequacy and warfighter acceptability.

The success of the MRE program is made possible through the teamwork, communication, and partnership among the warfighters, vendors, procuring agencies, and academia. This unique arrangement has fostered technological growth and innovation to continually improve and refine what is already the finest combat ration in the world

About the Authors

Joe Zanchi has more than 20 years of experience as a logistician and military analyst. He is currently assigned to the Operational Rations Business Unit, Combat Feeding Directorate, U.S. Army Natick Soldier Center, Natick, MA. Mr. Zanchi is the recipient of the 2001 Soldier Systems Center Gold Award for Logistics Management and Silver Award for Technical Support.

John Woloszyn serves as a standardization supervisor in the Subsistence Support Office, Defense Supply Center Philadelphia. He has worked in the Defense Logistics Agency Standardization Program for 14 of his 23 years of federal service.

Joe Zanolle is a subsistence marketing and management analyst. He is currently assigned to the Operational Rations Business Unit, Subsistence Directorate, Defense Supply Center Philadelphia.

[1]U.S. Army Natick Laboratories, *Operational Rations Current and Future of the Department of Defense*, June 1970.

[2]U.S. Department of the Army, Headquarters, *Nutrition Standards and Education*, AR 40-25/25/BUMEDINST 10110.6/AFI 44-141, June 15, 2001.

[3]U.S. Army Research Institute of Environmental Medicine, *Military Dietary Reference Intakes: Rationale for Tabled Values*, Technical Report TN-00/10, February 2001.

The Office of the Surgeon General must approve all components, fortification, etc., associated with procuring MRE items.

The Defense Logistics Agency (DLA)/Defense Supply Center Philadelphia (DSCP), Directorate of Subsistence, is responsible for the commercial component specification development, technical and quality contractual development, acquisition, supply, and oversight of MREs:

- In a normal peacetime environment, DSCP annually procured approximately 3.1 million cases of MREs, which generated about $250 million in sales.
- DSCP provided 61.2 million MREs in support of Operation Iraqi Freedom.
- Approximately 2 million MREs are stored in the continental United States.

The U.S. Army Center of Excellence for Subsistence is responsible for the initial planning and menu approval for MREs.

MRE "Sound" Bites

The U.S. Army Natick Research, Development and Engineering Center performs development and research of the product components, specification development, packaging, labeling, unitization, etc.

Production inspection and storage inspection are performed by both the U.S. Department of Agriculture and the U.S. Army Veterinary Corps.

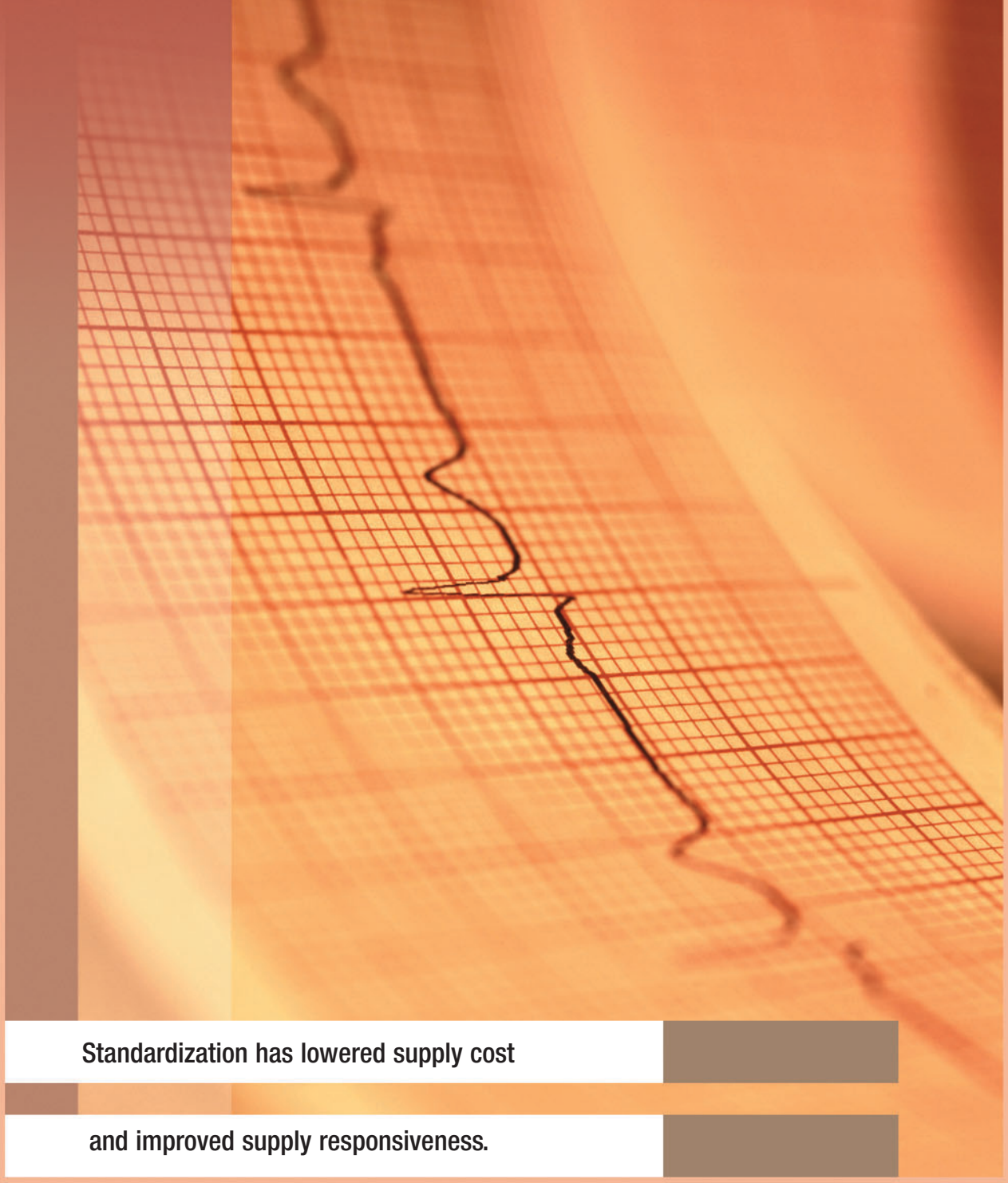
Industry and academia involvement is funneled through Research and Development Associates for Military Food and Packaging Systems, Inc.

Plans have been made to include a free-postage post card from the war zone in the MREs for soldiers to write home. The post card will be printed on the outer MRE entree carton. Request came from the mother of a U.S. Marine in Iraq, as her son and many others used the blank inside of the MRE carton as a post card.

"MREs have come a long way in recent years." (SFC Rony Michel, PSG B Co 4-64 AR)

"MREs are excellent. Cheeseburger, Jambalaya, Spaghetti, Enchiladas are all my soldiers' favorites. Number 8 (beef patty) is everyone's favorite of all." (LTC Stephen Twitty, Bn Cdr 3-15 IN)

"Without [MREs] it sure would have been tuff on the troops that were moving north into Baghdad. The lines of supply were stretched so thin that the only meal the troops could count on was their MREs. I know that they have definitely improved over the last 5–10 years in quality and troop acceptability not to mention some of the newer menu selections being offered. We did push a heck of a lot through PWC prior to and during the war. I did not hear of anyone complaining about them and turning them down. There were many units that survived off the MREs for more than 35–60 days. They are truly a mainstay in the operational ration family. As a note I basically lived off the MREs, Halal and Kosher meals myself for almost 5 months and I never got tired of them nor did I ever have a bad one." (CW5 Richard Goodman, Command Food Advisor for DLA/DSCP)



Standardization has lowered supply cost and improved supply responsiveness.

Standardization and the Tri-Service Regional Medical Logistics Support Program

By Melinda Sass, MAJ USA, and Theresa Tillock, Lt Col USAF

Background

In late 1997, a study commissioned jointly by the acting Assistant Secretary of Defense (Health Affairs) and the Assistant Secretary of Defense (Comptroller) proposed eight broad recommendations for improving the effectiveness and efficiency of the tri-service managed health care operations. Two of the eight recommendations focused on medical logistics and resulted in the establishment of a tri-service medical materials management program in each health care region (i.e., TRICARE region). This was the first major revision of DoD's health care logistics system in almost a decade.

In a few short years, the Tri-Service Regional Medical Logistics Support Program evolved from a promising concept to become a cornerstone of the current military medical logistics process. This program promoted and facilitated regional standardization and volume purchasing of high-quality medical surgical supplies, medical equipment, and hospital services by fostering partnerships among the Army, Navy, and Air Force health care facilities within the regions. Its overarching goals are to capture cost savings for medical surgical products and equipment through standardization, to maximize purchasing efficiencies through clinical and logistical collaboration, and to optimize the use of Defense Supply Center Philadelphia's (DSCP's) prime vendor and e-commerce commercial support programs.

This article outlines the Tri-Service Regional Medical Logistics Support Program's regional standardization process. Next, it describes the keys to the program's success, provides examples of recent DoD standardization initiatives, and concludes with a summary of program benefits.

The Standardization Process

The standardization process for DoD's Tri-Service Regional Medical Logistics Support Program consists of five steps:

1. Define target products and product groups
2. Select and prioritize products for standardization
3. Evaluate products
4. Approve and implement standardization decision
5. Communicate findings and coordinate with regional stakeholders.

STEP 1. DEFINE TARGET PRODUCTS AND PRODUCT GROUPS

This step begins with an analysis of where regional supply dollars are being spent in order to identify and prioritize product lines to standardize. It then entails identifying the primary users of each major product group. These users should be represented on clinical product teams, or CPTs, and in clinical trials. In this step, there is an assessment of the degree of individual clinician preference for each product and group. (Items associated with a high degree of individual preference, such as sutures, require more effort to obtain consensus, whereas other less-clinician-sensitive items may be standardized on cost alone.)

STEP 2. SELECT AND PRIORITIZE PRODUCTS FOR STANDARDIZATION

Two broad strategies are typically followed when selecting items for standardization: by individual line item and by product group. In both strategies, selection of the items or groups for standardization is based on the anticipated benefits.

The individual line items selected for standardization are typically low-threat items that are not part of broad product groups. Such items are selected for their low cost and clinical acceptance and for their availability through a common prime vendor distribution center.

In contrast, the broad product groups targeted for standardization account for high-dollar products or include numerous line items and are commonly

used by private-sector hospitals and hospital networks. This approach allows for standardization of many lines of materiel with a single effort, and it provides the opportunity to leverage the purchasing power of an entire DoD region or business unit to obtain competitive prices.

STEP 3. EVALUATE PRODUCTS

Materiel managers usually evaluate the individual, low-threat items, while CPTs, chartered by the regional Tri-Service Product Review Board (TPRB), evaluate the product groups. A CPT is normally composed of logisticians, doctors, nurses, technical personnel, infectious control personnel, and representatives from each military service. The role of a CPT is to conduct an impartial, clinical evaluation of proposed products from the users' perspective. One of its first tasks is to establish the selection criteria and evaluation strategy for the products or product groups being considered. The criteria include such factors as cost, ease of use, product support or other specific customer services, and qualitative features that contribute to clinical acceptance.

The evaluation criteria are not limited to product attributes. Vendors often offer value-added services in their business proposals that could influence a best-value decision. Examples of such services include vendor commitments to exchange or give credit for existing products, favorable (sometimes free) provision of equipment in return for use of consumables, staff in-service or patient education, and assistance with utilization management. When the evaluation is part of an effort to obtain a Regional Incentive Agreement (RIA) based on committed volume, the request for vendor prices or business proposals usually is separate from the CPT. (The Tri-Service Regional Business Office, under the review and supervision of the Regional Logistics Chief, typically made such a request.)

All evaluations of the price proposals for broad product lines are conducted at the line-item level. A vendor could state an aggregate discount in return for a purchase commitment, but may apply different discounts to each item within the product line. If high-demand items receive only a nominal discount while lower-demand items carry a higher rate, the total benefit may be less than expected and less than competing proposals.

STEP 4. APPROVE AND IMPLEMENT STANDARDIZATION DECISION

Each region established an approval authority for standardization decisions. Typically, CPTs report their findings, including recommendations for selection, to the regional TPRB. After the TPRB accepts the recommendations, they are referred to the regional commanders for final decision. In the National Capital Region, an executive committee of the TRICARE Regional Governing Board, consisting of the Medical Center and hospital commanders from each service, make decisions on behalf of the region. In other regions, the full Regional Executive Committee, consisting of all medical facility commanders in the region, approve the standardization decisions. In all cases, the final standardization decisions have the authority of commanders.

STEP 5. COMMUNICATE FINDINGS AND COORDINATE WITH REGIONAL STAKEHOLDERS

A website, dmmonline.dscp.dla.mil/, was created to promote communication and coordination throughout the regions and to provide potential business partners and other interested parties with detailed information about the initiative. The latest versions of the *Implementation Guidance* and *Consolidated Price Book* can be found at this site.

Standardization Enablers

A critical factor in the success of DoD's program has been its organizational structure and leadership. DoD has nine Tri-Service Regional Business Offices (TRBOs) staffed with a total of 30 contract personnel. These offices serve as DSCP's forward presence for regional standardization programs. Each TRBO is directed by a senior military officer—the Regional Logistics Chief (RLC)—supported by a cadre of contractor personnel who include full-time logisticians, clinical analysts, and data managers. TRBOs provide day-to-day support for the RLC and promote DSCP acquisition programs. The program really took root once the program gained the support of senior clinical leaders in the regions. Together with the RLCs, they provided vital leadership and support.

The keys to effective implementation include assuring the staff that clinicians were involved in the selection process; that outcome-based, best-value criteria were used in the decision; and that clinical leadership and commanders were providing visible support. Program leadership has

gained the commitment of most clinician customers, as evidenced by the high compliance rates and improving program metrics. Medical surgical prime vendor sales for standardized items priced through RIAs is approximately 30 percent and growing significantly every year. The program is also achieving high cost avoidance: $3.04 million in FY00, $7.35 million in FY01, $9.26 million in FY02, and $11.90 million in FY03.

The following are some of the keys to the success of the standardization effort:

- Access to information on products and product-line usage
- A decision process that is clinically led, empowered to make decisions, and given the authority to mandate compliance
- An acquisition process that is timely and responsive to clinical requirements
- An effective means for communicating regional standardization decisions (through the *Consolidated Price Book*).

Recent Initiatives

DSCP; Regions 6, 7, and 8; and the Department of Veterans Affairs (VA) have agreed—under the umbrella of the Tri-Service Regional Medical Logistics Support Program—to collaborate in a procurement effort for standard vital signs monitors. This joint effort includes mandatory participation by VA and preferred sourcing for Regions 6, 7, and 8; savings are estimated at 10 to 15 percent of total purchases over the next 5 years.

A second major DoD/VA initiative involving general surgical instruments is underway. All nine DoD TRICARE regions are participating in this initiative. With DSCP as the contracting lead, the expected results will be a DoD/VA blanket purchase agreement under a General Supply Administration Federal Supply Schedule for clinically superior surgical instruments. Clinically driven, materiel standardization is an important component in both of these medical materiel acquisition initiatives.

Summary

The hallmark of DoD's regional materiel standardization program is a leadership focused on ensuring that only clinically accepted products result from each standardization decision. DoD's Tri-Service Regional Medical Logistics Support Program has already produced significant, tangible savings for the Military Health System—with cost avoidance exceeding $35 million since FY98, an exceptional return on investment.

In addition to lowering supply costs through reduction in the purchase price of materiel, other outcomes and benefits of regional standardization have included

- access to and use of clinically accepted products,
- a reduction in the amount of waste and excess,
- fewer lines of materiel purchased,
- improved supply responsiveness,
- usage data for utilization management and outcome analysis,
- reduced consumption through improved utilization management, and
- various intangible benefits gained through the synergy of regional logistics and clinical collaboration.

Although the program has avoided sizable costs to date, its ultimate goal is, and will remain, extraordinary patient care.

About the Authors

MAJ Sass is chief of the Materiel Distribution Branch, Assistant Chief of Staff for Logistics, U.S. Army Medical Command in San Antonio, TX. In that position, she is responsible for providing Class VIII (medical) materiel management policies and procedures for six Regional Medical Commands and 38 medical treatment facilities purchasing more than $350 million in medical supplies annually.

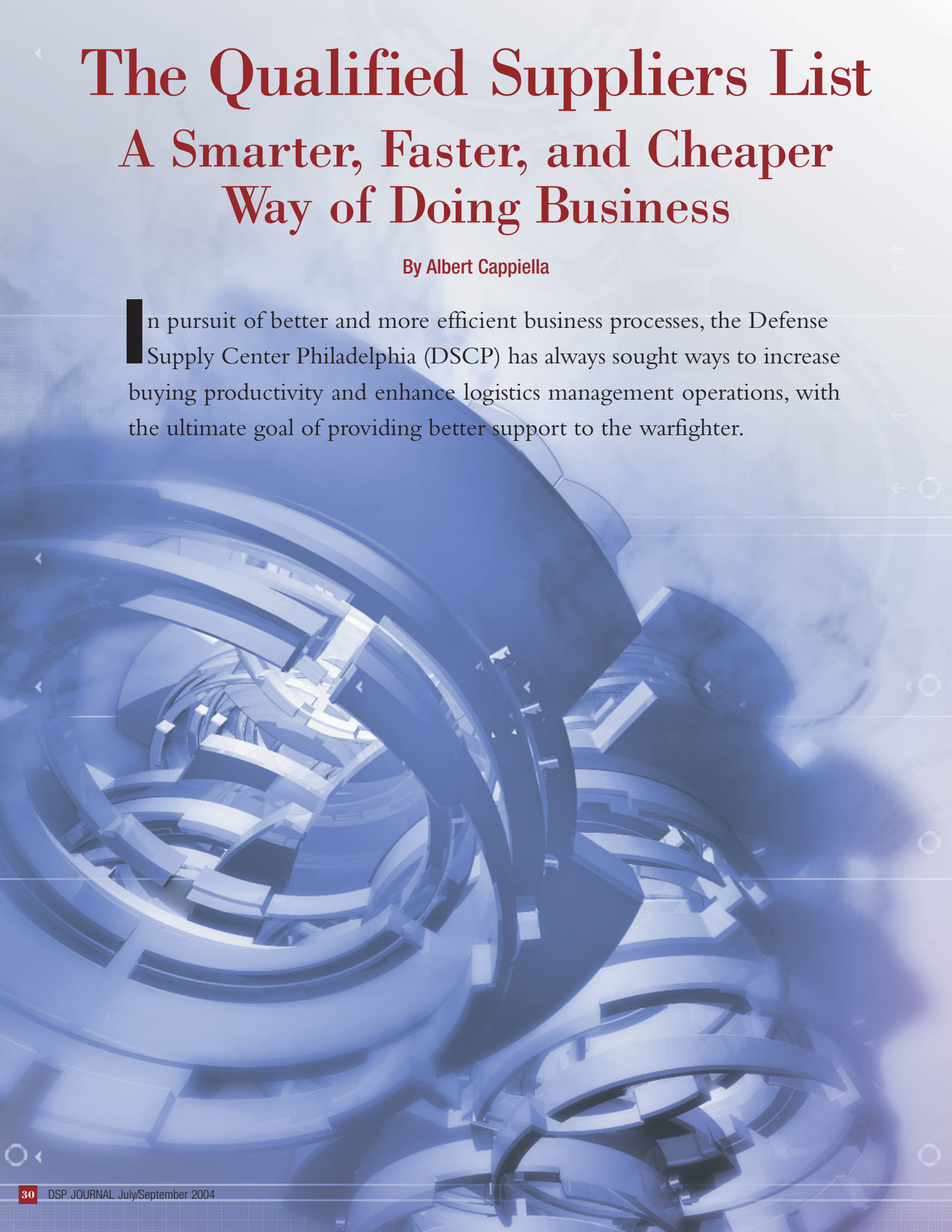
Lt Col Tillock is chief of the Medical Surgical Prime Vendor Branch, Medical Directorate, Defense Supply Center Philadelphia. She is responsible for the overall Medical Surgical Prime Vendor program, including logistics integration and supply chain management, contingency operation support options, and facilitation of e-business initiatives.

The Qualified Suppliers List

A Smarter, Faster, and Cheaper Way of Doing Business

By Albert Cappiella

In pursuit of better and more efficient business processes, the Defense Supply Center Philadelphia (DSCP) has always sought ways to increase buying productivity and enhance logistics management operations, with the ultimate goal of providing better support to the warfighter.



Recognizing early that inventory stock levels were too high and costly to maintain, DSCP looked at alternative methods that would enable suppliers to ship contracted goods directly to DSCP customers under a program called direct vendor delivery (DVD). However, implementing DVD had one major impediment, namely, how to eliminate the costly and time-consuming traditional source inspection process, while still achieving a high level of confidence in the quality of products received by DSCP's customers. The solution—developed through DSCP's engineering leadership in the General and Industrial Directorate—is the qualified suppliers list (QSL).

The QSL Concept

The QSL concept emulates industry-recognized practices to provide maximum assurance that suppliers' products meet technical requirements. Specifically, DSCP develops and applies sound engineering criteria, tailored to a specific commodity. DSCP then uses those criteria to qualify companies that can consistently provide a good product. DSCP adds companies—manufacturers or distributors—to the QSL for a commodity if they can demonstrate (through surveys and audits) that they have and use adequate process controls. Any company that can meet published DSCP criteria can qualify for inclusion on the QSL.

In addition to enhancing customer support and improving DSCP competitiveness, a related goal of the QSL program is to reduce product lead-times and overall Defense Logistics Agency (DLA) costs (such as source inspection, product testing, depot operations, dual transportation costs, and receipt inspections). Using the QSL, DSCP has proven that "faster and cheaper can actually be better!"

The QSL Pilot Program

Bulk steel was chosen as the commodity to demonstrate QSL viability in a pilot program limited to about 300 national stock numbers (NSNs). This commodity was selected primarily because of the potential added benefit of avoiding stock deterioration (most bulk metals are stored out in the open at DLA depots). Also, the pilot program was designed to demonstrate just-in-time delivery of high-quality products to meet customer needs.

DSCP interacted with the private sector to see how industry accomplished similar efforts and obtained feedback in a number of areas. QSL team personnel established engineering criteria elements for use in qualifying potential bulk steel suppliers. The key ingredient to the success of this endeavor was to develop and implement sound criteria to ensure that the process is always under control, resulting in final product conformance to stated requirements without the need for costly and time-consuming source inspection and preshipment testing on each contract. DSCP also generated a QSL application format, procedures, and peripheral documentation and implementation requirements. After obtaining local approval, DSCP marketed the program at the DLA level with a business case justification. Headquarters DLA approved the QSL initiative in April 1991. DSCP's implementation began by publicizing the program and holding a prequalification conference attended by numerous steel suppliers.

Experience under the QSL bulk steel pilot program was so favorable that in June 1994, DSCP expanded coverage to include virtually all bulk metals. Solicitation processing is now further enhanced through the use of electronic quotations. With the exception of precious metals, all bulk metal products in Federal Supply Group 95 (currently, 16,384 NSNs) are bought by DSCP using the QSL concept. As of June 2004, DSCP had 171 qualified bulk metal suppliers.

As a result of the QSL pilot program, coupled with DVD initiatives, DSCP has reduced the total lead-time (procurement and administrative) for purchases of bulk metals by an average of about 200 days. In addition, DSCP has been able to reduce the cost recovery rate (surcharge) on affected bulk metal products from 48 percent just prior to the establishment of the QSL for bulk metals to less than 10 percent today.

QSLs for Other Commodities

Because of its success with the QSL for bulk metals, DSCP adopted the concept to include use of QSLs for manufacturers (QSLMs) and distributors (QSLDs) for other selected commodities where appropriate. When DSCP contracts with a QSLD for delivery of an item, that item must be traceable to an approved QSLM. For example, DSCP developed a QSL for competitive Class 3 aerospace fasteners in 1995, for blind aerospace rivets in 1996 (later expanded to cover threaded/grooved pin rivets), for rope and cordage products in 1997, for laminated shims in 1998 (transferred to Defense Supply Center Richmond in 1999 and no longer under the QSL), for O-rings in 1999, and for Class 2 threaded fasteners in 2000. DSCP presently has 222 QSLMs/QSLDs approved to supply Class 3 aerospace fasteners, 80 rivet suppliers, 31 rope sources, 57 O-ring suppliers, and 212 sources for Class 2 threaded fasteners.

The QSL concept is in line with the trends in industry to use quality suppliers and with DoD's goal to use best commercial practices with reduced oversight to improve or streamline government acquisitions. Due to QSL process efficiencies, customers can expect to get better quality parts faster today for QSL-selected commodities. For example, customers can expect to receive Class 3 aerospace fasteners 49 days sooner, blind aerospace rivets 31 days sooner, rope and cordage 22.5 days sooner, O-rings 55 days sooner, and Class 2 threaded fasteners 2 days sooner than under previous acquisition methods.

DSPC's newest QSL is for quick-release pins. In October 2003, DSCP hosted a conference to introduce suppliers to the proposed QSL. QSL implementation for this commodity will permit elimination of numerous supplemental quality requirements imposed since the cancellation of a qualified products list for those items. DSCP began accepting applications under the QSL for quick-release pins in April 2004, and acquisitions are underway. DSCP estimates that the QSL program will enable customers to receive quick-release pins 91 days faster than before.

As DSCP pursues the development of QSLs for other commodities, it tailors the engineering criteria to be commodity and industry sensitive, recognizing that the savings in lead-times and cost may differ for each commodity. DSCP also employs the Defense Contract Management Agency (DCMA) to ensure program efficiency and effectiveness and to monitor results and customer feedback. DSCP expects the QSL program to continue to foster a greater partnership among DSCP associates and DCMA through widespread use of their specialists in surveying quality processes of manufacturer/supplier facilities.

The QSL Qualification and Evaluation Process

Suppliers continue to show interest in qualifying for the QSL program. Candidate suppliers for participation in the program obtain and review the DSCP technical criteria. In return, they submit completed applications to DSCP, along with a quality control manual. DSCP evaluates each supplier's submission to initially determine "paper" compliance with the engineering criteria and evaluates any recent industry audit references included in the submitted information. Complemented by the extent and quality of

feedback from reputable systems and equipment design and manufacturing activities, DSCP determines the need to conduct a site survey, or have one performed by DCMA, before qualifying a supply source. Further adopting industry practices, DSCP maximizes the use of existing audit data in making this determination. If problems are evident, the supplier is sent a corrective action letter citing the specific deficiencies. The DSCP process is intentionally rigorous; historically, only 60 percent of applicants have attained qualification.

Once the supplier becomes qualified for inclusion on the QSL for a particular commodity, it can participate in electronic solicitations on DSCP's Procurement Gateway for that commodity. The QSL system also facilitates automated low-dollar threshold procurements by tying each procurement to the approved source listing for that commodity. Along with criteria, QSL suppliers also receive the provisions (procedures that further define QSL terms, details of process, reasons for removal, and so on).

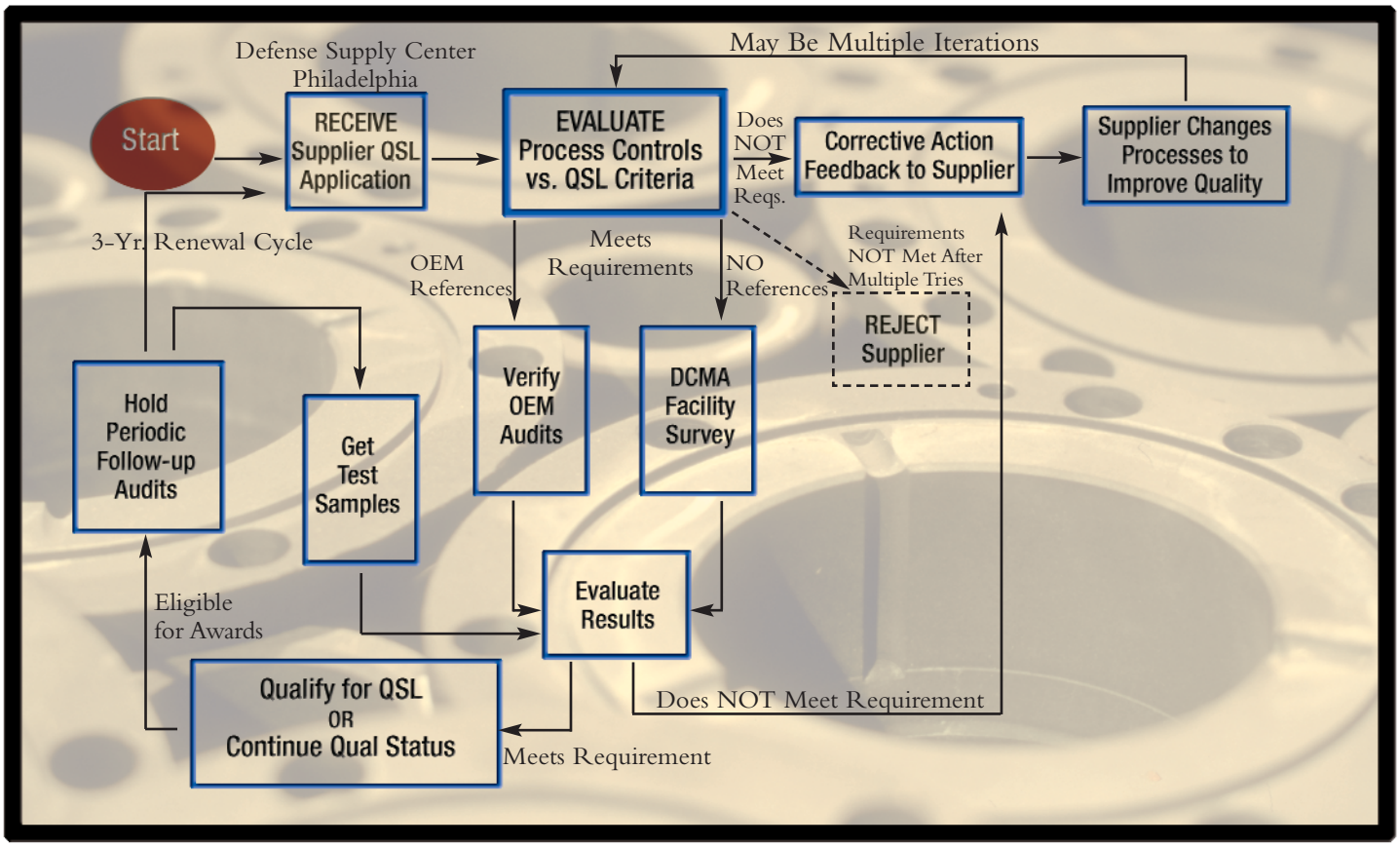
After a product is delivered, it must go through the supplier's approved quality system at the customer's facility. Later, after the supplier has received several contract awards, DSCP conducts periodic random audits to verify that the supplier has traceability of material (typically back to the producing mill) on those contracts. Surveillance audits also confirm compliance with other QSL procedures and ensure that the process is working as it should. As further assurance of continuing compliance, DSCP may acquire samples during the audits for later testing without affecting contract deliveries. Suppliers must requalify at 3-year intervals to maintain their status.

Figure 1 is a simplified flow chart of the QSL evaluation process. In short, QSL establishes quality control at the point of supply by precertifying manufacturers and distributors based on a continuing evaluation of their in-place quality systems. Stringent process controls are used to maintain quality levels in lieu of redundant, and time-consuming, source inspections, product verifications, and first-article testing. Use of the QSL is a highly effective way to obtain conforming products. Moreover, the QSL can be applied to families of similar items. Although nothing is an absolute guarantee against fraud, the QSL program reduces the likelihood of doing business with fraudulent vendors, because the QSL concept is founded on the mutual cooperation of suppliers and the government to enhance processes.

Product verification testing detects nonconformance in products already manufactured and ready for shipment. The QSL concept implements, through sound engineering, a proven system to ensure continuous conformance and consistent quality, up front, utilizing process controls. This focus provides DSCP a basis for having confidence in the level of support to our customers, with significantly improved product quality, reduced delivery lead-times and costs, and a business posture commensurate with today's competitive environment.

The QSL Program in Action

As DLA procurements have evolved over recent years and become more automated, the QSL program has kept pace by establishing a website. Through that website, users can view approved sources in real time, confirm a supplier's qualification status, find approved suppliers for a commodity within a geographic area, access QSL application forms and criteria for a specific commodity, and through electronic links, learn about relevant program events. An enhanced QSL database, utilizing Oracle programming with Cold Fusion and Microsoft Active Server user interface, identifies suppliers whose qualification is due for renewal, tracks audit history, and relates QSL contract awards. These



improvements also facilitate automated small buys to qualified sources. Finally, DSCP's QSL program has become recognized and accepted by industry and emulated by other entities.

The QSL concept implementation has no impact on product specifications or standards; in other words, specifications do not require the use of a QSL. Once a firm is qualified, this qualification can apply to the entire product line that the company produces, as long as the company uses its approved process. In addition, unlike most ISO 9000 registrations, companies do not have to pay DSCP a fee to qualify.

The QSL concept, as applied by DSCP's engineering personnel, incorporates a total team effort as the respective customer business units execute contracts implementing DVD and QSLM/QSLD to enhance acquisitions. Customer feedback indicates a high level of satisfaction; customers are receiving the right material at the right time and at the best value.

Information about specific QSL commodities, including applications, criteria, and currently approved sources is available through the DSCP website: www.dscp.dla.mil/gi/qsl/. Once at the QSL home page, select the commodity of interest to obtain relevant QSL data. Questions about the QSL may be directed to Albert Cappiella, Design and Qualification Branch (DSCP-ITA), at 215-737-7020 or DSN 444-7020.

About the Author

Albert Cappiella has 38 years of engineering service with three defense agencies. Currently, he is chief of the Design and Qualification Branch at the Defense Supply Center Philadelphia. Mr. Cappiella is responsible for implementing qualification programs, document preparation, and quality engineering initiatives.

Aerospace Community Works Together to Share Best Practices on Standards

By Ann Sides

Organizations providing representatives to the Association of Aerospace Standards Users

BAE Systems

Bombardier Aerospace

Defense Standardization Program Office

GD Decision Systems

L-3 Communications

Lockheed Martin Corporate EPI Center

NASA Technical Standards Program Office

Northrop Grumman

Raytheon

Systems & Electronics Inc

U.S. Air Force Materiel Command, Wright-Patterson AFB

U.S. Army Materiel Command

U.S. Navy, Naval Air Systems Command

University of Alabama

The massive consolidation experienced by the aerospace community in the last 10 years brought about many challenges. One of these challenges is the formation and management of enterprise-wide standards subscription contracts. The goals of forming an enterprise-wide standards contract are to reduce costs of procurement and management and to share the benefits of increased access to standards across an organization.

Early in 2000, Raytheon formed a team to establish an enterprise-wide standards contract. The team successfully developed an agreement giving users access to a larger selection of standards at substantial savings. The team also completed two additional 1-year contracts; each year, the lessons learned from the previous year were invaluable. The NASA Technical Standards Program Office also successfully negotiated a 5-year contract.

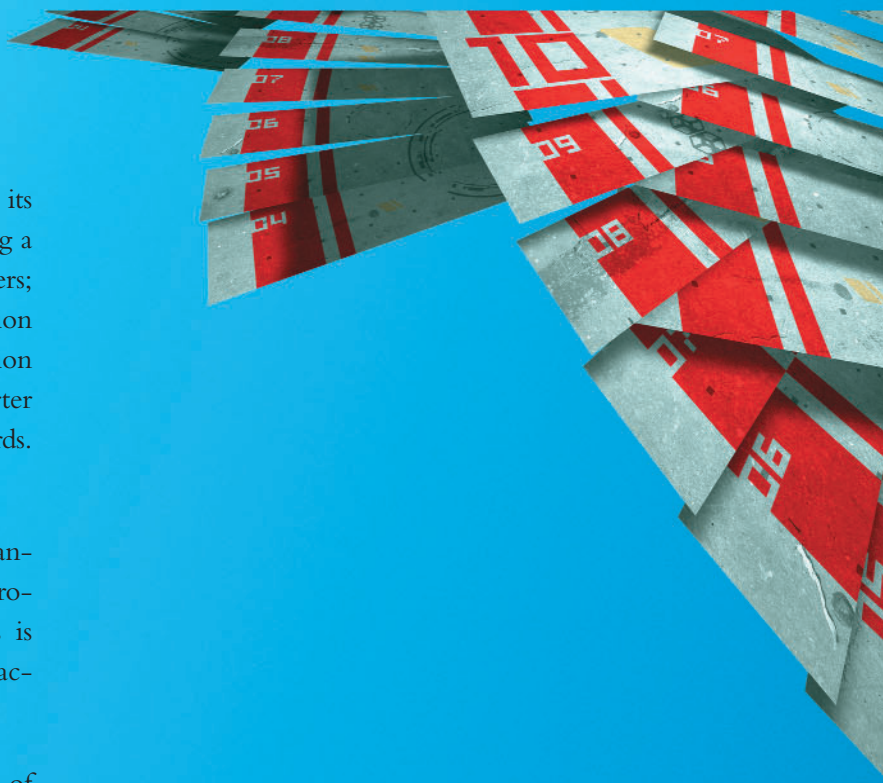
To promote the sharing of best practices and to provide a single voice for the needs of standards users, Raytheon and NASA, along with L-3 Communications Integrated Systems, formed an industry and government association called the Association of Aerospace Standards Users (AASU). Since the first meeting in January 2003, the group has grown to include representatives from 14 companies and government agencies. These representatives manage their organization's standards agreements. No proprietary information is shared within the group.

The AASU's objectives are twofold:

- Provide a forum for sharing best practices in the acquisition and distribution of standards
- Address issues regarding access and procurement costs of standards.

The development and sharing of best practices is one of the most beneficial outputs of the association. The following are examples of best practices available to members:

- Determination of standards requirements for multiple sites
- Model requests for proposals and statements of work
- Product lists
- Technical benchmarks
- Award criteria
- Metrics collection and analysis
- Copyright education and antitrust issues
- Examples of portal entry pages
- Dissemination, interpretation, and application of standards policies.



AASU set an aggressive goal of deliverables for its first year, including forming a charter; establishing a current state, including a survey of AASU members; and identifying baseline metrics. This information will be used to further develop communication plans with standards developers. The AASU charter may be viewed at the group's website: standards.nasa.gov/asug/menu.taf.

The AASU believes sharing best practices in standards delivery issues will benefit the entire aerospace community. Although the group's focus is primarily aerospace, it is willing to share best practices with other standards users.

For more information on the Association of Aerospace Standards Users, contact Ann Sides at 903-457-6636 or ann.sides@L-3com.com.

About the Author

Ann Sides chairs the AASU. At L-3 Communications—a leading supplier of intelligence, surveillance, and reconnaissance systems and products; secure communications systems; avionics and ocean products; training services; telemetry; and space and navigation products—she has a wide variety of responsibilities, including engineering support, employee supervision, and management of the L-3 corporate-wide standards agreement.

Supporting the Warfighter Through Performance-Based Contracting

By W. Gregor Macfarlan and Brian Mansir

DoD policy guidance requires performance-based logistics (PBL) for all new weapons systems and for Acquisition Category I and II fielded systems. A PBL objective is to acquire and deliver improved weapons systems logistics support for the warfighter. PBL increases military contractor responsibility for the operational availability of their products by tying their compensation to logistics support performance outcomes. It rewards high performance and provides negative consequences for poor performance. It focuses on buying results rather than simply products, services, or processes. It draws on performance measurements and effective performance-based contracting (PBC) relationships to create leaner logistics systems—systems with a reduced logistics footprint.

PBL purchases support as an integrated performance package designed to optimize system readiness. Advocates believe that where suppliers' long-term profitability is involved, suppliers will seek to optimize profit by meeting the U.S. government's performance objectives. PBL transfers the responsibility and risk for the performance of products from buyers to suppliers.

The ultimate success of PBL depends heavily on the quality of the requirements, metrics, and relationships defined in the underlying performance-based contracts. Logistics support excellence requires end-to-end optimization of the logistics delivery processes, clear accountability, and the bringing together of clear requirements, metrics, expected outcomes, and well-defined performance parameters. This requires military managers to develop and implement PBL strategies that optimize total system availability while minimizing the cost and logistics footprint. Such strategies include the best use of public- and private-sector capabilities through government-industry partnering initiatives.

DoD Directive 5000.1 requires acquisition program managers to "focus on logistics considerations early in the design process to ensure that they deliver reliable systems that can be supported cost-effectively and provide users with the necessary support infrastructure to meet peacetime and wartime readiness requirements." DoD Instruction 5000.2 complements this focus by directing planning for full life-cycle support as

part of the overall acquisition strategy for new programs and post-production support.

Throughout a system's life cycle, the support provider works under a performance-based incentive to sustain the system at an optimal level, with continuous, reliable, and affordable support to achieve the prescribed availability. PBL represents a sea change in acquisition planning and an equally dramatic change in the shaping of contractual requirements and contract administration relationships between a military organization and its industry providers.

Changing PBL Paradigms through PBC

Achieving excellence in warfighter logistics support begins with a clear understanding of warfighter needs. First, the warfighter needs weapons system availability and capability to perform wartime missions. Availability results from the combination and synergy of design and support system elements. Design-driven availability depends heavily on choosing the right parts and components and on optimizing how those parts and components function together. The right parts have a number of important characteristics, not the least of which is cost. Parts must be capable of technically performing the needed functions across the full range of operational environments and conditions. Parts must also be reliable to minimize failure rates and the need for logistics support (maintenance, supply, transportation, etc.). Choosing parts that will not quickly become obsolete is also essential.

Choosing standard parts, including parts used on other weapons systems and thereby already in the logistics support inventory, can greatly improve part availability and lower part cost, both vital for logistics support excellence. Although these choices are generally the domain of systems engineering, it is important that systems engineering guidance and training emphasize the importance of the right choices. In addition, it is important that the performance-based contract language address such issues and that performance incentives and technical review questions focus on the right choices.

Planning for the logistics support of weapons systems and related equipment is part of any responsible acquisition management process. Modifying the traditional planning process to consider performance-based logistics requirements requires changes in mindsets and organizational relationships, as well as the establishment of creative partnering among providers, their subcontractors, and warfighter users, all of whom blend their efforts to produce and support systems to deliver optimal capability. PBL introduces contractual performance parameters that enable and encourage innovative approaches and the application of new or emerging technologies to enhance a weapons system's capabilities. It establishes contractual conditions that permit logistics support providers to enhance a system's effectiveness or availability under expressed standards and assessment measures associated with monetary or nonmonetary incentives.

The benefits of using PBC to achieve PBL are threefold:

- The contract explicitly identifies what is required, but the contractor determines how to fulfill the requirement.
- Performance-based standards and measures, along with expressed requirements, create an interdependent relationship that determines acceptable performance.

- The use of innovative ideas and approaches is not encumbered by traditional constraining specifications, standards, and cost-producing processes.

A Performance-Based Logistics Structure

Advance planning for logistics support requires the participation of specialists in maintenance, supply, manpower, test equipment, training, technical data, reliability, maintainability, packaging, transportation, and other areas. PBL involves these and other functions in an integrated advance planning team under the direction of a designated military manager. Systems engineering, users, contracting, finance, field support, and contract administration also participate to shape the PBL plan. The outcome of the PBL team process must reflect the interest of all these functional specialties, each a value-added stakeholder in a contractual arrangement to ensure optimal warfighter support outcomes. When appropriate, this process includes industry providers.

Basic Elements of a PBC Arrangement to Achieve PBL

The objective is an integrated acquisition and logistics process focused on total cost of ownership and optimal support for individual or joint operational forces. Achieving this objective relies on contracting. PBL depends on contractually defined requirements, standards of acceptable performance, performance assessment methods and metrics, and, when applicable, appropriate incentives all tailored to the needs of the individual acquisition.

The basic elements of a PBC arrangement complement each other as follows:

- *Performance requirement*. A performance requirement is a statement of an expected outcome or result. It specifies what is to be done and does not specify how it is to be done.
- *Performance standard*. A performance standard represents the level of performance required for determining that a specified performance requirement has been satisfied.
- *Performance measure or metric*. A performance measure expresses the methods used by an organization to monitor or assess how well a contractor performs a specified performance requirement in conformance with its associated performance standard.

Not every performance requirement for PBL may have an expressed performance standard or performance measure. Every performance requirement, however, is a contractual requirement. On occasion, an applicable standard or measure is either inherent in a requirement or inferred to be in accordance with standard commercial practice. That is, it substantially complies with a customary trade practice.

Determining Performance Standards and Measures

Although each element of a PBC arrangement is important, with one complementing the other, determining performance standards and measures in order to assess performance is especially critical. Under a performance-based contract, the traditional government function of quality assurance usually becomes a responsibility of the contractor, and performance assessment becomes the government's responsibility. In some instances, the government may choose to prescribe for itself precise oversight responsibilities in a detailed

quality assurance surveillance plan.

Performance standards and assessment measures require careful attention. If they place an unwarranted hardship on a contractor, their enforcement may become problematic. In considering performance standards and their relationship to performance measures, one must consider the following questions:

- Is the standard *measurable*? If not, then evaluating performance may be difficult, questionable, or legally considered arbitrary, capricious, or biased.
- Is the standard *achievable*? If not, then monitoring or surveillance may be useless and will have no force and effect.
- Is the standard *relevant*? An irrelevant standard serves no purpose, wastes time, and can represent a costly misuse of resources to pursue.
- Is the standard *controllable*? If the expected result or outcome depends on something over which a contractor has no control, then its reliability as a benchmark for assessing performance is suspect.

PBC Theory versus Reality

Achieving a comprehensive PBL contract often results in a blended or hybrid work statement. Some requirements are performance-based, while others may be more traditional. For instance, many requirements for safety, security, and availability tie to standards or processes required by law, military necessity, or long-established practices. These may include specific how-to compliance requirements.

Prescribing how the contractor must perform some elements of the work may seem to violate the basic PBC tenet of prescribing "what" not "how" to accomplish work, but security, safety, and statutory requirements have priority. The fact that prescriptive requirements are used does not compromise what is otherwise a performance-based arrangement. Most PBCs are, of necessity, blended or hybrid performance-based arrangements.

The Influence of Performance Incentives

Any contract, performance-based or otherwise, should provide an incentive or motivation to perform well. When applying PBC to achieve PBL, incentives should be aligned with the key performance outcomes (safety, accountability, responsiveness, delivery, and deployment). Specified incentives should make sense and provide a benefit commensurate with their cost. (Complex incentive arrangements can prove to be an unwarranted and costly burden.)

Whether the incentives are monetary or nonmonetary, positive or negative, some basic questions apply. For instance: Will a focus on pivotal performance areas motivate a contractor to provide the desired results? Will incentives for above-average performance provide additional value to meet a set of logistics requirements? Is an incentive arrangement necessary and affordable?

The establishment of incentives should occur early in the acquisition process when basic logistics support concepts, performance requirements, standards, and measures are forming. They should be kept as simple as possible, be capable of periodic assessment, and act as motivators for strong performance. Performance incentives should be expressed clearly and explicitly within a PBC.

Lessons Learned

Over the past few years, some telling lessons have been learned about PBL and PBC. Among the more important are the following:

- *It is essential to establish a dedicated and committed integrated solutions or process team very early in the acquisition process.* Team membership may vary and should be tailored, but should include representation from all key stakeholder communities, including the user or warfighter; systems, design, and production engineering; logistics and field support; contracting; contract administration; and legal. Working within an expressed mission, this team defines the basic elements of a performance-based arrangement and, if applicable, determines the basic areas to which performance incentives may be most usefully applied.
- *Performance-based arrangements require a different approach to contract administration.* Although traditional contracts called for hands-on surveillance or monitoring based on detailed specifications and processes, the administration of a performance-based arrangement calls for continuing communication and the building of buyer-seller trust based on expressed performance standards. (Remember: performance-based arrangements rely on the contractor to implement an effective quality control system, while the role of the buying organization is performance assessment.)
- *Nothing is intuitive about PBL or PBC.* Understanding the basic philosophy and developing familiarity with the key elements is one thing; creating an effective performance-based environment is quite another. It takes time, patience, and considerable energy to shape and articulate a performance-based arrangement. This is particularly the case when an integrated solutions or process team does not have existing requirements descriptions to convert into performance-based language.

Summary

Achieving PBL through PBC requires that logistics planners pursue a non-traditional approach to realize enhanced operational availability. Building an effectively integrated solutions or process team from key stakeholders is essential, as is a new mindset for effective post-award contract administration.

Also critical are defining performance expectations in concise, verb-driven requirements (along with their associated performance standards and measures) and shaping any incentives to emphasize pivotal outcomes for warfighter support. The interdependency of these elements works to ensure a successful performance environment.

Arguably the greatest advantage of using PBL or PBC is the opportunity it gives industry to pursue innovative approaches for accomplishing contractually defined work. Toward this end, the reduction in traditionally prescriptive and costly specifications and detailed processes can result in more effective warfighter support.

About the Authors

Greg Macfarlan and Brian Mansir are research fellows at LMI. Mr. Macfarlan provides consulting and training in acquisition management and related areas, including acquisition planning, end-to-end procurement management, and performance-based contracting.
Mr. Mansir leads research and analysis projects and provides counsel to senior leaders of the nation's national security and other public-sector organizations.

The Item Reduction Program Provides the "Right Item" Efficiently

By Michael Jones

The IR team helps prevent situations involving obsolete items from delaying support to the warfighter.

An Army unit relies on its High Mobility Multipurpose Wheeled Vehicle (HMMWV) for a great many things: transportation, shelter, safety—the list goes on and on. But what happens when that HMMWV breaks down during an operational mission? The warfighters are left without the proper equipment needed to complete their mission. Readiness suffers; the warfighter cannot react to emergencies as quickly. That situation will continue until the HMMWV is repaired, and that cannot happen until the Army gets the required parts.

To get the HMMWV operational, the Army submits a requisition for the failed part to the Defense Supply Center Columbus (DSCC). Unfortunately, when a requisition for an obsolete part enters the automated system, it is kicked out to the DSCC item manager (IM). The DSCC IM attempts to manually process the requisition but finds that no one builds the part anymore because it is an older technology. The IM contacts the equipment specialist, and together, they start the time-consuming process of trying to identify another source of supply for the part—always keeping in mind that the warfighter mission is being negatively impacted by the delay. At DSCC, supporting that warfighter is "job #1."

The IM and equipment specialist begin to search the item reduction (IR) database and find that the IR team has already identified another part as interchangeable (form-fit-function) with the obsolete part. The IM then notifies the Army of the problem and asks if the interchangeable part would be acceptable. The Army evaluates the interchangeable part and determines that it will indeed get the HMMWV operational. The Army then submits a requisition for the interchangeable part via the normal logistics process. DSCC ships the interchangeable part, and the HMMWV is repaired and once again available to help the warfighter complete the mission.

Unfortunately, the initial evaluation of a potential replacement part is labor intensive and adds a number of days to the lead-time for the original requisition. Of course, during those days, the HMMWV was not operational, preventing the warfighters from responding in an emergency.

Once the Army has accepted the interchangeable part as a replacement, the IM notifies the IR team, through the use of Defense Logistics Agency (DLA) Form 1152, Technical Guidance for Stock Management. The IR team swings into action to prevent future situations involving obsolete items from delaying support to the warfighter.

The IR team begins by researching national stock numbers (NSNs) to identify parts that are similar to the obsolete part. Typically, when a manufacturer decides to discontinue a part, it usually impacts an entire production line or, at a minimum, several other part types within that technology. The IR team undertakes a comprehensive IR study to identify as many interchangeable parts as possible to ensure the availability of parts when new requisitions or stock buys become necessary to support the warfighter. Often, a single interchangeable part can replace several obsolete parts.

Information about proposed replacement parts is loaded into a web application called the Item Reduction Web Site Capability (IRWSC). The IRWSC becomes the coordination vehicle for all the applicable custodians and users of the parts. In addition, an e-mail is generated to alert the custodians and users that an IR proposal needs their immediate attention. Each identified custodian is responsible for coordinating the proposed replacements with all the appropriate users—engineering and program managers within their military service. These users research the proposed replacement parts for compatibility with their equipment applications. If the replacement parts are determined to be acceptable, then each service will concur via the IRWSC.

Then, the IR professional once again swings into action. The proposal, called a relationship, is then reflected in the Federal Logistics Information System (FLIS), and all associated logistics systems currently in use by DLA are updated with the interchangeable part. If applicable, an order-of-use criterion is established to deplete any residual DSCC stock in an orderly manner.

The Federal Logistics Information System and other related logistics systems reflect updates to interchangeable parts.

The advantage of this IR process can be demonstrated by an example. One week after the relationship is built in FLIS, the Navy needs a part to repair a piece of critical equipment on the Aegis Cruiser. The Navy submits a requisition. This time, although the part is obsolete, the logistics system can automatically fill the requisition with the interchangeable part, because, through the IR process, the Navy and the other affected services have already agreed to the interchangeable part. Consequently, the Aegis Cruiser is back in full operation quickly. This automatic substitution will occur for all future requisitions, including the next time an HMMWV needs a part. Warfighters can continue their mission, and the logistics process is more efficient.

The guided missile cruiser USS *Lake Champlain* on a scheduled deployment. Because the Navy has agreed to use interchangeable parts, cruisers such as this can be back in operation quickly even if a piece of critical equipment goes down.

The stories above highlight how the IR process works when requisitions are hitting the logistics system, but many IR studies really began months, if not years, earlier. The IR team at DSCC continually reviews entire groups of parts that are within a particular federal supply class (FSC) and item name code (INC). The IR professional sorts through the volumes of data within the INC and groups the various NSNs based on common characteristics. Once the items are sorted, certain NSNs are determined to be "duplicates" of other NSNs. These NSNs are submitted to the IR process and ultimately linked together and stored in the IR database for use by the IMs. These proposed relationships are fully coordinated with all users and then reflected in FLIS for automatic use by the logistics community. In addition, the IR professional maintains contact with manufacturers and contractors, and monitors various technical avenues to keep aware of the potential discontinuation of parts. As soon as such parts are identified, the IR professionals research and identify replacement/interchangeable parts. The IR process can then avoid another situation involving obsolete items.

Currently, the results of the IR program affect about 200,000 NSNs in the DLA system. These NSNs represent potential savings in time to respond to a warfighter's needs and reductions in costs to DSCC.

The IR program can reach out and touch all items of supply managed by DLA. In particular, the DSCC IR program works with electronic

and hardware items ranging from advanced microelectronics to pipes and fittings. Because it addresses such an expansive array of technologies, the IR program has a large impact on the warfighter. At the same time, it requires the IR professional to stay abreast of the changes in a number of advanced technologies.

The IR team within DSCC ensures that requisitions are satisfied as efficiently as possible and, more important, that they are satisfied with the "right item." The IR process has many checks and balances in place, and the IR professional is a trained technical associate who understands the nuances and peculiarities of the FSCs with which he or she works. Following this technical review, the services provide a second technical review based on the weapon system application and environment. Both of these reviews are imperative to ensure that the item supplied will work as needed by the warfighter. The IR team understands that DLA must supply the right item. This focus intensifies the efforts by the IR team to get swift and accurate technical feedback from the users of the parts. Without the users' input, no relationships are formed, and the IR process is placed on hold. Consequently, each requisition must be processed manually, and the warfighter suffers. This fact places an importance on the users' involvement in the process.

The bottom line? The IR program enables DSCC to provide the right item as efficiently as possible. The program includes a complex process that has been designed over the years to ensure that the warfighter gets the right item and nothing less. With the assistance of the users, the IR program fulfills its goal of providing the right item of supply to the warfighter.

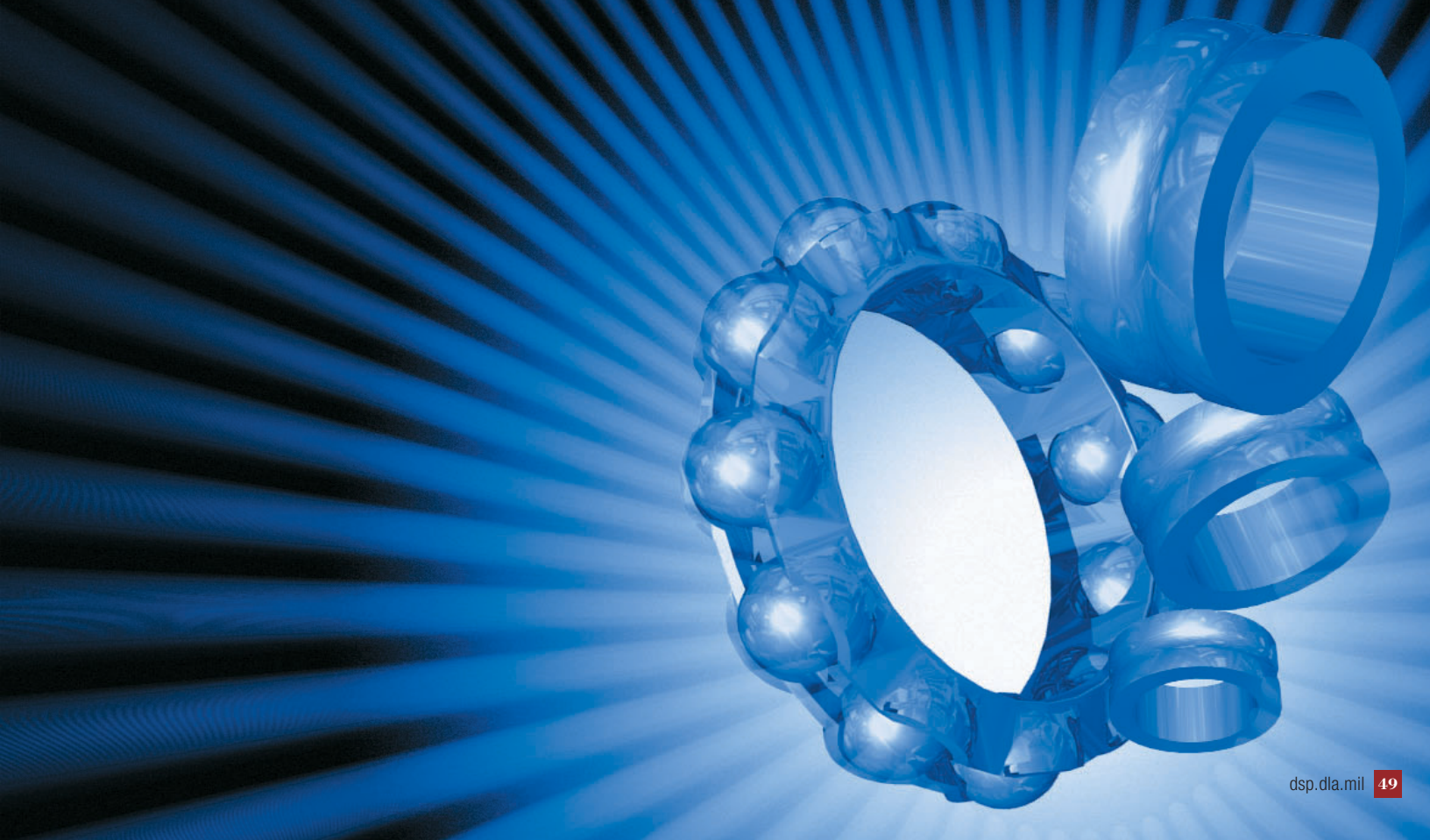
About the Author

Michael Jones is the manager of the Parts Management Support Team at the Defense Supply Center Columbus. His organization is responsible for DSCC's item reduction and parts management programs.

A Standardized Approach to Obsolescence Management

By Angie Perry

Technical obsolescence is a growing concern throughout DoD because it increases acquisition and life-cycle support costs and decreases system availability rates. Most incidents of obsolescence occur in the electronics area (primarily microcircuits), but every part, module, component, equipment, and system is vulnerable. This article highlights some of the effects of materiel obsolescence, outlines a promising approach to managing it better, and briefly describes an Army pilot program that implements several features of this approach.



An Increasing Problem

The effects of technical obsolescence range from low system performance and long supply chains, to high support costs. But even after obsolescence situations are identified, resolution efforts are often hampered by numerous factors, including short notification response time frames, lack of coordination among affected parties (both government and industry), and insufficient funding to replace obsolete parts and components.

Historically, DoD has responded to technical obsolescence piecemeal—every situation was unique and required a special effort to correct. Not only was this response costly, but it often failed to capitalize upon lessons learned from earlier programs and those that affected multiple equipment platforms.

As corrective action, DoD needs to adopt a more standardized approach to obsolescence management. Such an approach to identifying and resolving obsolescence problems has both proactive and reactive elements. The proactive elements must focus on addressing prospective obsolescence situations during the initial phases of weapons system development, such as identifying potential obsolescence items early in the system or equipment design phase and then effecting design tradeoffs or improvements to minimize life-cycle vulnerability. In contrast, the reactive elements must respond rapidly to obsolete parts or components that surface after system fielding, with an emphasis on developing cost-effective corrections. A coordinated and total program approach would include both proactive and reactive initiatives and stress cross-system or -platform readiness and cost objectives.

A Promising Approach to Managing Obsolescence

As technical obsolescence becomes more pronounced, DoD management will need to adopt a more coordinated and standardized approach to reducing its effects. The objective of such an approach would be to transition today's ad hoc concept of obsolescence management into a common process for lowering the costs of future systems.

Currently, most acquisition programs follow unique obsolescence management policies, which results in duplicated efforts, increased costs, and wasted resources. They also fail to share their experiences and successes with other programs, eliminating the benefits of lessons learned and leveraging opportunities for shared solutions. The transition from standalone obsolescence management to a more coordinated approach requires the development and implementation of a common strategy. Such a strategy would have five primary components:

- *Working group to manage the risks of technology obsolescence*. The group's responsibilities could include identifying and assessing program risk, establishing and monitoring criteria for ranking potentially obsolete parts, preparing and presenting prospective problems, and developing mitigating actions at the earliest opportunity.
- *Management plan to define the philosophies, procedures, and responsibilities for a standard obsolescence management program*. This plan could define how the working group would resolve issues that contribute to higher than neces-

sary obsolescence rates during the life cycle of the program.

- *Central database for obsolescence data.* This database could include information on configuring and developing an obsolescence baseline, tracking part and component availability, projecting obsolescence rates, and monitoring technical component details.
- *Tool for tracking obsolescence solutions across platforms.* This tool could provide visibility over successful obsolescence initiatives, including the parts or components, a description of the initiative, the implementation issues and subsequent actions, and the keys to success.
- *Best practices guide for obsolescence identification and resolution.* This guide could outline a standard process for managing the risks associated with technology obsolescence and describe management best practices for anticipating, responding to, and mitigating technical obsolescence.

Among the benefits of this approach are elimination of redundant efforts, lowering of costs, and better use of available resources.

An Army Pilot Program

The Army is implementing, through a pilot program, a standardized approach to obsolescence management. That approach—Single Process Initiative or SPI—is founded upon the practice of sharing obsolescence data across Army systems. A pilot program is being used to develop and validate the SPI concept. To date, SPI has yielded five major products:

- Baseline of microelectronics components used in multiple platforms
- Database for tracking obsolescence across weapons systems and the costs associated with correcting the obsolescence
- Policies and procedures for identifying and resolving obsolescence issues
- Working group that is charged with addressing obsolescence issues
- Standardized budgeting process for resolving obsolescence issues.

Clearly, SPI is creating a foundation for successfully countering the effects of obsolescence.

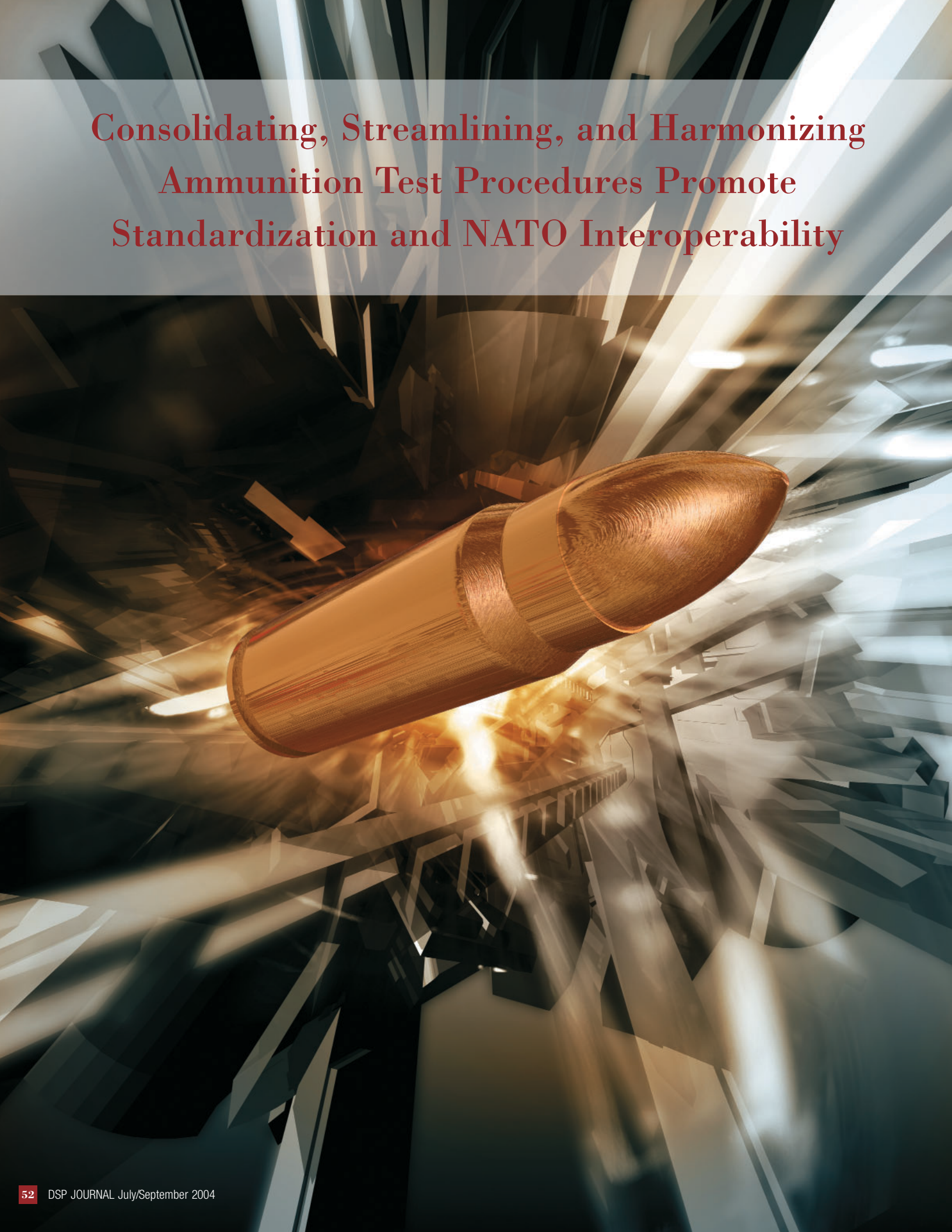
Summary

Through its adverse effect on cost, performance, and schedule, technical obsolescence poses a significant challenge to many program and platform managers. A promising Army pilot program is creating the foundation for a successful standardized obsolescence management plan that builds upon the best practices of multiple programs and equipment platforms.

About the Author

Angie Perry is a weapons systems analyst for Manufacturing Technology, Inc., representing the Aviation Missile Research Development and Engineering Center in Redstone Arsenal, AL. She specializes in obsolescence management and risk mitigation for all Missile Defense Agency elements and various Army aviation programs.

Consolidating, Streamlining, and Harmonizing Ammunition Test Procedures Promote Standardization and NATO Interoperability



Standardizing weapons systems safety testing was the focus of a U.S.-led NATO effort that began in 1997. Test procedures for the transport and storage of rockets, missiles, and ammunition were streamlined and harmonized, and then were produced as a series of updated NATO standardization agreements (STANAGs). The end goal of standardization—to promote interoperability and cut life-cycle program costs—was well illustrated by this work, which combined DoD efforts with those of a team of NATO experts. The DoD Explosives Safety Board (DDESB), the Army Development Test Command, and the Naval Air Warfare Center (China Lake) were the primary DoD activities involved in the effort.

Testing munitions involves subjecting ammunition, rockets, and other explosive weaponry to extremes of temperature (to mimic the effects of climatic elements) and severe impacts. For example, how do munitions react when struck by projectiles like bullets or when jarred by being dropped from 40 feet onto a metal plate (as in a drop on an aircraft carrier elevator)? Testers also measure "sympathetic reaction" to the detonation of nearby munitions and the effects of fire in the vicinity of the munitions. Almost 30 individual tests were required to fully test munitions.

The NATO effort resulted in the streamlining of six tests—sympathetic reaction, bullet impact, safety drop, slow heating, liquid fuel/external fire, and fragment impact. When technical experts examined each of these tests line by line with the goal of finding the essentials in each test procedure, they were able to combine many procedures and even eliminate some as nonessential. The work of two NATO groups was involved. One group focused on ensuring safe transport and storage of munitions; the other was concerned with the safety of insensitive munitions (munitions that reliability fulfill their performance, readiness, and operational requirements on demand, but that minimize the probability of inadvertent initiation). They established that combining some tests and creating a single standard to cover both transport and storage arenas—explosive safety (hazard classification) and weapons systems safety (insensitive munitions)—could eliminate a substantial amount of duplication in testing.

The combined testing is expected to save almost $150 million for the Patriot Advanced Capability-3 missile program. The anticipated savings for the Theater High Altitude Air Defense (THAAD) missile program will be almost twice that much.

The remainder of this article provides some background information and then describes the testing consolidation effort in more detail. It also notes some lessons learned that could be applied in similar situations.

Munitions Safety: A Growing Problem

Safe transport and storage of munitions has always been a matter of concern for modern societies. Powerful explosives, an essential element of modern warfare, are hazardous to handle and use. How much rough treatment can ammunition or bombs endure without becoming unsafe? This question has always concerned the military establishment, but the new technology and more powerful weapons that became available in the Cold War era made the consequences of an accidental explosion much more devastating.

Furthermore, isolating munitions from the public has become increasingly difficult. As civilian populations spread into the countryside, safety zones around isolated storage sites disappeared. Test facilities and sites for military war games are widely dispersed. Transport often has to take place over commercial routes in areas of high population density.

Although great strides in munitions safety were made after World War II, environmental and safety concerns became issues of ever-increasing importance in the United States during the decades after 1970. As a result, DoD focused attention on testing of insensitive munitions. As a result of that increased attention, DoD expanded the number of tests performed.

During those same decades, U.S. involvement with NATO was strong, and equipment standardization among NATO members was increasing. Not only were more combined military exercises taking place, but NATO was also involved in several international peacekeeping efforts. Incidents where NATO member nations couldn't communicate with or resupply one another caught the public's attention. The value of international standards in areas like fuel nozzle sizes or ammunition calibers had long been recognized, but standardization in other areas could improve NATO interoperability.

NATO cooperation was already in place in the munitions field. The NATO Group of Experts on the Safety Aspects of Transportation and Storage of Military Ammunition and Explosives (AC/258) had been active for a long time. In the late 1970s, the group reconfigured itself, having decided that the field had become too complex for a single group to handle. The main concern was that environmental safety testing, which had been considered as part of the whole, deserved individual attention. The end result was a committee with four subgroups. This necessary adjustment brought with it the inevitable concomitant problem: the subgroups became somewhat insular, and each technical specialty pursued the best form of testing it could find. Some duplication of testing was the inevitable long-term consequence. The laudable emphasis on safety and ecological impact added an important dimension to munitions testing, but at the same time, enlarging the scope of the effort added layers of complexity.

Developing a Solution

The NATO STANAG effort to standardize weapons systems safety testing had its inception in two incidents. The first was a conversation about high-temperature testing between Herb Egbert, Army Developmental Test Command (DTC), and Dr. Jerry Ward, DDESB. The conversation resulted from a paper, "Comparison of AC/258 and United Nations Hazard Classification Test Procedures with AC/310 Safety and Suitability for Service Test Procedures for Articles," published by the DDESB. The paper compared insensitive munitions testing and transportation testing. The two men discussed how sustained heat testing of insensitive munitions generates much of the same data that the bonfire test generates for hazard classification (for storage and transportation). Closer examination revealed substantial overlap. Those facts led to speculation on what changes could be made to bring the two data sets more closely in line. When it became clear that combining the two high-temperature tests was feasible, the next logical step was to look at other tests for similar combination possibilities.

The second incident occurred later. In a meeting with Pat Vittitow during an unrelated trip to the Missile Defense Center at Redstone Arsenal, AL, Mr. Egbert mentioned Dr. Ward's suggestion that storage and environmental tests be combined. Her response was "We're doing that already." She explained that while he and his colleagues were considering what could be done at the international level, the Army had already begun to combine those same types of tests at the development command level with excellent results. She showed him a chart on a whiteboard that laid out testing overlaps and combinations for THAAD programs.

These two incidents sparked further conversations about how testing overlaps should be removed. Handling the problem at the local level, as was being done at Redstone, is efficient, because it is generally easier to change processes and procedures case by case than it is to change a standard. But this approach left the larger issue unresolved. Fortunately, the issue of overlap in testing in the storage and transport fields had begun to surface at the NATO level by January 1999. A 1999 NATO paper by Dr. Ward proposed harmonization of NATO test methodology based on coordinated testing being conducted in the United States.

This U.S. interest in exploring the possibility of combining testing spurred efforts to take the matter to the NATO level through the AC/258. The U.S. committee members felt comfortable in doing so.

They knew their European colleagues well as a result of interaction at NATO meetings and at professional conferences.

It was determined that Subgroup 3 (Environmental Safety Testing) of AC/310 (Group on Safety and Suitability for Service of Munitions and Explosives) would host a meeting of experts to review the STANAGs that were candidates for harmonization. The meeting was cochaired by Brent Knoblett (DDESB Secretariat) and Mr. Egbert (DTC). They gathered a group of experts—one each from France and the Netherlands, two from the United Kingdom, and four from the United States—to compare the test procedures. The first meeting with the experts was held at DTC in May 2000, and a second meeting was held at the DDESB in August 2000. After that meeting, the experts took the group's findings concerning the STANAGs for which their country was the custodian and returned home to rewrite the STANAGs and prepare a ratification draft. There was one exception. Because Germany, the custodial nation for STANAG 4241, did not have an expert at the meeting, the United States prepared the initial documentation and forwarded it to Germany to develop a ratification draft. The rewritten STANAGs are as follows:

- STANAG 4240—Liquid Fuel/External Fire, Munition Test Procedures
- STANAG 4241—Bullet Impact, Munition Test Procedures
- STANAG 4375—Safety Drop, Munition Test Procedures
- STANAG 4382—Slow Heating, Munition Test Procedures
- STANAG 4396—Sympathetic Reaction, Munition Test Procedures
- STANAG 4496—Fragmentation Impact, Munition Test Procedures.

Thus the possibility of a major consolidation of tests, implemented at the development program level and contemplated at the DoD level, was pursued to the highest level of military standardization, a NATO STANAG, largely because personnel were in place to seize the initiative.

Garnering Support

The group received a significant boost when the U.S. Director of Munitions, Tony Melita, gave his approval to the preliminary efforts. He decided that if DoD found the final combined tests satisfactory, it would adopt the new test procedures created by the committee even if the NATO members did not promulgate the STANAGs. This encouragement fueled the group's incentive to persevere. The conceptual work, which was engaging and relatively interesting, had been completed. The painstaking, meticulous, and potentially boring and contentious work of implementation remained to be done. The U.S. use of the STANAGs was an important ingredient in the final success of the project.

In keeping with its hands-on philosophy, the whole group scrutinized the rewritten STANAGs in detail, both to ensure a high level of technical accuracy and to understand the implications of every change and compromise. The group members resisted the urge to step aside and let the experts battle out the details. Instead, the group met with the experts and went over the text line by line until they found a version that everyone could accept.

First, everyone had to agree on a methodology. The experts and the committee chairs examined all the test methods and decided on two basic test procedures in most cases. Whenever possible, the standardized method was the first choice. The second option was designed to be tailorable. The group's reasoning was that in every case, testers should attempt to use the standardized method. If the standardized test option would not provide the necessary data in a given scenario, then the second, tailorable option would be available.

When the rewritten drafts were completed, they were reviewed by the committee leadership. As with previous reviews, the review was a detailed line-by-line effort. In addition, the format for all the

STANAGs was standardized.

Almost total agreement was reached. All but one of the six STANAGs was agreed upon. The fragmentation test (STANAG 4496) was the only one for which the committee members and the experts could not find a workable compromise. Acceptable fragment size and hardness differed in the U.S. military standard and the corresponding draft STANAG. The issue has since been resolved; a ratification draft of STANAG 4496 was distributed in January 2004.

Reaping the Benefits

DoD had made a substantial contribution to the development of the munitions safety testing STANAGs. The long-term goal for DoD was to reap the benefits of that effort by using the knowledge and consensus gained to update MIL-STD-2105, Hazard Assessment Tests for Non-nuclear Munitions. To that end, Mr. Egbert prepared a first draft of MIL-STD-2105C (which superseded MIL-STD-2105B, issued in January 1994). When referring to test procedures, the new standard directs that the tests be performed in accordance with the appropriate STANAG. The Navy issued MIL-STD-2105C in July 2003.

Demanding that the U.S. investment create a positive return was an important step. Historically, the United States has resisted accepting NATO standards for two main reasons. First, some NATO standards have been far less rigorous than U.S. standards, so they were seen as a poor alternative to U.S. standards. Second, the timeline for preparing a NATO standard has been very long—typically 3 years to get to a draft standard. Postponing or delaying DoD programs to wait for the appropriate NATO standard has been seen as counterproductive.

The committee hoped that the munitions testing STANAGs could avoid both of these pitfalls. The compromises made in the testing procedures had not resulted in watered-down standards. Could the ratification process move speedily? The STANAGs were sent out for ratification on December 12, 2001, only 21 months after the experts began their work.

Then, the lag began. It wasn't until April, 4 months later, that the test community in France received the document. Other test communities received their documents sooner, but any slowdown impedes the ratification process. As a further complication, the number of nations required to ratify the STANAGs was raised from 8 to 10 while the ratification process was underway.

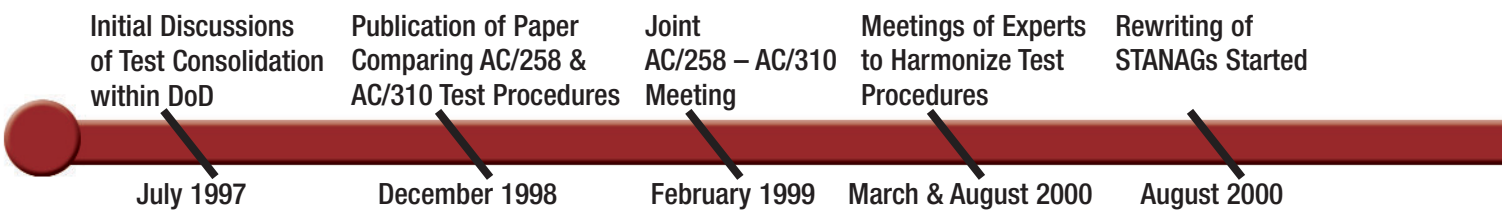
As with any complex endeavor, particularly one dealing with safety standards, the more organizations (or nations) involved in the process, the longer the process will take. However, as the timeline presented in Figure 1 illustrates, a small and focused group of people got the process off to a good start.

Lessons Learned

The consolidation of munitions test procedures involved many managers and experts from six nations working together over 6 years. They were successful because of their active involvement, extensive and deep knowledge, and a willingness to work together to reach consensus. They learned many important lessons in the process. The following points are based on those lessons:

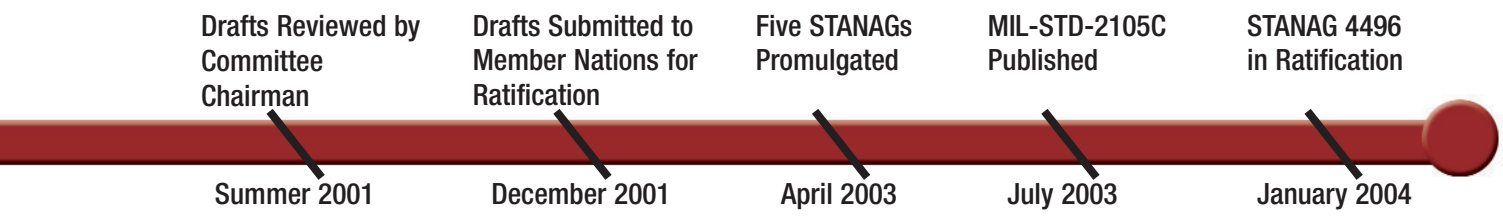
- *Find the right experts*. Don't assume that one person is the authority. Also don't assume that the solution to a problem is in your discipline or

FIGURE 1. Test Consolidation Timeline



your narrow technical specialty. In this endeavor, getting the right mix of focused technical experts and visionaries was crucial.

- *Find and use the right medium*. Broaden the level of coverage as far as you can. Sometimes we waste effort by working on a problem at the local level when it could be solved more effectively at a higher level. Take the time to consider if your local problem could have broader application. In this effort, DoD seized the initiative and raised the level of standardization to the highest military level possible. If the STANAGs are ratified, the benefit will be as broad as possible.
- *Expend the time and resources required to gain long-term benefits*. The pressure of day-to-day job requirements can drain away the energy needed to pursue "nice-to-have" projects. DoD's decision to adopt the U.S.-ratified STANAGs as U.S. standards, even if they were not yet promulgated by NATO, provided greater incentive to pursue the effort and guaranteed long-term gain.
- *Look for "savings" in the juncture between fields*. To say it another way, look at what people in other areas are doing and see if what's happening elsewhere can be applied. How did the initial insight occur? Members of one group looked with interest at what another group was doing, made the connection, and decided to follow up on it. Cross-fertilization is the key. Look outside the envelope for similar problems in different fields.
- *Commit yourself to active participation in your discipline*. Go and look: attend conferences, read proceedings, serve on committees. Find your counterparts and get involved in groups. Carve out the time to engage with others in your field and in related fields. Cultivate a healthy interest in what other groups are doing. The efficient progress of the test consolidation effort was possible because the people in charge knew each other and knew the field.



Parts Standardization & Management Committee Conference Report

The Parts Standardization & Management Committee (PSMC), a joint industry/government working group that promotes best parts management business practices, held its biannual Spring Conference April 19–22, in Orlando, FL. Through formal presentations, subcommittee activities, and membership networking, the conference provided attendees with a wealth of information related to parts management. The complete conference minutes, including presentations, are available on the PSMC website (www.dscc.dla.mil/psmc). Following are a few of the highlights:

- The Defense Standardization Program Office provided an update on the recently established DoD Parts Management Reengineering Working Group. The group's goal is to develop processes, and an implementation plan, to efficiently manage quality parts introduction, inventory, standardization, substitutability, and elimination to reduce DoD's logistics footprint to support the warfighter.
- The Parts Management Transformation Subcommittee provided an overview of performance-based logistics and benchmarking from two industry parts management processes:
  - ▲ "Parts Management Plan Guideline" (Lockheed Martin)
  - ▲ "Parts Management Transformation for the Supplier" (Honeywell Airframe Systems).

  The subcommittee's mission is to explore and develop a parts management process that will support weapon system readiness and reduce the overall logistics footprint through total life-cycle systems management.
- The Diminishing Manufacturing Sources and Material Shortages (DMSMS) Subcommittee addressed some of the problems and solutions associated with part obsolescence and provided information on available resources for use in the obsolescence area:
  - ▲ "DMSMS Solutions, Problems and Issues from the Contractor's Perspective" (Radian MILPARTS)
  - ▲ "Program Manager's Handbook: Common Practices to Mitigate the Risk of Obsolescence" (Defense Microelectronics Activity)
  - ▲ "DMSMS Tools" (Government-Industry Data Exchange Program)

  The DMSMS Subcommittee chair will present at an upcoming DoD DMSMS Working Group in Philadelphia.
- The Plastic Encapsulated Microcircuits/Commercial Off-the-Shelf (PEMS/COTS) and the Parts Management Education/Documentation subcommittees conducted sessions on the status of previous action items and to work on current projects.

Additional conference highlights included a presentation, "Expanding the Usefulness of Your Parts Management Solutions through Reference Content," by Information Handling Services, and a group tour and presentation at Chip Supply, Inc., which supplies semiconductor products and services.

Conference participants included representatives from Anteon Corporation, Air Force Aeronautical Systems Center (Wright-Patterson Air Force Base), Air Force Logistics Information Support Office, Army Aviation and Missile Command (Redstone Arsenal), The Boeing Company, Defense Logistics Agency, Defense Logistics Information Service, Defense Microelectronics Activity, Defense Standardization Program Office, Government-Industry Data Exchange Program, Honeywell, Information Handling Services, Intuitive Research and Technology, Inventory Locator Service, Lansdale Semiconductor, Lockheed Martin, Manufacturing Technology, Inc., Naval Air Systems Command, Naval Inventory Control Point (Philadelphia), Naval Surface Warfare Center (Crane), Parker Hannifin, Radian MILPARTS, Raytheon, and SRA International.

The next PSMC conference is scheduled for October 19-21 at the Bay Club Hotel and Marina, San Diego, CA. Details will be forthcoming on the PSMC website. Participation in the PSMC is open to all individuals or organizations that want to stay on the leading edge of parts management technology and processes. For more information, please visit www.dscc.dla.mil/psmc.

Upcoming Events and Information

Events

October 13, 2004, Washington, DC
U.S. Celebration of World Standards Day 2004

World Standards Day will be held at the U.S. Chamber of Commerce, in Washington, DC. The event will include a reception, exhibits, dinner, and presentation of the Ronald H. Brown Standards Leadership Award. The Aerospace Industries Association is the administrating organization for this year's event.

October 13, 2004, Washington, DC
ANSI Annual Conference

The American National Standards Institute will hold its annual conference from 9 a.m. to 5 p.m. at the Marriott–Metro Center in Washington, DC. For more information, please contact Pamela Suett at 212-642-4976 or e-mail her at psuett@ansi.org.

October 25–28, 2004, Houston, TX
DoD Maintenance Symposium and Exhibition

SAE International will be hosting a symposium to explore the latest developments in DoD weapons systems and equipment maintenance, including military and commercial maintenance technologies, information systems, and management processes. The symposium will be held at the Hilton Americas and George R. Brown Convention Center, Houston, TX. For more information, please call 877-606-7323.

November 15–18, 2004, San Diego, CA
36th International SAMPE Technical Conference

The Society for the Advancement of Material and Process Engineering will hold its 36th conference at the Sheraton, San Diego Hotel and Marina, San Diego, CA. For more information, please visit www.sampe.org, call 626-331-0616 ext. 610, or e-mail registration@sampe.org.

Upcoming Defense Acquisition University Standardization Courses

PQM 103—Defense Specification Management (05-001), October 26–November 5, 2004, Fort Belvoir, VA

PQM 212—Market Research for Engineering and Technical Personnel (05-701), November 2–3, 2004, Columbus, OH

People in the Standardization Community

People

Welcomes

Ronald Davis Jr., newly installed Deputy G-3 for Industrial Operations at Headquarters, Army Materiel Command (AMC), was designated as the Army Standardization Executive in a July 12, 2004, memorandum signed by the Commanding General, AMC. A member of the Senior Executive Service, Ron comes to the Army from a career in management and engineering of Navy shipbuilding and ship repair programs. Before his current assignments in AMC, he served as acting director, supervisor of Shipbuilding Management Group, Naval Sea Systems Command Headquarters.

The Subsistence Directorate at the Defense Supply Center Philadelphia (DSCP) would like to welcome **Leah Eason** to the Specification Preparing Activity community of the Defense Logistics Agency (DLA). Leah joined DSCP 2 years ago as an intern and has been a great addition to the Standardization Management Services Branch.

Dick Hayes, of the Technology Management Division, has replaced Curtis Cohen as the point of contact for the Defense Standardization Program (DSP) at Headquarters, U.S. Army Developmental Test Command.

The Operations and Support Group at the Defense Supply Center Columbus (DSCC) welcomes two new engineers into the DLA standardization community. **Erika Baker** and **Mary McWilliams** have been selected to fill engineering positions in the Sourcing and Qualifications Unit and the Document Standardization Unit, respectively. Both have engineering experience in the private sector and have received product/quality assurance training through the intern program.

Due to the reorganization of the Materials Division of the Weapons and Materials Research Directorate, the Specification and Standards Office (S&SO) has gained three new people: **Richard Squillacioti**, **Bernard Hart**, and **Dana Granville.** Rich, who has numerous years of experience with specifications, is the leader of S&SO.

Promotions

Gemma Meloni was promoted in December 2003 to lead ship specification manager in the Command Standards Executive Office, SEA 05Q. Her duties include ship specification management responsibility for the SSGN- and NSSN-class submarines and for the Ship Specification Revitalization Program, a program to revise and revitalize core technical documentation critical to the mission of the Naval Sea Systems Command.

Brenda Pearson was recently promoted to a technical writer position within the Standardization Management Services Branch. Brenda began her federal career nearly 20 years ago and, before her promotion, worked as an automation clerk.

Awards/Kudos

Anthony LaPlaca, Communications Electronics Command, Fort Monmouth, NJ, has received the Army Presidential Rank Award. Award winners are chosen through a rigorous selection process. They are nominated by their agency heads, evaluated by boards of private citizens, and approved by the President. The evaluation criteria focus on leadership and results.

Gregory Saunders, director of the Defense Standardization Program Office, has been selected to receive the 2004 Aerospace Chair Award on behalf of the Society of Automotive Engineers. He will be presented the award on November 3, 2004, during the World Aviation Congress in Reno, NV. The award, established in 1997, recognizes outstanding leadership demonstrated by chairs of committees under the Aerospace Council and Air and Space Group.

Farewells

Harrell (Dick) Barnett, Deputy G-3 for Industrial Operations at Headquarters, AMC, and the Army Standardization Executive, announced his retirement effective July 2, 2004. As Deputy G-3, Dick directed the AMC Industrial Base Management and Engineering Management programs, including production and quality management, defense and international standardization, and technical data management. During his tenure as the Army's Standardization Executive, Dick served on the Defense Standardization Council and managed the Army's participation in a number of important standardization initiatives, including implementation of the DSP strategic plan and development of the joint materiel standards road map.

DSCP's General and Industrial Directorate bids a fond farewell to **Frank Ciccarone**, who retired on September 30, 2003. Frank worked in the federal government for 38 years, initially as a professional engineer and later as a supervisor/manager at the Naval Air Engineering Center, at the Defense Industrial Supply Center, and finally, at DSCP.

Etta Dorsey retires on September 30, 2004, after a 38-year tenure at DLA. Etta started with DLA in 1966 in the Directorate of Installations and Services Technical Programs Office. In 1978, she moved to the Technical and Logistics Services Directorate, and in 1993, she joined the Technical and Quality Policy Division.

Edward Dotson retired in 2003 with 36 years of service. He supported the DSP in the Item Reduction Program and the Lead Standardization Activity (LSA). As an equipment specialist in the LSA, Ed concentrated his efforts on promoting the policies and procedures of the DSP for performance-based documents and the adoption of non-government standards (NGSs). Ed received the 1995 Defense Standardization Award.

Arthur Hudson retired in 2003 with 34 years of dedicated federal service. He supported the DSP through his leadership as a Preparing Activity and LSA for electronic components. Art was involved with the Telecommunications Industry Association for many years in the area of fiber-optics standardization. He did an outstanding job in the review of standardization project requests for electrical connectors.

John Perrapato retired from federal service on June 4, 2004. John was Deputy of the Program Executive Office for Command, Control, and Communications Tactical (PEO C3T). He also served as the PEO C3T Standards Executive.

Jean Van Sullen, qualification specialist for the Fuels and Lubricants Technology Team, Research, Development and Engineering Command, retires on September 30, 2004. She has more than 20 years of experience in standardization documentation for fuels and lubricants for the U.S. Army.

The Parts Management Support Office at DSCC bids farewell to **Robert Foltz** and **Carroll Hoffman**. Rob and Carroll worked in various functions with the parts management program for 6 years. Their knowledge, work ethics, and inquisitive minds will be greatly missed. We wish them well in their new positions in Maritime Operations at DSCC.

Passings

Sam Miller, who retired from the Defense Standardization Program Office, passed away June 4, 2004, after a long illness. A former acting director of the Defense Materiel Specifications and Standards Office (which later became the Defense Standardization Program Office), Sam focused on international standardization issues and had a long career working with NATO and other treaty organizations.

Upcoming Issues—
Call for Contributors

We are always seeking articles that relate to our themes or other standardization topics. We invite anyone involved in standardization—government employees, military personnel, industry leaders, members of academia, and others—to submit proposed articles for use in the *DSP Journal*. Please let us know if you would like to contribute.

Following are our themes for upcoming issues:

Issue	Theme	Deadline for Articles
January–March 2005	Defense Laboratories	August 15, 2004
April–June 2005	Qualification & Conformity Assessment	November 15, 2004
July–September 2005	Air Force Standardization	February 15, 2005
October–December 2005	The Program Manager	May 15, 2005

If you have ideas for articles or want more information, contact Tim Koczanski, Editor, *DSP Journal*, J-307, Defense Standardization Program Office, 8725 John J. Kingman Road, Stop 6233, Fort Belvoir, VA 22060-6221 or e-mail DSP-Editor@dla.mil.

Our office reserves the right to modify or reject any submission as deemed appropriate. We will be glad to send out our editorial guidelines and work with any author to get his or her material shaped into an article.


NO STEP