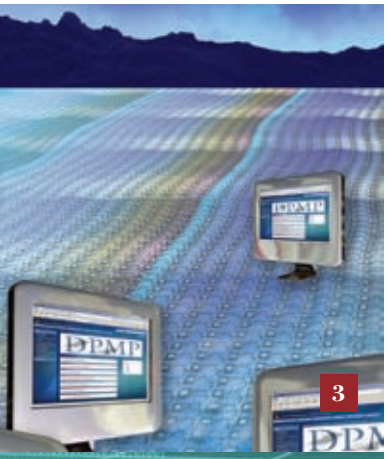
Defense Standardization Program
Journal
April/June 2008

Diminishing Manufacturing Sources and Material Shortages

Defense Parts Management Portal
The DoD DMSMS Guidebook
DMS Shared Data Warehouse 101

Defense Standardization Program
Journal

Contents *April/June 2008*



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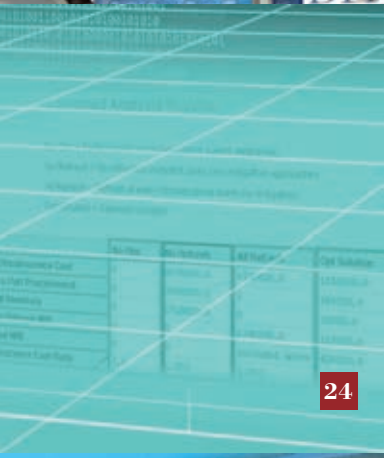
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Director's Forum

Managing the Costs and Risks of Diminishing Manufacturing Sources and Material Shortages—A Team Sport

When was the last time you tried to buy a new amplifier tube for that old black-and-white TV that's gathering dust in the corner of the basement? How about a new relay for your rotary dial phone? Hey, does anyone have a replacement needle for my old record player cartridge? (You do remember record players don't you?) OK, these are silly examples, but how about, "Does anybody have an M38510/75201SCX? We need 15 of them for a launch vehicle."

Not getting a needle for my record player may be annoying, but if we can't find the right microcircuit for the launch vehicle, it may well mean that a multibillion-dollar weapon system has to be grounded as not combat ready. Or, it may mean that we have to redesign whole segments of a guidance system or communication system at a cost of many millions of dollars, with long lead-times and high risk.

These are just a few of the costs and risks introduced into systems when obsolete or unprocurable parts are identified. The whole field of Diminishing Manufacturing Sources and Material Shortages (DMSMS) raises unacceptable risks and costs to sustainment of our weapon systems.

Just a few years ago, an Under Secretary of Defense described DMSMS as an unavoidable train wreck that was barreling toward us at breakneck speed. The unavailability of parts has cost millions of dollars and will cost us millions more. But, as leaders in the Office of the Secretary of Defense, the military departments, and our industry partners have recognized and reacted to the impending risks, we have averted the train wreck—at least for now.

We are increasingly finding supply solutions rather than redesigning circuit boards or subsystems, avoiding millions of dollars in costs.

We're also getting much better at making good decisions about when redesign may indeed be the most cost-effective solution. In short, we're getting much better at early diagnosis, good analysis, effective information sharing, and good decision making. We're

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getting better, but there is much left to do. Now that DMSMS is under DSPO's purview, you'll be reading, over the coming months, about how we're dealing with it.

DMSMS—defined as "the loss or impending loss of manufacturers of items or suppliers of items or materials"—is an issue of great significance at DoD. The same rapid development of new technology that allows us to have ever-thinner laptops, MP3 players with more capability and greater capacity, phones that will do all sorts of tricks, cars that nearly drive themselves, as well as countless other technological capabilities, also contributes to the rapid obsolescence of technology that was cutting edge just a few months earlier. That often means the cessation of manufacture of last year's whiz-bang microcircuit.

On June 23, 2005, the Under Secretary of Defense for Acquisition, Technology and Logistics (Mr. Kenneth Krieg) addressed the challenges of obsolescence in DoD weapon systems. Where proactive DMSMS management efforts are employed, the impact of obsolescence on readiness is mitigated, and the spending to maintain readiness is reduced; where the DMSMS management efforts are merely reactive, DMSMS has a negative impact on readiness, and the associated spending is harmful.

In addition, in July 2006, the Joint Requirements Oversight Council established a mandatory warfighter materiel readiness/sustainment key performance parameter (materiel availability) and identified materiel reliability and ownership cost as related key system attributes (KSAs) for new acquisitions. Further, 14 life-cycle sustainment (LCS) "enablers" that are key considerations throughout a program's life cycle were identified. These enablers are important technical and management processes that have a positive impact on materiel readiness LCS outcomes. The status of the KSA goals and their attendant enablers are being reported at program reviews (Defense Acquisition Board, Defense Acquisition Executive Summary, etc.) for all Acquisition Category 1 programs and for all major legacy programs in the Defense Readiness Reporting System. The assessment of DMSMS is one of the 14 enablers.

Managing the costs and technical risks of DMSMS is a team sport. It involves sharing knowledge about parts that are becoming hard to replace and about sources for those hard-to-find parts. It involves sharing solutions so that we don't have to solve the same part unavailability issues over and over. It is about finding and implementing the most cost-effective solutions after applying all that we know about the problem, the possible solutions, the costs, the risks, and the life cycles of both the parts and the systems they go on. Although my office has the policy lead for DMSMS, policies alone won't solve DMSMS issues—teamwork will. We'll team the DSP knowledge bases with the sharing capabilities and data-mining capabilities of the Government-Industry Data Exchange Program; with the expertise that military department and agency experts have gained through tough and often expensive experience; with the dedication, knowledge, and capabilities that exist in our program offices; and, finally, with the extensive experience and knowledge available with our industry partners.

Whether through collaboration with both national and international industry groups, data sharing with tools such as the Shared Data Warehouse or the DMSMS Knowledge Sharing Portal, or using the newly issued MIL-STD-3018, "Parts Management," we can—and must—get better.

Together, we can effectively mitigate both the costs and the risks, but only if we find new and innovative ways to work together.

Defense Parts Management Portal

Coming Soon to a Website Near You

By Brian Mansir

Parts management is a vital component of the acquisition and sustainment processes—from design and development through support, modification, and phaseout of weapons systems and equipment. A comprehensive parts management program addresses the totality of parts-related organizations, processes, materiel, and management required for a weapon system throughout its life cycle.

In the past, many people used the phrase "parts management" to describe "parts control" as defined by MIL-STD-965, "Parts Control Program." Today, parts management encompasses far more. Acquisition reform, and the cancellation of MIL-STD-965, had profound effects on parts management, both positive and negative. On the positive side, equipment manufacturers were freed from the rigid and prescriptive requirements of the standard and given far greater flexibility for creativity and innovation. On the negative side, the discipline of parts management largely disappeared, resulting in increasing parts proliferation, life-cycle support costs, and obsolescence issues. The Defense Parts Management Portal (DPMP) is intended to enhance the positive aspects of parts management in the new acquisition environment while also minimizing or eliminating many of the negative aspects.

In 2004, DSPO chartered a joint government and industry team to examine defense-related parts management and to reengineer the discipline where necessary to make it more effective. In October 2005, the group issued its report, *Better Serving the Warfighter: Improving Parts Management to Achieve Interoperability, Reduce Logistics Footprint, and Lower Life-Cycle Cost*. The report contained a number of recommendations for improving defense-related parts management in both government and industry. The following were among the recommendations:

- Make parts management a policy and a contractual requirement
- Revitalize parts management within systems engineering
- Develop improved parts management tools and metrics
- Create a Defense Parts Management Portal.

A second government and industry team developed strategies, processes, and products to address each of these recommendations. That team recently passed the baton to the Parts Standardization Management Committee, also a government and industry body, to carry the implementation efforts across the finish line. The earlier teams achieved exemplary results, including the recent release of MIL-STD-3018, "Parts Management."

This article focuses on the creation of the DPMP. (When this article was written,

the DPMP was still in development, but was rapidly approaching its release to the general public.) The DPMP employs a different design approach from most government portals. Most resources accessed through the DPMP are user-created content from both government and industry participants. This approach has worked with considerable success in the private sector, as evidenced by Wikipedia, YouTube, and Facebook.

DSPO is the governing authority for the DPMP. Although portal destinations will consist largely of user-created content, clear business rules will govern what content is allowed and what is not. The DPMP resides on a server operated and maintained by the Government-Industry Data Exchange Program (GIDEP). Participating organizations wishing to use the portal to offer information and resources to the parts management community must first obtain a GIDEP account. The authorized organizations will then be granted administrative rights and control over a dedicated interface or "bridge page" that will thereafter be managed and maintained by the organization. The DPMP will provide open access to the general public. However, government or industry content providers may elect to limit access to certain content by requiring a user name and password from authorized users.

What Is the DPMP?

The portal is intended to be a single point of entry for accessing just about any information that is related to parts management and is web accessible. The portal enables easy navigation to organizations with parts management-related roles or responsibilities, as well as to parts and components sources, tools, services, information resources, documents, policies, and templates. The following are the key objectives of creating the DPMP:

- Improve parts management throughout DoD
- Enable more efficient and effective parts management
- Provide improved access to parts management data and tools
- Improve the quality of parts data
- Promote and support increased standardization
- Improve communication and collaboration
- Promote data sharing and parts-related research
- Improve integration of parts data resources between government and industry
- Lower costs.

The DPMP is designed to keep the technical content residing on the DPMP server as small as possible. Technically complex resources or tools that require extensive development or support will reside on servers owned and maintained by

organizations other than GIDEP. The GIDEP portion of the portal will consist largely of navigation resources and connectivity to external resources through a user-managed interface or bridge page.

The DPMP will provide users with a functional framework, logical navigation pathways, tools, and interface capabilities that will connect users with content providers. Users will find and access the parts-related resources they seek via the portal's logical navigation structure. Content providers will make available information, tools, or other parts-related resources to portal users and potential customers. In this manner, the DPMP becomes an exchange forum or marketplace for the parts management community. The size and range of portal destinations and content will be largely determined by the content that providers are willing to offer potential customers. The impact of the portal on the parts management community will largely be determined by the degree to which users find the resources offered by content providers to be accessible, accurate, and useful in addressing their parts-related needs.

DPMP Structure and Design

The DPMP opens with a simple home page (see Figure 1) that includes the following function buttons arrayed across the top of the screen:

- *What's New*—information about recent changes to the portal
- *About DPMP*—information about the portal sufficient to address most inquiries
- *Search the DPMP*—an internal search utility
- *Feedback*—a utility that will enable users to inform the DPMP team about what they do and do not like and about what is working and what is not
- *DPMP Calendar*—a utility for posting or announcing DPMP-related events or milestones
- *Agreement*.

The portal also provides navigation tracking—an onscreen trail of bread crumbs that will enable users to always know where they are and where they have been.

DPMP Core Functionality

The DPMP main menu contains several navigation options. These constitute the starting points for the key navigation paths found in the portal. These navigation starting points are as follows:

- *Community Connections*—serves as "Yellow Pages" of organizations within the defense parts management community. Destination organizations must hold a GIDEP account to control and administer a bridge page.
- *Part and Component Sources*—serves as a marketplace through which users can

FIGURE 1. DPMP Home Page

quickly identify and access trusted sources of parts and components.

- *Tools and Services*—serves as a marketplace for customers seeking tools or services to connect with organizations offering tools or services.
- *Share Knowledge and Collaborate*—serves as a marketplace for organizations that offer knowledge sharing and collaboration tools and services to the community and for customers seeking such resources.
- *Life Cycle Parts Management*—enables navigation to information and resources related to professional disciplines (for example, systems engineering and configuration management) with roles and responsibilities in parts management. It also contains information about the activities and tasks performed by the various disciplines throughout all phases of a weapon system life cycle.
- *Education and Training*—enables access to a wide array of parts-related courses, seminars, and conferences.
- *Part Information Repositories*—enables access to repositories, including libraries and databases.

Three of the more complex navigation paths are addressed below to illustrate how the DPMP menu structure will permit users to navigate logically to a desired destination.

COMMUNITY CONNECTIONS

One objective of Community Connections is to bring all government and industry organizations that constitute the defense parts management community together through a common portal. Each participating organization is a navigation destination at the end of a navigation pathway. The menu structure organizes community members by organizational type and then by subcategory. For example, the second-tier menu choices under Community Connections are as follows:

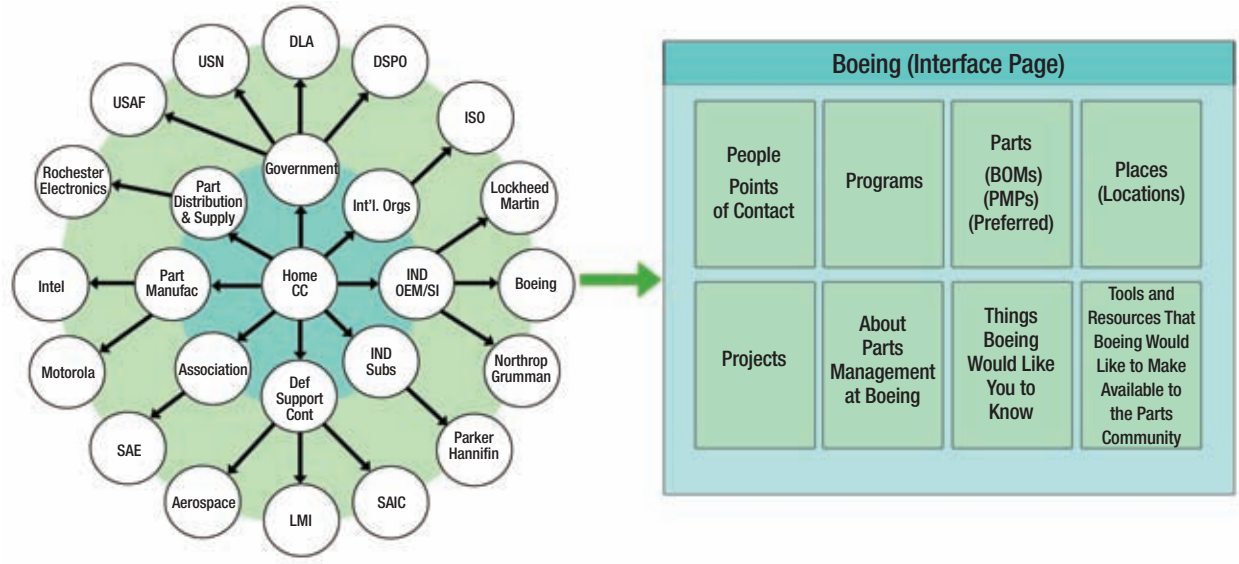
- Government
- Industry: original equipment manufacturers and systems integrators
- Industry: subcontractors and subtier suppliers
- Part and component manufacturers
- Part suppliers and distributors
- Defense support contractors
- Associations
- International organizations.

This navigation structure will help users quickly drill down to a desired destination in three or four menu choices (or mouse clicks).

Each destination organization "owns" a bridge page within the portal. Figure 2 illustrates the relationship.

A bridge page contains information about the organization and connects users to its points of contact, catalogs, tools, or other resources. A bridge page is a web-based re-

FIGURE 2. Navigation to Bridge Pages



source that participating organizations will use to link members of the parts management community to the organization's products, services, capabilities, and resources.

The DPMP provides connectivity between buyers and suppliers. Each organization will determine what information and resources it will make available on its bridge page. It will also determine specifically how the offering will be presented to users. Each bridge page opens in a separate window. This design helps ensure that navigation paths and connections can be maintained and that users can easily return to the DPMP after exploring an organization's offerings.

LIFE CYCLE PARTS MANAGEMENT

This navigation path allows users to explore the roles, responsibilities, and resources of various parts management-related disciplines, including the following:

- Systems engineering
- Configuration management
- Reliability engineering
- Quality management
- Standardization
- Cataloging.

For each listed discipline, the DPMP will identify useful discipline-related information or resources across categories such as

- key organizations;
- policies, procedures, and standards;
- training;
- tools;
- best practices; and
- activities and tasks.

TOOLS AND SERVICES

This navigation path allows users to navigate to a variety of part-related tools and service providers. A number of tools exist within the community in both government and industry. Unfortunately, many of these tools are unknown to, or underutilized by, the parts community. This menu item will direct customers to such tools as the following:

- Weapon System Impact Tool
- Generic Compound Analysis Tool
- PinPoint and other part selection tools

- Acquisition Streamlining and Standardization Information System
- Diminishing Manufacturing Sources and Material Shortages website and obsolescence tools
- GIDEP
- E-Mall
- Federal Logistics Information System.

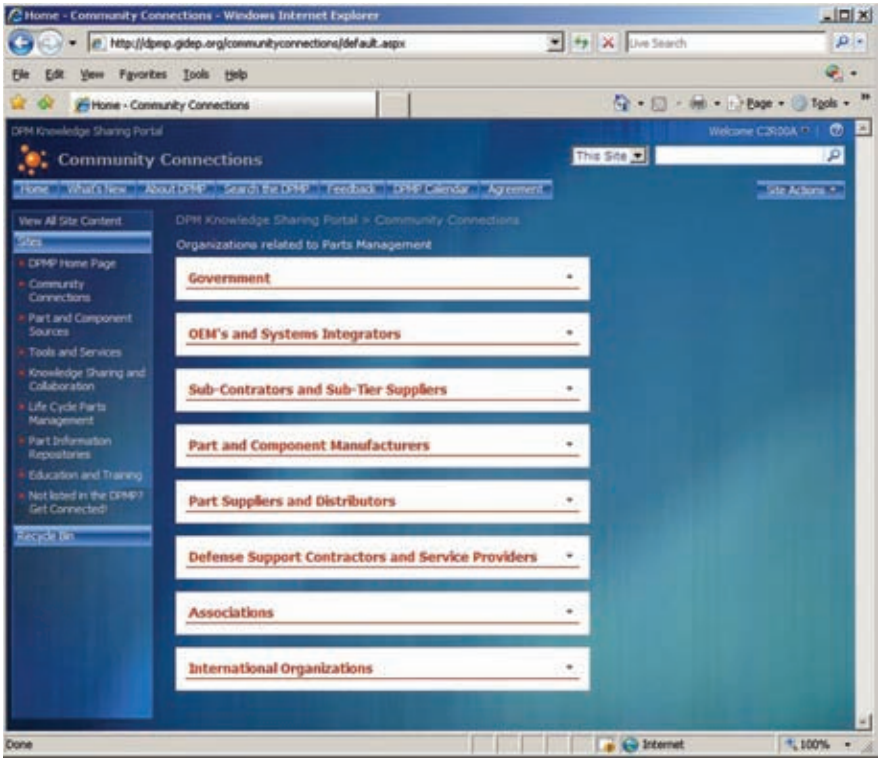
The DPMP will identify as many useful tools as possible with utility for parts management. Many tools will be free to users, while others may require a fee or license. To the degree possible, the portal design will accommodate the revenue models of those organizations willing to make their tools accessible through the portal. (See Figure 3.)

Tools listed in the DPMP will be organized into categories based on what the tools are designed to do:

- Part selection
- Analysis
- Performance measurement
- General searches.

Selecting optimum parts for a system is a crucial element of the design phase of an acquisition program. Collectively, parts are primary determinants of system reliability,

FIGURE 3. DPMP Community Connections



maintainability, supportability, and availability, as well as of logistics readiness, interoperability, logistics footprint, and total ownership costs. Proper parts selection requires consideration of myriad factors, including technical characteristics, part reliability, cost, commonality, performance, part and supplier quality, qualification, potential obsolescence, and standardization. The DPMP will feature new and enhanced part selection tools that will assist design and component engineers with addressing these factors and making wise parts selection decisions faster and at lower cost. These part selection tools will be addressed in future articles in this journal.

Summary

The DPMP is now, and always will be, a work in progress. By design, the portal will grow and be shaped by its user community. When launched, the DPMP will contain a limited number of destination organizations, tools, and other resources. It will grow through increasing the number of content providers, expanding resources available, and, of course, addressing user feedback. Organizations not currently listed may ask to be listed to become more involved in the community or possibly to keep up with the competition. Major organizations may ask their supply chain organizations to become involved. Tool and service providers may want to participate to increase their business visibility, acceptance, and utilization. Navigation pathways and logic will evolve as users suggest improvements. DPMP is a user-driven system because the content providers are invested in providing accessible, accurate, and useful information and resources to their customers.

The DPMP facilitates a new approach to business and collaboration between government and industry. If the successes of commercial websites built on the principles of a user-driven system are any indicator, the future of the DPMP should be very bright. If you are part of the parts management community and your organization is not represented or participating in the DPMP, it should be. This article is an open invitation for you to join and participate in this adventure. To learn more, visit the DPMP at http://dpmp.gidep.org or contact the DSPO point of contact at dpmp@dla.mil.

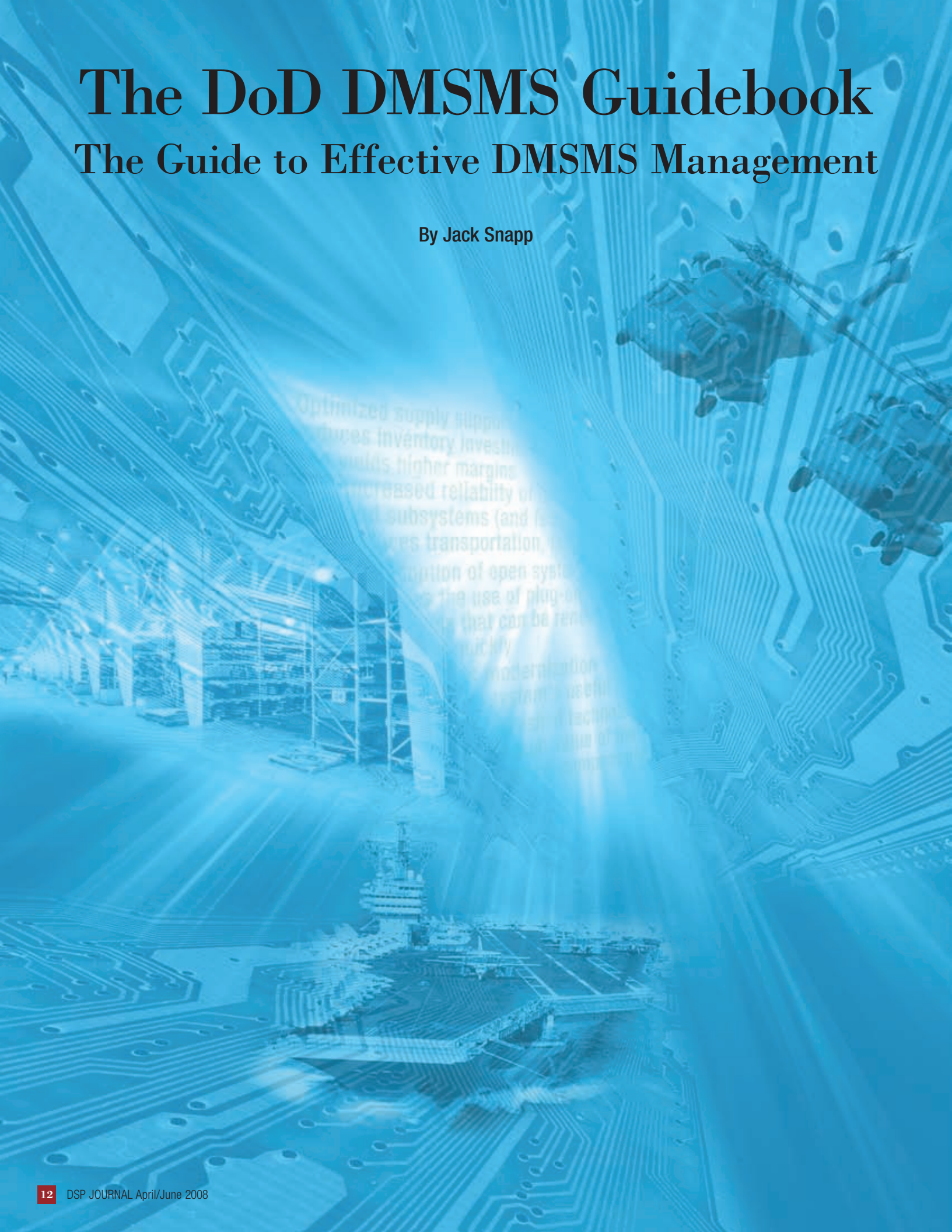
About the Author

Brian Mansir has worked at LMI, a not-for-profit government consulting company, for the past 30 years. He leads research and analysis projects and provides counsel to senior leaders of the nation's national security and other public-sector organizations.

The DoD DMSMS Guidebook

The Guide to Effective DMSMS Management

By Jack Snapp



Imagine being an engineer faced by a commanding officer demanding an answer: "How in Sam Hill can I have five $80 million attack aircraft just sitting on a carrier deck in the Arabian Sea while the Air Force has to pick up my mission?" The problem? Obsolete, inoperable bomb relay assemblies.

With our services using equipment well past the anticipated operating lifetime, more and more attention needs to be turned to ensuring that equipment stays operable. Today, obsolete parts are the bane of any weapon system program manager (PM). Mechanics and engineers do wonders in keeping many of these antiquated systems up and running. But at some point, the patching and prayers stop working. And, if you don't have a plan in place to replace those aging parts, you'll find yourself in the engineer's shoes. To make sure that doesn't happen, you will need guidance, specifically, SD-22, *DoD Diminishing Manufacturing Sources and Material Shortages (DMSMS) Guidebook*.

The DMSMS guidebook has been around since April 2005. It pulls from the best DMSMS management practices of the DoD service agencies. In the DMSMS arena, many PMs have gone before you and what has worked best for them is laid out in this handy reference document. This nifty little (only 72 pages) book is the brainchild of the Under Secretary of Defense for Acquisition, Technology and Logistics. It is full of examples and tidbits that have proven to be extremely useful to both novice and hardened DMSMS PMs. The information in this guidebook can be used to build a program to figure out what is wrong, or might go wrong, with the systems that you've been charged to oversee. It gives ideas, among others, on the following topics:

- What predictive tools to use to determine parts obsolescence
- How to figure a return on investment for the money you've spent, or are about to spend, on DMSMS (with a focus on prioritizing the workload)
- What resolutions to consider to defeat obsolescence
- What information to track that will be useful to share with your superiors or other PMs.

You can access SD-22 on the Defense Acquisition University (DAU) website via this link: http://www.dau.mil.

Let's take a closer look at some of the offerings of SD-22.

One of the first things that a smart PM needs to do is attend DMSMS training. Two recommended courses offered through DAU are "DMSMS Fundamentals" and "DMSMS for Executives." These courses will teach you, step by step, how to

implement a proactive DMSMS course tailor-made for your organization. If you are just starting a DMSMS management program, then take heart. The guidebook lists several other training resources available through DAU. In addition, the guidebook gives examples of successful DMSMS programs that can be studied and emulated. The B-2 bomber and Global Positioning System are two DMSMS management programs that are highlighted, with links to some of their reference material. In addition, several pages of DMSMS-related web links give you even more information. These include links to the U.S. Army Materiel Command Logistics Support Activity, Defense Logistics Agency, Defense Supply Center Columbus, Generalized Emulation of Microcircuits Program, Government-Industry Data Exchange Program (GIDEP), and DMS Technology Center at the Naval Surface Warfare Center, Crane Division, just to name a few.

An efficient DMSMS management process is critical to providing more effective, affordable, and operational systems by identifying and mitigating DMSMS issues that affect their availability and supportability. This is in line with the Total Life Cycle System Management initiative and the Performance Based Logistics (PBL) initiative. In a PBL environment, responsibility for meeting performance requirements, as outlined in the performance-based agreement, shifts to the product support integrator under the PM. To help in that regard, SD-22 provides examples of PBL-type contract language.

As with any project, good management and prioritization (what to work on first to prevent your system from becoming inoperable due to DMSMS) are key. This means solid planning for the DMSMS project, along with equipping and enabling your DMSMS management team (DMT) to work together. There are four primary keys to a successful DMSMS management program:

- Management buy-in (i.e., commitment) to champion the effort
- A DMT with the right people, processes, and predictive tools
- An accurate bill of materials (BOM) and data (demand rates, spare quantities, cost of solutions) to prioritize
- Financial resources for infrastructure, operations, research, and implementation.

The active interest of senior leadership is vital to a successful DMSMS program. Without this support, a PM will have a difficult time securing the resources needed to build a proper DMT. A DMT needs motivated, qualified people to get results. The team that is put together and the predictive tool that it chooses become the heart of a successful program. The PM must bring together representatives from the program office, engineering, logistics, the integrating original equipment manufacturer (OEM), and any other organizational representative that will help manage the problem. Analysts, engineers, equipment specialists, logisticians, and item managers are examples of the types of skills needed.

The DMT will need to choose DMSMS predictive tools to forecast the parts in the BOM. Most predictive tools perform the same core function and are limited to the analysis of electronic components. They monitor the status of components of the BOM. Each has a set of loading criteria and a format, specific output report formats, and other unique information that can be gleaned from the loaded BOM. The DMT should perform a review and work together to select the tools that are right for the program, based on needs and available budget. SD-22 lists several predictive tools that are in use today.

The BOM is the key element that allows effective DMSMS management. The DMT must have (or be able to obtain) accurate and complete configuration data (as defined by the OEM design data). It must know the piece parts and materials and chemicals that make up a system or line replaceable unit configuration (e.g., card, box, or subsystem) before they can identify the problem parts. If the DMT cannot obtain such data, it can only react to problems as they arise, and then the program must be designed for that mode. A reactive process is undesirable and should be avoided. Program managers should consider requiring DMSMS forecasting source data in accordance with DI-SESS-81656, "Source Data for Forecasting Diminishing Manufacturing Sources and Material Shortages (DMSMS)," as part of the contract data requirements, in order to identify, forecast, and manage piece-part obsolescence impacts and mitigations.

Of course, none of this can happen without funding support. This goes back to the degree of emphasis that upper management places on the DMSMS management program and its priority in the grand scheme of things. The guidebook contains a notional rating scheme to encourage a long-range view of funding requirements and explains how the time needed to acquire the funding can affect program status.

The guidebook provides examples of metrics in regard to program cost, schedule, and performance criteria. One of the most significant methods presented in the guidebook is the Defense Microelectronics Activity (DMEA) resolution cost metric for DMSMS. Through cost analysis, this metric provides a means of depicting the positive implications of a DMSMS program. In fact, the DoD Joint Requirements Oversight Council mandates reporting of metrics of this type for life-cycle sustainment (LCS) of new acquisitions. These metrics appear in the revised Chairman of the Joint Chiefs of Staff Manual 3170.01C, *Operation of the Joint Capabilities Integration and Development System* (May 2007). In addition, DoD has 14 LCS "enablers" that tend to be key leverage considerations to materiel availability and reliability throughout a program's life cycle. The Deputy Under Secretary of Defense for Logistics and Materiel Readiness directs use of these enablers because they positively impact the materiel readiness LCS outcomes. One of these enablers deals with tracking and reporting DMSMS case resolution results and ownership

costs. So, service organizations can use the resolution cost metric for DMSMS to determine cost avoidance as a means of complying with a portion of this DoD mandate.

In the late 1990s, DMEA asked ARINC, Inc., to develop this cost metric for various parts obsolescence resolutions. However, this metric has not been updated since (except for applying annual escalation factors). An effort is under way to begin laying the groundwork for an update to the cost metric. The plan is to query the services and industry for current inputs. GIDEP is tasked to handle this action for the services, and the Department of Commerce is tentatively set to do the same for industry. This data collection will begin soon and run through fall 2008. So, if you are contacted by either organization and asked to provide inputs to update the cost information, remember that you will be helping not only your own organization or company, but also DoD and the rest of industry. After the new information is collected, it will be analyzed and an update to the resolution cost metric will be published. It is anticipated that DSPO will then take ownership of the resolution cost information and update it periodically.

Here's a simple example that shows how a PM, using average resolution costs, can show cost avoidance as the result of maintaining an active DMSMS program.

The DMEA cost resolution metric ranks each solution type from lowest cost to highest cost. This is shown in Table 1 by the nonrecurring engineering cost metrics data pulled from the DMEA report on cost resolution metrics.

TABLE 1. Nonrecurring Engineering Cost Metrics (2006)

Resolution type	Average cost ($)
Existing stock	0
Reclamation	2,000
Alternate	7,000
Substitute	21,000
Aftermarket	54,000
Emulation	78,000
Redesign—minor	127,000
Redesign—major	469,000

Cost avoidance is determined by subtracting the average cost of a resolution derived from that of the next most cost-effective feasible resolution (assumed to result from taking no action or from following a reactive DMSMS program). For 2006, the resultant mathematical calculation (using Table 1 data) is depicted in the "delta cost" column in Table 2.

Using this information and hypothetical resolution data from a weapons system we will call Platform X, an annual DMSMS cost avoidance can be computed. We start with the number of times each resolution type was used in 2006 for a total of 181 obsolete parts. We can then determine a probability of occurrence by dividing the number of occurrences for a particular resolution type by the total of 181 parts. Next, using the delta cost

TABLE 2. Estimated Cost Avoidance for Platform X (2006)

Resolution type	Probability of occurrence (%)	Number of occurrences	Delta cost ($)	Cost avoidance ($)
Existing stock	4.5	8	2,000	16,000
Reclamation	0.0	0	5,000	0
Alternate	68.0	123	14,000	1,722,000
Substitute	19.0	35	33,000	1,155,000
Aftermarket	5.0	9	24,000	216,000
Emulation	3.0	5	49,000	245,000
Redesign—minor	0.5	1	342,000	342,000
Redesign—major	0.0	0	0	0
Total	**100.0**	**181**	**—**	**3,696,000**

values and the Platform X resolution data, we can calculate the 2006 DMSMS cost avoidance. Table 2 summarizes the results.

To determine estimated benefit resulting from a DMSMS program for Platform X in 2006, we subtract the cost of the DMSMS program from the total cost avoidance of $3,696,000. If the DMSMS program cost was $325,000 for that year, the resultant estimated benefit for this example would be $3,371,000 ($3,696,000 minus $325,000).

Sometimes the benefits of having an active DMSMS management program are not as clearly evident. Realistically, it will be a number-crunching drill like the one above that will show a definite improvement in the cost of doing business. This will convince superiors of the value of providing funding and resources to develop and sustain DMSMS programs.

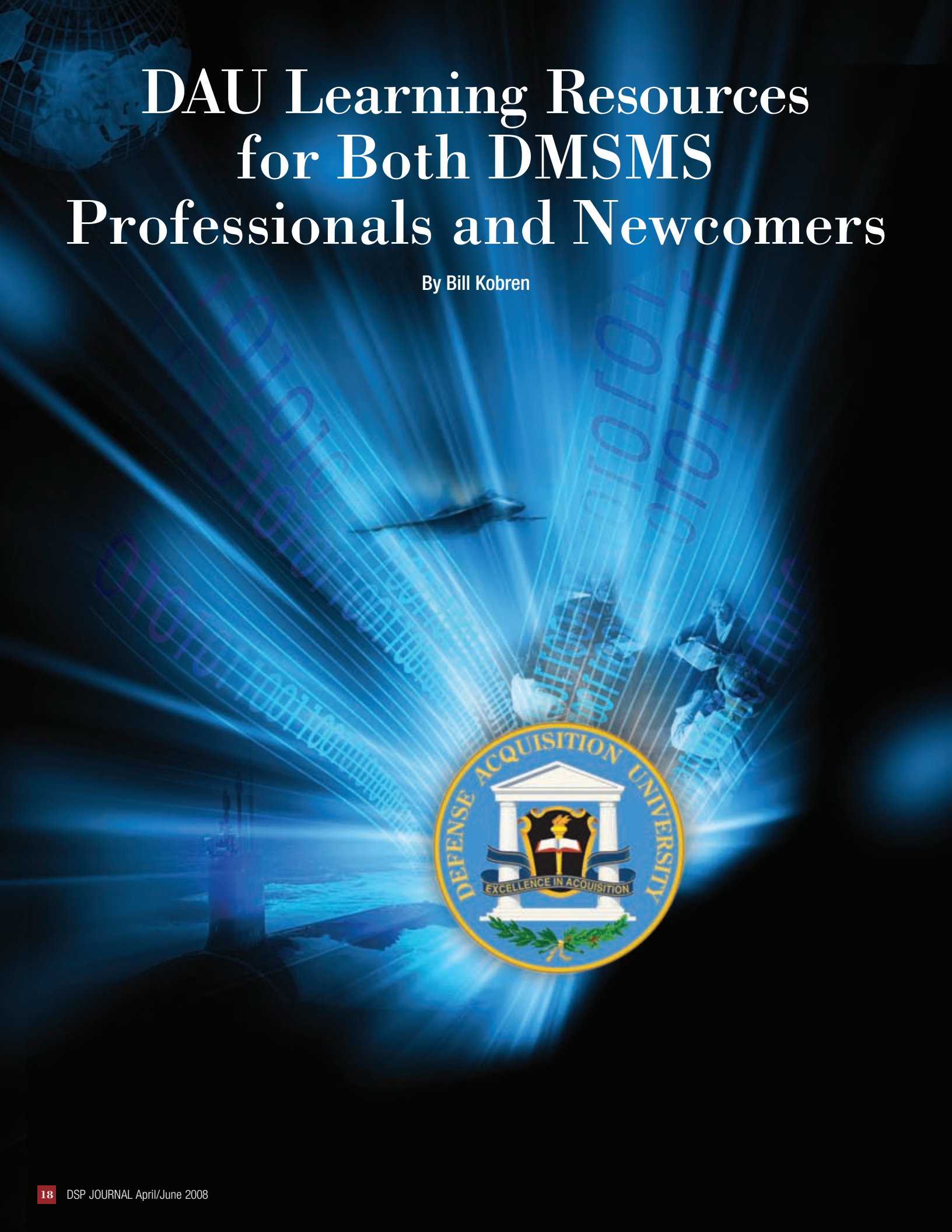
I hope that this overview of the DoD DMSMS guidebook will prove to be of value to you. The guidebook was developed to be a useful, practical tool in the fight against parts obsolescence. Let SD-22 be *your* guide in developing an effective DMSMS management program.

About the Author

Jack Snapp is a senior manager with ARINC, having been with the company for 12 years. A retired Air Force Lieutenant Colonel with flight crewmember experience, Mr. Snapp is DoD certified in acquisition program management. He has experience managing numerous DMSMS projects covering various aspects of parts obsolescence.

DAU Learning Resources for Both DMSMS Professionals and Newcomers

By Bill Kobren



Diminishing Manufacturing Sources and Material Shortages (DMSMS) are a fact of life, but they can be effectively mitigated in the long term through detailed early planning, budgeting, and funding. What is a good DoD program manager, engineer, or logistician to do to better understand and learn more about DMSMS mitigation? The good news is that ample resources and tools are available.

The Defense Acquisition University (DAU), working in concert with the Defense Logistics Agency (DLA) and the DoD DMSMS Working Group, has fielded an extensive set of DMSMS-related training and planning resources. Those resources include five separate web-based continuous learning modules, as well as the inclusion of DMSMS, obsolescence, and continuous modernization topics in several DAU courses, including a new course on intermediate sustainment management (LOG 206) currently in development. In addition, comprehensive web-based materials are available through the DAU Logistics Community of Practice (https://acc.dau.mil/log).

The five continuous learning modules are available either for continuous learning credit for the DoD acquisition, technology, and logistics workforce or in a browse mode that allows students to review the content but not receive official credit for completion. These modules, which can be accessed on the DAU Continuous Learning Center site (http://clc.dau.mil/), are as follows:

- *CLL 201, Diminishing Manufacturing Sources and Material Shortages Fundamentals.* This module is designed to provide a working-level overview of DMSMS issues. The module contains six lessons: "Overview of DMSMS"; "Combating the DMSMS Problem"; "Reporting, Measuring, and Predicting DMSMS"; "Guidance and Reference Sources"; "DMSMS Tools for the Program Manager"; and "Successful DMSMS Management Models." This 3-hour computer-based continuous learning module is designed to provide the student the basics of DMSMS. It is also designed to be service and discipline neutral. Although students will not be experts upon completion of the module, they will have a good basic working knowledge of DMSMS history, issues, tools, and current initiatives and will have read some successful DMSMS programs. Students will understand why standardization of polices and procedures within the DMSMS community is so important and will become

familiar with many other related topics. One of the most important tools students will learn about is the DoD DMSMS Center of Excellence. Upon completion of this module students receive three continuous learning points.

- *CLL 202, Diminishing Manufacturing Sources and Material Shortages Executive Overview.* This module provides concise DMSMS information for the executive or program manager who needs to understand how DMSMS affect their operations. DMSMS affect multiple processes, including reliability, maintainability, supply chain efficiency, funding, policy, procedure, and staffing. This module is tailored to offer the executive a perspective of management and supervisory actions necessary to enable effective DMSMS mitigation, thereby enhancing mission readiness, efficiency, and cost effectiveness. This 1-hour module is designed to empower the program manager and other senior leaders by giving them an understanding of the challenges and options to ensure proper establishment of an optimum DMSMS team. Upon completion of this module, students will receive one continuous learning point.
- *CLL 203, Diminishing Manufacturing Sources and Material Shortages Essentials.* This module assumes a working knowledge of the fundamentals of DMSMS management, including regulations and policies, setup of a DMSMS program, applicable metrics, and other issues. CLL 203 contains more technical content than the other modules. It introduces students to DLA's DMSMS programs and capabilities and reviews basic techniques for component research. This module takes approximately 2 hours to complete. Students receive two continuous learning points upon completion.
- *CLL 204, Diminishing Manufacturing Sources and Material Shortages Case Studies.* This module ties the basic DMSMS concepts, tools, information, and skills together. In this module, students review a few DMSMS program scenarios. For each scenario, students evaluate the program's level of proactivity. Students also make simple DMSMS management decisions for a real-world DMSMS scenario. There is no single best way to address a DMSMS issue. Instead, there are opportunities and choices. One student may make a different decision than another student, but the results of the two decisions may be equally effective. What is important is finding a solution for managing a DMSMS situation that saves the taxpayers money and, more important, supports warfighters in their mission with operational equipment when it is needed. This module takes students approximately 2 hours to complete. Upon completion of this module, students receive two continuous learning points.
- *CLL 205, Diminishing Manufacturing Sources and Material Shortages for the Technical Professional.* This module covers the current processes, policies, and procedures used by technical professionals for DMSMS management. It focuses on the high-

level best practices for managing a DMSMS program. This module takes approximately 3 hours to complete, and students receive three continuous learning points.

None of the DMSMS modules have prerequisites, but students should take the DMSMS fundamentals module (CLL 201) or the DMSMS executive overview (CLL 202) before attempting the module on DMSMS DLA essentials (CLL 203) or the case studies module (CLL 204).

Tailored classroom versions of each of these continuous learning modules can be presented to your organization by a DLA or service instructor. Those who are interested should contact dksp@dmsms.org.

In addition to the continuous learning modules on DMSMS, DAU recently deployed a newly revised web-based course on configuration management (LOG 204), which includes a module on DMSMS as part of a larger lesson on issues and initiatives affecting configuration management. LOG 235, Performance Based Logistics, also discusses the importance of DMSMS and obsolescence planning and the use of continuous modernization as a mitigation strategy.

Under "Aging Systems" at https://acc.dau.mil/CommunityBrowser.aspx?id=22415 on the DAU Logistics Community of Practice site, the university also maintains individual sites on five topics. Visited more than 23,000 times over the last 2 years alone, these sites contain extensive materials and resources. The topics are as follows:

- *Continuous modernization*—process by which state-of-the-art technologies are inserted continuously into weapon systems to increase reliability, lower sustainment costs, and increase the warfighting capability of a system to meet evolving customer requirements throughout an indefinite service life.
- *DMSMS*—loss or impending loss of the last known manufacturer or supplier of raw material, production parts, or repair parts.
- *Lead-free electronics/solder*—elimination of the use of lead in electronic components. This environmental initiative, which has arisen in large part as a result of a European Union directive, raises some very real concerns related to reliability and maintainability of highly technical weapon systems, as well as potential logistics issues related to configuration management, parts management, and cataloging.
- *Obsolescence management*—resolution of issues related to equipment that is no longer useful or no longer available for production or repair and to equipment whose form and function are no longer current.
- *Technology insertion* (sometimes also referred to as technology transition)—application of critical technology in military systems to provide an effective weapons

and support system in the quantity and quality needed by the warfighter to carry out assigned missions and at the best value as measured by the warfighter.

The DAU DMSMS site (https://acc.dau.mil/dmsms/) contains dozens of DMSMS links, documents, and policy memorandums from across DoD and the military services. One key document is *DoD Diminishing Manufacturing Sources and Material Shortages (DMSMS) Guidebook*, SD-22, issued in November 2006 (https://acc.dau.mil/CommunityBrowser.aspx?id=46237). The guidebook is a compilation of the best practices from across the DoD services and agencies for managing the risk of obsolescence. With material extracted from various DoD DMSMS management documents, SD-22 provides the DMSMS program manager with a central repository of best practices. In addition, it identifies assorted measurement tools that may be useful in analyzing and tracking the effectiveness of DMSMS programs. The DMSMS program manager is highly encouraged to make this guidebook a handy desktop reference to quickly pinpoint key actions required in managing DMSMS issues and concerns.

...DAU is an integral part of an aggressive DoD effort to help programs manage and mitigate DMSMS problems.

Complementing the extensive DMSMS resources already available—through the DMSMS Knowledge Sharing Portal (www.dmsms.org), the Defense Microelectronics Activity (http://www.dmea.osd.mil/), the Government-Industry Data Exchange Program (GIDEP) (http://www.gidep.org/), and a number of individual service websites—DAU is an integral part of an aggressive DoD effort to help programs manage and mitigate DMSMS problems.

The training resources available through DAU did not come about by accident. In October 2004, DLA and the university entered into a unique strategic partnership to develop and deploy DMSMS training. The partnership has not only exceeded every initial expectation, but has led to collaboration on a variety of levels and initiatives far and away more than ever envisioned at the time the original agreement was signed. With direct support from industry partners ARINC, Inc., and Karta Technologies, Inc., this arrangement has truly become a standard-setting best practice for collaborative partnerships between DAU and other DoD organizations. Working with DoD experts from DLA headquarters, GIDEP, DSPO, Naval Surface Warfare Center–Crane Division, Defense Supply Center Columbus, and the military services

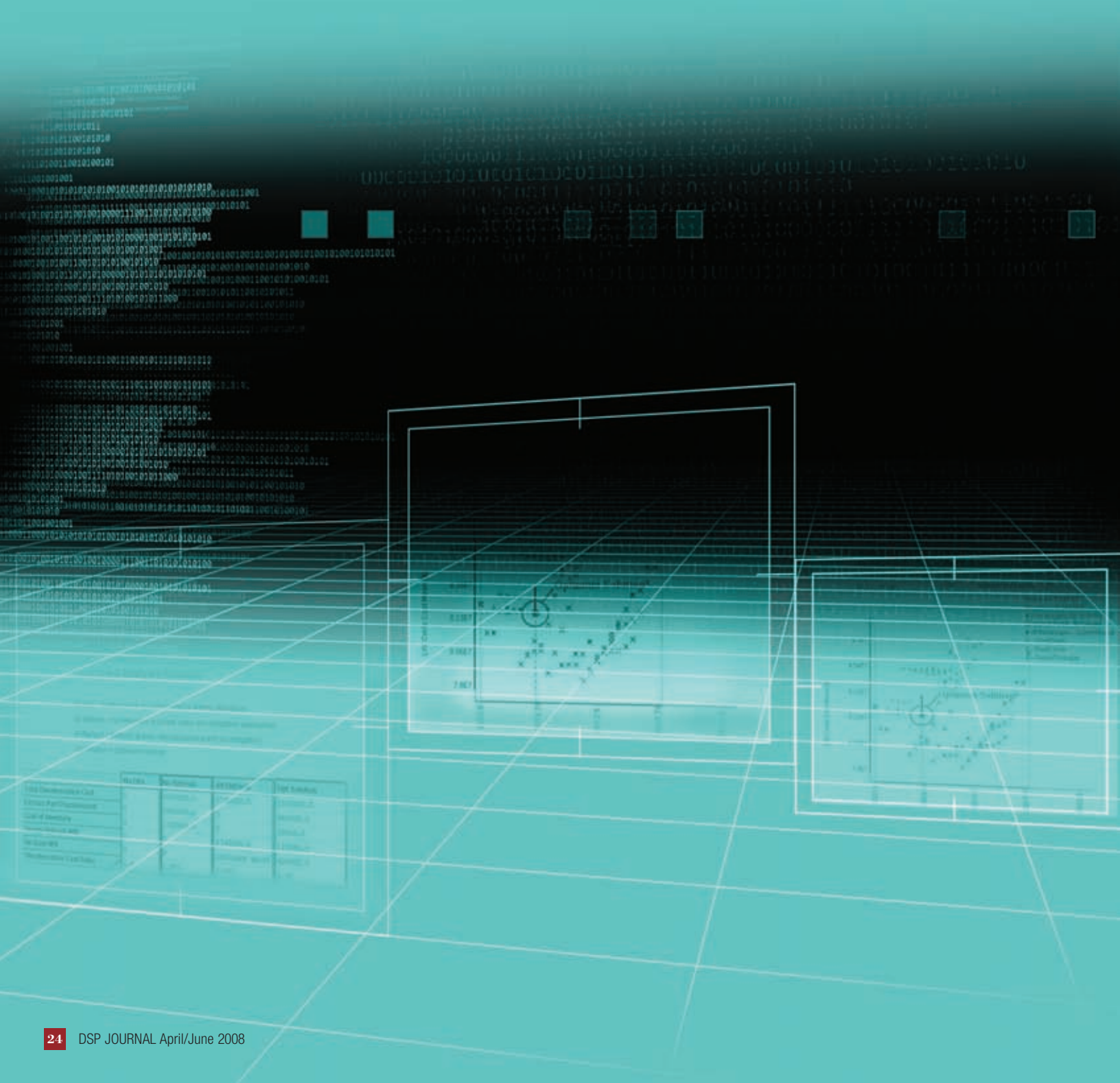
(among many others), the partnership, originally intended simply to field DMSMS computer-based training, has resulted, in just 3 years, in the deployment of five separate continuous learning training modules, graduating almost 2,000 students. Results do not end there. Together, we have leveraged this partnership to integrate extensive DMSMS information into a variety of other DAU courses, including collaborative development of LOG 206 as a Defense Acquisition Workforce Improvement Act (DAWIA) certification course, as well as extensive participation in the DoD DMSMS Working Group chaired by DSPO, the annual DMSMS conference, development of the DMSMS guidebook, and multiple other opportunities to deliver learning assets at the point of need. In short, the partnership has had a true win-win-win-win-win outcome for DSPO, the DoD standardization community, DLA, DAU, and most important, the DoD workforce.

About the Author

Bill Kobren is the director of the Logistics and Sustainment Center at the Defense Acquisition University. He has responsibility for development and continuing assessment of all logistics- and sustainment-related materials and support for the university, including curricula development, cross-functional integration of logistics resources, training, performance support, guidance, and enhancement of the body of knowledge compiled in the Logistics Community of Practice. He is a member of the DoD Acquisition Corps and is DAWIA Level III certified in life-cycle logistics. Mr. Kobren is also a SOLE–The International Society of Logistics Certified Professional Logistician and received the 2005 SOLE Field Award for Integrated Logistics Support excellence.

Strategic Management of DMSMS in Systems

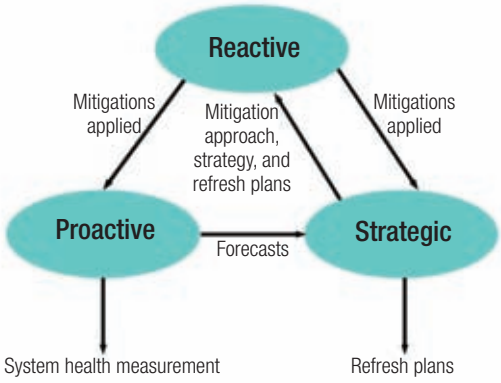
By Peter Sandborn



The escalating impact of Diminishing Manufacturing Sources and Material Shortages (DMSMS) on systems has resulted in the development of a growing number of methods, databases, and tools that address the obsolescence status of components, forecast future obsolescence risk, and provide DMSMS mitigation and management support. However, the majority of the existing offerings focus on reactive and, to a lesser degree, proactive management of DMSMS issues associated with electronic parts.

Effective long-term management of DMSMS in systems requires addressing the problem on three different management levels: reactive, proactive, and strategic. Figure 1 defines these levels and shows their interactions. To maximize the cost avoidance associated with managing systems, all three of the management areas should be considered concurrently.

FIGURE 1. DMSMS Management Strategy and Definitions



Reactive—When components become obsolete, determining an appropriate resolution to the problem, executing the resolution process, and documenting/tracking the actions taken.

Proactive—Determination of the status of the entire system with respect to DMSMS risk and assessment of the expected component needs against DMSMS risk, inventory, and spares status. Proactive requires an ability to forecast obsolescence risk for components. Proactive management also requires that there be a process for articulating, reviewing, and updating the system DMSMS status.

Strategic—Use system status, forecasted DMSMS risk, and expected needs, inventory, and spares to determine the mix of reactive mitigation approaches and design refresh (minor and major) that minimizes the life-cycle cost (i.e., maximizing cost avoidance) while continuing to meet all system requirements.

Strategic Management of DMSMS

Strategic management of DMSMS means using DMSMS data, logistics management inputs, technology forecasting, and business trending to enable strategic planning, life-cycle optimization, and long-term business case development for the support of systems.

Too often, programs become caught up in addressing obsolescence events as they occur, for example, making decisions on a case-by-case basis whether to undertake a lifetime buy of the obsolete part or to initiate a design refresh activity to replace the obsolete part with a newer part. This can lead to being caught in a "death by a thousand cuts" system management trap, spending valuable resources making a continuous stream of independent decisions about how to manage parts. Hindsight in this case often reveals that greater cost avoidance would have been realized by combining the management of many individual obsolescence events together into a single funded design refresh at a predefined date and bridge-buying sufficient parts to reach that refresh date when obsolescence occurs rather than trying to mitigate each individual problem to the end of the field life of the system.

This example is not meant to imply that the best DMSMS management approach for all systems is bridge-buy and refresh, but rather to point out that strategic management of DMSMS requires a broader view. It is not about making independent management decisions about each part in a list and then measuring results by accumulating individual DMSMS case-resolution metrics and cost-resolution factors. Strategic management requires the following:

- *A view that extends beyond individual electronic parts to boards, boxes, line replaceable units (LRUs), and so on.* Many things are not repaired, spared, upgraded, or replaced at the part (chip) level. Part-level obsolescence management is of little value to programs that never reach deeper into the system than individual circuit cards or boxes.
- *A view to all system components.* Obsolescence does not just affect hardware. Hardware and software obsolescence management must be coupled.[1]
- *A view to the enterprise.* Ideally, strategic solutions require coordination across multiple systems that share common parts and subsystems.
- *Applicable policies, technology upgrade plans, and other factors.* Such factors may constrain what DMSMS solutions can be applied, when they can be applied, and how they can be applied.
- *Decision making under uncertainty.* Everything that goes into determining a strategic solution is uncertain: obsolescence risks and dates are uncertain, resolution costs are uncertain, the end of support is uncertain. Finding optimal solutions that do not account for these and other uncertainties may be misleading.

Building Business Cases to Support Strategic Management

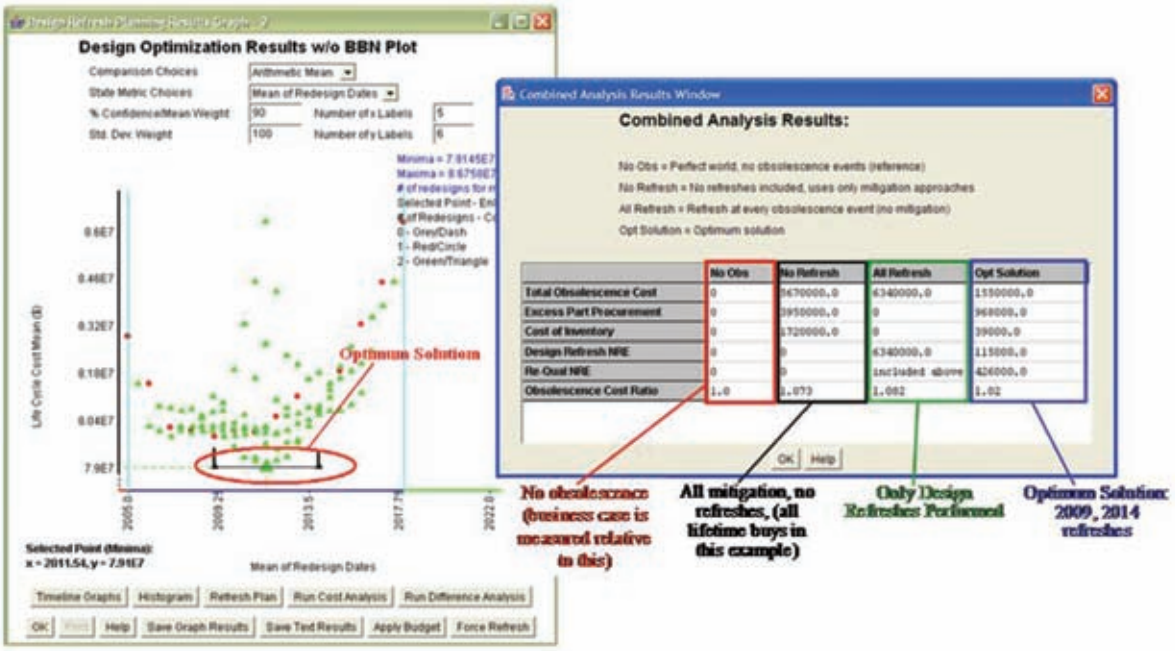
Unfortunately, even when experienced DMSMS managers think strategically and propose solutions that have longer term impacts (e.g., planned design refreshes), they often cannot create the necessary business case support to convince the customer to take a strategic view.

A tool—Mitigation of Obsolescence Cost Analysis (MOCA)—has been developed to aid organizations in creating a plan for managing obsolescence and constructing associated business cases to support that plan. MOCA has been designed to generate a plan consisting of design refreshes mixed with reactive mitigation approaches where the total sustainment cost of the plan has been minimized.[2] MOCA takes as its input the bill of materials for a given system, along with the procurement cost and projected obsolescence dates or procurement lifetimes of the individual components (in this context, chips, circuit boards, LRUs of other kinds, or even software applications). MOCA can model multiple levels of hierarchy, so that an entire system or a system of systems containing common components may be loaded into the tool for concurrent analysis. MOCA also requires a production/deployment schedule as an input. This schedule may be supple-

mented with inventory status and a forecast of required spares. Using this information, MOCA creates a timeline of all possible design refresh dates that it couples with a timeline of all of the projected obsolescence dates for the components. MOCA generates candidate refresh plans consisting of zero refresh dates (all reactive mitigation), exactly one refresh date in the lifetime of the system, exactly two refresh dates, etc. The life-cycle cost of all the plans is computed, and the candidate plans are ranked according to the resulting life-cycle cost of the system.

Figure 2 shows an example output from MOCA. In the graph on the left side of the figure, each dot represents a unique refresh plan (the result in Figure 2 contains plans with exactly zero, one, or two refreshes in them). Corresponding to each plan, MOCA generates a list of components that are obsolete or about to go obsolete so that they can be refreshed. Parts that become obsolete before the designated refresh date are managed using a user-defined short-term mitigation scenario (in the example shown here, the parts are bridge-bought) until they can be replaced. The cost of the bridge-buy, along with the storage and handling costs and the costs of the design refresh itself (including

FIGURE 2. Sample MOCA Solution



nonrecurring engineering and requalification costs) are all included in MOCA's total life-cycle cost calculation for each refresh plan. The vertical axis on the graph is life-cycle cost, and the horizontal axis is time. The data points corresponding to the plans are plotted at the mean of the group of refresh dates they represent (one plan is expanded in the graph to show the actual two refresh dates it contains).

In order for the refresh planning predictions to be useful, the impact of the plans must be articulated as a business case. To evaluate the utility of the optimal plan, it is compared to a case in which no parts go obsolete, a purely reactive mitigation approach case, and a strategy in which every obsolescence event is resolved with a design refresh. These scenarios are compared by breaking down the total cost of obsolescence management into subcosts to identify where the money is being spent.

The true cost of obsolescence management can be determined for a given strategy by taking the total cost of the plan and subtracting from it the cost of managing the no-obsolescence scenario:

$$O_C = T_A - T_{LCP},$$

where O_C is the obsolescence management cost, T_A is the actual total life-cycle cost of the system with the selected obsolescence management approaches, and T_{LCP} is the total life-cycle cost in the no obsolescence scenario.

T_A includes all costs associated with procuring parts and building the system, all costs associated with design refresh and requalification costs, all costs associated with mitigation, and all inventory costs for storing parts. T_{LCP} includes only those costs that are not associated with obsolescence; it simply includes the recurring costs of building the system (if applicable) and procuring the parts. Thus, by subtracting T_{LCP} from T_A, the obsolescence management cost can be obtained.

MOCA breaks down the obsolescence management cost into the subcosts associated with the excess part procurement (the difference between part procurement costs if there was no obsolescence and part procurement costs associated with the mitigation of obsolete parts) as well as the inventory cost (cost of storing the parts over the long term). The obsolescence management cost also includes any costs associated with the redesign and requalification and any other costs associated with a design refresh. All the obsolescence management costs include cost of money (they are net present values indexed to the analysis starting year) and include the effects of the budgeting period duration. An example output from MOCA's business case analysis is shown on the right side of Figure 2 for a case in which all mitigation was either lifetime buys or bridge-buys.

Constraint-Driven Planning

Constructing and costing combinations of mitigation approaches and candidate refresh plans constitute a significant step in the direction of strategic planning, but rarely is the management of a system this simple. Often, a plethora of constraints find their way into DMSMS management problems. The constraints may be budgetary (e.g., a ceiling exists on the expenditure that can be made on the system in a particular year), logistical (e.g.,

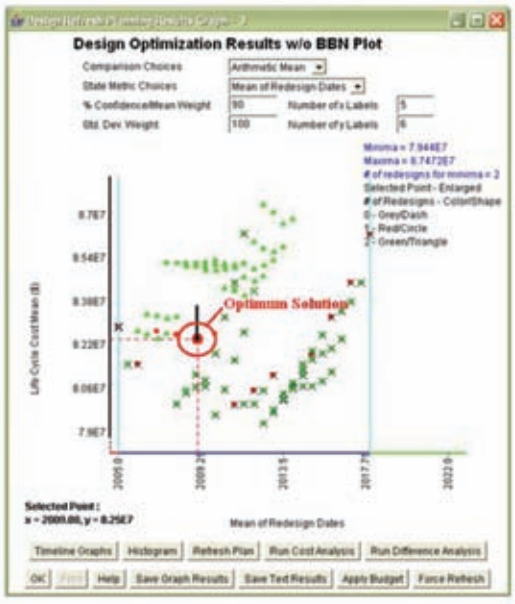
the platform is not available to be refreshed during a particular period of time or a finite throughput is associated with upgrading systems), or policy (e.g., a road map dictates that the system must be upgraded in a certain way during a certain period of time). In order to introduce constraints into the refresh planning process, the following obsolescence event types are used:

- *"Weak" obsolescence event.* No change to installed or new systems is required. As long as the obsolete item is available, new systems can be built and installed using it, and previously installed systems can be repaired with it if necessary.
- *"Strong A" obsolescence event.* Installed systems can continue to operate with the obsolete item until the obsolete item needs replacement due to a failure of the item. New systems cannot be built and installed with the obsolete item (whether the obsolete item is available or not).
- *"Strong B" obsolescence event.* Installed systems are not allowed to continue to operate with the obsolete item and must be backfitted within a defined time period. New systems cannot be built and installed with the obsolete item (whether the obsolete item is available or not).

As an example, Strong B events can be associated with the end of support of critical software components such as operating systems used in communications applications that connect through public networks. In this case, end of support means the end of security patches, after which the software represents a security risk if not replaced.

Figure 3 shows the MOCA simulation outputs after specific road-map constraints have been applied (the solution before constraints is shown on the left side of Figure 2). The refresh plans that do not satisfy the road-mapping constraints are crossed out in the graph

FIGURE 3. Sample MOCA Solution with Constraints Applied



in Figure 3. All the viable refresh plans (plans that satisfy the constraints) have been shifted upward in the graph because of the additional cost constraint that was applied to all design refresh plans with a design refresh between 2007 and 2010. The optimal refresh plan changes from a solution with two refresh dates (2009, 2014) to a solution with a single refresh date (2009) because of the constraint.

Closing Thoughts

Reactive management of DMSMS problems will always be necessary. However, strategic DMSMS management is possible and can lead to substantial cost avoidance for many systems. Use of strategic approaches such as refresh planning must be carefully tempered; in particular, when the required quantities of obsolete parts are relatively small, a careful analysis is required because, as so aptly stated by John Becker (former DMSMS program director for DSP), the "struggle to find duplicates, alternates or substitutes cost-effectively [creates] the illusion that some higher cost engineering solution or an end-product upgrade is financially attractive or the only option available" when it is not.

[1]P. Sandborn, "Software Obsolescence—Complicating the Part and Technology Obsolescence Management Problem," *IEEE Transactions on Components and Packaging Technologies*, Vol. 30, No. 4, pp. 886–888, December 2007.

[2]P. Singh and P. Sandborn, "Obsolescence Driven Design Refresh Planning for Sustainment-Dominated Systems," *The Engineering Economist*, Vol. 51, No. 2, pp. 115–139, April–June 2006.

About the Author

Peter Sandborn is a professor in the CALCE Electronic Products and Systems Center at the University of Maryland. Dr. Sandborn's group develops obsolescence forecasting algorithms, performs strategic design refresh planning, and lifetime buy quantity optimization. Dr. Sandborn is a member of the U.S. Navy TRENT Shareholder Council and is the author of the DoD DMSMS working group's DMSMS tool/data taxonomy. Dr. Sandborn also is an associate editor of *IEEE Transactions on Electronics Packaging Manufacturing* and a member of the editorial board of *International Journal of Performability Engineering*. He is the author of more than 100 technical publications and several books on electronic packaging and electronic systems cost analysis.

Diminishing Manufacturing Sources Shared Data Warehouse 101

Enabling Obsolescence Management

By Susan Dadey

One of the major ongoing issues facing DoD is the sustainment of effective weapon systems. Diminishing Manufacturing Sources and Material Shortages (DMSMS)—the loss or possible loss of manufacturers or suppliers of items and the shortage of raw materials—can occur in any program phase from design to post-production and can have a detrimental effect on schedule and item life-cycle cost. DMSMS includes not only detail parts, but all material obsolescence at the part, module, component, equipment, or other system indenture level. Although timely and cost-effective repair and replacement of equipment, parts, and materials have always been a challenge to supply chain logistics, never before has the impact of DMSMS been felt so acutely. Technological advances that render items of supply obsolete faster than ever, increased operational tempo, and the demands of reset and recap of U.S. forces and equipment—as well as global demand in both military and commercial sectors and defense budget constraints—all call for effective identification and proactive management of obsolete parts as key to reducing the impact of DMSMS and enabling viable maintenance of DoD weapon systems.

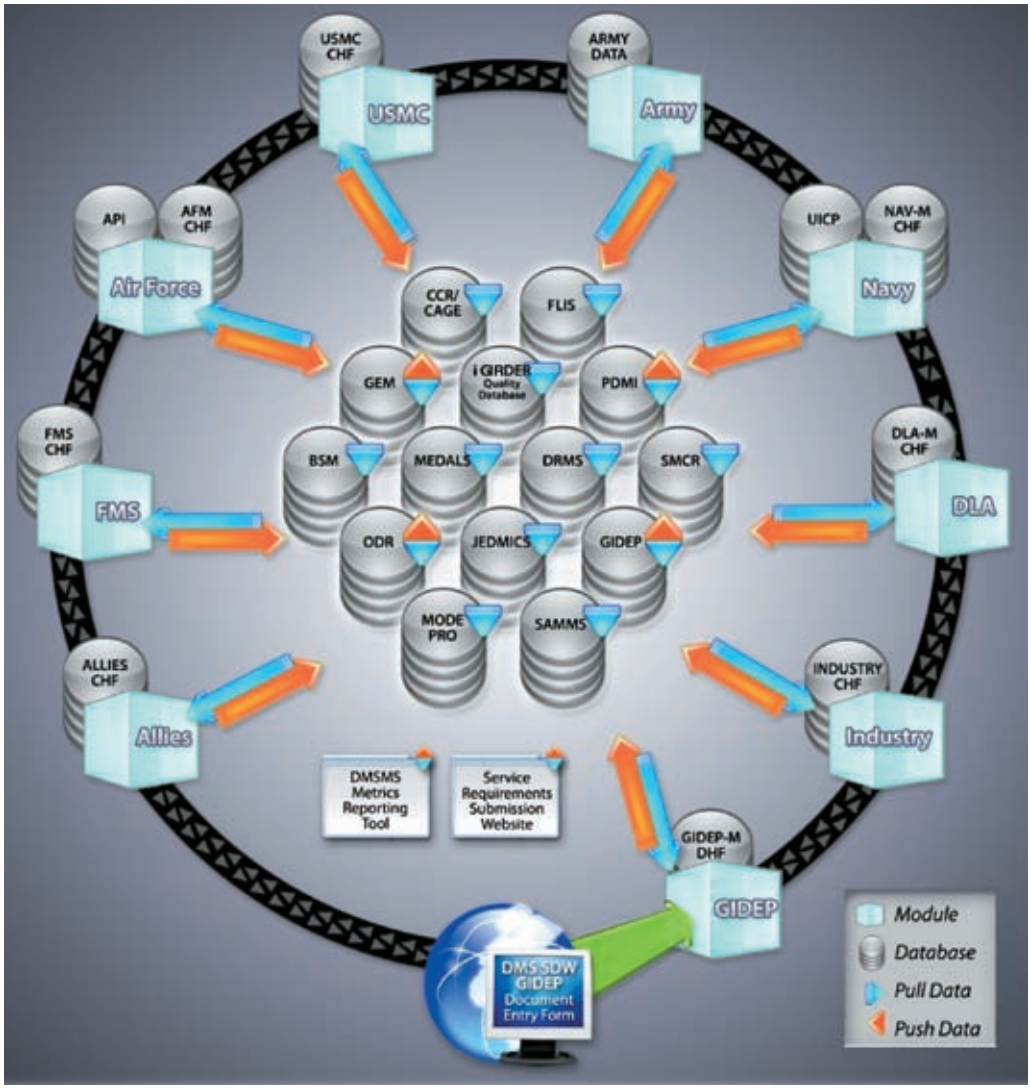
To address the DMSMS obsolescence issue, Concurrent Technologies Corporation—an independent, nonprofit, applied research and development professional services organization—designed and developed the Diminishing Manufacturing Sources Shared Data Warehouse (DMS SDW). The DMS SDW—sponsored by the Defense Logistics Agency (DLA), Government-Industry Data Exchange Program (GIDEP), Defense Supply Center Columbus, Marine Corps Logistics Command, and Air Force Materiel Command—improves the sustainability of weapon systems by reducing the impact of DMSMS through more effective identification and management of DMSMS parts. Figure 1 depicts the information flow of the DMS SDW Enterprise.

Challenges

Addressing the DMSMS problem across the DoD enterprise presented a multitude of challenges, the foremost being that each military service has developed or adopted various diverse tools, methods, and techniques for mitigating obsolescence issues. These disparate or "stove-pipe" systems of operations limit the sharing of DMSMS data and knowledge across the military services and the DoD-related manufacturing and supply industry. The ability to share this information, both within DoD and with industry, is a crucial factor in providing obsolescence managers the resources necessary to address imminent critical parts issues and to plan proactively. A major strategy is to integrate these operations and provide a single source for all military services, industry, and foreign military sales (FMS) partners to obtain information and solutions for DMSMS issues.

Another challenge is that—although the various services may use some of the same data available from databases such as the Federal Logistics Information System (FLIS) and Central Contractor Registration (CCR) in their DMSMS mitigation processes—

FIGURE 1. DMS SDW Enterprise Information Flow



AFM = Air Force Module
API = Applications/Programs/Indentures
ASP/VB COM = Active Server Pages/Visual Basic
CAGE = Commercial and Government Entity
CCR = Central Contractor Registration
CHF = Case History File
DB = Database
DHF = Document History File
DLA = Defense Logistics Agency
DLA-M = Defense Logistics Agency Module
DMS SDW = Diminishing Manufacturing Sources Shared Data Warehouse
DMSMS = Diminishing Manufacturing Sources and Material Shortages
DMZ = Demilitarized Zone
DRMS = Defense Reutilization and Marketing Service
DSCC = Defense Supply Center Columbus
DSD = Decision Support Database
EBS = Enterprise Business Systems
FLIS = Federal Logistics Information System
FMS = Foreign Military Sales
GEM = Generalized Emulation of Microcircuits
GIDEP = Government-Industry Data Exchange Program
GIDEP-M = Government-Industry Data Exchange Program–Module
GIDEP-P = Government-Industry Data Exchange Program–Public Document Entry Module
HTTP/S = Hypertext Transfer Protocol/Secure Sockets Layer
ICP-M = Inventory Control Point–Mechanicsburg
ICP-P = Inventory Control Point–Philadelphia
iGIRDER = Interactive Government and Industry Reference Data Edit and Review
IIS = Internet Information Services
JEDMICS = Joint Engineering Data Management Information Control System
LAN = Local Area Network
MDF = Master Data File
MEDALS = Military Engineering Data Asset Locator System
NAV-M = Navy Module
ODR = Obsolescence Data Repository
PDMI = Product Data Management Initiative
QML = Qualified Manufacturers List
SAMMS = Standard Automated Materiel Management System
SMCR = Standard Microcircuit Cross-Reference
SMD = Standard Microcircuit Drawings
SMTP = Simple Mail Transfer Protocol
SOAP = Simple Object Access Protocol
SQL = Structured Query Language
SRSWS = Service Requirements Submission Website
SSO = Single Sign On
TACOM = Tactical Army Command
UICP = Uniform Inventory Control Point
USMC = United States Marine Corps
USMC-M = United States Marine Corps Module

the sources and timeliness of this information differ from service to service. In addition, each service has unique data sources, which are also required in addressing DMSMS issues. These data sources provide information about the inventory, system configuration, and the system's manager responsible for mitigating the obsolescence issue.

Finally, one of the most pressing challenges is the ever-evolving information technology within each service. Information technology initiatives to streamline systems include phaseout of legacy systems—such as the DLA implementation of Enterprise Business Systems (EBS) and the DLA enterprise data center initiative—and implementation of new enterprise resource planning solutions. In addition, inconsistencies exist between the services with respect to DoD policies and directives, including security-related policies and procedures and approved technologies and techniques.

The Solution

The solution to these challenges is the DMS SDW Enterprise, an integrated suite of web-based case management modules and common tools to provide case resolution and case management, enable workflow, and provide access to disparate critical legacy and current data in support of decision analysis.

Case management modules for the GIDEP, DLA, Air Force, Marine Corps, and Navy facilitate the business processes and workflow of obsolescence management activities and military services through DMSMS case resolution and information sharing, enhancing DoD's ability to focus obsolescence data within a central repository housed within GIDEP. The case management modules also enable the determination process of life-of-type buy requirements, including analysis, computation, notification, and electronic submission of requirements. Some modules have specific features, such as the GIDEP Module (GIDEP-M), which allows uploading of notices of discontinuance and technical specifications and enables automated searches of FLIS and CCR data. The DLA Module (DLA-M) enables searches of DLA procurement data sources such as the legacy Standard Automated Material Management System, EBS data, and the Defense Reutilization and Marketing Service, as well as other data sources supporting the obsolescence management process. The military service case management modules access data sources specific to each service to obtain catalog, procurement, historical usage, forecast demand, engineering, and platform cross-reference data.

The DMS SDW case management modules directly populate the centralized data repository, the Obsolescence Data Repository (ODR), via web service calls. The ODR is designed to gather and store solutions and other relevant in-process and historical information about reactive and proactive obsolescence issues from disparate sources. Obsolescence managers within DoD and its industry partners can access this shared information

for solutions pertinent to their specific DMSMS problems. In addition to the summary data from the case management modules' case history files, the ODR contains additional solution data from government and industry sources to enable a more diverse and all-encompassing solution set, as well as DoD-wide metrics development and reporting. Eventually, the addition of modules designed for DoD's industry partners, allies, and FMS partners will provide critical DMSMS information for inclusion in the ODR and will significantly expand this "collaborative partnership of information" for obsolescence management and mitigation.

DMS SDW users will have access to common obsolescence management tools that carry business processes across multiple activities and user communities. The GIDEP Document Entry Form and Metric Reporting Tool (MRT), as well as the Services Requirements Submission Website, which is under development, are designed to integrate processes and information flow and to provide supplemental information, creating a collaborative work environment for enhanced management of DMSMS issues.

The GIDEP Document Entry Form allows public submission of obsolescence information and permits equipment and parts manufacturers and other sources of supply to provide notices of discontinuances and additional data directly to GIDEP to enable the creation of GIDEP documents, particularly GIDEP DMSMS notices. The GIDEP Document Entry Form helps streamline the business process and workflow of GIDEP's notice creation capability, resulting in faster and more accurate notifications to DMSMS focal points and field activities.

The MRT, hosted by GIDEP, is designed to enable the development and reporting of both standardized DMSMS metrics and custom reports. Its query functionality permits single-point access to current and legacy DMSMS data, as well as to DoD logistics data. The metrics reporting capability allows for the development, measurement, and visibility of key performance indicators such as DMSMS case management effectiveness and DMSMS impact on weapon systems. This gathered data will help obsolescence managers establish metrics used to determine the potential costs and cost avoidance of implementing an obsolescence resolution.

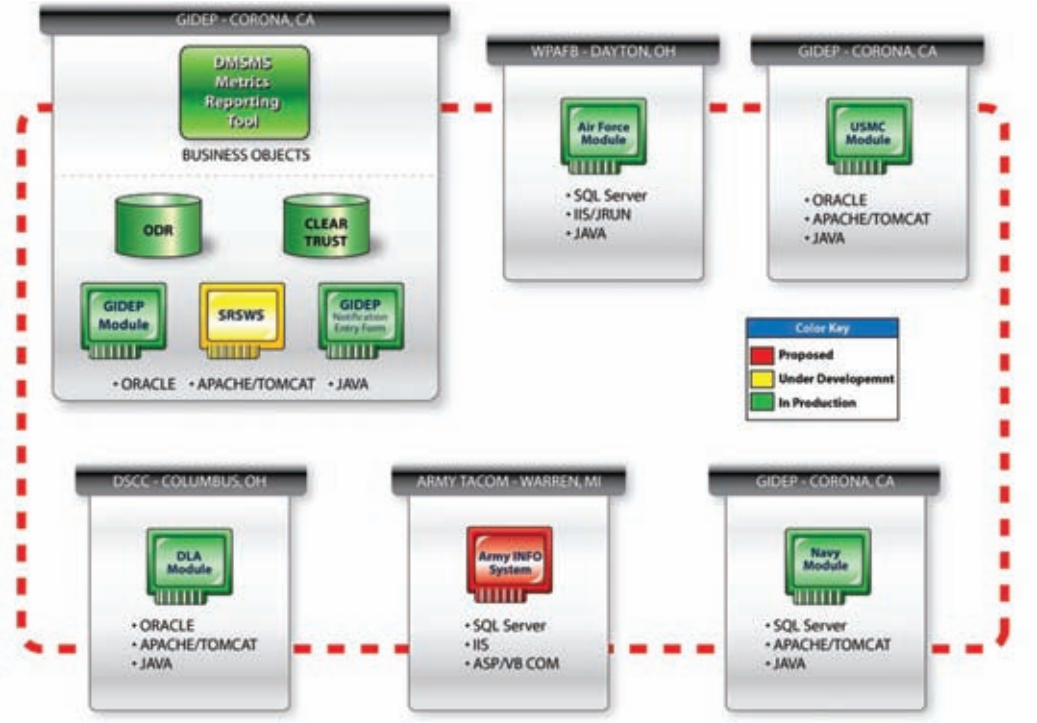
To further streamline the user experience with the DMS SDW Enterprise, single-sign-on capabilities have been implemented, enabling users to access case management modules and common tools and avoiding the need to assign multiple user accounts.

Implementation

The diverse standards of each service and respective hosting facility—along with the need to provide a system flexible enough to ensure integration of legacy systems and undeveloped future systems and tools to support DMSMS mitigation activities—have had a

significant impact on the design, development, and implementation of the DMS SDW Enterprise. For these reasons, the DMS SDW Enterprise has been implemented using open source products and standards whenever permitted by the hosting location. Figure 2 identifies the hosting locations and primary software used for the DMS SDW Enterprise.

FIGURE 2. DMS SDW Enterprise Hosting Locations and Primary Software



The case management modules, common tools, and GIDEP Document Entry Form are all Java-based applications using Java database connectivity to connect to their local Case History File (CHF) databases. Each CHF contains the detailed results and historical data generated by that specific case management module.

The DLA, Marine Corps, Navy, and GIDEP case management modules and the GIDEP Document Entry Form have been developed using the Apache Web Server and Tomcat Servlet Container on the application web servers. Each CHF uses Oracle and Microsoft's SQL server as its database software.

The Air Force Module (AFM) has been developed using Microsoft Internet Information Services as the application web server and Microsoft's SQL server as the database software.

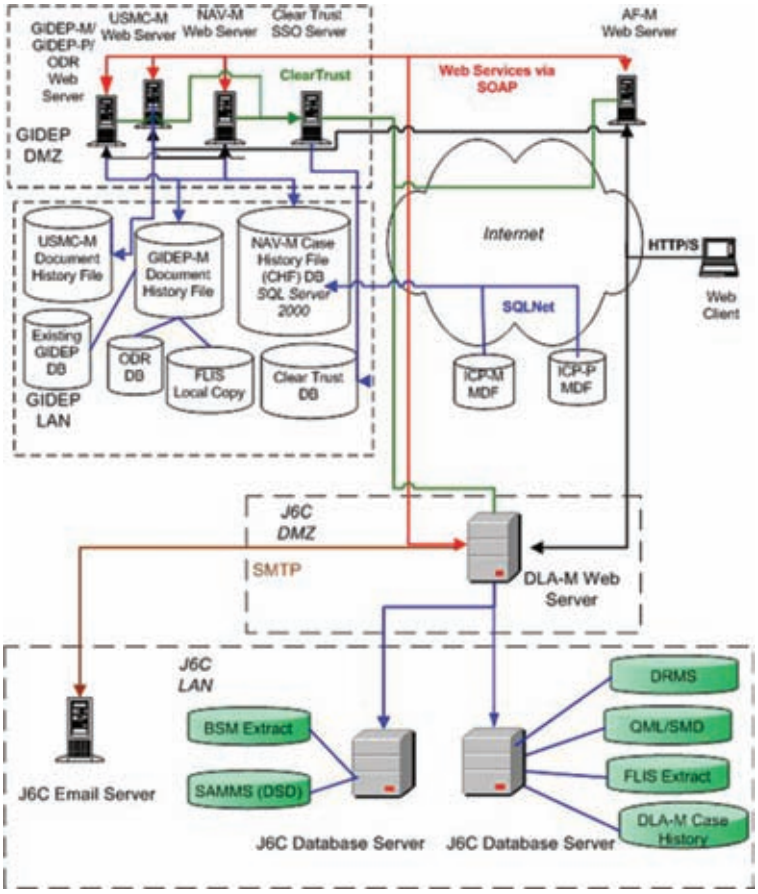
Communication between the case management modules is performed by web services. The DMS SDW web services framework was built on the Apache Axis Simple Object Access Protocol implementation, with message traffic queuing and persistence provided for each DMS SDW module using OpenJMS, an implementation Sun JMS 1.1 specification.

The MRT was implemented using Business Objects Web Intelligence. This product has a web interface allowing users to access standardized reports created by a group of core report designers and to create custom reports.

Access control to each of the case management modules and common tools is provided by RSA ClearTrust™. RSA ClearTrust provides the DMS SDW Enterprise with a single-sign-on capability and allows basic access to the modules and common tools to be managed through one tool. RSA ClearTrust required three different implementations based on hosting location and tool, with the MRT using the Lightweight Directory Access Protocol, the AFM using the RSA ClearTrust application programming interface, and the other case management modules and tools using the ClearTrust agent.

Figure 3 shows the basic overview configuration of this system of systems.

FIGURE 3. System-of-Systems Configuration



As mentioned earlier, each case management module requires access to other supporting data sources to provide the full picture needed to decide how to address a DMSMS issue. The supporting data sources are integrated into the DMS SDW Enterprise in a variety of ways, as required by the data source owners and hosting activities. The following

techniques are examples of data integration within the DMS SDW Enterprise:

- Web services
- Data warehousing
- Oracle database links
- Oracle external tables
- Microsoft SQL server linked servers
- Batch processing.

Conclusion

As a whole, the DMS SDW Enterprise is a viable, proven initiative that provides obsolescence managers throughout the DoD military services multiple benefits: improved DMSMS management business processes; convenient user access to DMSMS activities; increased efficiency for processing, notification, and resolution of joint service DMSMS cases; systematic sharing of information and exchange of data; and a collaborative environment for DoD obsolescence management activities.

For example, statistics from the AFM show substantial increases in the efficiency of addressing DMSMS issues since the module was first brought online. Before the AFM was implemented, the DMSMS process utilized by the Air Force to disseminate DLA requests for requirements and gather responses would take an average of 5 days to distribute data to the field and 4 days to collect responses from the field. With the electronic process implemented via the AFM, this process has been streamlined to a typical distribution time of 1 day to disseminate and 1 day to return. This allows AFM users to use a more significant portion of the DLA response window to research and compile requirements as opposed to the significantly slower paper process.

As its functionality and range of user and data source connectivity expand, the DMS SDW Enterprise will continue to evolve to create additional partnerships, collaborative work environments, and integrated data environments between the supply chain and DoD DMSMS managers. As each activity is provided with connectivity to the DMS SDW Enterprise, its function within the DoD logistics life cycle is added to the evolving business process of the DMS SDW, allowing users to gain access to associated data sources and in-house expertise.

Ms. Dadey wishes to express her gratitude to key project members who provided valuable expertise and input: Joseph Stevenson, logistics information technology integration manager; Allen Snyder, senior database engineer; Micah Mood, senior software engineer; and Craig Wills, database developer.

About the Author

Susan Dadey, director of focused logistics at Concurrent Technologies Corporation, is responsible for the logistics information and transportation technologies to provide holistic tailored solutions for rapid response, deployment, and sustainment of the warfighter. She is also the program manager for the DMS SDW Enterprise and the Collaborative Logistics Productivity programs.

Redesign of Air Force Test Set Achieves Savings and Improves Support to the Warfighter

By Leslie Cohn and Gary Luebbering

The Air Force uses a Paveway guidance kit to convert various "dumb" gravity bombs to highly reliable GBU-15 laser-guided "smart" bombs with all-weather capability and proven success in combat. The Paveway guidance kits are routinely tested while in storage and before being used in a mission. This testing has been performed with TTU-373 test sets. Because it uses a 30-year-old technology with obsolete parts, resulting in serious maintenance issues, the TTU-373 was becoming increasingly difficult to sustain. Moreover, the TTU-373 has a slower-than-desired testing rate.

Recognizing the Air Combat Command's urgent and compelling need to replace the TTU-373, the Air Force Paveway test set team at Hill Air Force Base, UT, undertook a project to redesign the test set and enhance its manufacturability. The Air Force enlisted the help of the National Nuclear Security Administration (NNSA) Kansas City Plant, which has some 40 years of proven test equipment knowledge and experience. Specifically, the Air Force asked the Kansas City Plant's test equipment organization to work with test set designers to convert the drawings and sketches into an Air Force–formatted drawing package and to enhance the manufacturability and reliability of the test set. The plant's test equipment organization conforms to Capability Maturity Model Integration principles, an industry-recognized framework for process integration and improvement. This demonstrated to the Air

About the NNSA Kansas City Plant

The NNSA Kansas City Plant is a government-owned facility that is managed and operated by Honeywell Federal Manufacturing and Technologies, LLC. The plant's primary mission is to manufacture the electronics and mechanical components to support the nuclear stockpile stewardship program. However, the plant focuses on low-volume manufacturing, product miniaturization, and special application hardware. This unique foundation of applied engineering and manufacturing capabilities is available to support programs sponsored by other government agencies, national laboratories, universities, and U.S. industry.

For more information about the NNSA Kansas City Plant, visit www.kcp.com or contact the NNSA DMSMS Program Champion, Roger Lewis, Deputy Assistant Deputy Administrator for Military Application and Stockpile Operations, NA-12 Office of Defense Programs, National Nuclear Security Administration (202-586-6864).

Force that the Kansas City Plant applies systematic, disciplined, and quantifiable approaches to product development.

The Air Force–NNSA partnership was a natural because both organizations share the challenge of sustaining legacy systems. That challenge is due largely to Diminishing Manufacturing Sources and Material Shortages (DMSMS). For example, NNSA faces a challenge within its nuclear weapons complex to source, design, and produce legacy components when little or no documentation exists. The role of the Kansas City Plant is to address that challenge by serving as NNSA's manufacturing/production agency, which requires a deep and sustained understanding of the weapons of the warfighter.

The Air Force chose the Kansas City Plant to manufacture the Paveway test sets because of the plant's ability to provide specialized solutions under one roof with the high quality, cost effectiveness, and agility to support the Air Force's mission readiness program schedule.

Although the mission of the Kansas City Plant is to manufacture components for nuclear weapons, it has expertise with dual-capability delivery systems, integration of components into a weapon system, and the functional and environmental testing required to ensure product performance when used by the warfighter. This experience in low-rate design and production and in upgrades of legacy products to sustain performance beyond their extended life was a match for the Air Force's requirement to redesign and enhance the manufacturability of the legacy Paveway test set for its laser-guided weapon system.

The Kansas City Plant has three high-level competencies particularly applicable to DMSMS challenges:

- *Specialized manufacturing.* The plant's expertise in this area includes manufacture of low-volume, highly reliable, ruggedized parts in a classified environment.
- *Systems integration.* The plant's main mission is to produce field-ready items and prototypes that integrate components to fieldable systems.
- *Technology insertion.* The plant's expertise in this area includes accelerating the time required to move from basic and applied research to tangible products, as

well as enhancing product realization and bringing designs to higher technology readiness levels and manufacturing readiness levels.

These competencies were important to the Air Force's need to engineer and build a part for which it had little to no documentation.

The Kansas City Plant used computer-modeling, multidisciplined engineering teams to improve the test set design and manufacturability. The plant utilized extensive environmental testing to simulate jeep, aircraft, and naval environments to identify reliability risks. Testing included temperature cycling, vibration, and drop testing. Considering the results of this series of tests, the Kansas City Plant recommended and implemented multiple enhancements to provide a more rugged and robust design.

The result? Replacement of the TTU-373 with the TTU-595 test set.

Paveway Tactical Test Unit (TTU-595) with Asset

Nomination for 2007 Air Force Science and Engineering Award

Due to its success in redesigning the TTU-373, the Paveway test set team, Hill Air Force Base, UT, has been nominated to receive the 2007 Air Force Science and Engineering Award for Engineering Achievement. From the initial concept, proof, and refinement to the production of the TTU-595, the team was able to reduce warfighter test time by more than 80 percent.

The Air Force chose the Kansas City Plant to manufacture the Paveway test sets because of the plant's ability to provide specialized solutions under one roof with the high quality, cost effectiveness, and agility to support the Air Force's mission readiness program schedule. Through coordination with an integrated team at the Kansas City Plant, the Air Force was able to transition the test set from design to full program support 10 months ahead of the projected date and at a lower projected cost.

The Air Force was able to provide field units to the warfighter that are combat ready, easier to operate, more ergonomic, and easier to maintain and that perform testing more than 80 percent faster than the legacy test sets. This reduces the number of personnel required and increases mission readiness.

About the Authors

Leslie Cohn and Gary Luebbering work at NNSA's Kansas City Plant. Mr. Cohn was the program manager for the Paveway Test Set Project, and Mr. Luebbering was the principal engineer and project manager. Mr. Cohn's responsibilities and experience include management of nonproliferation, national security, and DoD programs. Mr. Luebbering has 24 years of experience with the Kansas City Plant with responsibilities in design, manufacturing, and maintenance of computer-controlled test equipment and software used in calibrating nuclear weapon components.

Program News

Topical Information on Standardization Programs

Proactive DMSMS Management Helps the Warfighter

The 2007 Diminishing Manufacturing Sources and Material Shortages (DMSMS) conference held in central Florida brought together industry leaders, government supply-chain personnel, and senior military members to focus on the need for proactive DMSMS management to better support the warfighter.

The conference presented opportunities for industry representatives to hear the views of military leaders describing what is required to support the modern warfighter; and it provided a forum to discuss the best programmatic, technical, and logistics approaches. Panel members, who consisted of senior military and industry leaders, agreed that there is a need to adhere to policy and that both DoD and industry need to be incorporating proactive DMSMS management strategies. Lessons learned related to proactive management practices were shared by industry and DoD participants as part of the panel sessions throughout the conference.

Data sharing was a recurring theme throughout this year's conference. In this case, data sharing actually means sharing the information about what parts make up the complex systems within a military service's various weapons systems. Data sharing among the military services and between the services and industry will go a long way to help mitigate DMSMS issues, primarily because a single item shortage may likely affect multiple systems within different services. When one military service determines a solution to this shortage, other services can take advantage of this knowledge. By each military service and industry partner sharing available weapons system information, they will be able to decide the most cost-effective way to deal with DMSMS situations.

"There is an eminent theme throughout that data needs and the information exchange are areas of high interest for programs within the U.S. Defense Department, aerospace industries and international partners," said Tom Myers, product service manager for the Government-Industry Data Exchange Program (GIDEP). "GIDEP

continues to be dedicated to the DMSMS issues and we're going to continue supporting and hosting DMSMS tools and services."

Another considerable DMSMS concern discussed at length, and which information sharing will help alleviate, is the infiltration of lead-free solder and counterfeit parts into the aerospace supply chain. Industry, academia, and DoD have been working independently for several years now, and they have been collaborating as

Additional studies from the industry representatives indicate that from 8 to 28 percent of our electronics parts are purchased from unfranchised brokers (with an average of 23 percent) and between 8 to 15 percent of those are counterfeit.

part of the Lead Free Electronics in Aerospace Project (LEAP) since 2004. LEAP's goal is to bring U.S. aerospace industry stakeholders together to provide coordinated input into standards and industry guidelines for lead-free issues. Additional studies from the industry representatives indicate that from 8 to 28 percent of our electronics parts are purchased from unfranchised brokers (with an average of 23 percent) and between 8 to 15 percent of those are counterfeit. These estimates mean that between $5 billion and $8 billion a year of counterfeit parts are entering the DoD inventory. Senior officials from both the government and industry are collaborating to improve plans and policy substantially to combat the counterfeit part problem.

The conference enabled many of the participants to come together to discuss and strategize ways to overcome common barriers. "I think the great thing about the conference was the broad range of attendees," said Christine Metz, chief of the Technical and Quality Policy Division, Materiel Process Management Directorate, Defense Logistics Agency. "There was a good cross section of the defense industry as well as the services so it was very useful to see what programs and tools are being developed and how they relate to what we're trying to do. From another standpoint, we may be able to use what they are doing or they may be able to use what we are doing and we can share and save money. I also think it's good to get the per-

spective of the industry, in terms of what they are facing and what problems they are trying to deal with."

"DMSMS management is not just a concept for legacy systems to employ," said Ric Loeslein, the DMSMS team lead for the Naval Air Systems Command. New programs like the Joint Strike Fighter and Unmanned Aerial Systems have to incorporate it as well. There must be a focused effort to solve problems in design rather than fixing the problems retroactively. "We just completed a 3 year effort in the reengineering of the parts management program for the DoD," said Mike Goy, senior analyst with DSPO. "We've generated a new military standard, MIL-STD-3018, "Parts Management," which provides parts management policy under the Defense Standardization Program. The whole process was facilitated by service members with industry and academia representation. This interaction with industry and the military in dealing with the DMSMS topics that are associated with obsolescence planning provides such a wealth of information; it brings everyone in who has a stake in the issue."

Greg Saunders, DSPO director, said that we still have a long way to go before the goals are reached, but great progress is being made. "The policy is in place and we are beginning to see much better integration of the concept of DMSMS into program offices so that they are really doing DMSMS management," Saunders said. "There has to be a partnership at every level. We have to do what is necessary."

Events

Upcoming Events and Information

September 16–17, Lansdowne, VA

NATO Standardization Conference

The NATO Standardization Conference—sponsored by the U.S. Department of Defense, NATO Standardization Agency, and Allied Command Transformation—will be held in the United States at the National Conference Center in Lansdowne, VA. The overarching goal of this conference is to bring together delegates and subject matter experts from NATO nations and Partner for Peace nations to present new approaches and ideas for standardization within NATO, to foster integration of the latest developments in allied transformation, and to facilitate the practical application of standardization in support of the alliance. The conference theme, "Achieving Interoperability through Standardization," reflects the close linkage between standardization and interoperability, which helps to support multinational force operations.

Invited speakers include Vice Admiral Juan A. Moreno, Director, NATO Standardization Agency; Mr. Al Volkman, Director, International Cooperation, Office of Secretary of Defense for Acquisition, Technology and Logistics; Mr. Alan Bryden, Secretary General, International Organization for Standardization; Rear Admiral Torben Joergensen, Allied Command Transformation; Brigadier General Cripwell, Allied Rapid Reaction Corps, NATO; and Mr. Richard Froh, Deputy Assistant Secretary General for Armaments, NATO.

The content that will be presented at this conference is targeted for military, civilian, and contractor personnel, from NATO member nations and Partner for Peace countries, who are required to have a fundamental knowledge of current and future NATO standardization activities. Advance registration and hotel reservations are required, as space is limited. For more information about this event, visit the conference website at www.fbcinc.com/nato.

September 22–25, Palm Springs, CA

2008 DMSMS Conference

The 2008 DMSMS conference will be held September 22–25, 2008, at the Palm Springs Convention Center in California. This year's conference will feature an increased emphasis on the integration of several total life-cycle management processes, including DMSMS mitigation, the Government-Industry Data Exchange Program (GIDEP), DSP initiatives, value engineering and reduction of total ownership costs, and activities of the DoD Parts Standardization and Management Committee. A call for papers was released in February 2008, so plan to submit your implementation practices or lessons learned.

Visit www.dmsms2008.com periodically for updated information.

October 27–31, 2008, Burlingame, CA

PSMC Fall 2008 Conference

The Parts Standardization and Management Committee will hold its Fall 2008 Conference during the week of October 27–31 in Burlingame, CA. The conference will be held at the Embassy Suites San Francisco Airport (650-342-4600). The conference fee is $135. As plans develop, further information will be available at www.dscc.dla.mil/psmc.

People

People in the Standardization Community

Welcome

On May 21, 2007, **Sherry O'Conner** was appointed as the standardization point of contact for the U.S. Army Institute of Heraldry, Fort Belvoir, VA. Ms. O'Conner manages the standardization of the Army Heraldic Quality Control Program for textile heraldic items. She ensures that the items produced, sold, and used by the Army and Air Force are of the highest quality. We welcome her to the standardization community.

On November 26, 2007, **Thomas Casciaro** was appointed as the standardization officer for the U.S. Army Institute of Heraldry, Fort Belvoir, VA. He is replacing Stan Haas, who recently retired from federal service. Mr. Casciaro has purview over the standardization of the Army Heraldic Quality Control Program, ensuring that the heraldic items produced, sold, and used by the Army and Air Force are of the highest quality. We welcome him to the standardization community.

Joseph Gemperline has been promoted to chief of the Sourcing and Qualifications Unit at the Defense Supply Center Columbus. Since 1994, he had been the chief of the Hybrid Devices Team in that unit, and from 1986 to 1994, he served as chief of the Microelectronics Branch. He replaces Robert Evans, who retired this past January.

Farewell

Stan Haas, U.S. Army Institute of Heraldry, Fort Belvoir, VA, retired on October 31, 2007, after 21 years of federal service. Mr. Haas started his federal service with the Institute of Heraldry in 1985. His accomplishments at the institute from his entry as an industrial specialist to chief of the Technical and Production Division were many. We wish him well in his retirement and any future endeavors.

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
July–September 2008	Defense Standardization
October–December 2008	European Union Standardization

If you have ideas for articles or want more information, contact Tim Koczanski, Editor, *DSP Journal*, Defense Standardization Program Office J-307, 8725 John J. Kingman STP 3239, Fort Belvoir,VA 22060-6233 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.


DEFENSE STANDARDIZATION PROGRAM
MAKING SYSTEMS WORK TOGETHER