

Achieving Defense Transformation

Through Total Life Cycle Systems Management

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The 2001 Quadrennial Defense Review (QDR) charts the course for the Department of Defense to transform to a capability-based force to deter and defeat threats from our nation's adversaries well into the 21st Century. That transformation necessarily includes dramatic improvements in our sustainment capability to achieve rapidly deployable and employable forces with significant reductions in logistics footprint. Projecting and sustaining power in distant theaters is one of six top DoD transformation goals.



Joint Logistics Board

To achieve the required sustainment capabilities envisioned in the QDR, the Deputy Under Secretary of Defense for Logistics and Materiel Readiness (DUSD-L&MR) assembled senior logisticians from the Services, Defense Logistics Agency, Joint Staff, and U.S. Transportation Command into the Joint Logistics Board (JLB) and launched the Future Logistics Enterprise (FLE). FLE is DoD's near-term blueprint to improve military effectiveness and logistics support through end-to-end customer service and enterprise integration. As such, it is the critical enabler to achieving objectives of the QDR in the near term.

DoD is migrating to a performance-based weapon system sustainment model that focuses on weapon system performance, integrated across all functional support organizations. This "new" model was tested for three years on 30 pilot programs such as the C-17. Pictured is the C-17 Globemaster III.

Photo courtesy Boeing Media

FLE includes six specific, interrelated initiatives to achieve end-to-end customer service.

- Total Life Cycle Systems Management (TLCSM)
- Depot Maintenance Partnering
- Condition-Based Maintenance + (CBM+)

- Executive Agents
- End-to-End Distribution
- Enterprise Integration

Three of the initiatives—TLCSM, Depot Maintenance Partnering, and CBM+—will enable end-to-end weapon system support. Executive Agents and End-to-End Distribution will provide end-to-

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The F/A-18 E/F is the first naval aviation platform to be deployed to the Fleet under a Performance Based Logistics (PBL) strategy. Pictured is an F/A-18F1 on the deck of the USS *Harry S. Truman* (CVN 75). F1 is one of two Super Hornets used during sea trials.

Photo courtesy Boeing Media

end service for combat commodities and services; and Enterprise Integration will provide the real-time, actionable data required to deploy and sustain combat power rapidly with minimal footprint. This article focuses on recent DoD efforts to implement TLCSM and its inherent relationship to the other FLE initiatives.

Total Life Cycle Systems Management

Weapon system sustainment consumes 80 percent of our logistics resources, or

approximately \$64 billion per year. Currently, weapon system sustainment is provided by functionally focused organizations that optimize within their own business structures. Our immediate challenge is that we fight with capabilities and systems, not functions. To maximize our military effectiveness, the DoD is migrating to a performance-based weapon system sustainment model that focuses on weapon system performance, integrated across all functional support organizations.

This “new” model was tested for three years on 30 pilot programs such as the C-17 and the F-117. With a clear charter to apply innovative approaches to their sustainment strategies, the pilot programs demonstrated the benefits of the new model through increased performance at an affordable cost. For example, the C-17 and F-117 both exceeded operational requirements in Kosovo and Operation Enduring Freedom.

Along with their successes, the pilot programs also identified critical obstacles to life cycle management. Initial obstacles were addressed, and new systems are adopting this model based upon existing DoD guidance. The QDR directed that the performance-based focus be applied to all new and all appropriate fielded systems to achieve near-term improvements in end-to-end sustainment and materiel readiness.

The foundation of the new sustainment model is the designation of the Program Manager (PM) as Life Cycle Systems Manager, responsible for the development, production, and sustainment of



One recent example of emphasizing sustainment as a requirement is the Joint Strike Fighter. The Joint Strike Fighter Program is the first to place as much emphasis on affordably sustaining the air system as “up and away” performance.

Photo courtesy Lockheed Martin

the system to meet warfighter requirements. Combined with evolutionary acquisition, DoD envisions the new life cycle management process will be a closed-loop system, as shown in Figure 1.

PMs will develop and execute sustainment strategies based upon warfighter performance requirements. These strategies will build upon public-private partnerships, combining the best capabilities and inherent efficiencies of the industrial and organic support bases in an integrated support framework. Field results will be collected automatically through prognostics and embedded instrumentation to provide real-time system status. These results will be fed back to guide future system upgrades and block designs.

Clearly, this dramatic shift impacts our entire acquisition and sustainment structure. To ensure an orderly migration to the new model, the Joint Logistics Board, in conjunction with the acquisition community leadership in OSD and the Services, initiated the following actions:

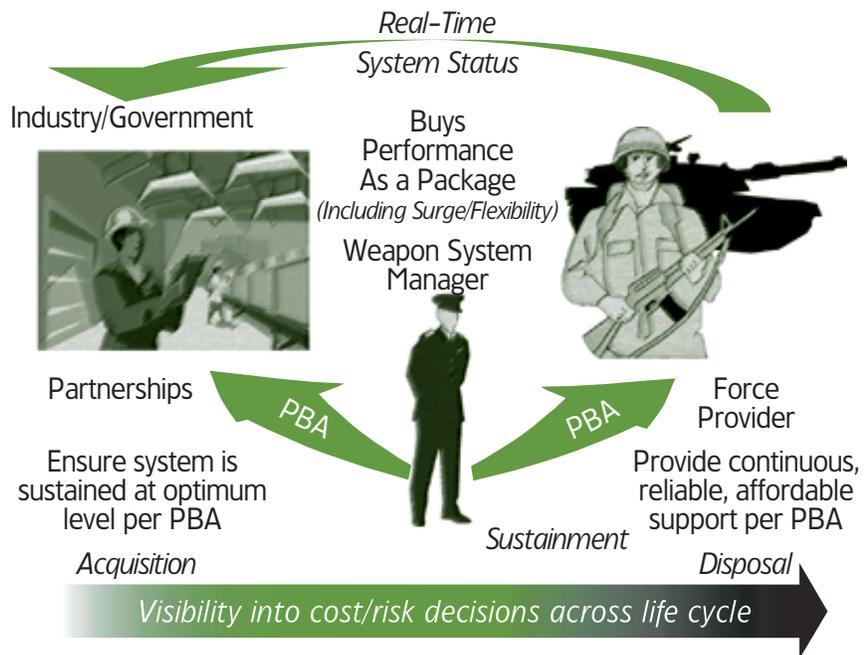
- Advocated greater consideration of sustainment in the requirements process.
- Engaged with the Comptroller to develop an enabling financial mechanism.
- Prepared necessary adjustments to existing acquisition policy.
- Reengineered the Defense Acquisition University curriculum for life cycle support.
- Developed comprehensive schedules to transition fielded systems to a performance-based environment.

The following discussion briefly describes each of these five actions.

Sustainment Requirements

The most powerful weapon in the world is useless if we can't deploy and use it effectively in the fight. This simple truth is well known in DoD, yet is only sporadically recognized. For years, we built ultra-reliability and redundancy into our strategic and space forces because of their national importance. For tactical

FIGURE 1. Total Life Cycle Systems Management



systems, we accepted trade-offs between reliability and technical performance because we were compelled to pursue technological superiority over the Soviet Union during the Cold War. We won that war in large measure because of the innovations and technical developments in our labs, our program offices, and industry.

As we move forward to rapidly employable and perhaps preemptive capabilities, we must view our conventional capabilities the same way we view our strategic forces. When called upon, they must work reliably! At this juncture, we need to apply that same innovation we applied to strategic systems to ensure our conventional equipment is ultra-reliable and sustainable with minimum footprint.

To lead that transition, the JLB is actively engaged with the Joint Staff to increase consideration of sustainment characteristics during the Joint Requirements Oversight Council (JROC). The emerging revision of Chairman Joint Chiefs of Staff Instruction (CJCSI) 3170, *Requirements Generation System*, will include significantly increased emphasis on supportability and sustainment as operational requirements. The revision is currently proceeding through final staffing with publication expected this fall.

One recent example of emphasizing sustainment as a requirement is the Joint Strike Fighter. The Joint Strike Fighter Program is the first to place as much emphasis on affordably sustaining the air system as “up and away” performance. Of the six Key Performance Parameters (KPP) assigned to all variants of the JSF, three are supportability-related: Sortie Generation Rate, Logistics Footprint, and Mission Reliability. To satisfy these KPPs, the Lockheed Martin team must design an air vehicle that is highly reliable, easier to maintain, and requires fewer resources (people, parts, and support equipment) to sustain.

In addition to these KPPs, the JSF Operational Requirements Document contains a number of other performance-based requirements that address Life Cycle Costs. The end result will be a JSF logistics system (known as Autonomic Logistics) that integrates all elements of logistics throughout the design and developmental and operational test activities, achieving an air system that meets operational requirements while reducing footprint and the cost of ownership.

Enabling Financial Mechanisms

The PM, as life cycle manager, requires financial authority, visibility, and enabling mechanisms with which to execute this responsibility. The early pilot

programs clearly demonstrated that our fundamental shift in business structure must be accompanied by a fundamental shift in our financial structures. Full and effective implementation of TLCSM will require revisions to the weapon system financial funding and DoD financial systems.

The DoD financial process is designed to consolidate funds into broad functional categories to support the budget and appropriation process. These broad categories—such as procurement; Research, Development, Test and Evaluation (RDT&E); operations and support; military personnel; and others—are built up from, and executed upon, DoD weapon systems; yet, our financial systems lack the visibility to accurately portray the costs to operate and support individual weapon systems. It is ironic that the very foundation upon which our force capabilities are based—the weapon systems—are neither financially auditable nor accountable in terms of their ultimate cost effectiveness. Clearly, a critical review of our financial processes vis-à-vis weapon system life cycle management is necessary.

That effort is underway, with an intense focus on developing a strategic “to be” financial process aligned with the characteristics of performance-based weapon system support managed by the PM. One of the fundamental tenets of Performance Based Logistics (PBL) is the acquiring of weapon system support as an integrated package based on objective outcomes, such as system availability. The objective outcomes—or operational performance requirements of the customer—will be documented in a formal performance agreement document, negotiated across all stakeholders, consistent with the Services’ corporate structures. The performance agreement defines system performance expectations (and corresponding support required), resources required to provide that level of performance, commitment to provide those resources, and signature by appropriate stakeholders. Consistent with the agreement, the PM has assurance that the necessary funds will be avail-

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able to manage the established support arrangements.

In this strategic “to be” financial process, appropriated funds will continue to flow to the warfighter, but there will be assurance that weapon system negotiated performance agreement funds will be available to the PM to manage the support program. Should warfighter priorities change, performance agreements and resource commitments will be revised accordingly. This financial discipline is critical to the success of PBL support.

Revised Acquisition Policy

The pilot programs demonstrated the benefits of program office innovation in

improving sustainment; however, they also indicated the need to ensure that innovative sustainment strategies fit within an overall framework to deliver combat capability. These findings are incorporated into the emerging revisions of DoDD 5000.1, *Defense Acquisition*, and DoDI 5000.2, *Mandatory Procedures for Major Defense Acquisition Programs (MDAPs) and Major Automated Information System (MAIS) Acquisition Programs*, and include:

- The PM is the Total Life Cycle Systems Manager, responsible for the development and execution of a customer-focused sustainment strategy.
- PBL is the preferred weapon system sustainment strategy.
- PMs will integrate the sustainment chain via public-private partnerships, consistent with statutory requirements.
- PMs will design in and employ appropriate health monitoring and prognostics to enable Fleet management.
- Service Logistics Commands are the sustainment process owners responsible for developing and improving sustainment processes, ensuring a single face to the user, and enabling the delivery of combat capability.

These key policy tenets were developed, based upon the pilot programs and recent new programs, to provide PMs sufficient flexibility for innovation, while ensuring that we don’t replace functional stovepipes with weapon system stovepipes. These tenets reflect the current practice within DoD for new systems, such as the F/A-18 E/F.

The F/A-18 E/F is the first naval aviation platform to be deployed to the Fleet under a PBL strategy. That strategy was developed by the program office in conjunction with the Fleet, Naval Air Command (NAVAIR), and Naval Inventory Control Point (NAVICP). As shown in Figure 2, it features a government/industry partnership that draws upon the best practices of NAVAIR, NAVICP, and Boeing, the system developer.

Boeing, under a performance-based contract, is responsible for material man-



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Louis A. "Lou" Kratz is the Assistant Deputy Under Secretary of Defense (Logistics Plans and Programs), within the Office of the Deputy Under Secretary of Defense (Logistics and Materiel Readiness). As such, he is responsible for guiding the DoD's logistics process improvement efforts to meet the operational requirements of the 21st century. Kratz oversees the implementation of DoD's Future Logistics Enterprise and the development of DoD's long-range logistics planning to meet the requirements of the Quadrennial Defense Review and Joint Vision 2020. He also leads DoD's implementation of Total Life Cycle Systems Management and Performance-Based Logistics, including acquisition logistics policy development, career development, and oversight of major weapon systems. Kratz is the Defense Standardization Executive.

Prior to joining DoD, Kratz was the Director of Life Cycle Integration at TASC, with 18 years of experience in weapon system acquisition, acquisition reform, and information resource management. He was an initial contributor to the Contractor Integrated Technical Information System (CITIS) specification and cost/benefit guidelines. Kratz also directed TASC's support to the OSD Acquisition Reform Office and the FAA Acquisition Policy Office, including policy development, metrics, cost/benefit analyses, and best practices assessments.

During his career, Kratz has directed detailed acquisition strategy analyses for several programs: the Advanced Cruise Missile (ACM), Sensor Fuzed Weapon (SFW), Range Application Joint Program Office (RAJPO), V-22, D-5, Stinger PMS, Fiber Optic Guided Missile (FOGM), and Aquila. These efforts involved cost/benefit analyses of alternative strategies, tooling indemnification, subcontract management, and breakout.

From 1983 to 1984, Kratz worked as an associate at Sears World Trade, where he was the principal author of *Establishing Competitive Production Sources: A Handbook for Program Managers*, prepared for the Defense Systems Management College. He also prepared an integrated logistic support plan for the Canadian Low Level Air Defense System.

From 1980-1983, Kratz served as an acquisition analyst, conducting cost/benefit analyses of alternative acquisition strategies for the Advanced Medium-Range Air-to-Air Missile (AMRAAM) and the Global Positioning System (GPS). He also provided analytic support to the Air Force Affordable Acquisition Approach (A3) Study and the Air Force Contract Management Review.

Kratz holds a B.A. and an M.A. in Economics from Georgetown University. His professional affiliations include the National Defense Industrial Association, Aerospace Industries Association, and the International Society of Logistics.

Reengineered Professional Development

Continued professional development of our workforce is one of the top five goals expressed by E.C. "Pete" Aldridge, Under Secretary of Defense for Acquisition, Technology and Logistics (USD-AT&L); and the professional development of program management and

logistics management staffs is critical to develop life cycle managers. Our greatest challenge today is we have no true life cycle managers; in essence, we must develop them.

Successful implementation of life cycle management and PBL requires a fundamental change in training and career development. This training must address the different ways to do business and provide the workforce the skills needed to migrate to these different business methods. Such training changes are underway at the Defense Acquisition University (DAU), with fiscal 2003 designated as the year of "Logistics Reengineering" at DAU.

The program management curricula already benefits from increased sustainment emphasis in key courses such as the new Program Management Office Course (PMT-352). Broadened learning objectives addressing total life cycle management and PBL are planned for incorporation in other Program Management career track courses, particularly the executive refresher and capstone courses. Evolving critical logistics issues are most appropriately addressed in case studies such as those in the Program Manager's Course (PMT-401) curriculum and other case-based teaching.

Reengineering the logistics curriculum at DAU is along two fronts: 1) re-energizing Acquisition Logistics training, and 2) increasing Systems Sustainment Management training. Figure 3 reflects these two Logistics training tracks and identifies the life cycle management skill sets of each. Existing acquisition logisticians' training will be transformed toward an engineering perspective to: 1) convey the tools to more effectively advocate essential logistics requirements such as readiness objectives, 2) drive down the logistics footprint, and 3) press to reduce operations and support costs.

The new Systems Sustainment Management initiative will develop business managers skilled in supporting the PM in oversight of critical life cycle management responsibilities such as supply chain management, enterprise integra-

agement, sustaining engineering, and overall system availability. Under subcontract to Boeing, depot support is provided by the Naval Aviation Depot (Jacksonville). NAVICP manages the Boeing contract in support of the Program Office at NAVAIR. Customer requisitions and maintenance actions are processed through existing Navy systems.

tion, partnering implementation, and PBL oversight. Both logistics training initiatives include a heavy dosage of PBL training.

In addition to the Program Management and Logistics training changes, DAU plans to interconnect total life cycle systems management themes with contracting, business and financial management, and engineering and technology curricula. Thus is the power of DAU—teaching PMs, acquisition staff, and logistics managers in an inter-curricula context promoting life cycle management skills and perspectives.

Service Transition Plans

The fiscal 2003 Defense Planning Guidance required the Military Departments to develop and submit integrated schedules to transition Category I and II fielded systems to PBL strategies. The schedules included:

- Strategic Service actions to develop enabling policy and guidance.
- Program Milestones for assessing the costs and benefits of PBL strategies.
- Identification of barriers to PBL implementation.

The Service plans were provided to the USD(AT&L) in the spring of 2002. The schedules included an orderly migration of programs to a performance-based environment, consistent with workforce

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development, policy maturation, enabling financial mechanisms, and sound business case analyses. The plans also identified financial mechanisms and

statutory limitations as continuing barriers to full PBL implementation. The JLB, in conjunction with the Comptroller and the DUSD(L&MR), is assessing alternatives to overcome those barriers.

The Future Logistics Enterprise

The 2001 QDR clearly identified the immediate need for defense transformation to deter and defeat 21st Century threats. The primary purpose of DoD logistics is to support current and emerging force structure and capabilities. As the Department assesses required future capabilities and systems, we continue to defend our national interests with the systems we have now. In the near term, the only way to significantly improve deployment and sustainment capability is to transform the logistics practices that govern those capabilities.

The Future Logistics Enterprise is DoD's description of those transformed practices. It is our near-term end-state of transforming from a functional focus to an integrated enterprise, driven by customer operational requirements. Strategically, the FLE builds upon our existing comparative advantage in logistics to yield deployment and sustainment capabilities that enhance weapon system effectiveness.

As this article has outlined, the FLE includes six interrelated initiatives; however, none of the initiatives stands alone. Each initiative contributes to and draws from the others to yield an integrated logistics enterprise that is more capable than the sum of its parts. For example, the TLCSM initiative depends upon CBM+ and Enterprise Integration to provide the information systems and Fleet knowledge to effectively optimize customer support. TLCSM is inherently linked to enhanced partnering to achieve integrated weapon system sustainment chains.

Finally, the success of TLCSM is directly dependent upon the evolution of a global, integrated distribution system that consistently meets customer delivery times. Combined, these initiatives will enable DoD to continue to meet

FIGURE 2. F/A-18 E/F Navy/Industry Partnership



FIGURE 3. **Life Cycle Logistics Workforce Training Tracks**



customer requirements while providing a sustainment structure that fulfills the intent of the QDR.

Toward Logistics Excellence

Our acquisition community and our industrial partners designed, developed, and produced the technologically superior weapon systems that enabled the United States to defend our vital interests through the 20th Century. As we usher in the new millennium, the United States is faced with new, insidious threats that require rapid global response or, in some cases, preemptive, decisive action. Faced with those requirements, the na-

tion once again calls upon our acquisition community and industry to produce and sustain required capabilities.

The Future Logistics Enterprise, combined with our dedicated acquisition and logistics personnel across industry and government, will provide the logistics excellence that our warfighters need and deserve.

Editor's Note: The authors welcome questions or comments on this article. Contact them at lou.kratz@osd.mil, jerry.cothran@osd.mil, or randy.fowler

IN MEMORIAM

*Retired Navy Petty Officer
John Jenkins*

The Defense Acquisition University has received word of the death of Retired Navy Petty Officer John Theodore Jenkins on Sept. 16, 2002, in Alexandria, Va. A Vietnam veteran and career non-commissioned officer in the U.S. Navy, Jenkins was an Audio Visual Technician at the Defense Systems Management College (DSMC) from 1979-1982. He retired from the Navy in April of 1982 at the conclusion of his DSMC tour, after 22 years of military service. Following his military retirement, Jenkins worked as a contractor for Naval Sea Systems Command and the Federal Aviation Administration. He is survived by his wife of 39 years, Pearl, and two sons.

Philip Alan Bolt

The Defense Acquisition University has received word of the death of Phillip Alan Bolt on Sept. 21, 2002, in Camarillo, Calif. For the past 14 years, Bolt had shared his expertise in the Architect-Engineer (A-E) Contracting field with thousands of DoD personnel, first for the Naval Facilities Contract Training Center and then for the Defense Acquisition University at DAU West-Port Hueneme, Calif. He also served as the A-E expert for the DAU "Ask a Professor" program and was a pivotal member of the CON-101 and -202 writing teams in years past. A Vietnam veteran, Bolt was an exemplary contracting officer, most notably in Europe and Kings Bay, Ga. He is survived by his mother Mabel, as well as two brothers and two sisters.

Publications Update

Update to OTA Guide

The *Other Transaction Authority (OTA) for Prototype Projects Guide* has been updated. The updated version is posted to the Internet at: <http://www.acq.osd.mil/dp/dsps/ot/dspsot.htm>.

New Draft Guidebooks Posted for Comment

A draft *Manager's Guide to Technology Transfer*, dated August 2002, and a draft *Packaging Guidebook, Integrated DoD Guide to Performance-Based Packaging Practices*, dated Aug. 22, 2002, have been posted at: http://www.acq.osd.mil/ar/re_sources.htm. Comments on these two workforce resources can be provided to: gregory.redick@osd.mil for the Technology Transfer Guide and kathy.reid@osd.mil for the Packaging Guide.