Life Cycle Logistics
-- for the rest of us --

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WHAT IS YOUR DEFINITION OF LOGISTICS?

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— Dwight D. Eisenhower —

AZ QUOTES
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My logisticians are a humorless lot ... they know if my campaign fails, they are the first ones I will slay.

— Alexander the Great
Requirements vice Capabilities
Weapon System Life Cycles

- **F-14**: 1969-1973, Notional Projected Lifetime 41+ Years
- **F-15**: 1969-1975, Notional Projected Lifetime 51+ Years
- **CH-47**: 1956-1962, Notional Projected Lifetime 71+ Years
- **C-130**: 1951-1957, Notional Projected Lifetime 79+ Years
- **KC-135**: 1954-1957, Notional Projected Lifetime 86+ Years
- **B-52**: 1946-1955, Notional Projected Lifetime 94+ Years

**Keys**:
- **Red**: Base Model Program Start
- **Purple**: Base Model IOC
- **Orange**: Planned Phase Out (Last Model)
"Traditionally, development and procurement have accounted for about 28 percent of a weapon’s total ownership cost, while costs to operate, maintain, and dispose of the weapon system account for about 72 percent of the total. In 2015, about $200 billion (40 percent) of DoD’s base budget of $500 billion was designated for O&M Funding in the base budget for each of the other major categories was much. As a result, some modernization has been postponed in order to pay high and unexpected operating and maintenance costs."
THE PM IS JUGGLING A LOT OF BALLS

By the way, PM, you don’t have forever to make your mark…. GIT ‘ER DUUUUUN?
KEY PROGRAM DOCUMENTS

- **Acquisition Strategy (AS)**
  - Overall strategy
  - Specific targets per phase

- **Systems Engineering Plan (SEP)**

- **Test and Evaluation Master Plan (TEMP)**

- **Life Cycle Sustainment Plan (LCSP)**
  - Outline
  - Phase specific targets – sections required by phase

NEW!!!
A NEW FOCUS: PRODUCT SUPPORT STRATEGY

• The objective of the product support strategy is to achieve warfighter operational readiness outcomes.
  • Achieving these outcomes is dependent on optimizing the integrated product support elements that constitute the support strategy.

• The Product Support Manager (PSM) is responsible for the development and implementation of the Product Support Strategy
  • Inherently Governmental Function
WHAT IS A PRODUCT SUPPORT STRATEGY?

- Product support strategy should improve the product’s:
  - Availability
  - Reliability
  - Affordability
  - Supportability

- The strategy describes the supportability planning, analyses, and trade-offs.

- The support strategy should address how oversight of the fielded system will be maintained.

Source: Defense Acquisition Guidebook
NEW DOD POLICY GUIDANCE

12 Integrated Product Support Elements
• Two New Elements: Product Support Management and Sustaining Engineering.

PSM Guidebook: codifies and matures DoD Product Support
• Product Support Sustainment Chart
• Product Support Business Model
• 12-Step Product Support Strategy
• Sustainment Maturity Levels

Business Case Analysis Guidebook
• Tool for the PSM
• Optimizes balance of Warfighter capabilities & affordability
• Analytic, standardized, objective
• Required for MS B/C/FOC and every five years or prior to a change to the strategy

Logistics Assessment Guidebook
• Tool for the PSM
• Validates system support strategy
• Conducted by a team of Subject Matter Experts
• Required for MS B/C/FOC and every five years or prior to a change to the strategy
Product support is enabled by a package of 12 Integrated Product Support (IPS) elements designed to deliver system readiness and availability while optimizing system life cycle cost.

- “Package of support functions required to field and maintain the readiness and operational capability of major weapon systems, subsystems, and components, including all functions related to weapon system readiness”
  (10 U.S.C. § 2337)

  - Throughout system life cycle, from requirements determination through system design, development, operational use, retirement, and disposal
  - More than logistics – includes engineering, cost, program management & other areas
  - Twelve Integrated Product Support (IPS) Elements

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Product Support Management

A  
Materiel Solution Analysis

B  
Technology Maturation & Risk Reduction

C  
Engineering & Manufacturing Development

Production & Deployment

Operations & Support

Sustainment

Disposal

Design Interface

Supply Support

PHS&T

Technical Data

Support Equipment

Maintenance Planning & Mgt

Computer Resources

Training & Training Support

Manpower & Personnel

Facilities & Infrastructure
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Four Logistics Workforce Categories from DoD Logistics Human Capital Strategy

Includes procurement to disposal of defense system material, and integration of multiple material sources and processes to meet warfighter requirements.

Includes planning and executing maintenance, both scheduled and unscheduled, to defense system equipment.

Includes transportation, packaging, cargo scheduling, and dispatching of materials, support services, and personnel in response to customer requirements to move and sustain the force.

Includes planning, development, implementation, and management of a comprehensive, affordable, and effective systems support strategy.

Bottom line: Support the Warfighter!

Life-Cycle Logistics: At Nexus of DoD Acquisition & Logistics

DoD Acquisition Community

Life-Cycle Logistics

Property Mgt
Purchasing
Contracting
Program Mgt
PQM
BCEFM
Systems Engineering
S&T

DoD Logistics Community

Deployment/Distribution/Transportation
Supply Management
Maintenance Support

T&E
IT Mgt
FE
Audit

KEY FOCUS: Horizontal & Vertical Integration
Perhaps a Better Depiction
Is…

SUPPLY CHAIN MANAGEMENT

Includes procurement to disposal of defense system material, and integration of multiple material sources and processes to meet war fighter requirements.

LIFE CYCLE SYSTEMS MANAGEMENT

Integrated management of linked activities associated with providing materiel from a raw material stage to an end user as a finished product.

DEPLOYMENT/ DISTRIBUTION/ TRANSPORTATION

Includes transportation, packaging, cargo scheduling, & dispatching of materials, support services, and personnel in response to customer requirements to move sustain the force.

MANUFACTURING SUPPORT

Includes planning and executing maintenance, both scheduled and unscheduled, to defense system equipment.

LIFE CYCLE LOGISTICS

Includes planning, development, implementation, and management of a comprehensive, affordable, and effective systems support strategy.

WARFIGHTER SUPPORT ACROSS LIFE CYCLE

Includes planning, development, implementation, and management of a comprehensive, affordable, and effective systems support strategy.

AFFORDABLE, RELIABLE, MAINTAINABLE, SUPPORTABLE, & AVAILABLE SYSTEMS

OUTCOME-BASED LIFE CYCLE PRODUCT SUPPORT ARRANGEMENTS

…TRUE INTEGRATION
LOG and PQM Combined Workforce = 30,456
PRODUCT SUPPORT ENGAGEMENT STRATEGY ACROSS THE LIFE CYCLE

Key Objectives:

- Design, maintain and modify systems to reduce (or eliminate) demand for logistics
- Effective and efficient logistics support
- Optimize system availability/readiness and life cycle costs

Key Enablers:

- Life Cycle Management (LCM)
- Product Support Manager (PSM) & well-trained team of life cycle logisticians
- Supportability Analysis
- Product Support Strategy Development, Refinement, Implementation
- Life Cycle Sustainment Plan (LCSP)
- Product Support Business Case Analysis (BCA)
- Adequate O&S funding
- Key Life Cycle Sustainment Outcome Metrics
- Reliability, Availability, Maintainability, Supportability (RAMS)
- Performance Based Life Cycle Product Support (PBL) Strategies
- Prognostics & Health Management (PHM) and Advanced Diagnostics
- Proactive Obsolescence & DMSMS mitigation program
The LCSP Evolves

- Materiel Solution Analysis
- Technology M&RR
- Engineering and Manufacturing Development
- Production & Deployment
- Operations & Support

**Acquisition**

- IOC
- FOC

**Sustainment**

- LRIP/IOT&E
- FRP Decision Review
- Post IOC Reviews

**Materiel Solution Analysis**

- Establish sustainment concept & execution plan framework
- Set metrics goals/thresholds & test methods

**Technology M&RR**

- Identify key technologies
- Analysis process & estimating LCC drivers

**Engineering and Manufacturing Development**

- Support structure & Product Support Package requirements defined
- PSP & metric verification methods established
- Detailed development & fielding plans established

**Production & Deployment**

- Product Support Package elements refined
- Detailed site fielding plans refined
- Sustaining Engineering
- Logistics assessments

**Operations & Support**

- Fielding plans adjusted
- Metrics tracked & adjustment plans established
LCSP Phase Emphasis:
Material Solution Analysis Phase

**LCSP Focus:**
- Framing the baseline product support strategy
- Analytical process for determining:
  - Affordable metrics
  - Cost drivers and availability degraders
- Key sustainment technologies requiring development

- Establish notional maintenance concept and metrics
- Identify key technologies
- Analysis process & estimating LCC drivers
LCSP Phase Emphasis: Technology Maturation and Risk Reduction

LCSP Focus

- Baseline product support strategy
- Analytical process for determining affordable metrics goals and thresholds:
  - System and subsystem level
  - Supply chain
- Ensuring the supportability design feature requirement are incorporated in the overall design specifications
  - Sustainment metrics test methods

- Establish sustainment concept & execution plan framework
- Set metrics goals/thresholds & test methods
LCSP Phase Emphasis:
Engineering and Manufacturing Development Phase

LCSP Focus
• Product Support Package (PSP) & supply chain
  – Detailed Product Support Element requirements
  – Detailed Product Support Package development & implementation
  – Performance verification methods
  – Fielding plans
LCSP Phase Emphasis: Production and Deployment Phase

LCSP Focus

- Fielding plan details and adjustments
- Logistics assessments
  - How sustainment performance will be measured, managed, assessed and reported
- Analytical and management processes for:
  - Refining Product Support Package elements
  - Cost drivers and availability degraders
LCSP Phase Emphasis:
Operations and Support Phase

LCSP Focus

- Sustaining Engineering processes for refining Product Support Package elements
- Logistics assessments on how the system and supply chain are performing
- Adjustments required for program or funding changes
US Code Title 10 Section 2337 (Life-Cycle Management)

- Each major weapon system be supported by a Product Support Manager
  
  - “The Program Manager, with the support of the Product Support Manager (PSM), will…” (Aug 2017 DoDI 5000.02, Enclosure 6)

- Product Support Strategy
- Life-Cycle Sustainment Plan (LCSP)
- Product Support Business Case Analysis (BCA)
- Product Support Arrangements (PSA)
- Optimized Affordable Readiness

Provides weapon system product support subject matter expertise to the Program Manager for execution of PM’s duties as Total Life Cycle Systems Manager
PSM is the Warfighter’s Principle Product Support Agent
Responsible for Incentivizing PSI(s) to Achieve Warfighter Requirements
Product Support Manager (PSM)
10 U.S.C. § 2337 - PSM Role & Responsibilities

- Develop and implement a comprehensive product support strategy
- Use appropriate predictive analysis & modeling - improve availability & reliability, reduce O&S costs
- Conduct cost analyses to validate product support strategy, including cost-benefit analyses
- Ensure achievement of desired product support outcomes through appropriate product support arrangements;
- Adjust performance requirements & resource allocations across product support integrators (PSI) & product support providers (PSP) to optimize implementation of product support strategy;
- Periodically review product support arrangements between PSIs & PSPs to ensure the arrangements are consistent with product support strategy;
- Prior to change in product support strategy or every five years, revalidate business-case analysis of the product support strategy;
- Ensure product support strategy maximizes small business participation at appropriate tiers
- Ensure product support arrangements for the weapon system describe how such arrangements will ensure efficient procurement, management, and allocation of Government-owned parts inventories in order to prevent unnecessary procurements of such parts
- Identify obsolete electronic parts included in specifications for an acquisition program and approve suitable replacements for such electronic parts (Note: from FY14 NDAA Sec 803)

PSM is Responsible to the PM for Development, Implementation, and Execution of Life Cycle Product Support
Our job as Life Cycle Logisticians is to:
- Influence system requirements, design, development, testing, fielding, sustainment, disposal
- Tightly align product support planning and execution with a range of acquisition and sustainment community stakeholders
- Support system PEOs, PM and, product support managers in achieving program goals
- Develop, field & sustain reliable, available, maintainable, supportable, & affordable systems
- While achieving program cost, schedule, performance and supportability requirements
- Enabled by interdisciplinary, multi-functional integration
- Spanning the system life-cycle -- from requirements to disposal
- Documented in system life cycle sustainment plan and other programmatic documents
- Bridging acquisition and sustainment
- Supporting a wide range of customers and stakeholders
- In Support of the Warfighter

Our job at DAU is to support the workforce in achieving these outcomes through:
- Integrated, multi-functional learning asset portfolio
- Classroom, distance learning, continuous learning, and video-based training
- Web-based workflow learning resources
- Workshops, mission assist and advisory support
- Subject matter expertise
Figure P3. Integration of IPS Elements Product Deliverables
LIFECYCLE SUSTAINMENT PLAN = “LOGISTICS REQUIREMENT”
LIFE CYCLE SUSTAINMENT OUTCOME METRICS

Materiel Availability (KPP*)
• A Key Data Element Used In Maintenance and Logistics Planning

Materiel Reliability (KSA*)
• Provides A Measure Of How Often The System Fails/Requires Repair
• Another Key Data Element In Forecasting Maintenance/Logistics Needs

Ownership Cost (KSA*)
• Focused On The Sustainment Aspects Of The System
• An Essential Metric For Sustainment Planning And Execution
• Useful For Trend Analyses – Supports Design Improvements/Modifications

Mean Downtime
• A Measure Of How Long A System Will Be Unavailable After A Failure or PM
• Another Key Piece Used In The Maintenance/Logistics Planning Process

Established in 10 Mar 07 DUSD (L&MR) Policy Memo

* Sustainment KPP & KSAs Included In Revised CJCSM 3170

These 4 Life Cycle Sustainment Outcome Metrics Are Universal Across All Programs & Key To Effective Sustainment Planning
WHY OUTCOME BASED?

Budget pressures mean that we must do more with the same....

• Across the life cycle, product support costs for any system are larger than RDT&E and production combined...and costs are growing.
• We are buying fewer systems and keeping them longer, creating additional upward pressure on Operations and Support cost.
• Aging systems bring along baggage: obsolescence, decreasing reliability, diminishing manufacturing sources, and declining performance.
WHY OUTCOME BASED? CONT.

Proven way to impact readiness and reduce costs is to continuously invest in:

- Affordability
- Reliability
- Availability
- Maintainability

...beginning with the acquisition strategy.

Incentives = Continuous Investment = Better Performance & Lower Costs = Affordable Readiness
ADDITIONAL RELATED RESOURCES

- Life Cycle Logistics Community of Practice
- Logistics ACQuipedia Articles
- Life Cycle Logistics Tools
- CLL 004 Continuous Learning Module: Life Cycle Logistics for the Rest of Us
Ten Things Great PM’s Know About Product Support

1. I'm the life cycle manager (LCM): The product support buck stops with me.
2. The right Product Support Manager (PSM) is key. Demand excellence & accept nothing less.
3. Everything that really matters can be captured on a single page.
4. Design systems with supportability in mind.
5. Product support strategies must be iteratively crafted, revalidated, & documented.
6. Twelve new Integrated Product Support (IPS) elements provide the framework.
7. Obsolescence & DMSMS will eat your lunch (along with breakfast & dinner if not careful).
8. Performance Based Logistics (PBL) is a powerful force multiplier.
9. Maintenance planning and management is a big deal. So is supply chain management.
10. Acquisition and sustainment are ultimately two sides of the same coin.

Reference: PM e-Tool Kit
Aligned & Integrated Suite of DoD Product Support Guidance
...Reinforced by Portfolio of Targeted DAU Learning Assets

Overarching Policy: DoDI 5000.02, Enclosure 6 & DoD Life Cycle Sustainment Plan (LCSP) Outline

Key Players: product support managers, life cycle logisticians, program managers, systems & sustaining engineers

Common Themes: affordability, effectiveness, integration, outcomes, life cycle management

Focus: crafting & executing well-thought out, affordable product support strategies to meet warfighter readiness & cost requirements

LOG CoP
Logistics Community & Knowledge Repository

PBL CoP
PBL Community & Knowledge Repository

Analytical Tools
Product Support Tools Database

Product Support Strategy Development Tool
12-Step Implementation Tool

O&S Cost Mgmt Guidebook
Cost Guidance

BCA Guidebook
COA Guidance

DMSMS Guidebook
SD-22 DMSMS Mgmt Program

IPS Element Guidebook
12 Product Support Elements

ML-HDBK-502A
Product Support Analysis Supportability Analysis Process

RAM-C Report Manual
Design for Supportability

PSM Guidebook
Product Support Key Reference

DAG Chapter 4
Life Cycle Sustainment

PBL Guidebook
Product Support Arrangements

PPP Guidebook
Partnership Development

ILA Guidebook
Product Support Readiness

CBM+ Guidebook
Maintenance Enablers

IPS Roadmap
Product Support Across Life Cycle

Training
13 Logistics Courses & 44 Logistics CL Modules

ACQuipedia
137 Logistics & Product Support Articles

Logistics Blog
Latest LCL & Product Support Information