Performance-Based Logistics

SOLE Aberdeen Chapter
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Ken East, CPL
* Retail depiction based on Army example; retail processes reflect Service unique requirements and procedures.
Performance-Based Logistics

Customer Focused Product Support

Single Digit Response Time (days)

Competitively Sourced Prime Vendor

Integrated Product Support Provider

Daas

Industry Suppliers

ICPs/Depots

Integrated Material Management Center, etc.

* Unique to each Service; Program Manager,

Organic Depots

Delivery

Buying Availability

Commercial Maintenance Providers

Unique to each Service; Program Manager,

Integrated Material Management Center, etc.

DFAS

Unique to each Service; Program Manager,

Integrated Material Management Center, etc.

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PBL Working Definition

- **PBL** is a Sustainment Strategy designed to meet the **WarFighter’s Operational Requirements** at the most reasonable **Life Cycle Cost** and smallest sufficient **Logistics Footprint**. The strategy is a result of a **Business Case Analysis** (BCA) that balances the measurable inherent supportability characteristics of the Weapon System with a **Metrics** based and incentivized approach to product support under the direction of a **Product Support Integrator** (PSI).
Definition (…extract from PBL Army Implementation Guidebook)

- PBL has been mandated to achieve performance goals for a weapon system through a contractual-type document (Performance Based Agreement (PBA)) which shows clear lines of responsibility, authority, and metrics for measuring stated objectives.

- New skills, processes and roles are emerging from this evolving concept. All mission area functions are integrated and career fields are cross-trained.

(DoD 5000.1) **Performance-Based Logistics.** PMs shall develop and implement performance-based logistics strategies that optimize total system availability while minimizing cost and the logistics footprint. Sustainment strategies shall include the best use of public and private sector capabilities through government/industry partnering initiatives, in accordance with statutory requirements.
The Army has restated the OSD definition, as follows:

“a product support strategy in which the logistics requirements are stated as expected results (outcomes), and wherein the responsibility and accountability for meeting these expectations fall on the PM’s designated Product Support Integrator (PSI) and their product support provider(s) (PSP).”
x. **Performance-based logistics.** Performance-based logistics (PBL) is the preferred support strategy for materiel systems. The Army will implement PBL on weapon systems in order to provide the warfighter increased operational readiness; increased reliability; enhanced logistics response times; enhanced deployment; reduction in the logistics footprint; and reduction in logistics costs.

(1) **PBL implementation strategy.**

(a) The extent and level of detail to which PBL will be applied will be based on a business case analysis (BCA). The BCA will be validated by the Deputy Assistant Secretary of the Army for Cost and Economics, SAFM–CE, 109 Army Pentagon, Washington, DC 20310–0109.

(b) PBL will be implemented on all ACAT I and ACAT II programs, where PBL is proven to be economically and operationally feasible.

(c) PBL will be applied to ACAT III programs at the discretion of the PM, with approval from HQDA.

(d) When a PBL strategy is used, the PM will designate a product support integrator (PSI) to integrate all product support for the system. For new programs the PSI will be identified no later than the system design and development (SDD) phase. For other systems, the PSI will be identified as soon after the BCA has been validated by the DASA–CE.
(e) PBL must be tailored to individual system needs. Where feasible, the PM will integrate their system centric PBL strategy with those of other PMs to form a system-of-systems PBL strategy.

(f) PBL will be executed through performance based agreements (PBAs) with, at a minimum, the using MACOM(s) and the product support integrator (PSI). All PBAs will be approved by the AAE.

(2) **PBL constraints.** The following will serve as constraints in the design and implementation of a PBL strategy.

(a) The approach must be transparent to the field user. Transparency will be determined by any changes in how the field user is trained to perform logistical activities.

(b) Contractors on the battlefield policy will be followed unless a written waiver is obtained as defined in AR 715–9.

(c) The PSI will integrate with existing and future logistics systems, that is, STAMIS and WLMP.

(d) Total asset visibility (TAV) will be maintained.

(e) Standard Department of Defense (DOD) distribution hubs will be used for all contingency and wartime operations.
(3) **Decision criteria for PBL.** All ACAT programs will consider the PBL constraints, identified above, and the following in their BCAs:

(a) The commodity  
(b) Service life/life cycle phase  
(c) Operational requirements  
(d) Statutory provisions  
(e) Regulatory provisions  
(f) Linkage to higher level strategic plans and their performance measures
ARMY GOALS & OBJECTIVES

• To Provide Warfighters Increased Operational Readiness
• To Enhance the Logistics Response Times
• To Enhance Deployment
• To Reduce the Logistics Footprint
• To Reduce Logistics Cost
Army PBL
BOUNDARIES/CONSTRAINTS

- Follow Contractor On Battlefield Policy
- Maintain Total Asset Visibility
- Use of Distribution Hubs
- Use of STAMIS* Systems
- Compatible with Army Maintenance Strategy
- Transparent To the Field User
- Interface with SALE**

Statutory constraints
Regulatory constraints

*STAMIS – Std Army Mgt Info Sys
**SALE – Single Army Logistics Enterprise
Army PBL Criteria
-- How The Army Defines a Weapon System PBL --

PBL requires …
• Incentives for better product support performance outcomes
• Measurable metrics
• Best use of organic / commercial partnering resources
• Application of at least 1 of the DoD overarching metrics
• Compliance with the Army’s PBL guidance
• High potential for increase in system level performance
• Ability to facilitate continuous Logistics modernization

Must include, or have a plan for:
• An approved & validated Business Case Analysis (BCA)
• A Product Support Integrator (PSI)
• Performance Based Agreements (PBAs) between impacted entities (Warfighter, PM, PSI, PSP)
DOD Metrics

- Materiel Availability-KPP
- Material Reliability-KSA
- Ownership Cost-KSA
  - Total Life Cycle System Cost per Unit of Usage
  - Cost per Unit of Usage
- Mean Down Time
PBL In The Life Cycle

**Concept & Technology Development Phase**
- Initiate Business Case Analysis (BCA)
  - PBL Planning
  - Supportability Analysis
  - Risk Assessment
  - Life-Cycle Cost Modeling
  - SS Development
- SEIPT Participation
- Core Depot Assessment

**System Development & Demonstration Phase**
- BCA Development
  - Support Strategy Development
  - PSI Selection
  - Life-Cycle Cost Modeling
  - PBA Development
  - Data Collection Mechanics Identified
- SEIPT Participation
- Core Depot Assessment
- BOIPFD/QQPRI
- Training Analysis & Development
- Test and Evaluation Support

**Production and Deployment Phase**
- BCA Development
  - PSI Negotiates and Put PBAs/PSAs in Place
  - Test Data Collection in a Field Environment
- Complete Core Depot Assessment
- BOIPFD/QQPRI
- New Equipment Training Plan

**Operations and Support Phase**
- Performance Based Logistics Management
  - Metrics Data Collection and Performance Assessment
  - PSI Reports performance to PM (TLCSM)
- Continuous Sustainment Process Improvement
- Continuous Product Improvement
  - Reliability
  - Maintainability
  - HMI

**PBL Is A Life Cycle Process and Not Just A Sustainment Event**
Systems Engineering Discussion

Designing a Supportable System

That Meets the Warfighter’s Performance Requirements

Lowest Cost

Smallest Footprint

METRICS DRIVEN!!
System Design Processes

• Used To:
  – Convert Agreed-Upon Performance Objectives Into a Set of Realizable Products That Satisfy Acquirer and Other Stakeholders
  – Define Requirements
  – Define Performance Levels
  – Prepare a Set of System Technical Requirements That Are Unambiguous, Consistent, Achievable, Verifiable and Necessary and Sufficient For a System Design
Supportability*

• Supportability is co-equal to cost, schedule, and performance.

• System supportability must be fully addressed throughout the system acquisition process.

• Supportability analyses must be conducted as an integral part of the systems engineering process to ensure supportability requirements are identified to optimize total system performance.

• Supportability planning and execution are a component of the integrated logistics support (ILS) process, as defined in Army Regulation (AR) 700–127.

* Paragraph 1-4,g
Supportability in the System Engineering Process

- Allocate System Level Supportability Parameters to Lower Level Systems and Sub-systems Until All System Level Requirements Are Met
- Supportability Metrics Can Be Allocated and Distributed to Lower Levels In Exactly the Same Way as Other Performance Requirements
- Supportability is Measurable, Allocable, and Predictable
- Testable!
Business Case Analysis
Business Case Analysis - BCA

A BCA Should Be Conducted to Assure That All Business Decisions Related to System Operational Effectiveness are Based On PBL Goals of Meeting or Exceeding the Warfighter’s Performance Requirements at the Most Reasonable Life Cycle Cost and Smallest Practical Logistics Footprint.

In that Context:
• Every Design Decision Is a Business Decision
• Every Supportability Decision is a Business Decision
What is a BCA?

- Tool used to influence and assess the Design for Supportability
- Document that identifies feasible alternatives
- Tool used to select Support Strategy
- Tool used to manage process improvements
- Used to Identify Underlying Support Metrics
- Tailored to each application
- Validated by Army DASA(CE)
Business Case Analysis - BCA

Included in a BCA:

- Warfighter Metric Goal/Customer Satisfaction Index
- Statement of scope – What is and is not included
- Explanation of How Equipment Design Considerations Contribute to Meeting Warfighter Readiness Metric at Lowest Cost and Footprint
- Statement and Analysis of Design and Support Alternatives
- Risk assessment for each alternative
- Selected Justified Alternative
- Life Cycle Cost Projections
- Required Measures of Supplier Performance
- Footprint Assessment

No Pre Conceived Notions of
Establishing PBAs

DoD policy states that: “The PM shall work with the users to document performance and support requirements in performance agreements specifying objective outcomes, measures, resource commitments and stakeholder responsibilities.”

(DoDI 5000.2, Para 3.9.2.3)
Performance Agreements

• Force Provider Focused – High Level Metrics
  • Documents the negotiated range of support metrics necessary to meet operational objectives
    – Expectations
    – Range of performance
    – Peace and War

• Involves and is recognized by all appropriate stakeholders
  – Service corporate structure
  – Logistics providers
  – Customers

• Synchronizes allocated resources (corporate decision process) with service level expectations
A written performance-based agreement between the PM and the user is the foundation of the PM’s overall PBL support strategy.

• Typically, the agreement identifies ranges of outcome performance with thresholds and objectives (possibly stemming, in part, from the Key Performance Parameters for the system).

• The agreement also delineates any constraints or boundary conditions (e.g. funding resources) and will delineate variations, when applicable, for various types of operational use (e.g. peacetime, training, and surge or contingency).

• The execution performance level will be dictated by the allocation of funds to a weapon system during the execution year.
Performance-Based Logistics

INDUSTRY/ORGANIC
Support Provider

Program Manager (TLCSM)

Warfighter (Force Provider)

Ensure system is sustained at optimum level per agreement

Provide continuous, reliable, affordable support per agreement

Visibility into cost/risk decisions across life cycle

Buys Performance As a Package (Including Surge/Flexibility)

Provide continuous, reliable, affordable support per agreement

Disposal

Acquisition

Sustainment

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Industry/organic Buys Performance As a Package (Including Surge/Flexibility)
Product Support Integrator

- Reports to PM – TLCSM
- Single interface between the force provider and the service/support providers
- Enforces performance agreements with suppliers
- Balances ILS elements with design characteristics to reduce cost and increase effectiveness IAW PA
- PSI must have authority to integrate all participants in a fashion to maximize outcomes required by the PBL agreement
The PSI is a single source responsible and accountable for providing product support to the assigned Defense/Army system (the PM)

The PM designated ILSM oversees the supportability and product support activities, which include providing guidance to the SIPT and the PSI

The PSI does the execution, monitoring and redirection of product support -- identifies the product support requirements -- with sub-tier providers, provides logistical products and services at a stated level of performance (per PBA) -- takes whatever action is necessary to ensure the performance goals are met

-- Per PBL Army Implementation Guidebook
Product Support Integrator (PSI) Functions (cont’d)

Definitive PSI Functions have their Basis in the Performance Based Agreement --

- Meet realistic, quantifiable, and measurable metrics identified by the PM
- Collect, process, analyze and report performance data as identified/required in the PBA
- Plan, program and distribute funds as identified/required in the PBA
- Collect and provide specific supportability data (reliability, maintainability and availability data) and cost data from data sources identified/required in the PBA
- Follow the formula for calculating the critical metrics from the data elements and formulas identified/required in the PBA
- Meet the identified/required schedule (frequency) for reporting results and use the identified/required format found in the PBA
- Participate in a formal performance review to present results/difficulties/etc
- Follow the formal dispute resolution process outlined in the PBA, if required
- Provide/honor signatory authority of PBA acceptance in all cases
- Metrics -

Measuring Performance
Metrics

- Metrics Should Be Achievable and Measurable
- What Is The PM Going To Deliver To The Warfighter?
- How Are the Service Providers Going To Be Measured?
- Initially Obtained from the Requirements Document
- May Be Refined By Theater Commanders
PBA Performance Metrics

- Measure how well objectives are met or exceeded
- Identify realistic, quantifiable, & measurable metrics
- Use Warfighter’s supportability-related performance requirements to influence design
- Identify all stakeholders roles and responsibilities
  - To collect, process, analyze, and report performance data
- Identify the source and data to be collected
- Describe data elements and formula(s) to calculate critical metrics
- State frequency and format for reporting results
- Establish formal performance review frequency
- Establish formal dispute resolution process
Help Define/Establish Contract Metrics

• Selecting appropriate metrics is one of the most important aspects in constructing a PBL arrangement.
• The metrics must relate directly to the customer's/end user's requirement.
• The metrics must be easy enough to gather data on and accurately measure and validate the contractor's performance.
Sample Supportability Requirements:

- **Availability 95% -** (SOO 3.11.1)
  - The intent of the Government is to maintain an operational availability of 95% for the AN/XXX system.

- **Reliability** (PS 3.19) – 185 HRS (I1) - 330 HRS (I2)
  - Must reach 80% Confidence Level
  - Minimize single points of failures (I1) (PS 3.19.1)

- **Maintainability** (PS 3.20) (I1):
  - Operators perform 80% of scheduled maintenance (PS 3.20.1)
  - Maintenance Ratio will not exceed 0.05 Maintenance Man-hours/Operating hour (PS 3.20.2)
  - Maximum-Time-To-Repair (MaxTTR) at field level shall not exceed 30 minutes for 90 percent of the maintenance tasks (PS 3.20.3)
  - Built-In Test (I1) (PS-3.20.4)
    - Built-in Test/Built-in Test Equipment (BIT/BITE) shall isolate and report failures or faults to the maximum extent possible.
    - BIT must demonstrate the capability to detect and isolate all system mission-critical faults or failures to a single LRU. The false removal rate for LRUs shall be less than 2%.
    - Those faults/failures not isolated by BIT shall be capable of being isolated by manual troubleshooting procedures using IETM and standard tools.

- **PS =** Performance Specification
- **SOO =** Statement Of Objectives
**Operational Availability**

**Definition:** The percent of time that a weapon system is available to sustain operations

**Formula:** \[ Ao = \frac{MTBM}{MTBM + MDT} \]

**Variables:**
- MTBM  Mean Time Between Maintenance
- MDT  Mean Down Time
Operational Availability Pictorial Hierarchy

- **$A_o$** (from Sparing x $A_o$ adjustment from Periodic Actions)
  - **$A_o$ from sparing**
    - [ $\frac{MCTBF}{(MCTBF + MTTR + MRDT + CWT)}$ ]
    - **MTBPA**
    - **MDTPA**
    - **(MTBF x 24 / Op Hours per Day)**
    - **MCTBF**
    - **MTTR**
    - **MRDT**
    - **CWT [ (1 – SA) x RCT (repair chain) or RWT (supply chain) ]**
    - **Op Tempo**
    - **MTBF**
    - **SA (PLL)**
    - **RCT (unit)**
    - **(RST + TAT + OST) - or - RWT (unit) [ OST + (1 – SA) x RCT or RWT ]**
    - **RST (from unit)**
    - **TAT**
    - **OST (to PLL)**
    - **SA (ASL)**
    - **RCT (ASL) - or - RWT (ASL) [ OST + (1 – SA) x MTTOBO ]**
    - **RST (from ASL)**
    - **TAT**
    - **OST (to ASL)**
    - **SA (wholesale)**
    - **MTTOBO**
Logistic Footprint

**Definition:** The government/contractor size or “presence” of logistics support required to deploy, sustain, and move a weapon system.

**Formula:**
- Weight = Total weight of deployable consumables, support equipment, energy, and spares.
- Volume = Total volume of deployable consumables, support equipment, energy, and spares.
- Personnel = Total number of personnel in the deployed area required to transport and sustain the weapon system.
Logistics Footprint

• Design
  – Test Measurement Diagnostic Equipment (TMDE)
  – Spiral Development
  – Design for Logistics Footprint Reduction
  – Logistics Modeling and Simulation
  – Open Architecture
  – Physical Dimensions
  – Power Requirements
  – Commonality of Components
  – Single Fuel

• Reliability and Maintainability
  – Failure Factor (FF)
  – No Evidence of Failure Rate
  – Maintenance Ratio
Logistics Footprint (Cont.)

- **Personnel**
  - Number of Operators
  - Number of Maintainers
  - Transportability
  - Training
  - Technical Manuals (TM)

- **External Factors**
  - Technical Manuals (TM)
  - Transportation
  - Diminishing Manufacturing Sources (DMS)
  - Density
  - Facilities Set Up Time
How to Measure (Metrics) and Manage Performance

Design Phase (Use cost and availability models)
- Life Cycle Cost – Power costs, Crew size, Vehicle costs
- Design to Availability Ao (High Reliability)
- Footprint

Production/Support Phase
- Availability
- Improve Reliability (lower Life Cycle Cost)
Conclusion
PBL – Lessons Learned

- PBL Is Not Just A Sustainment Activity
- PBL Is A Systems Engineering Discipline
- Supportability and Sustainment are Different
- Business Case Analysis Evolves and Documents
  - Supportability (Ao, LCC, Footprint…) In Design
  - Logistics Infrastructure Trade-Offs
  - Sustainment Concept and LCC
  - Performance Based Agreements-
  - PBL Management-PSI
- Contractual Considerations-Metrics and Incentives
PBL Building Blocks

Business Case Analysis
Comments or Questions?