Using Analytics to aid in Performance Based Logistics Decision Making Processes

ICEAA 2021 Professional Development & Training Workshop
May 17-20, 2021
Agenda

- Problem
- Operations & Sustainment Costs
- Performance Based Logistics – overview
- Use of modeling to assess system performance
- Current approach and measures
- What will change with a PBL?
- How might one evaluate whether a PBL is a good way forward?
The primary goal of DoD weapons system acquisition programs is to acquire capabilities needed by the warfighter and have those capabilities available when they are required. Historically there have been challenges in having programs meet these readiness requirements.

However, readiness cannot come at any cost. Increasingly, affordability plays a more prominent role in evaluating the future of weapons system programs, particularly when focusing on operations and sustainment.

As OEMs push towards high dollar value, long-term Performance Based Logistics (PBL) contracts, decisions surrounding these types of contracts should be driven by an analytical process. PBL is sold as a way to improve system performance while reducing costs. Modeling and simulation can be used to evaluate the performance and cost impacts of the PBL-suggested improvements and assist decisions makers select an appropriate way forward.

### System Readiness and Affordability Problem

### MISSILE-CAPABLE RATES

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Total (funded) 4566
Total (under fianl) 5249
Average (entire fleet) 71.39% 72.10% -0.08% 72.10% 72.10%

*Value for Air Force*
The Classic Iceberg

- Acquisition costs
- Operation costs
  - Maintenance costs (repair and overhaul)
  - Software support costs
  - Documentation costs
  - Spares and repair component costs
- Service costs
  - Technical support costs (contractor support)
  - Training costs
  - Costs for tools and test equipment
  - Disposal costs

**PBL focus area**

- Acquisition costs are typically the most visible for a weapon system program.
- Operating and sustainment costs make up the majority of the cost for these types of programs.
- PBLs will focus on spare parts supply and maintenance.
Operations & Sustainment Costs

Once a program reaches the O&S phase, the opportunity to reduce the total lifecycle cost is small.

However for all types of acquisition programs, the O&S portion of LCC (in blue on the right) is the largest.
Performance Based Logistics - Overview

Most programs follow a transactional approach to O&S. In a transactional approach, “support” is procured, which refers to the spare parts and maintenance required to support an acquisition program.

With a PBL strategy, performance is procured. How that performance is achieved is ultimately up to the winner of the PBL contract.

The PBL strategy works by incentivizing desired outcomes. Under the traditional transactional product support model, a Contractor is not incentivized to reduce the need for repairs and repair parts. When equipment fails or is overhauled, the provider charges the Services for repair or replacement on a transaction-by-transaction basis. With transactional sustainment, the provider’s revenue and workload increase as equipment failures increase.

In a PBL arrangement, a commercial provider is incentivized to reduce both the number of repairs and the cost of the parts and labor used in the repair process. Commercial providers are incentivized to reduce system downtime in PBL arrangements because the contract specifies it or their profit is increased by reducing their cost.
Performance Based Logistics – How do we evaluate

Refer back to the problems we are trying to address: system performance/readiness and affordability. These areas will be the focus of the evaluation of a PBL strategy.

There needs to be a metric established to measure system performance/readiness, of which there are a few to consider:

- Mission capable rate
- Fully mission capable rate
- Non-mission capable for supply or maintenance

There could also be certain metrics established for lower level components (below the system level), such as:

- Supply response time
- Gross issue effectiveness

Finally, some measure of affordability needs to be included:

- Total operating and sustainment cost
- Cost per operating hour
Utilize models to simulate system readiness and sustainability over time

- Evaluate different scenarios, uncertainty and the impact of time-dynamic factors
  - Simulate effectiveness, resource utilization and drivers of unavailability
  - Establish flexible, robust and sustainable solutions

SUPPORT SOLUTION ➔ OPERATIONAL CONCEPT ➔ TECHNICAL SYSTEM

Utilize models to simulate system readiness and sustainability over time
Performance Based Logistics – Understand the current approach

How has the system in question performed on the PBL evaluation metrics in the past?

What are the projections for these metrics going forward based on the status-quo transactional approach?

Does the current way forward include funded improvement plans?
Performance Based Logistics – Understand the current approach

What is the current forecasted lifecycle sustainment cost and when does it get potentially unaffordable?

Which area of sustainment cost is the top cost driver?

Do total lifecycle sustainment costs and cost per operating hour follow similar trends?
Performance Based Logistics – What will change v. the baseline

- Component lead times
- System maintainability
- Component reliability
- Part Prices

[Graph showing performance projections over years]
Performance Based Logistics – Evaluation

Do the proposed changes with a PBL strategy meet our system performance goals?

Is the PBL approach more affordable? If not, is meeting performance goals more important?

Does the contractor have confidence in the ability to meet the targets? What incentive structures are in place?

Penalty (MTF ≤ 0.9) = 100 %
Penalty (0.9 ≤ MTF < 0.91) = 90 %
Penalty (0.91 ≤ MTF < 0.92) = 80 %
Penalty (0.92 ≤ MTF < 0.93) = 60 %
Penalty (0.93 ≤ MTF < 0.94) = 40 %
Penalty (0.94 ≤ MTF < 0.95) = 10 %
Penalty (MTF ≥ 0.95) = 0 %

Penalty distribution (100 replications)

Average penalty: 22%
Questions & Discussions