NDIA Joint DoD-Industry Life Cycle Cost/Total Ownership Cost Workshop

27 April 2010

Sponsored by:
NDIA Systems Engineering & Logistics Divisions
Workshop Objective

Convene senior SMEs from OSD, Services and Industry to address major issues related to assessing and optimizing LCC and affordability for both new and existing weapons systems in order to deliver value to the warfighter. The group will identify and prioritize issues and accomplish a first level assessment of root causes of each issue.
Agenda

• 0730 Continental Breakfast
• 0800 Welcome: Bruce Pieper, NDIA Logistics Division, Chair, LCC Committee
• 0810 Opening Remarks: Mr. Randy Fowler (Assistant Deputy Under Secretary of Defense, Materiel Readiness), Mr. Nic Torelli (Director, Mission Assurance Systems Engineering, DDR&E)
• 0845 Agenda Review, Administrative Information, Introductions: Jerry Cothran, NDIA System Engineering Division, Co-Chair, LCS Committee
• 0945 Break
  – Team Composition: 4 teams
    1. Pre-Milestone B (Material Solution Analysis, Technology Development, Analysis of Alternatives)
    2. System Acquisition (EMD: Requirements, Design and Development, T&E)
    3. Production and Deployment (Initial fielding through FOC and standup of Organic Depot capability)
    4. Operations and Support: phase out of production; operational use (FOC through disposal)
• 1000 Walt Cooper (CAPE) Updates on Major Operating and Support (O&S) Cost Projects
• 1030 Team Group Activity 1: Identify and Prioritize the Issues
  – Product: Consensus list of issues prioritized by Life Cycle Phase categories
• 1200 Lunch: Provided
• 1300 Team Group Activity 2: Recommended Actions
  – Product: List of recommended actions to address issues
• 1530 Break
• 1545 Summary/Closing Joel Moorvitch, NDIA System Engineering Division, Co-Chair, LCS Committee
• 1630 Adjourn
Administration

• Team Composition
• Handouts
• Restrooms
• Breaks
• Lunch
• Blackberrys, Cell Phones

During Breaks and Lunch!
Lack of a well-defined and institutionalized methodology for assessing the life cycle cost and affordability of DoD weapon systems across the defense system life from Material Solution Analysis through Technology Development, EMD, Production and Deployment, Operations and Support, and Disposal activities for new and legacy systems.
There is an urgent need to:

- Conduct early (pre-Milestone B) LCC-Affordability CAIV trades to enable “design for support” of system configurations that will meet warfighter mission capabilities while optimizing life cycle cost and enabling affordable sustainment strategies.

- Emphasize and enable post Milestone B Design and Development tools, guidance, and methodologies that facilitate producing systems that optimize supportability in both the primary system and the enabling support infrastructure.

- Identify and enable methodologies and analytic tools necessary to optimize modifications and upgrades to operationally deployed systems that emphasize and optimize LCC, obsolescence mitigation, and affordable sustainment.
Potential additional discussion areas:

• Also consider upgrades to already deployed systems.
• Also include consideration for incremental capabilities to users
• DoD initiatives for robust, adaptable and supportable systems not currently using Life Cycle affordability.
• Current DoD affordability metrics focused on initial acquisition costs only
Affordability Project Scope

- Identify and characterize LCC-Affordability issues across the DoD life cycle framework
- Address both new development programs and legacy deployed operational systems
- Address Systems Engineering and Logistics Engineering functions and methodologies including Analysis of Alternatives, System Architecting, “Design for Support”, CAIV trades, optimizing the Primary system and the Enabling product support infrastructure, and assessing and optimizing modifications, upgrades, and service life extension programs for affordable sustainment and minimized life cycle cost
Affordability Project Tasks

• Conduct DoD and Industry workshop
  – April 27, 2010
• ID and prioritize LCC-Affordability issues
• Determine root cause and relationship of these issues to the system life cycle.
• Prepare recommendations and appropriate guidance
Affordability Project Deliverables

• A gap analysis identifying prioritized LCC-Affordability issues mapped to the DoD life cycle framework
• A top-level root cause analysis for the identified issues
• Initial list of required solution sets for LCC-Affordability issues
• Initial list of appropriate supporting/enabling metrics pertinent to identified issues and solution sets
  – Action/path forward recommendations report that can provide the foundation for: A more detailed action plan
  – Subsequent DoD/OSD policy and guidance on LCC-Affordability
Affordability Project Schedule

- Workshop April 2010
- Prioritized Issues List May 2010
- Results of root cause analysis September 2010
- List of appropriate metrics December 2010
- Recommendations March 2011
LCC/TOC Challenges
Policy & Guidance

- Policy and Guidance
- Where are LCC/TOC opportunities?
- Focus by Life Cycle Phases
- Affordability Touch Points
Policy & Guidance

• Weapon Systems Acquisition Reform Act (WSARAA) 2009
  – Established the new Cost Assessment and Program Evaluation Office
  – Stronger emphasis on cost and accurate cost estimates

• Section 805 2010 NDAA
  – “Maximize value to the Department of Defense by providing the best possible product support outcomes at the lowest operations and support cost”
2010 Sustainment Governance

“Increasing visibility of sustainment factors is vital to ensuring we deliver a program that meets Warfighter materiel readiness objectives with long-term affordability consideration”
• PSAT Report
  – “The lack of an affordability requirement and adequate visibility of operating and support costs has been a long-standing barrier to effectively assessing, managing, and validating the benefits or shortcomings of product support strategies”
  – “Recommendation: Make life cycle affordability a core business process for all communities and stakeholders involved in system acquisition and sustainment”
Policy & Guidance

• USD/ATL Reliability, Availability, and Maintainability Policy memo 2008
  – “Establishing reliability improvement policy, with appropriate oversight, will support effective implementation of the mandatory Materiel Availability Key Performance Parameter, and Material Reliability and Ownership Cost Key System Attributes”
Policy & Guidance

• USD/ATL Next Steps to Improve System Reliability memo, March 2010

• “My Director, Systems Engineering, will chair a working group with executive membership representing the Director, Defense Procurement and Acquisition Policy; the Director, Developmental Test and Evaluation; the Assistant Deputy Under Secretary of Defense for Materiel Readiness; and the President, Defense Acquisition University. The Director will assess existing reliability policy and, within 90 days, propose actions for my approval that will improve effectiveness.”
Where are LCC/TOC Opportunities?

- **Life Cycle Phase**
  1. **Pre-Milestone B** (Material Solution Analysis, Technology Development, Analysis of Alternatives)
  2. **System Acquisition** (EMD: Requirements, Design and Development, T&E)
  3. **Production and Deployment** (Initial fielding through FOC and standup of Organic Depot capability)
  4. **Operations and Support**: phase out of production; operational use (FOC through disposal)
Across the Life Cycle

A
Materiel Solution Analysis
- Materiel Development Decision

B
Program Initiation
- Technology Development
- Engineering and Manufacturing Development
- Post PDR Assessment
- Post-CDR Assessment

C
Production & Deployment
- IOC
- FRP Decision Review

FOC
Operations & Support (Legacy & New)

Early Acquisition
- System Design
- Initial Fielding
- Life Cycle Support

Develop good Requirements for Affordability & Supportability

Design for Support
- Design the Support System Architecting Initial PSS analysis

Finalize PSS
- WBS Analysis
- Support Transition Planning

Validate PSS
- Reduce O&S Cost; Mod Trades

CAIV Trades
Design for Support
PSS Analysis
PSS Validation & Refinement
Analyses Scope and Depth

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

#### Early Acquisition
- Materiel Solution Analysis
- Technology Development
- Engineering and Manufacturing Development

#### System Design
- Materiel Development Decision
- Engineering and Manufacturing Development

#### Initial Fielding
- Production & Deployment
- Operations & Support

#### Life Cycle Support
- Operations & Support

### Teams: focus on issues in your phase, but discuss actions, inputs, outputs across phases

#### Analysis/Trades
- Assess configuration costs
- Assess mission profiles
- Versus acquisition $$$
- And supportability $$$
- Mission Simulations
- Parametric data
- Modeling of
  - Mission profiles
  - Configurations
  - Support impacts
  - Support cost

#### System Design
- Engineering models
- Architecting tools
- Design trades
- Modeling of
  - Design & support cost
  - Support impacts
  - Support cost

#### Initial Fielding
- Finalize support strategy
- Reliability improvement
- Depot transition plan
- Support system stand-up

#### Life Cycle Support
- Finalize support strategy
- Reliability improvement
- Depot transition plan
- Support system stand-up

- Mod CAIV trades
- Assess SLEP options
- Assess obsolescence impacts
- Invest for supportability

- PSS analysis
- PSS alternatives
- Initial support strategy

- Mod/upgrade trades
- Obsolescence impacts
- Invest for supportability

- Mission Simulations
- Parametric data
- Modeling of
  - Mission profiles
  - Configurations
  - Support impacts
  - Support cost
 Updates on Major Operating and Support (O&S) Cost Projects

NDIA/DoD Life Cycle Cost/Affordability Workshop

Walt Cooper
CAPE
April 27, 2010
About O&S Costs

- Long track record of real annual growth
- O&S costs tend to increase with greater weapon system complexity

![Pie charts showing the distribution of O&S costs in different categories: Surface Ships, Fixed Wing Aircraft - Fighters, Rotary Wing Aircraft, and Ground Systems.](image-url)
CAPE Responsibilities in O&S Costing

• Lead or assist DoD efforts related to O&S costing
  – Collection of contractor costs
  – Work with L&MR on Life Cycle Management Initiatives
  – Use of T&E data in cost analysis
  – Linking reliability with O&S costs
  – Costs of depot operations

• Prepare independent estimates of O&S costs

• Provide oversight of cost collection programs: Visibility and Management of Operating and Support Costs (VAMOSC)
  – Establish policy
  – Promote use of actuals to predict future costs
  – Conduct annual review, required by regulation
WSARA-Directed Review of O&S Costs for Major Defense Acquisition Programs

• Two tasks
  – Review existing systems and methods for tracking and assessing O&S costs for MDAPs. Include findings and recommendations.
  – Assess feasibility and advisability of establishing baselines for O&S costs

• Report to be provided to the Secretary by May 22, 2010 and oversight committees within 30 days thereafter

Statute does not identify issues, but we know we have a problem with cost growth.
About the Departments’ Systems and Methods

- More than 60 systems used across the military departments and OSD – all geared to support decision-making and analysis

- No major issues with the systems and methods themselves

- Instead, we need to:
  - Improve the quality and timeliness of the information
  - Strengthen estimating methods by providing more recent results from testing
  - Examine our human capital -- size and skills of O&S cost analysis workforce – and supporting information systems
Establishing O&S Cost Baselines

- Department has been moving in this direction since 2004 Defense Science Board review
  - Ownership Cost Key System Attribute
  - Resources-to-Readiness pilot program (PB-60)
  - Sustainment Quad Chart

- Challenges
  - Accountability
  - Validation
  - Promoting good decision-making
Areas of Likely Recommendations

- Management oversight
- Quality and timeliness of O&S cost information
- Visibility into investments in reliability and maintainability
- O&S cost baselines
Sustainment Contractor Cost Reporting

• Reliance on industry for sustainment has increased in recent years

• Notable examples
  – Stryker in OIF
  – MRAP vehicles in OEF and OIF
  – F/A-18 E/F
  – F-22A
  – T-45 Navy jet trainer
  – C-17A
  – Joint Surveillance Target Attack Radar System (Joint STARS)
  – UAVs

• The issue: Limited visibility into contractor costs seriously degrades cost analysis in support of life cycle cost estimates, business case analyses
Numerous programs have submitted sustainment cost-reporting plans
- Military departments and CAPE working these on a case-by-case basis
- Non-standard reporting structures BUT structures are “mappable” to standard O&S cost structures

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<thead>
<tr>
<th>Program</th>
<th>Contractor</th>
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<tbody>
<tr>
<td>F-119 Engine (F-22A)</td>
<td>Pratt &amp; Whitney</td>
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<td>F-22A Air Vehicle*</td>
<td>Lockheed Martin</td>
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<td>F-414 Engine (F/A-18E/F)</td>
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<td>Joint Cargo Aircraft</td>
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<td>C-5M RERP</td>
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<td>V-22</td>
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<td>Light Utility Helicopter</td>
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<td>F-35 (JSF)</td>
<td>Lockheed</td>
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<td>F/A-18E/F FIRST</td>
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Path Forward

• We have coordinated proposed formats, data item descriptions and reporting requirements with cost centers and industry
  – Industry participation: Northrop Grumman, Boeing, Lockheed Martin, GDLS, Pratt & Whitney, and Raytheon

• Will launch training program for industry this fall

• Mandatory reporting requirements for sustainment will be published later this year
Additional Topics

- Greater rigor needed in Milestone A life cycle costing… PM must notify Milestone Decision Authority if estimate increases by more than 25%
- Addressing energy efficiency in AoAs -- Fully Burdened Cost of Fuel
- Capturing full manpower costs -- Fully Burdened Cost of Manpower
LCC/TOC Issues

NDIA/DoD LCC/TOC Workshop
27 April 2010
LCC/TOC Issues Categories

1. Culture/Lack of Understanding/Value
   - Source Selection Authorities
   - RFP authors
   - DoD reviewers
   - Education

2. Lack of Sufficient Requirements Definition
   - Definition of scope and incremental plan
   - Missing TOC requirements
   - Missing Design for Support Requirements
   - Missing Support of the Design requirements
   - Methodology for improving confidence and completeness of requirements

3. Disconnect between Budgeting and LCC Analysis
   - Inflexibility of Funding Sources
   - Colors of money
   - Annual funding profiles/budgeting cycles
LCC/TOC Issues Categories Cont

4. **Limitations to Contracting**
   - Limited multi-year contracts
   - Competition for Competition sake
   - Policy/Title 10

5. **Lack of Sufficient Evaluation Tools/Methodologies**
   - No agreed upon models for LCC trades (cost and performance)
   - BCA
   - Lack of actuals
   - Need to identify cost drivers and questions by program phase
   - Evaluating completeness of requirements and KPPs/KSAs

6. **Conflicting Program Management Concerns**
   - Keep program sold
   - Talk LCC but work in shorter term decisions
   - Ensure program executable
   - Cost estimating approaches
   - Lack of skilled People

7. **Stovepipe Organizations**
   - Don’t work holistically
   - Multiple Teams/Overlapping Charters
Teams:

1. Pre-Milestone B (Material Solution Analysis, Technology Development, Analysis of Alternatives)

2. System Acquisition (EMD: Requirements, Design and Development, T&E)

3. Production and Deployment (Initial fielding through FOC and standup of Organic Depot capability)

4. Operations and Support: phase out of production; operational use (FOC through disposal-Includes Legacy Systems)
Discussion Starters

• Pre-Milestone B
  – Need for Modeling & Simulation, Tech demo contracts, better D4S enabling requirements

• System Acquisition
  – Design for Support tools, O&S/supportability ‘forcing functions’

• Production & Deployment
  – Better BCA process; valid cost comparisons; improved Logistics transition to operations

• Operations & Support
  – 70-80% of our O&S cost is on legacy out of production systems, yet all our policy and rhetoric is on new acquisition programs – how do we attack that huge cost issue?
Team Activity 1

- Using provided “Issues Categories” list (and adding /revising as necessary) Document and Prioritize Issues On Templates provided
- Product: Consensus list of issues prioritized within 4 L/C phase categories
- Time: 45 minute discussion, 10 minute per team outbrief (90 minutes)
- Discuss issues within assigned team categories
- Develop specific issues; prioritize
- Outbrief
## Teams

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<tr>
<th>Name</th>
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<td>Andy Long</td>
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<td>Dan Proulx</td>
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<td>Kyle Reybitz, Maj</td>
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<td>Liz Rodríguez-Johnson</td>
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<td>Ashton Bulloch</td>
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<td>Capt Jerry Reid</td>
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Ground Rules

• Try to identify Major Issues-Don’t Worry about Solutions
• Include issues even if other teams or initiatives underway to address
• Identify hand-offs between L/C phases
• Document any major barriers or constraints.
• Non-Attribution. Comments are kept in the room.
• Think out of the box
• No issue is insignificant
Issues Template

- Life Cycle Phase
- Major LCC Issue Category
- Description of Issue
- Barriers/Constraints
- Key Inputs
- Key Outputs
- Affect on Affordability (H, M, L)
- Priority for Resolution
- POC for follow-up
LUNCH!!
Team Activity 2

- Use issues developed and revised during consensus facilitation
- Product: List of root causes and initial actions to address issues (e.g. policy, guidance, training, tiger team, etc.)
- Time: 1 hour discussion, 15 minute per team outbrief (2 hours)
- Discuss issues, root causes, initial solution actions within assigned team categories
- Outbrief
Root Cause Template

• Life Cycle Phase
• Major LCC Issue Category
• Description of Issue
• Root Causes
• First cut of potential solutions (If time permits)
• POC for follow-up
Summary

- Issues identified and documented?
- Consensus on above?
- Classified within (and across) 4 life cycle phase categories?
- Root causes and initial solution recommendations for all issues?
Post Workshop Actions

- NDIA LCS sub-committee (members and ‘volunteers’)
- Complete issue descriptions, categorization, root cause analysis, and recommended solution actions
- Objective: prepare LCC-TOC Issues Report for OSD (Randy Fowler, Nic Torrelli)
- Submit to OSD; commit to work jointly on implementation recommendations
THANK YOU!