M&S Tools for Life Cycle Management

Dave Robertson, LMI
on behalf of
Mr. Randy Fowler, ADUSD(MR)
Agenda

• Task from USD(AT&L)
• LCM Tool Assessment
• Observations
1. Reinforce Life Cycle Sustainment Metrics
   - Materiel Availability, Reliability, and Ownership Cost

2. Align Resources to Readiness

3. Track Performance Throughout the Life Cycle

4. Implement Performance-Based Life Cycle Product Support Strategies
M&S Task in LCM Memo

- Programs will use predictive M&S tools to assess life cycle sustainment metrics
- Military Departments must report to L&MR on inventories of existing tools **used for this purpose**
- L&MR will review the information, catalog it, identify gaps in the toolset, and provide recommendations
Review Approach

• Each military department issued a call for information (name of tool, purpose, functional description, POC)

• Categorized all tools for top-level summary information
  – Life Cycle Sustainment Metrics
    • Materiel Availability
    • Reliability
    • Ownership Cost
  – Logistics elements
    • Maintenance Planning
    • Supply Support
    • Training & Training Support
    • Computer Resources Support
    • Facilities
    • Downtime
    • Other
    • Design Interface
    • PHS&T
    • Technical Data
    • Manpower & Personnel
    • Support Equipment

• Limited the analysis to tools related to LCM and sustainment of major weapon systems
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Overview of Inputs

• Army
  – 153 inputs
  – Most cited tools: COMPASS (7), SESAME (7)
  – Number in final vetted toolset: 76

• Navy
  – 119 inputs
  – 39 inputs related to cost and budget requirements
  – Number in final vetted toolset: 61

• Air Force
  – 125 inputs
  – 21 inputs related to the physics of failure
  – Number in final vetted toolset: 46
Sample Review - USAF

<table>
<thead>
<tr>
<th>Model Name</th>
<th>Government POC (users/owners)</th>
<th>Programs and Purpose (what programs use the model and for what purpose?)</th>
<th>Functional Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Airborne Laser On-Station Availability Model (ABL OSA)</td>
<td>AFMC</td>
<td>Operational/Maintenance Readiness</td>
<td>ABL OSA is a simulation model developed at OAS to estimate the on-station availability of the ABL. The model considers laser fuel support equipment availability, inventory levels, ABL deployment scenarios as well as ABL mission parameters.</td>
</tr>
<tr>
<td>AIRCAT Center Wing Box Management Tool</td>
<td>WR-ALC</td>
<td>Maintenance</td>
<td>Used to predict C-130 equivalent baseline hour consumption based on ops-tempo in order to forecast when the aircraft will reach its grounding point. Essential in managing flying hours so aircraft don't ground prior to scheduled center wing box replacement.</td>
</tr>
<tr>
<td>Aircraft Sustainability Model</td>
<td>AFMC</td>
<td>Supply</td>
<td>Computes optimized quantity requirements for deployable aircraft spares kits given a flying hour scenario. Also assesses readiness spares kits for Status of Resources and Training System (SORTS) in terms of predicted aircraft availability.</td>
</tr>
<tr>
<td>Aircraft Trim, Linearization and Simulation program (ATLAS)</td>
<td>AAC</td>
<td>The ATLAS program is a 6-degrees of freedom (DOF), nonlinear, non-real time simulation that contains numerous configurations within its aerodynamic database available for analysis.</td>
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</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sustainment Metric(s) addressed (availability, reliability, downtime, ownership cost)</th>
<th>ILS elements addressed</th>
<th>Keep (√) Discard (X)</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Availability Maintenance Planning</td>
<td>√</td>
<td></td>
<td>System performance.</td>
</tr>
<tr>
<td>Availability Supply Support Support Equipment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Availability Downtime Maintenance Planning</td>
<td>√</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Availability Ownership Cost Supply Support PHS&amp;T Maintenance Planning</td>
<td>√</td>
<td></td>
<td></td>
</tr>
<tr>
<td>None No ILS</td>
<td>X</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


Sustainment Metrics

DoD M&S Tools

- Availability
- Reliability
- Ownership Cost
- Downtime
- Other
Logistics Elements

DoD M&S Tools

- Maintenance Planning
- Supply Support
- Training and Training Support
- Computer Resources Support
- Facilities
- Design Interface
- PHS & T
- Technical Data
- Manpower and Personnel
- Support Equipment
Other Metrics

- DMSMS risk
- Runtime
- Energy costs/usage
- Availability of networks / computer equipment
- Weapon load out
- Fuel usage
- Transportation throughput

- Personnel Readiness
- Deployment efficiency
- Maintenance efficiency
- Hazard risk
- Supply information system readiness
- Information throughput
- Infrastructure service life
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• LCM Tool Assessment

• Observations
Observations

• Multiple tools are required to fully perform LCM analysis
  – Tools tend to be created for a single functional area or metric
  – Resource decisions may involve trade-offs which cut across tools

• Input assumptions (e.g., operational tempo and employment) significantly influence M&S forecasts
  – Creates confidence issue with long-term projections
  – A more extensive tool with detailed input does not improve confidence level