Process for Evaluating Logistics Readiness Levels (LRLs) for Acquisition Systems

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Aging Aircraft Integrated Product Team (AAIPT)
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Agenda

- Background of Logistics Readiness Level (LRL) concept
- LRL Defined
- LRL Excerpts
- Benefits
- Next Steps
- Questions
- NAVAIR Aging Aircraft Points of Contact
Background

- LRL concept initially based on the DOD 5000.2 mandated Technology Readiness Levels (TRL) assessment process

- TRLs provide:
  - Evaluation of critical technology maturity
  - Maturation plan (as needed)
  - Best practices/guidelines for each Milestone
    - MS B target is TRL = 6
    - MS C target is TRL = 7
    - MS C preferred is TRL = 8
System Validated on Representative A/C Via OT …
System Validated on Representative A/C Via DT …
System Demo ~ Dynamic OP Flight Environ …
Sys/Subsys Demo ~ Relevant Lab Environ …
Component/Breadboard ~ Relevant Environ …
Component/Breadboard ~ Lab Environ …
Analytical /Experimental Proof-of-Concept …
Technology Concept ……..
Basic Principles ……..

TRL 9
TRL 8
TRL 7
TRL 6
TRL 5
TRL 4
TRL 3
TRL 2
TRL 1

- System Completed
- Flt / Mission Qual
- System/Subsystem Development
- Tech Demo
- Tech Development
- Research to Prove Feasibility
- Basic Tech Research
Background

- TRLs provide an understanding of the technical maturity without consideration of the sustainment of those technologies
  - TRLs were never intended to consider logistics
  - LRLs is a new concept with the intent to consider sustainment issues

- Logistics benchmark system was desirable
  - ~10 logistics elements that are often interdependent and parallel are required to successfully acquire, field, and support new technology
  - Aid in understanding what sustainment is required at different time phases
LRL Definition

- **LRL intent:**
  - Provide a methodology for assessing Logistic Element Readiness for technology
  - Establish benchmarks for programs at different phases in time
  - Provide a management tool to forecast logistics workload, manpower requirements, identify gaps, etc.

- **NAVAIR Aging Aircraft** convened a working group of engineers, logisticians, and program managers to draft an LRL concept
  - LRL concept is work in progress!!!
  - Initial phase was to focus on technology insertion for in-service (post MS C) aircraft platforms
  - LRL evaluated for project (vice platform)
Draft LRL

- LRL’s considered at the project level (i.e. technology insertion) for an in-service aircraft
- LRL’s evaluated for 6 project phases:
  - Lab Test/R&D
  - Project Definition (Fleet Need/metrics/BCA/Decision to proceed)
  - Project Development /Implementation (Finalized analysis, change recommended, ECP development, Class II change development, RAMEC, LECP, other)
  - Engineering Validation
  - Fleet Verification
  - Fleet Use
- Answers question of what has to be done at each project phase for logistics
## LRL Excerpt – Design Interface

<table>
<thead>
<tr>
<th>Phase</th>
<th>Lab Test/R&amp;D phase</th>
<th>Project Definition</th>
<th>Project Development /Implementation</th>
<th>Engineering Validation</th>
<th>Fleet Verification</th>
<th>Fleet Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design Interface</td>
<td>Review and identify significant design interface impacts of project to existing system or platform (ex. available power, weight constraints, etc.) Create POAM to resolve any design interface issues.</td>
<td>Existing Reliability and Maintainability (RAM) metrics reviewed. Initial improvement predictions determined. Design interface issue resolution in work.</td>
<td>For new designs, Reliability Centered Maintenance (RCM) and Failure Modes and Effects Analysis (FMECA) completed to identify failure modes, failure frequency, effect on performance, and criticality. For modifications to existing design, RCM and FMECA reviewed for impacts. Design interface issues resolved.</td>
<td>Results of RCM and FMECA used to develop or modify existing condition based and schedule based maintenance tasks. Results of RCM and FMECA also used to update the Critical Items list as applicable. Technical data updates drafted and validated.</td>
<td></td>
<td>Technical updates completed and available.</td>
</tr>
</tbody>
</table>
## LRL Excerpt – Training and Facilities

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</tr>
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<tbody>
<tr>
<td><strong>Training</strong></td>
<td></td>
<td>Existing training procedures/curricula and training plan identified and reviewed.</td>
<td>Impacts to Training identified</td>
<td>Training curricula changes drafted. As required changes to Naval Training Systems Plan (NTSP) drafted.</td>
<td>Training curricula changes updated post validation/verification with changes as necessary. NTSP changes finalized. Changes submitted for approval.</td>
<td>Training curricula updated. NTSP updated.</td>
</tr>
<tr>
<td><strong>Facilities</strong></td>
<td></td>
<td></td>
<td>Current Facilities reviewed and impacts identified. When applicable, facilities modifications or new requirements are documented and analysis completed for (in) adequacy of existing facilities, trade studies for optimal new facility, funding requested.</td>
<td>As needed with funding available, Facilities modification s or new facilities projects in work.</td>
<td>Facilities project completed and approved.</td>
<td>New or modified Facilities completed.</td>
</tr>
</tbody>
</table>
## LRL Excerpt – DMSMS

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<tr>
<td>DMSMS</td>
<td></td>
<td>Existing DMSMS program management plan reviewed. Determine the technical refresh strategy (2 yr, 4 yr, spiral, etc.)</td>
<td>New technology evaluated to determine criticality as it relates to DMSMS. Assess component s against the tech refresh strategy. <strong>Impacts to DMSMS plan or metrics identified.</strong></td>
<td><strong>DMSMS forecasting</strong> completed for new technology. Updates to DMSMS management plan drafted. Technical data package requirements drafted.</td>
<td><strong>DMSMS management plan</strong> updated. Technical data package that supports DMSMS mitigation strategy available.</td>
<td></td>
</tr>
</tbody>
</table>

**Metrics and usage monitored as required.**
• Evaluated percentage of total effort required at each phase
• Graphed percentage effort as a function of phase of the project
• Percent effort is subjective number based on efforts outlined in the LRL for each element at each phase
• Many other ways to depict data
  – 3 examples follow
Percent Effort by Project Phase

- Lab Test/R&D Phase
- Project Definition
- Project Development
- Engineering Validation
- Fleet Verification
- Fleet Use

- Maintenance Planning
- Supply Support
- Technical Data
- Training
- Facilities
- Manpower
- PHS&T
- Support Equipment
- Computer Resources
- Design Interface
- DMSMS
• Benefits include:
  – LRLs will be a template/benchmark to measure readiness by logistic element on a project level basis
  – Template can be utilized to train/mentor new logistics personnel (and engineering personnel) in sustainment requirements for tech insertion projects
  – LRLs will aid in planning manpower/funding/schedule requirements for projects as they mature from project concept to implementation
  – LRLs will dovetail with logistics risk assessments for another perspective
Next Steps

- Continue to collect input on Draft LRL concept
- Brief Draft LRL concept to solicit further input
- Update/change draft as needed
- Establish a working group to expand the scope to encompass aircraft in the entire lifecycle vice limiting to in-service aircraft
- Apply and test the process at NAVAIR AAIPT
Questions?
AAIPT Points of Contact

- AAIPT Lead, Bob Ernst, 301-342-2203, robert.ernst@navy.mil
- AAIPT Assistant Program Manager for Logistics, Harry Proffitt, 301-757-0868, melvin.proffitt@navy.mil
- AAIPT Air Vehicle IPT lead, Don Sheehan, 301-342-0131, donald.sheehan@navy.mil
- AAIPT Consultant, Elizabeth Broadus, 301-862-7049, broadus_elizabeth@bah.com
Backup Slides
AAIPT Organization

Why is an AAIPT needed?

AAIPT Vision:
- Identify Problems - Quantify Risk
- Provide Information to Program teams
- Advocate for Enabling Technologies
- Provide Standard Risk & Cost Evaluation Tools
- Focus Attention to Aging Aircraft problems
- Leveraged Funding to reduce cost
AAIPT Organization

- Command Support Throughout NAVAIR
- Technical Expertise
- Adequately staffed to meet emergent needs (Triage)

Fleet Focus Teams
Fleet Focus Team

- Fleet Focus Teams (FFTs) identify, communicate, and leverage engineering solutions across Type Model Series and/or Service Boundaries

Simply Stated:

Common Fleet Issue → Fleet Focus Team (Engineering, Logistics, Cost) → Common Solution