Identifying Enterprise Leverage Points in Defense Acquisition Program Performance

Robb Wirthlin, Major, USAF
PhD Candidate
January 21, 2009

The views expressed in this work are those of the author and do not reflect the official policy or position of the United States Air Force, the Department of Defense (DoD), or the U.S. Government.
Early Research Observations

- Anomalous behaviors of acquisition are in-fact emergent behaviors of a much larger, complex system
  - Prior studies suggest many of the ‘pathologies’ outside of the control of the acquisition managers

- These studies point out a need to understand the entire system
  - To cut any piece out (like acquisition) and study it exclusively would preclude finding a full set of root causes
  - Therefore, I began to look “outside” of acquisition
Challenge: Find an appropriate representation for the Enterprise

• Here’s what I did
  • Borrowed ideas and concepts from Value Stream diagramming
  • Used commonly accepted understandings of probabilities and occurrence
  • Represented activity in frame of reference understandable to target audience: military and civil servants in AF (used DAU “Wall Chart” organizing framework)
  • Scoped it to a reasonable abstraction and size
    • Main unit of measurement is a “program”
    • Restricted to ACAT I, II, and III programs
    • Limited to Milestone C and earlier in Acquisition parlance
Top Level Abstraction

A Representation of the Enterprise of “Cradle to Grave” Acquisition in the US Air Force

<table>
<thead>
<tr>
<th>Swim Lane</th>
<th>Pre-MS “A” (Concept Refinement)</th>
<th>Pre-MS “B” (Technology Development)</th>
<th>Pre-MS “C” (System Development &amp; Demonstration)</th>
<th>Pre-Full Rate Production (Production &amp; Deployment)</th>
<th>Operations and Sustainment</th>
</tr>
</thead>
<tbody>
<tr>
<td>User</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Requirements</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Money</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acquisition</td>
<td>Scope of Model</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contractor</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Time

http://lean.mit.edu

© 2009 Massachusetts Institute of Technology  LAI Research Summit  01/21/09- 4
The Enterprise Model

Output consists of time elapsed and actual cost for single program - and tracks comparison to proposed time required and original proposed costs

http://lean.mit.edu
Model Design: Every decision point, every process task, is documented and sourced; now validated

RSR – Decision Point
-Sources: Official Docs, Interviews (Krussel, Moen)
-Probability: 98%

Funding Available? – Decision point
-Sources: Interviews (Krussel, Schilling, Duda)
-Probability: 80%

Conduct study or analysis – Task
-Sources: Official docs, Interviews (Krussel, Duda)
-- Time Distribution: 45 to 180 days; binomial, p=0.40
Discussion and Policy Implications

• A Few examples
  • PDR (and new DoD 5000.2 response)
  • Rework modeling (explicit vs. implicit)
  • Variance at local levels vs. Enterprise variance
  • Undocumented handoffs, waiting periods

• Policy Implications
  • Consider ^ overlay of staffing profiles to Enterprise model behavior
  • Consider ^ error bars of program vs. point estimates
  • ^ Oversight functions, managing risk, value-added govt workforce activities
Future Work

• Candidate issues to pursue:
  • How much time is spent “waiting” in the system?
    • What is the cost of waiting?
    • How can the ratio of waiting to non-waiting tasks be improved?
  • Which tasks do the data suggest have a more influential role in taking time (or cost) in the overall process?
    • What is the overall impact of a process’ time to Enterprise outcomes?
  • Where can an Enterprise leader suggest “investments” into the process with the greatest impact to cycle time or cost reduction?
Summary

- Introduction to problem and motivation
- Model development
- Discussion and Implications