Agile Methods: Tools, Techniques, and Practices for the DoD Community

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As a senior member of the technical staff at the SEI, Mary Ann Lapham supports and improves the acquisition of software-reliant systems. She has worked with DoD Program Offices to advise on software issues at the system and/or segment level.

See her full bio at:  
[www.sei.cmu.edu/go/agile-research-forum/](http://www.sei.cmu.edu/go/agile-research-forum/)
Agenda

The Problem

Setting the context

Our Journey

Solving the problem

Differences Between Traditional and Agile Methods

Comparing cultural elements
Polling Question

Please identify yourself as one of the following:

- DoD Program Office
- Federal Program Office (non-DoD)
- Contractor – Federal or DoD
- Commercial
- Consultant for tools/process
- Other
Acquisition and Innovation

Systems and Software Engineering Expertise and Framework

Balance evolution of user needs and developed capabilities.

New Mission Need

Traditional Approach

New Mission Capability

Time spent clarifying requirements

DoD/IC for intelligence community, requirements, stakeholders, needs, business practices, user test and evaluation

Traditional Approach

Incremental Approach

Time
Alternate Worlds

Fixed Vision

<table>
<thead>
<tr>
<th>Material Solutions Analysis</th>
<th>Technology Development</th>
<th>Engineering &amp; Manufacturing Development</th>
<th>IOC</th>
<th>FOC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material Development Decision</td>
<td>∆PDR</td>
<td>∆CDR</td>
<td>Post-CDR Assessment</td>
<td>FPR Decision Review</td>
</tr>
</tbody>
</table>

Requirements → Analysis → Design → Coding → Test → Operations

Evolving Vision

ROADMAP

<table>
<thead>
<tr>
<th>Daily Work</th>
<th>SPRINT</th>
<th>RELEASE</th>
</tr>
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<tbody>
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Deliverable Capability

Deliverable Capability

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Deliverable Capability
SEI ASP Agile Portfolio FY10 -14 (Our Journey)

- Policy & regulations barriers analysis
- Mgmt roles, estimation, culture, milestone reviews-barriers & high level recommendations (CMU/SEI-2011-TN-002)
- Executive Briefing
- CrossTalk Article
- 804 response, rqmts mgmt, contracting language, other topics per Agile Collab Grp (multiple publications)
- More topics per Agile Collaboration Group priorities

2009
- E-Learning Agile Course
- Denotes Air Force Funded

2010
- Multiple Presentations

2011
- NDIA C4ISR Committee
- Consulting on Actual DoD & Federal Programs 2011 and forward

2012
- Agile Defense Adoption Proponents Team (ADAPT) member

2013
- Metrics

2014
- September 2014
- Support Mechanisms

NDIA C4ISR Committee
Metrics
Support Mechanisms
Guiding Scenario

Traditional DoD Acquisition Framework

Incomplete Picture of How to Successfully Apply Agile Methods in DoD Settings

Agile & Lean Principles from Successful Commercial Use

Goerns

Using elements of grounded theory and action research

Actionable DoD-centric Agile Methods for Acquisition Practitioners

Solicit/Receive Feedback

Gaps

Characterize Gaps and Needs

Provide Potential Improved Practices

SEI Candidate Tools, Techniques, Models, Practices

PILOT/Disseminate
Using Agile Methods to Study Agile Methods

Backlog of Topics that Address Adoption Barriers in DoD

DoD Acquisition Stakeholders

Prioritized Backlog

Solution Reviews

Pilot Use by Practitioners

Codification of Validated Approaches

Single Topic Studies Iteratively Developed

End User-Validated Tools, Techniques, Practices

End User (Acquisition Practitioner) Validation & Feedback
What is different about lean/agile methods from basic incremental delivery?

<table>
<thead>
<tr>
<th>Traditional Incremental Delivery</th>
<th>Agile Methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>Developer-Acquirer relationship at arm’s length</td>
<td>Develop-Acquirer-End User collaboration</td>
</tr>
<tr>
<td>Hierarchical, command-and-control based teams</td>
<td>Collocated teams or strong communication mechanisms when teams are distributed</td>
</tr>
<tr>
<td>Leader as keeper of the vision and primary source of authority to act</td>
<td>Facilitative leadership and leader as champion and team advocate</td>
</tr>
<tr>
<td>Traditional, representational documents used by PMO to oversee the progress of the developer</td>
<td>“Just enough” documentation, highly dependent on product context</td>
</tr>
<tr>
<td>Lifecycle model with separate teams, particularly for development and test; some IPTs to involve multiple functions</td>
<td>Cross-functional teams including all roles across the lifecycle throughout the lifespan of the project</td>
</tr>
</tbody>
</table>

http://www.sei.cmu.edu/library/abstracts/reports/11tn002.cfm?DCSext.abstractsource=SearchResults
Polling Question

How Big a Challenge is Your Adoption of Agile Practices?
- large, we need a culture change
- medium, we are running into issues
- small, we are mostly ready
- no challenge at all
## Comparison of Agile and Traditional DoD Cultural Elements

<table>
<thead>
<tr>
<th>Knowledge Piece</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Organizational Structure</strong></td>
<td><strong>Agile DoD</strong></td>
</tr>
<tr>
<td></td>
<td>• Flexible and adaptive structures</td>
</tr>
<tr>
<td></td>
<td>• Self-organizing teams</td>
</tr>
<tr>
<td></td>
<td>• Collocated teams or strong</td>
</tr>
<tr>
<td></td>
<td>communication mechanisms when</td>
</tr>
<tr>
<td></td>
<td>teams are distributed</td>
</tr>
<tr>
<td></td>
<td><strong>Traditional DoD</strong></td>
</tr>
<tr>
<td></td>
<td>• Formal structures that are</td>
</tr>
<tr>
<td></td>
<td>difficult to change</td>
</tr>
<tr>
<td></td>
<td>• Hierarchical, command-and-</td>
</tr>
<tr>
<td></td>
<td>control-based teams</td>
</tr>
<tr>
<td></td>
<td>• Integrated product teams that</td>
</tr>
<tr>
<td></td>
<td>have formal responsibilities</td>
</tr>
<tr>
<td><strong>Leadership Style</strong></td>
<td><strong>Agile DoD</strong></td>
</tr>
<tr>
<td></td>
<td>• Facilitative leadership</td>
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<td>• Leader as champion and team</td>
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<td>advocate</td>
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<tr>
<td><strong>Rewards System</strong></td>
<td><strong>Agile DoD</strong></td>
</tr>
<tr>
<td><img src="Image" alt="Puzzle Piece" /></td>
<td>• Team is focus of reward systems</td>
</tr>
<tr>
<td></td>
<td>• Sometimes team itself recognizes individuals</td>
</tr>
<tr>
<td><strong>Staffing Model</strong></td>
<td><strong>Agile DoD</strong></td>
</tr>
<tr>
<td><img src="Image" alt="Puzzle Piece" /></td>
<td>• Cross-functional teams including all roles across the life cycle throughout the lifespan of the project</td>
</tr>
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<td></td>
<td>• Includes an Agile advocate or coach who explicitly attends to the team’s process</td>
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<td>Communications &amp; Decision Making</td>
<td><strong>Agile DoD</strong></td>
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<tr>
<td></td>
<td>• Daily stand-up meetings</td>
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<td>• Frequent retrospectives to improve practices</td>
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<td>• Information radiators to communicate critical project information</td>
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<td>• Evocative documents to feed conversation</td>
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<td></td>
<td>• “Just enough” documentation, highly dependent on product context</td>
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Agile Work – Published and in Process

Published

- **Considerations for Using Agile in DoD Acquisition**
  http://www.sei.cmu.edu/library/abstracts/reports/10tn002.cfm?DCSext.abstractsource=SearchResults

- **Agile Methods: Selected DoD Management and Acquisition Concerns**
  http://www.sei.cmu.edu/library/abstracts/reports/11tn002.cfm?DCSext.abstractsource=SearchResults

- **A Closer Look at 804: A Summary of Considerations for DoD Program Managers**
  http://www.sei.cmu.edu/library/abstracts/reports/11sr015.cfm?DCSext.abstractsource=SearchResults

- **DoD Agile Adoption: Necessary Considerations, Concerns, and Changes**
  http://www.crosstalkonline.org/issues/janfeb-2012.html

In Process Topics

- Information Assurance
- Requirements
- Contracting language and contract types
- Contingency Model (Readiness and Fit to use agile)
- Programmatic
- Guide to Agile terminology from a traditional viewpoint
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