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

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*Senior Technical Staff*

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

**Carnegie Mellon University, Software Engineering Institute, Pittsburgh, PA, 15213**

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**16. SECURITY CLASSIFICATION OF:**
- a. REPORT: unclassified
- b. ABSTRACT: unclassified
- c. THIS PAGE: unclassified

**17. LIMITATION OF ABSTRACT:**

**18. NUMBER OF PAGES:** 16

**19a. NAME OF RESPONSIBLE PERSON:**
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

2010
2012
2014

Traditional Approach

Time spent clarifying requirements

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

New Mission Capability

Traditional Approach

Incremental Approach

Time
Alternate Worlds

Fixed Vision

- Material Solutions Analysis
- Technology Development
- Engineering & Manufacturing Development
- IOC
- Production & Deployment
- FOC

Requirements → Analysis → Design → Coding → Test → Operations

Evolving Vision

ROADMAP

- DAILY WORK
- SPRINT
- RELEASE

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 2010 2011 2012 2013 2014

- E-Learning Agile Course
- Multiple Presentations
- NDIA C4ISR Committee
- Consulting on Actual DoD & Federal Programs 2011 and forward
- Agile Defense Adoption Proponents Team (ADAPT) member
- Metrics
- Support Mechanisms

Denotes Air Force Funded
Guiding Scenario

Using elements of grounded theory and action research

Actionable DoD-centric Agile Methods for Acquisition Practitioners

SEI Candidate Tools, Techniques, Models, Practices

GOVERNS

PROVIDE POTENTIAL IMPROVED PRACTICES

CHARACTERIZE GAPS AND NEEDS

SOLICIT/RECEIVE FEEDBACK

PILOT/DISSEMINATE

DoD Stakeholders

GAPS

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

Agile & Lean Principles from Successful Commercial Use

Traditional DoD Acquisition Framework

Fixed Vision

Requirements

Analysis

Design

Coding

Test

Operations

Material Solution

Problem

Technology

Development

Engineering & Development

Production & Deployment

Deployment

SEI Agile Research Forum

Twitter #SEIAgile

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Using Agile Methods to Study Agile Methods

- Backlog of Topics that Address Adoption Barriers in DoD
- DoD Acquisition Stakeholders
- Pilot Use by Practitioners
- Solution Reviews
- Prioritized Backlog
- Single Topic Studies Iteratively Developed
- Codification of Validated Approaches
- End User-Validated Tools, Techniques, Practices
- End User (Acquisition Practitioner) Validation & Feedback

Software Engineering Institute | Carnegie Mellon
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 communication mechanisms when teams are distributed</td>
</tr>
<tr>
<td></td>
<td><strong>Traditional DoD</strong></td>
</tr>
<tr>
<td></td>
<td>• Formal structures that are difficult to change</td>
</tr>
<tr>
<td></td>
<td>• Hierarchical, command-and-control-based teams</td>
</tr>
<tr>
<td></td>
<td>• Integrated product teams that 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><strong>Traditional DoD</strong></td>
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<td><strong>Rewards System</strong></td>
<td><strong>Agile DoD</strong></td>
<td><strong>Traditional DoD</strong></td>
</tr>
<tr>
<td></td>
<td>• Team is focus of reward systems</td>
<td>• Individual is focus of the reward system</td>
</tr>
<tr>
<td></td>
<td>• Sometimes team itself recognizes individuals</td>
<td></td>
</tr>
<tr>
<td><strong>Staffing Model</strong></td>
<td><strong>Agile DoD</strong></td>
<td><strong>Traditional DoD</strong></td>
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<td></td>
<td>• Cross-functional teams including all roles across the life cycle throughout the lifespan of the project</td>
<td>• Uses traditional life-cycle model with separate teams, particularly for development and testing</td>
</tr>
<tr>
<td></td>
<td>• Includes an Agile advocate or coach who explicitly attends to the team’s process</td>
<td>• Different roles are active at different defined points in the life cycle and are not substantively involved except at those times</td>
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<td><strong>Communications &amp; Decision Making</strong></td>
<td><strong>Agile DoD</strong></td>
<td><strong>Traditional DoD</strong></td>
</tr>
<tr>
<td></td>
<td>• Daily stand-up meetings</td>
<td>• Top-down communication structures dominate</td>
</tr>
<tr>
<td></td>
<td>• Frequent retrospectives to improve practices</td>
<td>• External regulations, policies and procedures drive the focus of work</td>
</tr>
<tr>
<td></td>
<td>• Information radiators to communicate critical project information</td>
<td>• Indirect communications, like documented activities and processes, dominate over face-to-face dialogue</td>
</tr>
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<td>• Evocative documents to feed conversation</td>
<td>• Traditional, representational documents used by the PMO throughout the development life cycle to oversee the progress of the developer</td>
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<td>• “Just enough” documentation, highly dependent on product context</td>
<td>• PMO oversight tools focused on demonstrating compliance vs. achieving insight into progress</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](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](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](http://www.sei.cmu.edu/library/abstracts/reports/11sr015.cfm?DCSext.abstractsource=SearchResults)
- **DoD Agile Adoption: Necessary Considerations, Concerns, and Changes**

In Process Topics

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