Adapting Agile to the Defense Acquisition Framework

Mary Ann Lapham, PMP, CSM
Principal Engineer
Software Engineering Institute
Carnegie Mellon University
Agile??

YOU WANT TO DO AGILE WHAT?

I think it says "agile".

A-GE-E-LAY, Must be Italian
Agenda

The Problem

Setting the context

Our Journey

Solving the problem

Differences Between Traditional and Agile Methods

Comparing cultural elements
Who’s My Audience?

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

New Mission Need

Traditional Approach

Balance evolution of user needs and developed capabilities.

New Mission Capability

Time spent clarifying requirements

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

Software Engineering Institute | Carnegie Mellon
Lapham
NDIA System Engineering Conference
Oct 30, 2013
© 2012 Carnegie Mellon University
Alternate Worlds

Fixed Vision

Material Solutions Analysis

Technology Development

Engineering & Manufacturing Development

Production & Deployment

Disposal

Requirements

Analysis

Design

Coding

Test

Operations

Evolving Vision

ROADMAP

DAILY WORK

SPRINT

RELEASE

Evolvability Capability

DAILY WORK

SPRINT

RELEASE

Evolvability Capability

DAILY WORK

SPRINT

RELEASE

Evolvability Capability

Delivered Capability

Delivered Capability

Delivered Capability

Software Engineering Institute | Carnegie Mellon

Lapham

NDIA System Engineering Conference

Oct 30, 2013

© 2012 Carnegie Mellon University
Agile Emphasizes Cross Team Collaboration

To succeed, all levels of an organization (e.g., the customer) need to support the Agile process.
Agile is NOT a Silver Bullet

©2013 Software Engineering Institute
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>
If Using Agile…

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
Agile provides complete & timely visibility into the program.

With Waterfall, they don’t see anything until the End.
## 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>
</tr>
<tr>
<td></td>
<td>• Leader as champion and team advocate</td>
</tr>
<tr>
<td></td>
<td><strong>Traditional DoD</strong></td>
</tr>
<tr>
<td></td>
<td>• Leader as keeper of vision</td>
</tr>
<tr>
<td></td>
<td>• Leader as primary source of authority to act</td>
</tr>
</tbody>
</table>
## Comparison of Agile and Traditional DoD Cultural Elements

<table>
<thead>
<tr>
<th>Knowledge Piece</th>
<th>Method</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<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>
</tr>
<tr>
<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>
</tr>
</tbody>
</table>

[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)
## Comparison of Agile and Traditional DoD Cultural Elements

<table>
<thead>
<tr>
<th>Knowledge Piece</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communications &amp; Decision Making</td>
<td><strong>Agile DoD</strong></td>
</tr>
<tr>
<td></td>
<td>• Daily stand-up meetings</td>
</tr>
<tr>
<td></td>
<td>• Frequent retrospectives to improve practices</td>
</tr>
<tr>
<td></td>
<td>• Information radiators to communicate critical project information</td>
</tr>
<tr>
<td></td>
<td>• Evocative documents to feed conversation</td>
</tr>
<tr>
<td></td>
<td>• “Just enough” documentation, highly dependent on product context</td>
</tr>
<tr>
<td></td>
<td><strong>Traditional DoD</strong></td>
</tr>
<tr>
<td></td>
<td>• Top-down communication structures dominate</td>
</tr>
<tr>
<td></td>
<td>• External regulations, policies and procedures drive the focus of work</td>
</tr>
<tr>
<td></td>
<td>• Indirect communications, like documented activities and processes, dominate over face-to-face dialogue</td>
</tr>
<tr>
<td></td>
<td>• Traditional, representational documents used by the PMO throughout the development life cycle to oversee the progress of the developer</td>
</tr>
<tr>
<td></td>
<td>• PMO oversight tools focused on demonstrating compliance vs. achieving insight into progress</td>
</tr>
</tbody>
</table>

http://www.sei.cmu.edu/library/abstracts/reports/11tn002.cfm?DCSext.abstractsource=SearchResults
Fragility of a New Agile Eco-system
2008 – 2013 Agile Adoption in Defense

"covert agile"

You've been awfully flexible lately...
Uh-oh, they're on to me!

Cumulative Flow

What agile metrics should I ask for?

Test Coverage

Burn Down

Escaped Defects

Government-Issued Acquisition Guy

©2013 Software Engineering Institute

Lapham
NDIA System Engineering Conference
Oct 30, 2013
© 2012 Carnegie Mellon University
Agile and Systems Engineering?
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)
804 response, rqmts mgmt, contracting language, other topics per Agile Collab Grp (multiple publications)
System /software engineering, metrics, parallel worlds. Sustainment

2009 2010 2011 2012 2013 2014

E-Learning Agile Course
Multiple Presentations
Executive Briefing
CrossTalk Article
NDIA C4ISR Committee
Agile Defense Adoption Proponents Team (ADAPT) member
Metrics
CrossTalk Article

Denotes Air Force Funded

Software Engineering Institute | Carnegie Mellon

Lapham
NDIA System Engineering Conference
Oct 30, 2013
© 2012 Carnegie Mellon University
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

DoD Information Assurance and Agile: Challenges and Recommendations Gathered Through Interviews with Agile Program Managers and DoD Accreditation Reviewers
http://www.sei.cmu.edu/library/abstracts/reports/12tn024.cfm?DCSext.abstractsource=SearchResults

Documenting Software Architectures in an Agile World
http://www.sei.cmu.edu/library/abstracts/reports/03tn023.cfm?DCSext.abstractsource=SearchResults

Integrating Software-Architecture-Centric Methods into Extreme Programming (XP)
http://www.sei.cmu.edu/library/abstracts/reports/04tn036.cfm?DCSext.abstractsource=SearchResults
Parallel Worlds: Agile and Waterfall Differences and Similarities (CMU/SEI-2013-TN-021)
http://resources.sei.cmu.edu/library/asset-view.cfm?AssetID=62901

Using Agile Effectively in DoD Environments
http://blog.sei.cmu.edu/archives.cfm/author/mary-ann-lapham

Readiness and Fit Analysis (blog)
http://blog.sei.cmu.edu/archives.cfm/author/suzanne-miller

Podcast
http://www.sei.cmu.edu/podcasts/index.cfm?getRecord=7D03CB1F-9D60-C314-66526F8E8B2864B8&wtPodcast=AgileAcquisition

Colloquium Graphical Recordings, June 2012, March 2013, July 2013
available upon request
SEI Agile Work – in Process

- Requirements
- System engineering and software engineering interface in an agile world
Agile and Systems Engineering?