An Agile Approach to Process Improvement

A Tale of Two EPGs

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SEPG North America
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Applied Research Associates

- Engineering and science services company with distributed offices
- Over 1,300 Employee Owners at locations in the U.S. and Canada
- Founded 1979, Albuquerque, New Mexico
- Diverse DoD and Federal contractor

Southeast Division

- Headquartered in Raleigh, North Carolina
- 153 employees operating in 5 locations across the U.S.
- Mix of MS and PhD-level engineers/scientists & software/system developers
- Areas of Expertise:
  - Game-based Learning
  - Decision Support
  - Information and Intelligence
  - Modeling and Simulation
  - Robotics
  - Sensor Systems
  - Systems engineering and Integration
  - Threat and Vulnerability Assessment
  - Weapons Effects
  - High-fidelity & fast-running physics-based weapon-target interaction modeling
Management Steering Group (MSG)
- Leadership support, guidance and oversight for on-going Process Improvement (PI) efforts
- Monitor projects’ compliance with standard processes during monthly project reviews
- Provide input, review and approve annual Training Plan
- Annually revise Measurement Plan
- Communicate regularly about the PI program to their teams

Engineering Process Group (EPG)
- Bi-directional project liaisons
- PI management team
- Develop annual PI Plan
- Configuration Control Board for Process Improvement Requests (PIRs)
- Overall ownership of Organizational Standard Process
- Set process release schedules
- Assess and monitor improvement progress

Process Working Groups (PWG)
- Transient existence
- Develop process improvements in specific areas
Observations on Existing PI Effort (2012)

• EPG project liaisons not effective at achieving project buy-in
• Working Groups spent too much time off course
• Working Groups lacked understanding of process architecture
• Excessive PI management overhead
• Not enough visibility of PI plan
• Long-range planning is difficult and unrealistic
• Resource requirements were not adequately forecasted and allocated
• Working on too many diverse changes at same time
• Long time between PAL releases
• Pressure / tendency to short-circuit parts of PI process
• Over-emphasis on minor changes rather than those with high impact
## PI Organizational Changes (2013)

<table>
<thead>
<tr>
<th>Issues</th>
<th>Proposed Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Working Groups are not productive and spend too much time off course</td>
<td>Replace ad hoc WGs with dedicated process improvement team, consulting w/ internal SMEs as needed</td>
</tr>
<tr>
<td>Working Groups don’t understand process architecture</td>
<td>Re-focus EPG role and develop other mechanisms for engaging projects and building consensus</td>
</tr>
<tr>
<td>EPG members as project liaisons hasn’t been effective at achieving buy-in</td>
<td>Change EPG to be a self-managed process improvement team</td>
</tr>
<tr>
<td>Too much PI management overhead</td>
<td></td>
</tr>
<tr>
<td>Not enough visibility of PI plan</td>
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# What is Agile?

## Manifesto for Agile Software Development

We are uncovering better ways of developing software by doing it and helping others do it. Through this work we have come to value:

- **Individuals and interactions** over processes and tools
- **Working software** over comprehensive documentation
- **Customer collaboration** over contract negotiation
- **Responding to change** over following a plan

That is, while there is value in the items on the right, we value the items on the left more.

<table>
<thead>
<tr>
<th>Kent Beck</th>
<th>James Grenning</th>
<th>Robert C. Martin</th>
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</thead>
<tbody>
<tr>
<td>Mike Beedle</td>
<td>Jim Highsmith</td>
<td>Steve Mellor</td>
</tr>
<tr>
<td>Arie van Bennekum</td>
<td>Andrew Hunt</td>
<td>Ken Schwaber</td>
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<tr>
<td>Alistair Cockburn</td>
<td>Ron Jeffries</td>
<td>Jeff Sutherland</td>
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<tr>
<td>Ward Cunningham</td>
<td>Jon Kern</td>
<td>Dave Thomas</td>
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<tr>
<td>Martin Fowler</td>
<td>Brian Marick</td>
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## Agile Approach to Process Improvement

### Individuals and Interactions
- Self-organizing team
- Fosters shared understanding

### Working Processes
- Seeks to deliver real benefits rapidly and regularly
- Focuses on the simple common stuff rather than trying to solve every problem before it occurs
- Emphasizes good process design, re-factoring as necessary

### Customer Collaboration
- Focuses on communication and shared vision

### Responding to Change
- Regular reflection and adjustment to become more effective
- Embraces and is responsive to change
## PI Project Management Changes (2013)

<table>
<thead>
<tr>
<th>Problems – opportunities for improvement</th>
<th>Suggested Solutions</th>
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</thead>
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<tr>
<td>Long-range planning is difficult and unrealistic</td>
<td>Constant level of effort by EPG, pulling work from prioritized backlog</td>
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<tr>
<td>Resource requirements unknown and not adequately allocated</td>
<td></td>
</tr>
<tr>
<td>Pressure / tendency to short-circuit PI process (skipping reviews, collateral changes, etc.)</td>
<td>Change to flow-based Kanban management system</td>
</tr>
<tr>
<td>Working on too many diverse changes at same time</td>
<td>Limit work in process and shorten cycle time with more frequent PAL updates with smaller, more-focused changes by using Kanban management system</td>
</tr>
<tr>
<td>Long time between PAL releases</td>
<td></td>
</tr>
<tr>
<td>Over-emphasis on minor changes rather than those with high impact</td>
<td>Visualize work and involve PMs and auditors in prioritization</td>
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</table>
What is Kanban?

Workflow management process

• Visualize the workflow
  • Split work into pieces
  • Show the present stage of each item
• Limit the Work In Progress (WIP)
• Optimize process to reduce cycle time
PI Sub-process Flow

Plan
- Plan execution of user stories
- User Stories
- Formulate process improvement goals
- Unfulfilled goals?
  - Yes
  - Develop Process User Stories
  - User Stories
- No
- Unfulfilled goals?
  - Yes
  - More user stories?
  - Yes
  - Plan execution of user stories
  - Tasks
  - Yes
  - Create or revise process
  - More tasks to do?
  - Yes
  - Release new or revised processes
  - PAL
  - Process Definitions and/or Aids
  - Yes
  - Report & Collaborate on PI Activities
  - Process PIRs
  - Goals
- No
- More user stories?
  - Yes
  - Assess process effectiveness
  - PIP retrospective
  - Submit PIR
  - ClearQuest
  - No
  - More tasks to do?
  - Yes
  - Formulate process improvement goals
  - Yes
  - Act
  - Assess process effectiveness
  - PAL
  - Release new or revised processes
  - PAL
  - Submit PIR
  - ClearQuest
  - No
High-level Training Process Goals

- Devise a better, more flexible way to select and plan training, while ensuring that it supports our business needs and is an efficient use of resources.
- Ensure timely training of new and reassigned employees, taking advantage of various ways of learning.
- Formalize our ad hoc mentoring process so we can evaluate its effectiveness and improve it.
- Improve oversight of training program that incorporates a focused effort on improvement.
Process User Stories to Support Training Goals

USER STORY B
As a mentor, I need to know what topics I need to ensure that my pupil knows so that I can fully prepare him/her to be productive.

Definition of Done
• Updated mentoring process released
• Initial mentoring roles identified
• Initial syllabus for each role drafted
• Framework established for on-going maintenance of mentoring syllabi

USER STORY A
As a new or re-assigned employee, I need to quickly learn the processes, tools and standards for performing my new role.

Definition of Done
• System exists to assign employees to roles
• Curriculums are defined for each role
• Mechanism exists to assess employee’s learning of new role
More Training User Stories

**USER STORY C**
As a supervisor, I need to have an easy and effective way to identify and prioritize training needs that are aligned with business needs and staff development goals.

**Definition of Done**
- We have released an updated process for Identifying Training Needs incorporating feedback from supervisors

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**USER STORY E**
As Division Manager, I need to ensure that our training efforts are supporting business needs and are effective and efficient.

**Definition of Done**
- A cross-functional group responsible for monitoring, controlling and improving our training program has been identified.
- The training board’s charter has been negotiated.
### Task Cards

#### Setup up mentoring wiki site

**Definition of Done**
- Wiki is operational
- Instructions for adding mentoring syllabi for new roles are posted

#### Meet with recent new hires and their mentors to get their feedback on the experience and the proposed mentoring process

**Definition of Done**
- Notes from each interview are gathered
- Meeting is held to compare notes and decide what process changes are needed, if any
Strategies/actions from EPG retrospective

- Facilitate getting input and especially buy-in from other groups/people
  - Proactive actions by EPG to solicit input (e.g., coding standards forum)
- Use discussion boards to reduce number of face-to-face meetings
- EPG members need to speak up if goals/tasks are not clear
- Notify or meet with submitter when PIR work begins
  - Include list of PIRs fixed / in work in Staff Meeting slides
Cumulative Flow Diagram

- Kanban shows snapshot of current work in progress (WIP)
- To gain insight into cycle time and total WIP
Results

- Smaller, incremental process improvements delivered more often
- Better engagement by EPG – not delegating and everyone can visually see the plan and what needs doing next
- Better focus
- Easier to adapt to changing priorities
  - Planning is done just-in-time
- Status at a glance
Contact Info

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Abbreviations Used in This Presentation

- ARA – Applied Research Associates
- DoD – Department of Defense
- EPG – Engineering Process Group
- MSG – Management Steering Group
- PAL – Process Asset Library
- PI – Process Improvement
- PIP – Process Improvement Process
- PIR – Process Improvement Request
- PM – Project Manager
- PWG – Process Working Group
- SME – Subject Matter Expert
- WG – (Process)Working Group (same as PWG)
- WIP – Work In Progress