INCOSE Project Kickoff:
Agile SE Life Cycle Model Fundamentals

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IW15 Town Hall Meeting, 27 Jan, 2015, 8:00-9:00

Addressing Systems Engineering …
Uncertainty, Unpredictability, Risk, Variation, Evolution.

Fifteen 3-day “discovery” workshops in US/Europe 2015/16.
• Workshop Hosts in defense and commercial sectors.
• Analyzing SE processes for mixed HW/ SW/ WW* projects.
• Immediate and long term benefits

Identify/ justify necessary & sufficient fundamentals:
• Compatible with ISO/ IEC 15288.
• Compatible with any agile SE process.
• Compatible with existing organizational cultures.

*WW=Wet Ware: stakeholders, customers, project personnel, operators, maintainers, …
The Time Has Come

Vision 2025
- Resilient Systems
- Composable Design
- Adaptable and Scalable Methods

Top Five CAB Priorities:
1) SE Professional development
2) Agile/Expedited methods
3) Effective Trade Studies
4) Product lines, re-use
5) Better Value proposal for INCOSE and SE
INCOSE Project: Agile SE Life Cycle Model Fundamentals


Objectives – Identified/justified necessary/sufficient fundamentals:

- That can be intuitively embraced and applied.
- Compatible with 15288, any agile SE process, existing organizational cultures.


- Workshop Hosts in defense and commercial sectors.
- Analyze SE processes dealing with UURVE in mixed HW/SW/WW* projects.
- Immediately apply action-learning to an SE process in need of (more) agility.
- Workshop Hosts must send 2 participants to 2 other-Host workshops.
- Host cost ~$20k USD, which covers facilitation, synopsis reports, materials, estimated participant travel costs, workshop lunches, and one dinner.

“Tell me and I forget. Teach me and I remember. Involve me and I learn.”

Benjamin Franklyn

Active In-Process Workshop Sites: Honeywell, General Dynamics, Lockheed, Northrop Grumman, Rockwell Collins, SPAWAR/MITRE, … You?

*WW=Wet Ware: stakeholders, customers, project personnel, operators, maintainers, …
Section 5.5.5 (p. 32):
"... to convey the idea that one can jump from a stage to one that does not immediately follow it, or revert to a prior stage or stages that do not immediately precede it."

"Further, the text in the model indicates that one applies, at any stage, the appropriate life cycle processes, in whatever sequence is appropriate to the project, and repeatedly or recursively if appropriate."

"While this may seem to be a total lack of structure, indeed it is not."

"Rather, the structure has well defined parts that can be juxtaposed as needed to get the job done, flexibly but still in a disciplined manner, just as a real structure would be created."

Seven asynchronously-invoked stages can be engaged repetitively and simultaneously to achieve benefit when engagement criteria are met.

Agreement Processes
- Acquisition
- Supply

Organizational Project-Enabling Processes
- Life Cycle Model Management
- Infrastructure Management
- Project Portfolio Management
- Human Resource Management
- Quality Management

Project Processes
- Project Planning
- Project Assess and Control
- Decision Management
- Risk Management
- Configuration Management
- Information Management
- Measurement

Technical Processes
- Stakeholder Requirements Definition
- Requirements Analysis
- Architectural Design
- Implementation
- Integration
- Operation
- Maintenance
- Disposal

Special Processes
- Tailoring

20 Processes of Interest
Tailoring process added 1-Feb-2015
Project Artifacts (Products)

1. An instructive technical report describing a generic Agile SE Life Cycle Model with supporting exemplar case studies. The model will support rather than supplant common agile systems-and-software SE processes.

2. Pattern Based SE Modeling (PBSE) will illustrate configurations aligned to the case studies (next slide).


4. Collateral technical information in briefer form and focus is anticipated as papers targeted for relevant SE journals and conferences.

Estimated project report completion is later half of 2016
Pattern-Based System Engineering (PBSE)

Pattern Class Hierarchy
Adapted from: Bill Schindel IS05 paper.

Agile Architecture Pattern (AAP)

Some Level 2 Candidates:
- ICSM: Incremental Commitment Spiral Model
- OSA: Open System Architecture PM concept
- EVO: Evolutionary Project Management
- RD: Rapid Development/Fielding
- QRC: Quick Reaction Capability
- SAFe: Scaled Agile Framework
- LVC: Live-Virtual-Constructive
- Scrum: Scrum PM concept
- Wave: Wave model

Agile PBSE Patterns

Level 1

Level 2

Level 3

Case Studies

ICSM QRC/RD ...??... Wave LVC
General Info

• Hosts will prepare a discussion presentation covering the processes to be analyzed and synthesized.

• Structured discussion and analysis templates are provided,

• Workshops will have max of 20 participants, plus briefers. Participants from Hosting organizations are favored.

• Within 30-days of each workshop: a results-synopsis, an evolving synthesis of accumulated discovery, and a case study write-up.

• No system-functional details need revealed, only SE life-cycle process and activity procedures. No problem for proprietary/classified projects.

Hosting and workshop details at:

www.parshift.com/ASELCM/Home.html
Notional Concept: Agile Architecture Pattern (AAP)
System Response-Construction Kit

Modules/Components
- Gears/Pulleys
- Motors
- Wheels
- Tools
- Joiners, Axles, Small Parts
- Structural Material

Integrity Management
- Module mix evolution
- Module readiness
- System assembly
- Infrastructure evolution

Infrastructure
- Active
- Passive

Rules/Standards
- Sockets
- Signals
- Security
- Safety
- Service

Parts Interconnect Standards
- (None)
- Harm-Proofing Standards
- Process Rules & ConOps
- Control Protocol
- Radio Control Standards
**Example: Scrum Agile Architecture Pattern (AAP)**


**Infrastructure evolution**
- Module mix evolution
- Module readiness
- System assembly
- Infrastructure evolution

**System assembly**

**Module mix evolution**

**Module readiness**

**System assembly**

**Infrastructure evolution**

**Active**

**Passive**

**Rules/Standards**
- Sockets
- Signals
- Security
- Safety
- Service

**Integrity Management**
- Product Owners
- Scrum Masters
- Developers
- Product Backlog
- Stakeholders

**Product Owner (PO)**

**Scrum Master**

**Developers**

**Product Backlog**

**Stakeholders**

**Example: Scrum Agile Architecture Pattern (AAP)**


Participants will construct AAP from Host discussion.
Participants will construct RSA from Host discussion

Example: Scrum Response Situation Analysis (RSA)

<table>
<thead>
<tr>
<th>Change Domain</th>
<th>Proactive</th>
<th>Reactive</th>
</tr>
</thead>
</table>
| Creation (and Elimination) | • requirements  
• experiments  
• next sprint activity | • shared team knowledge  
• customer satisfaction |
| Improvement | • process effectiveness  
• risk/uncertainty reduction | • effort estimating  
• completion to schedule |
| Migration | • new technology/tools that will impact infrastructure  
• lean SE process principles | |
| Modification (of Capability) | • new team member unfamiliar/uncomfortable with agile SE  
• new environmental situation | |
| Correction | • wrong requirement  
• wrong design  
• inadequate implementation | • non-compliant supplier  
• inadequate developer |
| Variation | • expertise and skill levels among team members  
• allowable deliverable performance range  
• customer availability, interaction, involvement expertise | |
| Expansion (of Capacity) | • 2x (or half x) project scope change  
• x to y engineers distributed across n to m locations | |
| Reconfiguration | • unanticipated expertise requirement  
• development activity-sequence priority change  
• system/sub-system design change | |
Participants will construct Reality Factors from Host discussion

Example: Scrum Environmental Reality Factors

RSA exercises often assume a reasonably behaved and supportive environment, and tend to focus on the system’s internal functional response situations. This framework tool moves the analysis into the external environment.

### Reality Factors

<table>
<thead>
<tr>
<th><strong>Human Behavior:</strong></th>
<th>Non-team behavior, error, expediency, uncommitted customer rep, …</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Organizational Behavior:</strong></td>
<td>Change in stakeholders, organizational priorities, resource access, …</td>
</tr>
<tr>
<td><strong>Technology Pace:</strong></td>
<td>Evolving technology, testing trade-offs, …</td>
</tr>
<tr>
<td><strong>Complexity:</strong></td>
<td>Large project with many involved simultaneously, emergent interaction affects, different …</td>
</tr>
<tr>
<td><strong>Globalization:</strong></td>
<td>Partners/teams with different ethics, cultures, infrastructures, …</td>
</tr>
<tr>
<td><strong>Partially-Agile Enterprise Concepts:</strong></td>
<td>Outsourcing, COTS affects, COTS supply/supplier affects, agile software practice-thinking dominance on HW/SW project…</td>
</tr>
<tr>
<td><strong>Agile Customers/Competitors/Adversaries:</strong></td>
<td>Continuous external-knowledge evolution, continuous external innovation, …</td>
</tr>
</tbody>
</table>
Planned (Roughly) Workshop Agenda

----------- Day 1 – 8 hours of structured work starting at 8:00am, room open at 7:30.
2.00 – Introductions, objectives, workshop agenda structure, tools and processes, accumulated learning review.
2.00 – Host process presentation/discussion of SE UURVE situation and SE process (guide provided to host, analysis forms provided to participants).
Lunch (one hour lunch allows informal conversation)
2.00 – Break-out analysis of RSA/RF/AAP (two separate teams doing identical analysis on total SE process overview).
2.00 – Brief-out: Analysis results, discussion, and refinement.
Dinner (host-funded for all participants) at time TBD.
----------- Day 2 – 8 hours of structured work starting at 8:00am, room open at 7:30.
1.00 – Review of yesterdays salient learning.
3.00 – Host presentation and Q&A of 19 processes (guide and discussion templates provided to host outlining the points we need to hear and discuss).
Lunch (one hour lunch allows informal conversation).
2.00 – Break out ties 19 processes to RSA/RF with issue closure, and refines AAP of SE process overall.
2.00 – Brief-out: Analysis results and discussion.
----------- Day 3 – 8 hours of structured work starting at 8:00am, room open at 7:30.
1.00 – Review/discussion of yesterday’s salient learning (with process/issue closure relations).
2.00 – Host presentation/discussion and Q&A of process challenge (in any form wished).
1.00 – Break out synthesis exercise – Synthesis exercise at overall process level – converge on key RSA issues with suggested process activity closure relations and general AAP elements.
Lunch (one hour lunch allows informal conversation).
2.00 – Break out cont. – Synthesis exercise at overall process level – converge on key RSA issues with suggested process activity closure relations and general AAP elements.
1:30 – Brief out and wrap up.
0:30 – Reflection on the workshop process, tools, learning, and results
Action Plan

• ~15 (TBD) three-day structured workshops will be conducted at host sites in the US and Europe to analyze a variety of different types of agile SE experiences.

• Workshops are anticipated to begin March of 2015, approximately one/month.

• Traveling participants must participate in at least 3 workshops. Host sites must provide at least two participants that will attend 2 additional workshops.

• Host sites will include both defense and commercial organizations.

• Workshops will analyze a host life-cycle experience, and then use accumulated learning to synthesize a host-chosen SE approach in need of more agility.

• Hosts will be expected to prepare a discussion presentation covering the processes to be analyzed and synthesized.

• Workshops will have up to 20 participants plus briefers. Participants are favored to be mostly from various Hosts.

• Within 30-days of each workshop: a results-synopsis write-up, an evolving synthesis of accumulated discovery, and a case study write-up.

• No system-functional details need be revealed, only SE life-cycle process and activity procedures. Proprietary and classified projects should not be a problem.
Pre-Workshop Host Preparation

- Get budget approved: estimated at $20k, to cover facilitation, synopsis reports, materials, estimated participant travel costs, workshop lunches, and one dinner.
- Identify principal point of contact, phone(s), and email address
- Reach agreement on process to be analyzed, process to be synthesized, and date of workshop
- Identify in advance any special sign-in/registration needs for participants including nationality constraints if any
- Recommend hotel(s) for traveling participants, means to travel from hotel to workshop facility, and provide map of facility location
- Identify host participants that will attend host workshop plus two more workshops, limit 2-3 at any one additional workshop, with email addresses
- Identify others that will present/participate in host workshop, limit 6-8, with email addresses
- Identify who will review post workshop results synopsis, phone and email address
- Schedule workshop facilities for full group (20 people max) and 1-2 additional break out team rooms that could accommodate two sub-groups
- Arrange suitable place for Day 1 evening dinner, one large (U preferred) table or smaller tables in proximity accommodating 4-8 people, and provide map
- Arrange morning and 2 break refreshments including coffee/soft drinks
- Arrange box lunch for three days served in workshop facility (preferred)
- Prepare Day 1 presentation
- Prepare Day 2 presentation
Outcomes and Benefits

Workshop Hosts:
• Diagnostic analysis of an agile SE process experience for fundamentals that enable effective response in uncertain, unpredictable, evolving SE environments.
• Action-learning synthesis applied to a host situation in need of more agile capability.
• Understanding of necessary and sufficient enabling principles for any type of agile SE process on any type of project.
• Insightful competency developed among at least a few host participants for knowledgeable internal leadership.
• Influence where things are going, compatible with your environment.

Traveling Participants:
• Insightful competency for transformational leadership.
• Bench-mark exposure to HW/SW/WW agile SE processes.

Systems Engineering Community:
• Generic principle-based framework for knowledgably evaluating, choosing, tailoring, integrating, and evolving agile SE.
• Means to address SE dynamics with resilient & composable processes.
• Clarified agile-SE compatibility with 15288 and INCOSE Handbook.
Status


Next

Host identification/scheduling **(yours?)**
Attention to balance with commercial sector and Europe.
Workshops will occur about one per month, with Mar/Apr start.

Project Leadership:

- Rick Dove, prior agile-fundamentals workshop series involvement
- Kevin Forsberg, V diagram and INCOSE Handbook involvement
- Bud Lawson, systems engineering text-book involvement
- Jack Ring, prior agile-fundamentals workshop involvement
- Garry Roedler, 15288 involvement
- Bill Schindel, PBSE concept involvement

Active In-Process Workshop Sites: Honeywell, General Dynamics, Lockheed, Northrop Grumman, Rockwell Collins, SPAWAR/MITRE, ... You?
Ask for Project Business Card if you are a Host candidate

This presentation with audio at: www.parshift.com/s/150127IW15-ASELCMTownHall.mp4

INCOSE-PROJ-2014-01
Discovering Domain Independent Agile Systems Engineering Life Cycle Model Fundamentals

3-Day Action-Learning Workshops USA and Europe, 2015-2016
For hosting details:
www.parshift.com/ASELCM/Home.html

Analyzing defense and commercial SE process experience on mixed HW/SW/WW projects under uncertain, unpredictable, evolving development situations

To Inquire About Hosting or Web Presentation:
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