

Working Group Outbrief



Ground System Architectures Workshop



Session 11D

Achieving Resiliency with Agile Methods

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Participants

- Lauren Ballard, Nesbitt Discovery Academy
- Lyle Barner, JPL
- Emily Brison, Nesbitt Discovery Academy
- Doug Buettner, Aerospace
- Jay Bugenhagen, NASA
- Brook Cavell, Aerospace
- Roger Claypoole, Aerospace
- Eric Cohen, Lockheed Martin
- Enrique Fraga, GMV
- Judy Kelley, ASRC Federal
- Peggy Lou, Aerospace
- Paul Mallon, Aerospace
- Ugur Melihslizue, TAI
- Sue Mobasser, Aerospace
- Phuong Phan, Navy
- Jodene Sasine, Aerospace
- Jim Schier, NASA
- Scott Smith, SAIC
- Bruce Steiner, Aerospace
- Michael Thimblin, Aerospace
- Rolando Ventura, Harris
- Russ Wolfer, USG

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Schedule

Time	Presentation and Discussion
1:00 – 1:30pm	Session Overview
1:30 – 2:00pm	“Agile ground segment software development: cheaper, faster and better” Enrique Fraga Moreira, GMV Aerospace and Defence
2:00 – 2:30pm	“SCRUB for Peer Review of Static Code Analysis Results” Lyle Barner, Jet Propulsion Laboratory
2:30 – 3:00 pm	General discussion - I <ul style="list-style-type: none">• Agile Battle Rhythm : <i>who, what, when, where, why, how many</i>
3:00 – 3:30pm	Break
3:30 – 5:00pm	General discussion – II <ul style="list-style-type: none">• Agile Architecture: <i>build “-ilities” and resiliency in</i>• Agile Enterprise: <i>cultural and paradigm shift</i>• Agile Mission Assurance: <i>trust but real-time verify</i>• Agile Supporting Infrastructure: <i>required product and process resources</i>



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Agile Battle Rhythm

- **Who?**
 - **Default:** Scrum Product Owner, Scrum Master, Developers and Testers
 - Team composition? Any special team, such as system engineering team, integration team, program management, customer liaison, Integrated Product (Process) Team (IPT)?
 - Embed Architect, SMEs, Requirements Engineer, SE into Agile team
 - Developers knowledgeable on cybersecurity or have a dedicated Cyber engineer
 - Release Train Engineer – manage multiple teams, release tempo
 - Human Factors Engineer – overall program, involve user communities
 - Who is your Product Owner?
 - Government – requires training/education; challenging due to frequent Govt rotation (consider if 2-3 month overlap is possible for cross training)
 - Contractor – ensure regular communication between Customer and Product Owners
 - Contractor Product Owner needs Govt counterpart to synchronize
 - Required certifications for Product Owner? Scrum Master?
 - Must be experienced



Agile Battle Rhythm

- **What?**
 - **Default:** Sprint Planning, Daily Stand-up, Sprint Demo, Sprint Retro, Story Grooming?
 - Scrum of scrums
 - Pre-release / Post-release (build / increment / iteration) Reviews
 - How to collaborate across teams?
 - Utilize Release Train Engineers
 - Any additional / tailored activities for the new roles?
 - Govt counterpart to Contractor Product Owner
 - Govt engineer/developer embedded/deployed into Contractor Agile team that Govt pays for



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Agile Battle Rhythm

- **When?**
 - Sprint length? Release length? Number of Sprint per Release?
 - Sprint length: 2-4 weeks
 - Release length:
 - Greenfield: quarterly (minor); 6 months (major)
 - Enhancements: monthly
 - Stakeholders constrained: 9 months
 - Number of sprints per release: depends on release length
 - Any empty/buffer Sprint? At least one per release
 - Milestone reviews?
 - Build / Increment / Iteration Review, TRR, RRD, RRT
 - Agile metrics at each sprint review (i.e., velocity)
 - Useful – burndown, burnup, velocity, features delivered, technical debt
 - Frequency of system-level demo? Monthly
 - Are you using Integrated Master Schedule (IMS)? Any alternative?
 - EVM at release/iteration level
 - Portfolio report (Jira)
 - SEER-SEM (agile)
 - Most productive is 80% assigned
 - PMI: 1 day is 6 hours



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Agile Battle Rhythm

- **Where?**
 - **Default:** colocated team members
 - Challenges on distributed teams? Mitigations?
 - Do you have colocated users?
 - If not, how do you collaborate? How often?
 - Visit contractor site at appropriate times – open hot desk
 - Online access to Contractor dashboard
 - » Be careful on micromanagement
 - Skype, VTC helps but things lost in translation (facial, body language)
 - Need periodic person-to-person contact
 - Development environments? Demo environments? Staging or Operational-like environments?
 - System demo done in test or ops-like environment; depends on program
 - Leave development environment for development
 - Utilize Docker
 - Watch out for 'it works on my machine'



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Agile Battle Rhythm

- **Why?**
 - **Default:** Four Manifesto Values and Twelve Principles
 - What works, what does not work?
 - Responding to change – sometimes means no change, expectation management, design for potential changes
 - For fixed price, Govt collaboration needs to be well understood
 - Be transparent, timely
 - Welcome changing requirements – typically no but tweak is ok

Individuals & interactions	over	Processes & tools
Working software	over	Comprehensive documentation
Customer collaboration	over	Contract negotiation
Responding to change	over	Following a plan

1. Satisfy the customer
2. Welcome changing requirements
3. Deliver working software frequently
4. Stakeholders work together daily throughout the project
5. Motivated individuals
6. Face-to-face conversation
7. Working software is the primary measure of progress.
8. Sustainable development
9. Continuous attention to technical excellence
10. Simplicity
11. Self-organizing teams
12. Continuous Improvement



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Agile Battle Rhythm

- **How Many?**
 - **Default:** 4-9 people per team
 - No more than 10 members
 - Ratio between Product Owner and teams?
 - 1 Product Owner to 1-2 teams (max)
 - Ratio between Scrum Master and teams?
 - 1 Scrum Master to 1 team



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Agile Architecture / Architected Agile Build “-ilities” and Resiliency in

- **Approaches:** Design-as-you-go, Emergent Design, Architecture Runway, Enterprise Architecture, Release Train
- What is your approach in developing architecture and design in Agile development?
 - Knowledge of Interfaces and Interoperability
 - Embedded Systems Engineering (including architect) team
 - Design in resilience; need team members educated on what resilience means
 - Architecture Runway – have SE/Design teams work ahead of development team to flush out design prior
- How do you address non-functional requirements?
 - Part of Definition of Done; every commit checks (mostly automated); peer review, performance testing
- How do manage dependency between components?
 - Roadmap needs to be clear with dependencies represented



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Pain Points (1/2)

- Buy-in at Middle Management
 - Use short term incentives; MVP for short term win
- Culture Shock
 - Leader is no longer the boss, acts as a facilitator
 - Transition: Processes, Metrics, Tools, Infrastructure, Role & Responsibilities
 - Hire an Agile Coach
 - Executive involved at the beginning
 - Government: increased workload tremendously
 - Contractor: matrix management of agile developers created risk across multiple projects
 - Agile is more costly in the beginning; cheaper in “total cost of ownership”



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Pain Points (2/2)

- System Acceptance
 - Minimum at Feature and System level
 - Full System Test at the end
- Better way to adopt Agile, Process Improvement
- Midstream Agile Adoption
- RFP, FAR, Acquisition Milestones
- Scaling
- Interface to different processes
- System enhancement vs Greenfield development
- EVM, Project Planning, Quality Management
- Requirements Management



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Good idea

- Infrastructure and Resources must be ready (e.g., DevOps)
- Continuous Planning, Continuous Code Integration & Test
- Agile experience required; more important than certification
- Empower the team; but balance with checks and controls
- Release Engineer: Align integration team and system engineering team
- Assign 10% margin for reengineering
- **All parties need to be Agile**