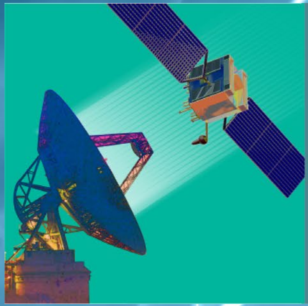
Working Group Session 11A Outbrief



Ground System Architectures Workshop

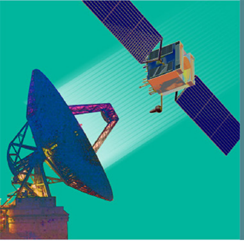
Opportunities in Data Exploitation

March 2–5, 2020 | Renaissance Los Angeles Airport Hotel

Agile Retrospective: Opportunities to Perform Agile Acquisition Differently

Leads:
Supannika Mobasser and
Jodene Sasine,
The Aerospace Corporation

Approved for public release. OTR 2020-00511.



Schedule

Time	Presentation and Discussion
1:00 – 1:20pm	Session Overview
1:20 – 1:45 pm	*Agile Working Group 2019 Outbrief* Jodene Sasine, The Aerospace Corporation
1:45 – 2:10pm	*Agile Readiness at SMC* Capt Patrick Wu, SMC/ACX
2:10 – 3:00pm	General discussion • *Agile-compatible milestones and battle rhythm* • *Which CDRLs, when, and how?*
3:00 – 3:30pm	Break
3:30 – 3:50pm	*Using Organizational Baselining to Inform Adoption Planning of New Practices* Suzanne Miller, Software Engineering Institute
3:50 – 5:00pm	General discussion • *Continuous integration, verification, and testing* • *Just-in-time certification and accreditation* • *Smarter and faster data-driven metrics* • *Agile & MBE* • *Transparency and Openness*

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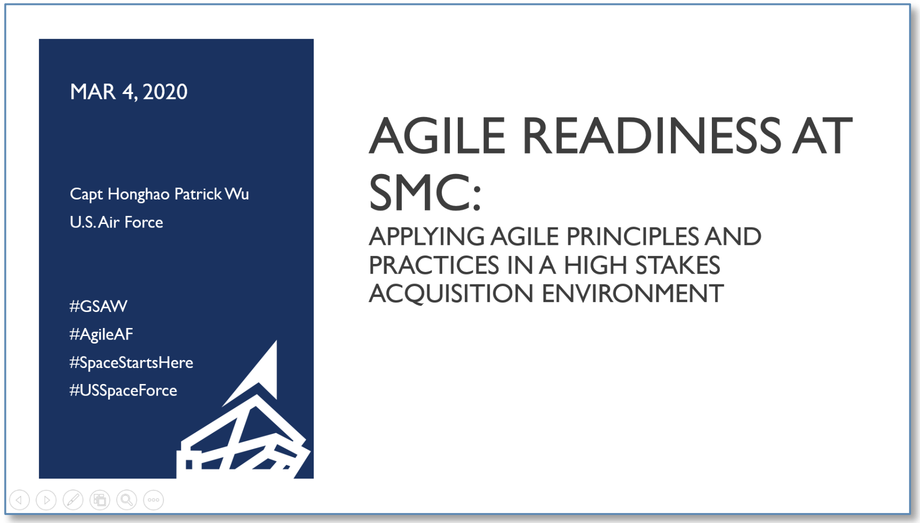


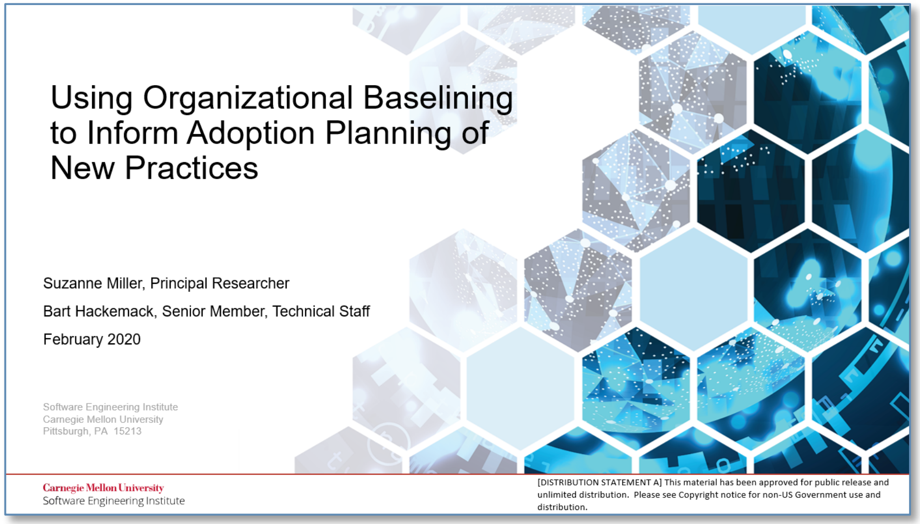
MAR 4, 2020

Capt Honghao Patrick Wu
U.S. Air Force

#GSAW
#AgileAF
#SpaceStartsHere
#USSpaceForce

AGILE READINESS AT SMC:

APPLYING AGILE PRINCIPLES AND PRACTICES IN A HIGH STAKES ACQUISITION ENVIRONMENT



Using Organizational Baselining to Inform Adoption Planning of New Practices

Suzanne Miller, Principal Researcher
Bart Hackemack, Senior Member, Technical Staff
February 2020

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Carnegie Mellon University
Software Engineering Institute

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SMC
SPACE AND MISSILE SYSTEMS CENTER

THE STATE OF AGILE REPORT

Space and Missile Systems Center
United States Air Force
September 2019

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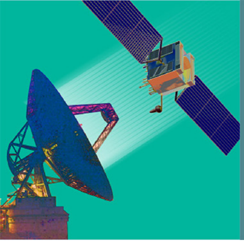
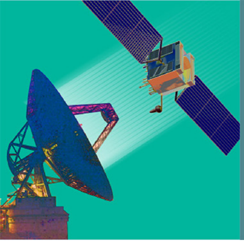
Download the SMC State of Agile Report at https://sites.google.com/view/atlasx/ARC



Pain Points about Agile Adoption

- Portfolio consistency on Agile adoption
  - *Agile adoption on System of Systems development*
  - *Coordinating with waterfall*
  - *Agile in sustainment and O&M*
  - *Agile in HW&SW development (complex cyber physical systems)*
- Agile architecture and design
- Budget, estimation, and tracking
- Agile mindset and culture
- Contract
  - *Limitation and inflexibility*
  - *Monolithic contract*



BLUF - Bottom Line Up Front

- Milestone reviews
  - *Keep SRR: Check the translation of requirements to Program Backlog*
  - *Keep other milestones incremental*
  - *Frequent but not too often, need to let the team works*
- CDRLs and document
  - *Develop a Product Roadmap pre-award to understand expectation and dependency*
  - *Use mission thread to tell story and priority*
  - *Keep ICD, test strategy, a document for platform infrastructure*
  - *Automate, auto-generate as much as possible*
  - *Don't request for CDRL upfront, high overhead to deliver a CDRL. Use live, online, incremental document*
- DevSecOps
  - *Keep Dev and Ops environments in sync*
  - *Integrate at the system-level as often as possible, cheaper rework, cheaper total cost of ownership*
  - *Ops might not be available for frequent deployment*
  - *Leadership may support frequent deployment, but AO is not available*

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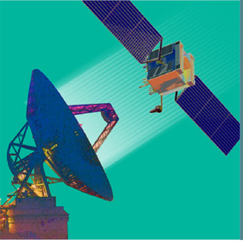

Agile-compatible milestones and battle rhythm

- Have you aligned traditional milestones with your program’s Agile planning and development battle rhythm? Did you tailor milestone expectations? How?
  - *SRR: Software Requirements Review*
    - *Kept this milestone; Translate Capability Development Document (CDD) into Program Backlog*
      - *Year one is decomposed to expected level of details (1-2 down from CDD)*
        - *Also, release 1 or 2 decomposed at this level, After year 1, keep at CDD level*
    - *Helps to start looking at Architecture, Leave room for learning by not over-specifying requirements*
  - *SDR, PMR, PDR, CDR, TRR, RRR*
  - *FDD: Full Deployment Decision*
    - *Kept this one in cyber-physical example*
  - *FD: Full Deployment*
- *other milestone activities are incorporated into other Agile events.*
  - *Apply incremental milestones as appropriate*

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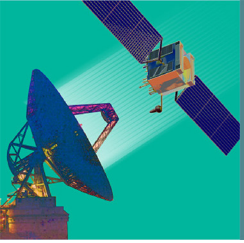

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Agile-compatible milestones and battle rhythm

- Product Roadmap – collaboration between Govt and Contractor
  - *Identify capability deliveries, then generate a product backlog per release/build*
  - *Capabilities are potentially shippable*
- Use Mission Threads and associate Epics to each Mission Thread
- Considerations for which milestones might be impacted by size of program
- Example program changed PMR structure to their 3-month increment cycle
- Adaptive Acquisition Pathways
  - *Lessons learned from 804, mid-tier programs, relaxed some requirements*
  - *Focused on meeting criteria as opposed to having events*
- Recognition that Hardware and Software can be treated differently

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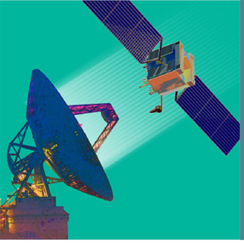
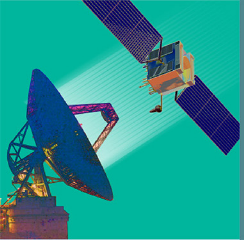


Agile-compatible milestones and battle rhythm

- What other Agile-compatible milestones or decision points are you using?
  - *Major and Minor Incremental Development Review (IDR) – every 4 weeks, demonstrate to govt*
    - Minor IDR - 1 day review, review software and some metrics
    - Major IDR – Revisit architecture

- Sustainment
  - *Develop a cadence for analysis of change requirements; does not require long-term analysis*

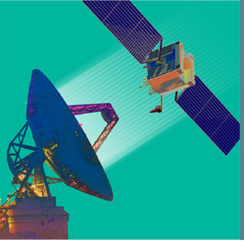
- Pathfinder Project
  - *Good candidate for Agile*
  - *Once project picked up, it imposed additional restrictions*
  - *How do you know if you are done? Change requests continuously*



Agile-compatible milestones and battle rhythm

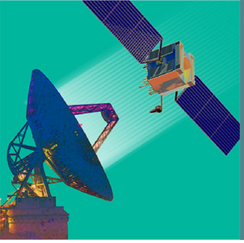
- Programs use different battle rhythms and terminology
  - *Program A: Build (9 months), Program Increment (3 months), Iteration (2 weeks)*
  - *Program B: Program Increment (3 months), Incremental Development Review (4 weeks)*
  - *Program C: Build Decision Review (8 months), System Demo (2 months), Sprint (2 weeks)*
  - *2 month increments, 1 month sprint*
    - Do this to align with EVM/Agile EVM
  - *A SME rep offers regular hours to be available for teams to ask questions*

- What battle rhythms that are not good?
  - *Examples*
    - 2 week sprint, 4 hour block meeting – not productive to Agile team



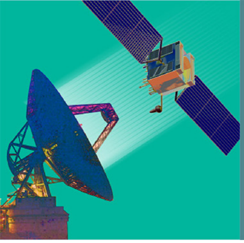
- How often do you release?
  - *Release to staging environment*
    - Every Sprint / Iteration (~1-4 weeks)
    - Every Release / Build (~3-6 months)
    - Every major milestone (~1 year)
    - Each Program Increment (~3 months)
    - One time Release at the end of development
    - Depends on component; typically 1/qtr; would like higher frequency
    - Continuous – CI/CD pipeline
    - Release on-demand
    - Window for deployment might be limited

Release defined as deployment to a non-development environment.



- How often do you release?
  - *Release to Ops Floor or Operation/Production environment*
    - Every Sprint / Iteration (~1-4 weeks)
    - Every Release / Build (~3-6 months)
    - Every major milestone (~1 year)
    - One time Release at the end of development
    - Sustainment: Quarterly to Ops floor
    - If deploy to multiple sites; each could pull from repo and upgrade at least 1 per year or more
  - ***Challenges:***
    - Ability for continuous ATO vs Ops floor is not ready to take the release

Release defined as deployment to a non-development environment.



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Program Management Level CDRLs

- Which CDRLs have you excluded / tailored, or added for your Agile program?
  - *Program Management, Subcontractor Management Plan*
  - *System Engineering Management Plan, Software and System Measurements Report*
  - ***Integrated Master Schedule (lagging rather than leading)***
  - *Product Roadmap, Work Breakdown Structure*
  - *Software Development Plan*
  - *Quality Assurance Program Plan, Configuration Management Plan, Data Management Plan, Accreditation Plan, Financial Management*

  - ***Challenges: Budget, estimation, tracking***
    - **Agile EVM**
      - *Uses Agile-compatible WBS; sync EVM with sprint or release*
      - *3 month cycles are recommended for EVM*
    - How do you know if you are on track to complete on 3-5 year roadmap?
    - Prioritized backlog vs 5-year POM
    - Budget to sustain and evolve instead of POM
    - Value: Enterprise value vs just Operator Value
    - Minimum Viable Product (MVP)

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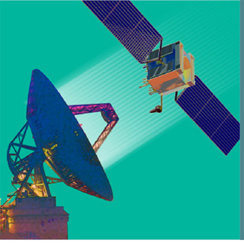
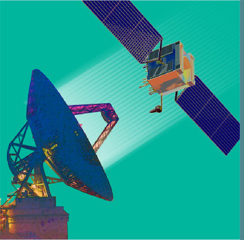


Requirement CDRLs

- Which CDRLs have you excluded / tailored, or added for your Agile program?
  - *System/Subsystem Specification, Software Requirements Specification*
  - *Technical Requirements Document*
  - *Requirements Traceability Matrix*
  - *Product Backlog*
  - ***Observations:***
    - Don’t let go of the ICDs
    - Need things that help tell the story
      - *Product backlog does not tell a story*
      - *Mission threads do help to tell the story*
      - *Help to provide priority*
      - *Option: Capability Needs Statement*

Architecture CDRLs

- Which CDRLs have you excluded / tailored, or added for your Agile program?
  - *Software Architecture Description, MBE models*
  - *Interface Control Document*
  - *System/Subsystem Design Description, Software Design Description*
  - ***Observations:***
    - Need something to define the platform architecture
    - Definition of the infrastructure
      - *Some programs fail due to not having a defined infrastructure*
      - *Dev and Ops environment aligned*
      - *Less emphasis on "to be"*
      - *More emphasis on "as built"*

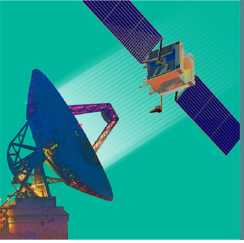


Testing CDRLs

- Which CDRLs have you excluded / tailored, or added for your Agile program?
  - *System Test Plan, System Integration and Test Plan*
  - *Software Test Plan, Software Test Description, Software Test Report*
  - ***Observations:***
    - TEMP – Test and Evaluation Management plan
      - *Define test strategies; incremental test detail in each appendix.*
    - Documentation of the test is via tool
    - Test plan for sustainment/sustained development
    - Identify the key test that you are going to run
    - Automated testing – autogenerate test documents

When and How?

- When are CDRLs delivered for your Agile program?
  - *Draft until final “As-built”*
  - *Align on battle rhythm (Release, Program Increment, …..)*
  - *Include in the “Definition of Done” for Build, Program Increment, Epic, Feature*
  - ***Observations:***
    - Depends of the purpose of the CDRL
    - Extremely high overhead cost to deliver a CDRL
      - *Contractor processes my inhibit quick delivery of CDRL*
    - Trust and good working relationship between Government and contractor
      - *Preferred option: Wiki-like, incremental, as-built documents*
    - Some documents need to be delivered in hardcopy such as technical manual



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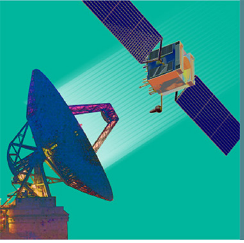
Continuous integration, verification, and testing

- How often do you integrate at the system-level on an Agile program?
  - *Every day (nightly build)*
  - *Every Sprint / Iteration (1-4 weeks)*
  - *Every Release / Build (1-4 months)*
  - *Every year (6 -12 months)*
  - *One time at the end of the development*
  - *Others? Depends*
  - ***Pros:***
  - ***Cons:***
  - ***Challenges:***
    - Determined by dependencies
    - Integration may cost less the more often you delivery and integrate
      - *Integrate early and often, lower rework cost*

DevOps : Synchronization between Dev and Ops

- Considering frequent software patching, updates, what level of consistency between Dev and Ops environments is necessary?
  - *Preferably 100% alignment between Dev and Ops*

- Techniques In ensuring the consistency
  - *Use the same baseline image*
  - *Use containerization*



Just-in-time certification and accreditation

- Do any of these suggestions from last year’s session work for an Agile program?
  - *Design for certification*
    - Microservice architecture
    - Use containers for accreditation scope
    - Artificial Intelligence (AI) driven 24 hour certification by DARPA
    - Automated compliance monitoring
  - *Stakeholders involvement*
    - Include accreditors, Authorizing Official (AO) as part of Agile team
      - *Accreditors need to know what they’re accrediting*

- Any new experiences regarding Continuous Authorization to Operate (ATO)?
  - *NASA has ATO out of the box, developer is using sandbox, but have to stay in the security boundary*
  - *Although leadership support, but AO is not available*

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