Adopting AGILE and the Scaled Agile Framework (SAFe) for the Federal Government: A case study application for a satellite ground system acquisition program

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Presentation Topics

- A case for adopting AGILE and SAFe – The Systems Program Office
- Defining the challenge
- Adopting Agile and the Scaled Agile Framework (SAFe)
- Lessons Learned and observations – How Federal “constraints” impacted the ability to be “Agile”
- Onward and beyond for the program office

Intent is to provide individuals and organizations key lessons learned for implementing the Agile and Scaled Agile approach within the constraints of the federal government

* Assumption – familiarity with Agile, Scaled Agile Framework (SAFe), and Continuous Integration concepts
A case for adopting AGILE and SAFe

The Systems Program Office

• Systems Program Office (SPO) - joint program office between multiple federal agencies and strategic organizations

• System-of-Systems (SoS) construct to provide ground station functionalities for space systems.
  • Remove stovepipe dependencies for various space system capabilities
A case for adopting AGILE and SAFe

The Systems Program Office

- Major Systems Acquisition (ACAT-I equivalent) program office responsible for the acquisition of a ground processing system
- “Government-As-The-Integrator” (GATI) – serve as the primary integrator for legacy and emerging ground station capabilities in support of NTM
- Software intensive development effort – multiple vendors, multiple sub-systems
- Primarily software development effort provided by >20 vendors with multiple contract lines and types.
- Program Office composed of Military, Government, Contractor-support
- Future Year Defense Program (FYDP) budget – FY 19-25 > $1.0B
Defining the Challenge

- Implement Agile methodology to software development in order to enable rapid software delivery (capability) to the users
- Scale the Agile process to enable enterprise integration activities
- Adopt cloud environments where applicable
- Enable organizational processes to allow iterative activities
- Align resource skillsets to enable Agile processes and integration capabilities

Federal Agency Organizational focus – Acquisition-centric approach
- DoDI 5000.02 – Operation of the Defense Acquisition System
- Traditional Waterfall approach
- Significant top-down System Engineering mindset
- Systematic oversight from Congress and other federal organizations
Program Office

Drive to adopt Agile and SAFe

- Decision to implement Agile and Scaled Agile (2015/16)
- Focused and deliberate activity
  - Allow/direct component development to utilize Agile development approach – Scrum
  - Adopt Scaled Agile Framework (SAFe) – early iteration of SAFe, tailored approach
  - Re-organize according to SAFe approach
  - Adoption of Agile and SAFe lexicon
- Initial emphasis on component developers to adopt Agile approach – tempo, delivery cycle, and scale where appropriate, within the component efforts
- Develop and migrate into the cloud environment as appropriate
- Establish a cyclic planning cycle – Increment planning
  - Organizational focused with stakeholder expansion
Successes

- Adoption of Scrum as the preferred Agile approach for developers
  - Cycle of activities around the iterative approach

- Established quarterly incremental planning cycle

- Established a dynamic, iterative approach that went beyond software development and deliveries – redefined organizational activities

- Provided a means for cross-component collaboration and interaction

- Led agency approach to address iterative (Agile) activities and overall adoption

- Pathfinder for additional framework activities

- **Effective component deliveries that addressed mission or user demands to the stakeholders**
Challenges

• Scaling of activities remains a challenge
  • Initial concept to adopt Minimum Value Threads was not successful

• Relegated systems engineering activities to supporting events
  • Program Office is responsible for translating Agile and SAFe “speak” to oversight and higher agency reporting

• Additional resources did not alleviate the challenges
  • Financial and human resources did not resolve difficulties

• Processes did not translate to effective tools and environment
  • Agile and SAFe came first; supporting structure was not ready

• Critical lessons learned obtained in four areas:
  • Requirements management
  • Contracts management
  • Continuous Integration Environment
  • Cybersecurity considerations
Scaled Agile Framework

Scaling Agile activities to support integration

- Fundamentally, the decision to adopt the Agile approach is to also implement the Scaled Agile Framework (SAFe)
- Mindset to go “faster in delivering capabilities” and “scaling faster delivery”
Define Mission Areas to accommodate difference between Requirements and System Deliveries (System Validation Testing)

Utilized contractor-defined software specifications after development (inclusive of user inputs) (Component Verification Testing)

Continuing challenge to maintain strategic obligations while executing dynamic development
Contract Impacts and Consideration

- Can be viewed as the PMO’s “span of control” – defines type of work that developers and contractors can legally execute

- Done incorrectly, this will disable ability to become Agile or integrate effectively
  - Ensure contract language exists for scaling and integration activities
  - Ensure contract language exists for product delivery

- Contract types will be a factor in determining flexibility – for the Program Office, Cost-plus award and incentive fee were particularly successful

- Contract definition (i.e. Statements of Work, contract deliverables, etc.) will be critical in defining work and ability to accommodate changes per the Agile doctrine
Continuous Integration Environment

• Key enabler for utilizing scaling and integration activities – tied to strategic vision of overall effort
• DEVOPS pipeline – strategic design – How can the user utilize the system?
• Provide the necessary environment for deployment for user access to software
• Align use of software development toolkits
• Lack of common environment will negate key advantages of what Agile and SAFE can offer (i.e. automated testing, etc.)

• **Significant driver for cost increase and cyber security activities; schedules and performance very close second**
Mismatch in approach negates advantages achieved in using Agile or immediate utility by the users.

Cybersecurity Considerations

The Agile way:
- Continuing iteration of software development and deployment
- Ability to ingest user changes and adapt to changing environment
- Dynamic changes and tempo

The Waterfall way:
- Deliberate and systematic linear activities
- Cybersecurity and site installation policies go hand-in-hand
- Process and document intensive

- Agency directives
- Site installation directive
Key Lessons Learned / Observations

1) “Digital Engineering” is an agency approach; Agile and Scaled Agile will influence a significant portion of how the organization conducts business.

2) Agile and SAFe does NOT replace good Systems Engineering processes
   • They are process tools to implement Systems Engineering
   • Adopt and tailor Agile and SAFE processes to maximize efforts

3) Federal ecosystem will continue to have challenges ahead
   • Most agency activities are still simply too entrenched in the traditional mindset of “waterfall”

4) Challenge in understanding the “Tools of Agile” – consistency and control of these tools are essential

5) The “Cloud” environment will exacerbate challenges of Agile
   • Highly recommend to understand the environment first, develop it, and prepare the environment, to fully maximize agility and integration
6) Mapping of lexicon and terminology is essential to organization success
   • Recommend that organizations implement a top-down approach for consistency

7) Establish the strategic implementation plan at the agency level – don’t forget data design and considerations

8) Highly recommend a common “digital environment” at the highest level possible (i.e. common environments, common platforms, common toolsets) – minimize duplicity in approach and redundancy in activity

9) Cybersecurity will be an exponential factor as you scale integration activities

10) Basics of Systems Engineering cannot be over-emphasized
Onward and beyond for the Program Office

- All component development activities are utilizing the Agile methodology
- Adopted SAFe construct for cross-component coordination
  - Increment Planning construct (quarterly coordination)
- Entering next phase of system-of-system integration
  - Multi-environment integration and testing (Distributed Test approach)
  - Common testing toolset
  - Rolling integration and test windows – adopted Agile process to system-of-system integration
- Continuing requirements management process (component verification testing)
  - Aligning integration testing to Mission Areas per user inputs (system test validation)
- Re-defining agency Systems Engineering process to adapt to Agile and Scaled Agile approach
- Preparing for higher Enterprise integration activities
Questions