Department of the Air Force

Integrity - Service - Excellence

How Agile is Agile: Characterizing the Agile Process for Government

22 October 2020

Purpose

- DoD is approaching Software Differently
  - 2018: Kessel Run stands up and becomes model to follow within the Air Force
  - 2019: Defense Innovation Board publishes Software Acquisition and Practices Study
  - 2020: Software Acquisition Pathway within the 5000 series created
- Modern software development approach still benefits from cost estimating and budget support
- Cost estimating community needs help to improve agile software metrics, estimating methods, and tools
- Greater characterization needed beyond “agile” and “non-agile”

Agile Analysis

- **Claims are often made that programs following an agile software development process are superior relative to historical programs: faster, cheaper, more productive, and/or higher quality**
- **Analysis to date on agile vs non-agile programs inconclusive:**
  - **Limited data: Predominance of data is traditional**
  - **Inconsistent "agile" identification**
  - **Program level rollup includes a mix of agile and non-agile elements**
- **Agile Subgroup to the Software Resources Data Reporting (SRDR) Working Group, comprised of members from Air Force, Army, Navy, CAPE, NRO, and MDA, set out to position ourselves to understand how comparable "agile" vs "non agile" programs are**

Agile survey developed to better understand where programs are on the spectrum of agile development processes, environment and tools

Survey Implementation

- Online delivery method using Qualtrics
  - User friendly interface
  - Database of results
- DoD Cost Assessment and Program Evaluation (CAPE) Endorsement memo signed by Fred Janicki 17 June
- Two phased implementation approach:
  - Initial distribution to jump start analysis and obtain survey feedback
    - Program targeting as identified agile subgroup members
    - IT-CAST supported DHS program targeting
  - Potential formalized continued implementation
    - Follow up to SRDR submissions provides context to quantitative data or incorporation into SRDR directly
    - DHS and/or NRO incorporation

Survey Overview

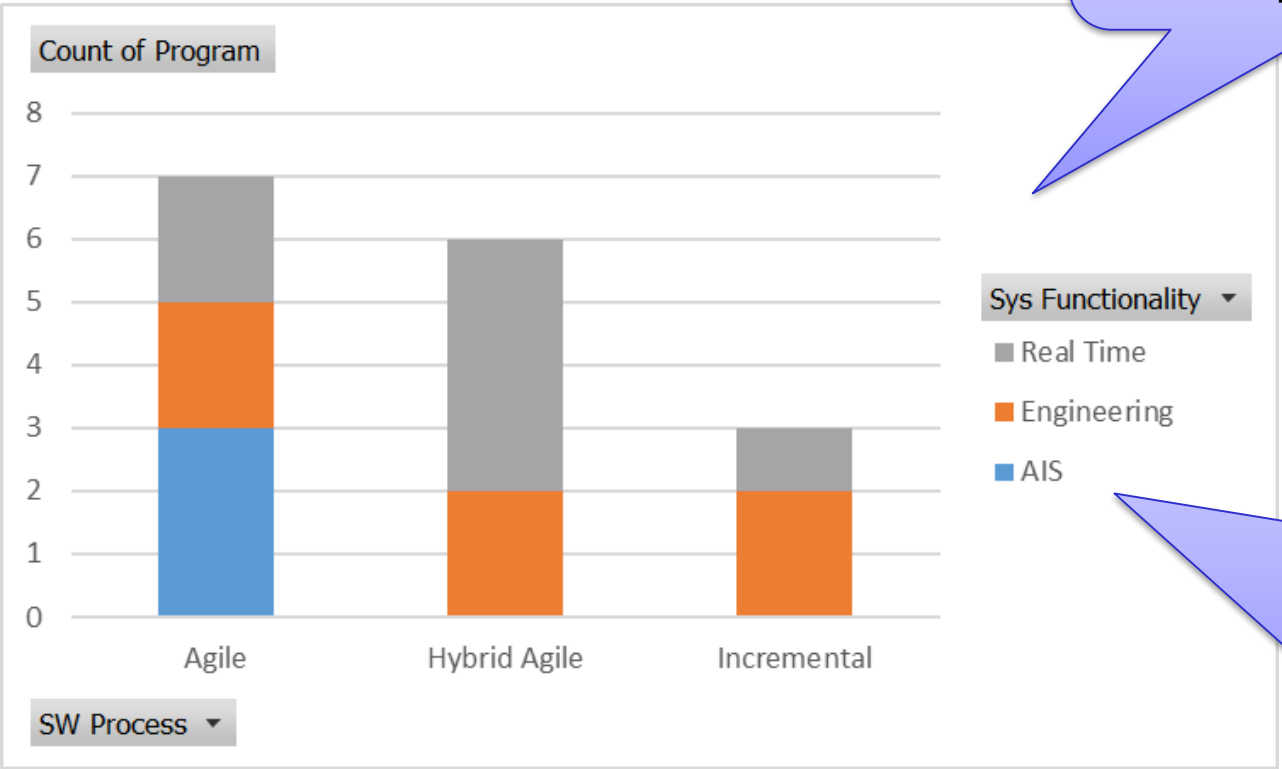
- Demographics
  - Contract Details
  - Software Development Process
  - Program Description and System Functionality
- Assessment questions: Multiple choice assessment questions ensures consistency
  - Pace of software delivery (internal and external)
  - Feedback, collaboration and involvement across key parties
  - Contracting strategy
  - Testing (automation and parallel)
- Value and metrics utilization understanding for shaping future data collection

SURVEY RESULTS

Response Composition

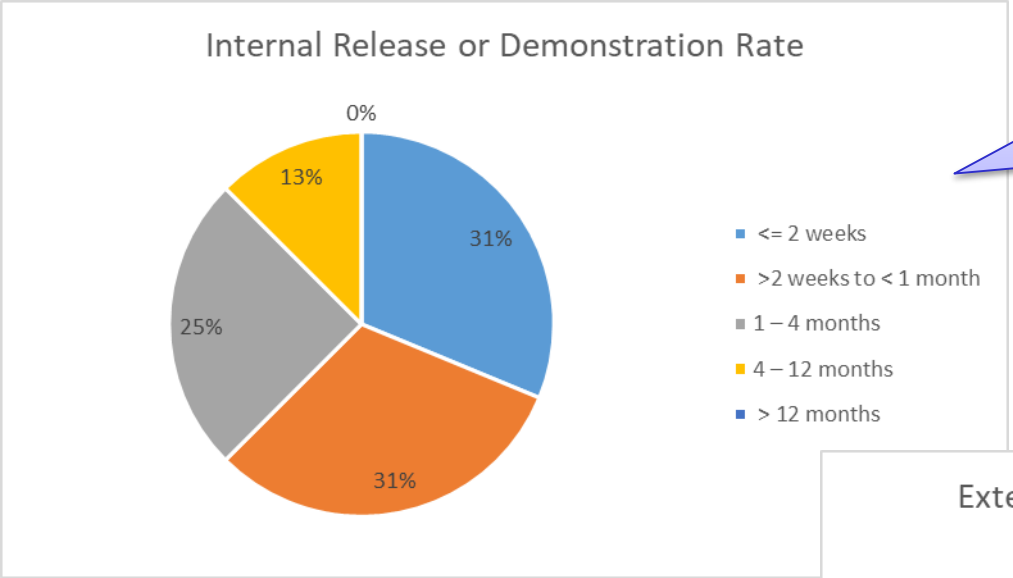
- **16 Survey responses received to date**
  - **Air Force, Army, MDA, DHS**

No programs identified as having Iterative, Evolutionary, or waterfall processes

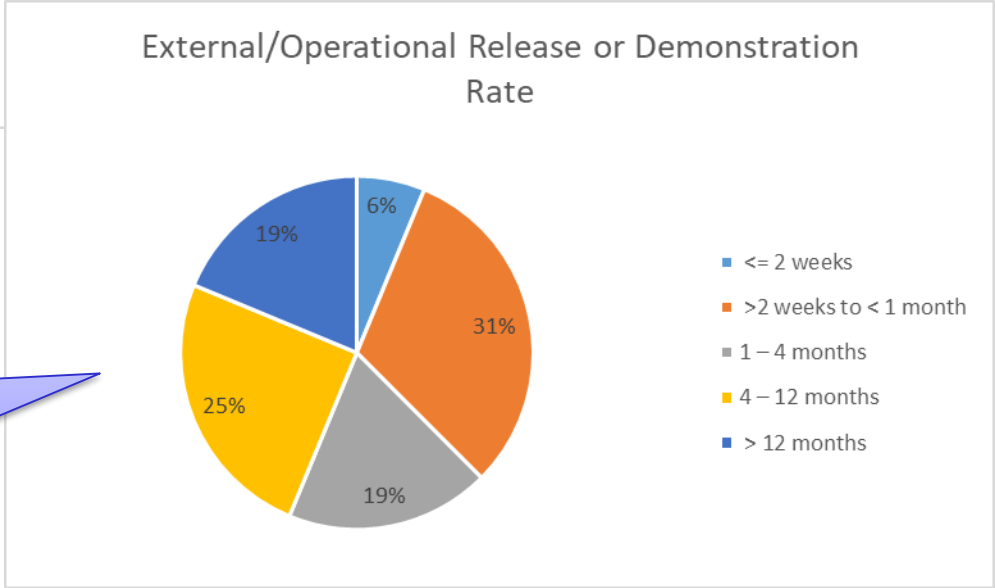


AIS is the least constrained system functionality of the options. Does this make it better suited for a more pure agile development approach?

Pace of Software Delivery



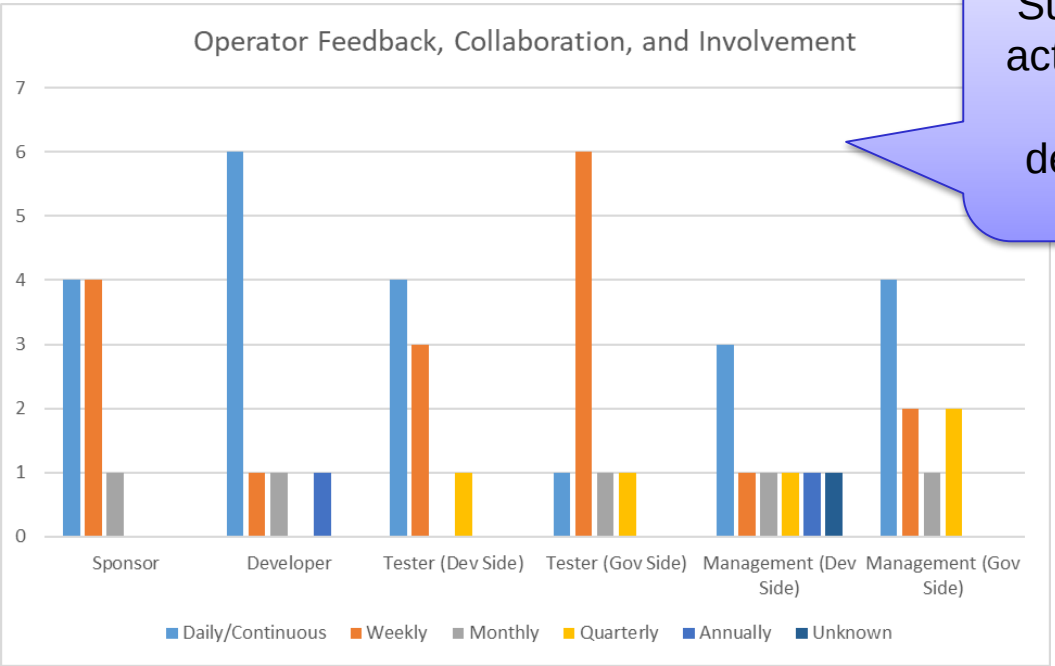
2/3 of respondents are delivering internally at a monthly cadence or better



More than half of the respondents are delivering new capability to the user at a quarterly cadence or better

Feedback, Collaboration, & Involvement

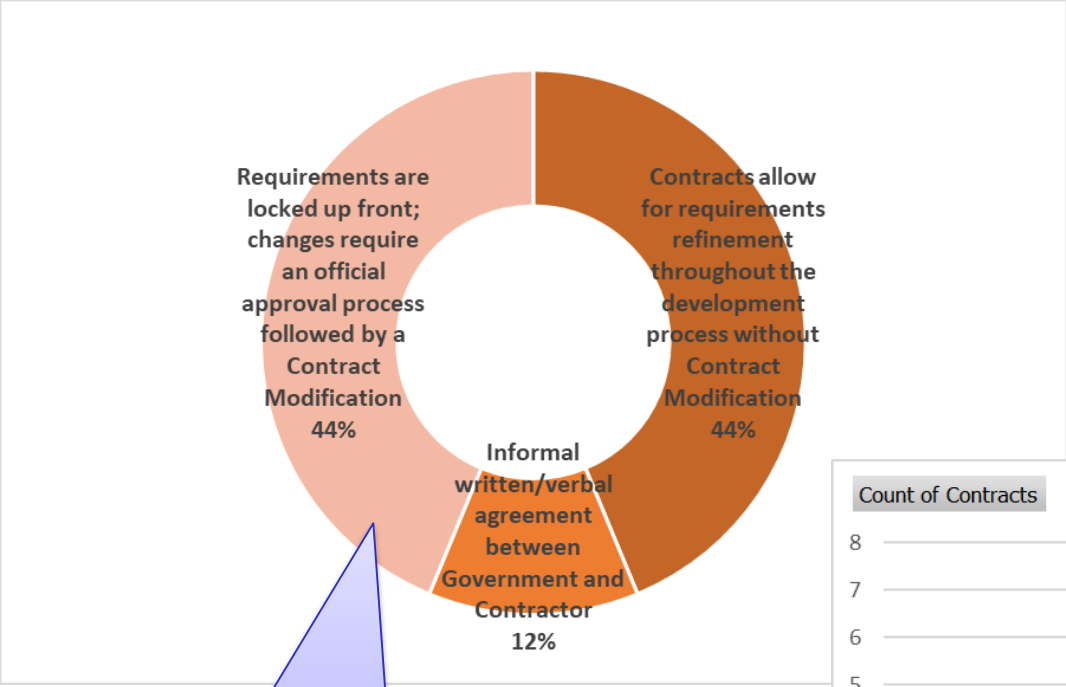
- **Survey responses show that engagement is taking place across sponsor, operator/user, developers, testers and management.**
- **User involvement is especially encouraged in agile software development.**



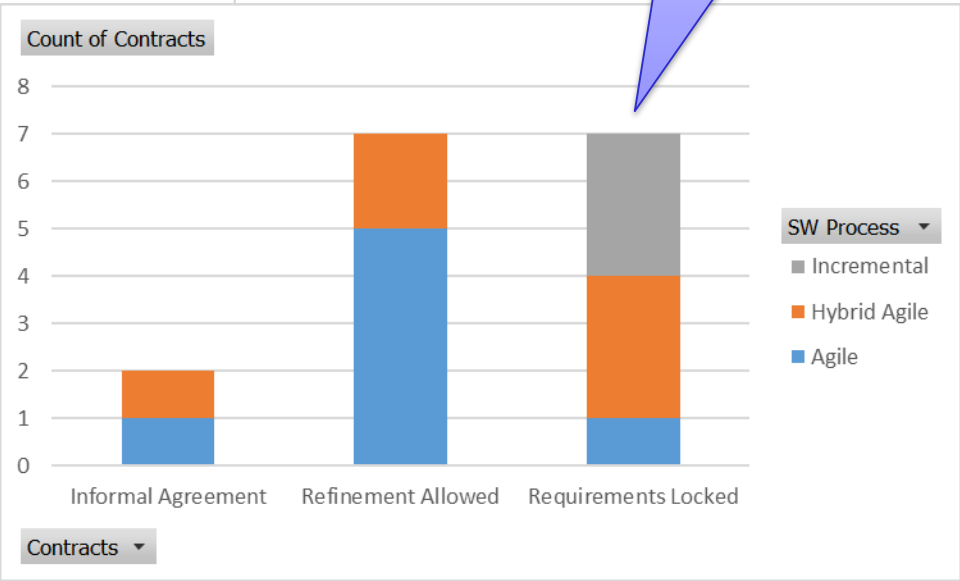
Survey results support active user involvement especially with the developer and testing community

See backup slides for more details

Contracting

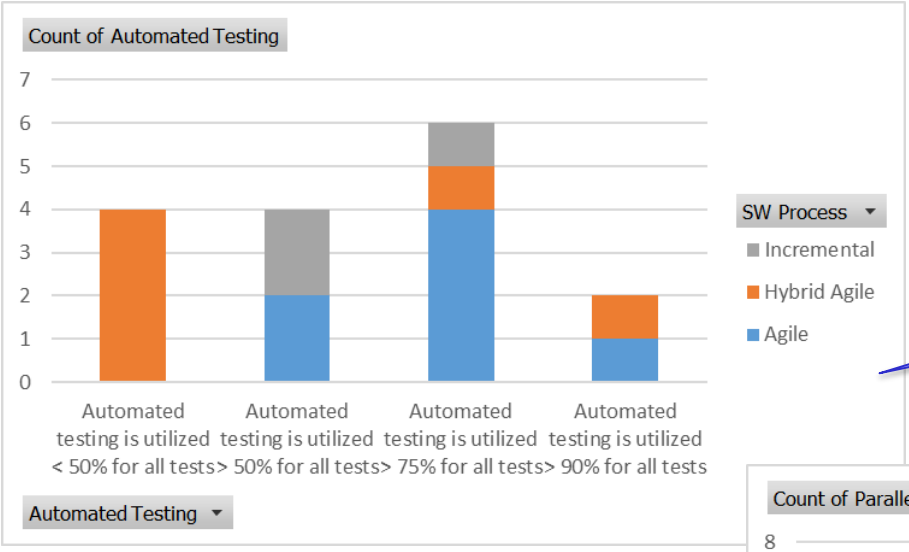


Contracts with locked requirements are mostly applicable to Incremental and Hybrid Agile efforts



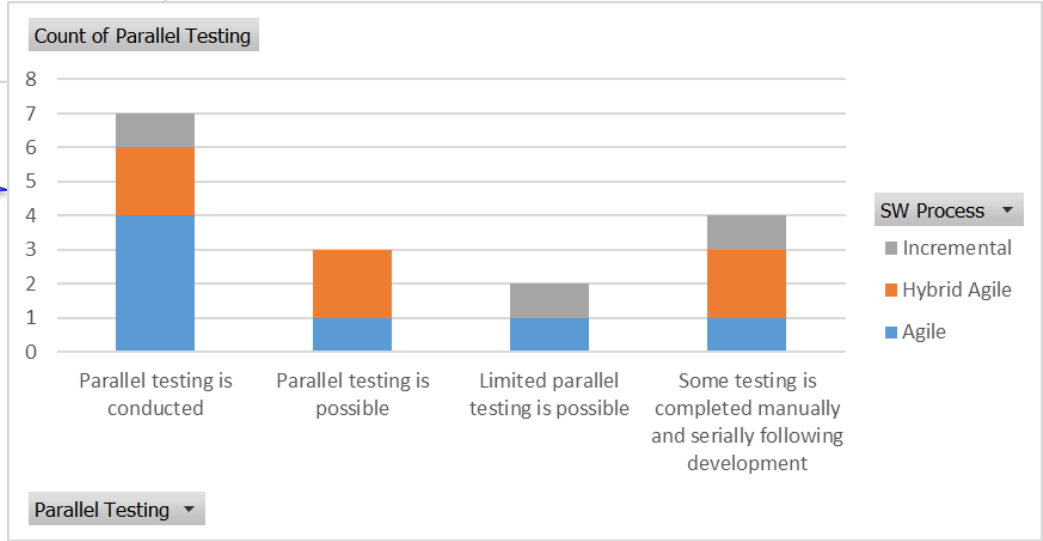
Many contracts still have requirements locked up front, limiting the ability to be truly agile

Testing



75% of programs are utilizing automated testing more than 50% of the time

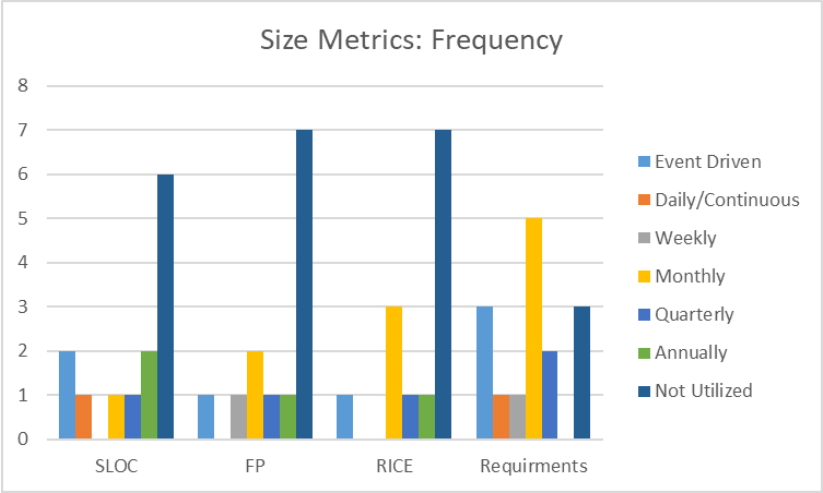
Most programs are taking advantage or parallel testing capability



Note: Survey feedback indicated that this question did not account for differences among tests types

Metrics

- **Size: Programs still measure SLOC, but not as much as requirements (7 vs 12)**
- **Process: Tracking story points is the primary metric collected (12 programs)**
- **Quality: Predominant metric tracked: number of blockers (8 programs)**
- **Product: Leading metric utilized: delivered features (13 programs)**
- **DevSecOps: Principal metric collected: deployment frequency (11 programs)**
- **Cost: burn rate is most common metric tracked (12 programs)**



See backup slides for more details

Value

- **Value definition, measurement and tracking commonalities:**
  - **Delivery of working software; achieving milestones**
  - **Utilizing Metrics**
  - **Earned Value**
  - **Qualitative feedback**

- ***"We track value based on the User perspective. Were system improvements delivered and fielded that provided the User with a positive business process improvement/change."***
- ***"We have a suite of metrics covering business value (to the user), agile development (health of the development process), cybersecurity and KPPs. All of these track value relevant to different stakeholders."***

Response Patterns

- **While not deemed definitive enablers, evaluating the responses holistically indicate that the following hypothesis is supported:**

Contract Type
- A flexible contract type influences

SW Process
- An agile development process which leads to

Internal Release Cadence + Test Automation
- More frequent internal release cycle which in conjunction with test automation allows for

External Release
- More frequent capability released to the user

Assertion is not conclusive. Additional data needed.

Summary and Way Ahead

- **Survey Feedback**
  - **Additional questions:**
    - **Formal training for personnel in Agile / DevSecOps?**
    - **Process for decomposing long term work into epics/capabilities/features/stories?**
  - **Difficult to answer:**
    - **Automated testing; did not accommodate different types**
    - **Answering questions on behalf of entire program**
- **Survey remains open and active!**
  - **https://survey.az1.qualtrics.com/jfe/form/SV_0ibcWes9jvqVXrT**
- **Data valuation will continue and formal implementation approaches are under consideration**

Feedback?

- **Cari Pullen**
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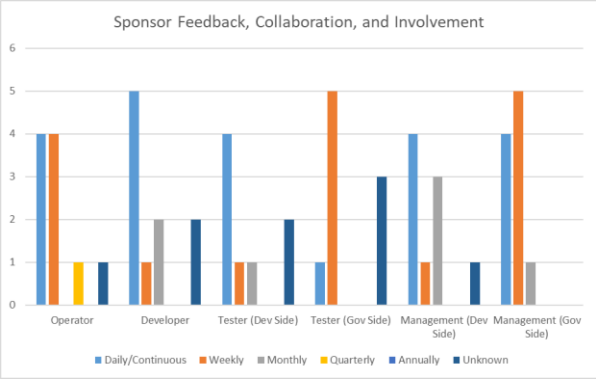
- **Matt Stahr**
  - matthew.stahr@us.af.mil

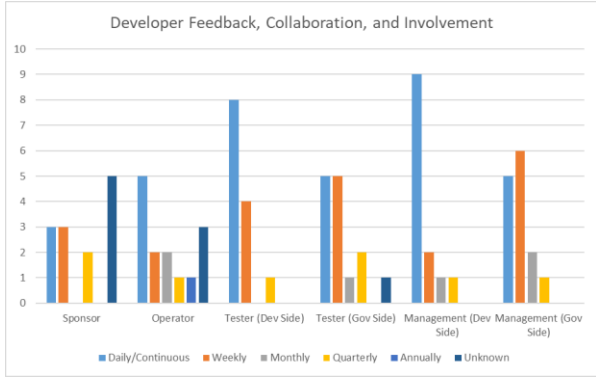
BACKUP
ADDITIONAL SURVEY RESULTS

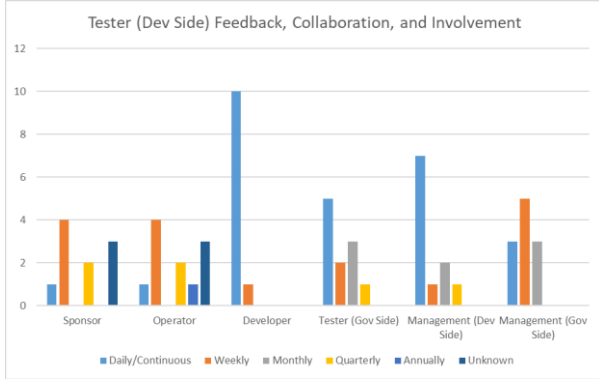
Agile Survey

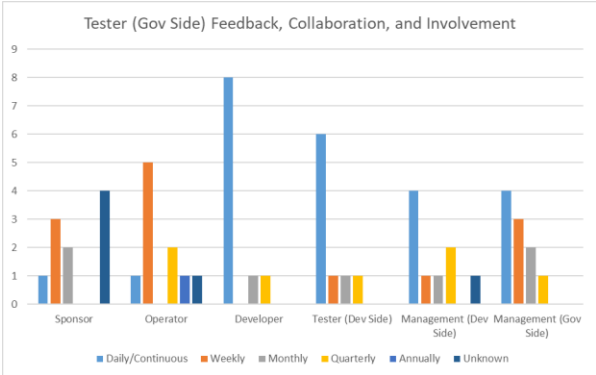
Microsoft Word Document

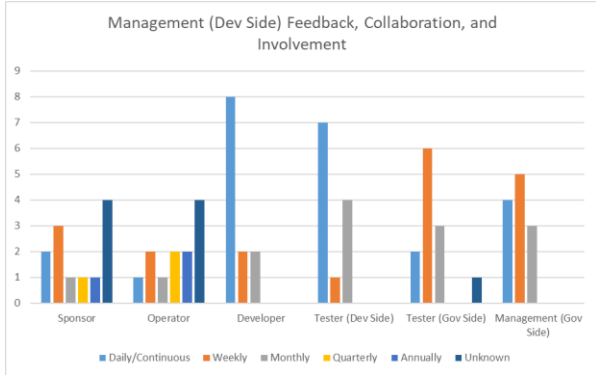
Feedback, Collaboration, and Involvement

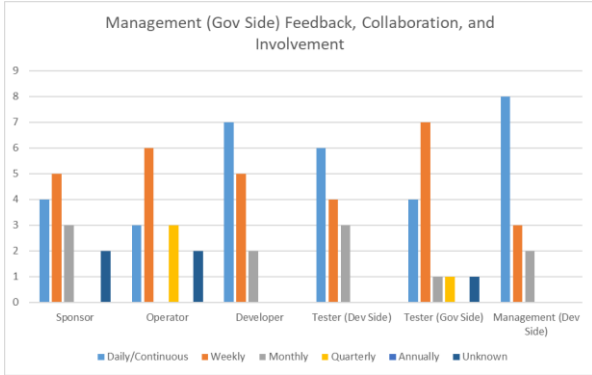




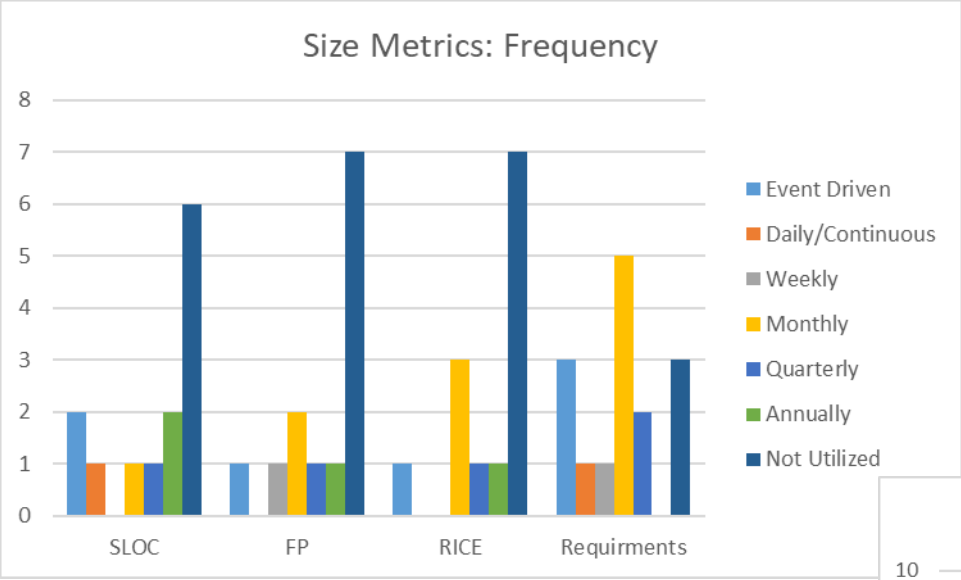


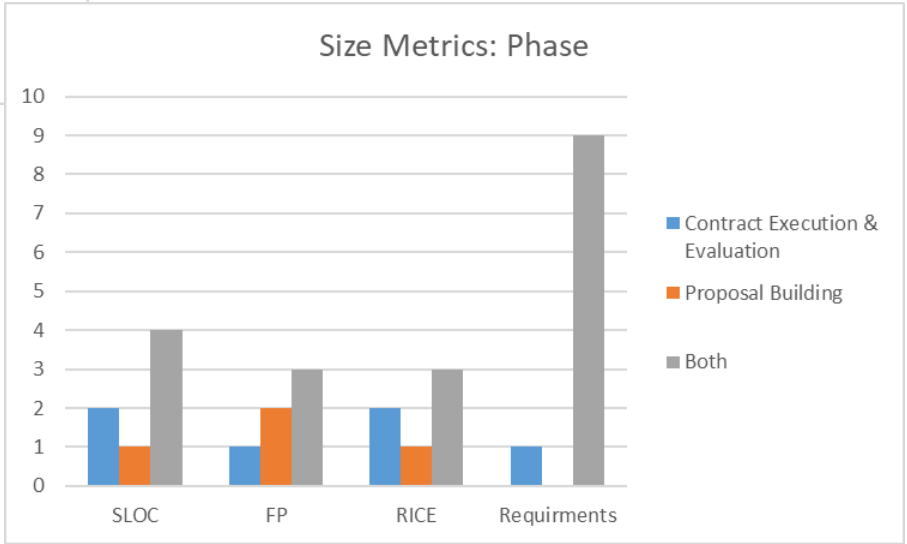




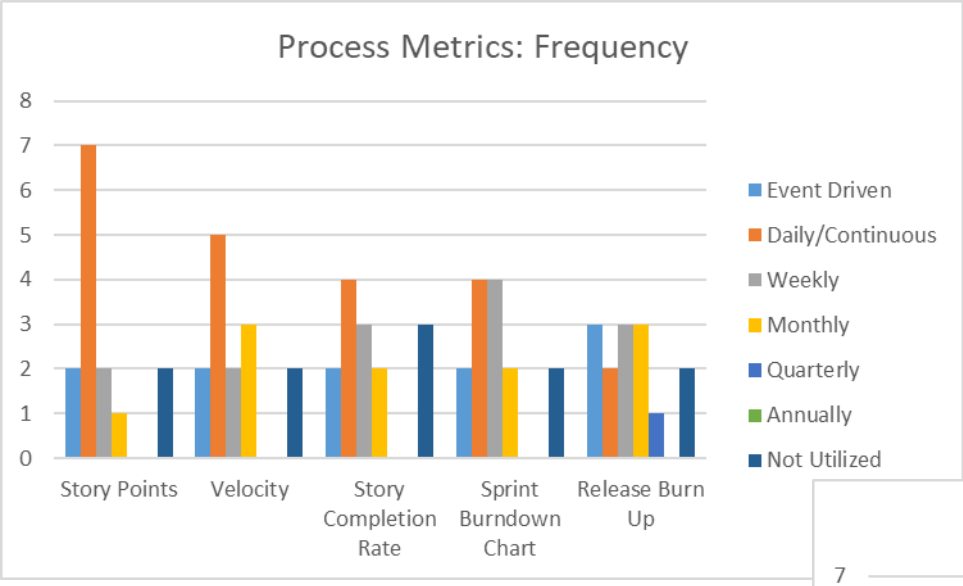


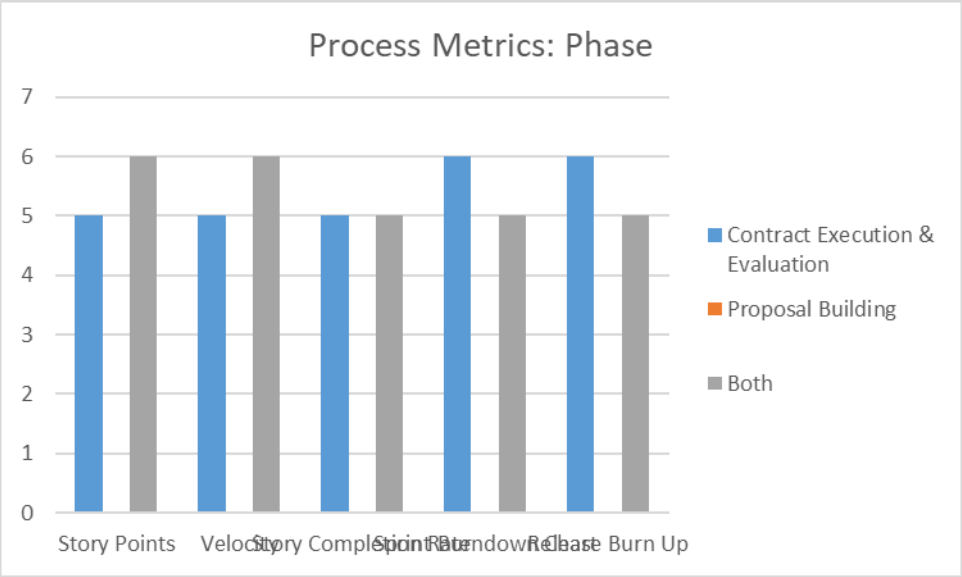
Size Metrics



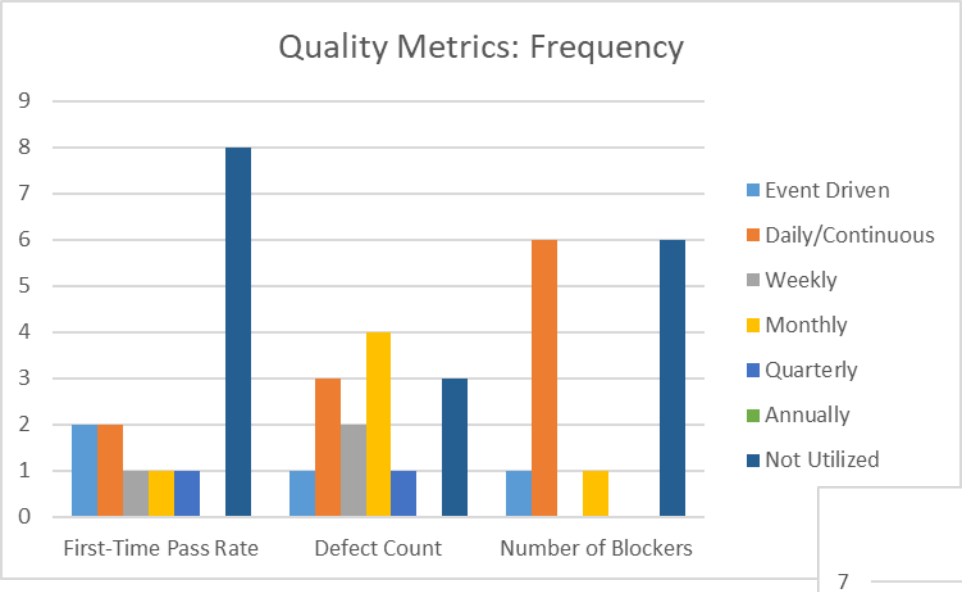


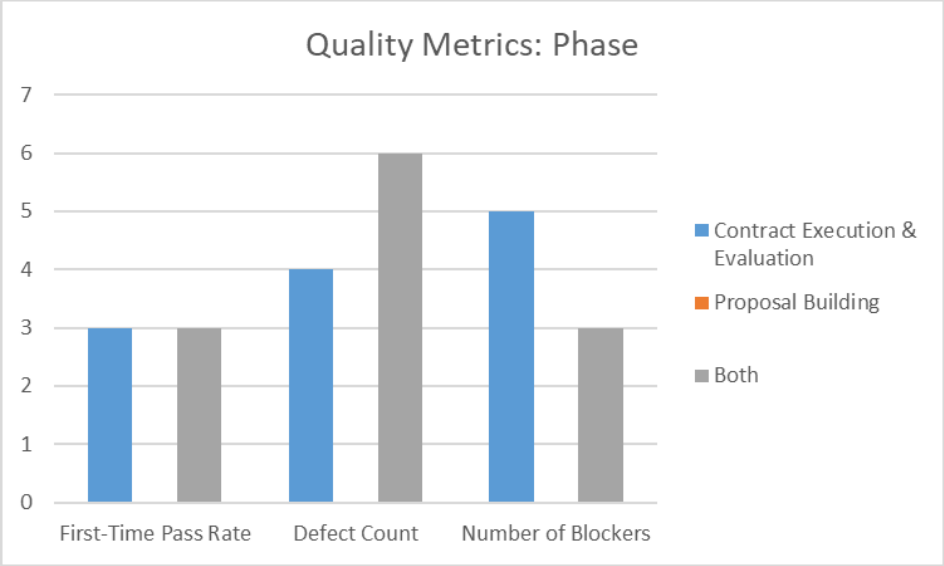
Process Metrics



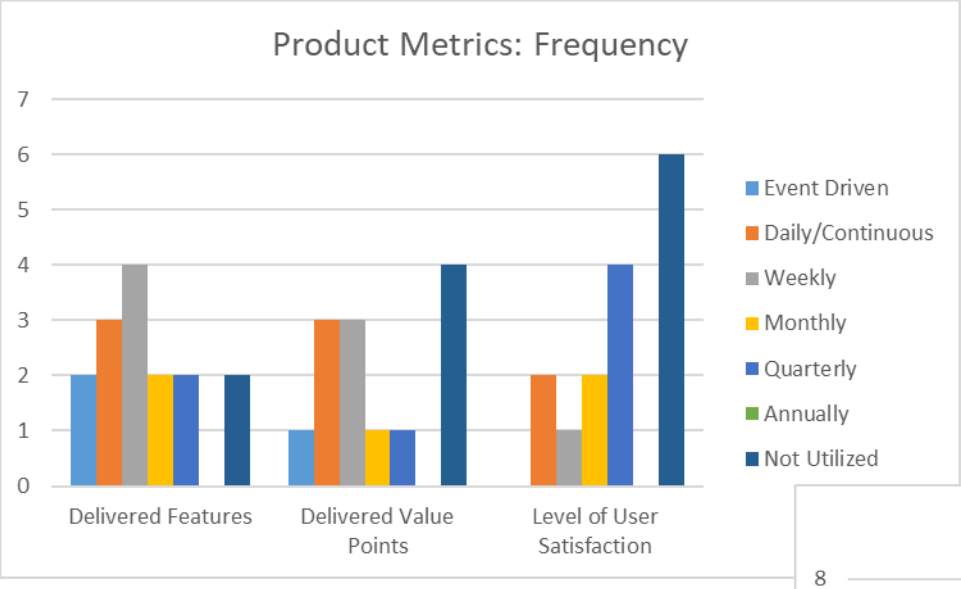


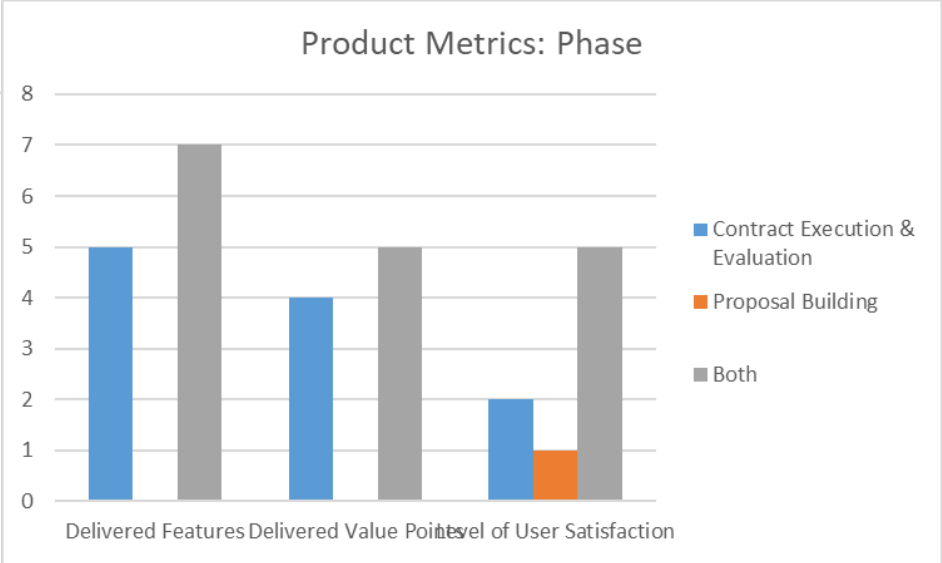
Quality Metrics



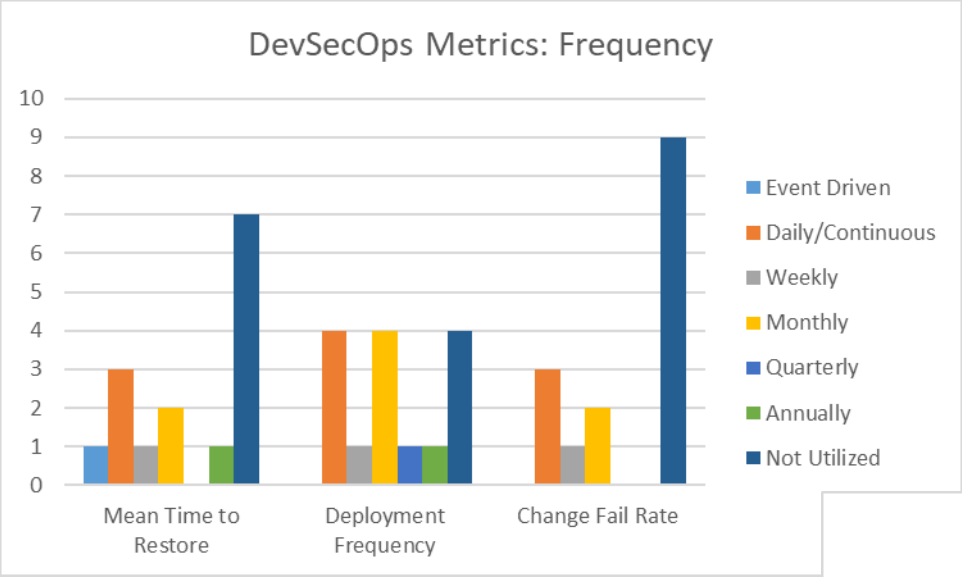


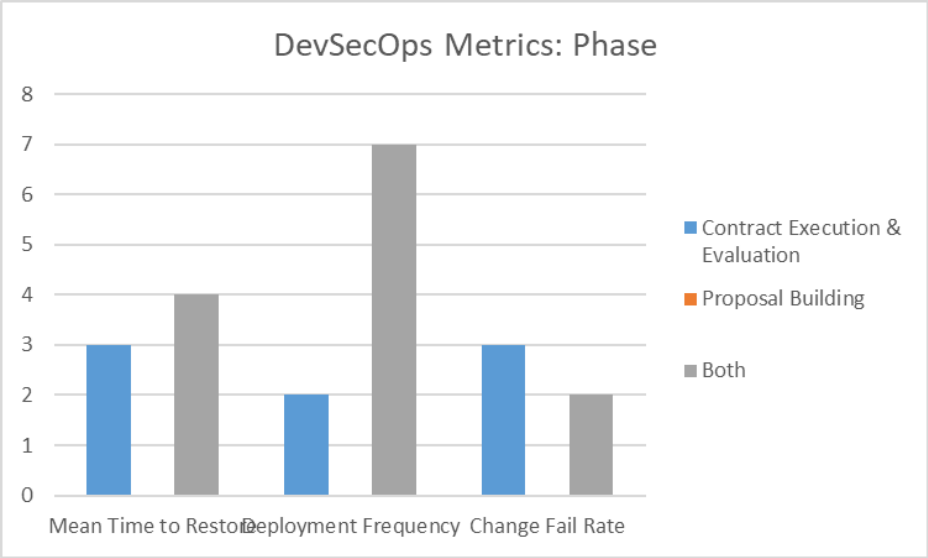
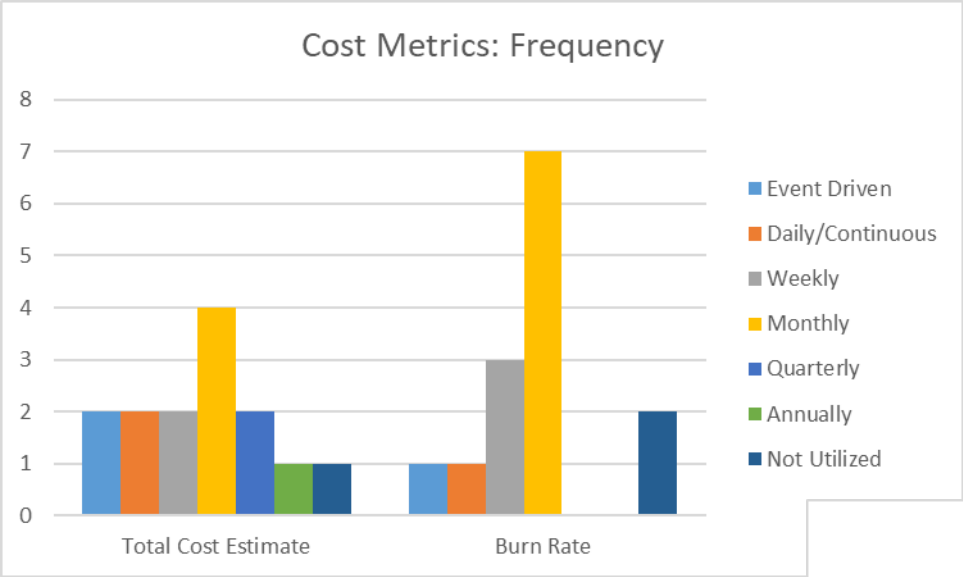
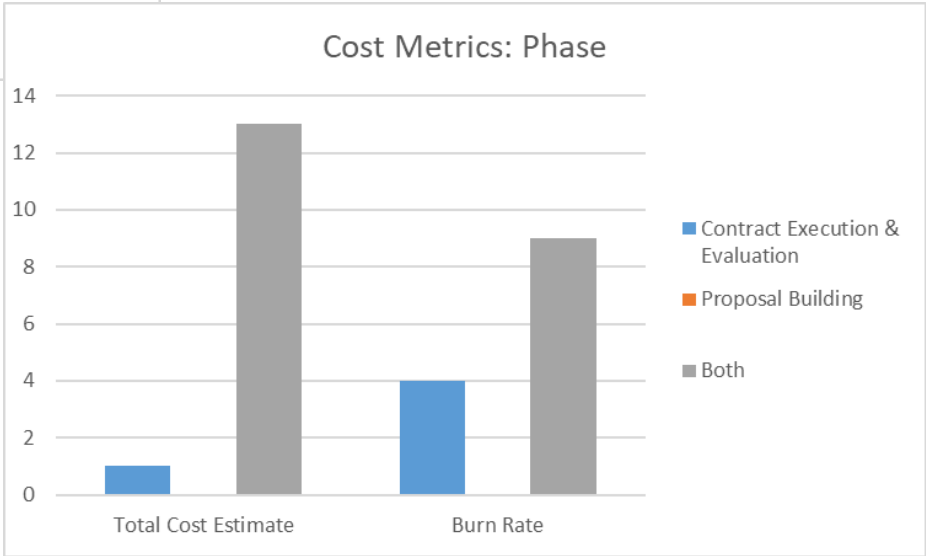
Product Metrics





DevSecOps Metrics





Cost Metrics