



Boeing Defense, Space & Security
Lean-Agile Software

Affordability Case Study of a Ground System Program

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February 26, 2014

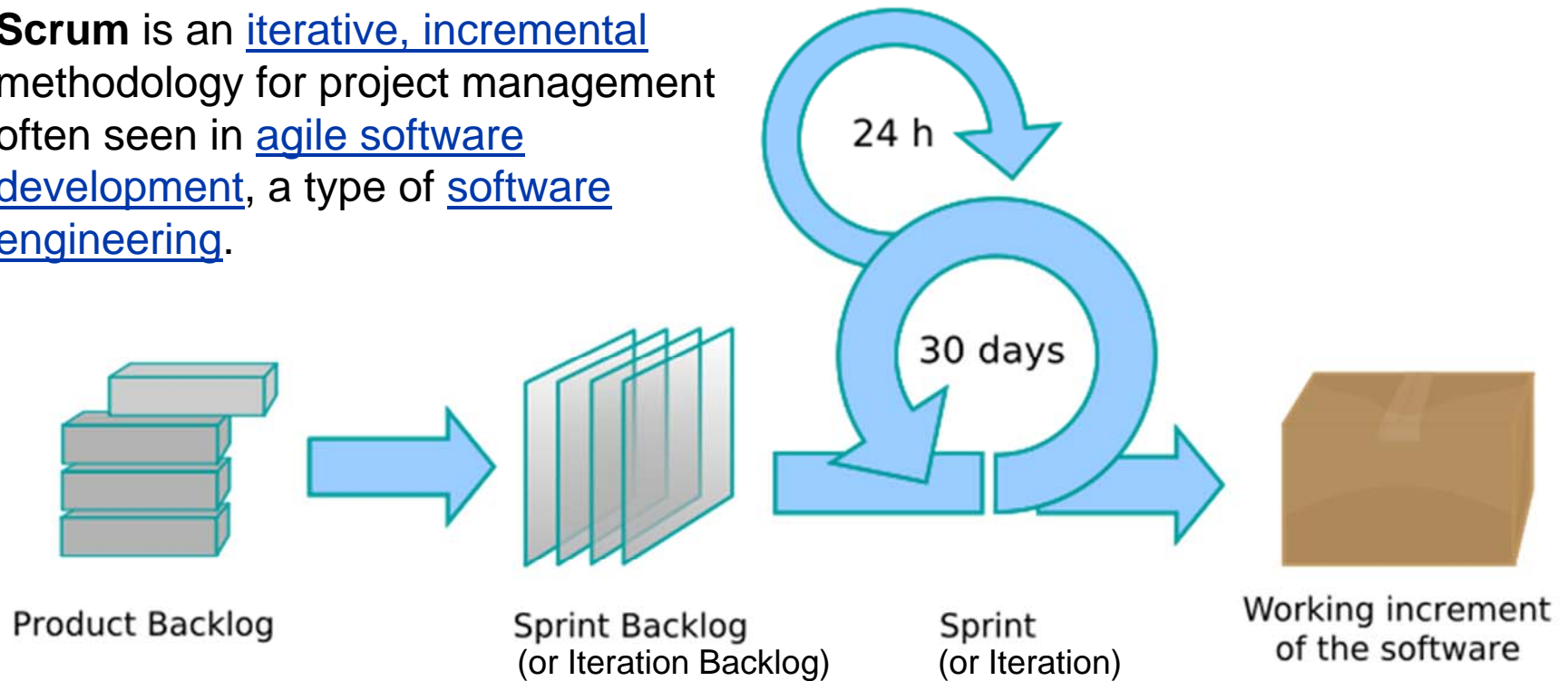
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Introduction to Agile (Scrum)

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Scrum is an iterative, incremental methodology for project management often seen in agile software development, a type of software engineering.

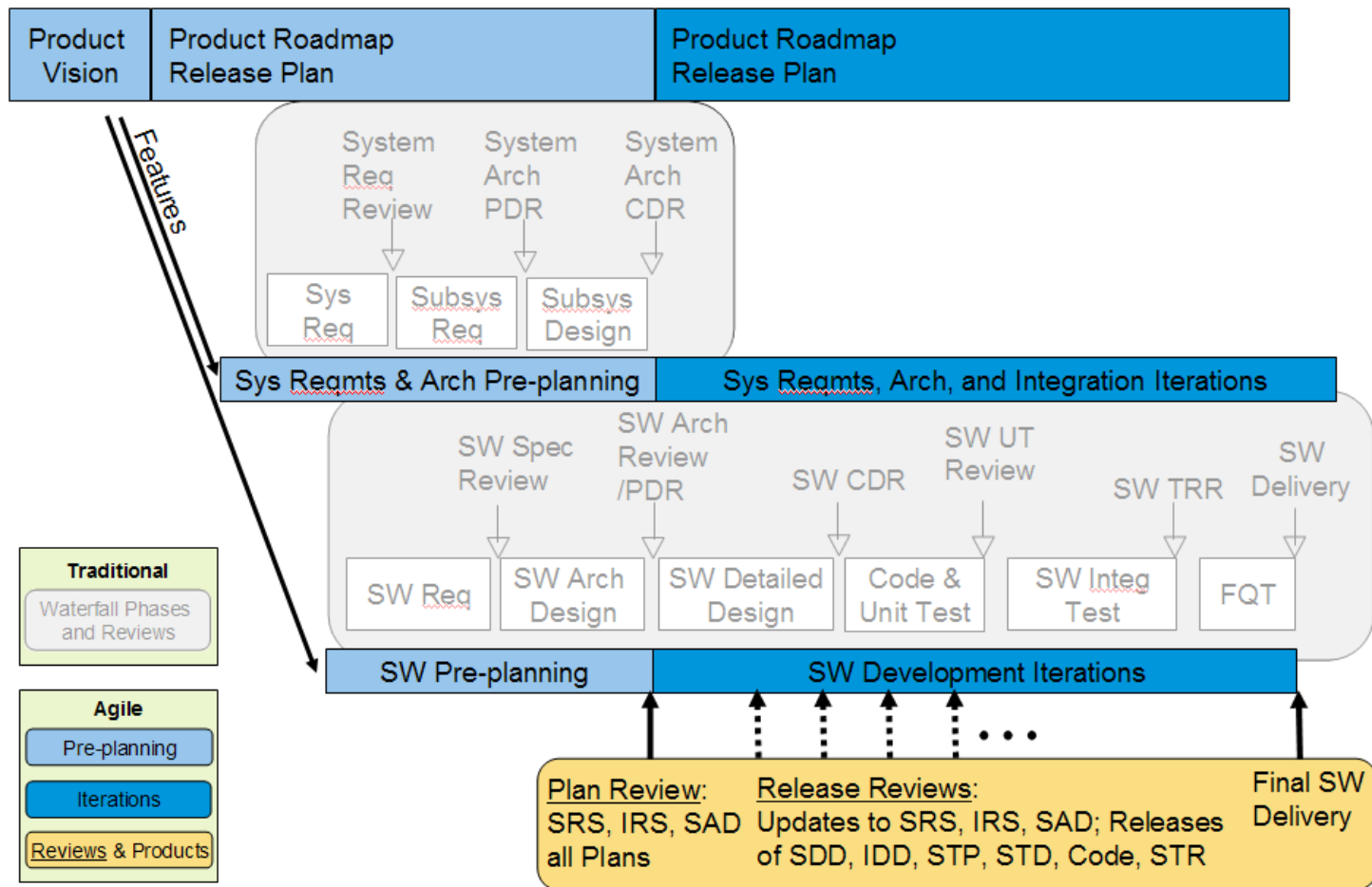


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http://en.wikipedia.org/wiki/File:Scrum_process.svg

Our programs have traditional customer review schedules

Agile and Customer Milestone Reviews

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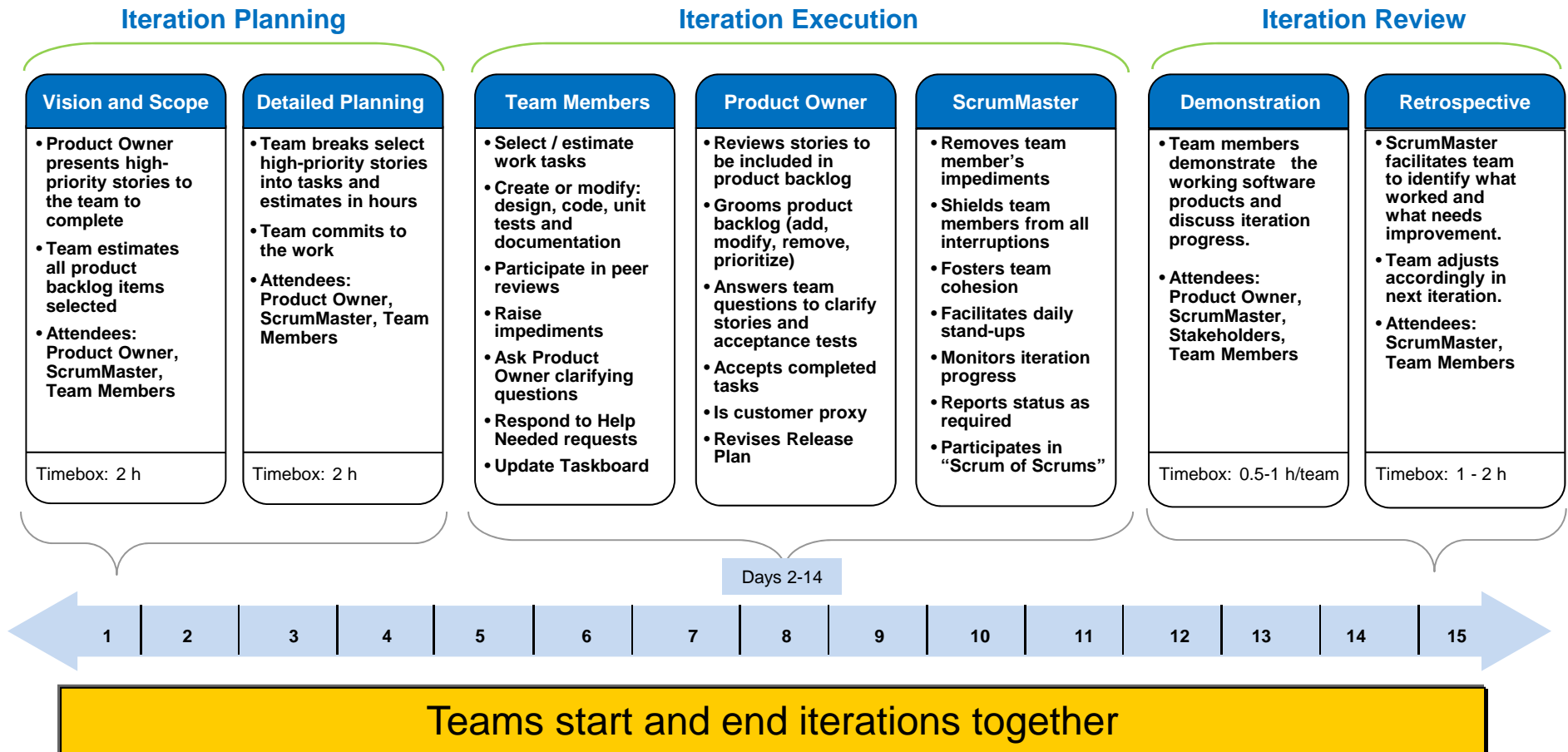


Once the plans are in place, the product backlog iterations begin

3-Week Iteration Timeline

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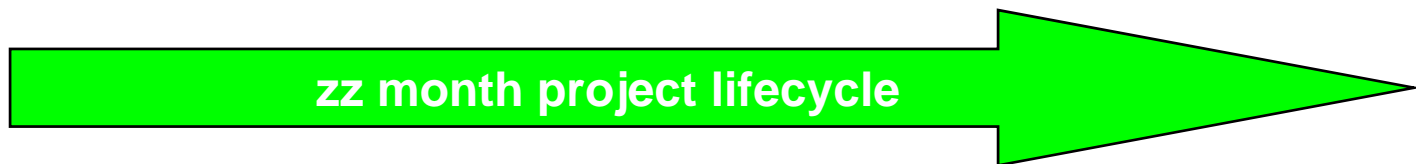
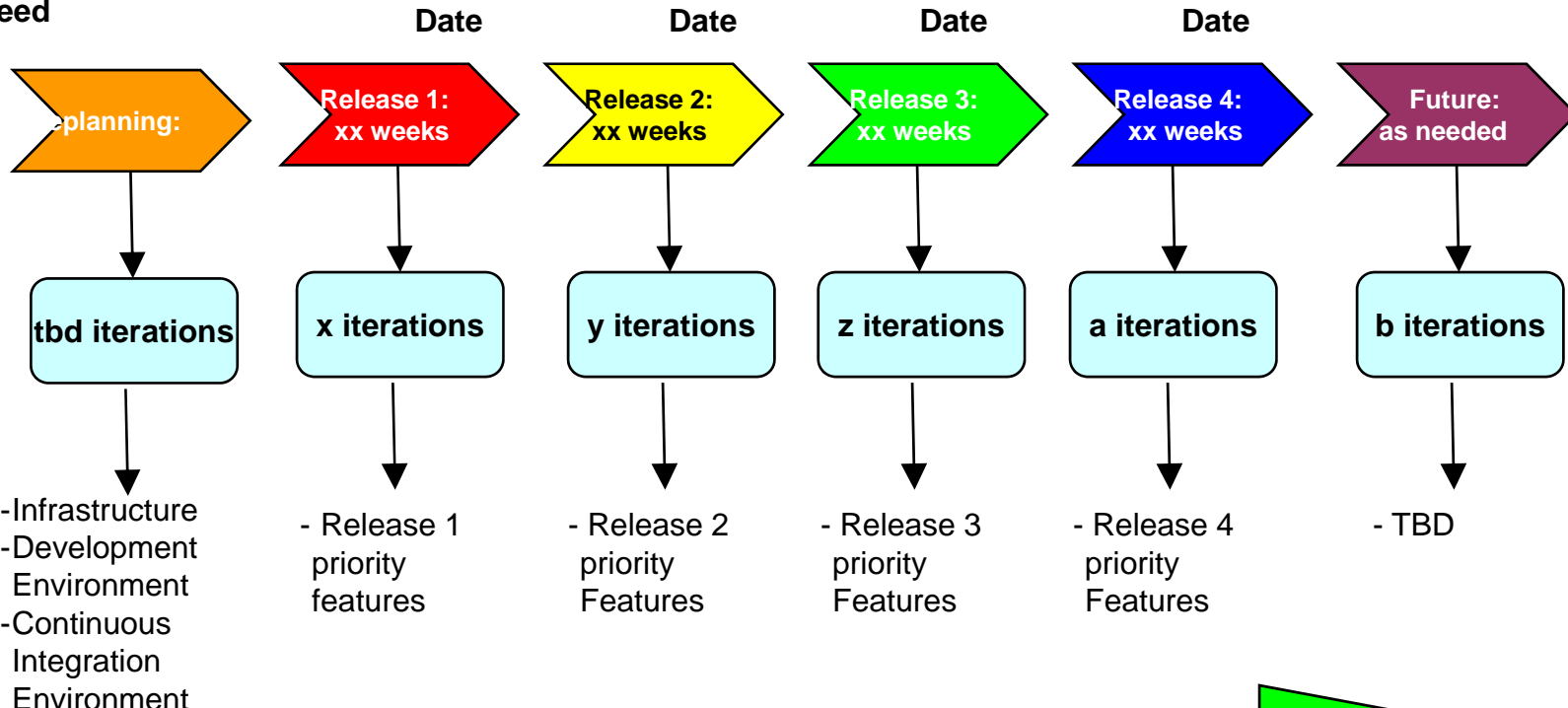
15-min. Standup Meeting – Occurs Daily



Agile Roadmap Template

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Authority To Proceed



Each release is potentially deliverable

Agile and Earned Value Management (EVM)

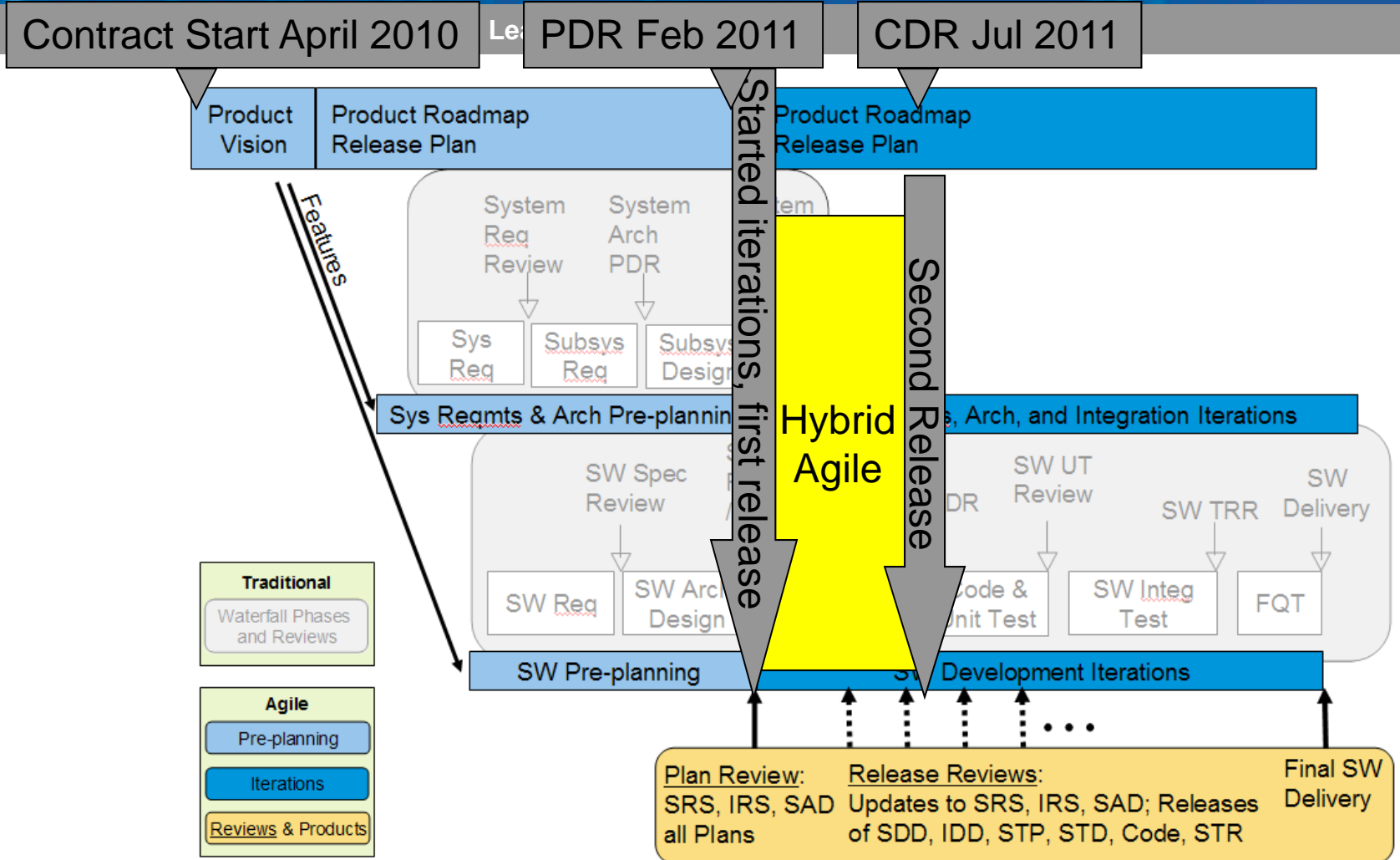
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- **Each software release is a milestone deliverable**
- **Progress reported weekly on the % complete story points for each release's planned total story points**
- **Story points are the estimated effort to complete a backlog item, or user story**
 - Example, some features might have a total of 120 story points and 10 user stories
 - Others might have 20 story points and 2 user stories
- **Business value is in the completion of the feature**
- **A release might have a partial feature delivered that will be finished in the next release**

Features are measured in story points, a measure of effort or complexity

Reference: *AgileEVM - Earned Value Management in Scrum Projects* by Tamara Sulaiman, Brent Barton, and Thomas Blackburn; AGILE 2006 IEEE Computer Society Conference.

Hybrid Agile

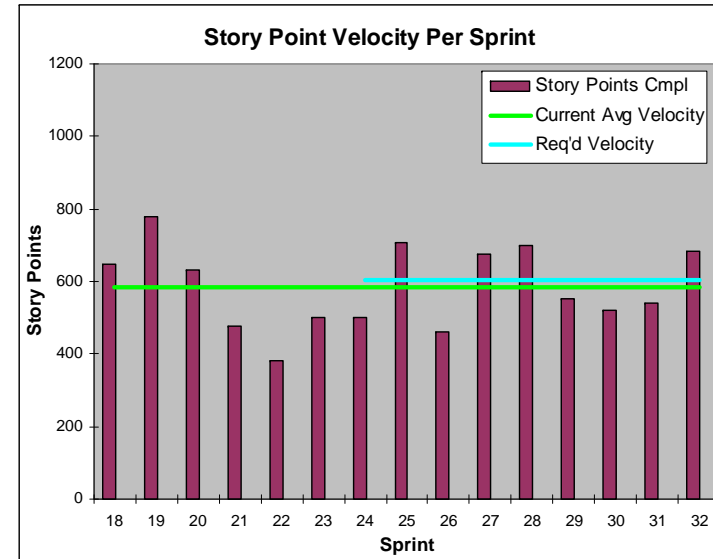


Hybrid: CI team continued with 2 week sprints, SW Developers worked detailed design until CDR

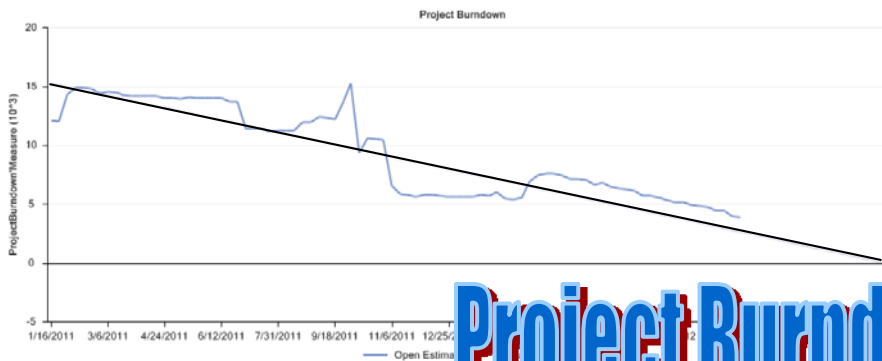
Metrics used to track progress

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Forecast



Velocity



Project Burndown

Customer attends the demonstrations every 3 weeks and has visibility of the detailed progress

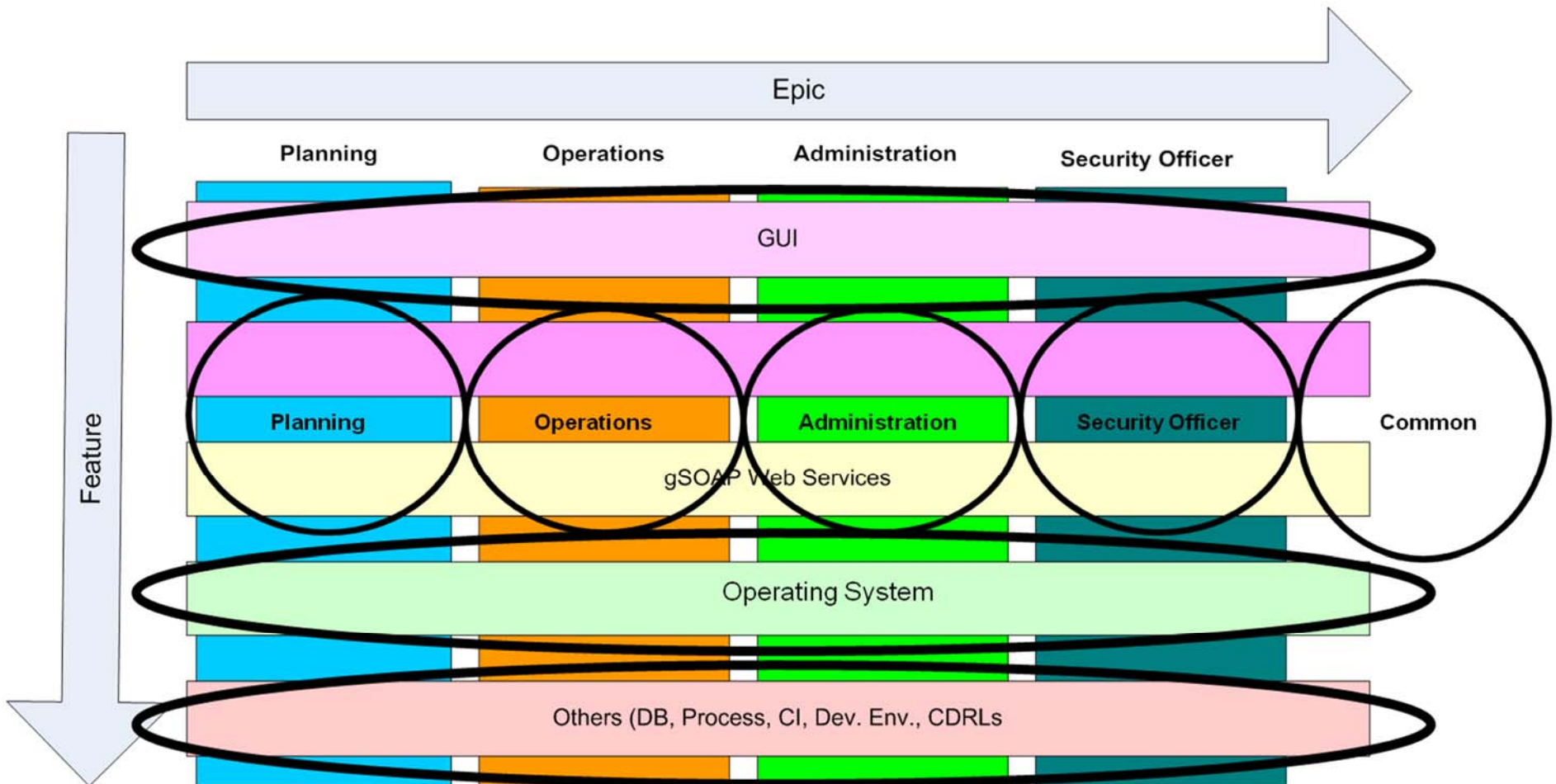
Productivity

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- **Productivity is Source Lines Of Code (SLOC) per hour**
- **Analyzing cumulative productivity each release**
- **Effective Source Lines of Code (ESLOC):**
 - Factors for integrating and reusing the legacy products
 - Factors for the autogenerated software: user interface software, other
- **Improvement of 100%**
- **FQT is complete**
- **Boeing Agile Software Process (BASP)**
 - Scrum
 - Continuous Integration
 - Automated Testing

Agile Teams Established

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Author Biography

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- **Phyllis R. Marbach is a Senior Software Engineer in Boeing Defense Space and Security (BDS). Phyllis has more than 30 years experience in aerospace programs including satellites, chemical lasers, the International Space Station, and various propulsion systems. Currently she is a member of the Lean-Agile Software Services (LASS) and an active Agile Coach who has worked with Unmanned Air Systems, Radio, Satellites, research and commercial air programs. phyllis.r.marbach@boeing.com**
- **Ms Marbach holds a BS in Chemistry and Applied Mathematics from Centre College of Kentucky and an MS degree in Engineering from UCLA.**