



From Fragile to Agile

INCOSE Enchantment Chapter Presentation

August 10, 2022

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SAND2022-10330 PE



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AGENDA

- Background – Agile Framework
- Agile Challenges
- New Agile Principles
- Summary
- References



Will use Scaled Agile Framework® (SAFe) as an example methodology

- One of the leading agile frameworks
 - 37% of organizations utilize SAFe (Digital.ai, 2021)
- Freely available from Scaled Agile, Inc.
- 5 major versions released since 2011
 - Version 5.1 is latest release



SAFe configuration scope

- Essential
 - Most basic configuration
 - Includes team and program levels (multiple Agile teams, a.k.a. Agile Release Train)
- Large Solution
 - Supports coordination and synchronization across multiple programs
- Portfolio
 - Includes strategic planning, relevant investment funding, portfolio operations/governance
- Full SAFe
 - Combines other 3 configuration levels



Alignment – cadency and synchronization

- Sprint – lowest level
 - Fixed-length timebox
 - Typically 1-3 weeks
- Program increment
 - Consists of multiple sprints
 - Typically 8-12 weeks
- Epic
 - Focused on delivering a minimal viable product
 - Consists of multiple program increments
 - Timeboxes between agile teams should have same cadence, coordinating input/output dependencies



Features and capabilities

- Feature: fulfills a stakeholder need
 - Contains benefit and acceptance criteria
- Capability: similar to feature
 - Comprise higher-level behaviors needed for the product
- Both features and capabilities are factored to fit within a program increment

Stories

- A basic element that describes system behavior
- Defined from a user viewpoint and terminology
- Should assist incremental development of a minimal viable product

Background – Agile Framework Basic Concepts - Roles



- Product Owner – represents the “voice of the customer”
 - Defines user stories
 - Prioritizes the team’s user story backlog
- Business Owner
 - Has programmatic and technical managerial oversight for developed solution
- System Architect
 - Typically oversees architecture at multi-team/Agile Release Train level
 - Defines and communicates the architecture so that solution is fit for intended use
- Epic Owner
 - Defines an epic’s minimal viable product
 - Coordinates/facilitates epic development – collaborates with other key stakeholders to identify features/capabilities needed for epic’s minimal viable product
- Agile Team
 - Multi-disciplinary team (< 9 members)
 - Define, develop, test/evaluate solution

2) Lack of emphasis on the longer planning horizon

3) No graded approach to product development

1) Reliance on Product Owner to adequately represent the “voice of the customer”



Challenges: 1) Reliance on the PO to adequately represent the “voice of the customer”

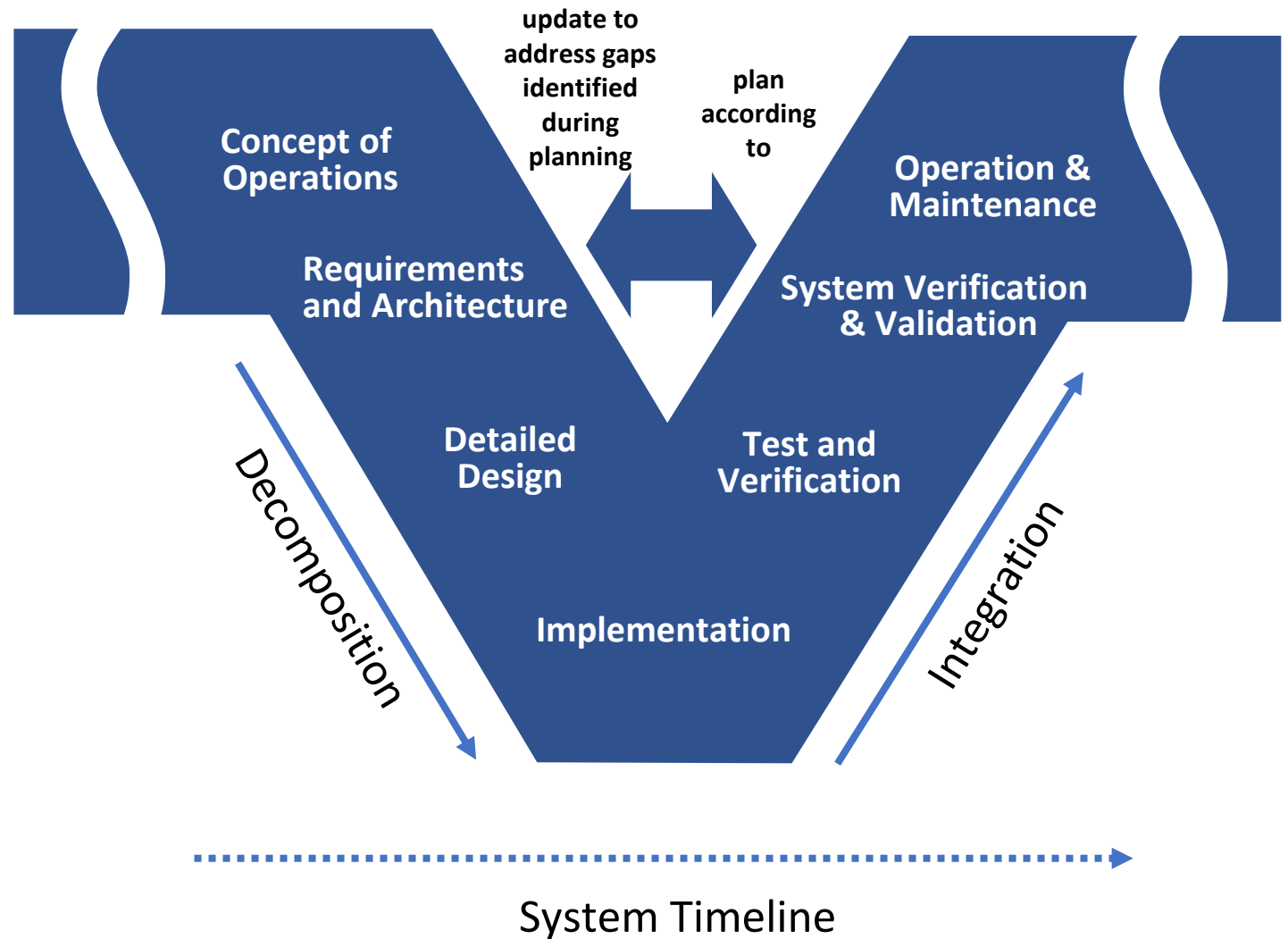
- Product Owner (PO) has profound impact on product development (Yorke, 2018)
 - Define user stories
 - Prioritize user stories/backlog
- Often selected for business-side prowess
- Great PO familiar with both product to be built and technical development process
 - If PO doesn't understand technical development, won't appreciate systems engineering activities
 - quality left to chance
 - may not understand that systems engineering activities occur in smaller scale, more continuous fashion
 - systems engineers may be marginalized → conflict + discord
 - may devolve into being run as classical waterfall project management, but more fragmented (user stories/program increments/epics planned and tracked as another form of traditional but fragmented schedule)



Challenges: 1) Reliance on the PO to adequately represent the “voice of the customer”



PO's mental model of systems engineering may be the traditional serial approach – the “Vee” model*



*Adapted from (INCOSE SEBoK, n.d.)

Challenges: 2) Lack of emphasis on longer planning horizon

- Agile Team focused on current sprint, maybe several future sprints
- Little visibility into more holistic development activities
- Foundational systems engineering activities ignored (e.g., planning for stakeholder needs/requirements elicitation and analysis)



Challenges: 3) No graded approach to product development

- Stress related to completing user stories within a sprint is palpable
- Systems engineers can be very analytical, unappreciative of “fit for use”
- Amplified by PO who is not knowledgeable about technical aspects of product development



We don't have time for _____!

New Agile Principles



- 1) Use a risk-informed graded approach to product development
- 2) Include technical and business perspectives in timebox planning
- 3) SE and program increments are not mutually exclusive
- 4) Reframe SE terminology



New Agile Principles: 1) Use risk-informed graded approach to product development



- Product Owner (PO) can feel more assured that
 - Product's technical development activities are done at the right rigor
 - More accepting of the need and value of these activities
- Sandia has implemented a risk-informed graded approach
 - Based on industry standards (ISO 15288, PMBoK, AS9100)
 - 1st step: determine risk level based on intrinsic project and product characteristics
 - 2nd step: Template for each rigor level for systems engineering, quality management and project management activities and deliverables
 - Rigor attributes = timing, scope, formality

New Agile Principles: 2) Include technical + business perspectives in timebox planning



- Ideally the Product Owner is strong in both technical development process and business knowledge
 - Understands product's domain and intended use
- Otherwise include the System Architect or an experienced systems engineer in planning
 - Include Business Owner to supplement knowledge of the programmatic and technical management aspects

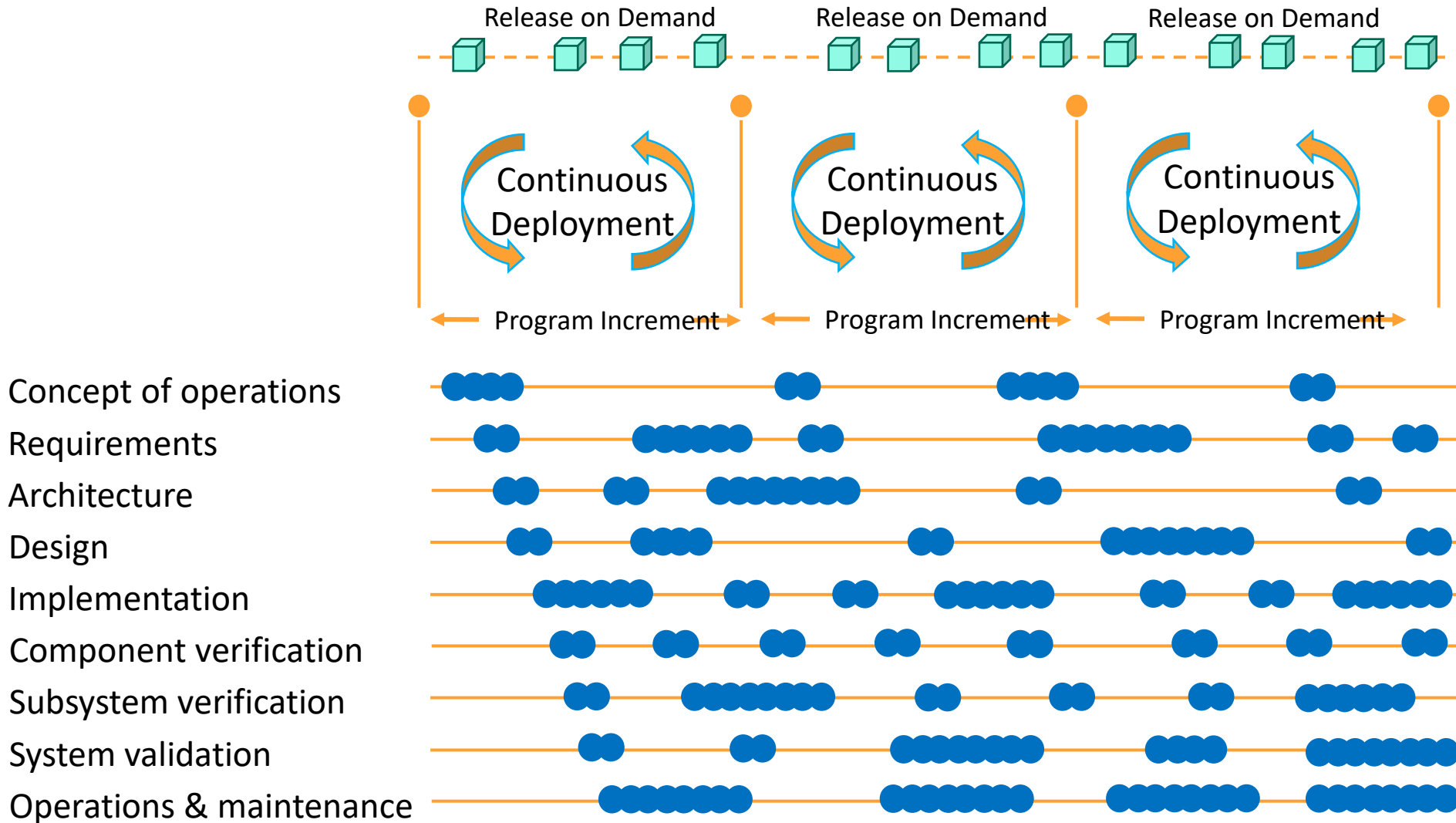
New Agile Principles: 3) Systems Engineering and Program Increments are not mutually exclusive



- Same systems engineering activities in the “Vee” model are implemented in a smaller scope
 - Elements of the “Vee” model in the development life cycle of a story
 - Understanding what needs to be done (“requirements”)
 - Determining how it should be done (architecture, design)
 - Implementing the approach
 - Meeting story acceptance criteria (verification and validation)

New Agile Principles: 3) Systems Engineering and Program Increments are not mutually exclusive

Continuous Flow



New Agile Principles: 4) Reframe systems engineering terminology



- Same systems engineering activities in the “Vee” model are implemented in a smaller scope
 - Elements of the “Vee” model in the development life cycle of a story
 - Understanding what needs to be done (“requirements”)
 - Determining how it should be done (architecture, design)
 - Implementing the approach
 - Meeting story acceptance criteria (verification and validation)

Summary – Principles address challenges



<i>New Agile Principles</i> <i>Challenges</i>	Use a risk-informed graded approach to product development	Include technical and business perspectives in timebox planning	SE and program increments are not mutually exclusive	Reframe SE terminology as necessary
Lack of emphasis on longer planning horizon		X	X	
Reliance on the Product Owner to adequately represent the “Voice of the Customer”	X	X	X	X
No graded approach to product development	X			

Summary



- Agile challenges demand new principles
- By incorporating these new principles agile practitioners are better positioned to achieve both the spirit and promised benefits of using an agile approach



An overhead view of a group of people sitting around a large wooden table in a meeting. Several laptops and tablets are open on the table, and some people are looking at them. The scene is overlaid with a large blue circular graphic on the left side. The word "Questions" is written in blue text across the center of this graphic. There are also several small orange L-shaped corner markers scattered around the table.

Questions



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