



Agile in DoD Acquisition

A Systemic Problem

Presented By:

Steve Praizner, SE, NSWCDD

steven.praizner@navy.mil

Contributors:

Milton Ridgeway, PM, NSWCDD

Dr. Steven Dam, SE, SPEC Innovations

26 Oct 2016



This Briefing is **UNCLASSIFIED**

NSWCDD-PN-17-00011

Distribution Statement A: Approved for public release. Distribution Unlimited.



Overview

➤ Compare & Contrast Each Methodology and Core Philosophy

- Systems Development LifeCycle
- DoD Acquisition Framework
- Agile
- Innovation

➤ Present Agile Challenges

- High level

➤ Recommendations

➤ Explanation of Our Agile Implementation Strategy

➤ Summary

➤ POCs



Contrasting SDLC and DoD Acquisitions Framework

➤ Systems Development LifeCycle

- Also known as the Software Development LifeCycle
- Originally developed in the late 1960's or early 1970's
- Intended for a Waterfall (phased) approach to systems development
 - Concept Development & Requirements Generation
 - Architectural Planning and Design
 - Development
 - Testing
 - Deployment
- Variations on the phased approach
 - V-Model
 - Spiral
 - Iterative
 - Synchronize and Stabilize
 - etc

➤ DoD Acquisition Framework

- Based on SDLC
- Structured for a Waterfall (phased) approach to systems development
 - Solution Analysis
 - Technology Maturation and Risk Reduction
 - Development & Developmental Test
 - LRIP / Limited Deployment and Operational Test
 - Production, Deployment & Sustainment
 - Disposal
- Variations on the phased approach
 - V-Model
 - Spiral
 - Iterative
 - Agile?



Core Philosophies Agile and SDLC

➤ Agile

- People
 - Allows people the freedom to decide what needs accomplished for a given effort
 - Empowered
- Customer Collaboration & Interaction
 - Refine the system continuously over the course of the effort.
- System Change
 - Assumes change will occur frequently
 - The system is incrementally defined
 - Personnel possess the flexibility to respond quickly to emerging challenges
- Verification & Validation
 - Executed incrementally in parallel

➤ Systems Development LifeCycle

- Processes
 - Provides people a process to govern their actions and lead them through a given effort
 - Personnel are expected to follow a process as long as it is compliant with latest policy
- Contracts and other Work Definition Documents
 - System is defined once in the beginning
- System Change
 - Assumes no change will occur
 - The system definition is extensively documented and associated work is parsed out
- Verification & Validation
 - Executed separately in sequence

The Underlying Core Philosophies Between Agile and SDLC are Diametrically Opposed in Every Possible Category!



Agile Suitability

➤ Agile is not Suitable for All Efforts

- We aren't going to build the next Aircraft Carrier using an agile methodology

	<u>Agile</u>	<u>SDLC</u>
User Requirements	Iterative	Detailed user requirements are well defined before design work begins
Rework Cost	Low	High
Development Direction	Readily Changeable	Fixed
Testing	On Every Iteration	When design is completed
Additional Personal Skills Needed	Interpersonal skill and basic business knowledge	Nothing
Suitable Project Scale	Low to Medium	Large
Documentation	Little	Vital
Collaboration Amongst All Project Participants	High (Vital)	Low



The Relationship Between Agile and Innovation

- **Innovation is NOT a new Technology**
- **Innovation is New Concept Entirely, Separate and Distinct from a Specific Technology**
 - Innovation is Multi-Level
 - A new way of doing things or a new way of looking at things
 - Generally, multiple technologies and/or processes will sprout from a single concept
- **Innovation Basics**
 - Like agile, the focus should be on the people and the concept, not on established policies and procedures
 - Innovation generally causes creative friction.
 - Like agile, it requires a very strong, well understood, central focus amongst the team members
 - Like agile, the team members need to be empowered to explore the concept as they see fit
 - Like agile, to an outside observer, the innovation team generally does not appear to be a well oiled machine, and in fact, may appear to be chaotic and/or undisciplined
 - The answers are not known and the team is exploring
 - The team should be judged on how well they deliver results, not comply with industrial age procedures

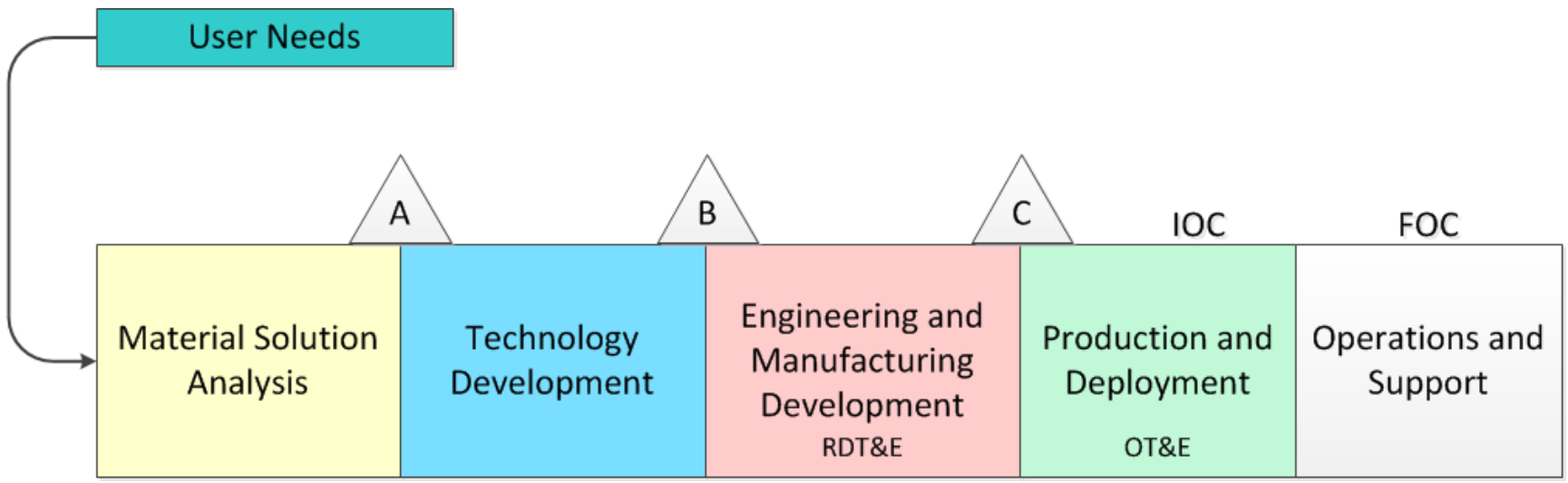
DoD Vertical Process Control

➤ Who is Actually in Control of DoD Efforts?

- It isn't the person actually executing the effort

➤ Relates To:

- Employee Empowerment
- Ability to execute an agile approach





DoD Vertical Process Control (An Analogy)

➤ **The American People are DoD's Customers**

- They are also the shareholders
- Like any shareholder, they require transparency and accountability

➤ **Congress is the Board of Directors**

- Ensures the welfare of the American People is met
 - Establishes primary organizational policies

➤ **Moving Towards Future**

- Like any organization, we need to evolve to remain relevant
 - Integration of Agile control mechanisms to allow for innovation



Agile Employment Challenges Within the Current SDLC Based Framework

➤ Vertical Process Control Mechanisms

- Only a single mechanism is currently available
 - Designed as a “one size fits all” approach
 - Industrial age production mentality
 - Extremely Structured
 - Government employees within the vertical have narrowly defined decision rights
 - Commonly referred to as “Employee Empowerment”
 - Intended for complicated systems
 - Reducible Systems

➤ Culture

- DoD is huge
 - Process based approach
 - People stick to what they know, even if it isn't the best approach, or if another approach is authorized

➤ Failures

- Can potentially incur significant loss of investment
- Regulated sequential process
- Less S&T risk taking

➤ Research, S&T Focus

- Versus acquisition of goods



Recommendations

➤ What Can We Do?

- The services should examine the current control mechanisms to identify areas where they can be modified to support agile
- Need to begin to socialize and experiment with new ways of acquisition to accommodate Agile and Innovation
 - The intent is to support early stage concept development, associated research, and S&T design and development

➤ Develop an Alternate Framework Based on the Modified Control Mechanisms

- Do not redact the current framework, it is still needed!
- Options should be available initially to decide which acquisition framework best supports the effort at hand

➤ End Users Need to be Fully Integrated in System Development Efforts

- The occasional survey or workshop is not enough
- Sustained, open, and end-user interaction is needed from start to finish

➤ Close the V&V Gap

- Given the complexity of DoD systems, can we really execute both RDT&E and OT&E activities simultaneously?
- We can better prepare for OT&E if
 - We integrate OPERATIONAL models and simulations with our technical models and simulations
 - Develop a DoD enterprise-wide Virtual Operations Simulation Environment (VOSE)
 - Focus on operations, not technology
 - Focus on Systemic Realism, not Fictional Realism

NSWCDD-PN-17-00011

Distribution Statement A: Approved for public release. Distribution Unlimited.



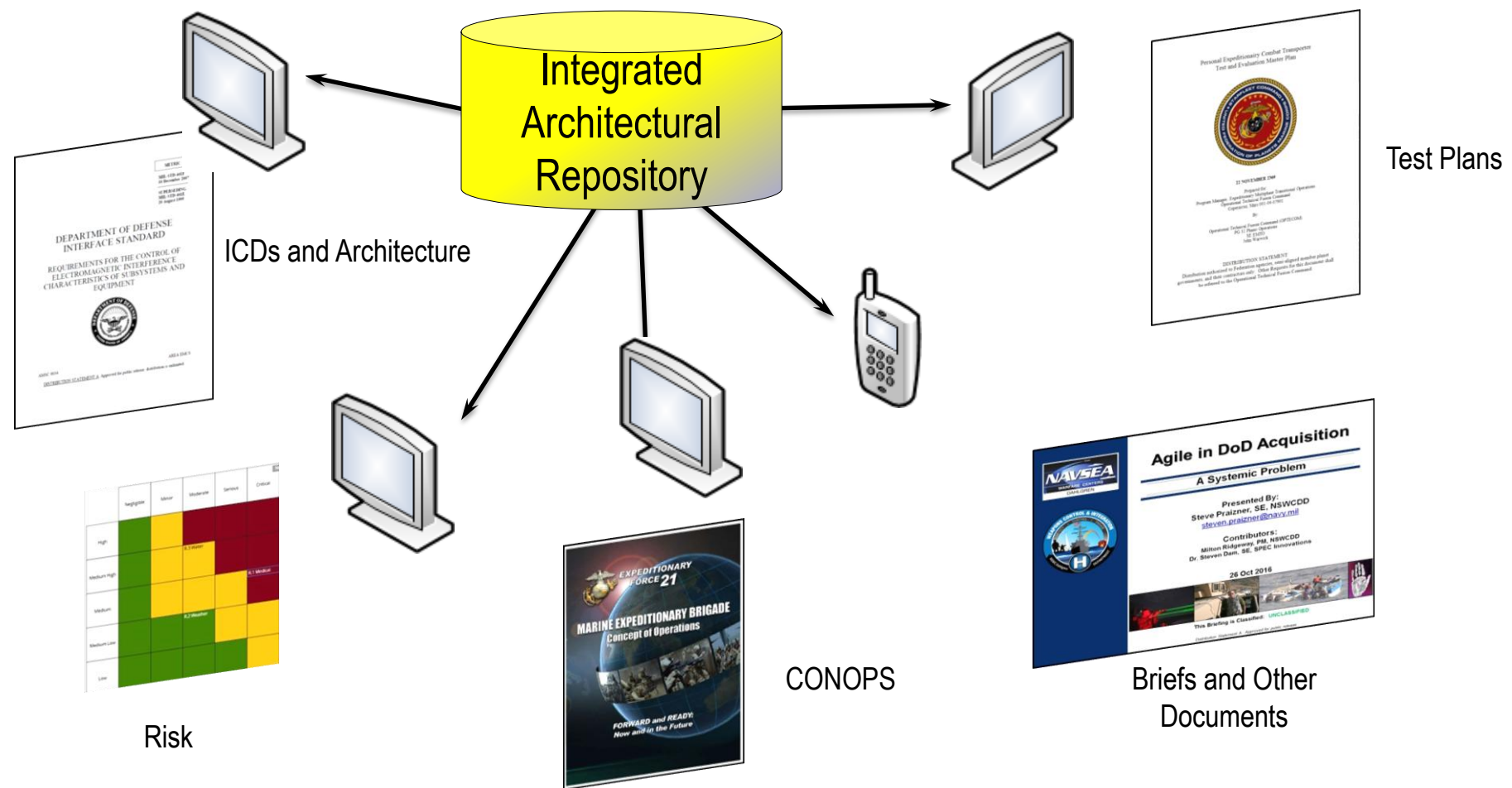
Our Strategy for our Current Effort

➤ Distributed MBSE in Support of Agile Methodologies: A Three-Pronged Approach

- The utilization of a cloud based, distributed M&S tool capable of full lifecycle management
- The formation of a stakeholder / developer High Performance Team (HPT)
- The development and implementation of agile processes allowable within the current process control mechanisms
 - Workflow Integration for a Distributed Agile Team (WI-DAT)

A Model for Distributed, Real-Time MBSE

➤ A Distributed Front-End Work Environment Linked to a Back End Integrated Data Repository



	High	Medium	Low
High	Critical	High	Medium
Medium	High	Medium	Low
Low	Medium	Low	Very Low

NSWCDD-PN-17-00011

Distribution Statement A: Approved for public release. Distribution Unlimited.



High Performance Team

➤ We Intend to Organize Stakeholders in a HPT

- As opposed to the traditional Integrated Product Team (IPT) or Working Group (WG)
- To encourage open communications and high quality interactions, the HPT will be supported by an online social business and knowledge management tool
 - MilSuite.mil

➤ Challenges

- Culture: Most are not familiar with a HPT or what it entails
 - It is more than simple organization
- Culture: Direct contact with the development team
- Online: “Social media like” interaction in lieu of email stove-pipes and required meetings
 - Culture: “Great, its another IT system I need to learn”



Workflow Integration for a Distributed Agile Team (WI-DAT)

➤ Intent

- To allow for the execution of agile-like management and development processes within the current DoN acquisition framework
- Incorporate various acquisition processes to the minimum extent necessary to allow tailoring to the needs of a given effort
 - Configuration Management and Control
 - Program Protection
 - Intellectual Property Strategy and Management
 - Etc

➤ Challenges

- It is being developed through the perspective of our own effort
- We are already coming up against hard boundaries imposed by the vertical process control mechanisms



Summary

- **Implementation of Agile System Engineering Methodologies in Support of System Design Provides**
 - Continuous, high quality interaction amongst the design team regardless of geographic location
 - Sponsors and Stakeholders are part of the design effort; not standing outside of it
 - Continuous, high-quality interaction amongst all the stakeholders and between the stakeholders and designers
 - Iterative Design Process
 - The System WILL change

- **Vertical Process Control Mechanisms**
 - DoD Acquisition Framework
 - Works exceedingly well for what it is intended for
 - Do not redact or significantly alter
 - Employee Empowerment
 - Examine the allocation of decision rights across the vertical process control mechanisms
 - Identify opportunities for modification of decision rights necessary to meet the challenges of the future
 - Implement an alternate framework parallel to the existing framework

- **Process Gaps**
 - We need to close the V&V gap
 - We need to end the segregation between the developers and end users
 - End users should be integrated in the development effort, from start to finish



End

POCs

Steve Praizner, SE: steven.praizner@navy.mil

Milton Ridgeway, PM: milton.ridgeway@navy.mil

Dr. Steven Dam, SE: steven.dam@specinnovations.com