



**Program Executive Office  
Command, Control, Communications,  
Computers and Intelligence (PEO C4I)**

## **Command & Control Rapid Prototype Continuum [C2RPC] Transition – Bridging the Valley of Death**

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# Introduction

- Navy undergoing C2 transformation to meet changing mission requirements
- 2 Focus Areas:
  - New C2 strategy
    - based upon the Operational Level of War (OLW)
  - New acquisition methodology
    - based upon incremental component capability model providing processes for rapid and agile C2 software development, test and integration of Science & Technology (S&T) into Program of Record (POR)

Bringing S&T community and C2 acquisition together  
as one continuous program



# Acquisition Life Cycle Shortfalls



**DoD's S&T  
community –  
2010 Budget**

**Basic, Applied &  
Advanced Research**

**Advanced Component  
Development &  
Prototypes**

>\$11 Billion

>\$14 Billion

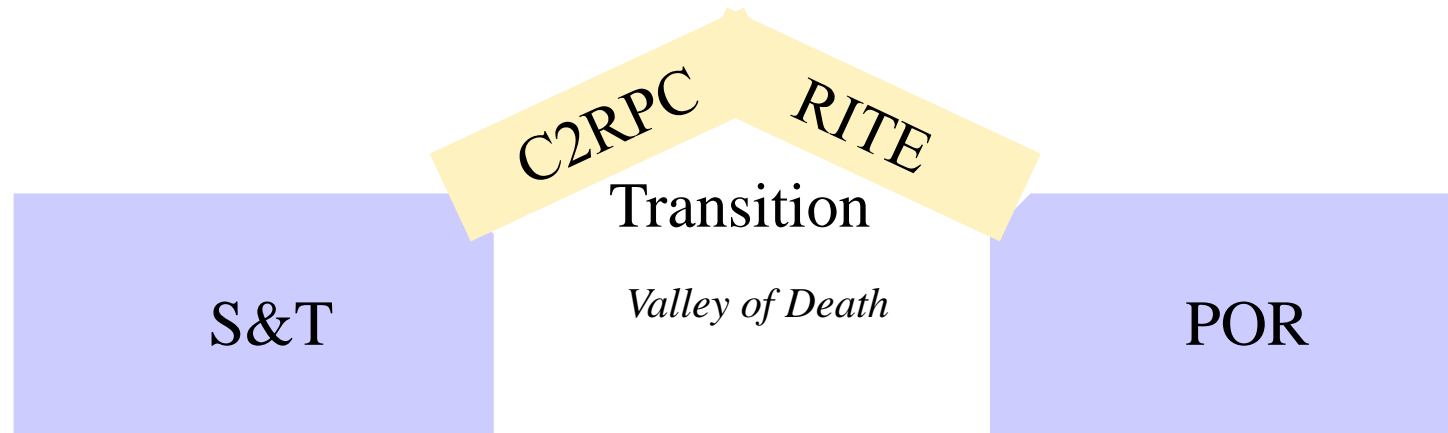
- **Studies\*** indicate a history of limited DoD success in transitioning S&T investment to Programs of Record (POR)
- **Transition Impediments include:**
  - Lack of transition funds in budget
  - Transition process lacks definition and visibility
  - Different goals & timelines between S&T and Acquisition Mgrs
  - Lack of incentives
  - No clear guidance during development from POR

\* National Academy of Sciences, The Role of Experimentation in Building Future Naval Forces, <http://www.nap.edu/catalog/11125.html>

\* Naval Research Advisory Council (NRAC) Technology Acquisition Reform, March 2004



# Bridging the Valley of Death



- **Continuum**

- **Organizational**
  - Relationships
  - Cultural Change
  - Communication
  - POR Guidance
- **Technical Innovation**
- **Funding**

- **Implementation**

- **Processes**
  - Incremental development
  - Experimentation/Demos/LTEs
  - Frequent, early & automated testing
- **Infrastructure**
  - Centralized develop repository



# C2 Rapid Prototyping Continuum (C2RPC) Migrating to Maturity



- Coalition of PEO C4I, ONR, and COMPACFLT



- Develop a C2 Prototype that Feeds Back into Enduring, Supported Programs Of Record

- Accelerate Development of OLW C2 CONOPS

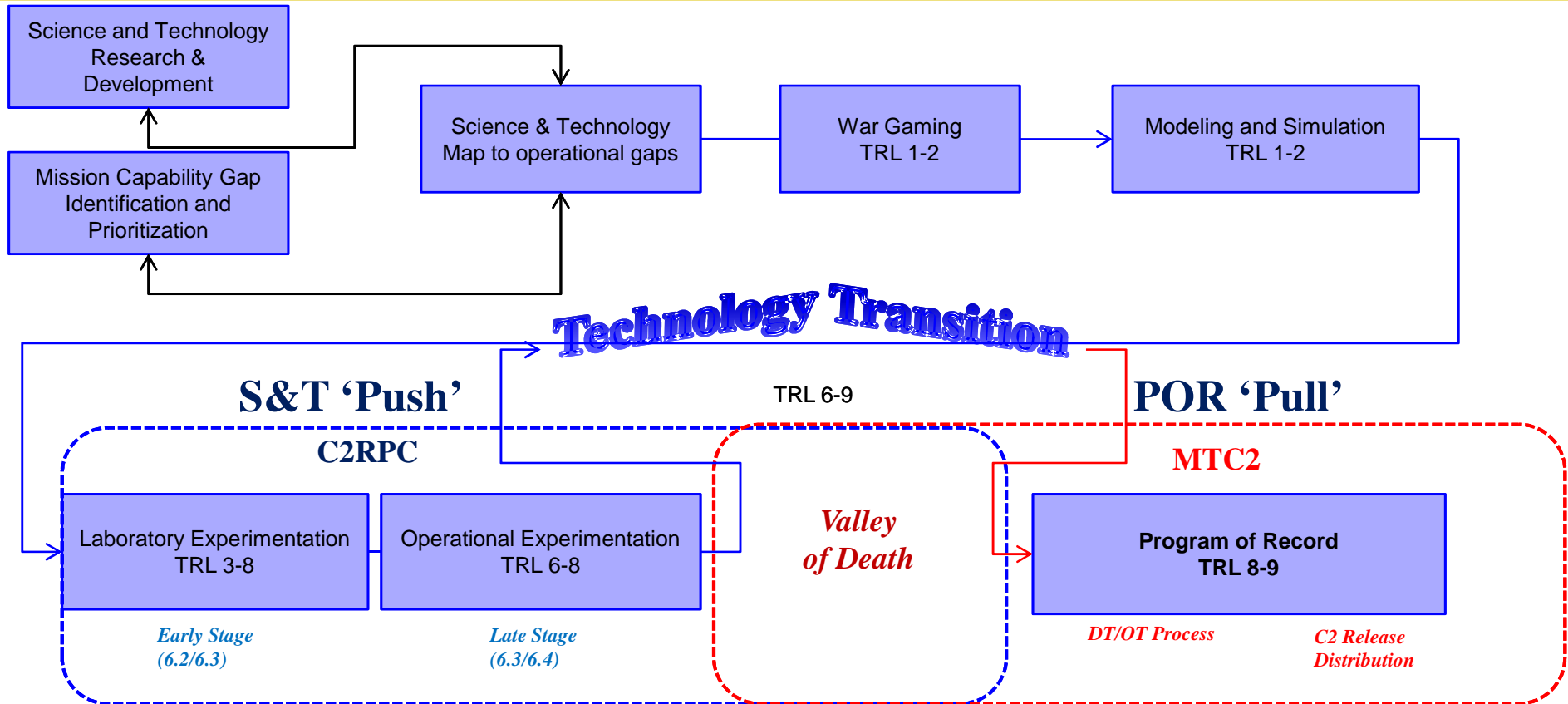
- COMPACFLT: “Use PACFLT as a ‘Petri Dish’ ”
- Advance the State of the Art of C2
  - Reduce Uncertainty
- Ensure Systems Meet Fleet Prioritized Capabilities/Needs



Ensures S&T developed capabilities meet needs of POR



# Technology Maturation and Funding Bridge



## Perceptions of S&T Community

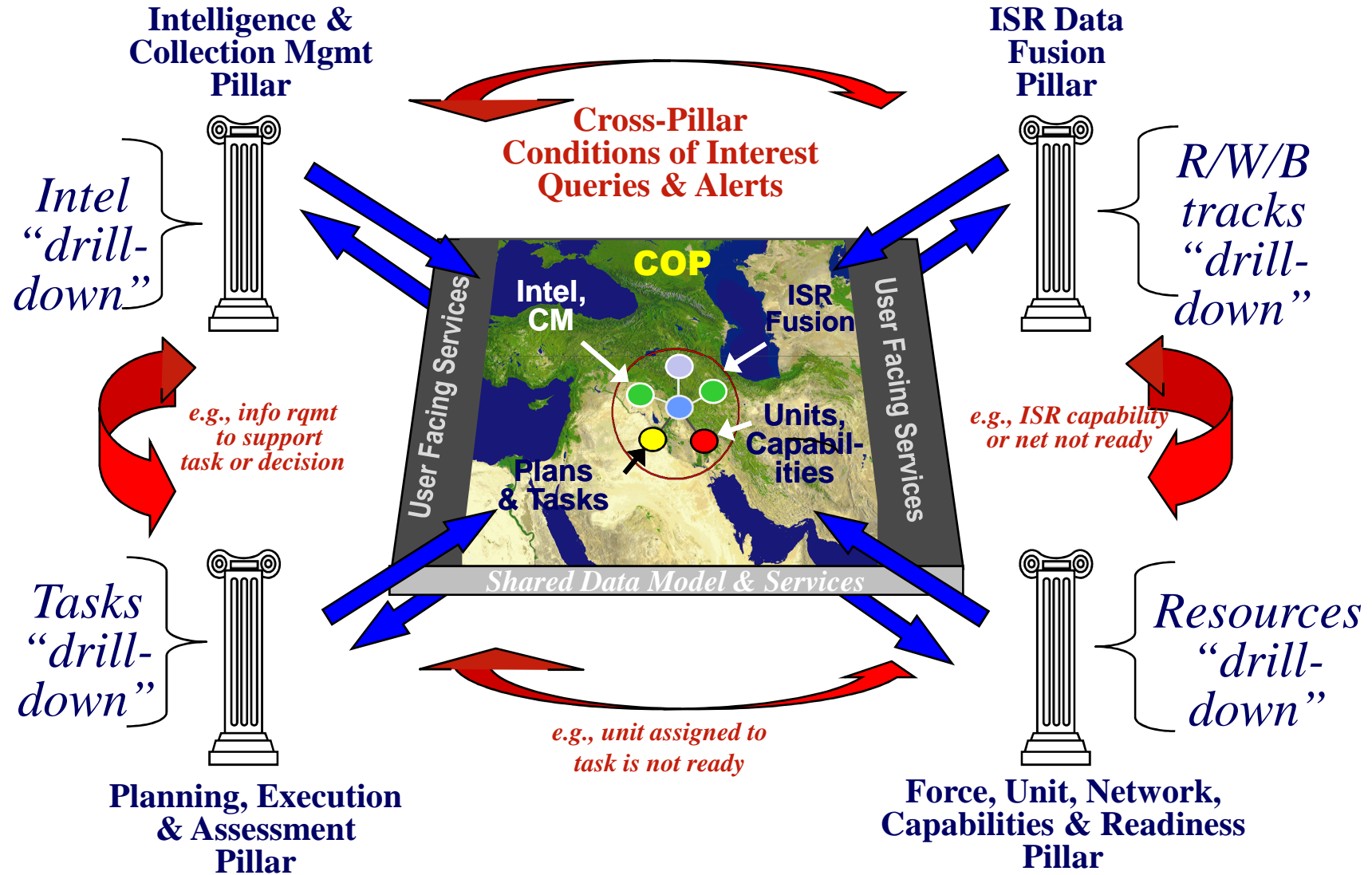
- S&T's job is complete at the tech dev stage
- Implementation of technology is the customer's responsibility
- "Role of S&T is tech push- build it and they will come"
- Develop cycle for S&T is too long for most acquisition and Warfighter (Customers)
- Lack of understanding on level of effort to transition technology

## Transition Impediments

- Lack of transition funds in budget
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# Notional OLV CONOPS



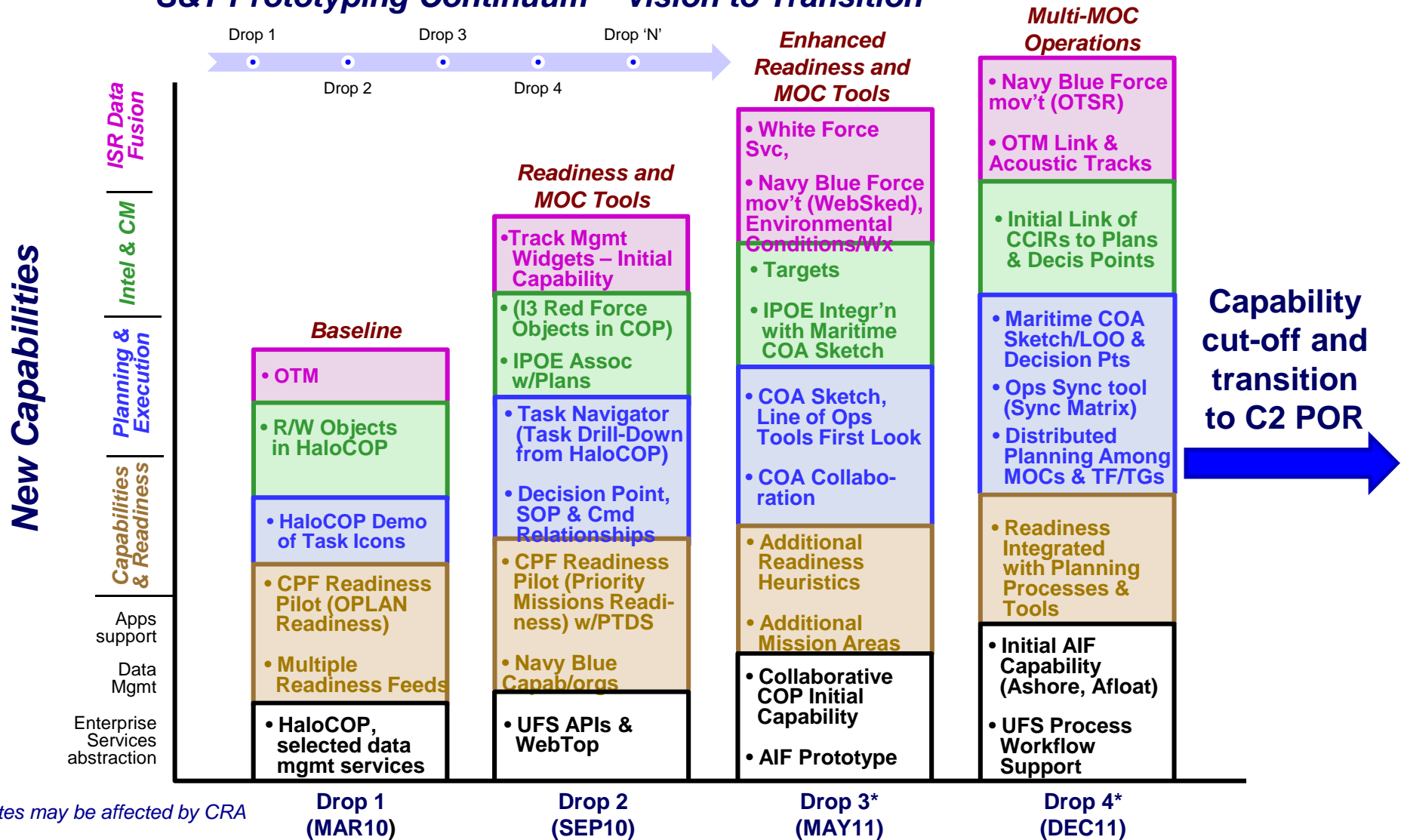




# Incremental Functionality Leads to C2 POR



## S&T Prototyping Continuum – Vision to Transition

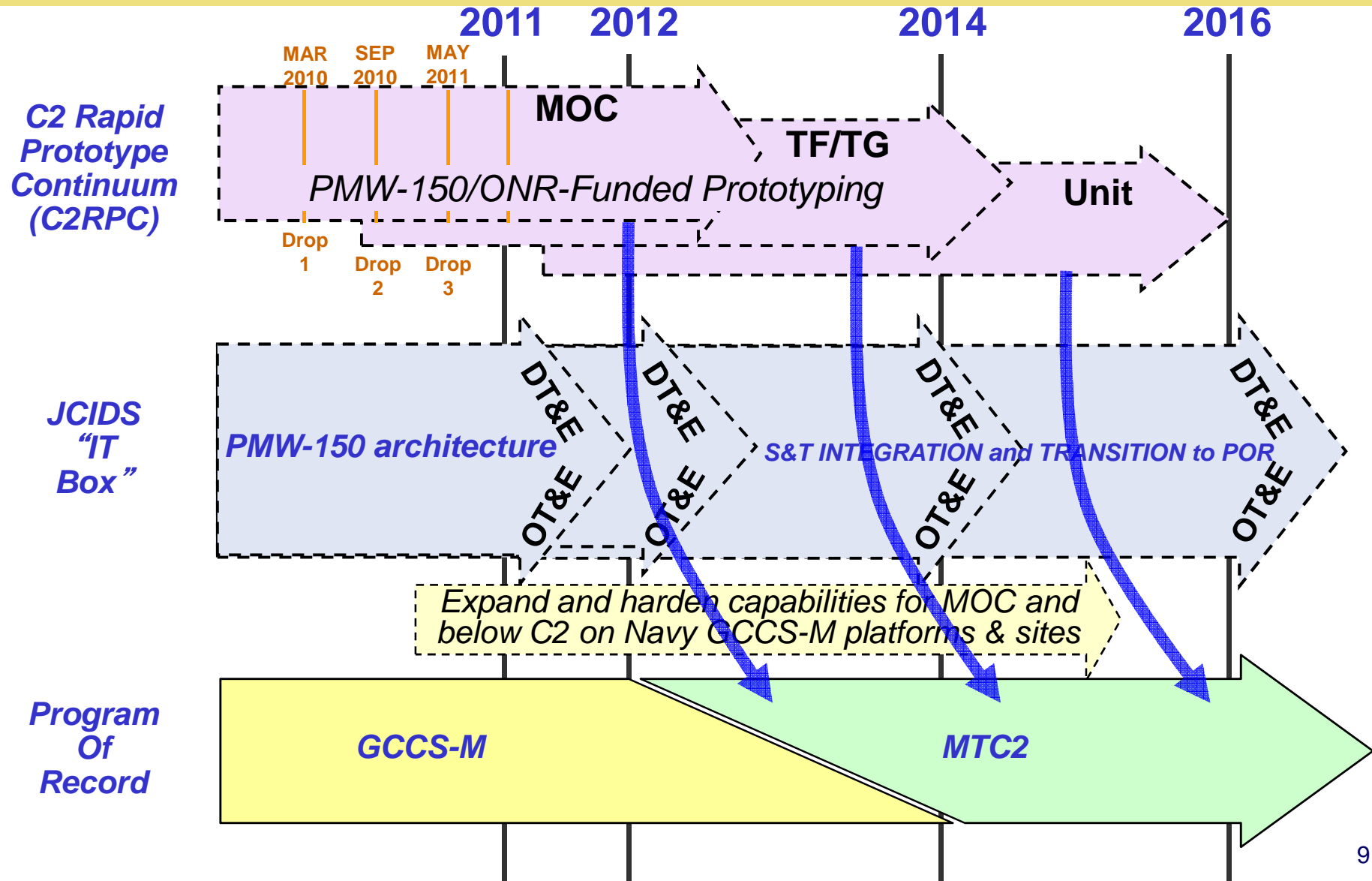


\*Dates may be affected by CRA





# C2RPC Incremental Drops to C2 POR





# Rapid Integration and Testing Environment 'Four Pillars'



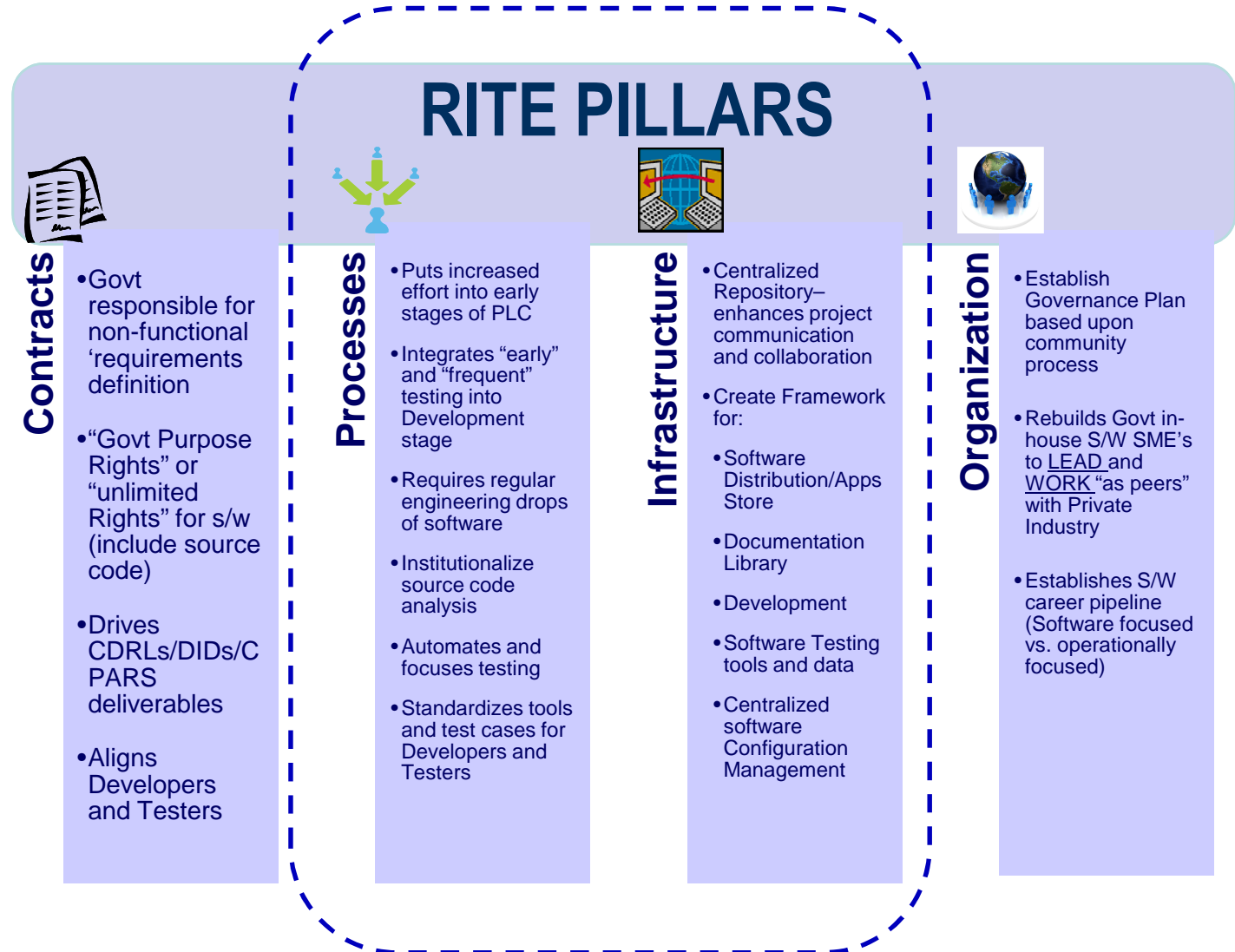
RITE addresses findings and facilitates development and distribution of Navy C2 systems:

▼ Check – software development

▼ Stabilize – the current build

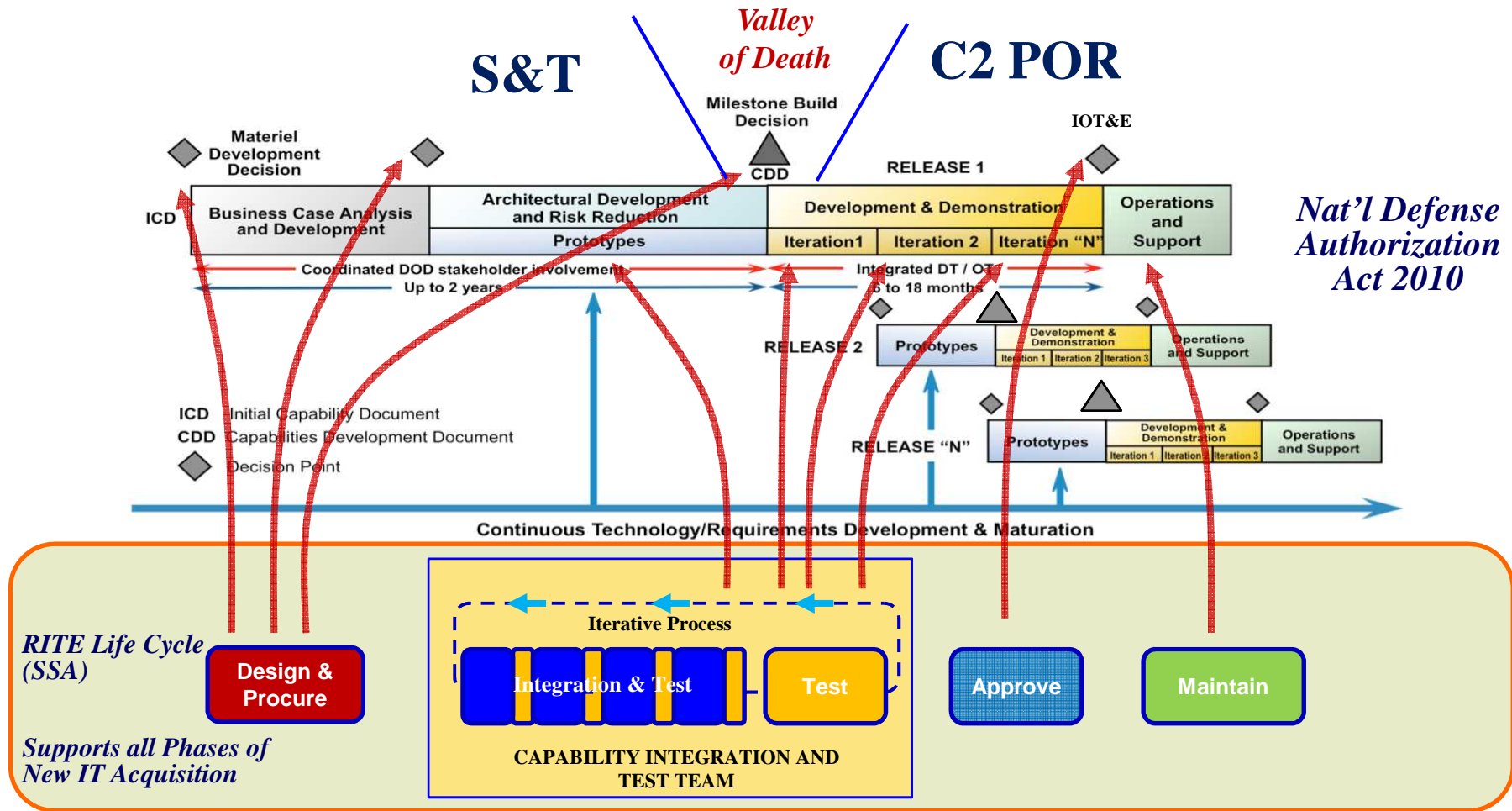
▼ Influence – the final product delivery

*“Manage as close to the source, as possible”*





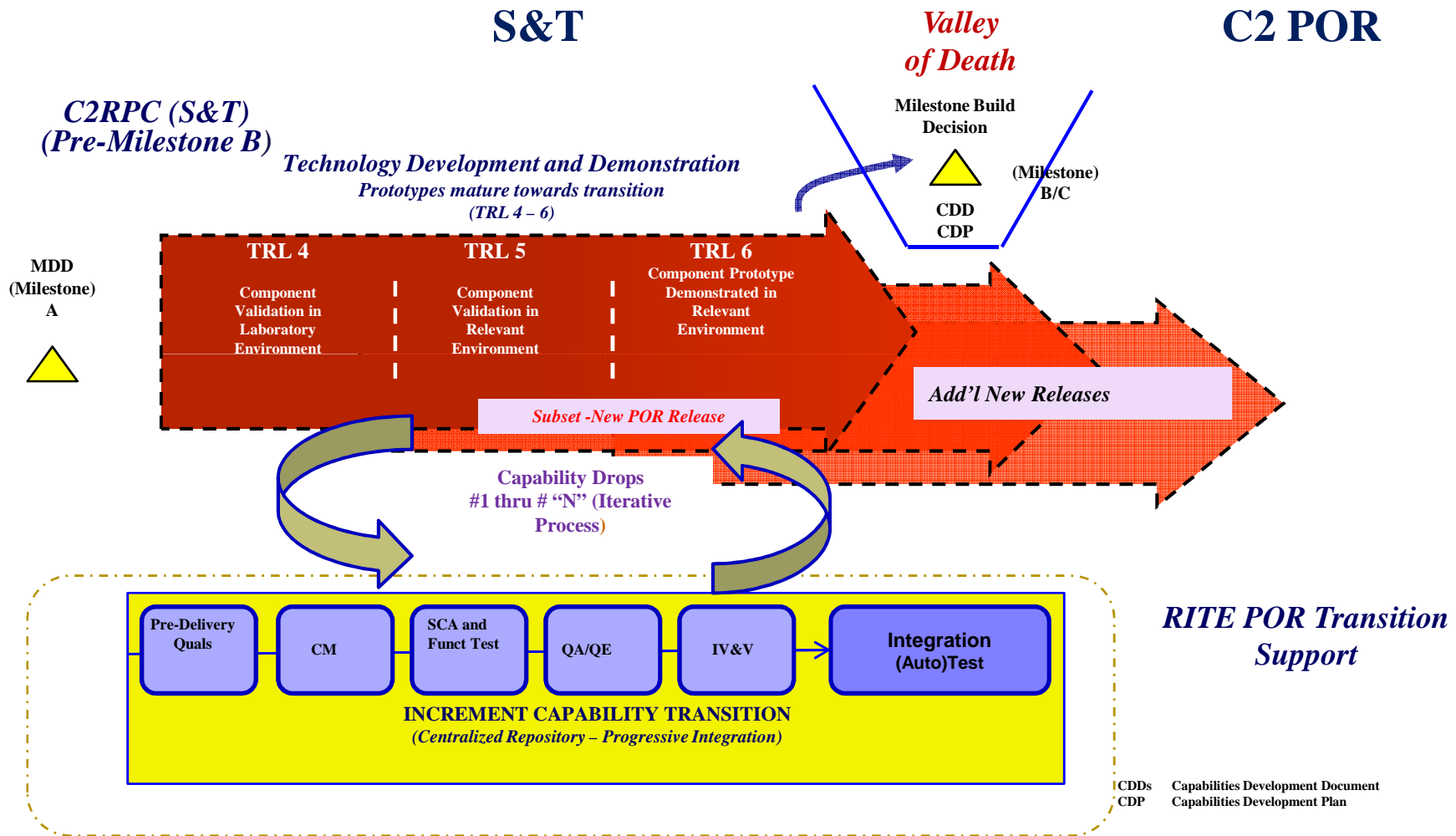
# IT Acquisition Life Cycle Bridge



*Rapid Integration and Testing Environment (RITE)*

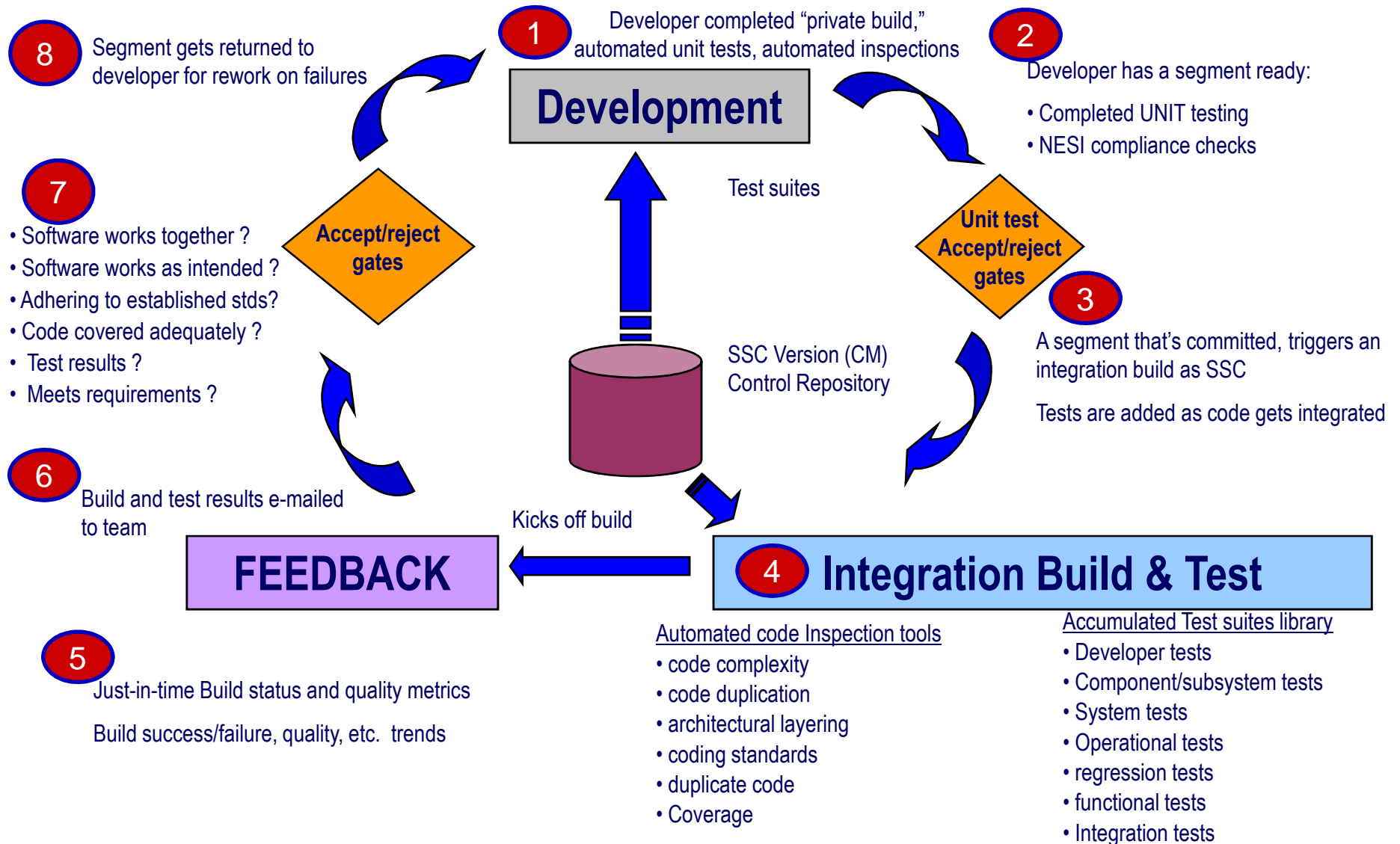


# RITE Supports Technology Maturation





# RITE's Iterative Development Process





# Summary



- **C2RPC is an ONR and PEO C4I Partnership to bring new technology to the warfighter**
  - Provides insertion path for POR expectation and guidance to S&T prototyping
  - Coordinates various funding sources to bridge the valley of death
  - Supports open communication between all stakeholders
  - Establishes continuous interaction with Fleet to understand operational needs and validate prototype solutions
  - Accelerates the transition of User-Validated C2 capabilities into POR
- **RITE provides assured integration of the technologies to meet cost, schedule & performance**

- *C2RPC is the first, from the ground up, services architecture application designed to run on a shore based "cloud" infrastructure or from new Consolidated Afloat Network Enterprise Services (CANES) infrastructure.*
- *Establishes C2 autonomous afloat capability (when needed) AND ashore high performance computer and network infrastructure augmentation when available*



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# Back-up



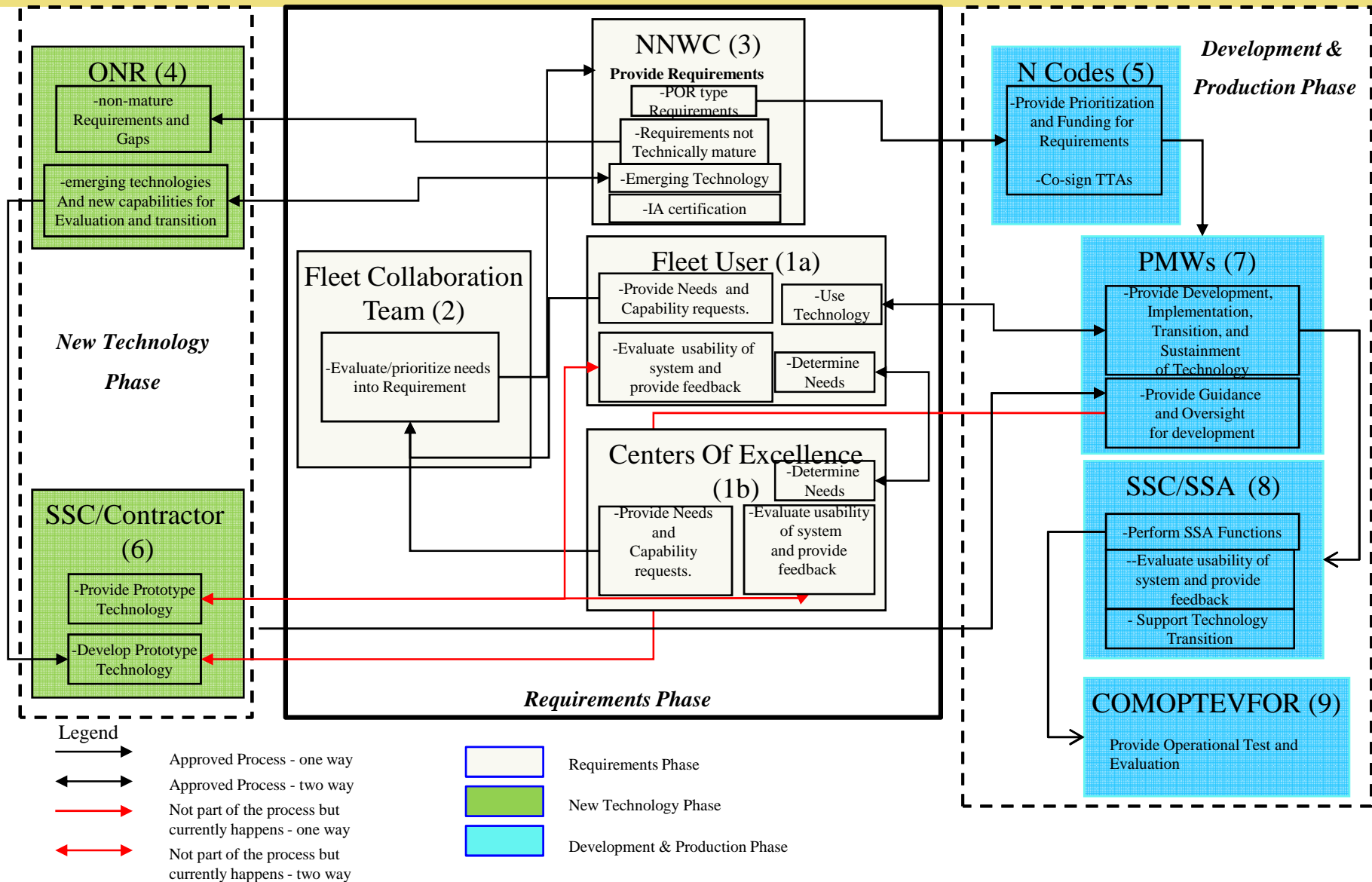
# C2RPC Governance



- Governance
  - Workshops
    - Used to establish operational objectives and receive operator feedback
    - 2 to 3 day workshops held at COMPACFLT (held quarterly)
  - Tech Reps
    - Assigned full-time (embedded) SME as “liaison” at COMPACFLT to gather real-time feedback for possible development modification
  - Software Change Requests (SCRs)
    - Formal process of submitting/documenting through trouble tickets
    - Used by ERB to document longer-range version enhancements, reprioritize current development efforts and assign resources
  - ERB
    - Governing body consisting of reps from ONR, PMW-150, & development contractors
    - Chaired by C2RPC Chief Engineer
    - Meets “weekly” to review

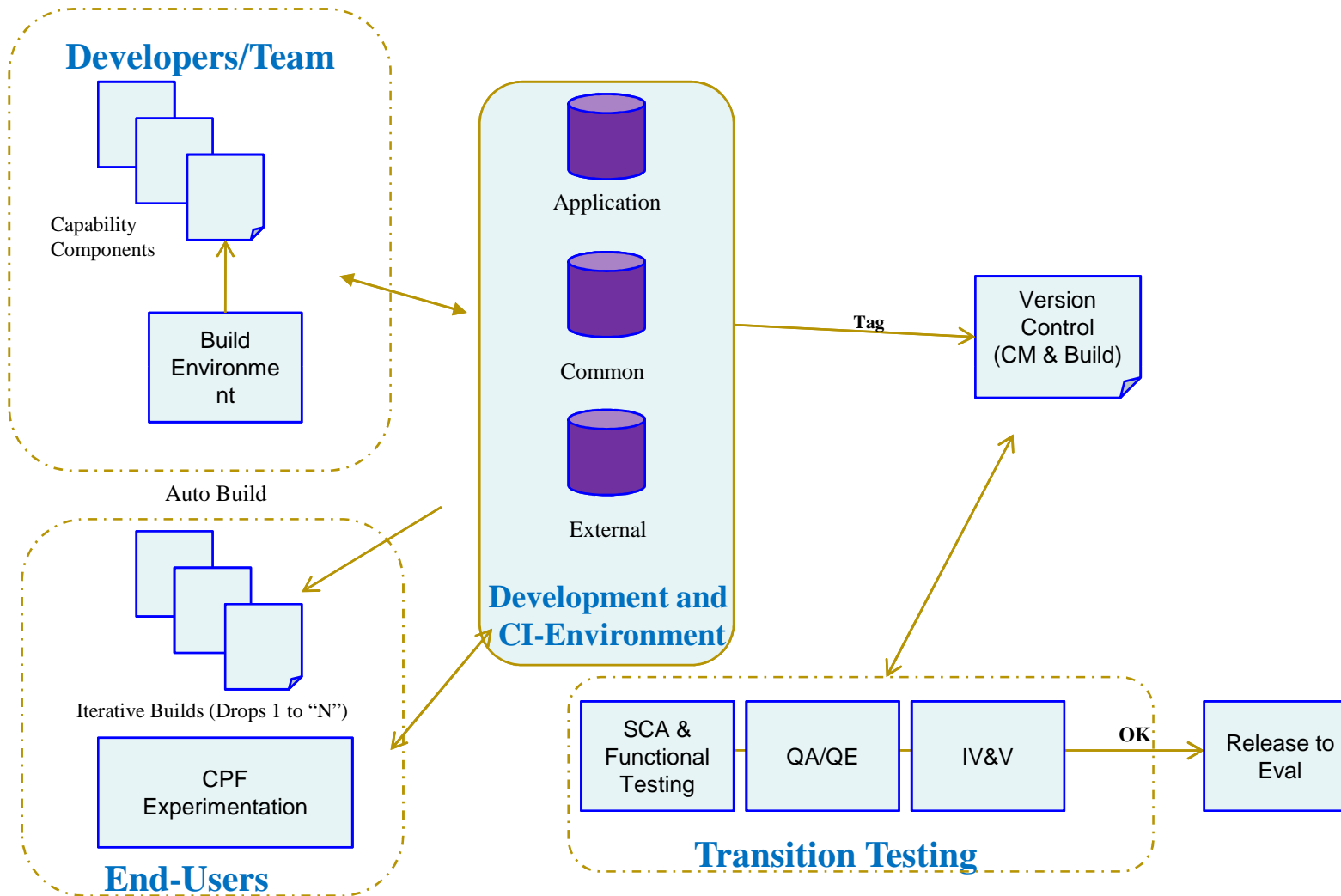


# Capabilities/Requirements Development





# RITE's Agile Integration and Test Architecture





# Requirements Process

- Current process does not meet rapid and agile development requirements – too cumbersome and slow
  - April 2011 – vice chairman Joint Chiefs of Staff announced DoD plans to rewrite acquisition requirements process (JCIDS)
  - No clear feedback functionality within the process to assure development is correct
- C2RPC uses a modified ‘operational objectives’ collection process
  - Links S&T community with Acquisition Manager
  - Involves interaction between Fleet operators and prototype developers