



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

**Command & Control Rapid Prototype Continuum
[C2RPC] – The Framework for Achieving a new
C2 Strategy (ID:033)**

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Introduction

- **Navy undergoing Command and Control (C2) transformation to meet expanding mission requirements**
- **“Cloud” infrastructure and capability-related applications will allow Navy organizations to reconfigure to meet dynamic operational environments**
- **Transformation has 2 inter-related drivers:**
 - A new C2 strategy
 - Based upon new paradyme for Maritime Operations the Operational Level of War (OLW)
 - A new acquisition methodology
 - Links Science and Technology (S&T) innovation with Navy C2 Program of Record (POR) requirements
 - Provides environment for rapid and agile C2 software development, test, integration and delivery of capabilities to the Fleet



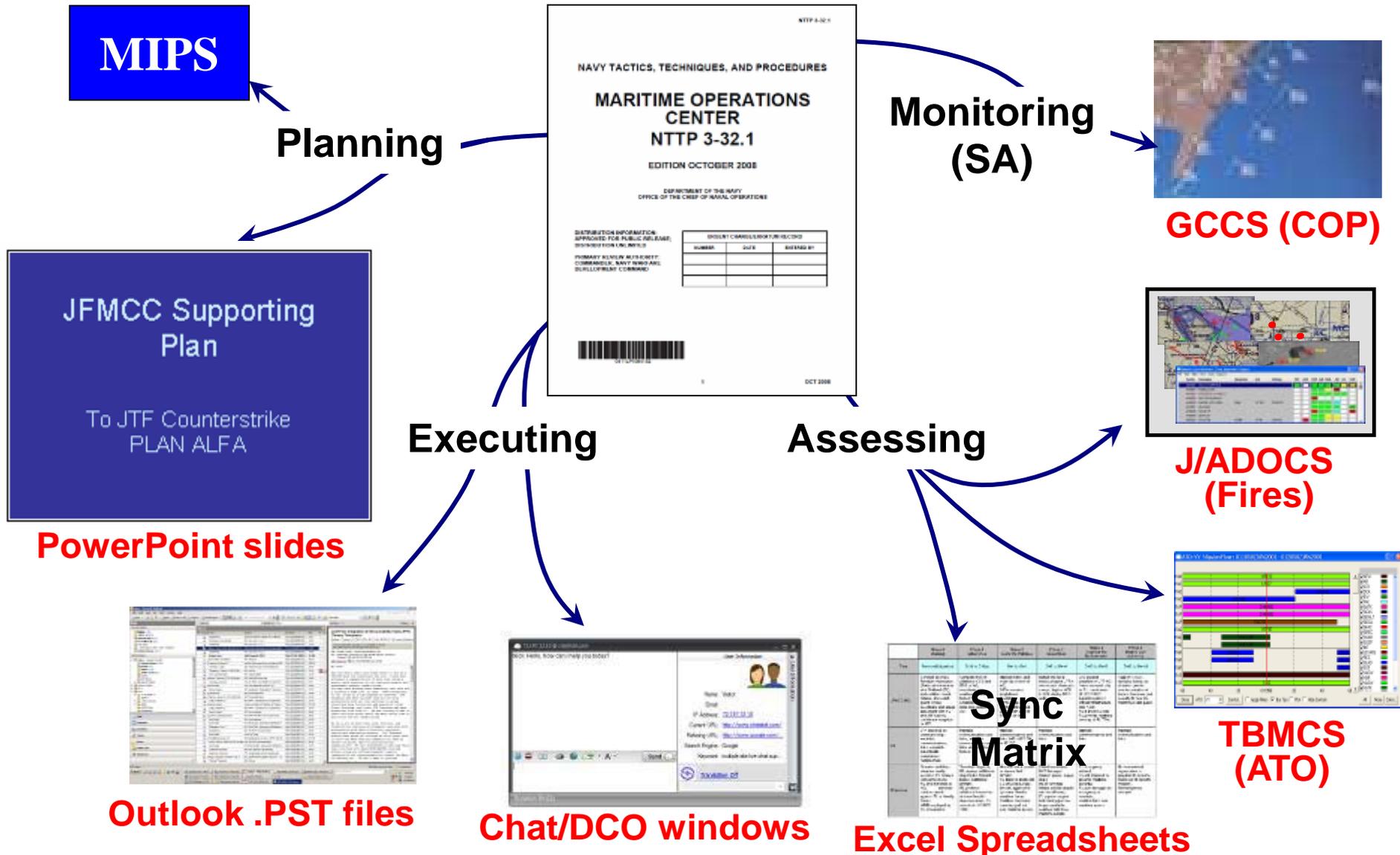
Agenda

- **New C2 Strategy**
 - Current C2 Situation
 - New component portfolio approach
 - Functional C2 Pillars
- **New C2 Software Acquisition Approach**
 - Changing S&T and POR relationship
 - Command and Control Rapid Prototyping Continuum (C2RPC) initiative
 - Rapid Integration and Test Environment (RITE) processes and infrastructure



Current C2 Situation:

Disconnected islands of C2 data





C2 Strategy Objectives

- **Provide Expanded Mission Management Capabilities**
 - Add “What”, “When”, “Why”, and “How” to currently provided “Who” and “Where” information
 - Needed to fulfill NWP 3-32 and NWP 5-01* requirements
- **Transition from Stove-Pipe Solutions to Net-Centric Operations**
 - Implement “component portfolio” approach to C2 system development
 - Use rapid prototyping and technology insertion to speed change and engage warfighter

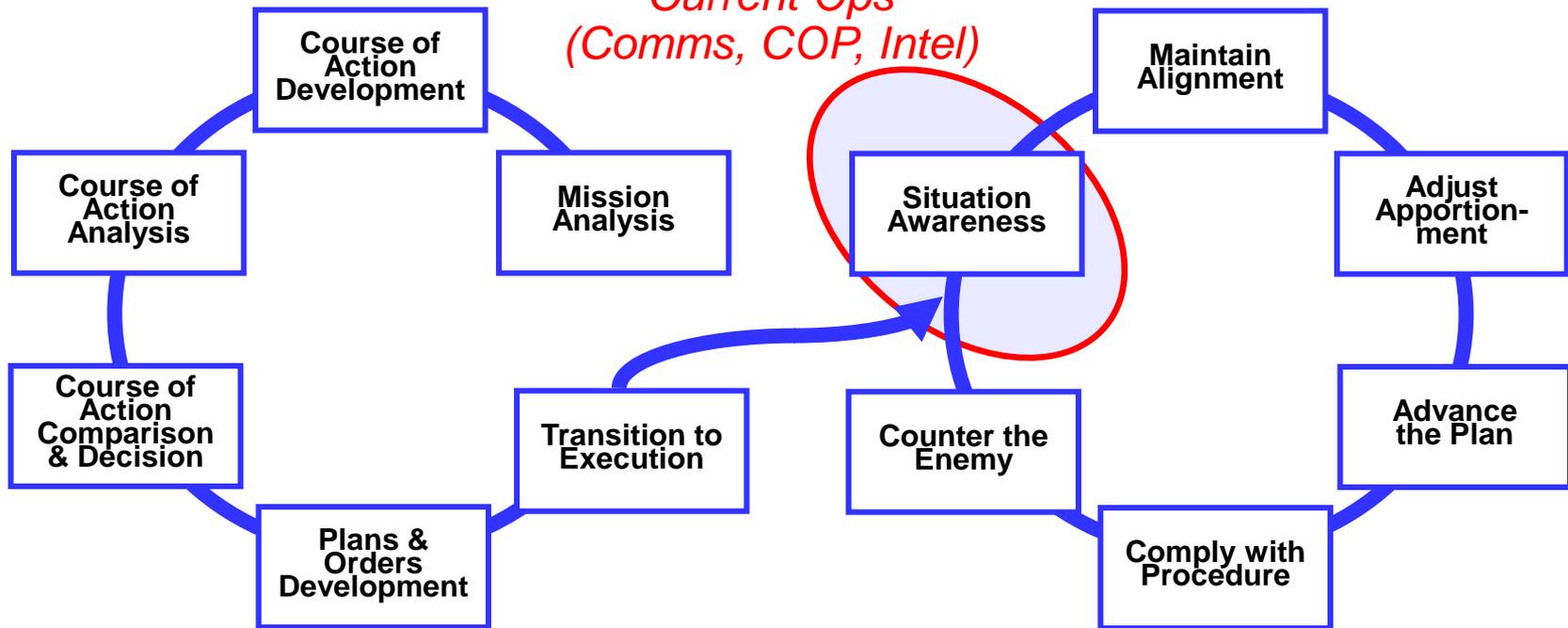
* Naval Warfare Publication (NWP) 5-01: *Navy Planning*
* NWP 3-32: *Maritime Operations at the Operational Level of War*



Navy Doctrine Demands an Integrated C2 Planning, Execution, & Assessment Process



PLANNING **C2 Program of Record (POR) Today:** **EXECUTION**
“Tracks on a Map”
Current Ops (Comms, COP, Intel)



Navy Planning Process

“Areas of Control”

NWP 5-01 Navy Planning

NWP 3-32 Maritime Operations at the Operational Level of War

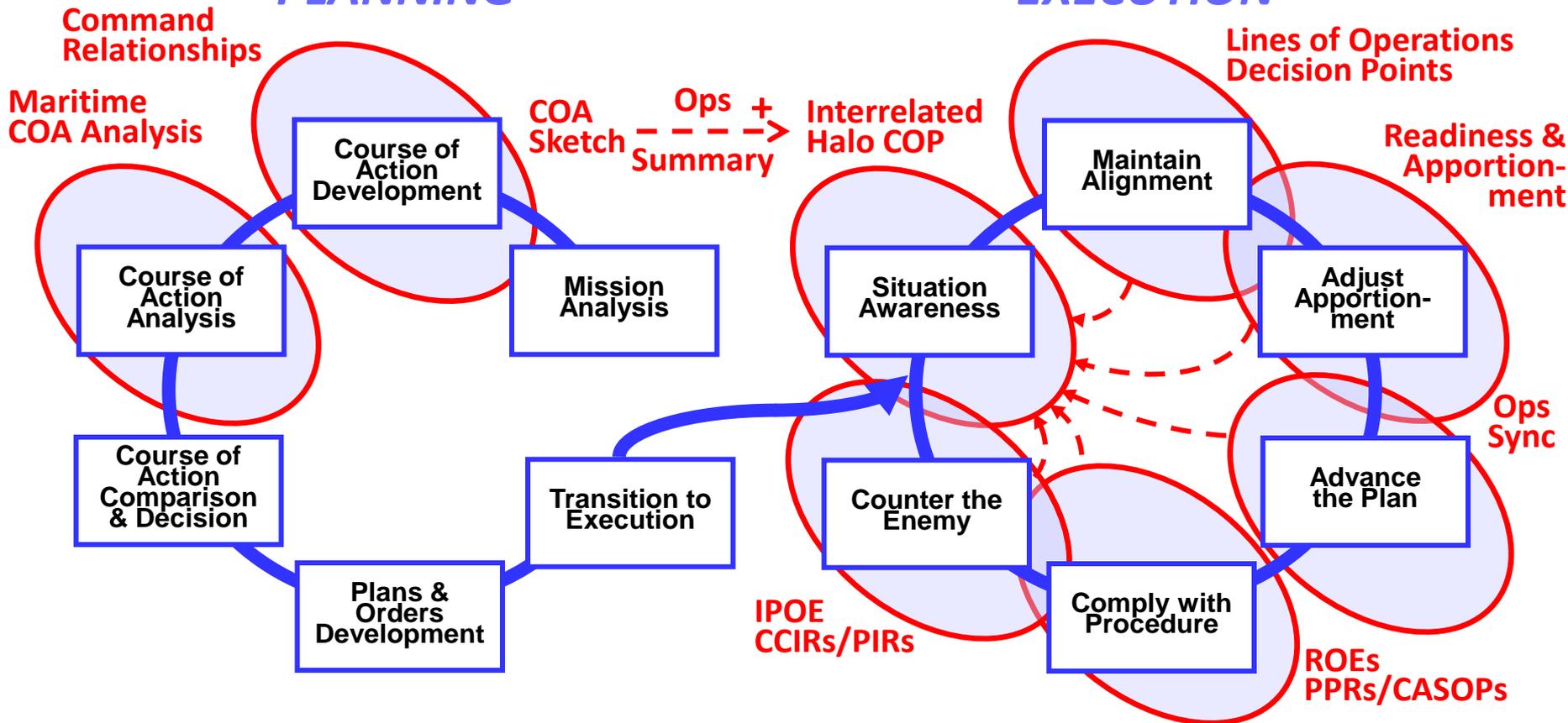


Navy Doctrine Demands an Integrated C2 Planning, Execution, & Assessment Process



PLANNING

EXECUTION



Navy Planning Process

"Areas of Control"

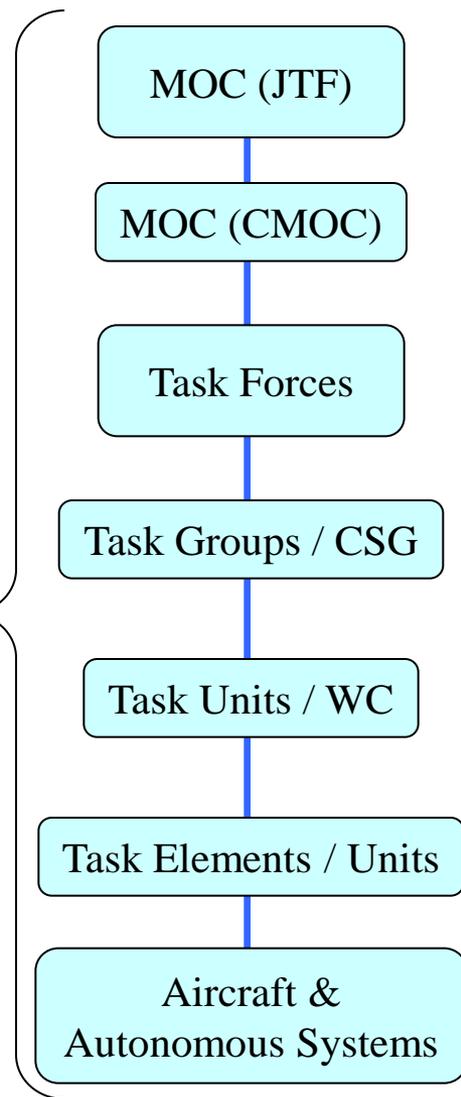
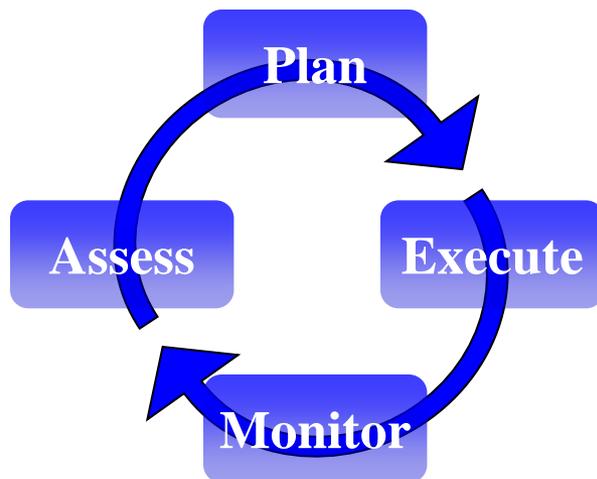
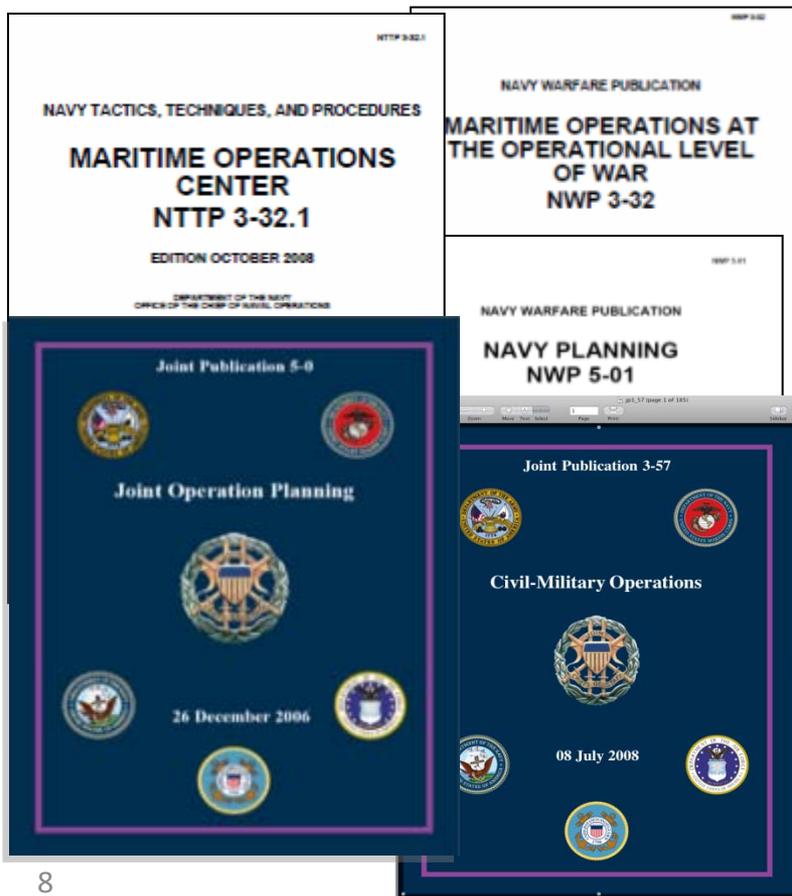
NWP 5-01 Navy Planning

NWP 3-32 Maritime Operations at the Operational Level of War



Desired End State

- Implement all C2 functions and process
- Exercise control actions in all six areas of control





Pillars of Future C2 system

Intelligence & CM

- I3
- Analysis products & IPOE
- Red Force Service
 - Units/Sites & Capabilities
 - Enemy COAs
 - NAI Characteristics
 - Targets
- Info Req's
- Collection Req's



e.g., info rqmt to support task or decision



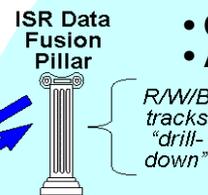
Planning, Execution & Assessment Pillar

Planning, Execution, Assessment

- Plans/Tasks & Data Service
 - Unit tasking & task status
 - Authoritative plans data
- Planning
 - Mission management
 - Decision Points, LOO
 - CMD relationships, COA sketch
- Execution
 - synchronization

ISR Data Fusion

- Conditions of Interest Alerts
 - Area entry
 - task execution deviations
 - (others TBD)
- OTM (new track mgr)
- Associate I3 info w/ OTM reporting



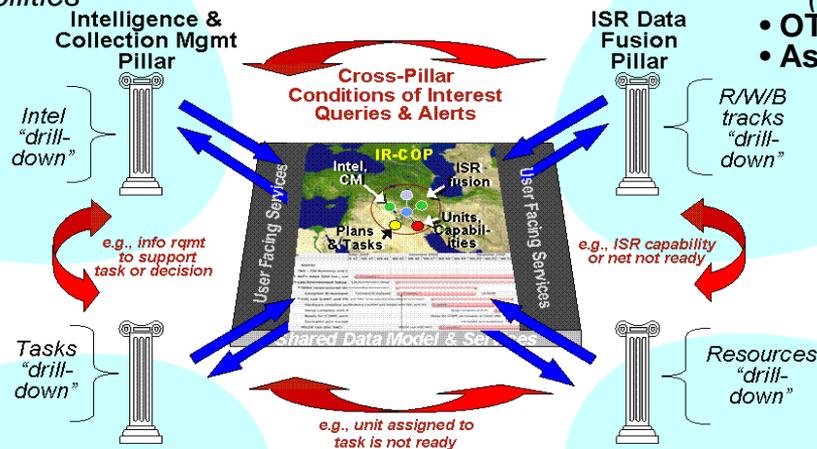
e.g., ISR capability or net not ready



Force, Unit, Network, Capabilities & Readiness Pillar

Capabilities & Readiness

- Blue Force Service
 - Units data (Admin, Op)
 - Platf's/Systems Capab
 - Networks Config
- Readiness COP
 - Platforms/Systems Status
 - NetOps Status
- Capabilities
- Conditions of Interest Heuristics & Alerts
 - Plan/task readiness





Acquisition Objectives

- **Establish Government Management and Governance of IT Software Acquisition Processes**
 - Implement agile IT acquisition and Test & Evaluation (T&E) processes “modeled on successful commercial practices for the rapid acquisition and continuous upgrades and improvement of IT systems.” (National Defense Acquisition Act of FY2010)
 - Execute agile performance-based contracting strategy by reducing vendor’s *“Institutional Knowledge Lock”*
 - Synchronize Government testing with private-industry development – testing early and often
- **Establish methodology that takes advantage of Navy S&T innovation and successfully transitions it to Navy C2 programs of record**



C2 Rapid Prototyping Continuum (C2RPC) Migrating to Maturity



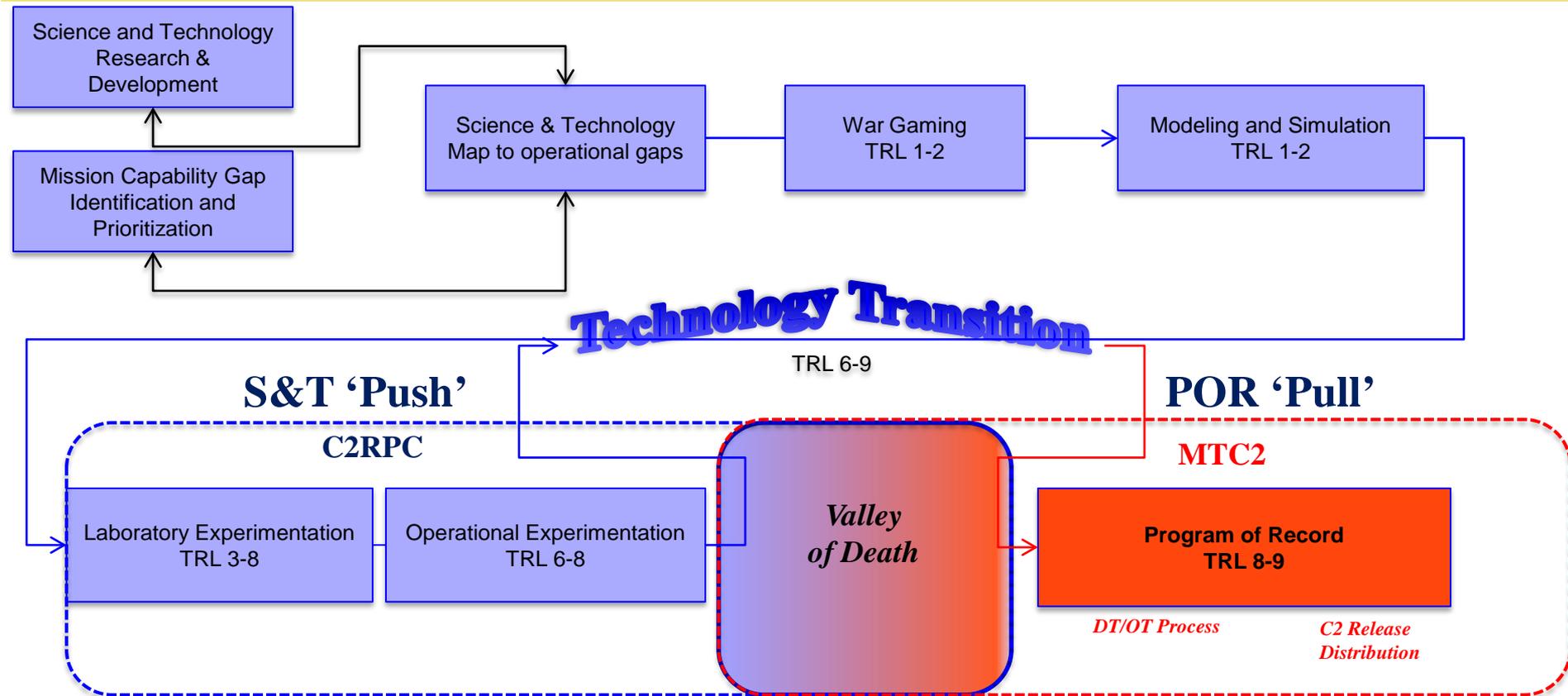
- Coalition of PEO C4I, Office of Naval Research (ONR), and Commander Pacific Fleet (COMPACFLT)
- Develop a C2 Prototype that Feeds Back into Enduring, Supported Programs Of Record
- Accelerate Development of OLW C2 CONOPS
 - COMPACFLT: “Use PACFLT as a ‘Petri Dish’ ”
 - Advance the State of the Art of C2
 - Reduce Uncertainty
 - Ensure Systems Meet Fleet Prioritized Capabilities/Needs



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



Technology Maturation and Funding Bridge



Acquisition Perceptions of S&T Community

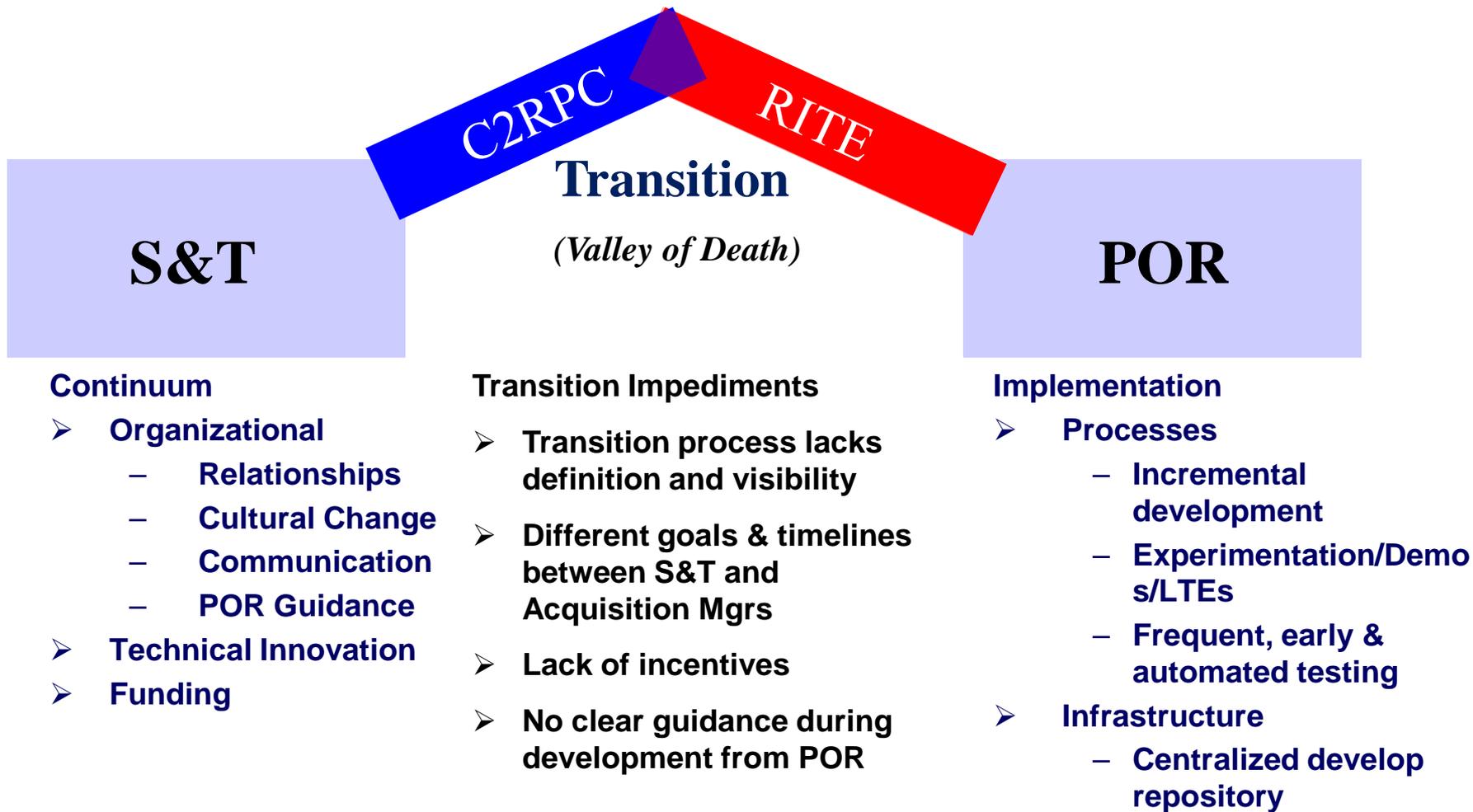
- S&T's job is complete at the tech dev stage
- Implementation of technology is the customer's responsibility
- "Role of S&T is tech push- build it and they will come"
- Develop cycle for S&T is too long for most acquisition and Warfighter (Customers)
- Lack of understanding on level of effort to transition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

Transition Impediments

- 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



Bridging the *Transition* Valley of Death



RITE: Rapid Integration and Test Environment



Rapid Integration and Test Environment (RITE) 'Foundational Pillars'



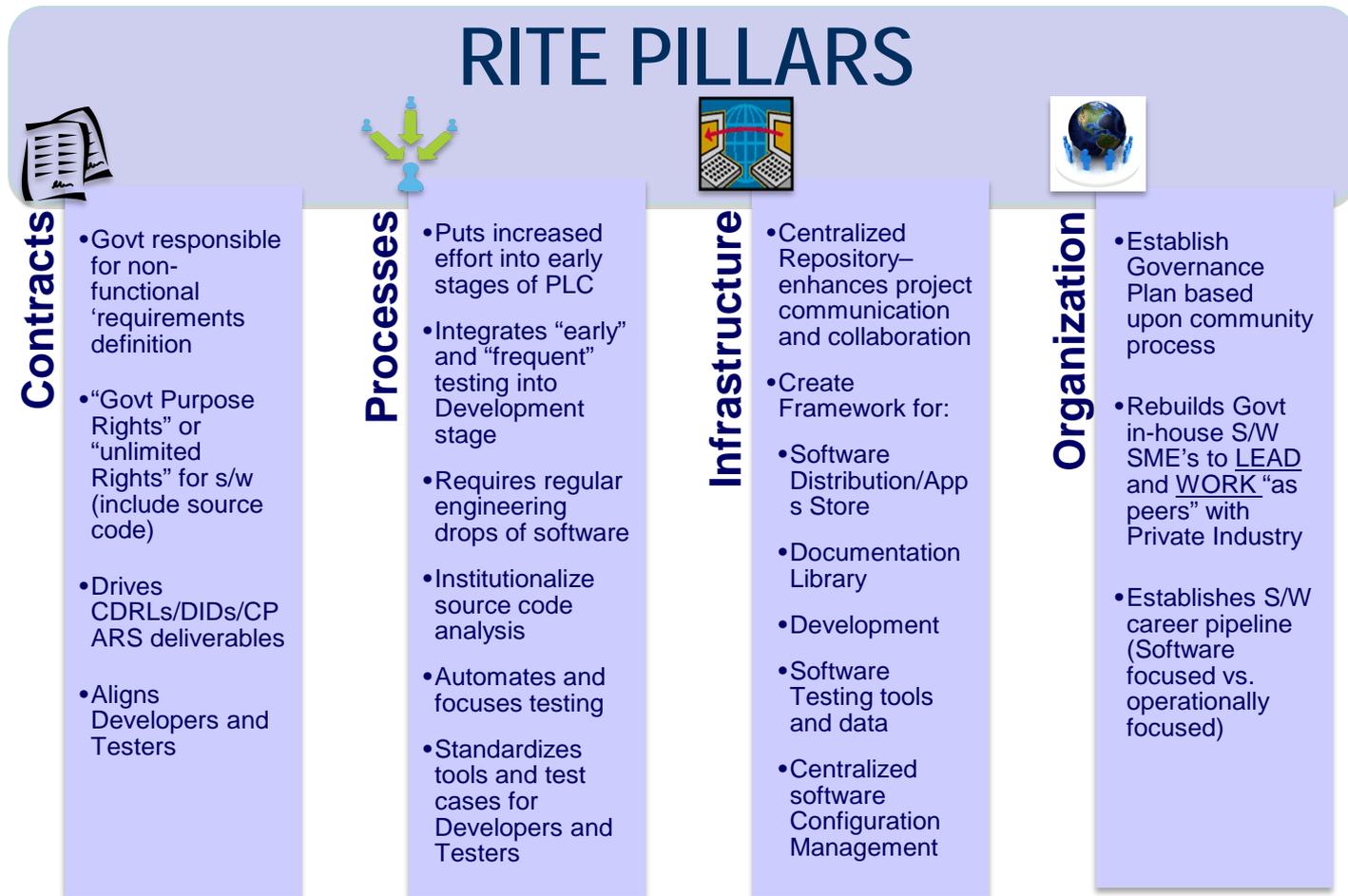
RITE addresses findings and facilitates development and distribution of Navy C2 systems:

▼ **Check** – software development

▼ **Stabilize** – the current build

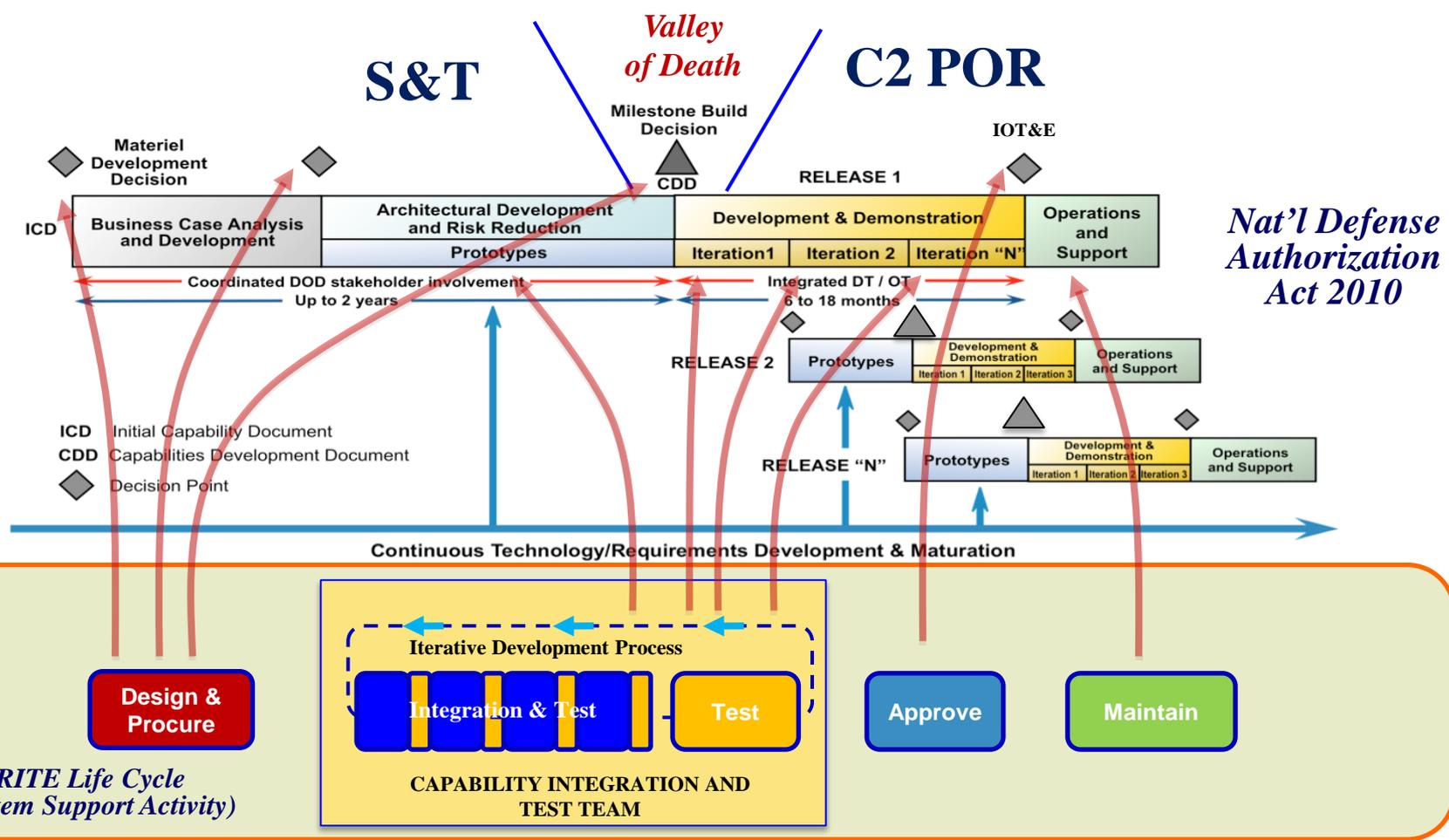
▼ **Influence** – the final product delivery

“Manage as close to the source, as possible”





IT Acquisition Life Cycle Alignment



Nat'l Defense Authorization Act 2010

Rapid Integration and Testing Environment (RITE) Supports ALL phases of IT Acquisition



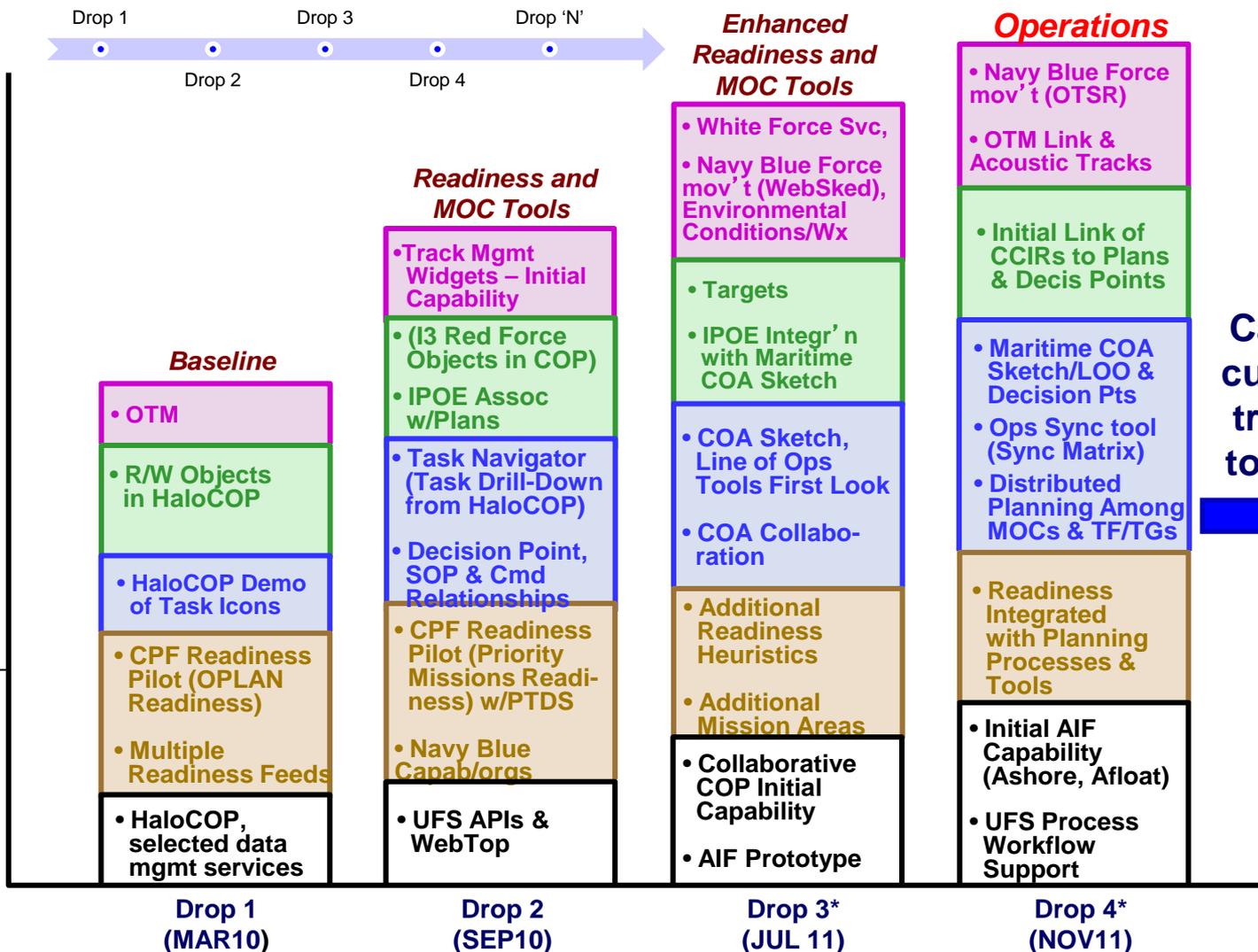
Incremental Functionality Leads to C2 POR

S&T Prototyping Continuum – Vision to Transition

New Capabilities

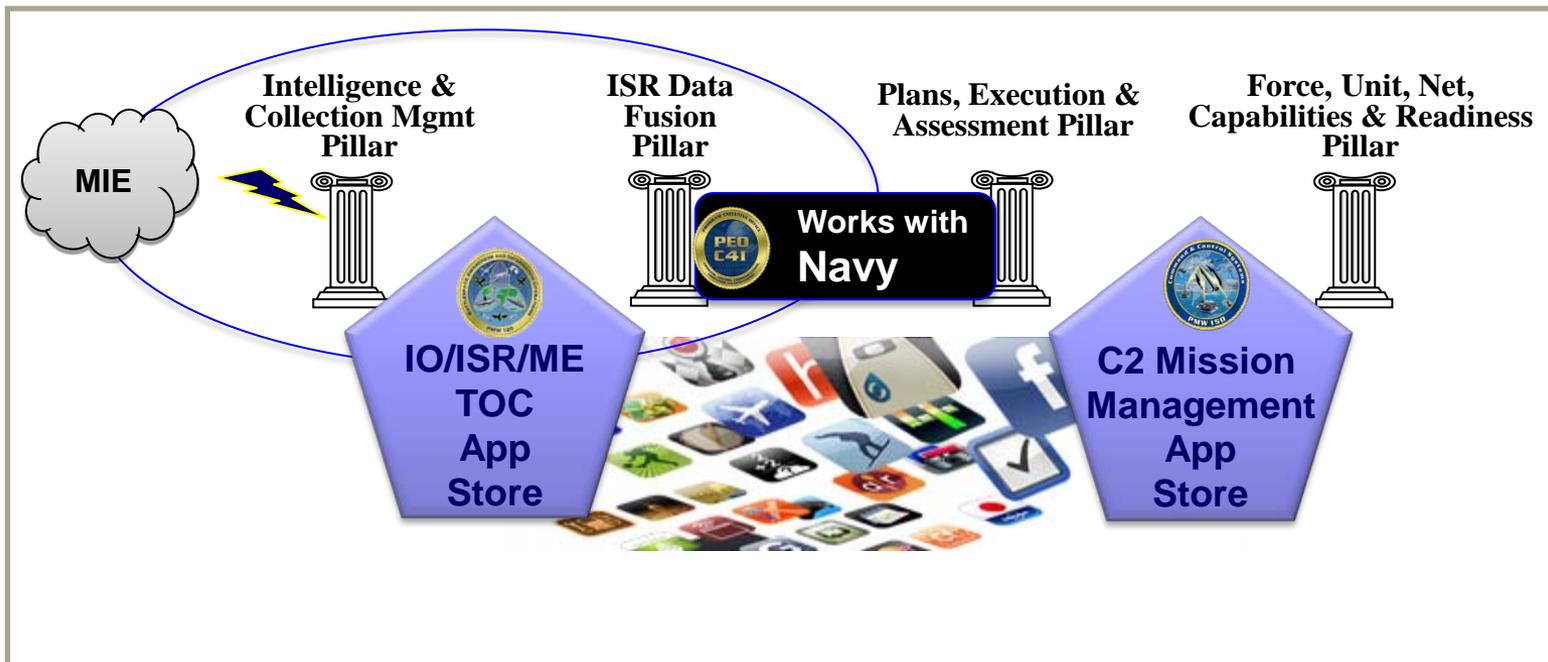
4 Pillars

- ISR Data Fusion
- Intel & CM
- Planning & Execution
- Capabilities & Readiness
- Apps support
- Data Mgmt
- Enterprise Services abstraction





iPhone™ Analogy for Navy C2 Software Distribution



Afloat Core Services and Infrastructure Software

CANES Network Hardware

Satellite Communications





Reconfigurable Navy C2 Distribution

Possible Scenario



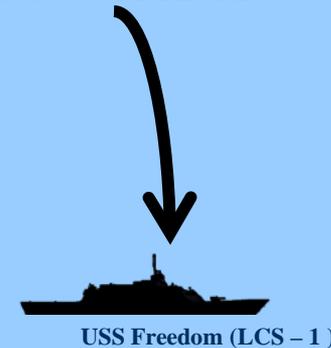
C2 Mission Management Applications Store

- C2 SW component catalog
- Incremental engineering drops (developer builds)
- Automated Test Tools
- FAQs, Guidance, Mil-STDs
- Requirements, Best Practices, and Lesson's Learned
- Codes Sample



Operational Commander

- Assigns new Tactical Mission (e.g. Civil-Military; Counter-drug; humanitarian relief, etc) to LCS-1
- Designates additional Navy C2 capability applications needed to conduct new operations and to inter-operate with other tactical forces
- Provides 'authorization code' to download needed C2 Apps



Navy C2 Software Support Activity (SSC Pac)

- Maintains Apps Store and Active Fleet configuration Management
- Interfaces with OPCON to identify specific "components" (app/version/release) for assigned unit
- Conducts interoperability and compatibility testing prior to releasing new components, as necessary
- Assigns 'Authorization Code' for selected Components
- Releases new components for designated unit

Operational Unit

- Upon new assignment notification and Mission Package Update authorization – logs into Apps Store
- Using authorization code is able to access Apps Catalog that pertains to specific unit
- Downloads new Mission Package components
- Runs automated acceptance test and installs into C2 Core



Summary

- **C2 implementing a new strategy to expand beyond Situational Awareness to assist in full spectrum of C2, and to address changes in Mission requirements**
- **C2RPC is an ONR and PEO C4I Partnership to improve development strategy and infuse new technology into future C2 systems**
 - **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*



Acronyms

Acronym	Definition	Acronym	Definition
AIF	Architecture Infrastructure Framework	HADR	Humanitarian Assistance and Disaster Relief
AMW	Air Mobility Wing	I3	Integrated Imagery and Intelligence
ASW	Anti-Submarine Warfare	IO	Information Operations
ATO	Air Tactical Order	IPOE	Intelligence Preparation of the Operational Environment
BMD	Battle Management Development	ISR	Intelligence, Surveillance and Reconnaissance
C2	Command and Control	JCIDS	Joint Capabilities Integration Development System
C2RPC	C2 Rapid Prototyping Continuum	JFMCC	Joint Forces Maritime Command Center
CANES	Consolidated Afloat Network Enterprise System	JOPEs	Joint Operation Planning and Execution System
CCIR	Commander's Critical Information Requirements	JP	Joint Publication
CM	Configuration Management	JTF	Joint Task Force
CMD	Cruise Missile Defense	LCS	Littoral Combat Ship
COA	Course of Action	MIO	Maritime Interdiction Operations
COP	Common Operational Picture	MIW	Mine Warfare
CPF	Commander Pacific Fleet	MOC	Maritime Operation Center
DIL	Disconnected, Intermittent and Limited	MSO	Maritime Security Operations
DT	Development Test	MTC2	Maritime Tactical C2
GCCS	Global Command and Control System	NTTP	Naval Technical Training Program



Acronyms (continued)

Acronym	Definition	Acronym	Definition
OLW	Operational Level s of War	S&T	Science and Technology
OPCON	Operational Control	SOP	Standard Operating Procedures
OT	Operational Test	SSA	Software Support Activity
OTM	Operational Track Management	SSC	Space and Naval Warfare System Command (SPAWAR) Systems Center
PEO C4I	Program Executive Office Command, Control, Communications, Computers, and Intelligence	T&E	Test and Evaluation
PMW150	Program Warfare Office Command and Control	TBMCS	Theater Battle Management Core System
POR	Program of Record	TF/TG	Task Force/Task Group
PPR	Pre-Planned Response	TLAM	Tomahawk Land Attack Missile
PTD	Plans, Tasks and Data Services	TRL	Technology Readiness Levels
RITE	Rapid Integration and Test Environment	UFS	User Facing Service
ROE	Rules of Engagement	USW	Undersea Warfare



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