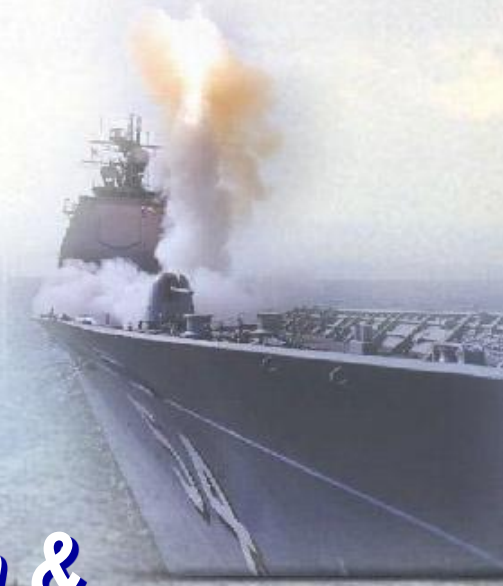
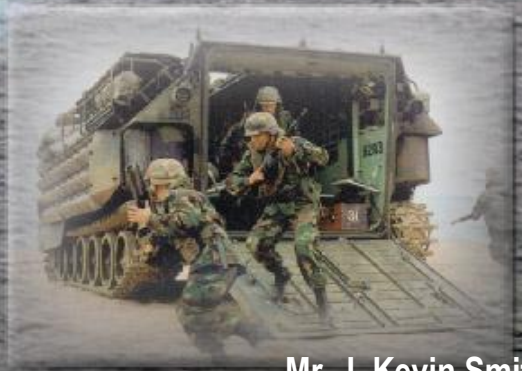
ASN (RDA)
Chief Engineer



Naval Power 21 Integration & Interoperability Improvement



21 October 2008

Mr. Carl Siel
ASN(RDA) Chief Engineer
carl.siel@navy.mil

Unclassified

Mr. J. Kevin Smith
Technical Director
ASN(RDA) Chief Engineer's Office
kevin.k.smith1@navy.mil

Purpose

- Provide an information briefing on the ASN(RDA) CHSENG initiative to improve integration, interoperability, and net-centricity across the Department of the Navy.

Agenda

- Background
- Overview of I&I Management
- Centralized Planning Processes
- Decentralized Execution Processes
- Capability Package Assessments
- Configuration Capture
- Role of Integrated Architectures
- Governance Structure

Background

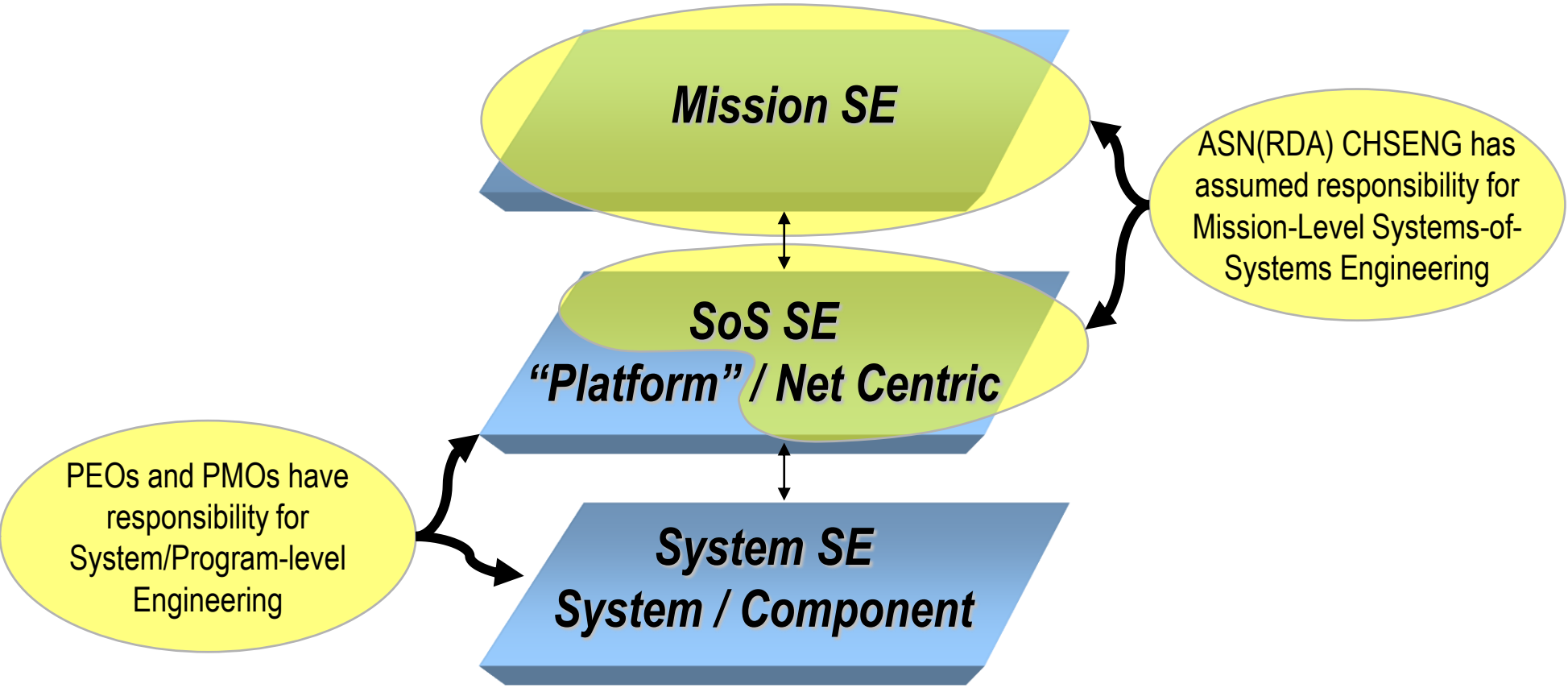
- In February 2006, ASN(RDA) Chief Systems Engineer (CHSENG) undertook to improve systems engineering across the department in the area of integration and interoperability of "information-handling" systems.
  - "Information-handling system" is the term used by RDA CHSENG to cover every data system within the Department, including both IT systems, national security systems, and everything else.

- After reviewing the existing systems engineering organizations under the ASN(RDA), CHSENG determined that the best value-added for the CHSENG was to accept the role of systems-of-systems engineer at the Naval mission level.
  - PEO systems engineers and technical directors already coordinated systems engineering within their organizations.
  - PMO system engineers held responsibility for program-level systems engineering.

Background

- But a gap existed at the echelon above where any PEO had the authority to operate and, as a result, PEO-to-PEO collaboration was unsupervised and haphazard.
  - ASN(RDA) CHSENG assumed the role of coordinator for issues which cross PEO boundaries.

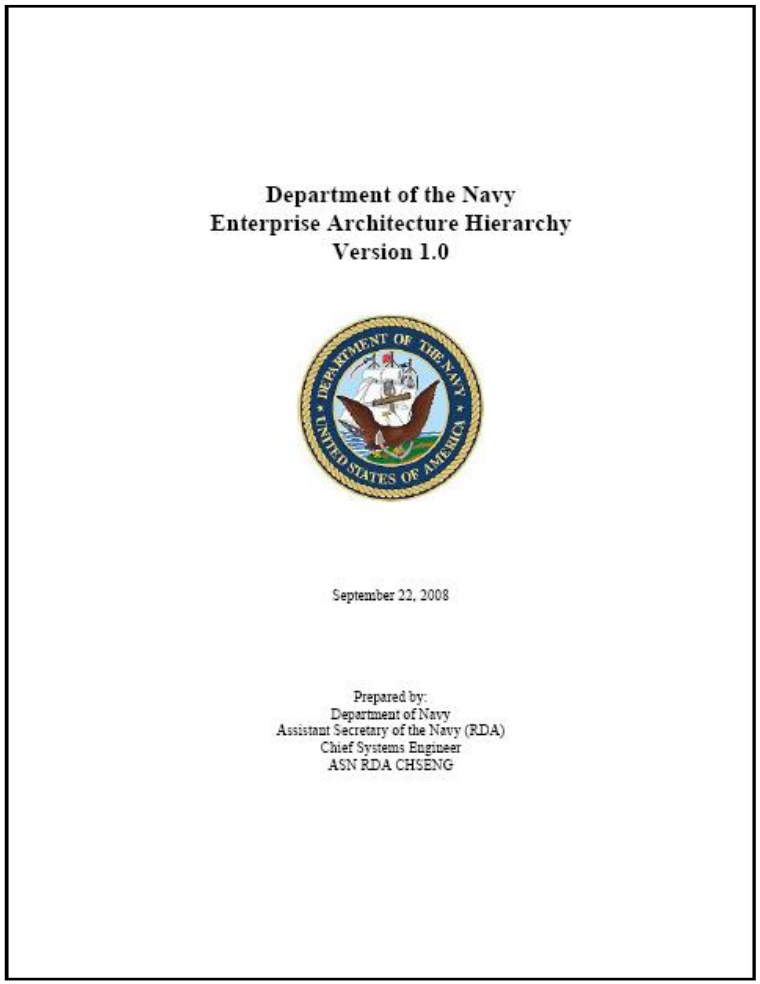
Background: DoN Systems Engineering Hierarchy



To do Enterprise & SoS / FoS SE need to Execute Sound System SE Practices

Background

- However, to establish the boundaries within which the RDA CHSENG would operate, it was necessary to define the systems-of-systems for which RDA CHSENG would take responsibility.
  - We created the DON Enterprise Architecture Hierarchy to establish those boundaries.
  - Aligns Mission-Level SOSs to the Joint Capability Areas.
  - Resulting mission-level architectures will describe the Secretariat, U.s. Navy, and U.S. Marine Corps' contributions to each JCA.
  - Approved for use across DON on 22 September 2008.



Department of the Navy
Enterprise Architecture Hierarchy
Version 1.0

September 22, 2008

Prepared by:
Department of Navy
Assistant Secretary of the Navy (RDA)
Chief Systems Engineer
ASN RDA CHSENG

Background

- Sample page from DON EA Hierarchy.

Hierarchy Identifier	Joint Capability Area/DON Segment Reference Architecture (Marine Corps Essential Task/Navy Required Operational Capability)	NP 21 Pillar/ MA CHENG	Existing Principle Mission-Level Architecture	Existing Supporting Mission-Level Architectures
04.05.02	Computer Network Operations	SS/S(Land) SS/S(Air) SS/S(SEA) FORCEnet EMFTS	EMFTS – C2	
04.05.02.MCT5.4.2.1	Conduct Computer Network Operations (CNO)	EMFTS	EMFTS – C2	
04.05.02.01	Computer Network Attack	SS/S(Land) SS/S(Air) SS/S(SEA)		
04.05.02.02	Computer Network Defense	FORCEnet	Fn – C&N	
04.05.02.03	Computer Network Exploitation	SS/S(Land) SS/S(Air) SS/S(SEA)		
04.05.03	Operations Security (OPSEC)	Sea Shield EMFTS	EMFTS – C2	
04.05.03.MCT5.4.2	Conduct Operations Security (OPSEC)	EMFTS	EMFTS – C2	
04.05.03.C2W4	Plan and Implement Operations Security Measures	Sea Shield		
04.05.03.C2W6	Plan and Conduct Countersurveillance, Countertargeting and Military Deception Operations	Sea Shield		
04.05.03.AMW36	Conduct Counterintelligence Operations	Sea Shield		
04.05.03.AMW37	Conduct Counterintelligence Operations with Local/Allied Agencies	Sea Shield		
04.05.04	Military Deception (MILDEC)	SS/S(Land) EMFTS	EMFTS – C2	
04.05.04.MCT5.4.1.1	Conduct Deception Operations	EMFTS	EMFTS – C2	
04.05.04.C2W6	Plan and Conduct Countersurveillance, Countertargeting, and Military Deception Operations	SS/S(Land) SS/S(Air) SS/S(Sea)		
04.05.05	Psychological Operations (PSYOP)	SS/S(Land) EMFTS		
04.05.05.MCT5.4.1.3	Conduct Psychological Operations (PSYOPS)	EMFTS	EMFTS – C2	

Integrated Architectures

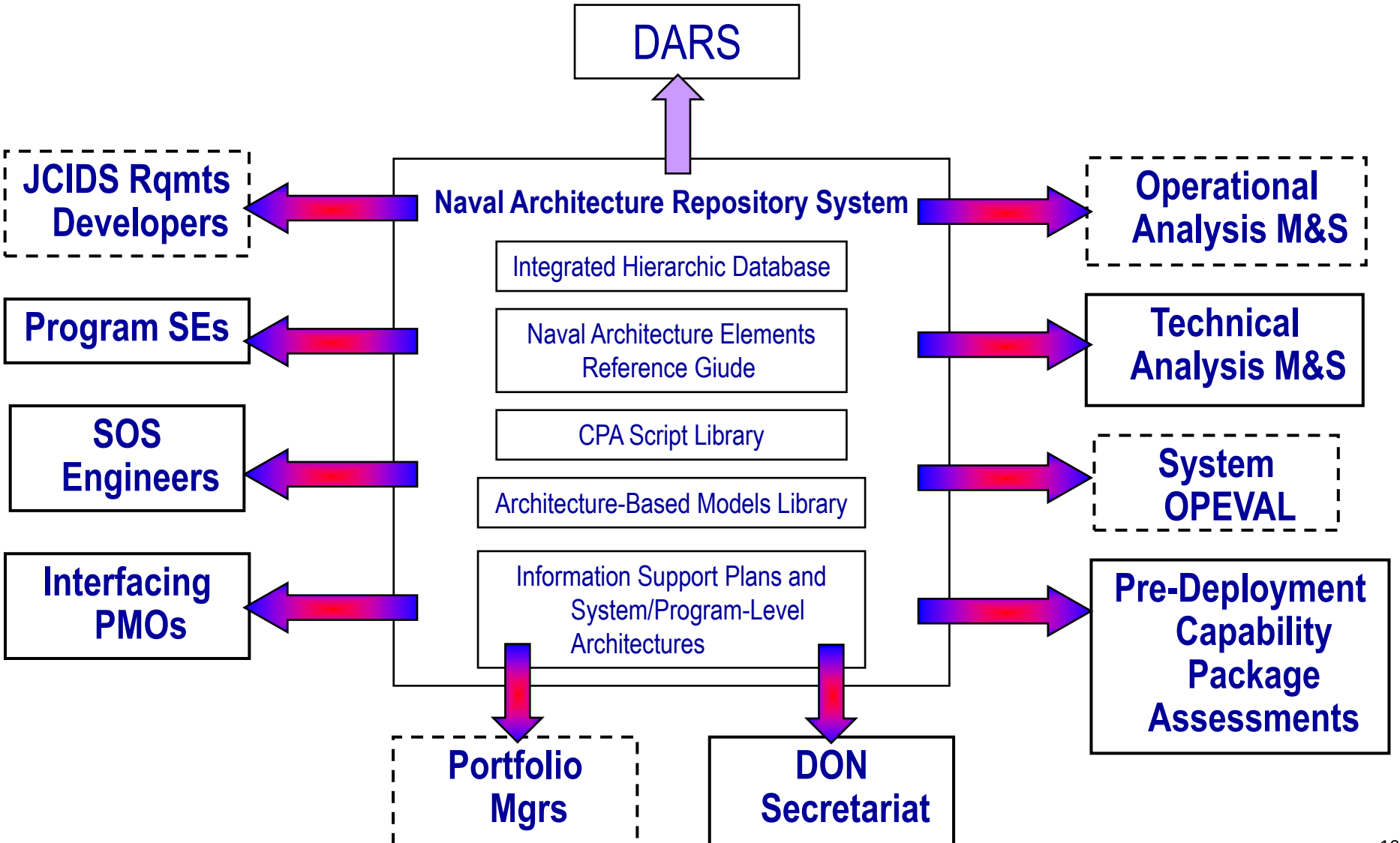
- Integrated architectures provide the means for defining the details of the operational and system requirements.

- Integrated architectures are needed for multiple echelons:
  - DON Enterprise Architecture.
  - Mission-level integrated architectures (244)
  - Program/Systems: ADNS, AEGIS, CVN, LHA-6, F/A-18

- Each tier of integrated architectures as a subset of the tier above it.

Integrated Architectures (continued)

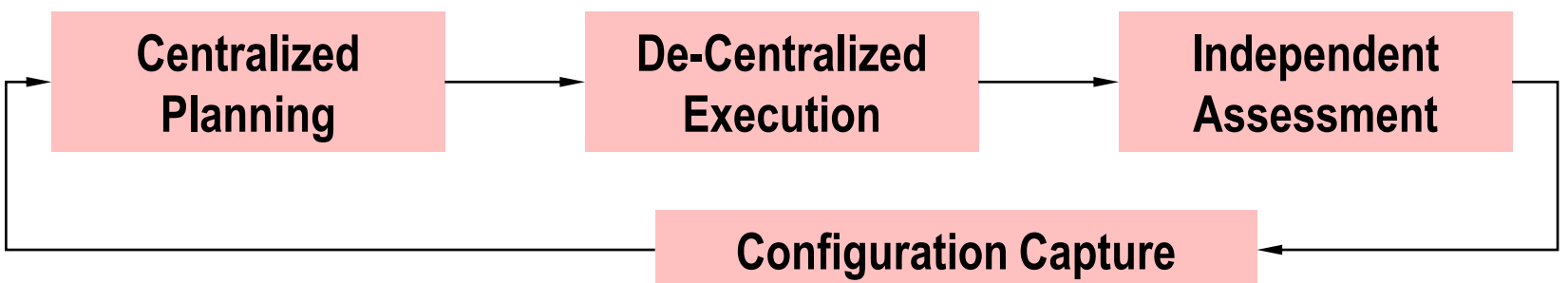
- How do we use integrated architectures?



Overview of I&I Management

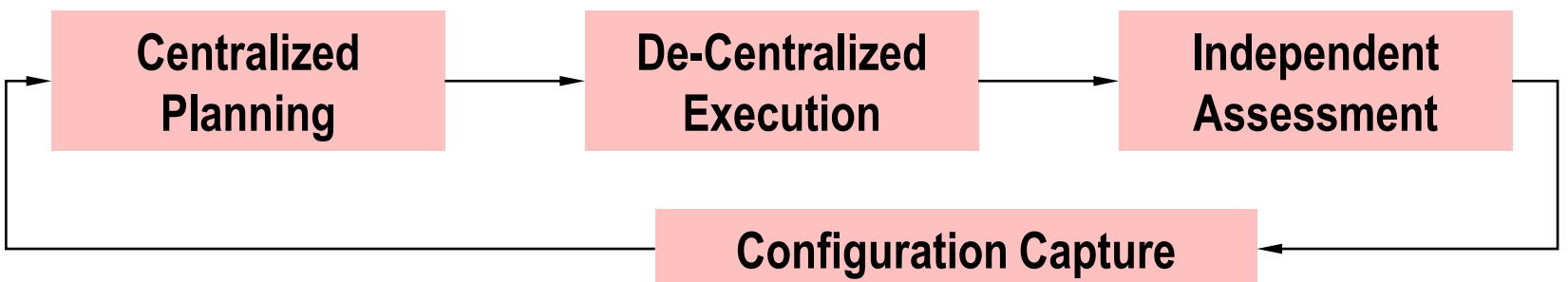
- First order of business was to identify ALL of the missions in the Department of the Navy (DON).
  - Requires a definition of a Naval mission.

- Naval missions are defined as the Navy, Marine Corps, and Secretariat contributions to the Joint Capability Areas (JCAs).
  - Results in 244 mission areas, based on 2007 JCAs.
  - These are listed and collated in the DON Enterprise Architecture Hierarchy.
  - Will be updated following revisions to the JCAs scheduled for November 2008.



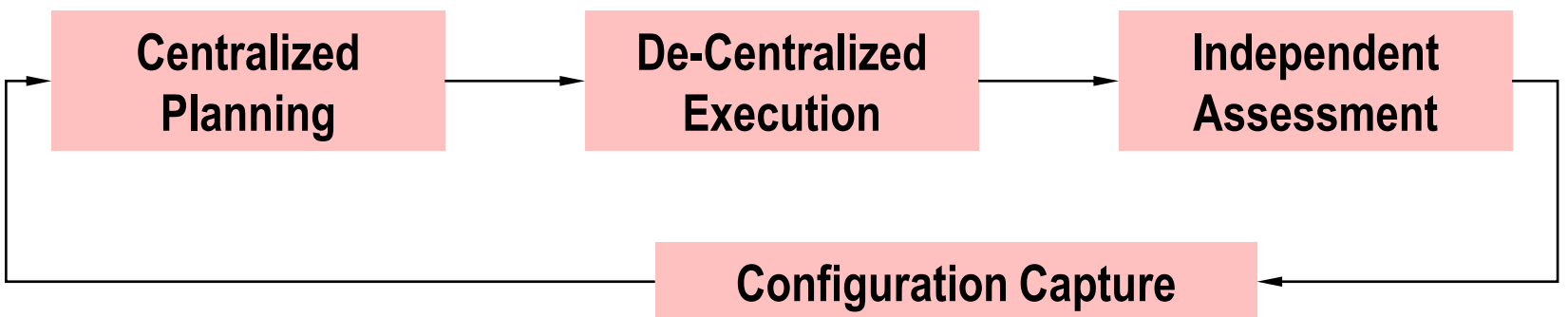
Overview of I&I Management (continued)

- Because of the complexity of the Department of the Navy (DON), RDA CHSENG relies on assistance provided by Mission-Area Chief Engineers who are experts in particular systems-of-systems and/or mission areas.
  - FORCEnet: SPSWARSYSCOM 5.1
  - Sea Shield: NAVSEASYSCOM 05W
  - Sea Strike/Shaping (Air, Sea, Land, INFO OPS, SPECWAR)
  - Sea Basing: To be determined.
  - Expeditionary Maneuver Warfare (MARCORSYSCOM DEP for ENG)
  - Manpower, Personnel, Training, Education: To be determined.
  - Sea Enterprise: To be determined.



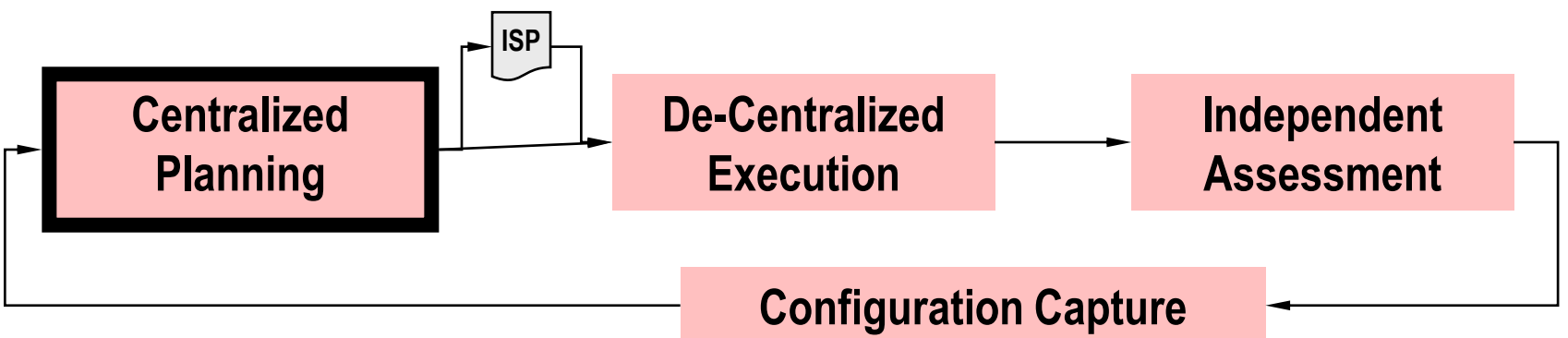
Overview of I&I Management (continued)

- We are implementing an end-to-end management process for I&I of information systems which is based on the systems engineering needed by the mission-level system-of-systems.
- Uses a philosophy of Centralized Planning – Decentralized Execution – Independent Assessments – Configuration Capture.
- Relies on multi-tiered integrated architectures to set technical requirements and to communicate among engineers.



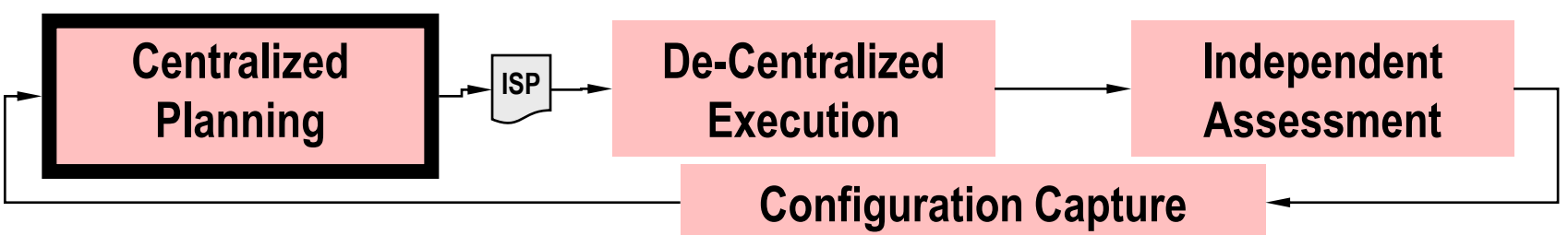
Centralized Planning

- Objectives for Centralized Planning include:
  - Consistent application of standards across PEOs/SYSCOMs.
  - Ensuring full understanding of the role of a single system within the SoSs where it participates. Overseeing the resolution of issues among PEOs/SYSCOMs.
  - Conduct initial evaluations of the operational effectiveness and technical performance of the mission-level SoSs.
- The Information Support Plan provides the means for accomplishing Centralized Planning across PEOs/SYSCOMs and with higher authorities.
  - Reviewed at each acquisition milestone and each major upgrade.



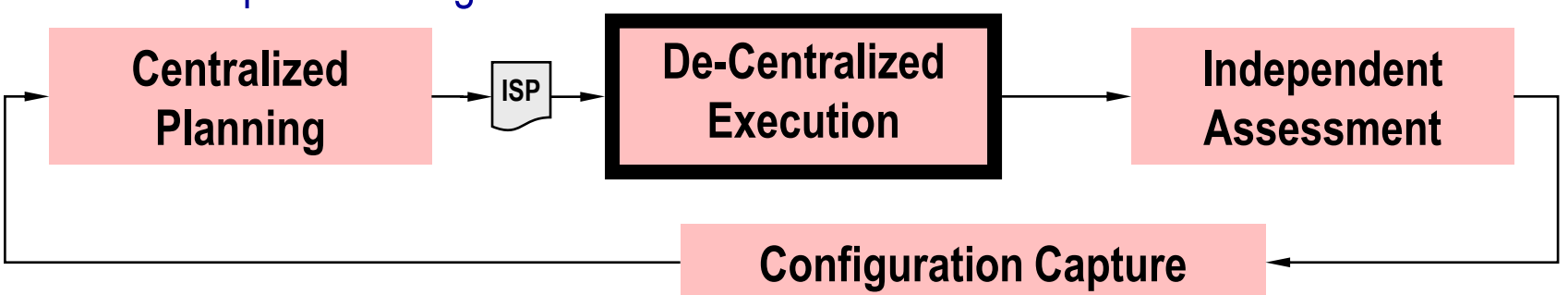
Centralized Planning Methods:

- Establishment of system-level and mission-level integrated architectures.
- Comparison of architectures of new systems with mission architectural baselines.
- Review of other ISP and NR-KPP requirements.
- Concurrence from PMOs of interfacing systems.
- Concurrence from CIO/DCIO(N)/DCIO(MC).
- Concurrence from NNWC, MCCDC and operational agents.
- Use existing processes for reviews of ISPs.
  - DON-level review.
  - DOD-level review using JCPAT-E



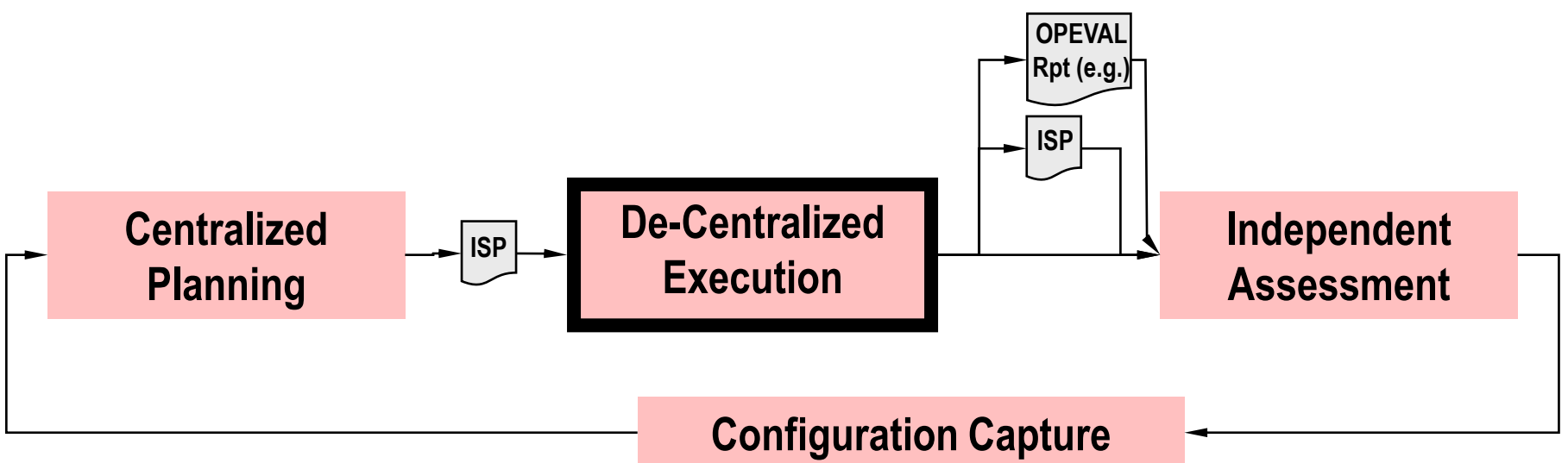
De-Centralized Execution

- PMs and PEOs execute their acquisition programs according to plans (SEP, ISP).
- ASN(RDA) CHENG, coordinating with the DON Engineering community, assists by:
  - Providing a venue for coordinating across PEOs, especially to resolve cross-PEO/SYSCOM issues,
  - Providing common dictionaries,
  - Developing and distributing mission-level integrated architectures.
  - Developing and interpreting policies of higher headquarters,
  - Supporting program representation to higher headquarters,
  - Providing a communications link to authoritative sources within the operational agents.



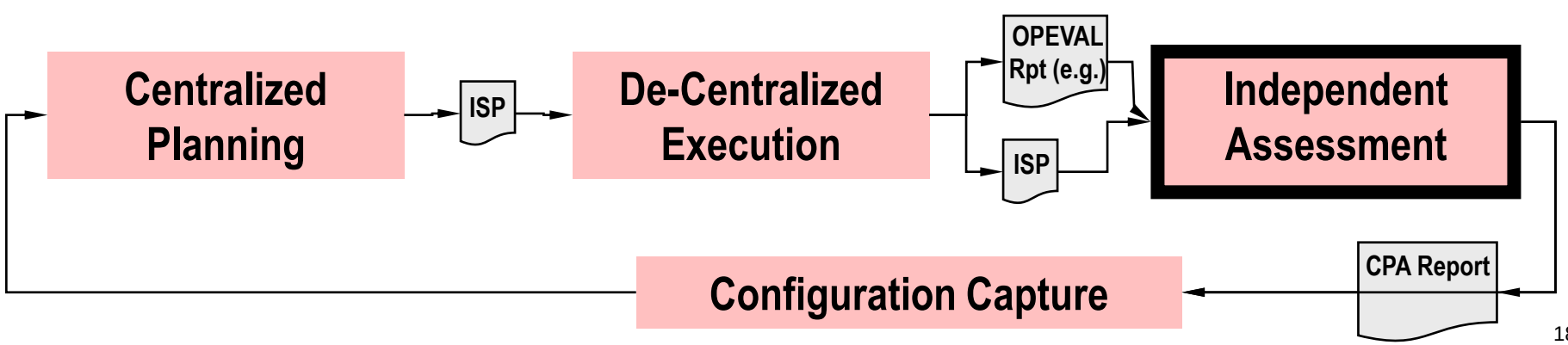
De-Centralized Execution (continued)

- Revised ISPs and system-level DT/OT test reports provide the means for oversight of De-Centralized Execution.



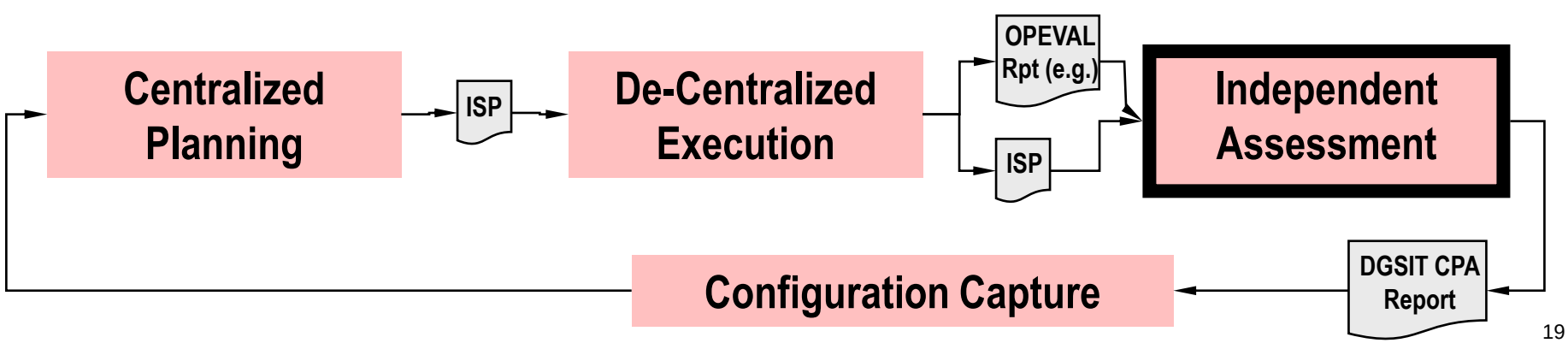
Independent Assessments

- There is a need for formal evaluation of the performance of mission-level systems-of-systems.
  - OPEVAL concentrates on single systems only.
  - Evaluation needs to be done in an operationally-relevant context.
- Capability Package Assessments (CPAs) will become the means for independent testing of SOSs.
  - Based on a process prototyped by MCSC/MCTSSA since FY02.
  - Aligns with NNWC desire for more relevant SOS assessments.
- Evaluation criteria are defined by the mission-level integrated architecture.



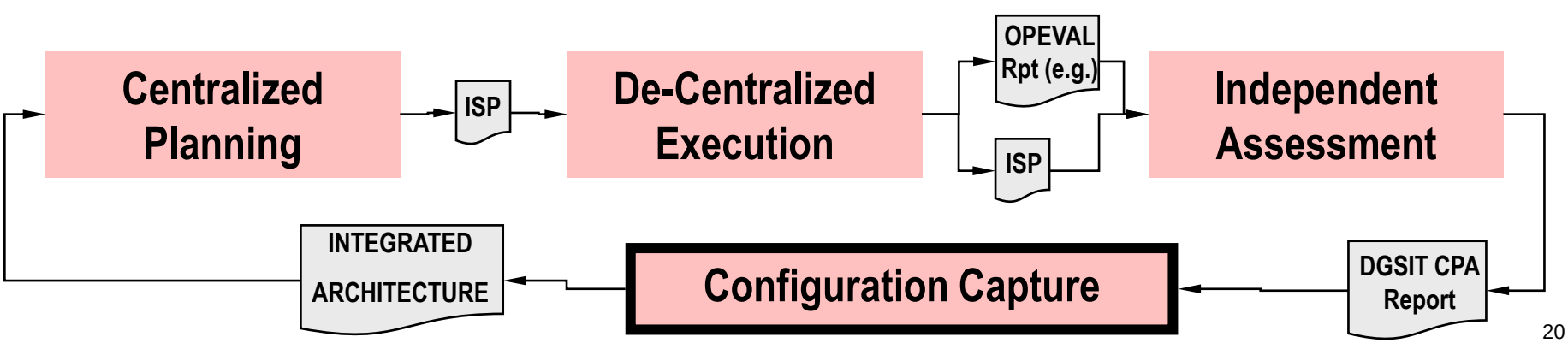
Independent Assessments (continued)

- Test scripts are developed for CPAs from the following MCP-level architectural views:
  - OV-5 Activity Model,
  - OV-6C Operational Event Trace Description,
  - SV-1/2 Systems Interface and Communications Description,
  - SV-5 Operational Activity to Systems Function Matrix,
  - SV-10C Systems Event Trace Description
- Initial test thread is Close Air Support.
- We are coordinating with NNWC for access to conduct CPAs during battle group pre-deployment work-ups.



Configuration Capture

- The configuration observed aboard the battlegroup during the CPAs will be incorporated into the architecture repository as the "As-Is" configuration for the afloat portion of the DON Enterprise Architecture.
  - CPA configurations and results inform the mission-level integrated architectures of real-world conditions.



ASN(RDA) View of I&I - Sea Strike: STOM Example

Navy Component Commander (COCOM)

USMC Component Commander (COCOM)

JTFHQ

JFACC

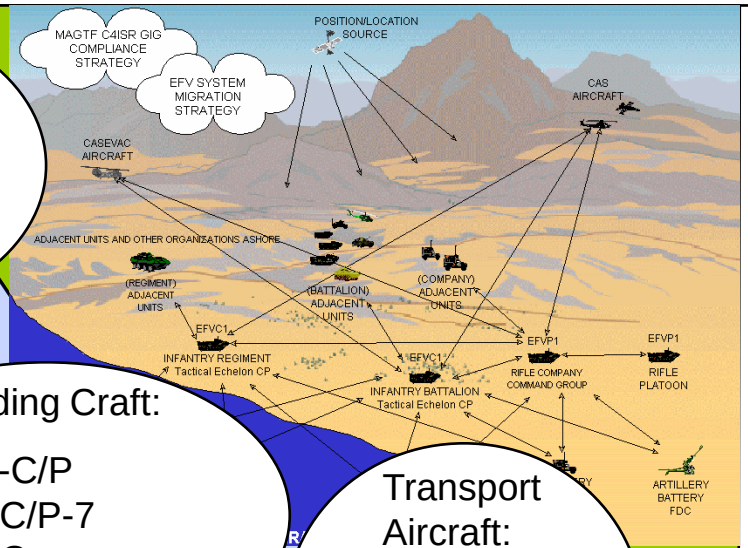
JFLCC

JFMCC

OTC

CAS Aircraft:

JSF
AV-8
F-18C/D/E/F
AH-1



NFSG:

DDG-51
FFG-7
LCS
SSGN

Landing Craft:

EFV-C/P
AAVC/P-7
LCAC
LCU

Transport Aircraft:

OV-22
CH-53
CH-46
UH-1

CVTG:

CVN(s)
CG-47
DDG-51
SSN

ATG Escorts:

DDG-51
FFG-7
SSN

ATG:

LHA-1/6
LHD-1/4/8
LPD-17/18
LSD-42/49

Not Shown:
MNW, LSG,
Sea shield
functions.

GIG and FORCEnet Systems/Services:
Comms & Networking Infostructure
C2/DS Systems
ISR/BA Systems

TDN/WIN-T Systems
MAGTF C2 Systems

I&I Management Structure