

7th Annual DoD Enterprise Architecture Conference

System Level Architectures & the Mission-Level Systems Engineering Process



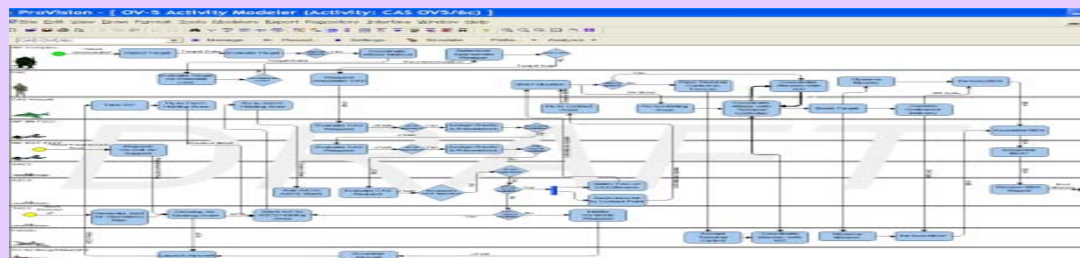
**Mr. Ricardo Cabrera
DASN (RDT&E)
Miami, Florida
2 May 2012**



Pre-Milestone A Activities

DASN (RDT&E) Chief Systems Engineer

INTEGRATED ARCHITECTURE METHOD (DoDAF)



TDS

CDD

CBA

ICD

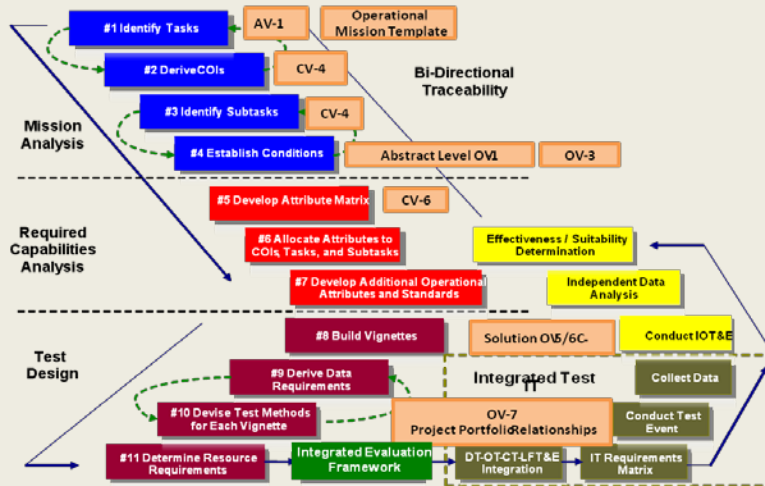
AoA

- Early Developmental Planning = Pre-Milestone A Activities
 - Define the user's needs in the Projected Operational Environment (POE)
 - Refine the user's Required Operational Capability (ROC) from mission perspective
 - Capture the information in appropriate architectural models and get concurrence
 - Derive the ICD requirements from mission-level architectural models
 - Define the attributes of the system-agnostic solution that supports interoperability
 - Use the information to influence the AoA



Mission Level Architectural Models Supports Mission Based Testing

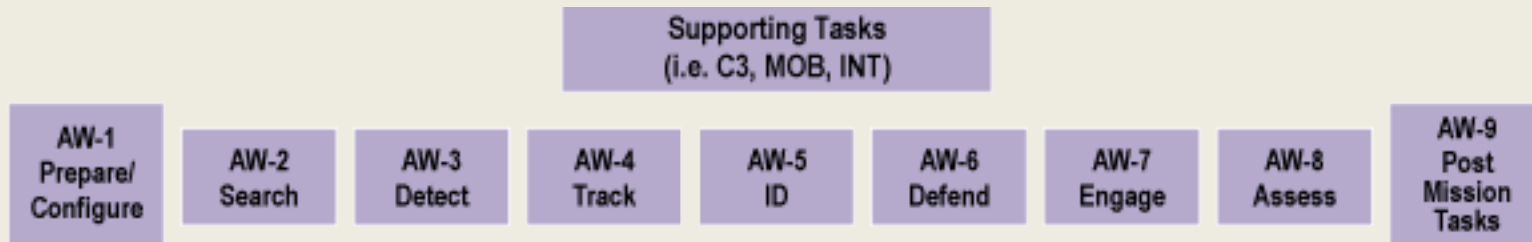
DASN (RDT&E) Chief Systems Engineer



Mission Based Testing

- COTF is incorporating DoDAF architectural models at varying times over the acquisition timeline

AIR WARFARE MISSION AREA

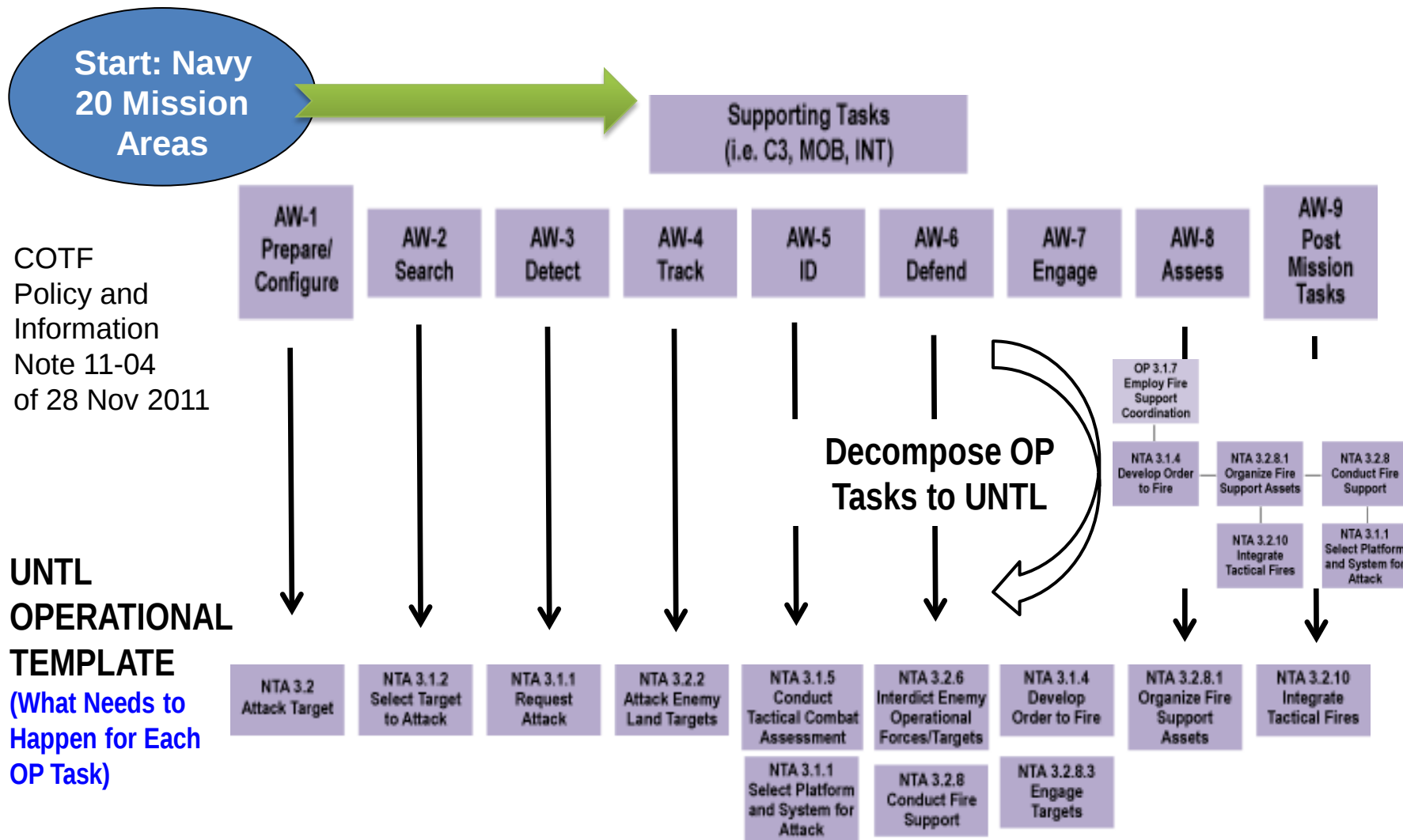


- COTF Mission Area Threads are linked to ROCs
System Engineers are aligning their architecture designs to COTF's Mission Area Threads. Thus, the design solutions will support the missions and the ROCs.



Mission Thread Development

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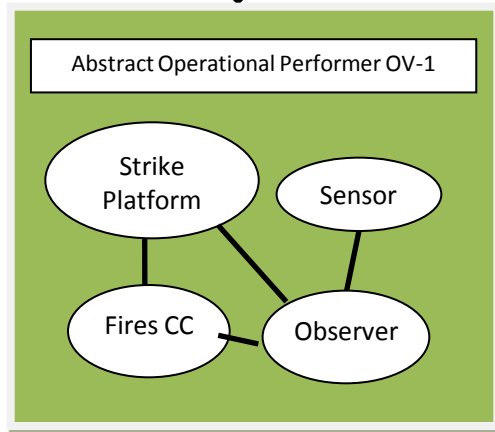


Mission Thread Development

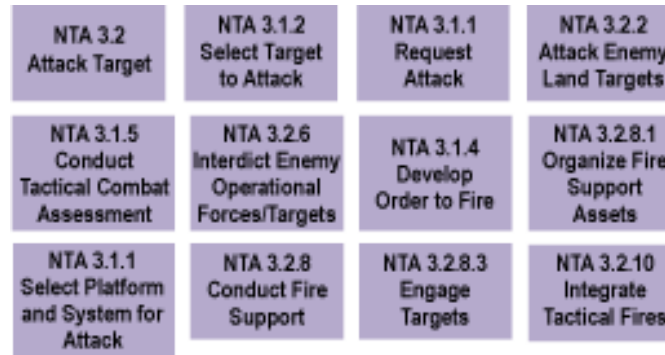
(How: Complete Agnostic Capabilities Requirements Breakdown by Task)

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Identify Operational Nodes needed to perform UNTL Tasks



OV-1



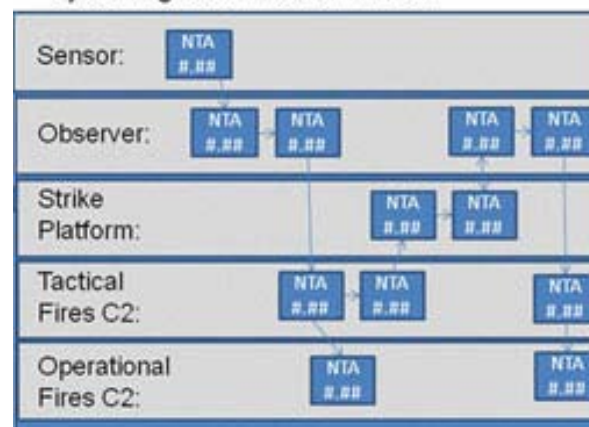
UNTL OPERATIONAL TEMPLATE

COTF (MBTD)

CONOPS

Decompose UNTL Tasks to User Activities

System Agnostic Mission Thread



System Agnostic OV-5b/6c

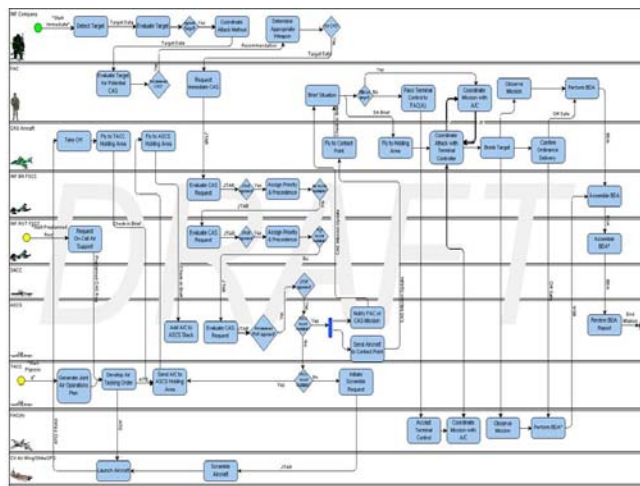
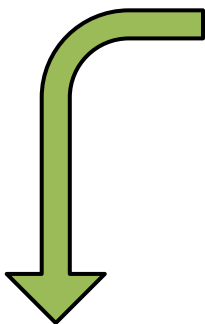
AoA



Mission Thread Development Supports NR-KPP

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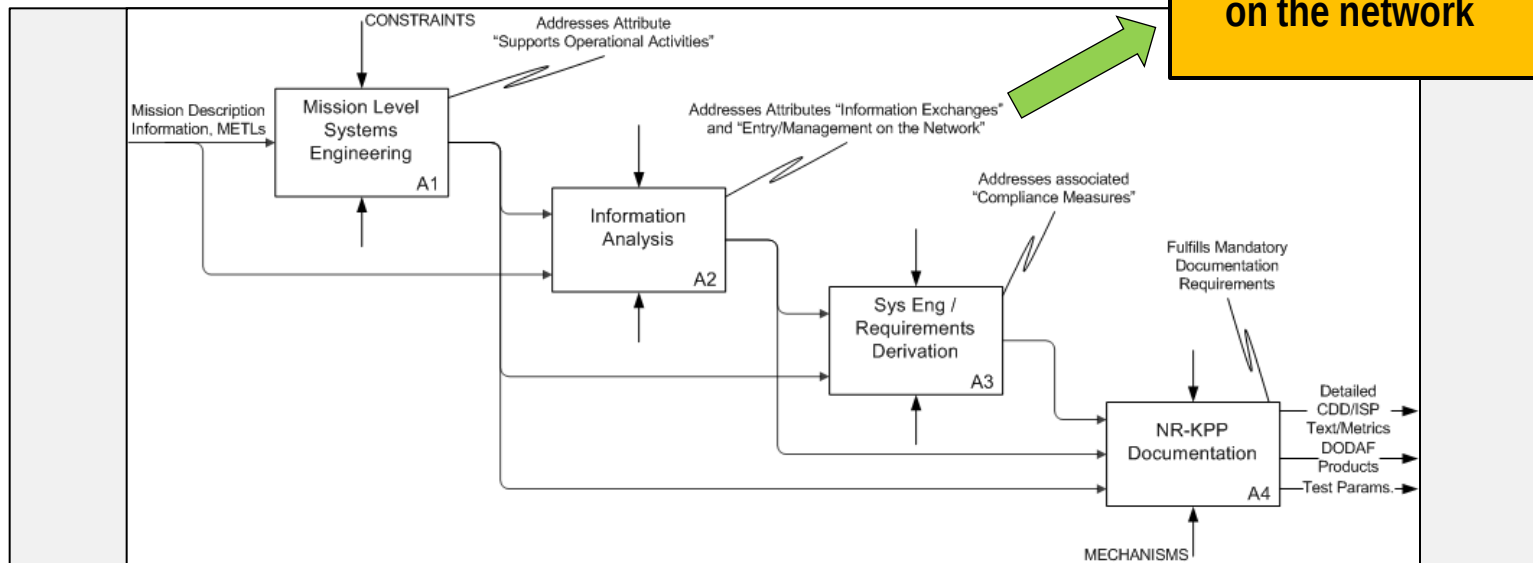
AoA Complete →



Fit for Purpose
OV-5b/6c

INFORMATION ANALYSIS

- Define attributes of information exchange
- Define entry management on the network



NR-KPP FOUR STEP PROCESS



DASN (RDT&E) CHSENG Challenge Areas

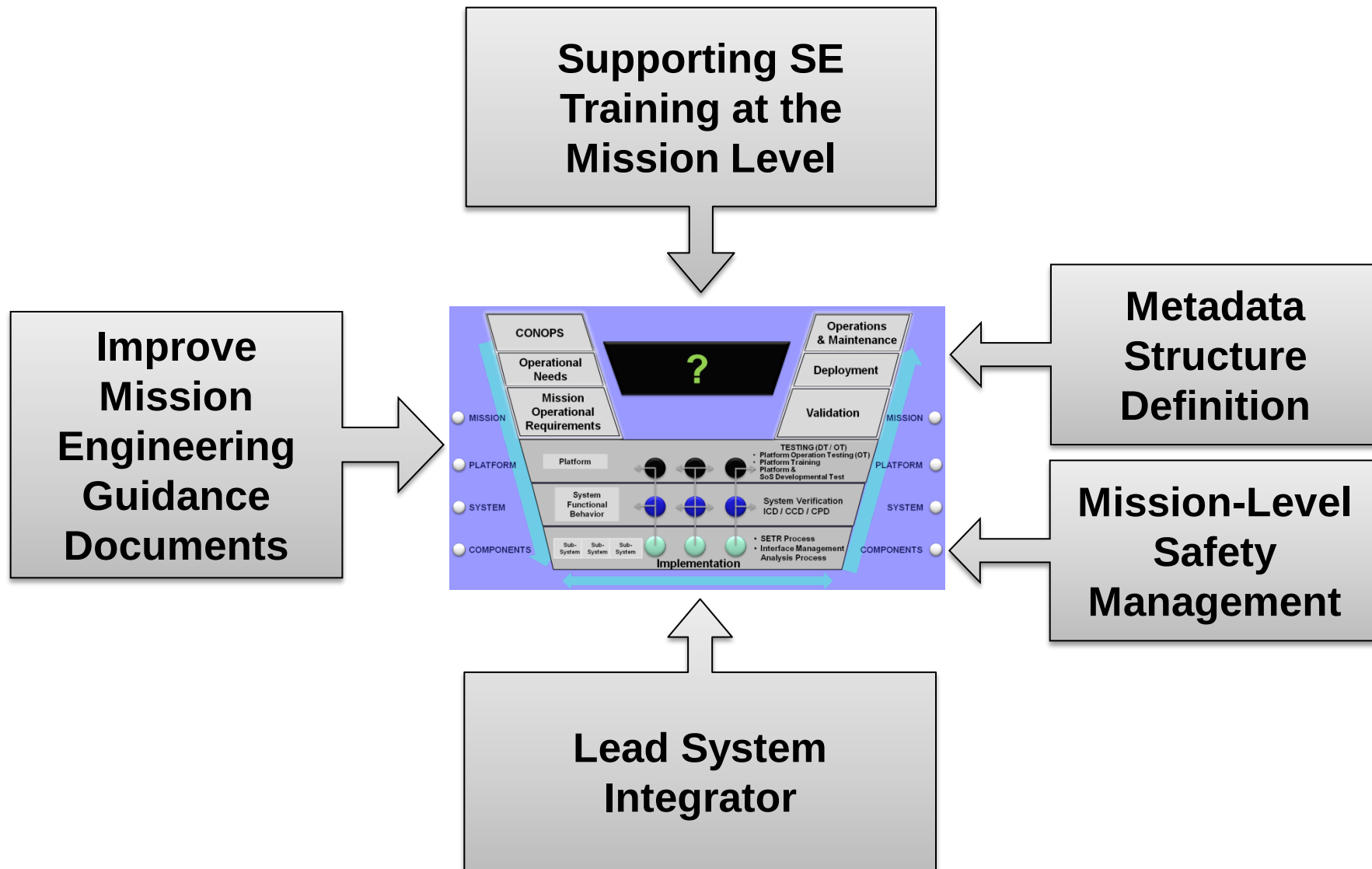
Five Areas Influencing Mission-Level Architectures



DASN (RDT&E) CHSENG Challenge Areas

Five Areas Influencing Mission-Level Architectures

DASN (RDT&E) Chief Systems Engineer





Five Areas Influencing Mission-Level Architectures: Supporting SE Training at the Mission Level

DASN (RDT&E) Chief Systems Engineer

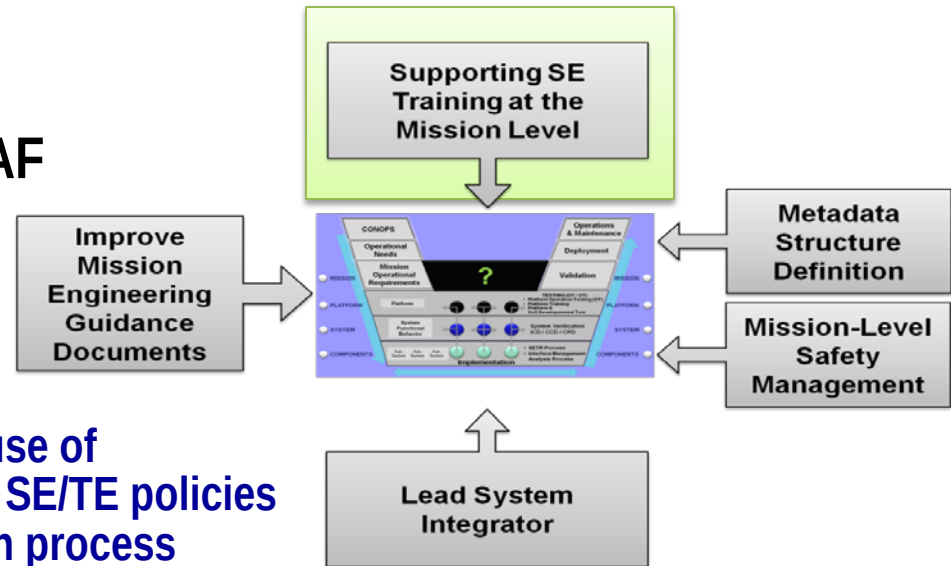
- One of DASN (RDT&E) CHSENG's observations is the need for SE training in developing DoDAF architectures and thinking at the mission level

- Challenge:

- Institutionalize the development and use of DoDAF architectures in all SYSCOM's SE/TE policies and processes, early in the acquisition process
- Support training in the use of DoDAF tools

- Actions taken in FY 11:

- Adding DoDAF to the Defense Acquisition Guidebook and the Naval Systems Engineering Guidebook
- DAU's MSSE program is training students on the use of DoDAF. More wide-spread training is needed
- Applying mission-level assessment techniques in fleet experiments/exercises (e.g. Trident Warrior, Valiant Shield)





Five Areas Influencing Mission-Level Architectures: Metadata Structure Definition

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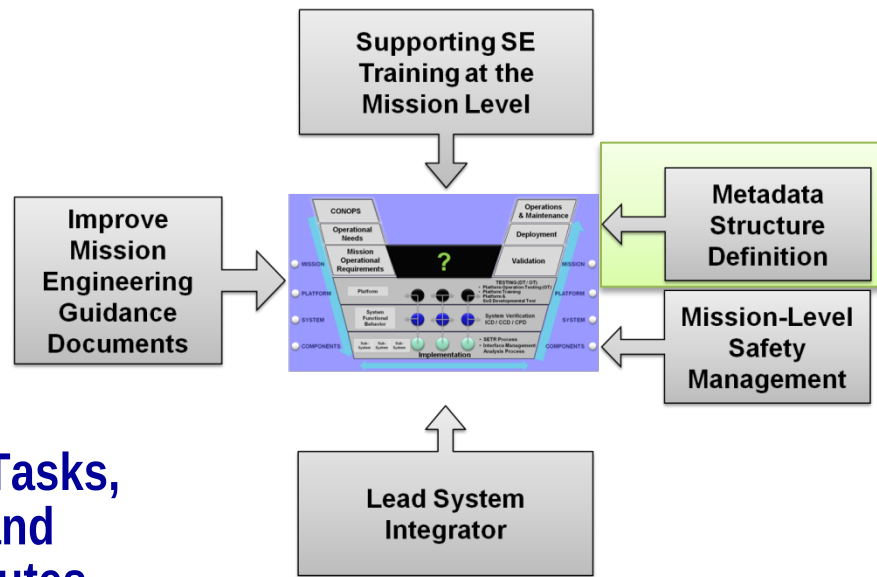
- Defining the metadata structure of tasks in a mission thread so that the tasks can be “discoverable” and re-used in multiple architectures.

- Challenge:

- Given the Naval Mission Essential Tasks, identify the attributes of the tasks and define the metadata for those attributes.

- Actions Taken in FY 11:

- More Communities of Interest across the SYSCOMs and PEOs are identifying the metadata for the mission areas in support of DoD Directive 8320.2.





Five Areas Influencing Mission-Level Architectures: Mission-Level Safety Management

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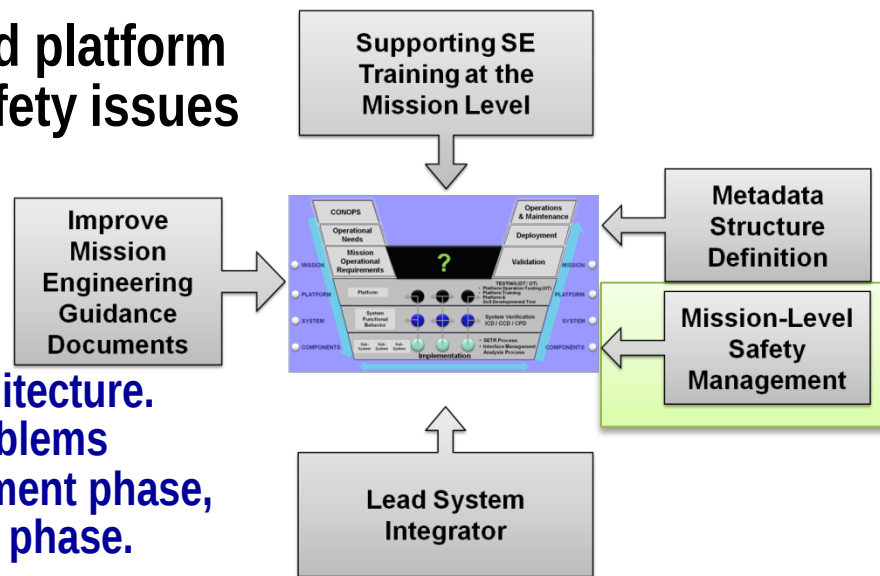
- Current processes at the system and platform levels have unknowingly created safety issues at the mission level.

- Challenge:

- A process is needed to assess force level safety risks in a mission-level architecture. The goal would be to identify safety problems during the System Design and Development phase, not the Operational Test, or deployment phase.

- Action Taken in FY 11:

- DASN (RDT&E) CHSENG developed safety evaluation criteria for inclusion in System Engineering Technical Reviews.

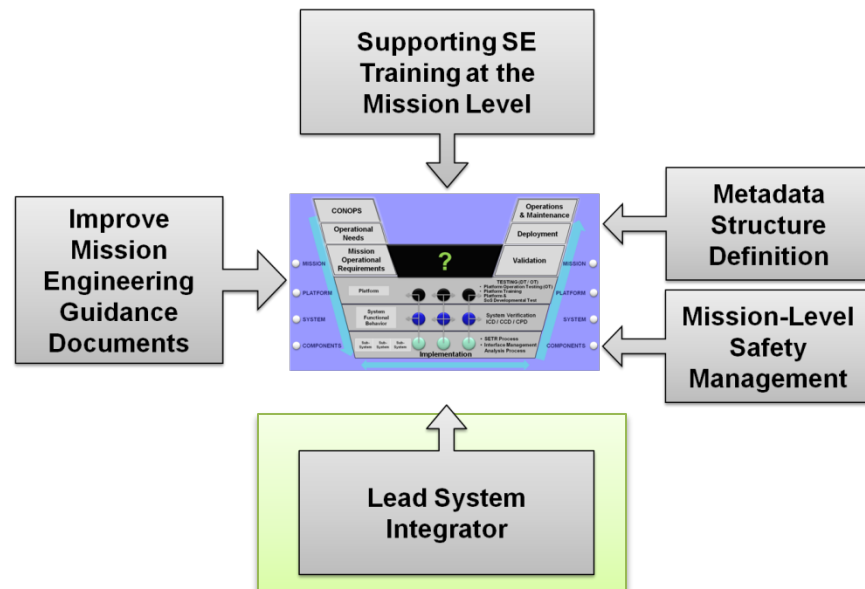




Five Areas Influencing Mission-Level Architectures: Lead System Integrator

DASN (RDT&E) Chief Systems Engineer

- Enable government engineers to take on the role of a Lead System Integrator. DASN (RDT&E) CHSENG has a policy under development.
- Challenge:
 - Support LSI policy development
 - Identify a process to grow LSIs and to evaluate success
- Action in FY 11
 - The System Engineering Stakeholders Group (cross-SYSCOM team) has accepted the challenge of defining career path for Lead System Integrators

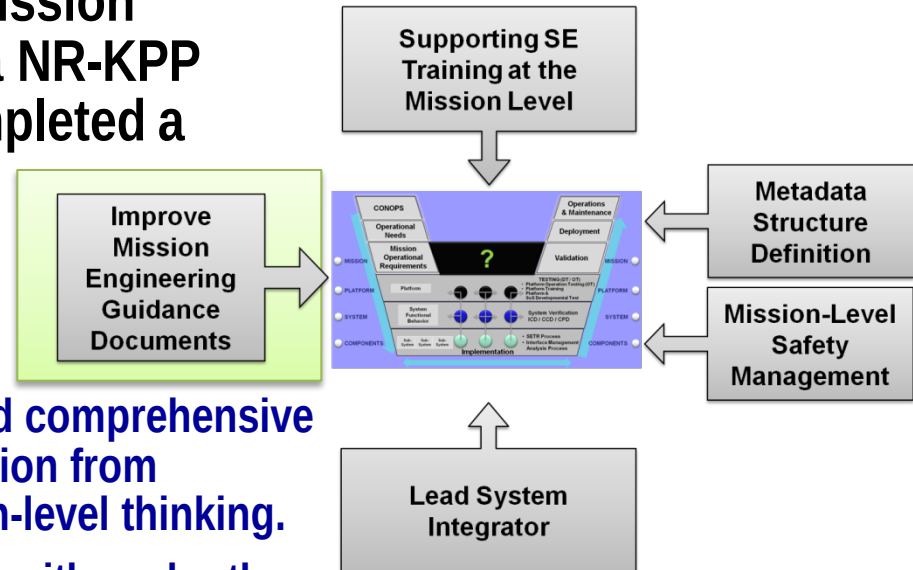




Five Areas Influencing Mission-Level Architectures: Improve Mission Engineering Guidance Documents

DASN (RDT&E) Chief Systems Engineer

- DASN (RDT&E) CHSENG drafted a Mission Thread Development Guide, issued a NR-KPP Implementation Guidebook, and completed a Mission Level Systems Engineering Guidebook.
- Challenge:
 - We need to ensure that they are clear and comprehensive enough for SEs to understand the transition from platform/system level thinking to mission-level thinking.
 - Need to ensure the guides are congruent with each other.



- Action in FY 11:
 - The NR-KPP Implementation Guide was issued in Sept 2011. The Mission Thread Development Guide and the Mission Level SE Guidebook were folded into the CNO's Integration and Interoperability (I&I) Working Group tasks. Tasks include the development of a common framework for mission engineering.



Summary

DASN (RDT&E) Chief Systems Engineer

- **The value of architectures:**
 - **Mission area architectures provide for effective pre-MS A analysis**
 - Platform/systems requirements and mission-level requirements
 - **DoDAF Meta Model (DM2) will allow re-use of architectures without manually re-entering data. If we could re-use architectures, we could roll information up from the system level to the mission level. Instead, we will have to push a mission level architecture down to the system level.**
- **Mission area architectures**
 - **Developing system-agnostic mission threads**
 - Enables effective AoA analysis across the DOTMLPF spectrum
 - Prevents community bias from influencing solution.
 - In a DON enterprise process, information can be entered once and used many times over by other stakeholders
- **DON enterprise elements getting in place**
 - **Coordinating with the CNO I&I Working Group development of an Integrated Capability Framework, and Capability Acquisition Management guidance.**



QUESTIONS ?

Know your enemy and know yourself and you can fight a hundred battles without disaster.

Sun Tzu *The Art of War*