

**Role of M&S
in Support of the
New DOD Requirements
and
Acquisition Processes**

Presentation to the
M&S Committee
Of the NDIA Systems Engineering Division

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Capabilities Analysis
OUSD AT&L/DS SI**

Purpose

- Outline changes in DOD requirements and acquisition
- Discuss strawman approach for use of M&S
- Solicit support from committee in identify best use of M&S in executing these new processes

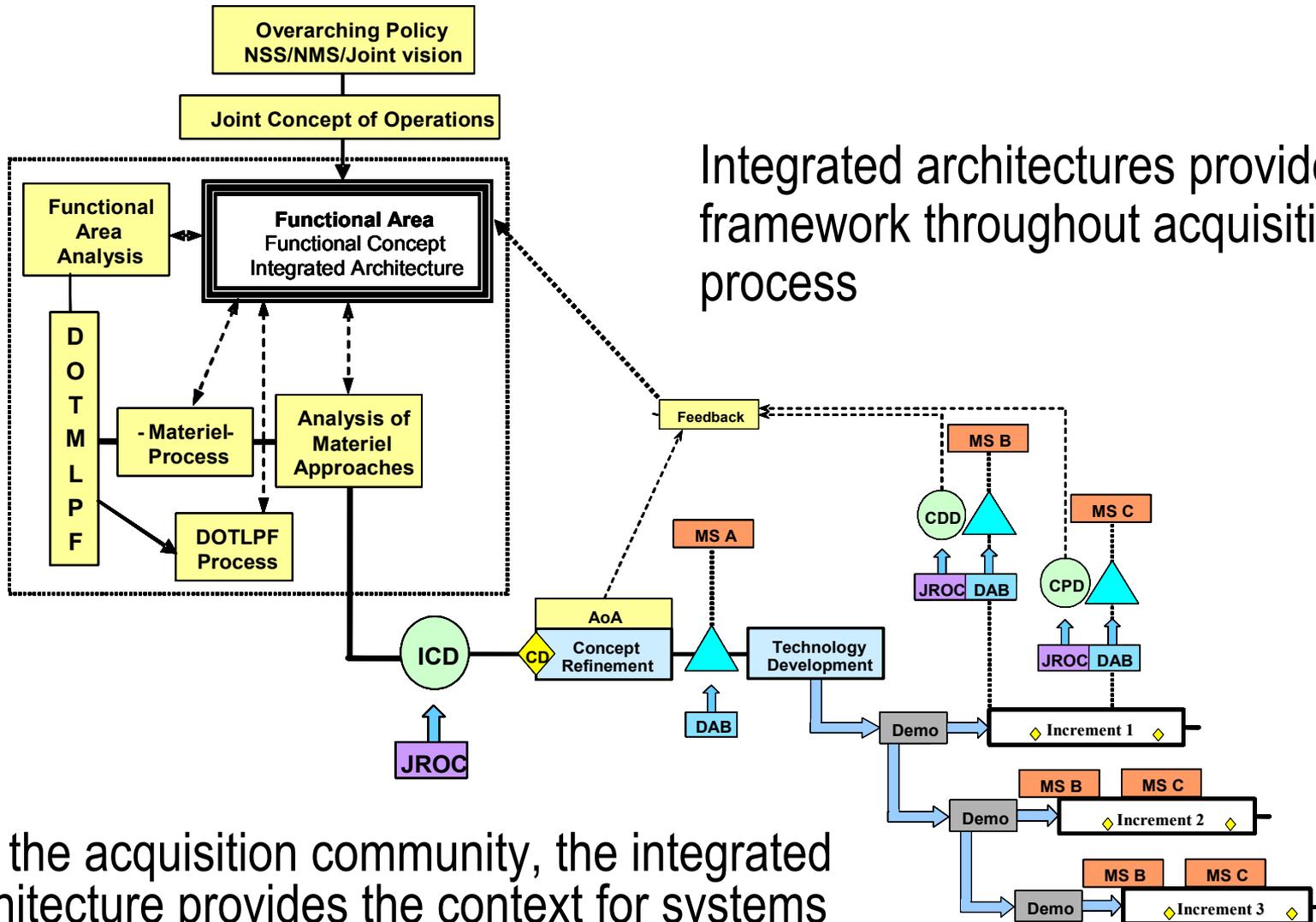
Topics

- New requirements and acquisition processes
 - New 3170 and 5000 regulations
- Implementation
 - New organizational structure and relationships
 - Current methodology for capabilities analysis
 - Plans for FY04
- Options for use of M&S

New Regulations

DoD 5000

May 2003



For the acquisition community, the integrated architecture provides the context for systems acquisition and systems engineering process

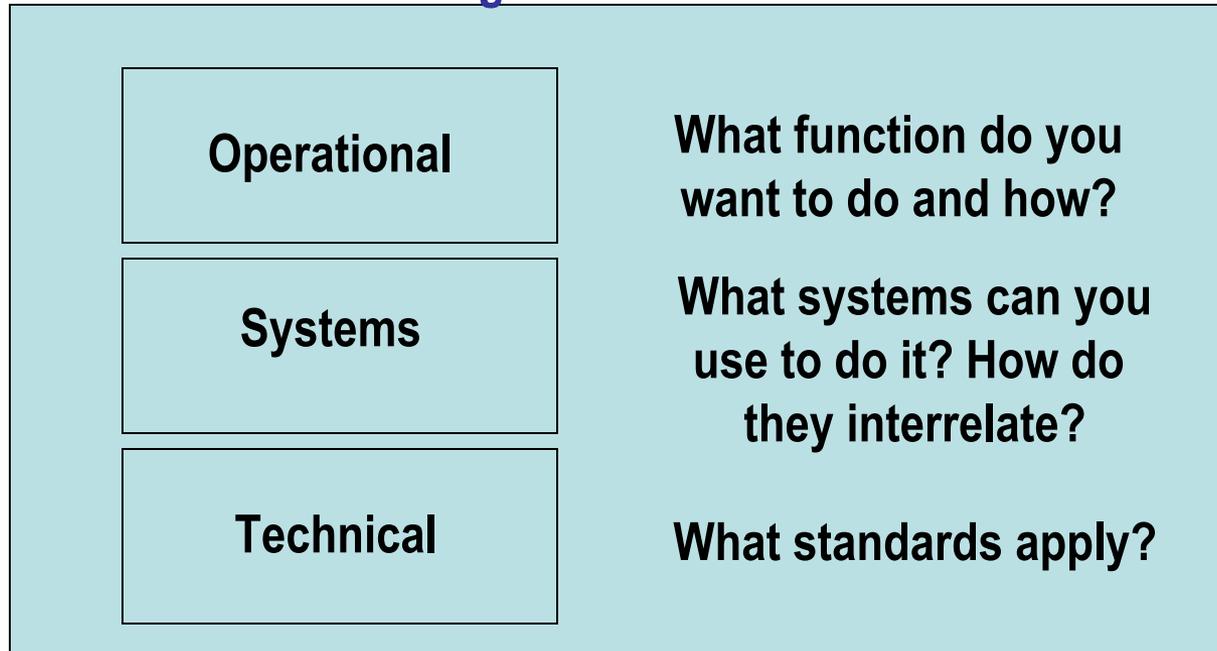
Integrated Architecture

An architecture is

“the structure of components, their interrelationships, and the principles and guidelines governing their design and evolution over time.”

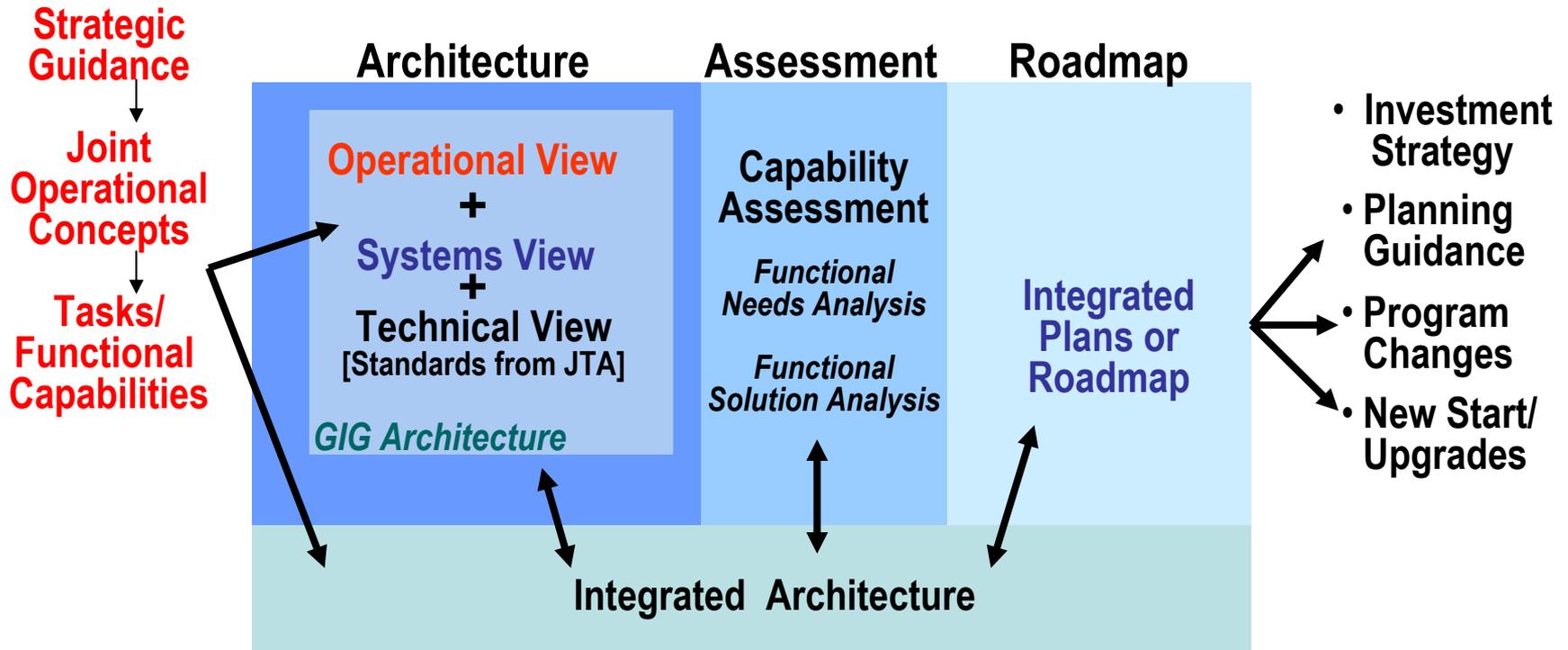
**Source: DoD Integrated Architecture Panel, 1995
Based on IEEE STD 610.12**

Integrated Architecture



Staged Joint Integrated Architecture Process

DoD 5000 (May 12, 2003)



Tasks Conducted Collaboratively
5000 Designated Lead/Oversight

Joint Staff
AT&L
DoD CIO
Collaboration

DoD 5000 lays out a set of collaborative activities to develop integrated architectures and capability roadmaps

Responsibilities Spelled Out in DODI 5000

3.2.1.2. Each **integrated architecture** shall have three views: operational, systems, and technical, as defined in the current Architectural Framework guidance and have direct relationships to DoD Component-developed functional area integrated architectures.

The **Joint Staff** (or Principal Staff Assistant (PSA) for business areas) shall lead development of the operational view, in collaboration with the Services, Agencies, and Combatant Commanders, to describe the joint capabilities that the user seeks and how to employ them.

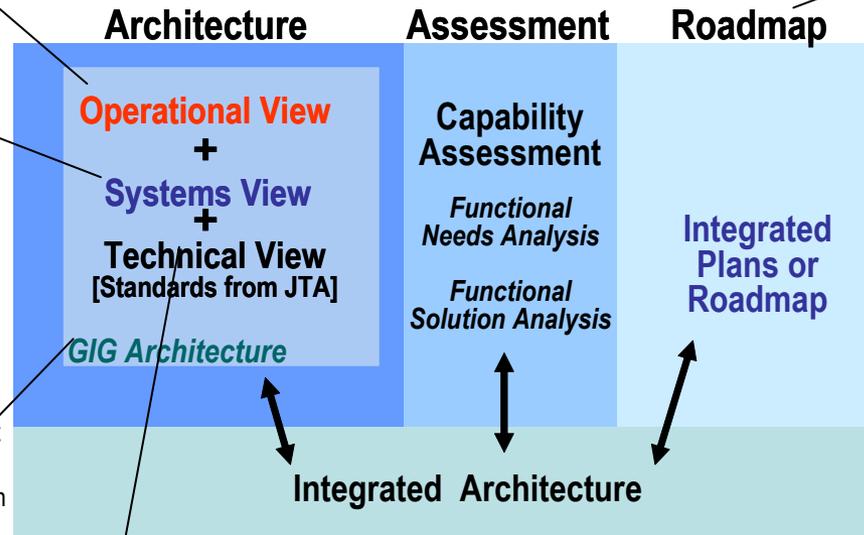
The **USD(AT&L)** (or PSA for business areas) shall lead development of the systems view, in collaboration with the Services, Agencies, and Combatant Commanders, to characterize available technology and systems functionality. The systems view shall identify the kinds of systems and integration needed to achieve the desired operational capability.

The **DoD Chief Information Officer (CIO)** shall lead the development and facilitate the implementation of the Global Information Grid Integrated Architecture, which shall underpin all mission area and capability architectures.

The Military Departments and Defense Agencies shall participate in the identification of the appropriate technical view consisting of standards that define and clarify the individual systems technology and integration requirements. The standards used to form the Technical Views of integrated architectures shall be selected from those contained in the current approved version of the **Joint Technical Architecture...**

3.2.1.1. The Under Secretary of Defense (Acquisition, Technology, and Logistics) (**USD(AT&L)**), the Assistant Secretary of Defense for Command, Control, Communications, and Intelligence (**ASD(C3I)**), the **Joint Staff**, the **Military Departments**, the **Defense Agencies**, **Combatant Commanders**, and other appropriate DoD Components shall **work collaboratively to develop joint integrated architectures for capability areas as agreed to by the Joint Staff....**

3.2.2. Integrated Capability Assessments, Capability Roadmaps, and Investment Strategies. Using the integrated architectures, the **USD(AT&L)** shall lead the development of **integrated plans or roadmaps.**

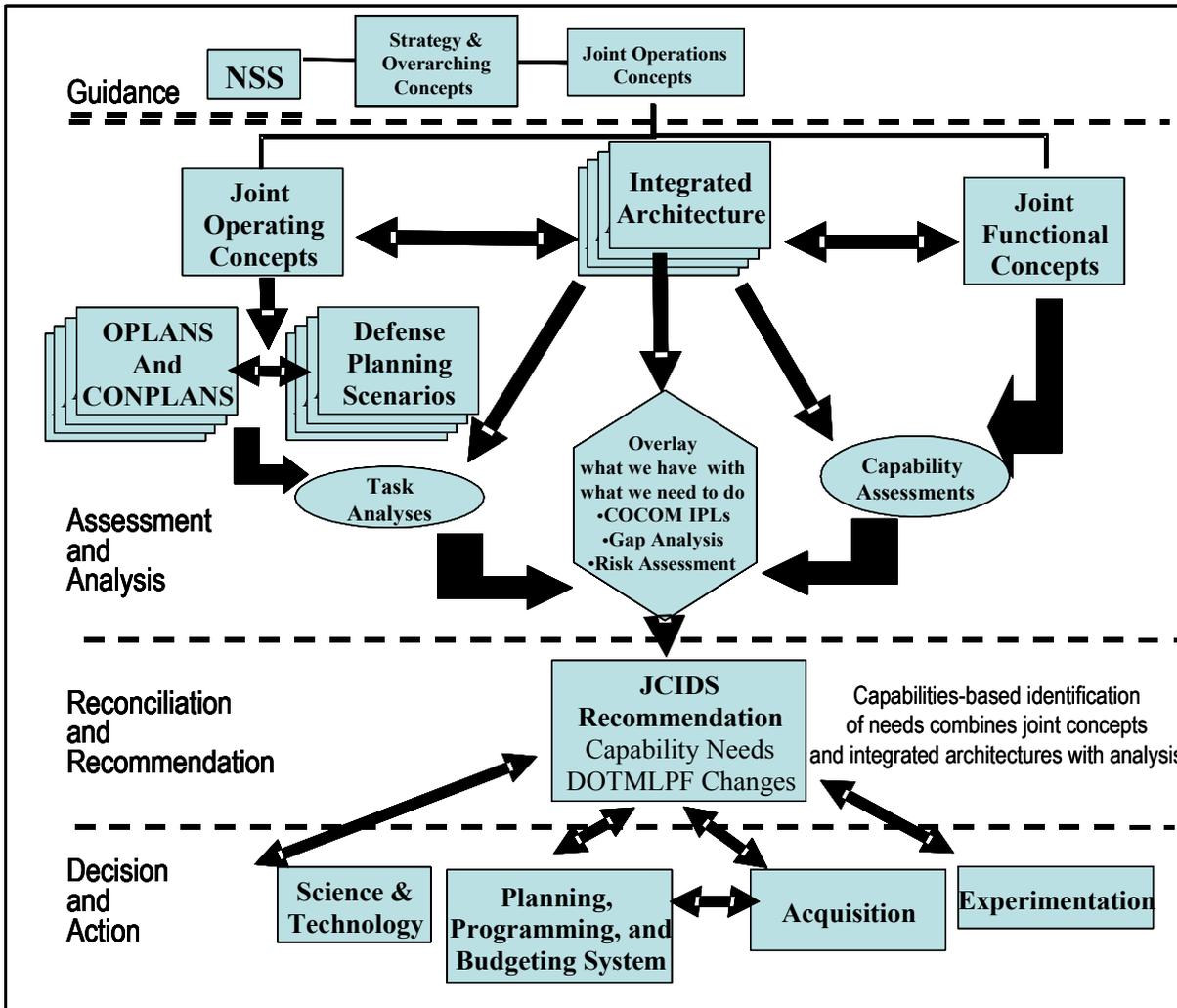


- Investment Strategy
- Planning Guidance
- Program Changes
- New Start/Upgrades

The Department of Defense shall use these roadmaps to **conduct capability assessments, guide systems development, and define the associated investment plans** as the basis for aligning resources and as an input to the Defense Planning Guidance, Program Objective Memorandum development, and Program and Budget Reviews.

CJCSI 3170

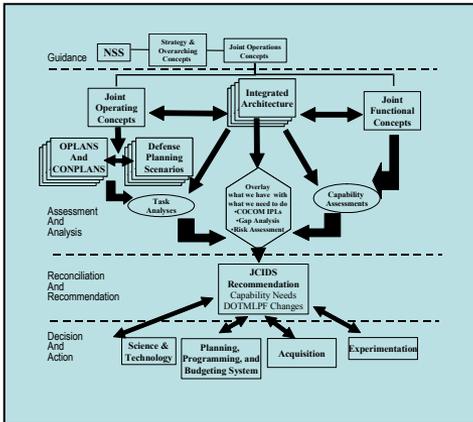
June 2003



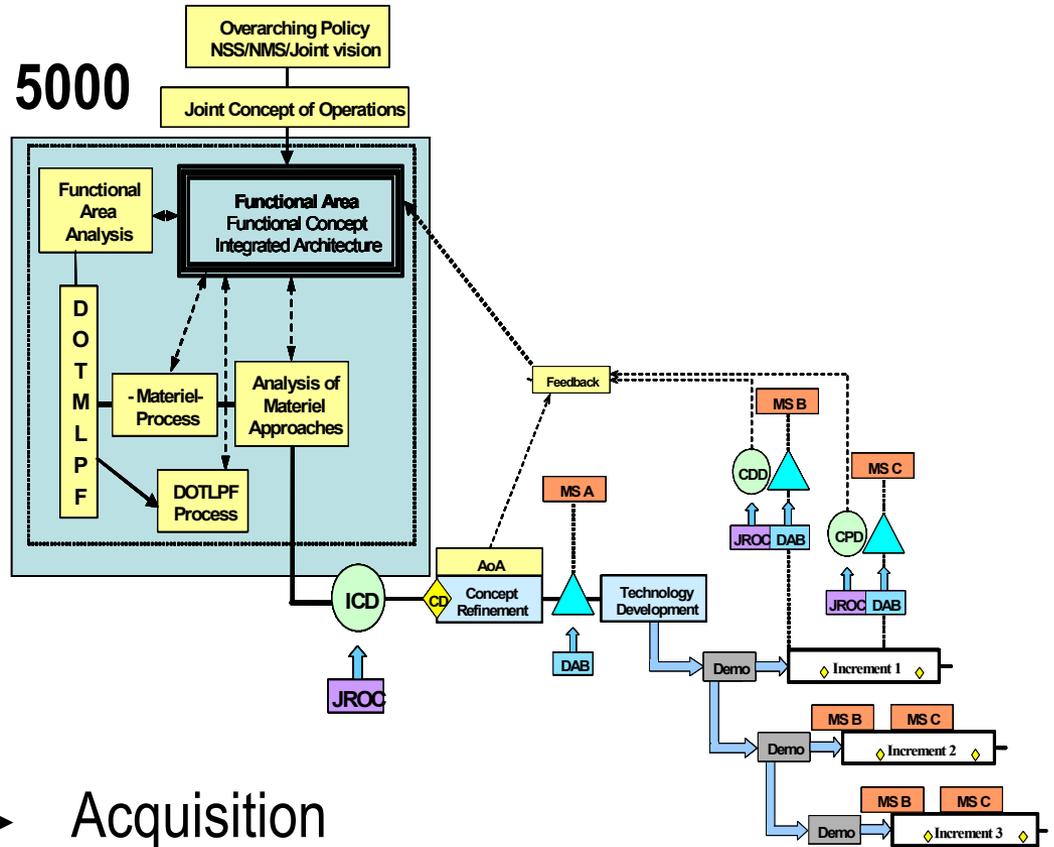
For the requirements process, integrated architecture provides the framework to evaluate options to address changing operational user needs

Two Views of the Same Process

3170



5000



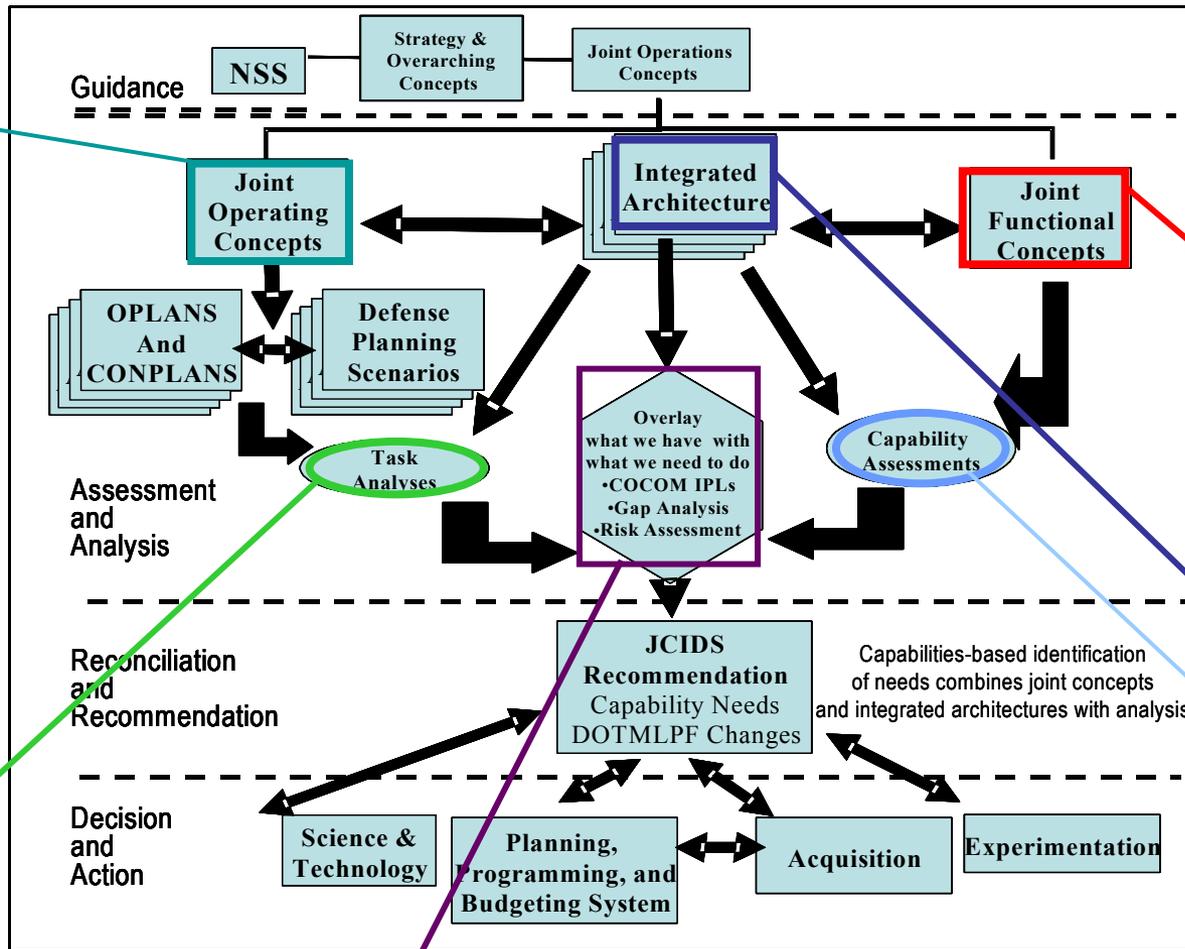
Requirements

Acquisition



CJCSI 3170

“Concept” Driven Process With Architectures as Integration Tool



CJCSI 3170, page A-3

Joint Operating Concepts

- Major Combat Operations (JFCOM)
- Homeland Security (NORTHCOM)
- Stability Operations (JFCOM)
- Strategic Deterrence (STRATCOM)

Task Analyses
Military tasks derived from JOCs, Plans, DPG Scenarios

Joint Functional Concepts (JFCs)

- Battlespace Awareness
- C2
- Protection
- Force Application
- Focused Logistics

Integrated Architectures

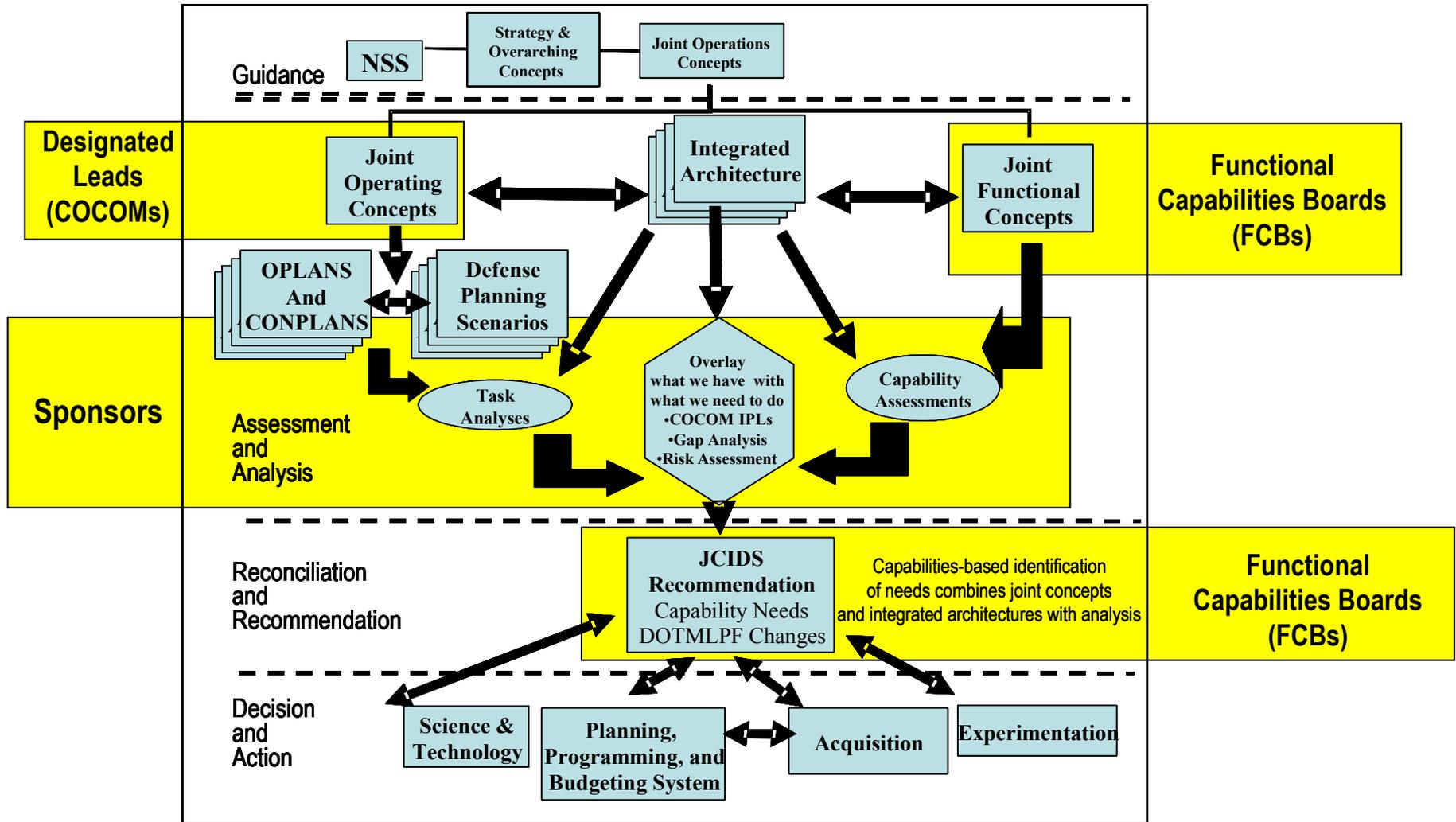
Capability Assessments are done for each of the JFC areas

JCIDS analysis addresses:

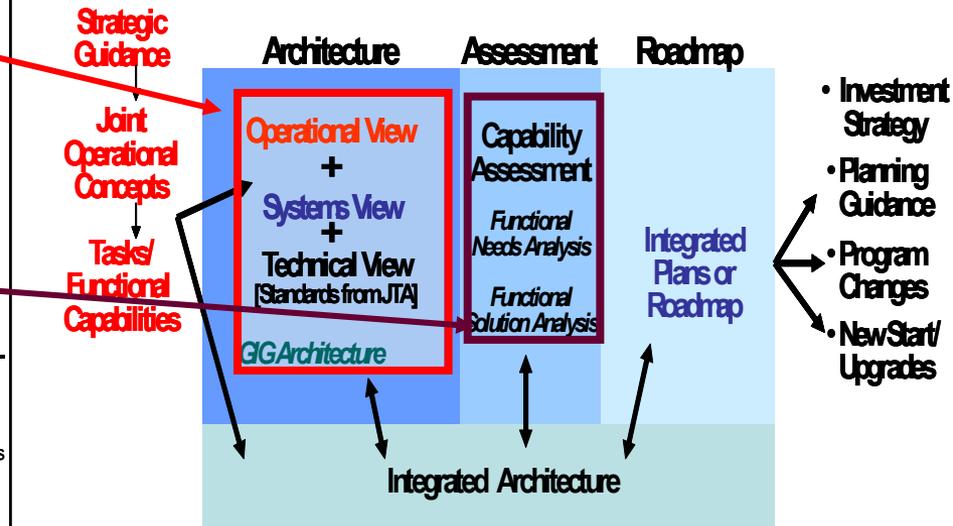
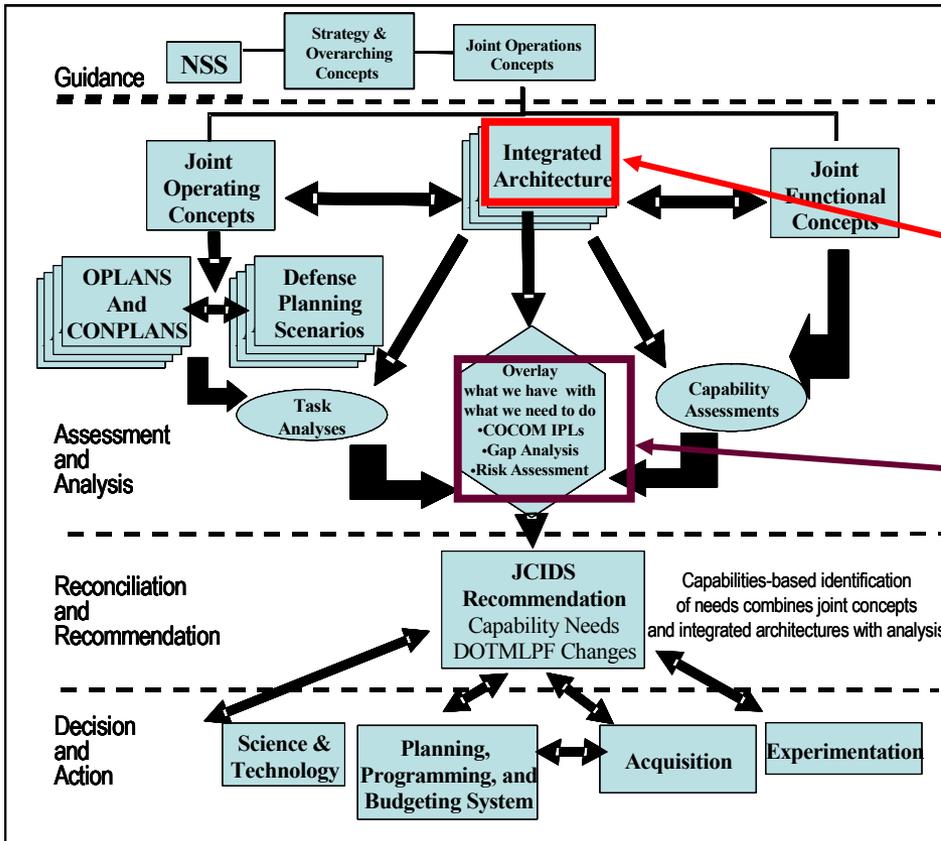
Ability of current capabilities (JFCs) to meet joint user needs as reflected in integrated architectures to support user needs via task analyses or capability assessments

CJCSI 3170 Responsibilities

June 2003

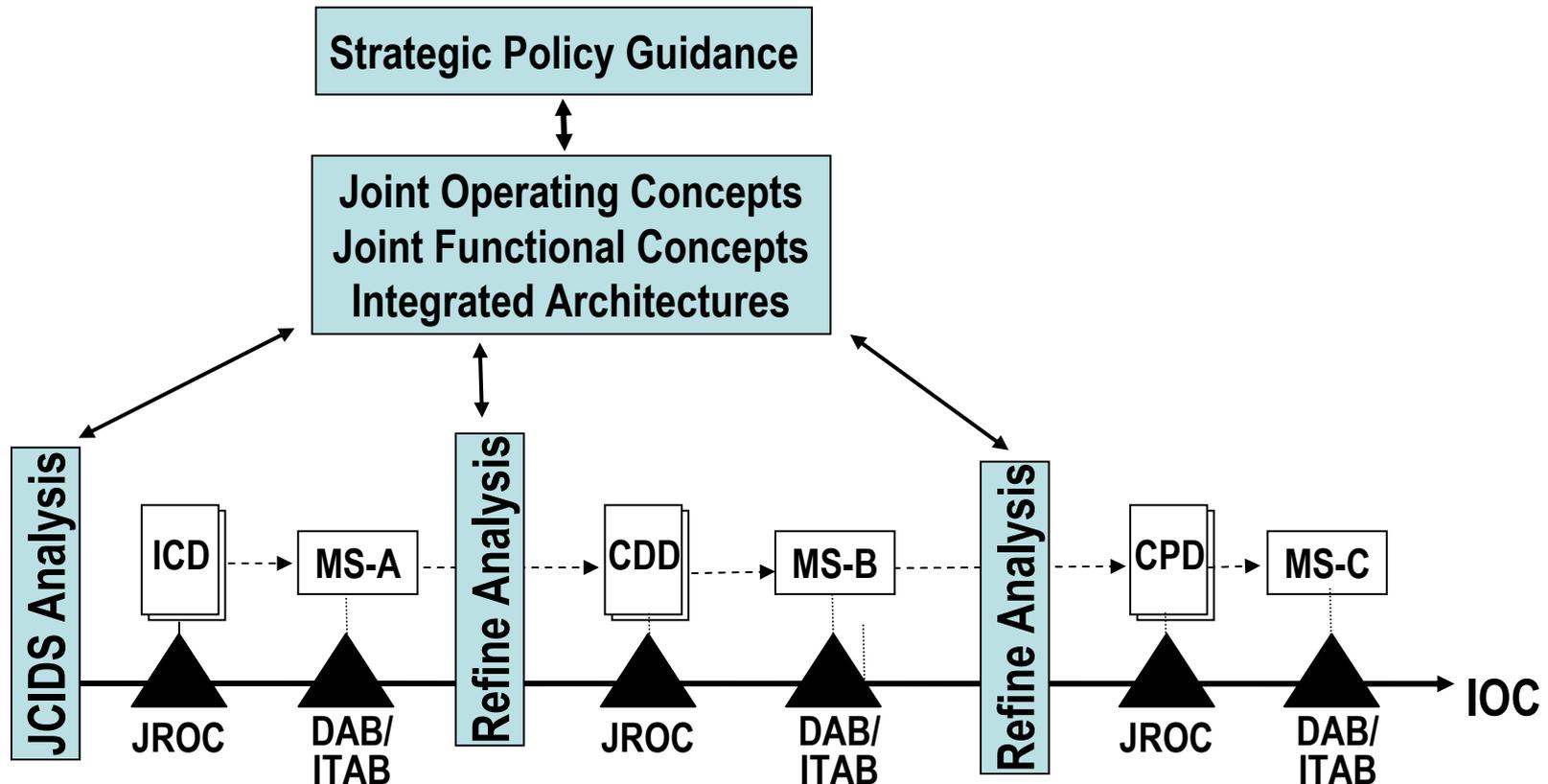


Side by Side



- Investment Strategy
- Planning Guidance
- Program Changes
- NewStart/Upgrades

3170 and 5000 Relationship Continues Throughout Acquisition Process



Implementation

Functional Capability Boards and Their Portfolios

War Fighting Capability and Architecture Integration Division (WCAID)

Integrates war fighting capabilities & architectures across capability areas

Battlefield Awareness (BA)

- All source intelligence
- Environmental data
- Own Force Info
- Predictive Analysis
- Knowledge management

Command & Control (C2)

- JBMC2
- Communications & Computer Environment

Force Application (FA)

- Land, Maritime, Air, Space operation
- Joint Targeting
- Conventional, nuclear, computer network, electronic attack
- Psychological & special Ops
- SEAD
- Military Deception

Protection

- Personnel & Infrastructure Protection (OPSEC, missile defense, electronic protection)
- Computer Network Defense
- Counter & Non-proliferation
- Consequence management

Focused Logistics (FL)

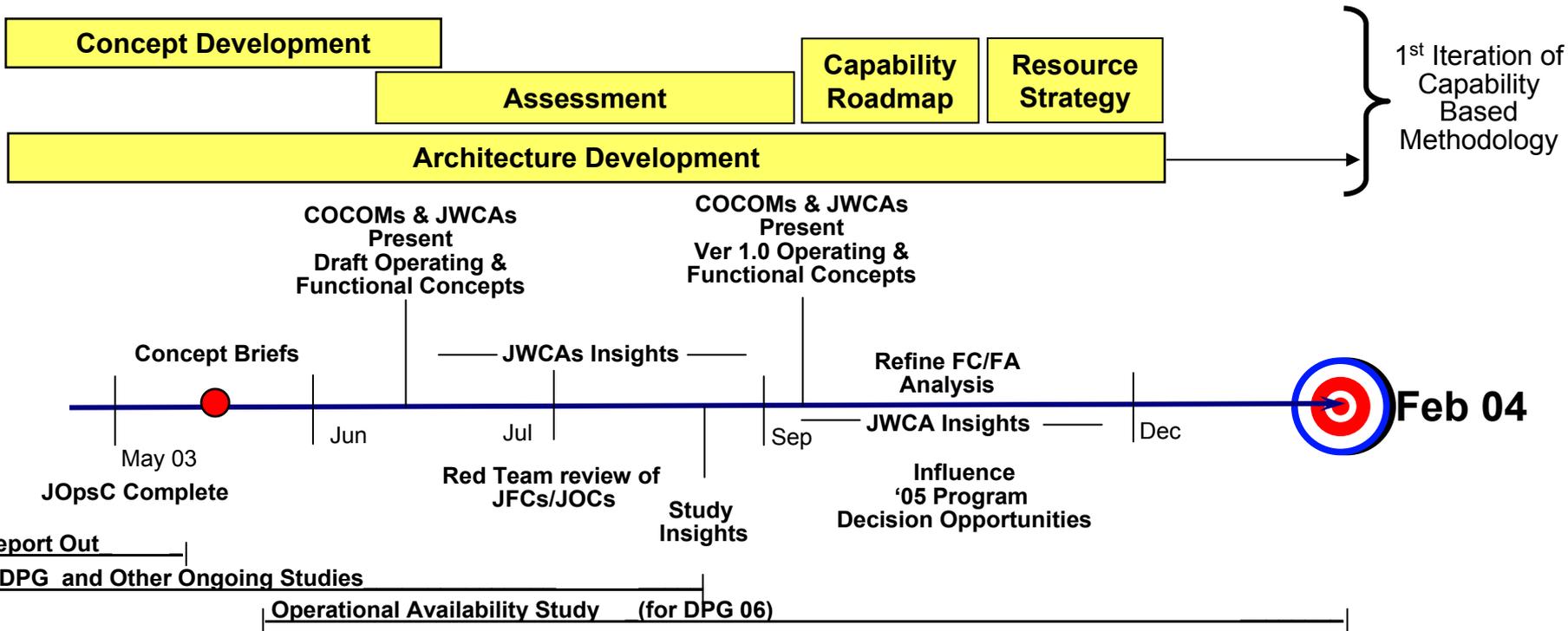
- Deployment Distribution
- Sustain
- Medical
- Mobility
- Logistics C2

AT&L partnerships with JS in FCB reviews and architecture and analysis

Getting Started....

- **Integrated architectures** are key to both requirements and acquisition
- Step one is to **create** the architectures to support the process
 - There has been a lot of ‘architecture work’ in the past; the focus here is to creating ‘shared’ view of how systems can support joint operations and use this to support future development
 - Architecture becomes a tool for defining a common way ahead and a means to manage multiple activities toward a common goal
- Transition to new way of doing business is a major challenge
 - Work is beginning with development of **concepts** in each of the **Joint Functional Capability** areas and begin supporting architecture developments
 - Concept work in the **Joint Operating Concepts** is underway in parallel
- **GIG** capability development and transition is also underway
 - 5000 direction is to incorporate the “**Global Information Grid** Integrated Architecture, which shall underpin all mission area and capability architectures”
 - Important to factor this into integrated architecture development from the outset

Joint Staff Action Plan

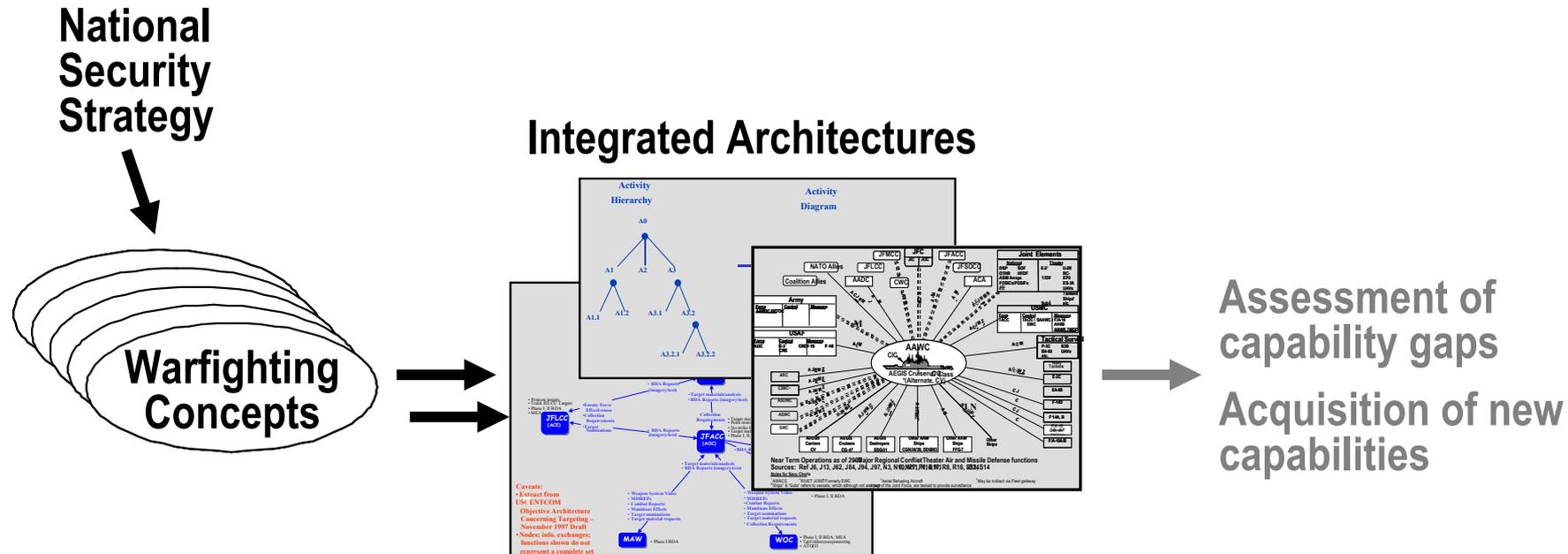


Deliverable

- End-to-end analysis in briefing format, that is ...
- Standard and as developed as possible given starting position...
- Which allows for analysis for insights toward a capability roadmap...
- That provide decision opportunities ...
- To prepare JROC input to CPR06.

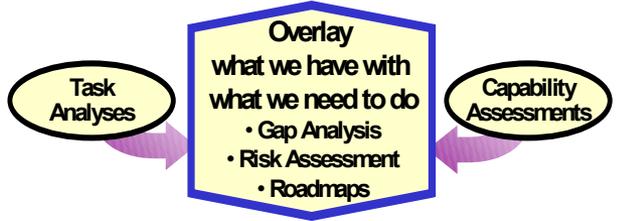
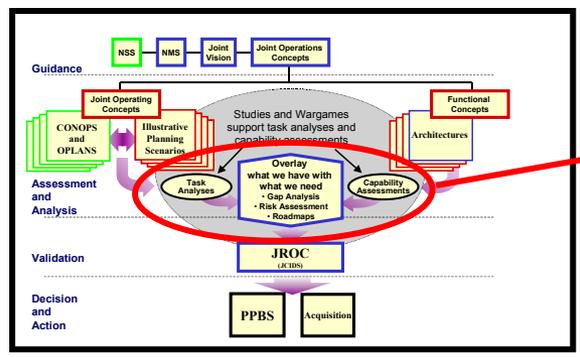


Architectures Will Be Based on Joint Concepts



- Joint Warfighting Concepts driven by National Security Strategy are the basis for integrated architectures
- Integrated architectures are developed collaboratively by the Joint Staff
- Architectures provide basis for decision making in both requirements and acquisition

Current Joint Staff Thinking Gap and Risk Analysis



COMPARE WHAT WE HAVE WITH WHAT WE NEED TO DO

Concepts, plans,
and scenarios define
required tasks

Architectures model
system capabilities and
associated metrics

Capability Capability Capability

	Task A	Task B	Task C	Task E	Task F	Task G	Task H	Task I
Sys 1		●	●			●		
Sys 2	●							
Sys 3			●					
Sys 4					●	●		
Sys 5			●	●				●
Sys 6						●		●

GAP ANALYSIS

Capability Forecast

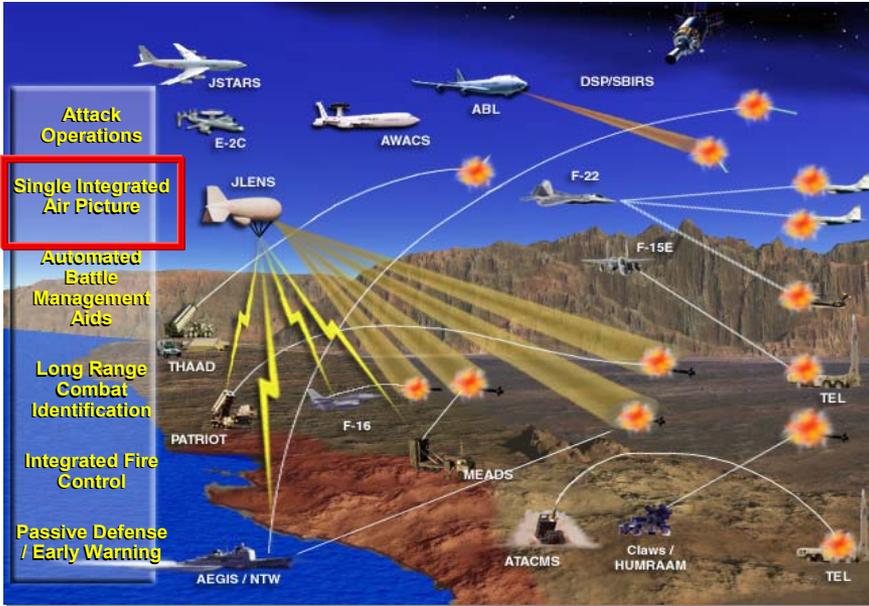


DEFINE GAPS AND ASSOCIATED RISK

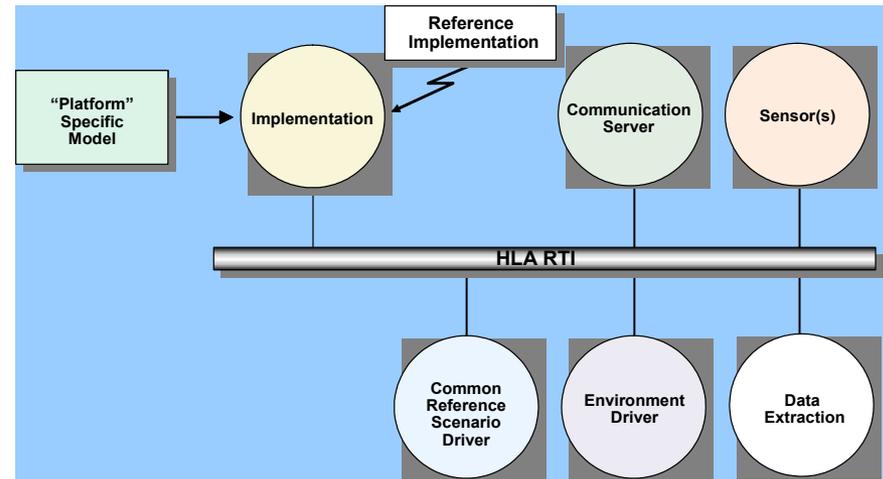
Where are we now.....

- **Concept development** is in process
- **Capabilities methodology** is being used in a set of 'pathfinder' applications conducted by JS, AT&L & NII
 - Precision Engagement
 - Combat Identification
- **Integrated architectures** are being employed to support acquisition in more mature system of system applications
 - Integrated Air Defense
- **Systems acquisition decisions** are being framed in light of the larger context
 - Future Combat Systems (FCS) Milestone B decision
 - Context presentation incorporated in all DAB reviews
- **Lessons learned** from 'pathfinders' are being evaluated as input into FY04 plans

Integrated Architecture for Air Defense

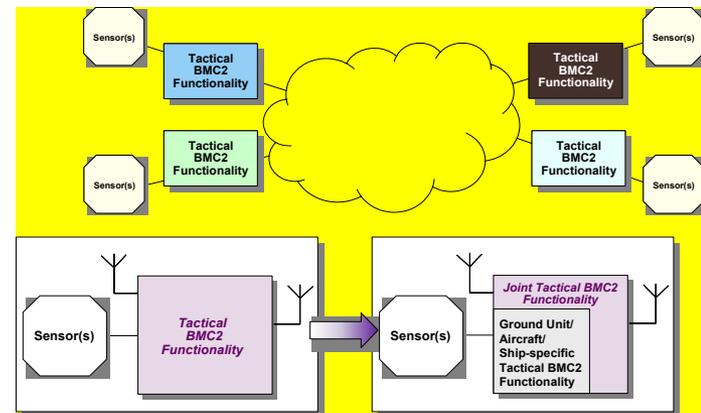


Example of architecture to support integrated systems engineering



Integrated Air Defense Architecture

- Force Protection FCB
- Support requirements for new capabilities (e.g. JLENS)
- Support integration across systems in the architecture
- Incorporates SIAP implementation strategy

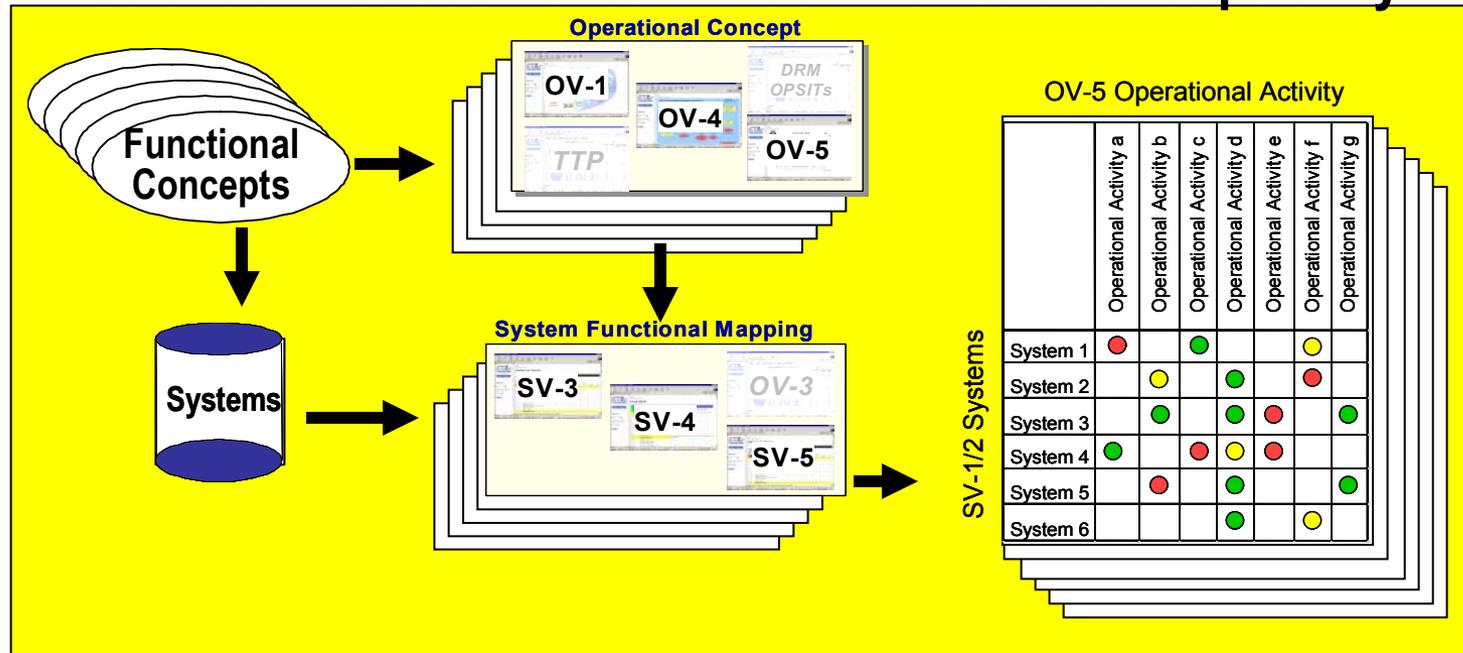


What is next?

- **Next steps:**
 - Develop **concepts** for each Functional Capability Area
 - Conduct **first order analyses** across the Functional Capabilities Areas
 - Represent these concepts in terms of the ‘operational view’ or the integrated architecture
 - Assess current systems ability to support these operations to identify gaps
 - (Under discussion) **Proof of Concept**
 - Integrate across these areas to address selected mission threads (to address ability to apply concepts and operational views to specific missions)
 - Use architectures and thread analysis to assess proposed new ‘Initial Requirements Document’ under 3170 process
 - Implement one future systems implementation and exercise this in a simulated environment to provide venue for future assessment
 - Implement one future mission thread entirely in simulation to assess impact of changes on battlespace outcomes

FY04 First Order Capability Analysis

First Order Assessments in Each Functional Capability Area

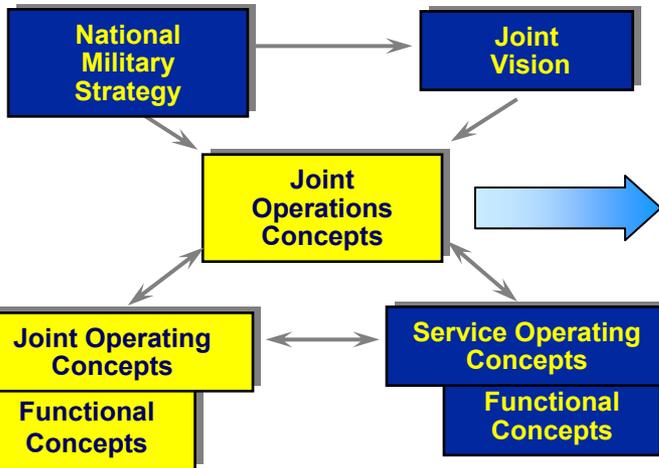


Current plans call for use of the capability analysis methodology

- Warfighting concepts in each functional capability area
- Operational architecture views reflecting those concepts
- System architecture views to assess available functionality

Joint Staff Capabilities-Based Methodology

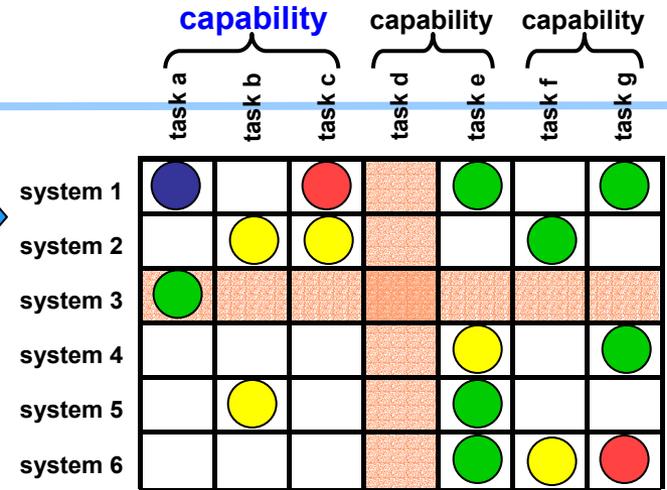
Concepts



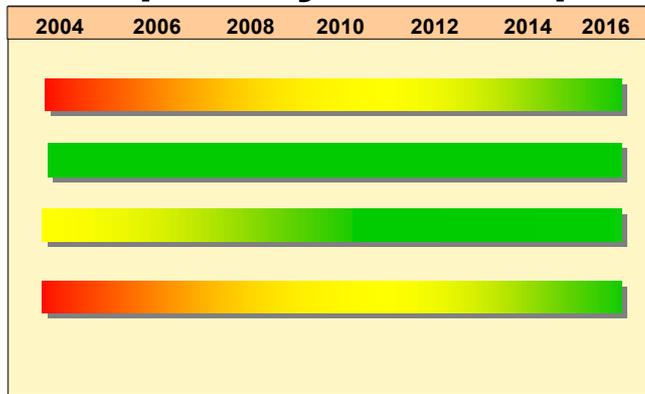
Architectures



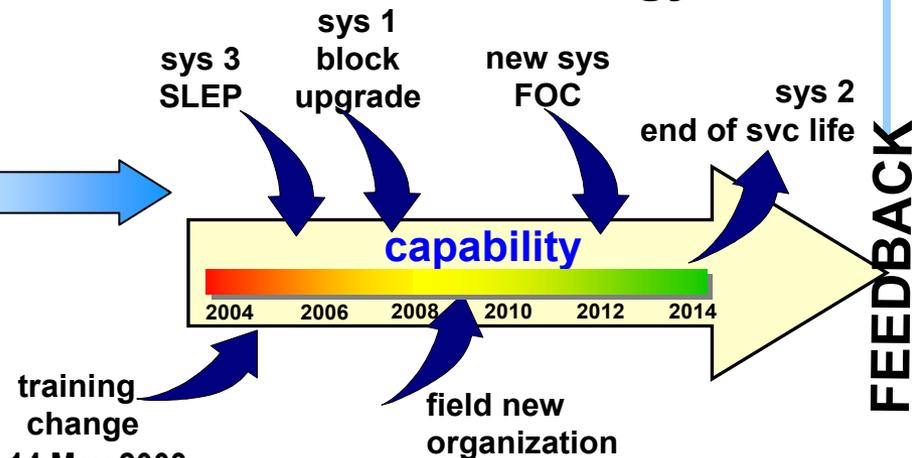
Assessment



Capability Roadmap



Resource Strategy



AT&L Proposed Spiral Implementation

First Order Analysis

Less than 1 year, 'tiger team'
Focus on key ops concepts and systems
Identify gaps in coverage and time sync
Basic analytic tools, secondary analysis
Retain products, data, metrics, lessons learned

Second Order Analysis

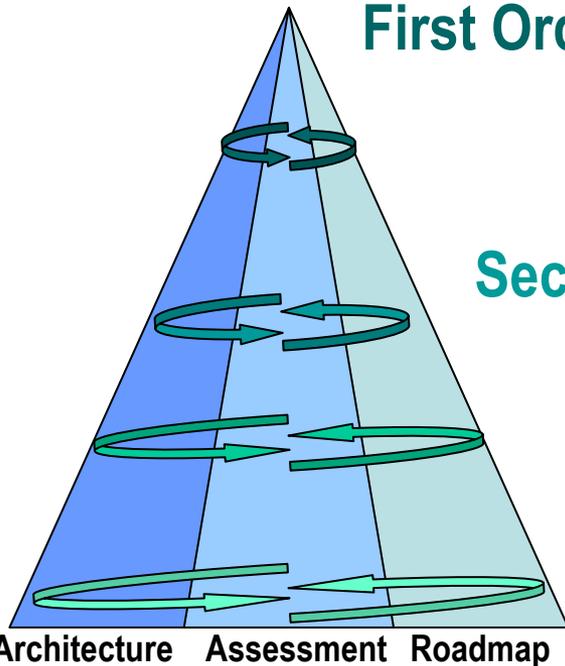
Focus on systems functionality & integration
Added original analysis, system upgrades

Third Order Analysis

Integrated systems performance focus
More sophisticated analytic tools
Simulation and live data analyses

And more....

Focus on combat effectiveness
Use of simulation and exercises
Detailed data and engineering analysis



- **Execute in a series of spirals**

- Provide useful, timely, decision support at each stage

- Start with a first order analysis, build up detail with each spiral

- JS/AT&L - **higher order analyses**; Combatant Commanders/Services/Agencies - **detailed analyses**

- Cumulative 'leave behind' grows analytic resource base

How Are The Architectures Developed and Analysis Conducted?

Collaborative team with dedicated technical support

Joint operations

Joint Staff/JWCAs

JFCOM/CoComs

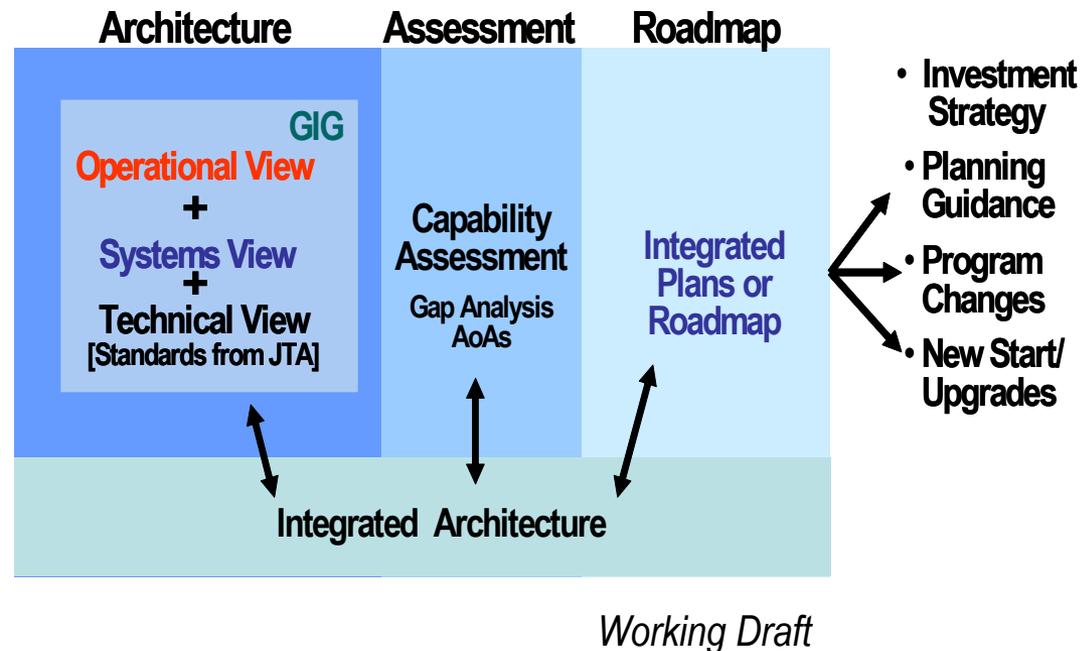
Integrated systems AT&L

GIG/JTA ASD C3

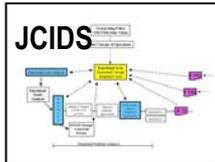
Planning/assessment PA&E

Operations and systems Services

Others Including DDR&E, Policy, MDA, Industry/FFRDCs



AT&L Initial View on Analytic Capabilities

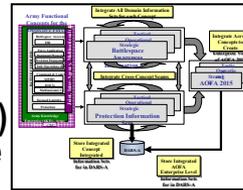


Joint Staff

J8 JWCA's
TACWAR, JICM

Army

Army Architecture
Integration Cell (AAIC)
Joint Virtual Battlespace
Army Analytic Models
Concepts Analysis Agency

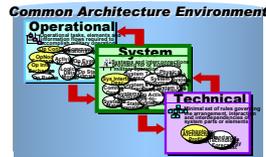


- **No shortage** of analytic support capabilities

- **Biggest challenges**

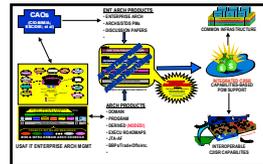
- Asking the **right** questions
- Focusing on an **integrated assessment** vice multiple independent assessments

ASD C3



C4ISR (DOD) Arch Framework
Defense Architecture Repository
Decision Support Center

Air Force



AF XI
AF Enterprise Arch
Joint Synthetic Battlespace
AF Studies & Analysis

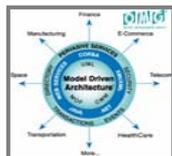
- **“Build while doing”**

- Begin with high priority issues

- First order analyses
- Support near-term needs

- **Build the analytic support structure in the process**

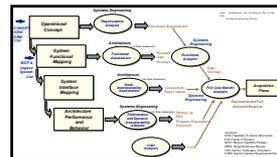
- **Identify needs for tools in the process**



Industry

OMG Model Driven Architecture
IEEE 1471 Arch Description
IEEE 1516 High Level Arch
for Simulation

Navy



RDA Chief Engineer of the Navy
Mission Capability Packages
Naval Collaborative Engineering Environment
N81

Opportunities for Modeling and Simulation

Challenges...