Integrated DoD/C4ISR Architectures – It’s Not About The Framework…

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Overview

- DoD/C4ISR Architecture Background
- Part of the Answer: JCIDS Process
- JCIDS-Driven Analysis Requirements
- Endgame Recommendation
Clinger Cohen Act of 1996: CIO Responsibilities & Duties

- **Primary Duty**
  - Information Resource Management
    - Process of managing information resources to accomplish agency missions
  - IT Architecture
    - Integrated framework for evolving or maintaining existing IT and acquiring new IT
  - Information Resources
    - Information and related resources, such as personnel, equipment, funds, and IT
  - Information Technology
    - Any equipment or interconnected system or subsystem of equipment, that is used in the automatic acquisition, storage, manipulation, management, movement, control, display, switching, interchange, transmission, or reception of data or information by the agency

*Chief Information Officer (CIO)*

Promote effective & efficient design and operation of all major processes

Assess and develop strategic plans for hiring, training and process development

Monitor and evaluate performance
DoD/C4ISR Architecture Background

Architecture Definitions/Tenets

• C4ISR/DoD Arch Framework: “…The structure of components, their relationships, and the principles & guidelines governing their design & evolution over time…”

• Federal CIO Council:
  – “… a strategic information asset base, which defines the mission, the information necessary to perform the mission and the technologies necessary to perform the mission, and the transitional processes for implementing new technologies in response to the changing mission needs…”
  – “…The primary purpose of an EA is to inform, guide, and constrain the decisions for the enterprise, especially those related to IT investments…”
DoD/C4ISR Architecture Background
We’ve Been Doing This Since 1996...

Are we THERE YET?!!!
Are we THERE YET?!!!

NO!!
DoD/C4ISR Architecture Background
Are We There Yet… Why Not…?

- **CIO’s chartered to build architectures; but… it was an “unfunded mandate…”**
  
- **CIO’s spent years “doing architectures…”**
  - “As Is” architectures were documenting a “moving target…” most efforts never completed
  - Viable “To Be” architectures seldom “gotten to”

- **Drove “Management Question…:”**
  - How best to capture architecture artifacts from new programs?
  - Answer: Make them document architectures as part of acquisition process (ORD and C4ISP)
  - But… there was no requirement to tie program architectures to CIO’s Enterprise Arch or DoD Data Standardization efforts
DoD/C4ISR Architecture Background

Are We There Yet… Why Not…?

• How C4ISP’s C4ISR Architecture Product Requirements Generally Accomplished:
  – OV-1, OV-2, SV-1, OV-6c:
    SME/Graphic Artist PowerPoint/Drawing Tool Engineering…
  – OV-3/SV-6, TV-1:
    SME/Engineer-developed Excel Spreadsheets…

• Usually NOT tied to the community CIO’s enterprise architecture, so information captured:
  – Fell on the floor…
  – Couldn’t be tied to requirements…
  – Couldn’t be analyzed on an enterprise level…

Was determined by whether or not the views “looked like” a C4ISR Arch Framework product, rather than whether it “answered the mail” with respect to the requirement delineated in an Integrated Architecture

WRT to Clinger-Cohen, the process didn’t “answer the mail…”
Architecture Background

Joint C4I Interoperability...
Transition Period:
RGS (CRD/MNS/ORD) => JCIDS (Int Arch/ICD/CDD)

Why Change:
- Historically, RGS process has been good at systems engineering “within the stovepipe”
- However, RGS has been “not so good” at enterprise-wide requirements management

Integrated Architectures:
- Provide engineering discipline to design of the Enterprise:
  - Business Processes + Systems + Rules by which systems built...
  - Constraint: that which one has financial control/influence over
- “Net Centric” transformation enabler: “raises the bar” on what the system is:

The Network IS the System...

(CJCSI 3170.01C, 20 Jan 03 Draft)
Part of “The Answer…”

Joint Capabilities Integration and Development Process (JCIDS):

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

Support:
- Service Operating Concepts & Architectures
- Service Functional Concepts & Architectures

FCBs
- Battlespace Awareness (J2)
- Force Application (J8)
- Protection (J8)
- Focused Logistics (J4)
- Net-Centric (J6)

Joint Operating Concepts

Joint Functional Concepts

Integrated Architectures

Joint Recommendations

Capability Needs

DOTMLPF Changes

Science & Technology

Planning, Programming, and Budgeting System

Acquisition

Experimentation

(JCIDS Analysis)

Reconciliation & Recommendations

Joint Operating Concepts

Assessment and Analysis

- OPLANS
- CONPLANs

Defense Planning Scenarios

Task Analysis

Overlay what we have with what we need to do:
- COMMPFs
- Gap Analysis
- Risk Assessment

Capabilities-based identification of needs combines joint concepts and integrated architectures with analysis

Transformation Planning Guidance, Apr 2003 (CJCSI 3170.01D)
**Operational Views**

**Systems Views**

**System of Systems Solution**

**Multiple SoS Solutions per CONOPs**

**System Functions**

**Activities**

**Time-Ordered Capability** = **Grouping of Activities**

**System of Systems** = **Roles** + **Systems**

(defined by KSAs) (Hardware/Software)

---

**JCIDS-Driven Analysis Requirements**

Joint Capabilities Analysis

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**Systems**

**Functions**

**SV-5**

**SV-4**

---

**Systems**

**Functions**

---

**Activities**

---
JCIDS-Driven Analysis Requirements
Enterprise-Wide Capabilities Analysis

- Analyze SoS’s across **ALL** applicable scenarios within the Enterprise
- Enterprise Examples:
  - Navy: Mission Capability Packages
  - AF: AF CONOPs (Global Strike, Global Response, etc.)
  - Joint: Joint Operational Concepts/ Joint Functional Concepts
- Potential Analysis Threads:
  - Systems coverage across scope of Activities
  - Min acceptable solutions

Decision Analysis/
Portfolio Management

Operations Analysis/
Modeling & Simulation

Analysis

Chosen SoS Solutions

Acquisition

MNS/ICD

C4ISP/ISP

ORD/CDD

TEMP
JCIDS-Driven Analysis Requirements
Gap Analysis
JCIDS-Driven Analysis Requirements

Enterprise-Wide Capabilities Analysis: Span DOTMLPF...

Concept Development
- Doctrine Development
- Support Training
- Support Acq Docs

Training
- Support Acq
- Support Leadership Understanding of Doctrine/CONOPS

Decision Analysis/Portfolio Management

Operations Analysis Modeling & Simulation

DoD/C4ISR Arch = Integrated Architectures
- Render info into Pictures
- Support Acq Docs

Program Support
- Acquisition Support
- Financial Management

Strategic Information Asset Base

- Support Analysis of:
  - Organization
  - Materiel
  - Personnel
  - Facilities

MNS/ICD
C4ISP/ISP
ORD/CDD
TEMP
JCIDS-Driven Analysis Requirements

Implication: Need Near-Real Time Total Asset Visibility

Need Near Real-Time Asset Visibility to Manage **ALL** Aspects of DOTMLPF, with ties to Financial and M&S
Endgame Recommendation
Tie Portfolio Management to Integrated Architectures

- What is Portfolio Management?
  - Software-supported management information system for program, asset, and activity management
    - Web based system for dynamic updating
    - Robust technology for managing any type of corporate asset
    - Leverages existing automated data collection systems
    - Views are customized for each level of management oversight

- Standardizes reporting across the organization
  - Reduces level of effort and turn-around time for status updates
  - Minimizes the need for ad hoc reports

- Tracks performance metrics in near real time
  - Tracking indicators highlight problems for rapid diagnosis and resolution
  - Collects performance histories over time (trend analysis)
  - Tracks ownership and status of deliverables
  - Visual status prompts pinpoint high value/high impact issues for risk mitigation
Endgame Recommendation
Tie Portfolio Management to Integrated Architectures

Choose
Annual Plan
Business Focus
Group/Program Focus
Team/Project Focus

Execute

All Views User Profile-based: User profile determined by role; user only sees information appropriate to their role

Investor Map
Scorecard
Dashboards
Workbook
Endgame Recommendation
Tie Portfolio Management to Integrated Architectures

• Recent Positive Developments:
  – GIG Net Centric Enterprise Services Core Enterprise Services definitions are maturing, and can possibly be leveraged for mediation services and/or IA/Security Services
  – Recent/Draft Documents/Guidance:
    ➢ OSD 03246-04, 22 Mar 04
      ✓ Subject: Information Technology Portfolio Management
      ✓ ...While the guidance specifically addresses IT portfolios and a process for making tradeoffs among IT projects, the IT portfolio is part of the Department's broader portfolio of investments...
    ➢ DoD Management Initiative Decision 918 (DRAFT)
      ✓ Subject: Establishing Portfolio Governance for the Global Information Grid (GIG)
      ✓ ...ensures that the Department's Information Technology (IT), including National Security Systems (NSS), investments in information capabilities and services are managed as portfolios...
Endgame Recommendation
Tie Portfolio Management to Integrated Architectures

• Positive Developments Since Paper was Written (cont.):
  – Recent/Draft Documents/Guidance (cont.)
    ➢ DoD Business Modernization and Systems Integration Office requested Industry Advisory Council’s Enterprise Architecture Special Interest Group to develop whitepaper:
      ✓ Subject: Integrating Enterprise Architecture and Portfolio Management Within BMSI (Domains: Acct & Fin, Acq, HRM, Inst & Env, Log, Strat Plan & Budgeting)
      ✓ To be published soon…
    ➢ Observation: these documents primarily deal with IT ONLY. Remember we need to manage ALL aspects of DOTMLPF… plus schedule… plus finances… and tie it to M&S…

• Endgame Recommendation:
  – Tie Enterprise Architectures to Portfolio Management
  – Leverage GIG NCES CES as Much As Possible
  – Do proof-of-concept at JFCOM, SOCOM, or TRANSCOM to prove Joint viability
  – Benefits:
    ➢ NRT Asset Visibility aids in monitoring progress from as-is to to-be
    ➢ Analysis of Program Slips, “what if’s”, etc. greatly facilitated
    ➢ Key start towards Net Centric Warfare…
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Backups...
• **Website:** [www.wbbinc.com](http://www.wbbinc.com)
• **Client Base:**
  – U.S. Departments of Defense, Transportation
  – UK, Australian, Italian and German Ministries of Defense
  – US and Allied defense-related businesses
  – Non-defense corporations
• **Contracting Vehicles:**
  – Government Services Administration (GSA) (MOBIS Schedule)
  – Sub-contract to Coalescent Technologies Corporation (CTC)
  – Direct Contract
• **Founded:** 1981
• **Ownership:** Employee-owned
• **2003 Revenues:** > $23 Million
• **Employees:** 100+
• **Locations:**
  – Vienna, VA
  – Hampton, VA
WBB Core Competencies

• Core Competencies:
  – Concept Development
  – Operations Analysis
  – Program/Financial/ Acquisition/JCIDS Support

• Additional Strengths:
  – Battlespace Knowledge
  – We Know the Players
    ✓ DoD and other Government Agencies

We help our clients improve their operational and business performance
What WBB Brings to Bear

Senior Warfighters from All Services
- Current operations, logistics, and acquisition expertise
- Detailed knowledge of the decision making, procurement, and budget processes

Experienced Military Engineers
- Operational Military and Prime Contractor design experience
- Seasoned Program Managers of large weapons systems and programs

Experienced Military Operations Research Analysts
- Senior Operations Research Analysts, with appropriate core models and tools
- JCIDS + DoD/C4ISR Arch subject matter expertise

Proven ability to identify issues, perform analysis appropriate to the problem space, and provide viable solutions
So What?
Implications: How WBB can help connect the Dots...

- Concept Development
- DoD/C4ISR Arch = Integrated Architectures
- Info Capture
- Strategic Information Asset Base
- Info Capture/Analysis
- Decision Analysis/Portfolio Management
- Operations Analysis
- Training
- Program Support
- Acquisition Support
- Financial Management
- Investor Map
- Scorecard
- Workbook
Concept Development

ConOps forms the foundation for requirements development, systems analysis and integration:
- Operationalizes new technologies, future concepts
- Clarifies emerging requirements
- Establishes a Joint perspective
- Identifies issues requiring resolution
- Achieves consensus among
  - Warfighters
  - Requirements and acquisition communities
  - System developers
- Gains broad support for new and ongoing programs

ConOps development has been at the core of WBB business for over 10 years

**WBB Process™**

- **Gather Data:**
  - Study the applicable technology and project the expected mission environment not only on systems being replaced, but on force structure and mission environment

- **Synthesize:**
  - Apply broad operational experience of WBB Navy/Marine/Air Force/Army personnel to develop employment concepts
  - Focus on the differences new technology & new environment will create from the way we do today’s missions

- **Validate:**
  - Validate new concepts with: Warfighters, Designers, Modelers/Analysts
Operations Analysis

- Cost-effective solutions to meet requirements
- End-to-end analyses focusing on particular measures or warfare areas
  - Optimization and Stochastic tools
- “Bookends” – leading and overseeing analytical efforts:
  - Study plan development
  - Identification of measures
  - Scenario development
  - Interpretation and packaging of results
- Consulting to analytical staff
  - Red teams
  - Supervision of analytical teams
  - Analysis training
- 10 consultants with OA degrees; 23 OA practitioners

Models/Tools  Approaches/Processes/Data

Must Be In Balance

Concepts/Context/ Capabilities
<table>
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<tr>
<th>Government</th>
<th>Industry</th>
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<tbody>
<tr>
<td>JSF/STOVL JSF</td>
<td>Discoverer II</td>
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<td>JDAM PIP</td>
<td>Mako LCA/AT</td>
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<td>DD-21 including C4ISR</td>
<td>CAC2S</td>
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<td>TAD-SE (CSFAB,CIDWG,SETs)</td>
<td>F/A-18G ConOps</td>
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<tr>
<td>NSFS C4ISR/LAW Center</td>
<td>JASSM and CASOM</td>
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<td>MV-22 ConOps/C4ISP</td>
<td>AIM-9X</td>
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<td>ONR-CCID</td>
<td>GEN III FLIRs</td>
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<tr>
<td>ASCIET / JADO/JEZ</td>
<td>Tactical Operations Centers</td>
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<tr>
<td>TCS/DSEAD TacMemo</td>
<td>FOPEN/FOREST</td>
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<td>N64 Info Ops/Global WG</td>
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<td>COBRA BALL/CS/RJ/SS Ops Guides</td>
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<td>N865 Theater Air and Missile Defense</td>
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<td>ASD/C3I Operational Architecture, ISR-ICSP</td>
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<td>Sustaining Engineering</td>
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<td>MRE/VTUAV/UCAV</td>
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<td>Avionics Master Plan</td>
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<td>F-15 C-E Roadmap</td>
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Program/Finance/ Acquisition/JCIDS Support Examples
Integrated DoD/C4ISR Architectures

JCIDS Requires Integrated Architectures for NR-KPP

- Mandatory Product Views for CDD, CPD, ISP: OV-1, 2, 5, 6c; SV-4, 5, 6; TV-1
- Integrated Arch Requires:
  - Understanding of JCIDS Process
  - Understanding of Joint and Service Operational and Functional Concepts
  - Understanding of DoD Arch Framework Product Interrelationships
  - Interconnectivity between Architecture products
    - Facilitated by Automated Tools
    - Tools generally “user hostile,” experienced tool drivers a must

Proven capability in developing Integrated DoD/C4ISR Architectures...
Where Enterprise Architecture “Fits”

Relationships Between Architecture and Systems Engineering

“Blue Sky” Vision

Enterprise Architecture

Systems Engineering

Architecture & Systems Engineering Overlap
Training

• How Washington Works:
  – Requirements
  – PPBS=>PPBE
  – Acquisition System
  – Congress
  – Networking

• Manpower, Personnel, & Training
• Operations Analysis
• GPS/Precision Targeting

Not just theory – how the system really works!
Decision Support

- Provides knowledge, facilitation, and tools to support decision makers at any level of an organization.
- Helps define, organize, analyze, and synthesize key decision variables to arrive at the best solution within the context of customers’ needs.

- Collaborative Facilitation (Group Systems)
- Analytic Hierarchy Process (Expert Choice)
- Portfolio Management (ProSight)
- Relational Databases/MS Access
- Programming Support

Investment decisions that optimally align corporate resources with business objectives to maximize earned value.
Decision Support
Scorecard Overview

Summary Values (portfolio view)

Projects (investments)

Scorecard of Interest

Portfolio of Interest

Category

Scorecard provides detailed view of key business and project parameters

Cell Value or Indicator (manual or extracted from other data sources)
For selected attributes, Dashboard displays information in bar chart, pie chart, trend graph, or scatter graph forms.
Investor Map shows project dynamics and portfolio performance across multiple variables (4 dimensions).