NDIA System Engineering Division 2012 Task #4

USE OF DODAF FOR SYSTEMS INTEGRATION: AN NDIA SE DIVISION ARCHITECTURE SUBCOMMITTEE UPDATE

INTERIM PROGRESS REPORT

October 2012
OVERVIEW

- Tasking Statement
- Architecture Subcommittee Members
- DoDAF Background
- Findings to Date
- Audience Input
- Next Steps
Is the use of authoritative DoDAF-like architectures critical for a successful systems integration effort? (Navy).

Does the DoDAF provide reusable architectures, environments and system hierarchies? (AF)
TASKING ANALYSIS

- **Input from Steve Henry (Chair, SE Committee):**
  - “The Navy is concerned about *Enterprise integration* across their mission threads.”
  - “...what level of architecture is needed to ensure successful integration.” (Navy)
  - “Air Force interested in architecture *reuse* to *save cost*”

- **Input from John Palmer (Co-chair, SoS Committee):**
  - “USAF wants to be able to *re-use architecture models*, and be able to link the models developed among different technical disciplines”
  - “… architecture *tools to better support* sustainment issues”
  - “The Navy was questioning the effective value of the DoDADF ... and asking for better ways”

- **Input from John Lohse (Chair, M&S Committee):**
  - Navy “stated the DoDADF artifacts don't allow for things to *change over time.*”
  - Navy “also addressed the desire to tie them to the Navy NMETLs and UJTLs.”
  - Navy “requested some help in understanding the *role of mission advocates and platform advocates* in Development Planning”
ARCHITECTURE SUBCOMMITTEE MEMBERS WORKING THIS TASK

- Barbara Sheeley, The Boeing Company (Subcommittee Chair)
- Dr. Steven Dam, SPEC Innovations
- Jack Zavin, OSD/USD(AT&L)
- Fatma Dandashi, MITRE
- Ron Williamson, Raytheon
- Bruce Brown, Northrop Grumman
- John Palmer, The Boeing Company
- Kevin Agee, Army Research Laboratory
- Dave McDaniel, Silver Bullet Solutions
- Raschid Muller, DISA
DODAF BACKGROUND

Direction for Unified Defense Architecture Framework

- Net-centricity and SoA
- SvcV views
- JCIOS & NR-KPP
- Applicability beyond C4ISR
- Use-based
- Integrated Architecture
- 26 AV/OV/VS/TV views
- Linked to I&S policies
- CADM 2.0
- Joint interoperability

- Fit-for-purpose
- Data-centric architecture
- Improved models of systems, services, capabilities, rules, measures
- DoDAF Meta Model (DM2) based on IDEAS
- Urgent CRs 52 \rightarrow 1 XSD
- IDEAS Foundation v1.0 fixes
- Urgent CRs
- TECHEDITS
- DM2 OWL

Framework Objective:
- Achieve a single integrated Architecture Framework for interoperability.
- Achieve a US, Canada, and United Kingdom single Framework with a common Data Meta Model
- Achieve alignment with the US Government Common Approach to Enterprise Architecture
Perceived Benefits of DoDAF

- Common vocabulary, semantics and viewpoints
- Support for JCIDS
- Emphasis on
  - architecture related DOTMLPF concerns
  - operational/business concerns
  - standards
  - operational and system structure/behavior
  - data and information
  - traceability among viewpoints
Perceived Limitations of DoDAF

- Relation between DoDAF and SE unclear
- Use case and requirements support missing
- Framework, not a methodology
- Data model still very complex at PES level
- Lack of metrics
- No DoDAF certification process for training courses
- No executable architecture support
- Limited tool integration support
- Large number of views
- No predefined templates
- No common sub-domain viewpoints
- No emphasis on quality attributes
Significant user resistance to DoDAF continues
Architectures often being developed to meet requirement, then ignored
Data-centric approach may miss key part of design: form, fit, and function
Visualization now a major issue – “fit-for-purpose” may lead to lack of standardization making comparisons more difficult
Moving to single coalition architecture framework has pros and cons
Many Architects do not consider themselves as doing systems engineering – following potentially duplicative paths

This is the focus of our recommendation paper
ARCHITECTURE & SYSTEMS ENGINEERING (SE) INITIAL THOUGHTS ON SE

SE 101 from INCOSE
+ Manage Complexity, Reduce Risk (Cost, Schedule, Technical)
+ Big Picture and Common Sense

Successful SE Features
+ **Understand the Problem**
+ Assess Alternatives
+ **Define System Architecture**
+ Manage Requirements
+ **Manage Interfaces**
+ Prepare Test, Training and Support Capabilities
+ **Track Progress Against Plan**

Source: INCOSE Transportation Working Group  www.incose.org/practice/techactivities/wg/transport
DODAF & SYSTEMS ENGINEERING
INITIAL THOUGHTS ON DODAF VALUE TO SE

- Understand the Problem
  + Who, What, Where, When, Why, How...Common Vocabulary
  + DoDAF Capability and Operational Viewpoints address the problem domain needs (current & objective)

- Define System Architecture
  + DoDAF Systems, Services, Data/Information, Standards Viewpoints address the solution domain (current & objective)

- Manage Interfaces
  + DoDAF core Systems and Services views focus on interfaces, flows and traceability to Operational Needs

- Track Progress Against Plan
  + DoDAF AV-1 defines the architecture plan and should be integrated with the SEMP (Systems Engineering Management Plan)
Audience Input

- Your DoDAF experience?
- Recommendations?
Next Steps

- Continue to gather information about DoDAF’s use today
- Deliver a recommendations report to SE Committee
- Long-term: develop a survey to obtain quantitative data on use and usability of DoDAF in architecture and SE development