The Challenges of Implementing Open Systems Architecture

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Agenda

- What is OSA? – a quick review
- Why do we want OSA?
- What are the barriers?
- What's the benefit?

What do we mean by Open Systems Architecture?

- System is designed with interfaces defined on an open, published, and preferably non-proprietary basis
  - Examples of open: RS-232, RJ-45, 1/8" phone jack, AAA battery, automotive tires
  - Example of open, but proprietary: HDMI, i-Pod dock connector
  - Interfaces include:
    - Electronic
    - Data
    - Mechanical
    - Thermal
    - Power
  - Government has data rights (at least Government Purpose Rights) to interface
  - Full Design Disclosure
- A Successful Open System Architecture can be;
  - Added to
  - Modified
  - Supported/maintained
  - Removed/replaced

  . . . by different vendors throughout the life cycle (Vendor Lock avoided)

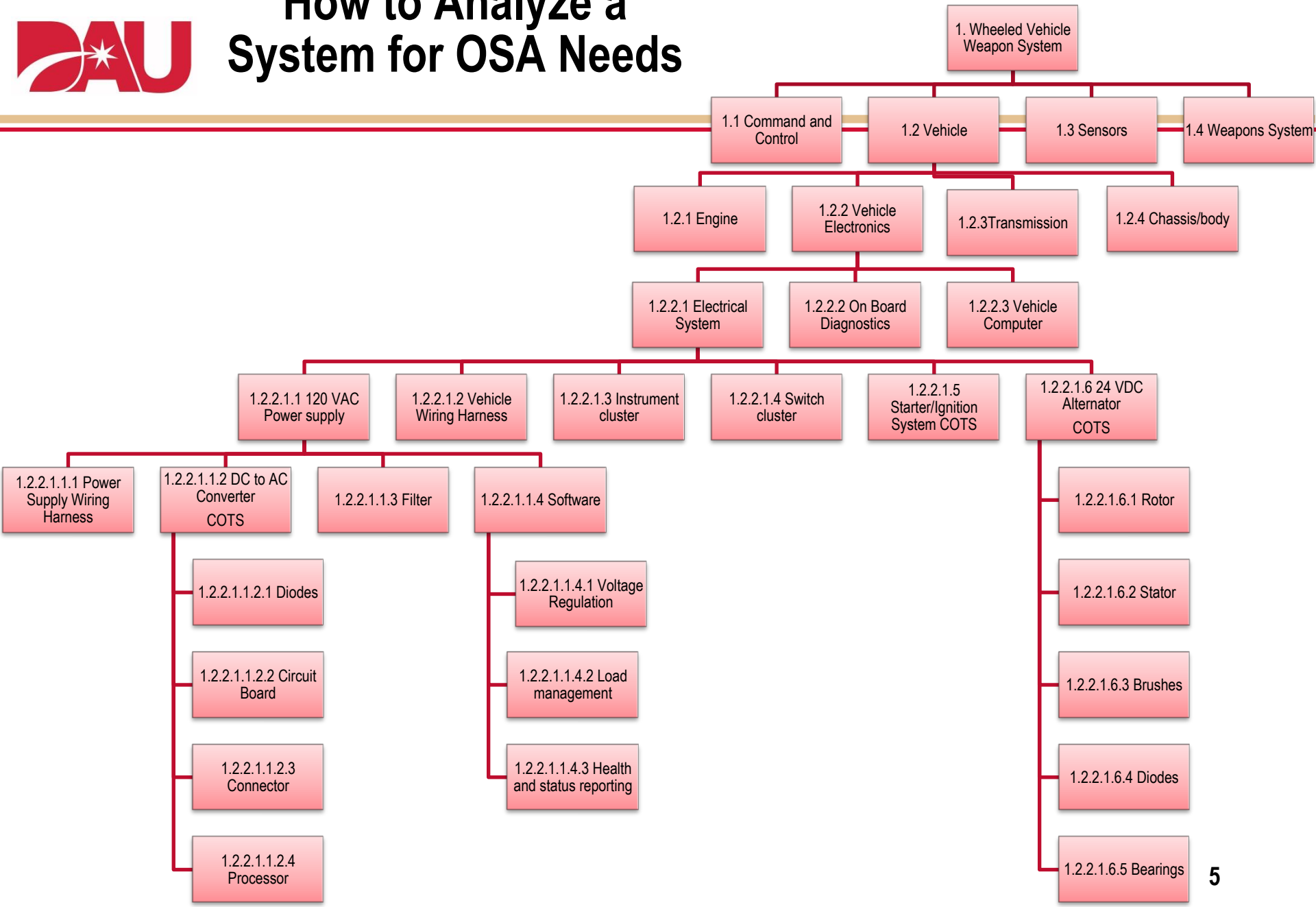
OSA is Mandated by the OSD Better Buying Power Initiative

What comes before OSA?

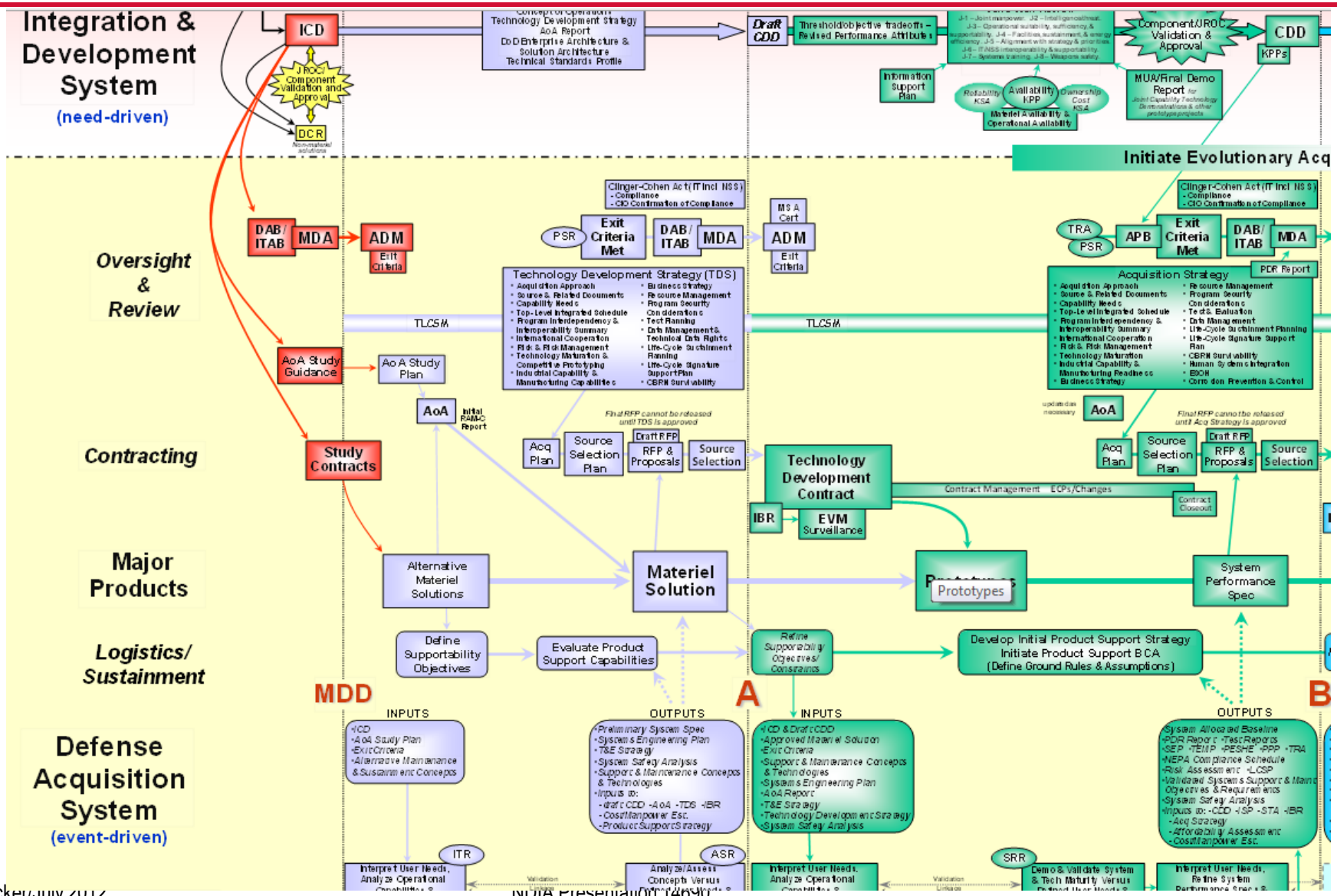
- **Three key activities:**
  - **Acquisition strategy**
    - **Plan for future increments (upgrades, tech refresh)**
    - **Provision for unplanned future increments (responding to new requirements)**
    - **Plans for future competition (follow-on production, spares, support)**
  - **Logistics support concept**
    - **Military vs. Civilian vs. Contractor**
    - **Where work performed (unit, support org. or depot)**
  - **Architectural concept (both internal and external)**
    - **Systems Viewpoints (SV-1,…)**
    - **Standards Viewpoints (StdV-1,…)**

All three are necessary to define which interfaces need to be open

How to Analyze a System for OSA Needs



Lifecycle Chart (excerpt) showing early acquisition activities



Where do we start?

- Current processes do not incorporate any consideration of OSA early in the acquisition process
  - Prior to Material Development Decision
    - ICD – defines capability gap – seldom identifies a need for Open Systems
    - AoA Study Guidance – developed by CAPE – normally focused on alternative technical solutions
  - Material Development Decision (MDD)
    - Milestone Decision Authority (MDA) approves entry into acquisition
    - Opportunity to provide guidance to program/project
      - May supplement/modify AoA Study Guidance

AoA Study Plan (DAG 3.3.3)

- Introduction
  - Background
  - Purpose
  - Scope
- Ground Rules
  - Scenarios
  - Threats
  - Environment
  - Constraints and Assumptions
  - Timeframe
  - Excursions
- Alternatives
  - Description of Alternatives
  - Nonviable Alternatives
  - Operations Concepts
  - Sustainment Concepts
- Determination of Effectiveness Measures
  - Mission Tasks
  - Measures of Effectiveness
  - Measures of Performance
- Effectiveness Analysis
  - Effectiveness Methodology
  - Models, Simulations, and Data
  - Effectiveness Sensitivity Analysis
- Cost Analysis
  - Life-Cycle Cost Methodology
  - Additional Total Ownership Cost Considerations (if applicable)
  - Fully Burdened Cost of Delivered Energy (if applicable)
  - Models and Data
  - Cost Sensitivity and/or Risk Analysis
- Cost-Effectiveness Comparisons
  - Cost-Effectiveness Methodology
  - Displays or Presentation Formats
  - Criteria for Screening Alternatives
- Organization and Management
  - Study Team/Organization
  - AoA Review Process
  - Schedule

The outline shown is from the Defense Acquisition Guidebook and is a suggested outline for the AoA Study Plan.

- From the description of what analyses will take place in the AoA, one can see that assumptions will be made about Open Systems Architecture and the costs/benefits associated with employing it.
- Most study plans do not explicitly recommend considering alternatives that are the same technology, but with different life cycle support concepts.
- The cost analysis is similar to a BCA

AoA Summary

- **Analysis of Alternatives**
  - **Alternatives**
    - **Normally technology based (missile vs. gun, etc.)**
    - **Includes life-cycle cost estimates for each alternative**
  - **Often performed by contractors**
  - **Assumptions made (explicit or implicit):**
    - **Logistics support concept**
    - **Level of "openness" in system**
    - **Data rights to support life-cycle cost estimates**

Should different levels of OSA be considered alternatives?

Initial Technical Review

- **Initial Technical Review**
  - Provides initial cost estimate for POM submission – Although an initial estimate – may become project/program budget
  - Usually precedes Technical Development Strategy
  - Assumptions made:
    - Sustainment strategy
      - Maintenance
      - Repairs
      - Spares
      - Refurbishment
      - Supply chain management
    - Plans for tech refresh, future increments
    - Need for data rights (present and future)
    - Basic architecture (internal and external)
  - Usually conducted before AoA is completed

Activities between MDD and MS A

- Technical Development Strategy (April 2011 Guidance)
  - Includes:
    - Draft Acquisition Strategy
    - Plans for TD Phase
    - Business strategy (only brief mention of OSA in current document)
      - 7.1 Competition Strategy
      - 7.4 Sustainment Strategy
      - 7.6 Technical Data Rights Strategy
  - See https://acc.dau.mil/CommunityBrowser.aspx?id=441130 for complete document

The Good, The Bad, The Ugly

- Good – by US law, the Government is entitled to Unlimited Rights to the following:
  - Form, fit and function data
  - Operations, maintenance, installation and training data
  - Computer software documentation
- Bad – more data required to re-procure or buy spares for many of our systems
- Ugly – in past, US Government has not enforced these rights

Summary

- Acquisition activities prior to MS A do not currently consider OSA, much less incorporate its consideration
- By midway between the MDD and MS A:
  - AoA completed
  - Initial POM submission made (supported by cost estimate prepared for Initial Technical Review)
  - Technical Development Strategy drafted (1st required OSA consideration)
- The program's life cycle costs are fairly well defined
- If OSA has not been incorporated, much re-work will be required to do so