



Open Systems Architecture in DoD Acquisition: Opportunities and Challenges

Mr. Stephen P. Welby

**Deputy Assistant Secretary of Defense
for Systems Engineering (DASD(SE)), OUSD(AT&L)
Defense Daily 6th Annual Open Architecture Summit
November 12, 2013**



DASD, Systems Engineering Mission



Systems Engineering focuses on engineering excellence – the creative application of scientific principles:

- To design, develop, construct and operate complex systems
- To forecast their behavior under specific operating conditions
- To deliver their intended function while addressing economic efficiency, environmental stewardship and safety of life and property

DASD(SE) Mission: Develop and grow the Systems Engineering capability of the Department of Defense – through engineering policy, continuous engagement with component Systems Engineering organizations and through substantive technical engagement throughout the acquisition life cycle with major and selected acquisition programs.

A Robust Systems Engineering Capability Across the Department Requires Attention to Policy, People and Practice

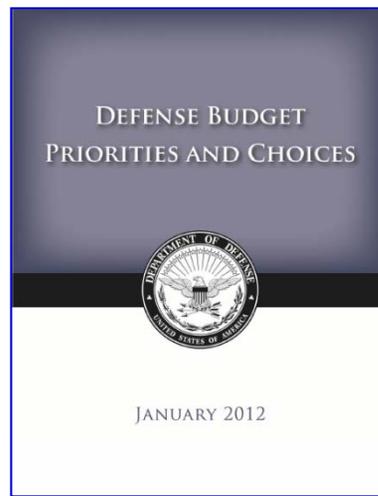
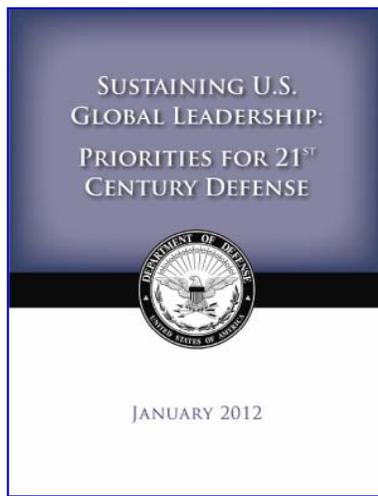
- ***US Department of Defense is the World's Largest Engineering Organization***
- ***Over 99,000 Uniformed and Civilian Engineers***
- ***Over 39,000 in the Engineering (ENG) Acquisition Workforce***



Key Elements of Defense Strategic Guidance



- The military will be smaller and leaner, but it will be agile, flexible, ready and technologically advanced.
- Rebalance our global posture and presence to emphasize Asia-Pacific regions.
- Build innovative partnerships and strengthen key alliances and partnerships elsewhere in the world.
- Ensure that we can quickly confront and defeat aggression from any adversary – anytime, anywhere.
- Protect and prioritize key investments in technology and new capabilities, as well as our capacity to grow, adapt and mobilize as needed.





2013 DoD Leadership Focus: Challenges, Choices, Opportunities



Chuck Hagel
24th Secretary of Defense
Sworn in February 27, 2013

- The challenges posed by a changing strategic landscape and new budget constraints;
- The choices we have in responding to these challenges; and
- The opportunities that exist to fundamentally reshape the defense enterprise to better reflect 21st century realities.



Challenges to the DoD Engineering Enterprise



- Lay solid foundations...create opportunities
- Envision multiple futures...enable flexible choices
- Design and build systems with focus on lifecycle cost
- Protect our critical defense “intellectual property”
- Focus on “**3 Ps**” of the DoD Engineering Enterprise: **Policy, Practice and, most importantly, People**



Resilient Design

- **The only constant for DoD systems is change:**
 - Evolving threats
 - Strategic and Tactical Innovation
 - Rapid technological change
 - Increased Defense leverage of commercial systems
 - Resource and demand uncertainty
- **These factors all demand increased resilience – the ability to explicitly design military systems to have capacity to adapt and adjust to maintain relevance and operational advantage in an environment of change**

Open System Architecture is a key contributor to Resilient Design



Defining Open Systems Architecture



What: *A technical architecture that leverages technical standards to support a modular, loosely coupled and highly cohesive system structure*

How: *Customer definition and ownership of product architecture; publication of key interfaces within the system*

Why: *Enables Open, Competitive Business Model – allowing components to be added, modified, replaced, removed or supported by different vendors throughout the life cycle – driving opportunities to enhance competition and innovation*



DoD Interest in Open Systems Architecture



- **Drives risk-prudent competition**
- **Enables Business Architectures that mirror Technical Architectures**
- **Provides a constant battle rhythm of competition**
- **Levels playing field; reduces barriers to market entry**
- **Addresses obsolescence risk**
- **Promises wider access to innovation**



Open Systems: Enabling New Business Models



Objective: Competition at the sub-system level

- **Government must be able to share:**
 - Design documentation, specifications, interfaces, tools, etc.
 - Architecture definition
 - Established sub-systems boundaries that are defined, coherent and loosely coupled
- **Focus on what is needed for competition:**
 - Scale sufficient to attract competitors
 - Scoped to accept innovative offerings
 - Support for innovation through appropriate licensing of IP
- **Government must be a smarter buyer.**
 - Creates significant new demands on government in-house engineering capabilities and capacity



Open Systems Considerations in Development



Establish an Environment for Change

- Be clear about intent to compete/recompete
- Establish a flexible contracting approach
- Incentivize good behavior among contributing contractors

Focus Systems Engineering for Openness

- Develop common architectures across a product line or across related product families
- Functionally decompose legacy capabilities



Leverage and Exercise Data Rights

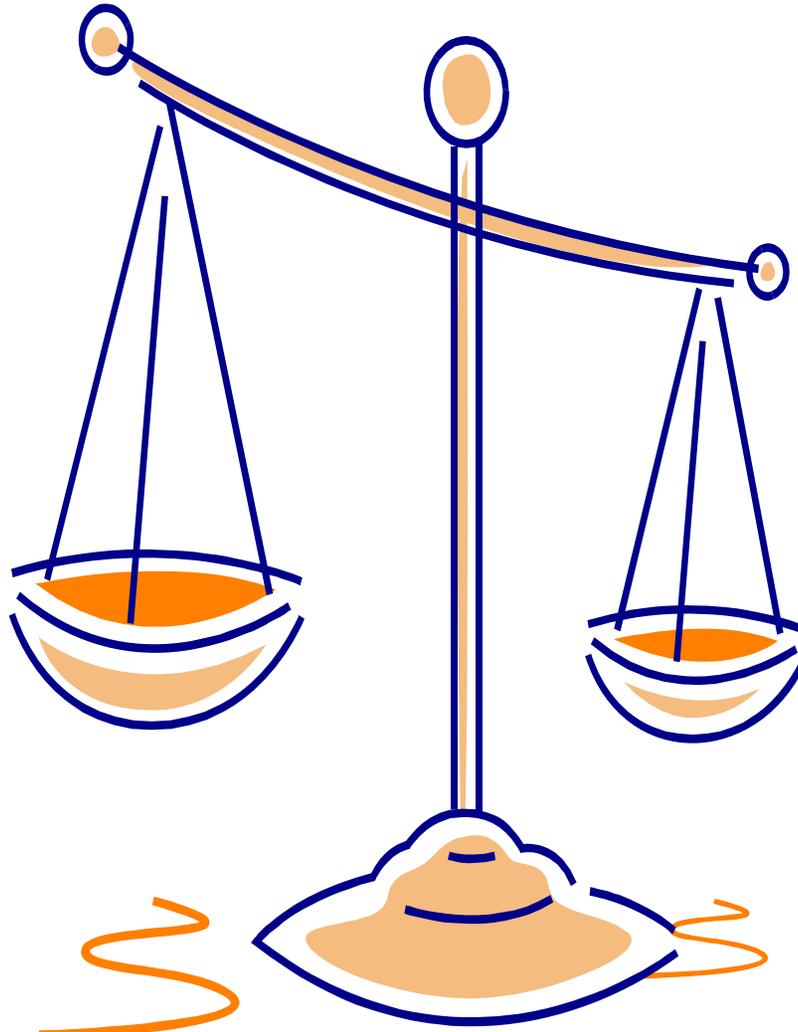
- Assess current and needed data rights
- Be a better customer: confirm that data rights restrictions are correct and assert data rights
- Use government purpose rights (GPR) for next competition

Explore Business Architectures and Sound Competition Approaches

- Create alternatives
- Inject OSA through technical insertions
- Consider alternative integrations concepts
- Insure incentives align with desired behaviors
- Reward reuse



Balancing Potentially Conflicting Goals



Customer

- Cost of Data Rights
- Typical Engineering Deliverables

Vendor

- Competitive Advantage
- Financial Return on Research Investment

Use of Open Systems must be driven by a value-focused business case.



Technical Data, Computer Software, and Intellectual Property Rights



- **Data rights are considered up-front when developing an acquisition strategy; if critical data and software are not be specified for delivery, they may be unavailable (or unaffordable) years later for use on a program during its sustainment phase.**
- **Some Technical Data Rights Strategy considerations:**
 - Data deliverables included in the RFPs and subsequent contracts
 - Data rights, including the responses to the contractor's data assertion lists
 - Data management approach including how the data will be delivered, accessed, maintained, and protected



Diminishing Manufacturing Sources and Material Shortages (DMSMS): An Emerging Crisis



- **Likely impact of current fiscal environment:**
 - Fewer new-start development programs
 - More Service Life Extension Programs (SLEP)
- **Accelerating technology life cycles means fewer sources for “pin-compatible” replacement parts**
- **Driving SLEP cost and risk:**
 - Loss of OEM sources
 - Obsolete parts
 - Loss of component pedigree
 - Loss of key manufacturing expertise

Open Systems Principles Mitigate Much of DMSMS Risk



Some OSA Challenges



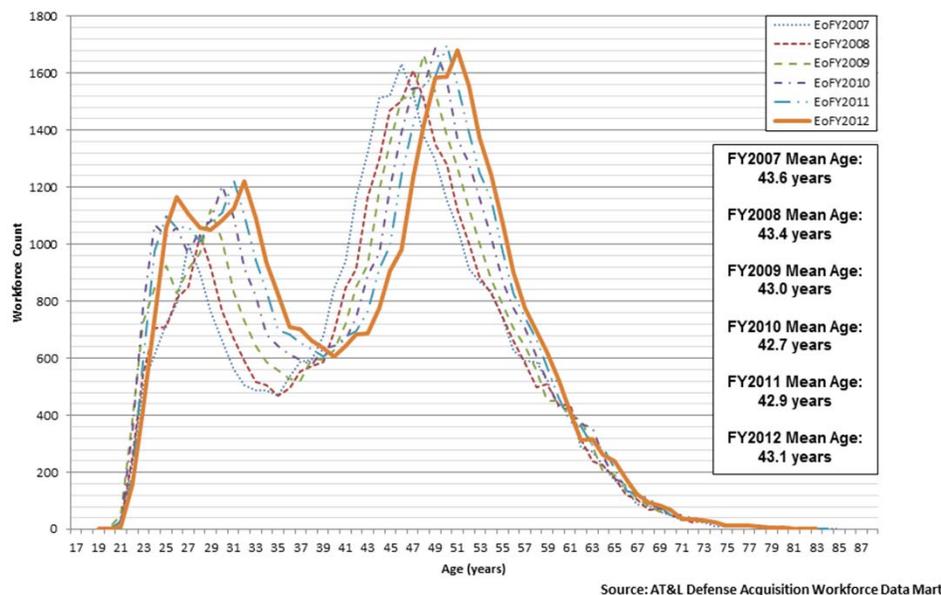
- **Lack of key technical insight by government customers**
- **Risk of Government acting as integrator**
- **Inability to project long-term DoD plans = uncertain business cases**
- **Risk of architectural lock in**



Defense Acquisition Workforce Readiness for OSA



DoD Acquisition Engineering Workforce Demographics



- Adequate capacity and capability in Defense engineering workforce
- Policy and practice supporting engineering design environment
- Department must be an informed user and have active participant in standards development
- Stable long term plan to support capturing ROI in OSA investments
- Successful OSA implementation creates technical demands on customer

Current fiscal uncertainty and government workforce pressures may impede adoption of OSA



Opportunities and Challenges



- **DoD is looking to innovative acquisition models to achieve increased efficiency and effectiveness**
- **Open Systems Architectures offer great opportunities to leverage sub-system-level competition to future-proof systems, provide a pathway for innovation and drive down cost over time**
- **Open Systems business models are dependent on detailed engineering designs that incorporate and define open systems architectures, standards and interfaces**
- **These designs will increase demand on DoD engineering competence, capability and capacity**
- **Adoption of open systems approaches should only be made where a well defined business case and acquisition strategy support this approach**



Systems Engineering: Critical to Defense Acquisition



Innovation, Speed, Agility
<http://www.acq.osd.mil/se>