



Naval Open Architecture *Gulf Coast System of Systems Community of Interest Symposium*



21 February 2007

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PEO IWS 7.0**



Agenda

- Why the Navy Is Implementing Open Architecture
- The OA Strategy and the Benefits of OA
- Small Business and Open Architecture



Why the Navy Is Implementing Open Architecture



The spiraling cost of our weapon systems ...



“Cost increases incurred while developing new weapon systems mean DOD cannot produce as many of those weapons as intended nor can it be relied on to deliver to the warfighter when promised. We must either make tough decisions now to increase the chances for programs to be executable within fiscal realities or brace ourselves for more draconian decisions later driven by those fiscal realities.”

- [DOD Acquisition Outcomes, A Case for Change, Statement of Katherine V. Schinasi, Managing Acquisition and Sourcing Management, GAO, 15 Nov 2005](#)

“Among the greatest risks we face is the spiraling cost of procurement for modern military systems, and shipbuilding is no exception. Shipbuilding cost increases have grown beyond our ability to control as compared to decades prior.”

- [Former CNO, ADM Clark, Statement Before the Senate Armed Services Committee, 10 February 2005](#)

... threatens our military today



The Navy must build a fleet where mission systems ...



... are modular, interoperable, and affordable to upgrade



Open Architecture is an enabler for meeting this goal

Naval Open Architecture is an enterprise-wide, multifaceted business and technical strategy for acquiring and maintaining National Security Systems as interoperable systems that adopt and exploit open system design principles and architectures.

OA CORE PRINCIPLES

Modular design and design disclosure

Reusable application software

Interoperable joint warfighting applications and secure information exchange

Life cycle affordability

Encouraging competition and collaboration

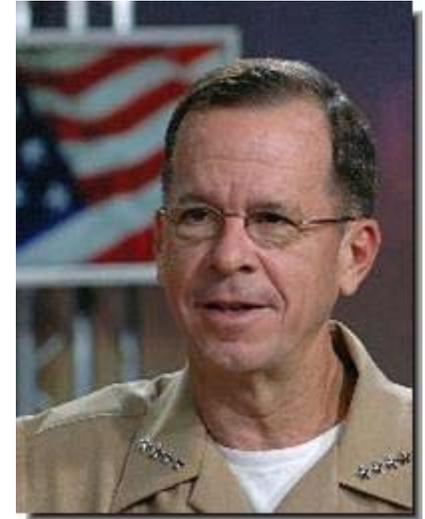
Open Architecture helps lay our path forward!



Now, more than ever, OA is one of leadership's priorities

“ My vision for OA isn't limited to systems built to a set of open standards, but rather it is focused on open business models for the acquisition and spiral development of new systems that enable multiple developers to collectively and competitively participate in cost-effective and innovative capability delivery to the Naval enterprise.”

- CNO ADM Mullen, Defense Daily , 11 September 2006



“Half the cost of a new ship is in mission systems. ... OA is one of the real enablers for us to do things in the future and a key to making ships more affordable”

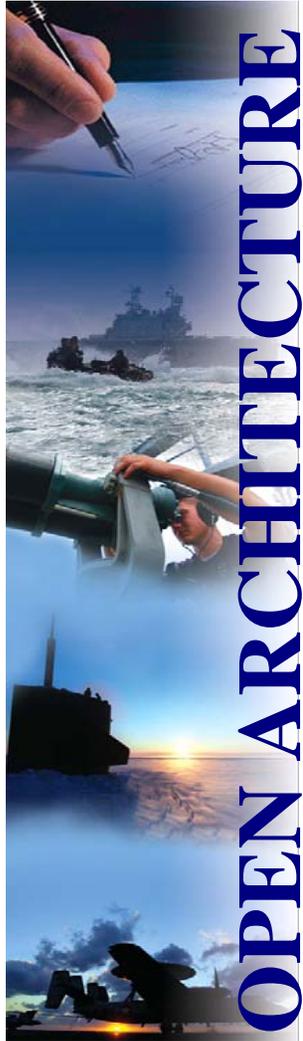
- ASN (RDA) Dr. Etter, DefenseNews.com, 1 November 2006



The OA Strategy and the Benefits of OA



Our vision is to transform the Naval organization to adopt OA through alignment, sharing, and collaboration



Naval OA Vision

We must transform our organization and culture and align our resources to adopt and institutionalize open architecture principles and processes throughout the Naval community in order to deliver more warfighting capabilities to counter current and future threats

Align

- Align Requirements and Acquisition Communities
- Align Domains across the Enterprise and with Joint Services
- Align Industry and Academia Partners
- ... to OA Vision

Share

- Share products and assets across the enterprise
- Share knowledge and ideas through communities of interest
- Provide easy access to products through government data rights

Collaborate

- Reduce risk thru end-to-end collaborative experimentation
- Harmonize standards and guidance
- Reduce T&E expenses through common modular designs and standard interfaces



Implementing Open Architecture yields many benefits ...

Reduction in Time to Field

- Decreased development and acquisition cycle times to field new warfighting capabilities
- Faster integration of open standards based systems

Increased Performance

- Improved operator performance thru delivery of cutting edge technologies and increased bandwidth capabilities from spiral developments and technology insertions

Improved Interoperability

- Use of common services (e.g. common time reference)
- Use of common warfighting applications (e.g. track mgr)
- Use of published interfaces to standardize collaboration

Reduction in Risk

- Leverage proven reusable components
- Test early and often in the developmental cycle to minimize risk of delivering non-interoperable products

Cost Avoidance

- Cost avoidance from software re-use and use commodity COTS products at optimum prices
- Reduced training and streamlined lifecycle support



... but requires a shift in our business and system model

PAST – MILSPEC MODEL

DoD leads micro chip design

Business Model Attributes:

- Platform Focused
- Owner controls evolution
- Cost emphasis
- Develop software
- Make custom hardware

System Model Attributes:

- Requirements driven
- Specification focus
- Rigid requirements
- Unique architecture
- Stable design
- Ignore evolution
- Obsolescence
- Waterfall-style development

PRESENT – OA MODEL

Industry leads micro chip design

Business Model Attributes:

- Capability / Systems Focused
- Market controls evolution
- Total Ownership Cost emphasis
- License or Reuse software
- Leverage COTS or Reuse

System Model Attributes:

- Market driven
- Business plan focus
- Flexible requirements
- Open system architecture
- Constant changes
- Design for evolution (tech refresh)
- Early-managed obsolescence
- Spiral development

1st IBM PC (1981)
4.77 MHz processor



USS Ticonderoga (CG-47) c. 1983
AN/UYK-7 processor



Intel Pentium Extreme (2006)
2066 MHz processor



1950 – 1970

1980

1990

Today



Small Business and Open Architecture



The ASN(RDA) OA Policy Memo, which created the OA Enterprise Team, cited the need for more Industry involvement in the OA initiative

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OFFICE OF THE ASSISTANT SECRETARY
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 WASHINGTON DC 20350-1000

AUG 05 2004

MEMORANDUM FOR DISTRIBUTION

Subj: SUMMARY OF OA EXCOMM OF JUNE 2, 2004

Encl: (1) OA EXCOMM Action Items
 (2) List of EXCOMM Attendees

On Wednesday, June 2, 2004, I hosted the second Open Architecture (OA) Executive Committee Meeting (EXCOMM) at the Washington Navy Yard. The specific purpose of this meeting was to:

- Review the status of the action items from the first OA EXCOMM;
- Present the OUSD (AT&L) Tri-Service Assessment Initiative Naval Open Architecture Assessment Report;
- Review OA progress to date;
- Present a detailed OA Plan of Action and Milestones;
- Reaffirm Navy leadership support for the Navy Open Architecture initiative.

The primary focus of the EXCOMM was the presentation of the OUSD Tri-Service OA Red Team Assessment. The key findings were:

- OA is an absolutely critical basis for achieving our goals.
- The plan we approved needs to be modified, then understood and institutionalized.
- OA will not succeed without more emphasis on overall business strategy vice technical details.
- More industry involvement is required.

We must find ways to foster innovation within these OA initiatives and make the most of opportunities in the commercial marketplace. OA brings with it a profound cultural change where we should no longer think of traditional DoD prime contractors as the only contributors. In any case, we need to significantly involve Industry and academia much more in the future to ensure OA's success.

Finally, I want to review our contractual obligations within the PEOs to fully understand all options with regard to alternate strategies for budgeting and contracting in order to maximize the benefits of open architecture.

Decision 4: More industry involvement is required.

Action: Identify mechanisms and venues to promote education, communication, and involvement in Open Architecture with industry and academia.

Mechanisms shall include, but are not limited to:

- Establishing an advisory team to interpret and advise other organizations on an as requested basis. Team should include industry and academia representatives.
- Implementing and sustaining a proactive OA education and information exchange program across the Industrial and Government communities

Lead: PEO IWS
 Follow: Enterprise Team

- A key finding of the OA “Red Team” was that **more Industry involvement is required** to implement Open Architecture
- “We must **find ways to foster innovation** within these OA initiatives and make the most of **opportunities in the commercial marketplace**. OA brings with it a profound cultural change where we should no longer think of traditional DoD contractors as the only contributors. In any case, **we need to significantly involve Industry** and academia much more in the future to ensure OA’s success.”
- Mechanisms to promote Industry involvement in OA include “Implementing and sustaining a proactive OA education and **information exchange program** across the Industrial and Government communities.”



In Feb. 2006, we held our 2nd OA Industry Day at which 5 topics important to small business were discussed

- ***Increasing Competition*** – Involve non-traditional contractors (small business) in the development of Naval warfare systems
- ***Data Rights*** – If the government correctly determines its future needs for data rights and obtains those rights, it will be able to share data with all prospective developers
- ***Award Fees*** – Financially motivate and reward prime contractors for including small businesses as subcontractors
- ***RFP Language*** – Subcontracting goals will require a predetermined percentage of contractors to be small businesses
- ***Peer Review*** - Participation should be open to anyone who has a candidate technology for transition

The OA Industry Day briefs are available on our website

We are planning our third Industry Day for March 22



In our post-Industry Day survey, we sought to determine small business participation and get its feedback

Results:

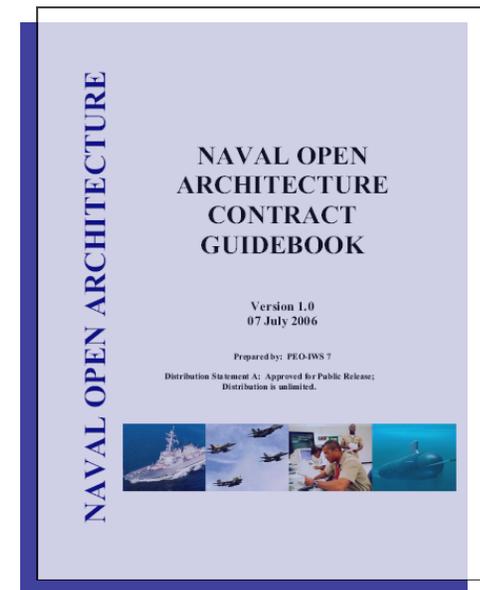
- **One-third** of respondents (41 out of 124) to our 2006 OA Industry Day survey worked for a **small business**
- Of the 30 small business respondents to the question, “Are you a prime integrator or subcontractor?”, 8 said they were primes and 22 said they were subcontractors
- **38 out of 39** small business respondents said that OA Industry Day was either **very helpful** (19) or **helpful** (19)
- According to small business respondents, the three most important topics discussed at Industry Day were:
 - Overview of the OA enterprise initiative
 - **Data rights** in acquisition strategies
 - **Increasing competition** in acquisition strategies



These results fed directly into the OA Contract Guidebook, which supports small business participation in OA

Sample Language:

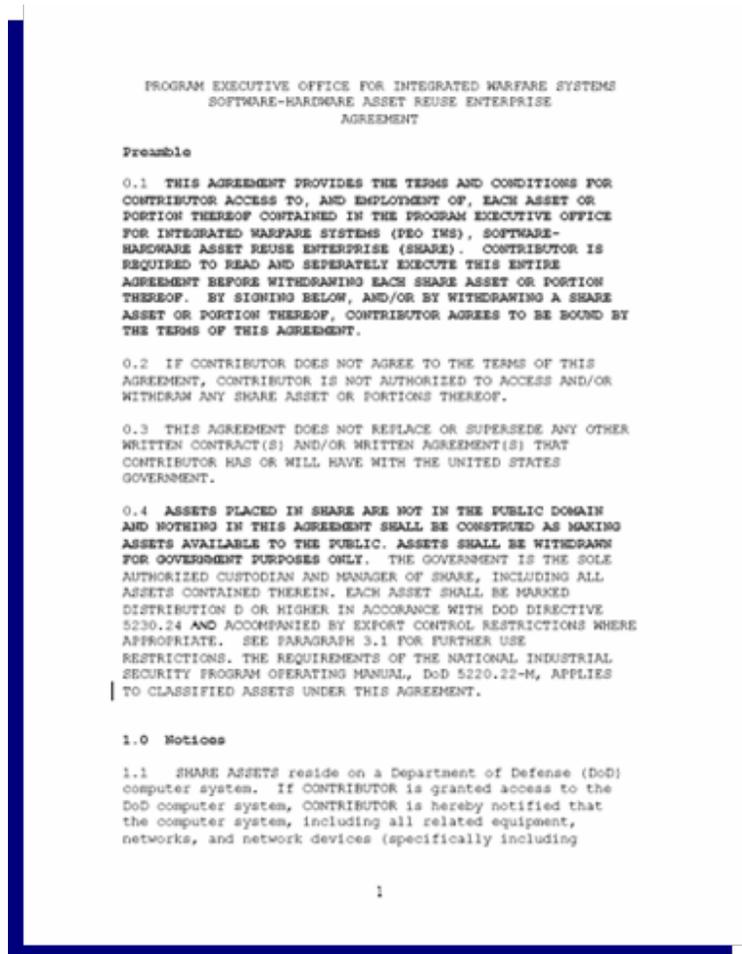
- Section C – Discuss the need to “support **third-party development** and delivery of **competitive alternatives** of designs for software or other components or modules on an ongoing basis”
- Section L – Demonstrate how a proposal “promotes identification of **multiple sources of supply** and/or repair and supports flexible business practices that **enhance subcontractor competition**”
- Award Fee Criteria – Reward contractors for identifying and working with **vendors who possess innovative technologies and methods**
- Naval OA Checklist – Encourage the **participation of qualified small businesses** to facilitate **competition and collaboration**





The Surface Navy asset library (SHARE) provides qualified contractors access to design artifacts, fostering competition

- PEO IWS developed the Software, Hardware Asset Repository Enterprise (SHARE) capability
 - Became operational Aug 06
 - Surface combat system centric
- It will link with an eventual enterprise repository
- Open to all qualified DOD contractors
- To date, SHARE contains assets from the following programs: Aegis, Ship Self Defense System (SSDS), DDG-1000 (Total Ship Computing Environment Infrastructure), Littoral Combat Ship (LCS)
- Visit <https://viewnet.nswc.navy.mil> to register for access



Example SHARE Non-Disclosure Agreement



We know greater Industry involvement is crucial to success

“The key is in designing an architecture that is going to take advantage of commercial standards, the ability to pull pieces out and reuse them in other systems and platforms, and that **allows third parties access.**”

*“This is really critical. This is where we bring in a much larger pool of people to help us develop things, [it] lets us access some of the people who haven't been involved because they didn't have the resources or capabilities to do the whole thing. ... **This opens up [the process] for a lot more of the small businesses.**”*

“There is no time to continue debating and discussing; we have to move out.”

- ASN (RDA), Defense Daily, 10 Oct 2006



To learn more about OA, use the OA Assessment Tool ...

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A Design Tenet: Interoperability							
A1 STANDARDS The use of standardized data and functional models, based on an open standard domain ontology is essential to how readily separate systems can exchange information and appropriately utilize each other's functional capabilities. Where two systems don't understand the same thing in exactly the same way, there will be greater or lesser problems. The larger the system, the greater the problems that semantic misunderstandings will create.							
A1_1	With what interoperability standards does the Unit of Assessment predominantly comply?					Explain	
	N/A	Not standards based	Project specific standards	Corporate standards	Domain standards	Enterprise / International standards	Current Status <input type="button" value="◀"/> <input type="button" value="▶"/>
A1_2	How standards-based is the Unit of Assessment's data model?					Explain	
	N/A	Not standards based	Project specific standards	Corporate standards	Domain standards	Enterprise / International standards	Current Status <input type="button" value="◀"/> <input type="button" value="▶"/>
A2 SCOPE							
A2_1	What is the scope of the data model that the Unit of Assessment uses to support interoperability with other systems?					Explain	
	N/A	There is no explicit data model used.	The data model is Unit of Assessment specific.	The data model is domain specific.	The data model is COI / Enterprise specific.	The data model is Joint / International Coalition specific	Current Status <input type="button" value="◀"/> <input type="button" value="▶"/>
A2_2	What is the scope of interoperability of the Unit of Assessment?					Explain	
	N/A	Standalone – does not expect to interoperate with other systems	System – expects to interoperate with other systems within the PDR	Domain – expects to interoperate with other systems within the Domain	COI – expects to interoperate with other systems within the COI	Joint Coalition- expects to interoperate with coalition forces	Current Status <input type="button" value="◀"/> <input type="button" value="▶"/>
A3 Services A service is a software component, described by metadata (interface, SLA, policies, dependencies) which can be understood by a program. The metadata is published to enable re-use of the service by components which may be remote from it, and which need have no knowledge of the service implementation beyond its published metadata. A service can be implemented many ways, for example, an enterprise Web Service, an enterprise java Bean, or a Business Process Execution Language construct. A description of the state data that it manages and its proper invocation sequences are optional.							
A3_1	To what extent does the Unit of Assessment, acting as a client, utilize mechanisms for the discovery and invocation of services?					Explain	
	N/A	No internal or external discoverable services are used.	Services are discovered manually and invocation is static and requires	The unit of assessment uses external services that are at fixed locations.	Service can be dynamically located and invoked.	Discovery of services is based on quality characteristics and services	Current Status <input type="button" value="◀"/> <input type="button" value="▶"/>

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... enroll in the Naval OA learning module ...

**DAU** Continuous Learning Center

Naval Open Architecture

Introduction to Naval Open Architecture

"In almost every conceivable way, we are not the same Navy we were five years ago. We don't think the same; we don't plan the same; we don't operate the same or fight the same.

By adapting to new technology and new ways of doing business, the Navy is now more capable, more ready, more effective and more efficient. The only constant in our future is change. Change will demand hard work and the willingness to adapt. We must continue to sharpen the blade that is naval warfare, both at sea and ashore.

Though we are clearly more ready today than we have ever been, we have much work yet to do and effort yet to expend to be ready for tomorrow. We must be able to transform ourselves and our thinking quickly in response to an ever-changing, ever-challenging and ever-more-joint environment. Much is riding on that ability."



Available from the Defense Acquisition University (DAU) at <https://learn.dau.mil>

<https://acc.dau.mil/oa>



... and visit the Naval OA Website

Acquisition Community Connection
Where the AT&L Workforce Meets to Share Knowledge

Defense Acquisition University

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Community Polls

Naval Open Architecture Enterprise Team

Surface Submarines Air Space C4I

What's New | General Information | Policy & Guidance | Terms & Definitions | Perspectives | Meetings & Events | Tools | OA in the News | Related Sites | FAQs



What can we do to help you help us implement OA?

Contact:

- Mr. Nickolas Guertin, Deputy Director, Open Architecture,
nickolas.h.guertin@navy.mil