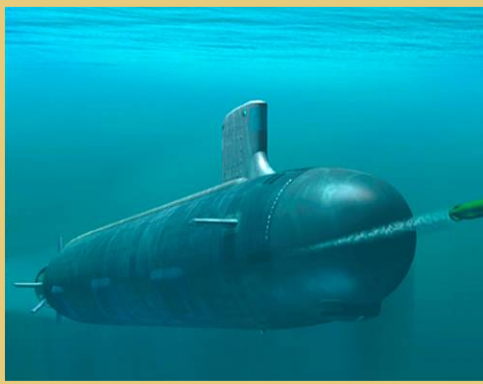
Beyond SBIR Phase II Conference
Open Architecture Session
Naval Open Architecture



August 22, 2007

Mr. Douglas Marker
Advanced Technology Coordinator,
Future Combat Systems
Open Architecture
PEO IWS 7ST

Imagine a Navy where our mission systems…

… are modular, interoperable, and affordable to upgrade

Where we accommodate
changing technology
and requirements…

Where we provide
interoperable capabilities
to the warfighter…

Where we **build a better fleet** for tomorrow!

How will we get there?

OPEN ARCHITECTURE

Open Architecture is the confluence of business and technical practices yielding modular, interoperable systems that adhere to open standards with published interfaces.

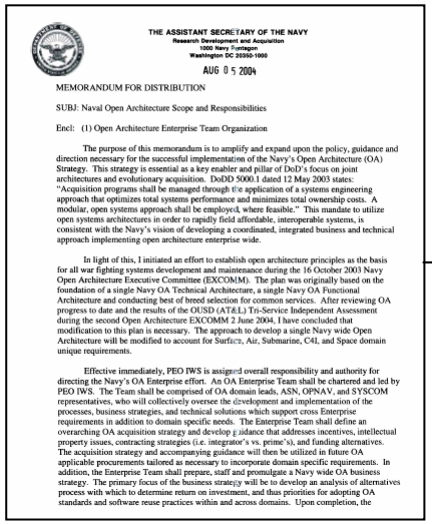
OA CORE PRINCIPLES

- ***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 is our path forward!

OA requirements are derived from three sources…

1 **Aug 2004 ASN RDA mandates open architecture**



THE ASSISTANT SECRETARY OF THE NAVY
Research Development and Acquisition
1000 Navy Pentagon
Washington DC 20350-1000

AUG 0 5 2004

MEMORANDUM FOR DISTRIBUTION

SUBJ: Naval Open Architecture Scope and Responsibilities

Encl: (1) Open Architecture Enterprise Team Organization

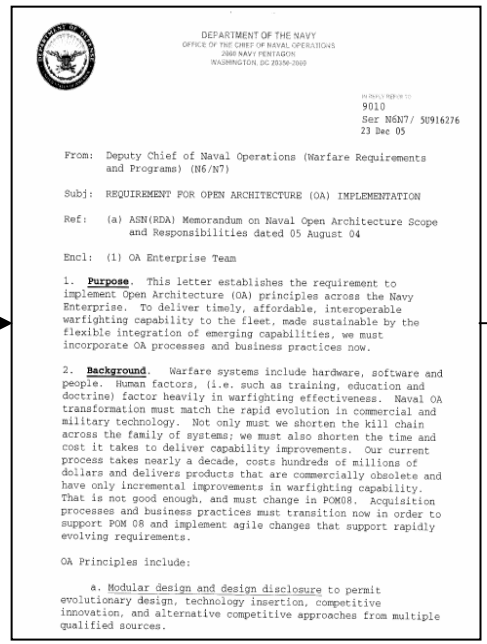
The purpose of this memorandum is to amplify and expand upon the policy, guidance and direction necessary for the successful implementation of the Navy's Open Architecture (OA) Strategy. This strategy is essential as a key enabler and pillar of DoD's focus on joint architectures and evolutionary acquisition. DoDD 5000.1 dated 12 May 2003 states: "Acquisition programs shall be managed through the application of a systems engineering approach that optimizes total systems performance and minimizes total ownership costs. A modular, open systems approach shall be employed, where feasible." This mandate to utilize open systems architectures in order to rapidly field affordable, interoperable systems, is consistent with the Navy's vision of developing a coordinated, integrated business and technical approach implementing open architecture enterprise wide.

In light of this, I initiated an effort to establish open architecture principles as the basis for all war fighting systems development and maintenance during the 16 October 2003 Navy Open Architecture Executive Committee (EXCOMM). The plan was originally based on the foundation of a single Navy OA Technical Architecture, a single Navy OA Functional Architecture and conducting best of breed selection for common services. After reviewing OA progress to date and the results of the OUSD (AT&L) Tri-Service Independent Assessment during the second Open Architecture EXCOMM 2 June 2004, I have concluded that modification to this plan is necessary. The approach to develop a single Navy wide Open Architecture will be modified to account for Surface, Air, Submarine, C4I, and Space domain unique requirements.

Effective immediately, PEO IWS is assigned overall responsibility and authority for directing the Navy's OA Enterprise effort. An OA Enterprise Team shall be chartered and led by PEO IWS. The Team shall be comprised of OA domain leads, ASN, OPNAV, and SYSCOM representatives, who will collectively oversee the development and implementation of the processes, business strategies, and technical solutions which support cross Enterprise requirements in addition to domain specific needs. The Enterprise Team shall define an overarching OA acquisition strategy and develop guidance that addresses incentives, intellectual property issues, contracting strategies (i.e. integrator's vs. prime's), and funding alternatives. The acquisition strategy and accompanying guidance will then be utilized in future OA applicable procurements tailored as necessary to incorporate domain specific requirements. In addition, the Enterprise Team shall prepare, staff and promulgate a Navy wide OA business strategy. The primary focus of the business strategy will be to develop an analysis of alternatives process with which to determine return on investment, and thus priorities for adopting OA standards and software reuse practices within and across domains. Upon completion, the

Naval OA Policy

2 **Dec 2005 OPNAV issues OA Requirements letter**



DEPARTMENT OF THE NAVY
OFFICE OF THE CHIEF OF NAVAL OPERATIONS
2000 NAVY PENTAGON
WASHINGTON, DC 20350-2000

9010
Ser N6N7/ 5U916276
23 Dec 05

From: Deputy Chief of Naval Operations (Warfare Requirements and Programs) (N6/N7)

Subj: REQUIREMENT FOR OPEN ARCHITECTURE (OA) IMPLEMENTATION

Ref: (a) ASN(RDA) Memorandum on Naval Open Architecture Scope and Responsibilities dated 05 August 04

Encl: (1) OA Enterprise Team

1. **Purpose**. This letter establishes the requirement to implement Open Architecture (OA) principles across the Navy Enterprise. To deliver timely, affordable, interoperable warfighting capability to the fleet, made sustainable by the flexible integration of emerging capabilities, we must incorporate OA processes and business practices now.

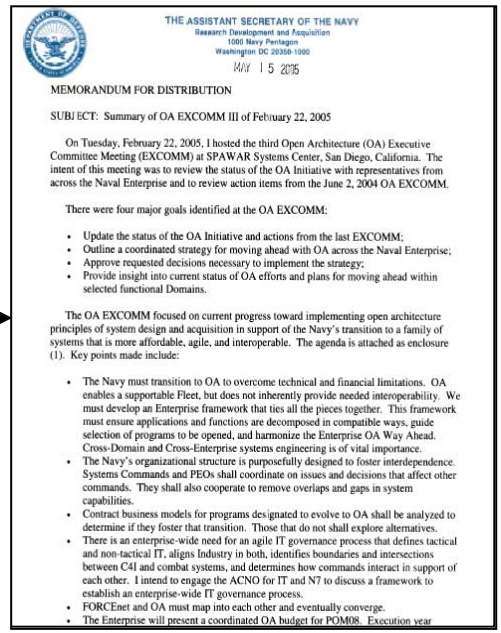
2. **Background**. Warfare systems include hardware, software and people. Human factors, (i.e. such as training, education and doctrine) factor heavily in warfighting effectiveness. Naval OA transformation must match the rapid evolution in commercial and military technology. Not only must we shorten the kill chain across the family of systems; we must also shorten the time and cost it takes to deliver capability improvements. Our current process takes nearly a decade, costs hundreds of millions of dollars and delivers products that are commercially obsolete and have only incremental improvements in warfighting capability. That is not good enough, and must change in POM08. Acquisition processes and business practices must transition now in order to support POM 08 and implement agile changes that support rapidly evolving requirements.

OA Principles include:

a. Modular design and design disclosure to permit evolutionary design, technology insertion, competitive innovation, and alternative competitive approaches from multiple qualified sources.

Naval OA Requirements

3 **OA EXCOMM Action Items**



THE ASSISTANT SECRETARY OF THE NAVY
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1000 Navy Pentagon
Washington DC 20350-1000

MAY 1 5 2005

MEMORANDUM FOR DISTRIBUTION

SUBJECT: Summary of OA EXCOMM III of February 22, 2005

On Tuesday, February 22, 2005, I hosted the third Open Architecture (OA) Executive Committee Meeting (EXCOMM) at SPAWAR Systems Center, San Diego, California. The intent of this meeting was to review the status of the OA Initiative with representatives from across the Naval Enterprise and to review action items from the June 2, 2004 OA EXCOMM.

There were four major goals identified at the OA EXCOMM:

- Update the status of the OA Initiative and actions from the last EXCOMM;
- Outline a coordinated strategy for moving ahead with OA across the Naval Enterprise;
- Approve requested decisions necessary to implement the strategy;
- Provide insight into current status of OA efforts and plans for moving ahead within selected functional Domains.

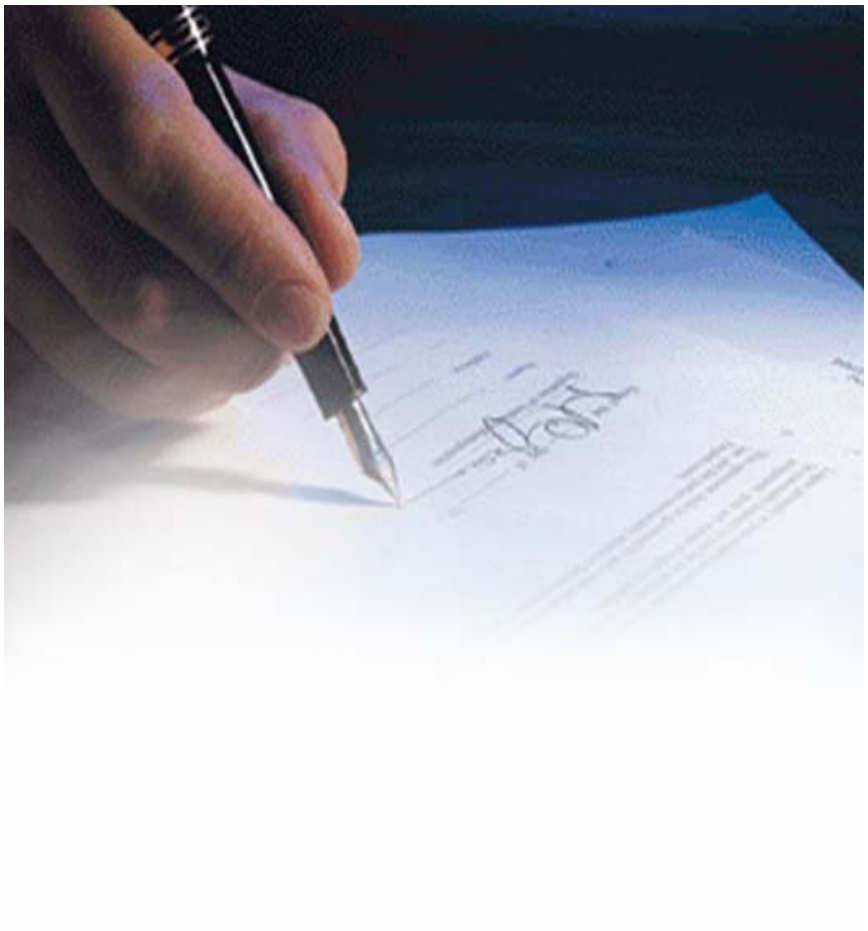
The OA EXCOMM focused on current progress toward implementing open architecture principles of system design and acquisition in support of the Navy's transition to a family of systems that is more affordable, agile, and interoperable. The agenda is attached as enclosure (1). Key points made include:

- The Navy must transition to OA to overcome technical and financial limitations. OA enables a supportable Fleet, but does not inherently provide needed interoperability. We must develop an Enterprise framework that ties all the pieces together. This framework must ensure applications and functions are decomposed in compatible ways, guide selection of programs to be opened, and harmonize the Enterprise OA Way Ahead. Cross-Domain and Cross-Enterprise systems engineering is of vital importance.
- The Navy's organizational structure is purposefully designed to foster interdependence. Systems Commands and PEOs shall coordinate on issues and decisions that affect other commands. They shall also cooperate to remove overlaps and gaps in system capabilities.
- Contract business models for programs designated to evolve to OA shall be analyzed to determine if they foster that transition. Those that do not shall explore alternatives.
- There is an enterprise-wide need for an agile IT governance process that defines tactical and non-tactical IT, aligns Industry in both, identifies boundaries and intersections between C4I and combat systems, and determines how commands interact in support of each other. I intend to engage the ACNO for IT and N7 to discuss a framework to establish an enterprise-wide IT governance process.
- FORCEnet and OA must map into each other and eventually converge.
- The Enterprise will present a coordinated OA budget for POM08. Execution year

OA EXCOMMS

…that comprise the OA strategy

OA requires changing our contracts…



-to **increase competition**

-to **foster innovation** and **reduce costs**

- to **share components** across the enterprise

…and securing the appropriate data rights

Disclosing design artifacts is essential…

PEO-IWS Software Hardware Asset Reuse Enterprise Repository

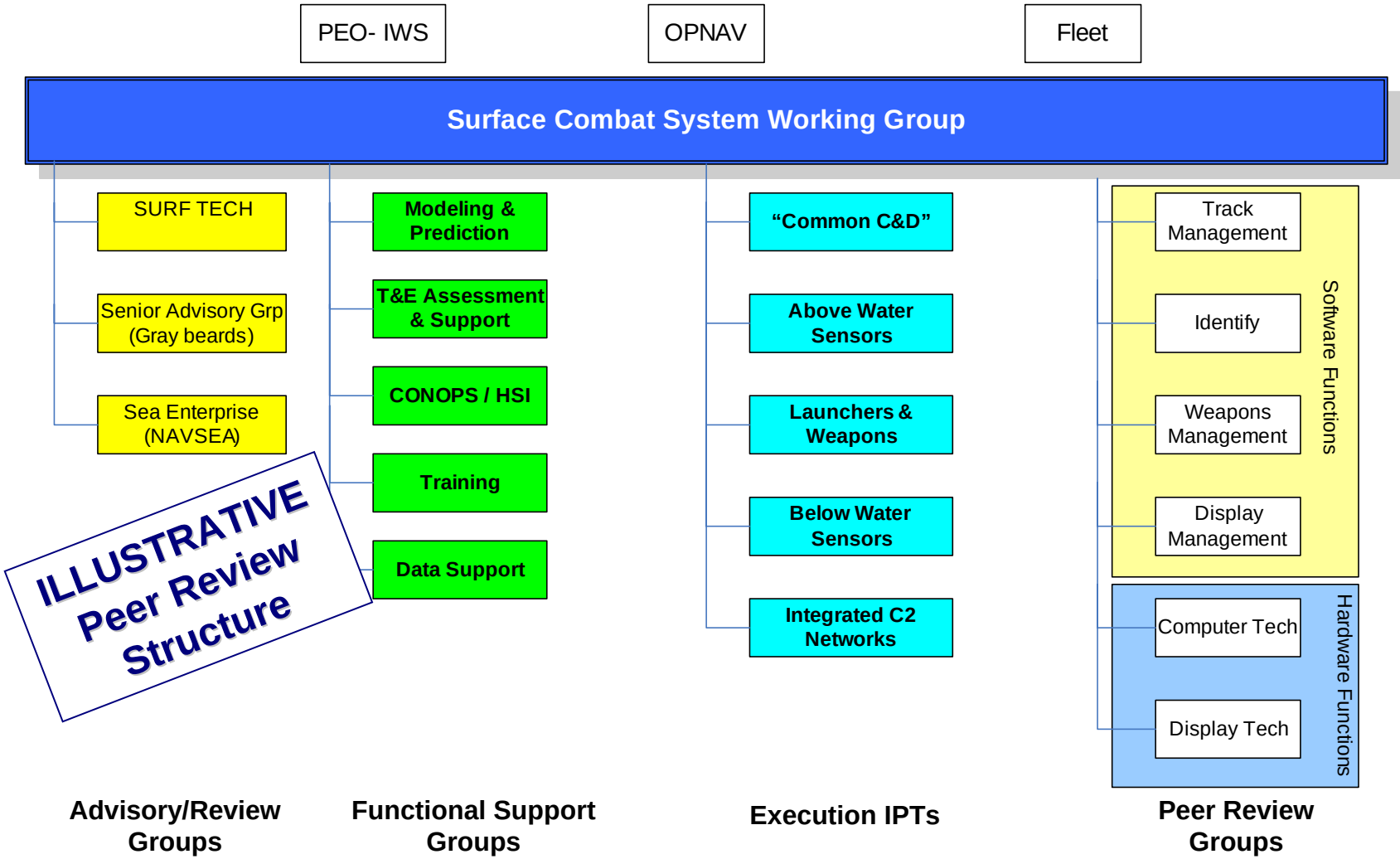
https://viewnet.nswc.navy.mil

PEO-C4I & Space Collaboration Site

https://nesi.spawar.navy.mil

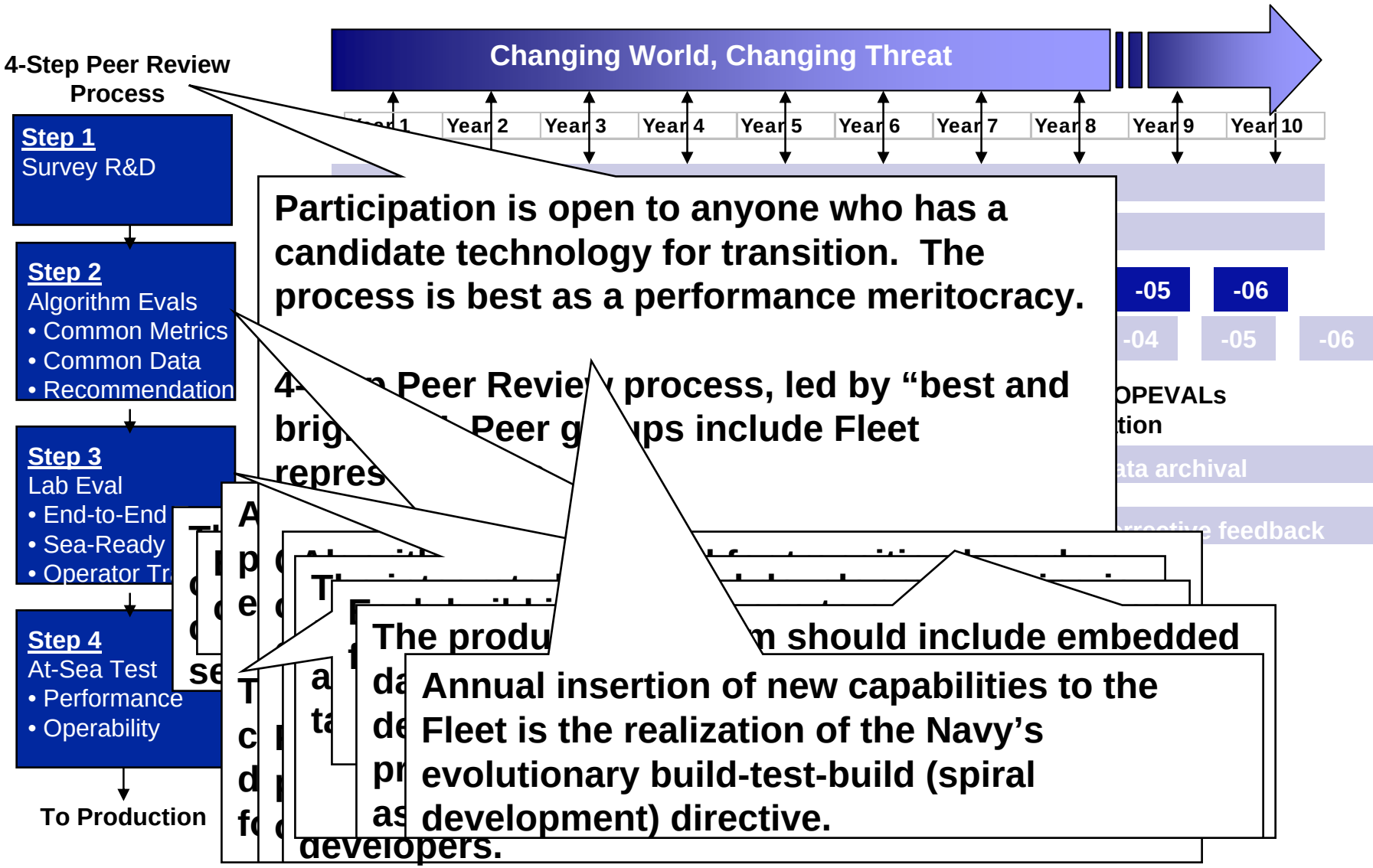
We must facilitate the sharing of government off the shelf products between programs, better understand the interfaces of systems to improve interoperability, and create opportunities for new products.

…as is increasing collaboration



Peer Reviews, COIs, and Collaboration Sites are some methods

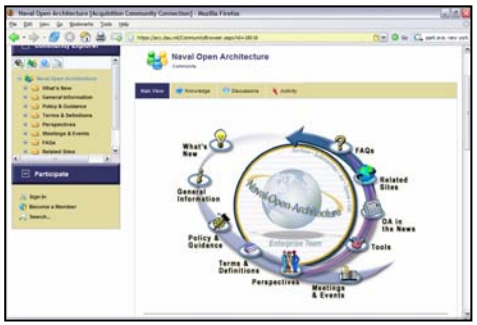
OA enables the rapid insertion of new capabilities



To institutionalize OA, we are changing behaviors thru training, education, and outreach

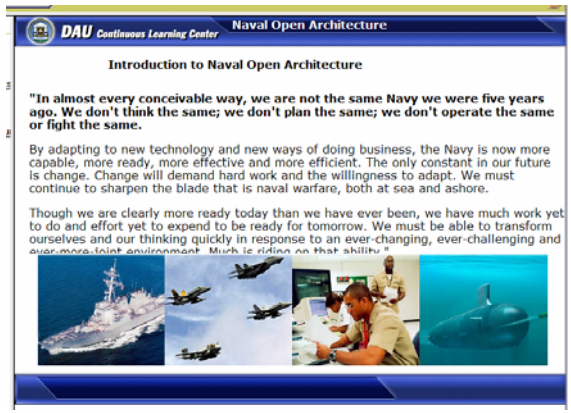
OA Website

https://acc.dau.mil/oa



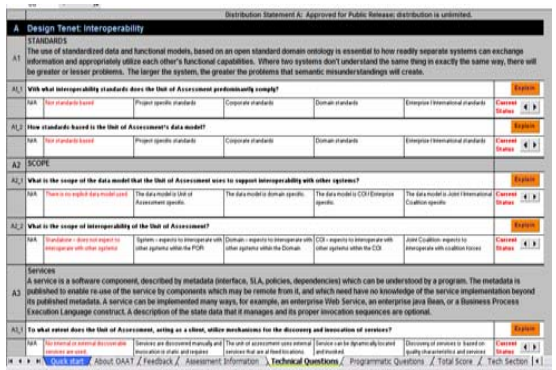
OA Continuous Learning Module

https://learn.dau.mil



OA Industry Days

Open Architecture Assessment Tool



OA changes the way we do business today to build the fleet of tomorrow

OA GOALS

1. Change the Naval processes and **business** practices to "utilize open systems architectures in order to rapidly field affordable, interoperable systems."
2. Provide OA **Systems Engineering** leadership to field common, interoperable capabilities more rapidly at reduced costs
3. Change the Naval and Marine Corps **Cultures** to Institutionalize OA Principles

OA PRACTICES

Disclose design artifacts
Negotiate appropriate data rights
Foster enterprise collaboration
Reuse GOTS products
Institute Peer Reviews
Develop new business models
Incorporate OA in contracts

Publish interfaces
Isolate proprietary components
Use widely adopted standards
Modularize systems

DAU OA Training
Outreach
Government Symposias & Industry Days
NPS Research

Government Programs and initiatives to help small companies

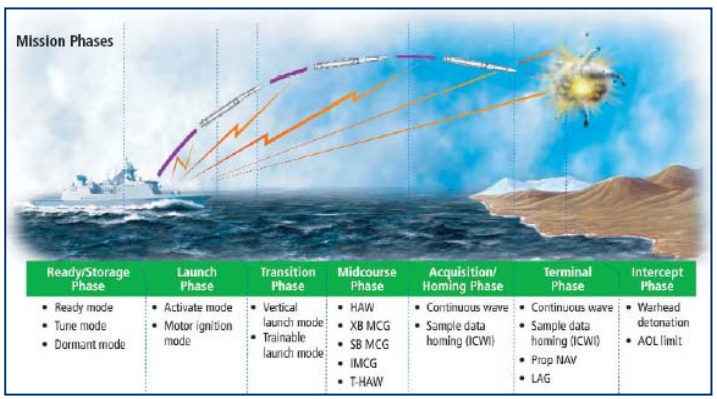
- The Department of Defense Office of Small Business Programs (OSBP) at http://www.acq.osd.mil/osbp/
- The Department of the Navy Office of Small Business Programs (OSBP) at http://www.donhq.navy.mil/OSBP/
- Naval Research Laboratory Office of Small Business Programs at http://sadbu.nrl.navy.mil/SADBU.htm
- The Department of Navy Small Business Innovative Research at http://www.navysbir.com/index.html
- The Department of Navy Program Executive Office for Integrated Warfare Systems Software Hardware Asset Reuse Enterprise Repository at https://viewnet.nswc.navy.mil

Not all inclusive

Naval OA Contacts:
Ms. Rene Thomas-Rizzo, Deputy Program Manager, Future Combat Systems, rene.thomas-rizzo@navy.mil
Mr. Nick Guertin, OA Director, nickolas.h.guertin@navy.mil

The application of OA principles is being applied to weapons programs today

Evolved SeaSparrow Missile (ESSM) is an international cooperative upgrade of the RIM-7 SeaSparrow Missile. ESSM provides self-defense battlespace and firepower against high-speed, highly maneuverable anti-ship missiles.

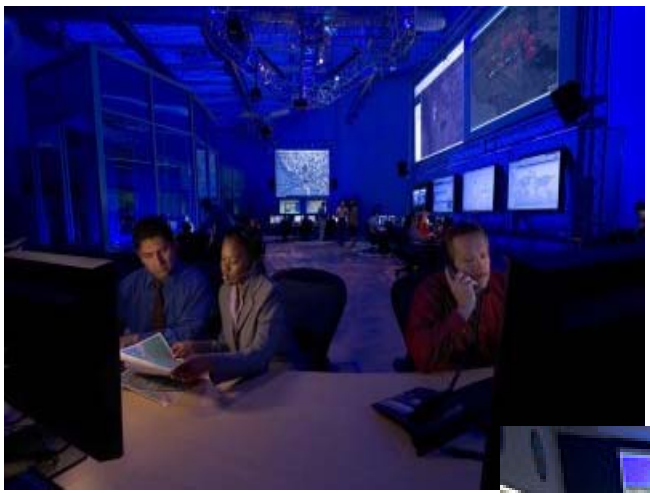


Adopted OA Principles

- ☑ **Design Disclosure** – interfaces are shared among 10 different countries
- ☑ **Reusable software** – several components from the SeaSparrow Missile are reused
- ☑ **Interoperable joint warfighting applications-** data exchanged among several applications
- ☑ **Lifecycle affordability-** lifecycle costs are significantly reduced by sharing resources among the consortium
- ☑ **Collaboration** – 10 countries are collaborating to improve the performance of the SeaSparrow Missile

Industry initiatives to build partnerships with small companies

- Industry Technology / Collaboration Centers



Lockheed Martin

General Dynamics

Northrop Grumman

Representative