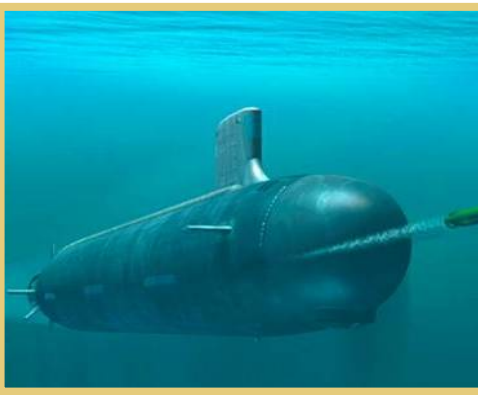
Naval Open Architecture Contract Guidebook Training



29 November 2007

Statement A: Approved for Public Release; distribution is unlimited.

Mr. Nick Guertin
Director, Naval Open Architecture
PEO IWS 7B

Agenda

- What is Naval Open Architecture (NOA)?
- Background on the *NOA Contract Guidebook for Program Managers* version 1.1
- Other OA Tools Available to Programs and Contracts/Legal

What is *Naval Open Architecture* (NOA)

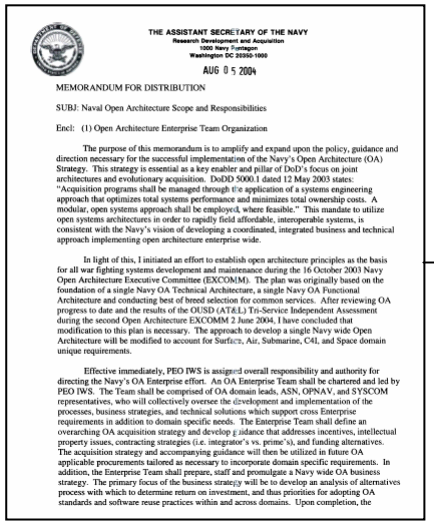
The Navy must build a fleet where mission systems…

… are modular, interoperable, and affordable to upgrade

Leadership has mandated the adoption of *Open Architecture* (OA) practices to meet these challenges

Naval Open Architecture (OA) is the confluence of <u>business and technical practices</u> yielding modular, interoperable systems that adhere to open standards with published interfaces.

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 05 2004

MEMORANDUM FOR DISTRIBUTION

SUBJ: Naval Open Architecture Scope and Responsibilities

Encl: (1) Open Architecture Enterprise Team Organization

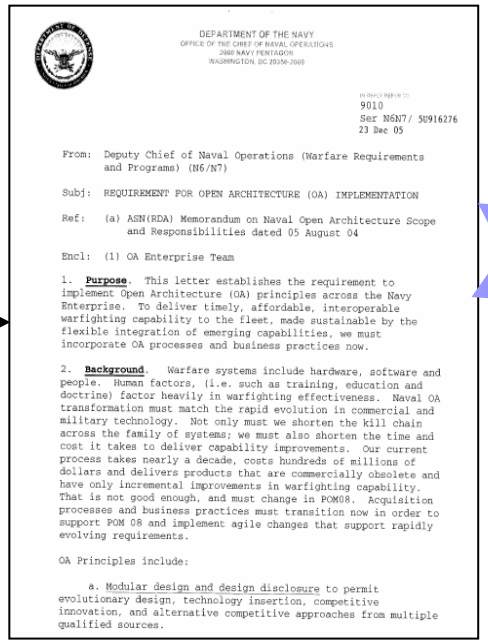
The purpose of this memorandum is to amplify and expand upon the policy, guidance and direction necessary for the successful implementation of the Navy's Open Architecture (OA) Strategy. This strategy is essential as a key enabler and pillar of DoD's focus on joint architectures and evolutionary acquisition. 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 (EXCOM(M)). 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

IN REPLY REFER TO
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

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***

This requires business, technical, and cultural changes

OA GOALS

1. Change the Naval processes and **business** practices to "utilize open systems architectures in order to rapidly field affordable, interoperable systems."

Provide OA **Technical 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
Institute Peer Reviews of solutions
Develop new open business models
Change contracts / increase competition

Publish interfaces
Isolate proprietary components
Use widely adopted standards
Modularize systems
Reuse software products
Build interoperable applications

OA Training
Outreach - Symposias & Industry Days
Research

The mandate to adopt OA is being driven from the top down

Chief of Naval Operations

- N6
- N8
  - OA CROSS FUNCTIONAL BOARD
- SYSCOMS

- Provide Naval requirements and POM/PR guidance to acquisition community
- Identify requirements for rapid, cost-effective, interoperable warfighting improvements with the objectives of supporting OA

Assistant Secretary of the Navy for Research, Development & Acquisition

PEO-IWS leads the OA Council

- OA Lead Council
- OA Enterprise Team
  - AIR
  - C4I
  - SPACE
  - SURFACE
  - SUB
  - MARINE CORPS

- Lead the enterprise to OA implementation
- Oversee the development and implementation of the processes, business strategies, and technical solutions for implementing OA
- Provide OA Systems Engineering Leadership to PEOs, Warfare Centers, Industry, etc.

- PEOs

- Identify architectures unique to domains and implement a process to ensure OA compliance

- SYSCOMS

- Provide technical, financial management and contracting support to PEOs
- Establish OA technical processes
- Monitor and assess compliance with OA standards and processes

Background on the *NOA Contract Guidebook*

History of the Open Architecture (OA) Contract Guidebook

<u>05 Aug 2004 OA Policy Memo</u>

- After OA EXCOMM II, ASN RDA directed PEO IWS and the OA Enterprise Team (OAET) to: "Define an acquisition strategy addressing incentives, intellectual property issues, ***contracting*** (integrators vs. primes) and funding alternatives."

DEPARTMENT OF THE NAVY
OFFICE OF THE ASSISTANT SECRETARY
RESEARCH, DEVELOPMENT AND ACQUISITION
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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.

For each recommendation, there is an associated set of actions that are detailed in enclosure (1). Though tasked in a 'lead-follow' format for accountability, I expect all actions to be fully endorsed and implemented by all stakeholders. A list of attendees from this EXCOMM is included in Enclosure (2).

It was re-emphasized during discussions at the OA EXCOMM #2 that the use of Open Architecture precepts as the basis for achieving our stated goals is critical to the long term needs of the Navy Enterprise. Today's computing architectures in the fleet are performance limited and expensive to upgrade. At the highest levels, the Navy recognizes the advantages of Open Architecture and has set out to implement a Commercial Off-the-Shelf Based Open System to increase processing capacity, provide system growth potential, reduce cycle time for future upgrades, realize inherent space/weight reductions, and enable a better return on investment dollars. Implementation of war fighting functions using an Open Architecture (OA), standards based solution will enable common, interoperable capabilities to be fielded more rapidly at reduced cost and enable more effective technology insertion.

Decision 3: OA efforts need to be guided by a well-defined business strategy.

Action: Prepare, staff and promulgate a Navy-wide business strategy to support OA goals.

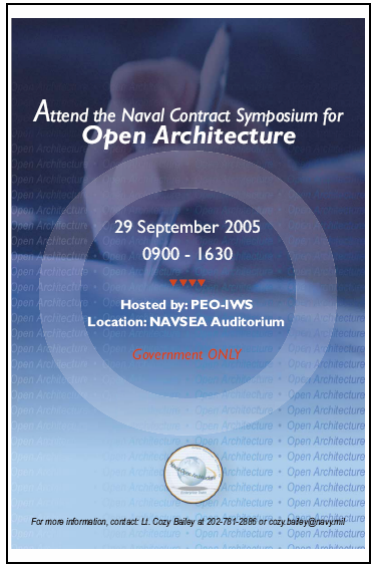
Business Strategy shall:

- Define an acquisition strategy addressing incentives, intellectual property issues, contracting (integrators vs. primes), and funding alternatives.
- Incorporate inputs from each lead PEO on current application of OA within its programs and identify if any OA redirection is needed or desired with associated costs. This includes a business case analysis for OA implementation across the Enterprise that is based on established criteria.
- Provide a prescribed format to be used by PEOs for OA compliancy waivers.
- Determine total cost estimate of projected OA effort for input to PR-07. Industry and academia participation is required.
- Provide programs with analysis tools needed to make OA tradeoffs.

Lead: PEO IWS
Follow: Enterprise Team
Due Date: 31 August 2004

History of the Contract Guidebook (continued)

- Pursuant to this guidance, the OAET first set out to conduct a Baseline Assessment of OA in Navy and Marine Corps Contracts
  - Each of five Domains volunteered 2 contracts to be assessed
  - Program and contract staff were interviewed by OAET representatives
  - A baseline assessment of best practices and lessons learned was developed
- The assessment led to the September 2005 OA Contract Symposium



History of the Contract Guidebook (continued)

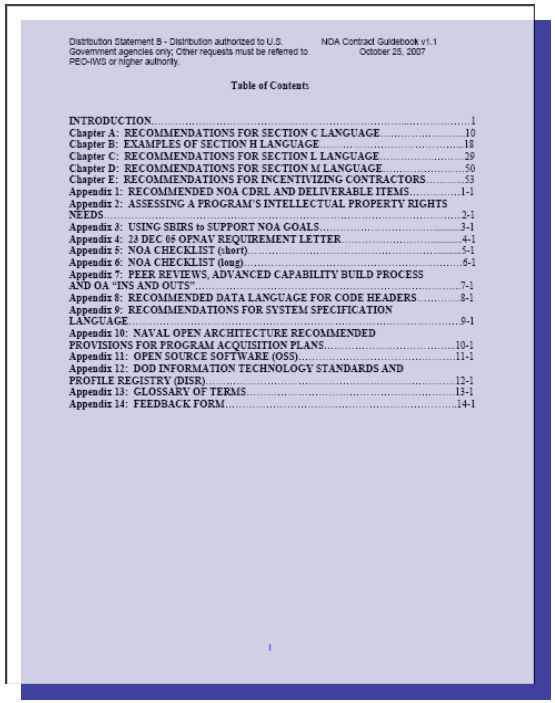
- Subsequent to the Contract Symposium, the OAET with the help of NAVSEA, SPAWAR, and NAVAIR contracting offices gathered best practices and lessons learned and put them in the *Naval OA Contract Guidebook for Program Managers*, version 1.0, signed out by PEO IWS RDML Michael Frick on 05 July 2006

- Intended to be a living document, the next spiral of the *OA Contract Guidebook* incorporated more than 100 suggestions from a range of sources including DASN(ACQ); version 1.1 was signed out by PEO IWS RDML Terry Benedict on 25 October 2007

***NAVSEA 00L (Legal) insisted that we publish two editions – one Statement A for Contractors, one Statement B for Government employees only**

Introduction to the Naval OA Contract Guidebook

- The Guidebook is recommended for use by Navy and Marine Corps Program Managers and Contracting Officers – and has been provided to DISA, USAF, and other DoD organizations
- For Programs incorporating NOA principles into National Security System (NSS) programs
- The recommended language should be tailored based on Domain, PEO, or Program-specific requirements
- The Guidebook is divided into five chapters of suggested contract language for Sections C, H, L, and M, and Incentive Plans
- Additionally, there are 14 Appendices on various topics, including CDRLs, intellectual property rights, peer reviews, and system specification language



Distribution Statement B - Distribution authorized to U.S. Government agencies only; Other requests must be referred to PEO-IWS or higher authority.

NOA Contract Guidebook v1.1
October 25, 2007

Table of Contents

INTRODUCTION....1
Chapter A: RECOMMENDATIONS FOR SECTION C LANGUAGE....10
Chapter B: EXAMPLES OF SECTION H LANGUAGE....18
Chapter C: RECOMMENDATIONS FOR SECTION L LANGUAGE....29
Chapter D: RECOMMENDATIONS FOR SECTION M LANGUAGE....50
Chapter E: RECOMMENDATIONS FOR INCENTIVIZING CONTRACTORS....53
Appendix 1: RECOMMENDED NOA CDRL AND DELIVERABLE ITEMS....1-1
Appendix 2: ASSESSING A PROGRAM'S INTELLECTUAL PROPERTY RIGHTS NEEDS....2-1
Appendix 3: USING SBIRS to SUPPORT NOA GOALS....3-1
Appendix 4: 23 DEC 05 OPNAV REQUIREMENT LETTER....4-1
Appendix 5: NOA CHECKLIST (short)....5-1
Appendix 6: NOA CHECKLIST (long)....6-1
Appendix 7: PEER REVIEWS, ADVANCED CAPABILITY BUILD PROCESS AND OA "INS AND OUTS"....7-1
Appendix 8: RECOMMENDED DATA LANGUAGE FOR CODE HEADERS....8-1
Appendix 9: RECOMMENDATIONS FOR SYSTEM SPECIFICATION LANGUAGE....9-1
Appendix 10: NAVAL OPEN ARCHITECTURE RECOMMENDED PROVISIONS FOR PROGRAM ACQUISITION PLANS....10-1
Appendix 11: OPEN SOURCE SOFTWARE (OSS)....11-1
Appendix 12: DOD INFORMATION TECHNOLOGY STANDARDS AND PROFILE REGISTRY (DISR)....12-1
Appendix 13: GLOSSARY OF TERMS....13-1
Appendix 14: FEEDBACK FORM....14-1

Suggested Contract Language

Recommendations for Section C Language

Section C of the Request for Proposal (RFP) and the resulting contract contains the detailed description of the products to be delivered or the work to be performed under the contract

Recommended OA language for Section C covers topics such as:

- Modular, open design
- Inter-component dependencies
- Design information documentation
- Technology insertion
- Interface design and management
- Treatment of proprietary elements
- Open business practices
- Reuse of pre-existing or common items

Sample Language

"Inter-component Dependencies – The Contractor's design approach shall result in a layered system design, maximizing software independence from the hardware, thereby facilitating technology refresh."

Recommendations for Section H Language

Section H of the RFP and the resulting contract contains special clauses that can be incorporated into contracts as appropriate

Recommended Section H clauses for OA contracts include:

- Requirement for an Open System Management Plan
- Early and Often Technical Disclosure
- Rights in Commercial Technical Data (TD), Commercial Computer Software (CS), and Commercial Computer Software Documentation (CSD)
- Specially Negotiated License Rights
- Special Provisions for the Purpose of Configuration Control
- Special Development Limitation Provisions

Sample Language

"**Clause H: Requirement for an Open System Management Plan.**

The contractor shall submit an Open System Management Plan. At minimum, the plan shall address:

Technical Approach and Processes

Open Systems Approach and Goals. The contractor shall prepare and submit for government approval its Open System Management Plan which shall include its approach for using …"

Recommendations for Section L Language

Section L of the RFP provides proposal instructions, conditions and notices to Offerors. Offerors should be encouraged to clearly demonstrate, through their use of similar technologies previously developed, the ability to meet the design, development, testing, and production requirements of the solicitation.

Recommended OA language for Section L addresses:

- Technical Approach and Processes
- System Compliance with Naval OA Guidance
- Management Approach
- Data Rights and Patent Rights
- OA Past Performance

Sample Language

"**Factor ( ) Data Rights and Patent Rights** …

The Offeror shall describe its plan for making design and interface information available as soon as possible after it is defined or established. The Offeror shall establish and maintain a process that will provide 'early and often' design disclosure directly to the Government or to third-party contracts."

Recommendations for Section M Language

Section M contains only recommended guidance for evaluation factors for contract award. Individual PEOs and programs can be flexible in selecting and weighting those items needed to meet their needs.

Recommended Section M evaluation factors for award of OA contracts include:

- Technical Approach and Processes
  - Open Systems Approach and Goals
  - Interface Design and Management
  - Treatment of Proprietary or Vendor-Unique Elements
  - Life Cycle Management and Open Systems
- System Compliance with Naval OA Guidance
- Management Approach
- Data Rights, Computer Software Rights and Patent Rights

Sample Language

"In evaluating the Management Approach, the Government will use information in the proposal to assess the degree to which the Offeror's approach facilitates competition at various levels (tiers) of the offered modular system, awards significant portions of the overall system to third-party sources, and uses Integrated Product Teams (IPTs) to improve processes, manage risk, and increase efficiency."

Recommendations for Incentivizing Contractors

Award Fee, Incentive Fee, and Award Term plans can be used by programs to incentivize and award contractors for implementing Naval Open Architecture principles.

Incentive plans can be used to award contractors for:

- Incorporating considerations for portability, maintainability, technology insertion, vendor independence, and reusability
- Implementing a layered and modular system
- Minimizing inter-component dependencies
- Collaborating with the Government and other contractors and vendors
- Reducing development cycle time
- Using open, standards based interfaces
- Enabling rapid technology insertion

Award Terms – Instead of rewarding contractors with additional fees for exceptional performance, award term contracts reward contractors by extending the contract period of performance in the form of additional term periods added on to the basic contract.

Appendices to the Guidebook

Appendix 1: Recommended NOA CDRL and Deliverable Items

- The Guidebook provides examples of Contract Data Requirements List (CDRL) and other deliverable items that support NOA, facilitate component reuse, and can be incorporated into contracts

- Examples:
  - Open system management plan
  - Results of periodic NOA assessments
  - A common data model for the system
  - Executable code
  - Software test programs and source code
  - Interface requirement specification

- This is an area of considerable interest and one that we are working to continually improve as our knowledge improves

Appendix 2: Assessing Intellectual Property Rights Needs

- Consistent with Under Secretary of Defense (Acquisition, Technology and Logistics) Memorandum on Data Management and Technical Data Rights,19 July 2007, directing programs to take steps to identify and manage their Intellectual Property Rights (IPR)
- Contains pointers on the questions that a data rights assessment should answer
- Discusses points to consider about data rights and rights in computer software and computer software documentation
- Cites sections of the Federal Acquisition Regulations (FAR) and Defense Federal Acquisition Regulation Supplement (DFARS) that provide information about IPR

Appendices 3 & 4: Using SBIRs and the OPNAV OA Requirement

Using SBIRs to support NOA goals

- NOA recognizes the importance of small businesses in stimulating innovation and enhancing competition
- The Small Business Innovation Research (SBIR) program offers an opportunity for PMs to identify, evaluate, and insert qualified small-business-developed technologies into programs
- However, PMs need to be aware of the special data rights associated with SBIRs

The OPNAV OA Requirement Letter

- Sets out the 5 OA principles: modularity, interoperability, reuse, lifecycle affordability, and competition and collaboration
- Provides requirement to build an OA asset repository to support software asset reuse
- Also directed conduct of OA / FORCEnet “experiments” to prove concepts and approaches

Appendices 5 & 6: The Naval OA Checklists

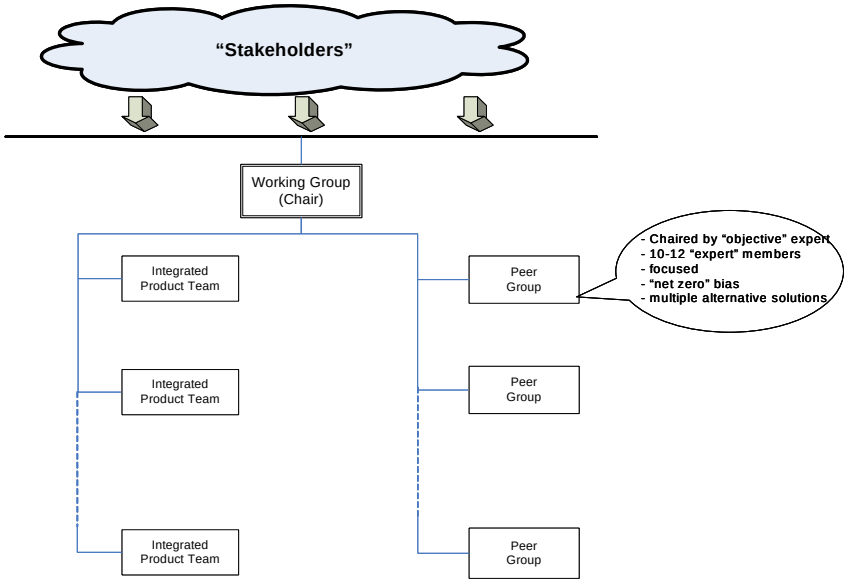
- Developed by the OAET to facilitate the implementation of NOA and to provide PMs, PEOs, and the Milestone Decision Authority an easy way to check to see that programs are implementing the main points of OA

- The short checklist is intended to be a quick check on a system's programmatics that when properly applied will yield the benefits of an open system

- The long version of the checklist is divided up consistent with the five OA principles laid out by OPNAV in the OA Requirement Letter

Appendix 7: The Peer Review Process

- The Peer Review process was vital to the implementation of OA in Sub Domain's Acoustic Rapid COTS Insertion (A-RCI) program
- The Surface Navy intends to incorporate this process, modified as appropriate, in its implementation of OA
- Peer Review basics:
  - Evaluate candidate technologies
  - Using "open" (known) and "closed" (previously unknown) data sets
  - A refereed, open process
  - Including representation from government, contractors, academia, and other private sector entities
  - Membership as a whole is unbiased and impartial



Appendix 8: Recommended Data Language for Code Headers

- Deliverable artifacts should include embedded data or language in code headers or in other locations that provides key information for those seeking to use these items in the future
- Appendix 8 includes recommendations for such language
- Developed by SPAWAR
- The following are suggestions that can be used as appropriate for artifacts delivered under the various types of licensing rights:
  - Unlimited Rights
  - Government Purpose Rights (GPR)
  - Specially Negotiated License Rights.

Appendix 9: System Specification Language

- Developed and recommended for inclusion by representatives from the Software Process Improvement Initiative (an effort sponsored by ASN(RDA) to improve how the Navy oversees and manages the acquisition and contractor development of software-intensive systems.

- The System Specification is the document that defines the requirements of the system to be built and delivered. It is against the system specification that the selected contractor will direct its development effort.

- Provides recommendations on the six general types of information should be contained in a system specification. These include System Operating Requirements, Required Capabilities, Behavioral Requirements, Quality Requirements, Quality Requirements, and Implementation Requirements.

- The System Specification does not generally include any programmatic requirements, dealing with cost, schedule, and other contractual items.

- It is crucial that the desired open system attributes of the system be captured in the System Specification, since this document provides the basis for the development effort.

Appendix 10: NOA Provisions for Program Acquisition Plans

- Contracts implement an individual program's Acquisition Strategy and Acquisition Plan.
- It was developed to provide guidance to Program Managers and others to help them incorporate the OA principles and other pertinent information into their acquisition plans and strategies.
- These provisions are not intended to be the complete sections of an Acquisition Plan, rather, they are suggested OA-related provisions to include in the named sections of acquisition plans, as appropriate for each domain, Program Executive Office, or program.
- Language grew out of PEO IWS 7's recommendations / comments on draft acquisition plans that have been reviewed over the past year.
- We are in the process of developing recommended changes for NAVSEA's Acquisition Plan and Acquisition Strategy Guides.

Appendix 11: Open Source Software (OSS)

- The terms “open source” and “open architecture’ are often confused and at times are incorrectly used interchangeably, however, they are distinct

- Open Source Software (OSS) presents the Government with unique challenges with respect to some OSS licensing requirements

- This Appendix explains issues to consider when using OSS, such as the inability to negotiate license terms and “viral” licenses

Appendices 12-14: DISR, Glossary of Terms, and Feedback

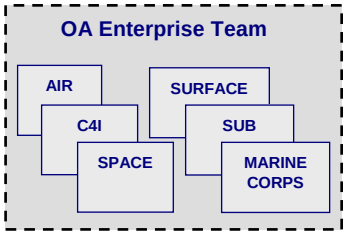
- **Appendix 12** provides a brief overview of the DoD Information Technology Standards and Profile Registry – an online repository of IT standards

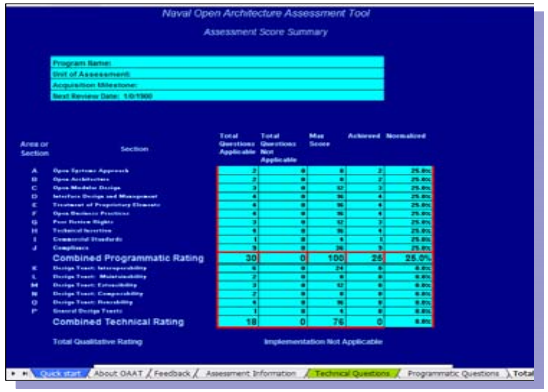
- **Appendix 13** is a glossary of NOA-related terms that appear throughout the Guidebook

- **Appendix 14** is the Guidebook Feedback Form

Other Tools and Information on Naval OA

The OA Enterprise Team is responsible for developing tools and guidance to institionalize OA practices





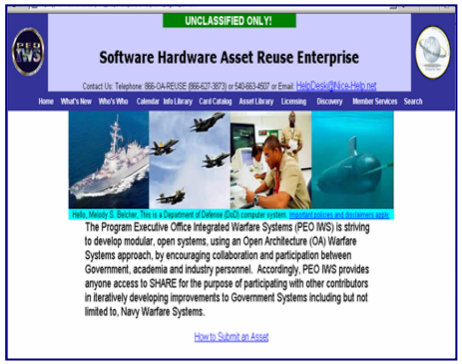
OA Assessment Tool

- Provide Program Managers with a tool to measure how open their programs are today from a business and technical perspective
- Roughly 80 questions in an Excel spreadsheet
- Over 150 Assessments completed to date
- A diagnostic for the PM – input into the decision making process for changing programs or architectures

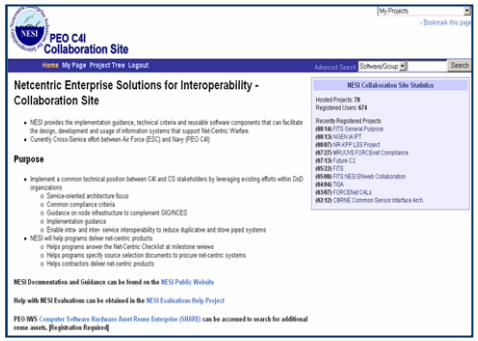
(Continued)

Repositories for Design Disclosure and Reuse

- Develop common end-user licensing agreement to access repositories and use assets
- Publish Interfaces of mission systems



- Domain **Surface** pilot repository underway (SHARE)
  - 143 registered users (85 government / 58 contractors)
  - 61 assets contributed (e.g. design, code, data models)
  - 246 requests for assets, 132 processed
  - First redeposit of changed assets--a third-party contractor returned modified AEGIS code to the repository for future reuse



- Domain **C4I** Collaboration Site (NESI)
  - 731 registered users to date
  - 73 projects in NESI

(Continued)

Build Communities of Interest to Promote Enterprise Collaboration

- ASW Community of Interest
- Significant reuse across 8 ASW platforms
- ~40 organizations participating (Fleet, OPNAV, Acquisition)
- ASW Data Strategy in development (Command and Control)
  - Alignment with JFCOM Joint C2 Capability Portfolio
  - Pilot Demos for C2, Sensors & Sensor Performance Prediction
- Metrics in development

(Continued)

Training

- OA Learning Module (101)
- Almost 400 graduates

Outreach

- OA Website - 301,025 page hits in last year
- Most viewed Section – Tools
  - Contract Guidebook, Learning Module, Assessment Tool
- Participation in 15 conferences
- Coordination with Air Force

Press

- At least 10 separate articles on OA
- Coverage in 8 different publications

Wrap-Up

The *OA Contract Guidebook* is an evolving document with high visibility within the Navy and Congress

- We will be reporting on the number of contracts that incorporate this OA language to Navy leadership and Congress.
- We need your input on its usability, accuracy, and clarity – specific recommendations are welcome!
- Please use the feedback form in the *OA Guidebook* or contact us directly!
- Areas for future update include addressing Services Oriented Architecture, and enhancing CDRLs to facilitate Re-Use.

More information on Naval OA is also available on the Web at https://acc.dau.mil/oa