Open Architecture Road Show Brief

Designed specifically for United States Marine Corps
Program Managers

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

November 07

*Imagine a military where our systems are **modular . . .***

***. . . and affordable** to upgrade*

We could accommodate
changing technology
and requirements.

We could provide
interoperable capabilities
to our warfighters.

We could build a better force for tomorrow!

*Imagine an environment where our **contracts** were **flexible . . .***

We could **increase competition** to foster innovation!

We could **share components** across our services!

. . . and secured the appropriate **data rights**.

How will we get there?

NAVAL OPEN ARCHITECTURE

A multi-faceted strategy providing a framework for developing joint interoperable systems that adopt and exploit open-system design principles and architectures

NAVAL OA CORE PRINCIPLES

- ***Modular design and design disclosure***
- ***Reusable application software***
- ***Interoperable joint warfighting applications and secure information exchange***
- ***Life cycle affordability***
- ***Increased competition and collaboration***

Open Architecture is our path forward!

How will we change?

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

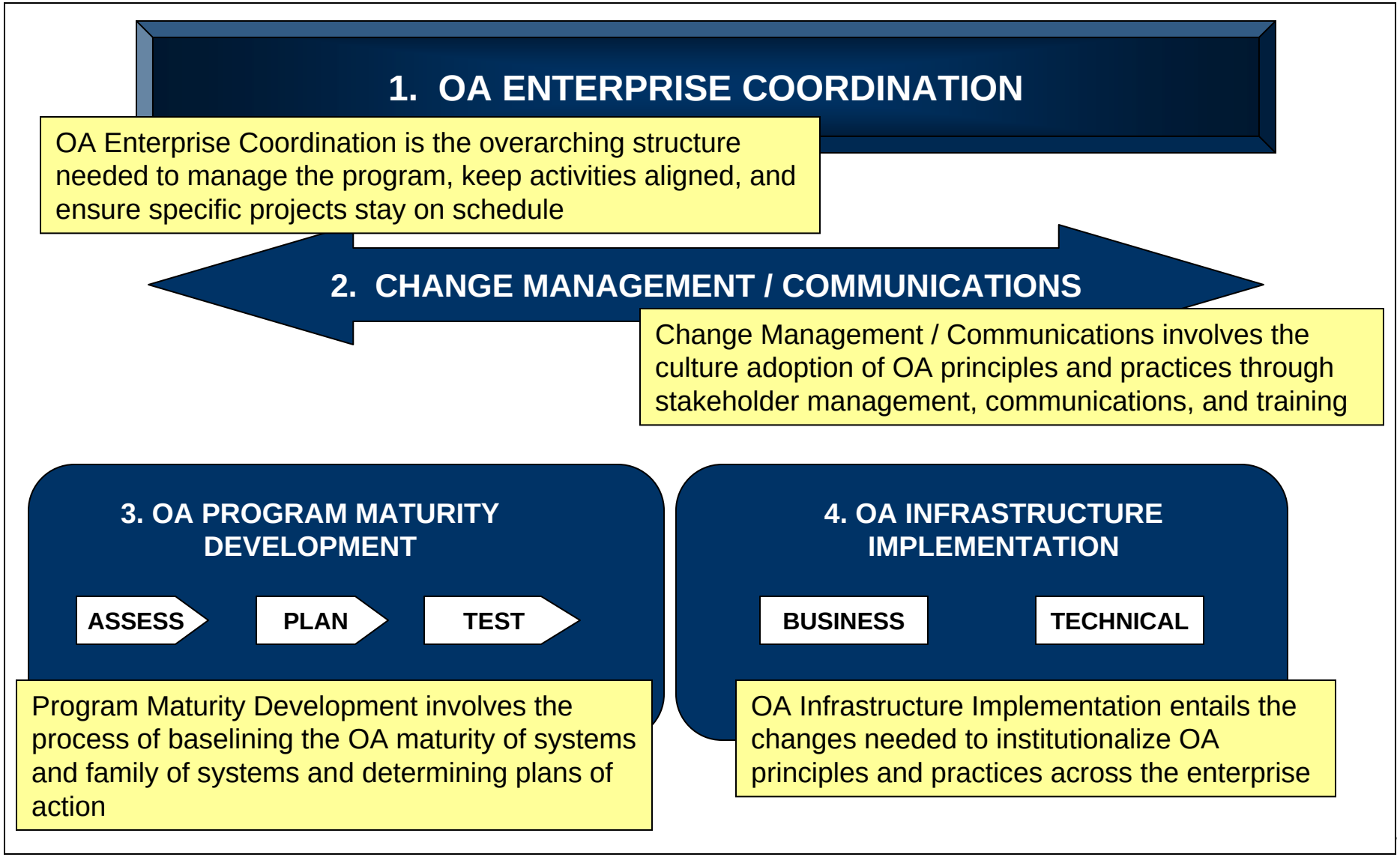
- Share products and assets across the enterprise
- Share knowledge and ideas through communities of interest
- Provide easy access to products through government data rights

Collaborate

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

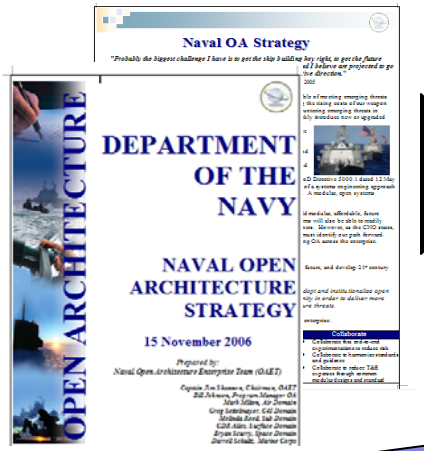
The OA Roadmap is the Navy's plan for reaching an end-state

OA Transformation Roadmap



Although the Navy has developed an OAET enterprise roadmap, each domain is responsible for their own implementation roadmap

OA Strategy



OA Enterprise Implementation Roadmap

- Implementation Roadmaps are a requirement of the DoN's Goals
- Each Domain should be prepared to brief out their OA Roadmap

Domain Implementation Roadmaps

AIR	C4I	SPACE	SUBS	SURFACE	MARINE CORPS
					

"Each PEO will be accountable for managing OA within their warfare system domain." 5 Aug 2004 OA Policy

POCs

So, how will OA benefit the services?

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 Commercial-off-the-shelf (COTS) products at optimum prices ■ Reduced training and streamlined lifecycle support

The Marine Corps must embrace and support the changes in processes, business practices and cultural attitudes in order to fulfill the directives and realize these benefits

But, *why?!*

- **Should the overwhelming benefits of OA not be enough, know that OA implementation is policy!**

- **Clear direction has been provided on our future path . . .**

Identify trends beyond OA

Implement a new business model

Identify new platform acquisition strategies

Change business processes

Accelerate OA in all Domains

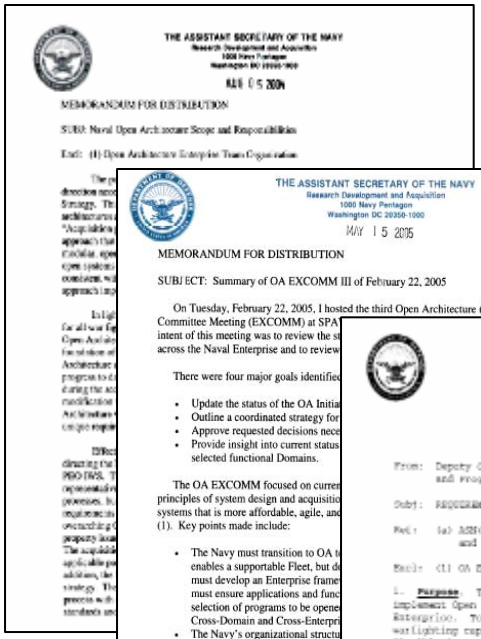
Incorporate OA language into contracts

Identify changes to T&E

Implement a Peer Review Process

OA requirements and program responsibilities form the basis for three overarching goals – business, technical, and culture

5 August 2004 OA Policy Statement



THE ASSISTANT SECRETARY OF THE NAVY

MEMORANDUM FOR DISTRIBUTION

SUBJ: Naval Open Architecture Scope and Responsibilities

Encl: (1) Open Architecture Enterprise Team Organization

OA EXCOMM Action Items

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

MAY 15 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 SPA... intent of this meeting was to review the st... across the Naval Enterprise and to review...

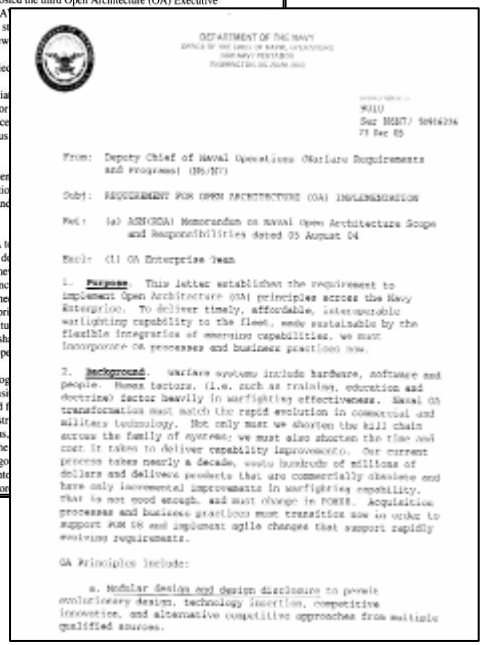
There were four major goals identifie...

- Update the status of the OA Initia...
- Outline a coordinated strategy for...
- Approve requested decisions nece...
- Provide insight into current status... selected functional Domains.

The OA EXCOMM focused on curren... principles of system design and acquisitio... systems that is more affordable, agile, and... (1). Key points made include:

- The Navy must transition to OA t... enables a supportable Fleet, but d... must develop an Enterprise frame... must ensure applications and func... selection of programs to be opene... Cross-Domain and Cross-Enterpri...
- The Navy's organizational structu... Systems Commands and PEOs sh... commands. They shall also coope... capabilities.
- Contract business models for prog... determine if they foster that transi...
- There is an enterprise-wide need f... and non-tactical IT, aligns Industr... between C4I and combat systems, ... each other. I intend to engage the... establish an enterprise-wide IT go...
- FORCEnet and OA must map inte...
- The Enterprise will present a coor...

23 December 2005 OPNAV Requirements



DEPARTMENT OF THE NAVY

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, wastes 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 FORCE. Acquisition processes and business practices must transition now in order to support FNN 06 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 GOALS

Change the Naval processes and <u>business practices</u> to "utilize open systems architectures in order to rapidly field affordable, interoperable systems."

Provide OA <u>Systems Engineering</u> leadership to field common, interoperable capabilities more rapidly at reduced costs

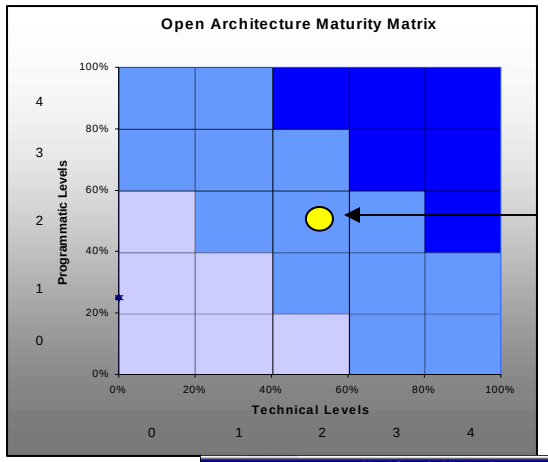
Change the Naval and Marine Corps <u>Cultures</u> to Institutionalize OA Principles

November 07

OA Assessments:
Where are we today?

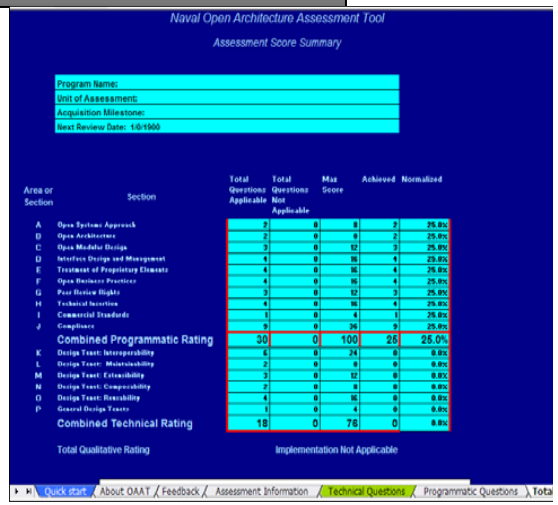
A first step in implementing OA is to conduct assessments to better understand how **open** our programs are **today**

- **Background**
  - Leadership has required that program managers complete OA assessments.
  - The OA Assessment Model (OAAM) and OA Assessment Tool (OAAT) were developed to support this action
  - *In order to know where to go, you must know where you are!*



OA Metric

OA Assessment Report

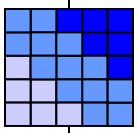


The OAAT helps determine where a program plots on the OAAM as a result of responses to 72 questions

OA Assessment Tool (OAAT)

Release Version 1.1

- Excel
- Purpose – Automated tool with 31 technical and 41 Business questions that serve as **Definition of, Metrics for and Examples of OA "Openness"** via program self assessment'
- Directly linked to the Modular Open Systems Approach PART
- Uses OAAM to present results

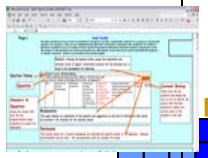


OA Assessment Model (OAAM)

Release Version 1.0 – Mar 8, 2005

PowerPoint

- Purpose – Concisely depict a program's technical and business 'openness' on the 5 x 5 matrix model



OA Assessment Tool (OAAT)

- Used to measure "As-Is Openness"
- Provides examples and options for Program of Record technical and business changes
- Best OAAT implementation involves small OA team (2 - 3 experts) working with PMs to evaluate as is conditions and explore options for tech and business change options based on proven lessons learned and examples from other programs
- OAAT Version 1.1 incorporating Modular Open Systems Approach PART questions into one tool out for review and comment

Naval OA Vision

- **Align**
- Share
- Collaborate

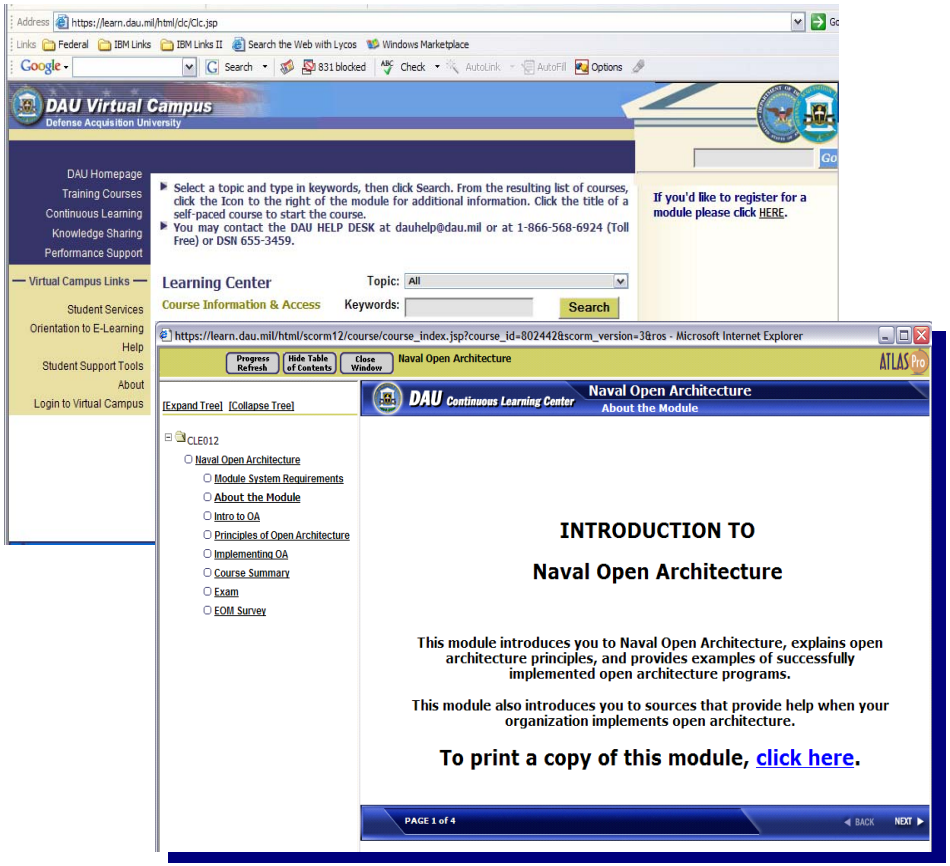
Education and Training:
Getting the word out

Educating the DoD Community

- Special Interest Areas on the web
- Symposiums and Demonstrations
- Defense Acquisition University (DAU) courses
- Conferences
- Workshops
- Briefings (Road Shows, etc.)

OA Special Interest Area - https://acc.dau.mil/oa

In support of changing the culture through training, the first OA Continuous Learning module was recently launched through DAU



Course Overview

- Introductory OA Training Module
- Target Audience: Acquisition Professionals, Sponsors, and Fleet Requirements Officers
- Continuous Learning Credit Received
- Est. Course Time: 2 hours
- Prerequisite for 2-day OA workshop

To launch the course go to: https://learn.dau.mil/html/clc/Clc.jsp

Contracts Guidebook:
Changing the Culture

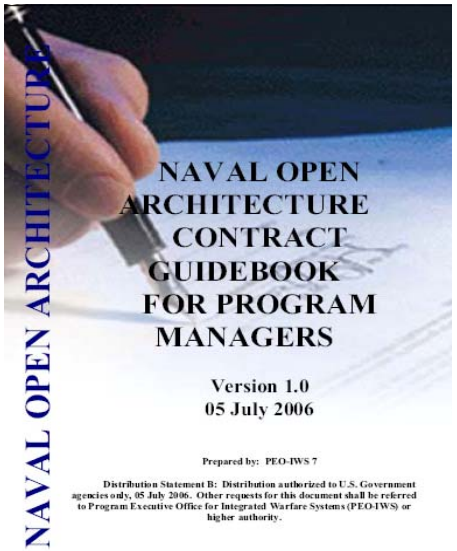
Changing the way we contract for combat systems is the next area we must address to implement OA

Tasking

The Enterprise Team shall define an OA Acquisition strategy and develop guidance….The accompany guidance will then be utilized in future OA procurements tailored as necessary to incorporate domain specific requirements.

-Naval OA Policy Statement, 05 Aug 2004

Guidebook



Implementation Plan

- Build Awareness and Obtain Leadership Sponsorship
- Issue OA Contract Guidebook V 1.0
- Conduct Training on OA Guidebook
- **Incorporate Language in Contracts**
- Institute Feedback Mechanisms "Build-Test-Build"
- Conduct Progress Evaluations

Communicate

" Until contracts include OA language, incentives, and award fees under the new paradigm, things will not change" - Quote from Industry Day participant

Leveraging the OA Contract Guidebook is essential

Naval OA Vision

- Align
- **Share**
- Collaborate

Asset Reuse:
Creating a Repository

In order to:

- Lower Engineering Costs
- Reduce Risk
- Improve Interoperability
- Increase Competition and Collaboration

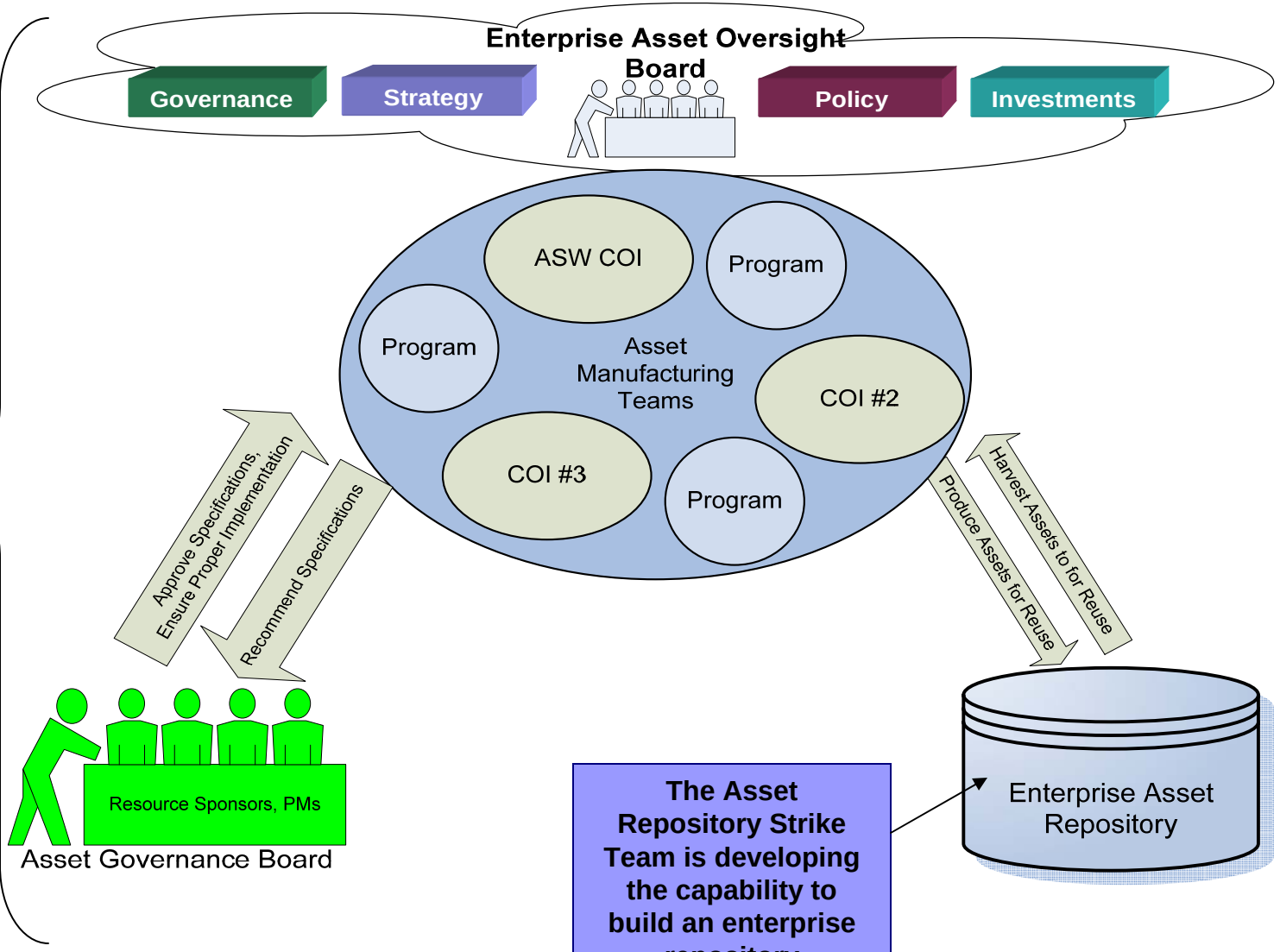
. . . Knowledge Sharing and Asset Reuse across all domains must be exercised.

By utilizing an asset repository, upgraded systems can leverage proven reusable components while reducing costs.

We're collaborating with the ReUse team to examine developing a Marine Corps asset reuse repository

ILLUSTRATIVE

The Asset Reuse Strike Team is developing the strategy to facilitate reuse



The Asset Repository Strike Team is developing the capability to build an enterprise repository

One Approach:
SHARE – Software Hardware Asset Reuse Enterprise

- PEO IWS directed Program Managers to use an **asset repository** approach to help "**open up**" the surface Navy business model. The PEO IWS Software Hardware Asset Reuse Enterprise (SHARE) repository was established for this purpose.

- After proper account registration, an individual may search the SHARE website for a particular asset.

- User can search for asset availability and descriptive information (i.e., meta-data only).

Naval OA Vision

- Align
- Share
- **Collaborate**

Collaboration:
Naval Open Architecture FORCEnet Experimentation

Concept:

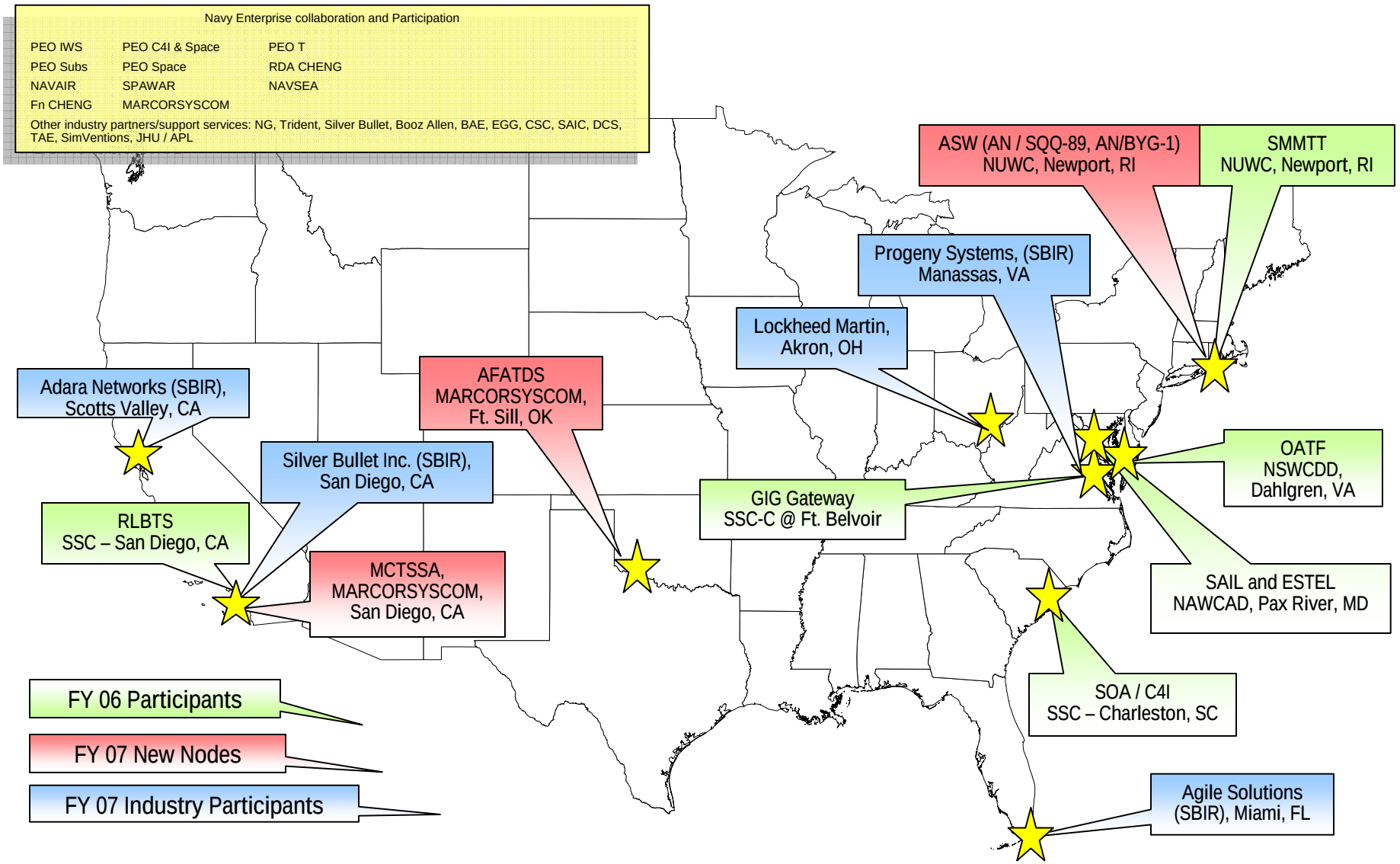
- **OA OPNAV letter addressed need for OA Experimentation:**
  - "Execute end-to-end force level system engineering experiments to identify and resolve issues related to interoperability and OA implementation"
- Leverage existing Open/Collaborative Engineering Environments Across Systems and Domains
- Foster Teamwork
- Prototype new Business and Engineering processes
- Ensure early Demonstration and Risk Reduction of critical OA and Fn solutions

OPNAV letter

This year's plan includes 9 objectives

OA Core Principles	FY 07 OA / FORCEnet Experiment Objectives
1. Interoperable joint warfighting applications & secure information exchange	A. Evaluate attributes of a common data model in support of several platforms B. Evaluate a communications mechanism to distribute the common data model and other information by platform application C. Evaluate attributes of a common data model in support of USW situational awareness
2. Reusable application software	A. Evaluate portability of components across multiple platforms for potential reuse B. Evaluate interface integration of components across multiple platforms for potential reuse
3. Encouraging competition and collaboration	A. Increase the # of participants to prototype OA business and technical practices B. Identify barriers to participate in the experiment C. Build collaboration across the Naval enterprise environment to achieve innovative outcomes for shared stakeholders quicker and more cost effectively than if they worked on their own D. Identify barriers to collaborate
4. Modular design and design disclosure	A. Evaluate ability to share assets across multiple participants
5. Life cycle affordability	A. Identify opportunities to increase affordability

Site and Industry Participants



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Summary

- **What? – Naval Open Architecture** – *A strategy to develop **joint interoperable** systems that exploit **open-system** design principles and architectures.*
- **How? –** *Through Aligning, Sharing, and Collaborating!*
  - **Assessments –** Know how *open* your system is
  - **Contracts –** Include OA language for early implementation
  - **Reuse –** Utilize asset and knowledge reuse repositories
  - **Experimentation –** Conduct end-to-end Force Level experiments
- **Why? –** Build a *Better Force* for tomorrow!
- **Who? –** *All military Domains!*
- **When? –** *NOW!*