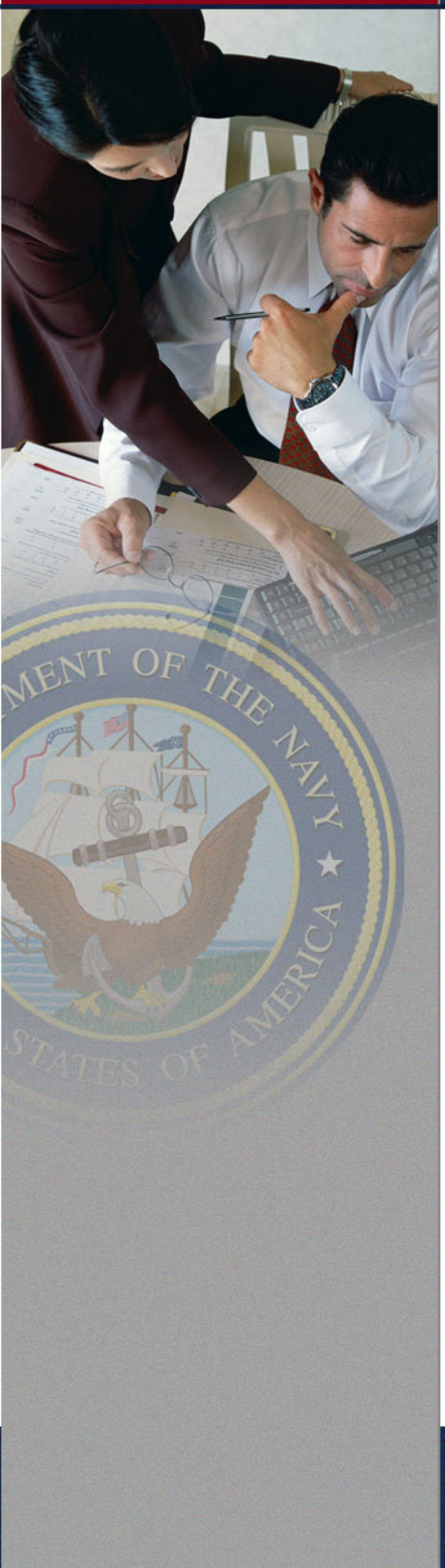
O·S·A Open Systems Architecture *Strategy*



Introduction

The current Naval Enterprise acquisition model is centered on highly integrated platforms with systems that are largely vendor locked, and expensive to acquire and upgrade. This model is especially problematic in the current economic environment.

The Naval Open Systems Architecture (OSA) strategy will decompose monolithic business and technical designs into manageable product lines composed of competition-driven modular Enterprise components. This will yield innovation, reduced cycle time, and lower total ownership costs.

The New Naval Enterprise OSA Strategy:

The Naval OSA Strategy is an iterative set of business and technical changes that points to an end state where affordable, open platforms easily accommodate open modules. As the Navy moves toward this future, the Enterprise must first align itself to become open, modular, common, competitive, and ultimately, affordable. It will begin by implementing change in a coordinated fashion across all programs.

The Naval OSA Enterprise Team will lead the execution of this strategy with the participation of stakeholders (e.g., Resource Sponsors, PEOs, TWAs, etc.) as follows:

- Implement the coordinated set of business changes that improve competition, incentivize better performance, and deliver capability more rapidly;
- Construct a limited number of technical reference frameworks to immediately support improved competition and ultimately enable enterprise re-use;
- Develop an Execution Guidebook for this strategy; and
- Lead and guide training the workforce on OSA implementation.

Once these changes have been adopted at the program level, a second iteration (Figure 1) will prepare the Enterprise to eliminate redundancy and deliver open systems with reusable modules.

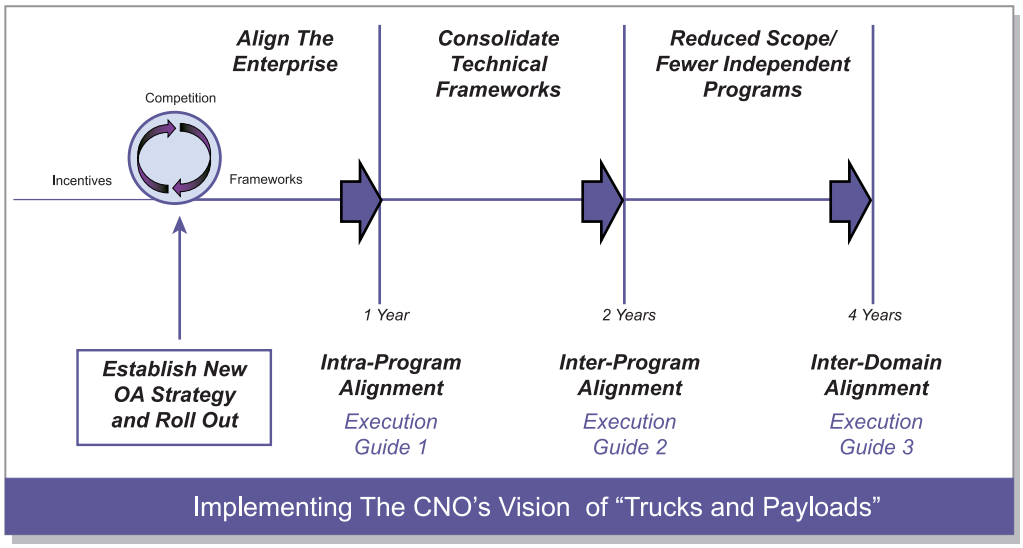


Figure 1. Iterative Naval OSA Strategy

An Open Systems Architecture (OSA) approach integrates business and technical practices that yield systems with severable and compete-able modules. A system constructed in this way allows vendor-independent acquisition of warfighting capabilities, including the intentional creation of inter-operable Enterprise-wide reusable components. Successful OSA acquisitions result in reduced total ownership cost and can be quickly customized, modified, and extended throughout the product life cycle in response to changing user requirements.

Naval OSA Strategy Actions

Unless otherwise stated, the principal lead for the following actions is the Open Systems Architecture Enterprise Team (OSAET), led by Deputy Assistant Secretary of the Navy (Research, Development, Test and Engineering) (DASN RDT&E), with participation from Systems Commands (NAVSEA, NAVAIR, SPAWAR, and MARCORSYSCOM), program Executive Offices (PEO), the Office of Naval Research, and designated Communities of Interest (COIs).

Phase 1: *Align current programs to execute the OSA strategy and report progress.*

Phase 2: *Consolidate technical frameworks across programs; eliminate redundant stovepipes.*

Phase 3: *Implement Enterprise architecture of modular development and maximum reuse.*

Phase 1 Tasks

- Establish a limited number of OSA Technical Reference Frameworks (TRFs);
- Change acquisition processes to adopt these coordinated and common OSA TRFs;
- Require and incentivize competition throughout program life cycles;
- Establish meaningful metrics to assess OSA progress;
- Develop the OSA Strategy Execution Guidebook;
- Educate the Naval Engineering, Logistics, and Acquisition Workforce; and
- Codify knowledge, skills and processes in the "OSA Program Managers Guidebook, rev 1.0"

Phase 2 Tasks

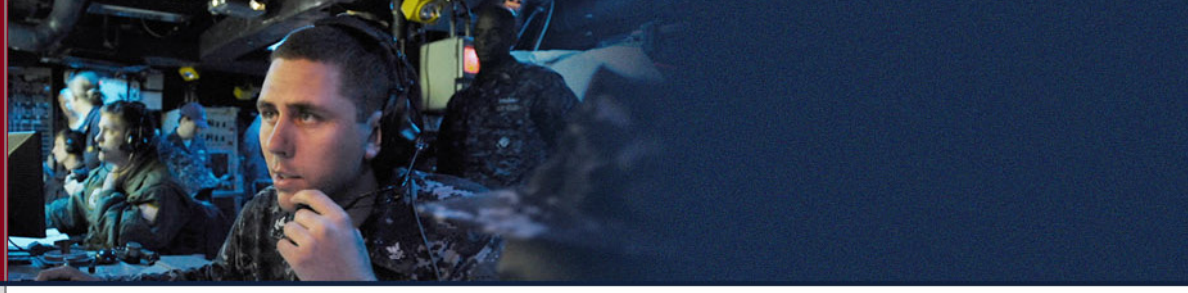
Tasks for phase 2 are TBD; here are a few categories:

- Communications processes to provide transparency across PEOs and SYSCOMS about existing programs
- Incentives for collaboration and cooperation
- Funding techniques for cross-Enterprise co-development
- Update the "OSA Program Managers Guidebook"
- Build on education efforts through DAU and integrate the new Guidebook with standing courses

Phase 3 Tasks

Tasks for phase 3 are TBD; here are categories:

- Fine tune communications processes to provide transparency across PEOs and SYSCOMS about existing programs, as needed
- Adjust incentives for collaboration and cooperation as needed
- Add courses to fill needed knowledge gaps
- Adjust funding techniques for cross-Enterprise co-development



Establish a Limited Number of Technical Reference Frameworks (TRFs)

A Technical Reference Framework (TRF) is an integrated set of components that provide a reusable architecture for a family of related applications. TRFs should be capability-based to maximize employment and capability insertion on multiple platforms. Limiting the number of TRFs will increase interoperability and reuse opportunities, leading to life cycle cost savings.

Maintaining non-duplicative TRFs will require cooperative interaction and create interdependencies across program boundaries. TRFs are dynamic so will continue to evolve as technology dictates. Configuration management and attribute/characteristic alignment processes will be crucial TRF enablers. To develop and maintain TRFs, the Naval Enterprise shall take the following steps:

1. Analyze existing system TRFs and develop a detailed set of proven Enterprise attributes, including standardized specifications, architectures, data models, interoperability protocols, and software development tools;
2. Catalog features and suitability for a variety of platform types;
3. Promote tailor-able open standards relative to TRF attributes;
4. Coordinate cross-program TRF implementations to reduce duplication through transparency;
5. Identify, publish, and manage TRF elements necessary to move programs to coordinated product lines and S&T investments using enterprise-level TRF attributes; and
6. Require PEOs and Systems Commands to use TRFs for all development unless explicitly waived by ASN (RD&A).

Change Acquisition Processes to Adopt OSA TRFs

Changes must be made to current Naval acquisition processes to allow Enterprise adoption of OSA TRFs. The Naval Enterprise shall take the following steps:

1. Charter cross PEO groups and Communities of Interest (COIs) through Program Management Offices (PMOs) to steer the development of common TRFs, applications, and testing strategies;
2. Identify best practices and collaborative forums to increase the likelihood of transitioning maturing technology into programs of record;
3. Change guidance, procedures, and instructions to require preference for OSA implementation and systematic reuse for cost savings across system life cycles; and
4. Insert OSA into the System Engineering Technical Review (SETR) and acquisition program Gate Review processes.

Require and Incentivize Competition throughout Program Life Cycles

The Navy values innovation and lower costs at all acquisition phases (i.e., concept development, design, build, maintenance and upgrade) and system levels (i.e., component, system, platform, and system of systems). The Naval Enterprise shall take the following competition-focused steps:

1. Create contract language templates for use in contract solicitations at the platform, integrator, system, and component levels;
2. Develop tools and methods to promote competition at the component level and to objectively measure the openness of development environments;
3. Require Program Managers to evaluate movement away from monolithic acquisitions to multiple, modular acquisitions enabled by OSA;
4. Require Program Managers to secure and exercise data rights needed to ensure future competition for sustainment, maintenance, and capability insertion; and
5. Establish reward mechanisms for programs and personnel successful in achieving OSA implementations that rapidly integrate innovation and lower total ownership costs.

Establish Meaningful Metrics to Assess Progress

Development and adoption of metrics that are objective, readily obtained (ideally from existing sources), easy to interpret, and actionable to enforce desired behaviors (i.e., increased competition, component reuse and reduced costs) are vital to the OSA strategy. The Naval Enterprise shall take the following steps to implement an OSA metrics program:

1. Establish a set of metrics for use in assessing the Enterprise value of new capabilities;
2. Pilot these metrics to selected COIs/Programs of Record (PORs) from each domain;
3. Update metrics based on these pilots for application across the Naval Enterprise;
4. Implement an Enterprise metrics program and conduct periodic peer review assessments on a sampling of PORs from across the Enterprise; and
5. Identify patterns of strengths and weaknesses in Enterprise OSA implementation and apply remediation throughout program life cycles.

Develop the OSA Strategy Execution Guidebook

The Execution Guidebook will contain actionable steps for each implementation phase of the OSA strategy. It will contain recommended changes in the business model and technical framework elements that will begin by improving competition and ultimately result in fewer programs that cost less and deliver capability more rapidly.

Educate the Naval Engineering, Logistics, and Acquisition Workforce

The success of the OSA Strategy depends heavily on a competent, innovative, and well educated workforce. The Naval Enterprise must produce a workforce that is well-versed in: identifying and managing cross-domain and life cycle dependencies, understanding and responding to adverse vendor behaviors, ensuring that competition yields the desired results, and incorporating OSA best practices as an integral part of program management. The Naval Enterprise shall take the following steps to develop an OSA workforce:

1. Target timely OSA training and communication to optimize acquisition program adoption;
2. Develop training and communication materials, leveraging existing training materials, use cases, and delivery mechanisms when possible;
3. Establish OSA transparency mechanisms to enable the acquisition workforce to become aware of opportunities for collaboration;
4. Work with the Defense Acquisition University (DAU) to develop an Acquisition OSA Qualification Standard;
5. Develop training materials and methodologies to train the non Defense Acquisition Workforce Improvement Act (DAWIA) Naval workforce involved in engineering, logistics, and program management; and
6. Establish an OSA mentoring program for acquisition professionals.