



# Naval Open Architecture



**8 August 2007**

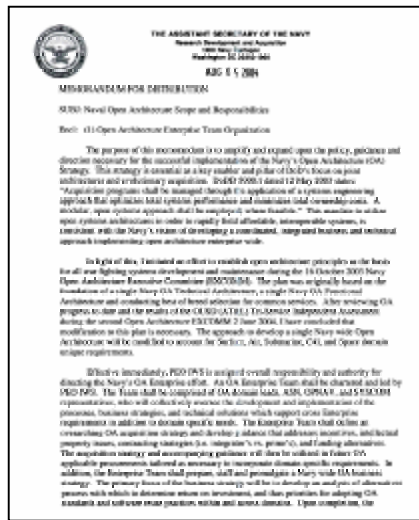
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**Captain James Shannon, USN**  
**Program Manager, Future Combat Systems**  
**Open Architecture**  
**PEO IWS 7.0**



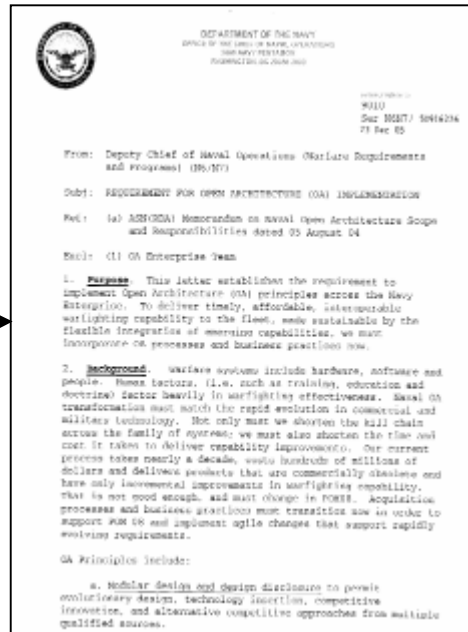
# The adoption of *Open Architecture (OA)* has been mandated for three years now

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



**Naval OA Policy**

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



**Naval OA Requirements**

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

## OA CORE PRINCIPLES

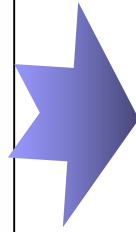
*Modular design and design disclosure*

*Reusable application software*

*Interoperable joint warfighting applications and secure information exchange*

*Life cycle affordability*

*Encouraging competition and collaboration*

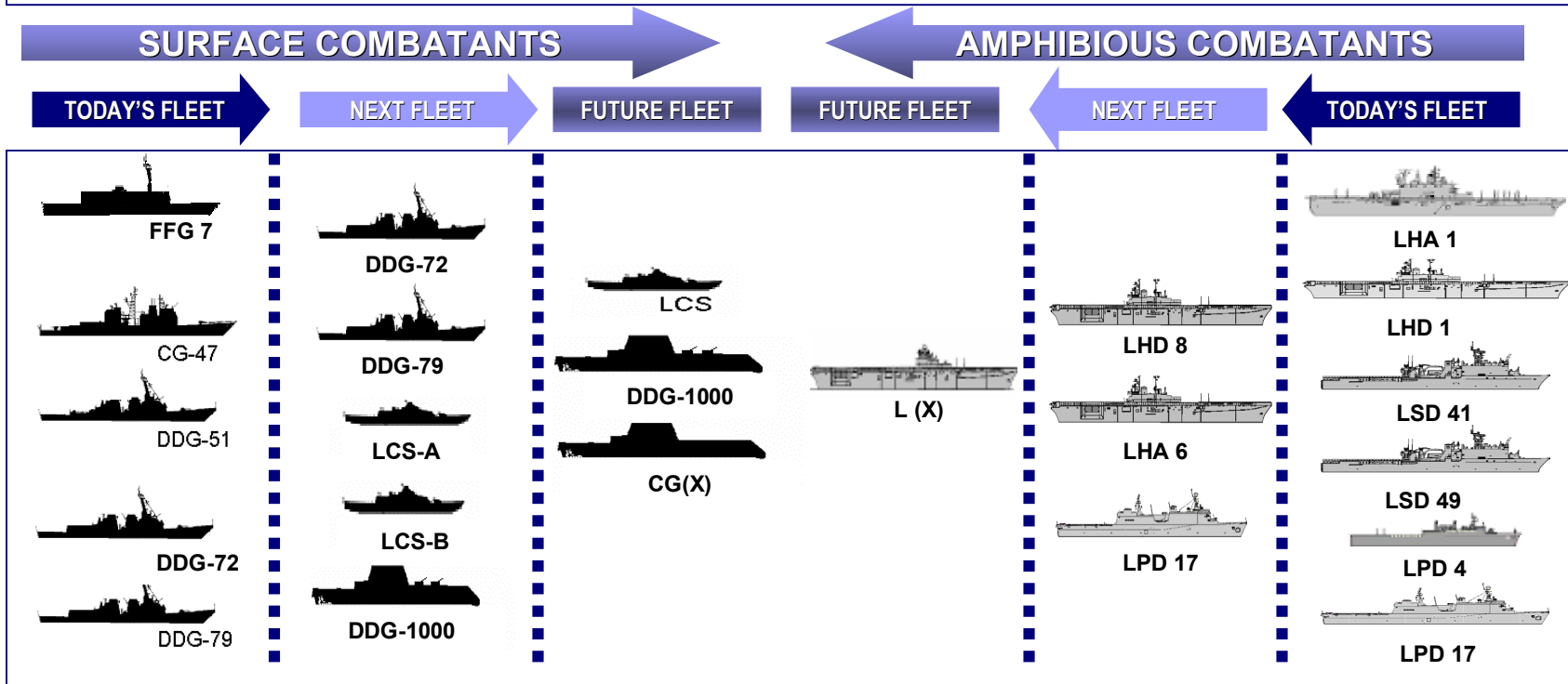




# OA is a critical piece to our national shipbuilding plan

## Necking Down

“The Navy’s 30 year shipbuilding plan call for 19 ship types and 27 models in 2020. But a team at NAVSEA says the types of ships could be whittled down to 6 with 10 models, by using OA and common hull designs. Only 1 aircraft carrier and 2 submarine types would be built. Here is what the surface fleet would look like:”



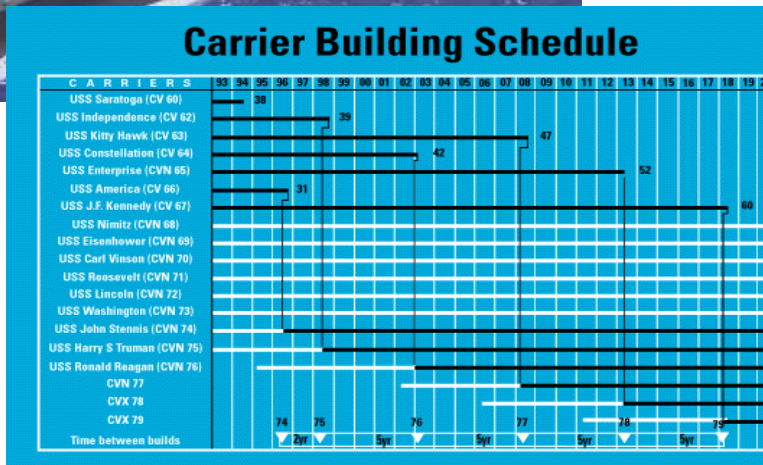
**“In addition to reducing ship types & models, we must implement OA, reduce system baselines and enforce more commonality and standardization in our components”**



# As we build our future fleet, we must make changes today to fulfill the projected life span of platforms

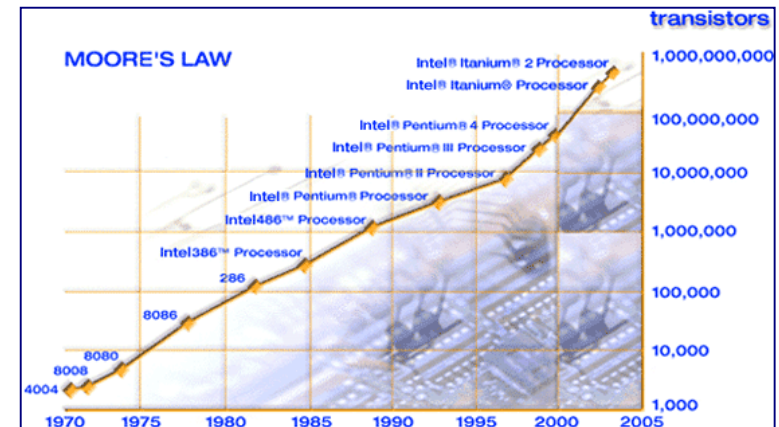


*...the “ CVX class is being designed for a 55-year life span, during which it could see as many as 4 generations of combat systems, 5 generations of aircraft and 10 generations of computers”<sup>1</sup>*



Num	Ordered	Comm	Decomm <sup>2</sup>
CVN 78	2007	2014	2064
CVN 79	2011	2019	2069
CVN 80	2017	2024	<b>2074</b>

**Moore’s Law - the # of transistors in an integrated circuit will double every year; adjusting the rate to every two years. Moore also predicted that the “manufacturing costs of ICs would dramatically drop as the technology advanced.” Each time the transistor size shrinks, integrated circuits become faster, consume less power, and its manufacturing costs decrease.**



<sup>1</sup> Sources: [http://www.popularmechanics.com/technology/military\\_law/1281161.html?page=2](http://www.popularmechanics.com/technology/military_law/1281161.html?page=2)

<sup>2</sup> <http://www.globalsecurity.org/military/systems/ship/cvx-unit.htm>



**Although OA is often in the news, there is still a learning curve on some key principles of OA**

**Why do we need to open and modularize our systems?**

**Why do we need the intellectual property rights to products?**

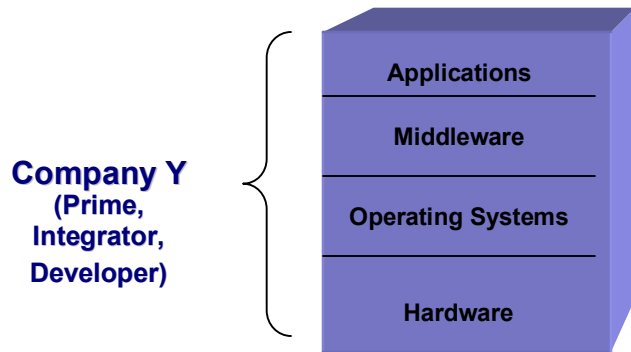
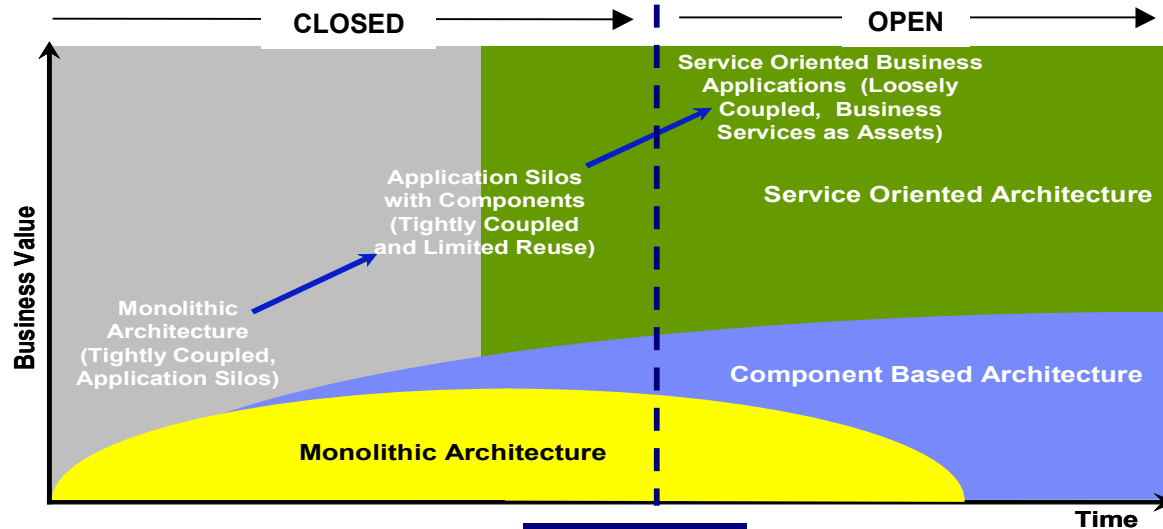
**Why do we need to disclose design artifacts early & often?**

**Why do we need to increase competition?**

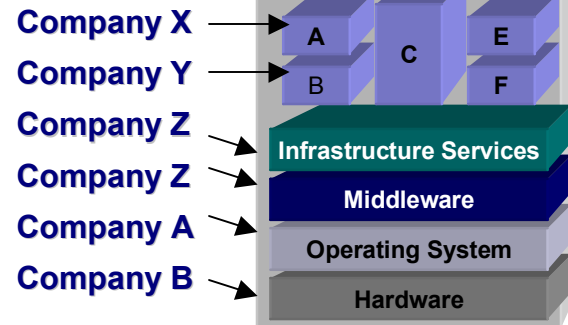
**Why do we need more collaboration?**



# Why do we need open, modular systems?



## Integrator

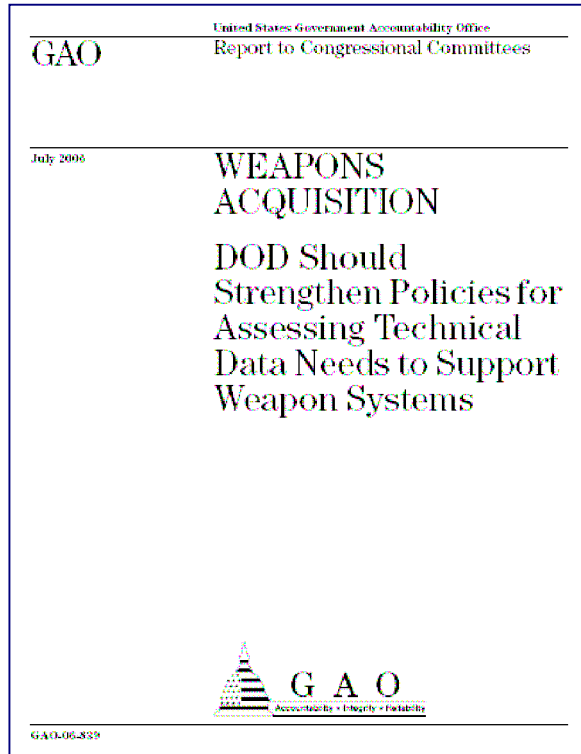


- Interfaces Defined
- Proprietary Components Isolated
- Use of widely adopted standards

**We must be able to quickly upgrade components as new technologies mature, field capabilities faster, reuse components, improve interoperability, and get the best value for the Navy.**



# Why do we need the appropriate intellectual property rights?



- The Services' have encountered limitations in sustainment plans for some fielded weapon systems because we lack needed technical data rights.
- The lack of technical data rights limits the services' flexibility to:
  - Make changes to sustainment plans that are aimed at achieving cost savings
  - Reuse software among Programs and Family of Systems
- The full impact of data rights issues often does not manifest itself until the program office attempts to perform system upgrades, at which point the PM learns how data rights (or lack of) restricts the available upgrade options

**We must strive for government purpose rights to use, modify, reproduce....or disclose intellectual and technical data within the government without restriction. Obtaining these rights is critical for systems of systems and family of systems engineering!**



# Why do we need to disclose design artifacts?

## PEO-IWS Software Hardware Asset Reuse Enterprise Repository

**UNCLASSIFIED ONLY!**

**Software Hardware Asset Reuse Enterprise**

Contact Us: Telephone 866-0A-REUSE (866-627-3873) or 640-863-4617 or Email: [HelpDesk@Nica.Help.net](mailto:HelpDesk@Nica.Help.net)

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**How to Submit an Asset**

Hello, Melody S. Reichert, This is a Department of Defense (DoD) computer system, important tasks and capabilities such.

The Program Executive Office Integrated Warfare Systems (PEO IWS) is striving to develop modular, open systems, using an Open Architecture (OA) Warfare Systems approach, by encouraging collaboration and participation between Government, academia and industry personnel. Accordingly, PEO IWS provides anyone access to SHARE for the purpose of participating with other contributors in iteratively developing improvements to Government Systems including but not limited to, Navy Warfare Systems.

<https://viewnet.nswc.navy.mil>

## PEO-C4I & Space Collaboration Site

**PEO C4I & Space Collaboration Site**

Home My Page Project Tree Site Reporting Site Admin Logout Advanced Search Software/Group Search

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Developer Info  
Project Admins: Jeremiah, Nick, Gregory, William, James, Randy  
Developers: 25 (View Members)

Registered: 2005-04-06 11:36  
Activity Percentage: 100%  
View project activity statistics.

Project Tools  
Tracker: There are no public trackers available  
Forums (111 messages in 14 forums)  
Document Manager  
Task Manager: There are no public subjects available  
Source Code Management (SCM) Repository

Latest News  
NCS MetEa Howto Posted - Jeremiah - 2005-04-28 11:36  
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<https://nesi.spawar.navy.mil>

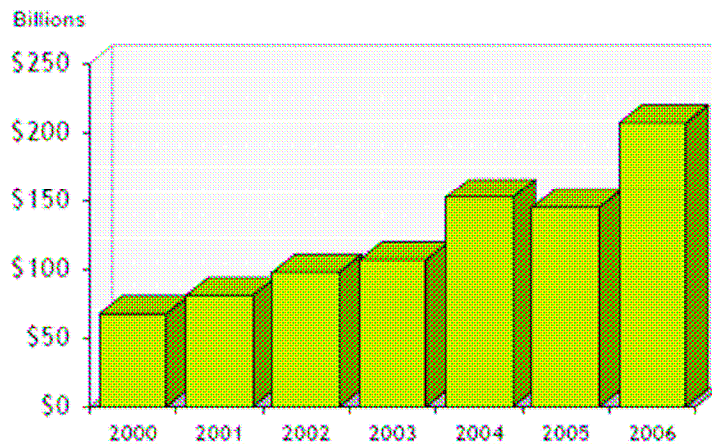
**We must facilitate the sharing of government off the shelf products between programs, better understand the interfaces of systems to improve interoperability, and create opportunities for new products.**



# Why do we need competition?

***Competition in federal contracting protects the interests of taxpayers by ensuring that the government gets the best value for the goods and services it buys. Competition also discourages favoritism by leveling the playing field for contractors while preventing waste, fraud, and abuse.***

FIGURE 4: Noncompetitive Contract Spending Has Increased



- In 2006, 6 companies received 24% of all federal procurement spending
- In 2006, 50.2% of federal procurement spending was awarded **without full and open competition**
- Federal spending on no-bid and limited competition contracts grew to \$206.9 billion in 2006— an increase of 206% from 2000<sup>1</sup>

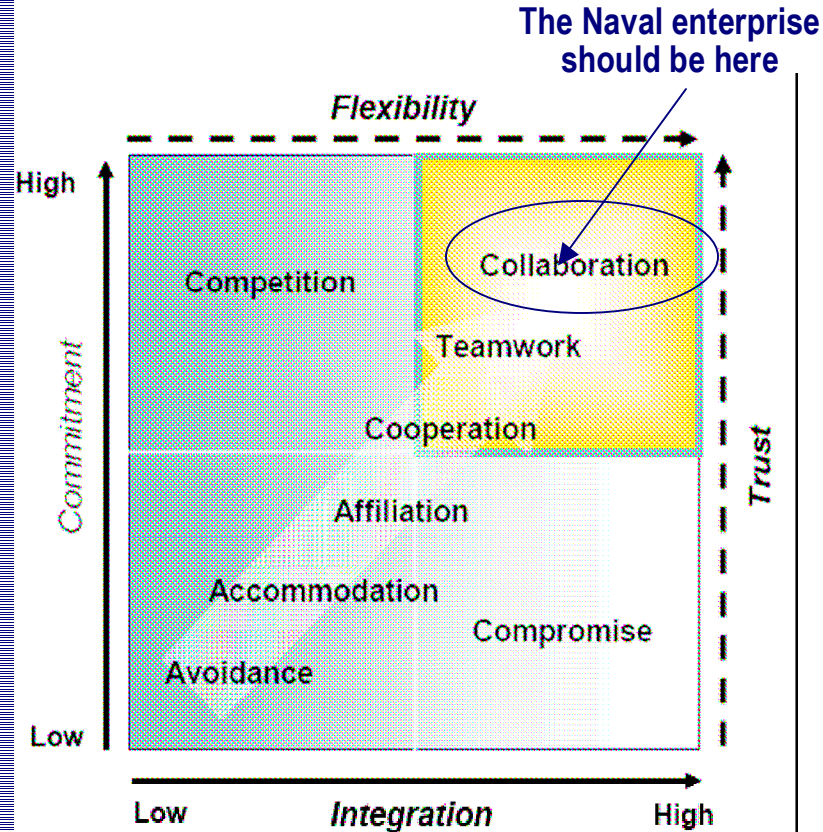
**We must avoid long-term vendor lock-in to proprietary solutions.  
We must drive innovation and ensure the Navy gets the best value.**

<sup>1</sup> Source: US House of Representatives Committee on Oversight and Government Reform, June 2007



# Why do we need more collaboration?

- ❑ **Competition** has losers and winners by its design, but it also yields greater innovation at whatever cost the market will bear. Closed competition breeds more losers than winners.
- ❑ **Compromise** rarely breeds best-in-class results but is based instead on the lowest common denominators among the parties. Naval Open Architecture is often mistakenly viewed as an example of compromise.
- ❑ **Collaboration** is the cultural characteristic that embraces commitment, integration, trust and flexibility. Collaboration leads to:
  - ❑ Improved decision making
  - ❑ Quicker access to subject experts and core knowledge
  - ❑ Improved productivity
  - ❑ Avoidance of redundancies and reinvention

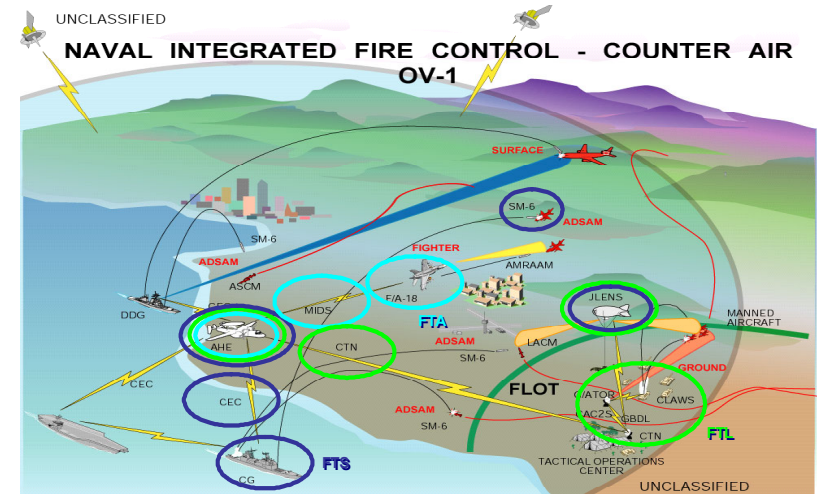
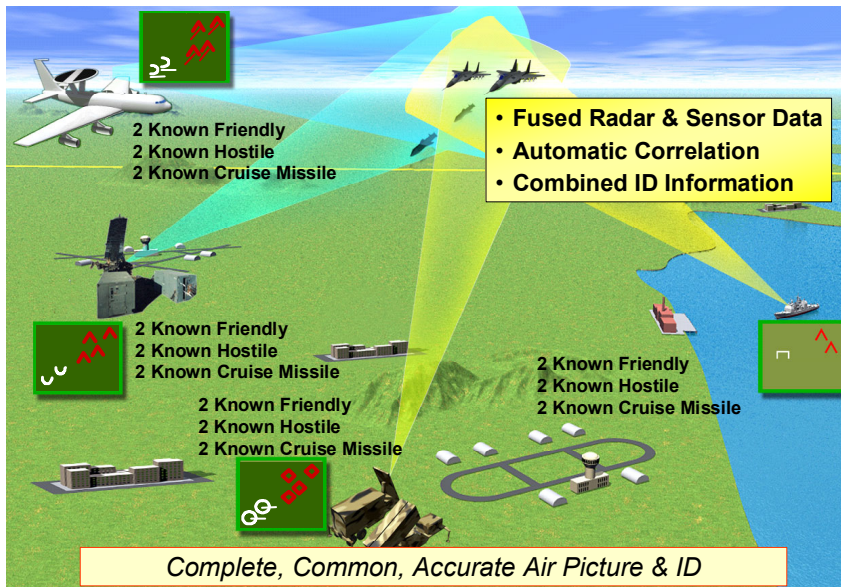


**We must identify the best of breed solution for the Navy, break down stovepipes and share information. How do we do it? Through Peer Reviews, Communities of Practice, & Collaboration Sites.**



# Adopting OA today enables us to develop new capabilities from families of systems...

*Naval Integrated Fire Control-Counter Air capability integrates technologies across multiple platforms from cooperative engagement, AEGIS, SM-6 and E-2D to expand the battle space to maximum kinematic range of the SM-6 missile.*

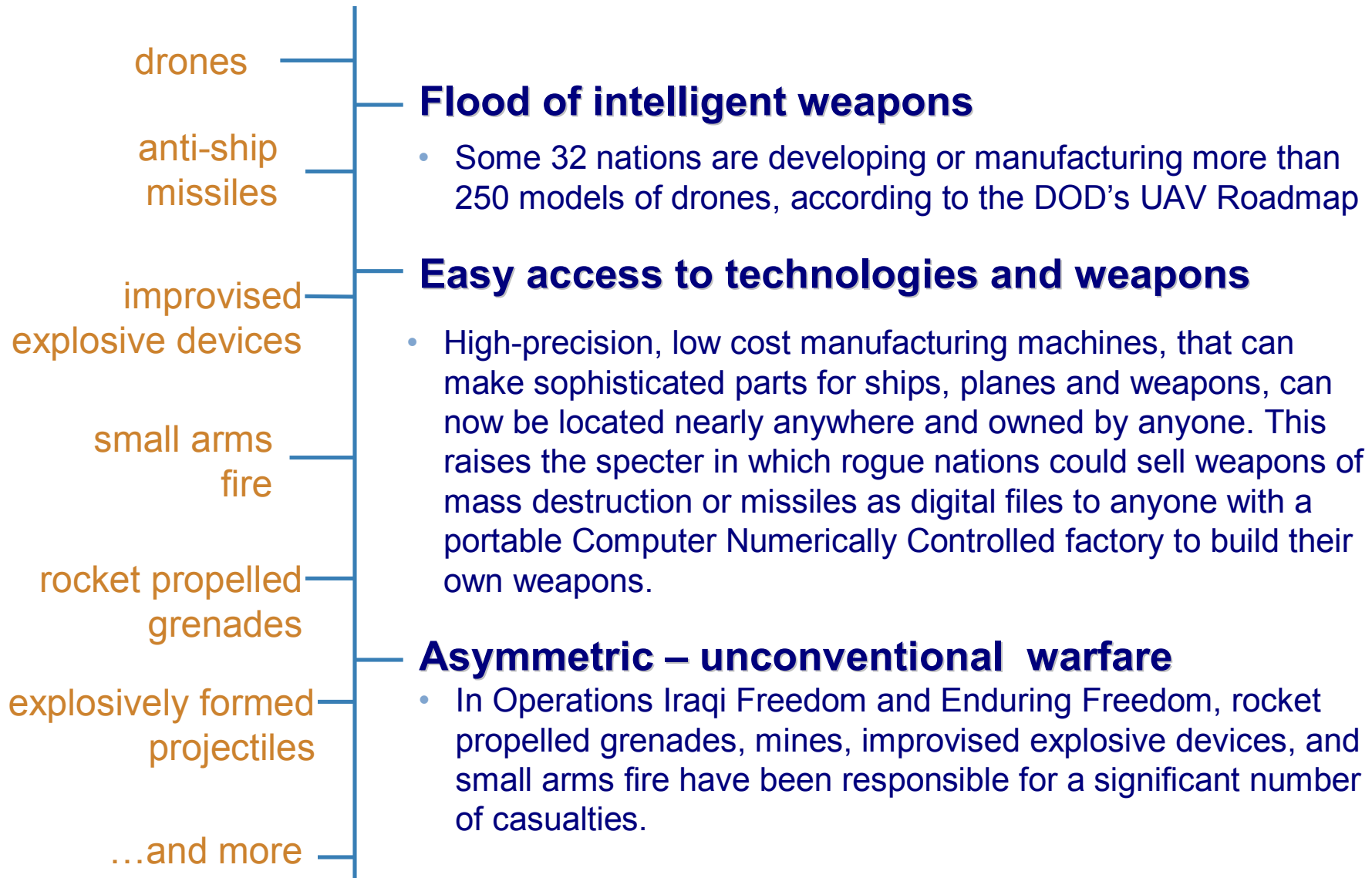


*The Single Integrated Air Picture capability will unite the military services in applying joint systems engineering to enhance air surveillance interoperability.*

## ...and across the Services...

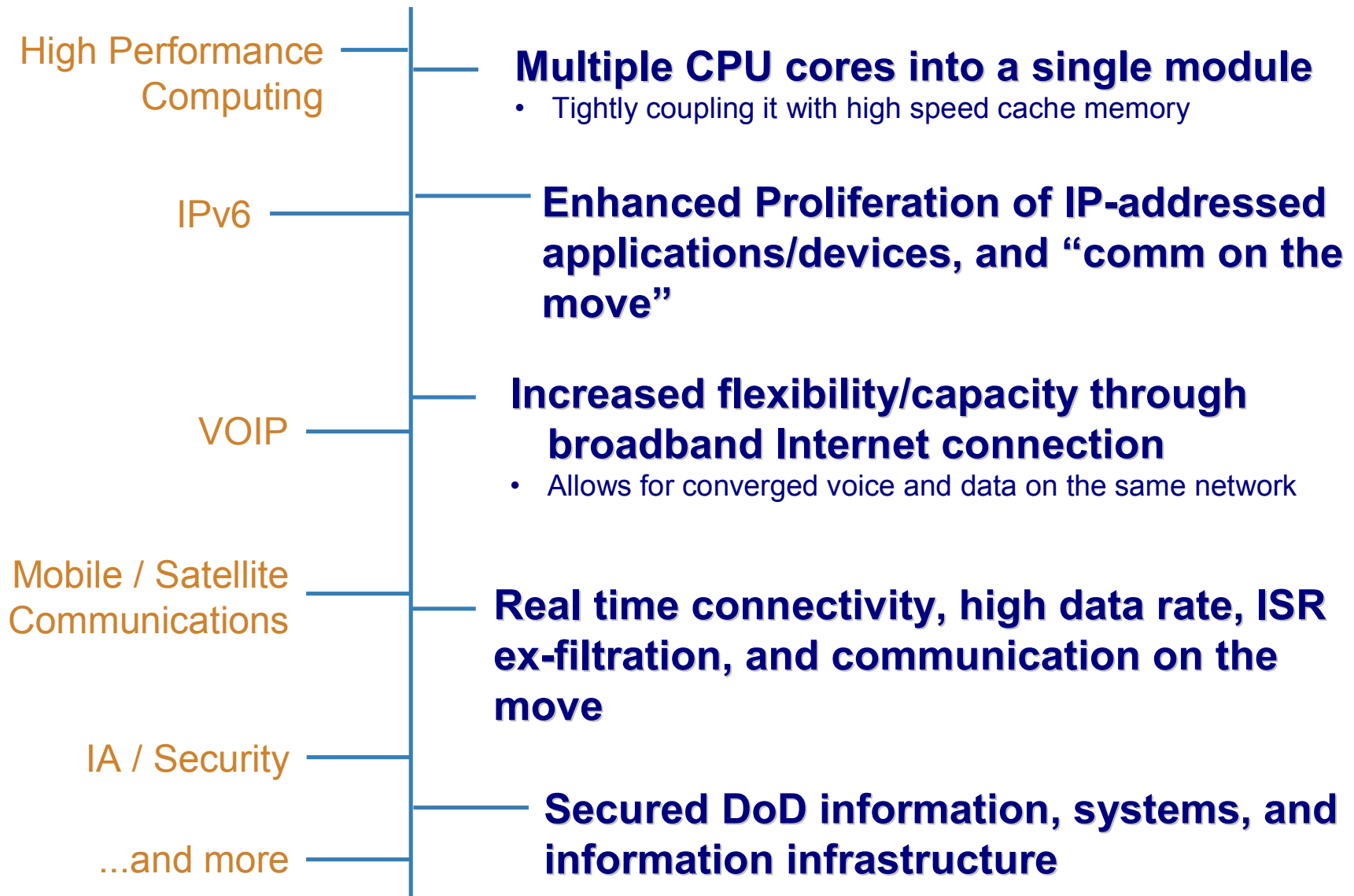


## ...to better counter new threats...



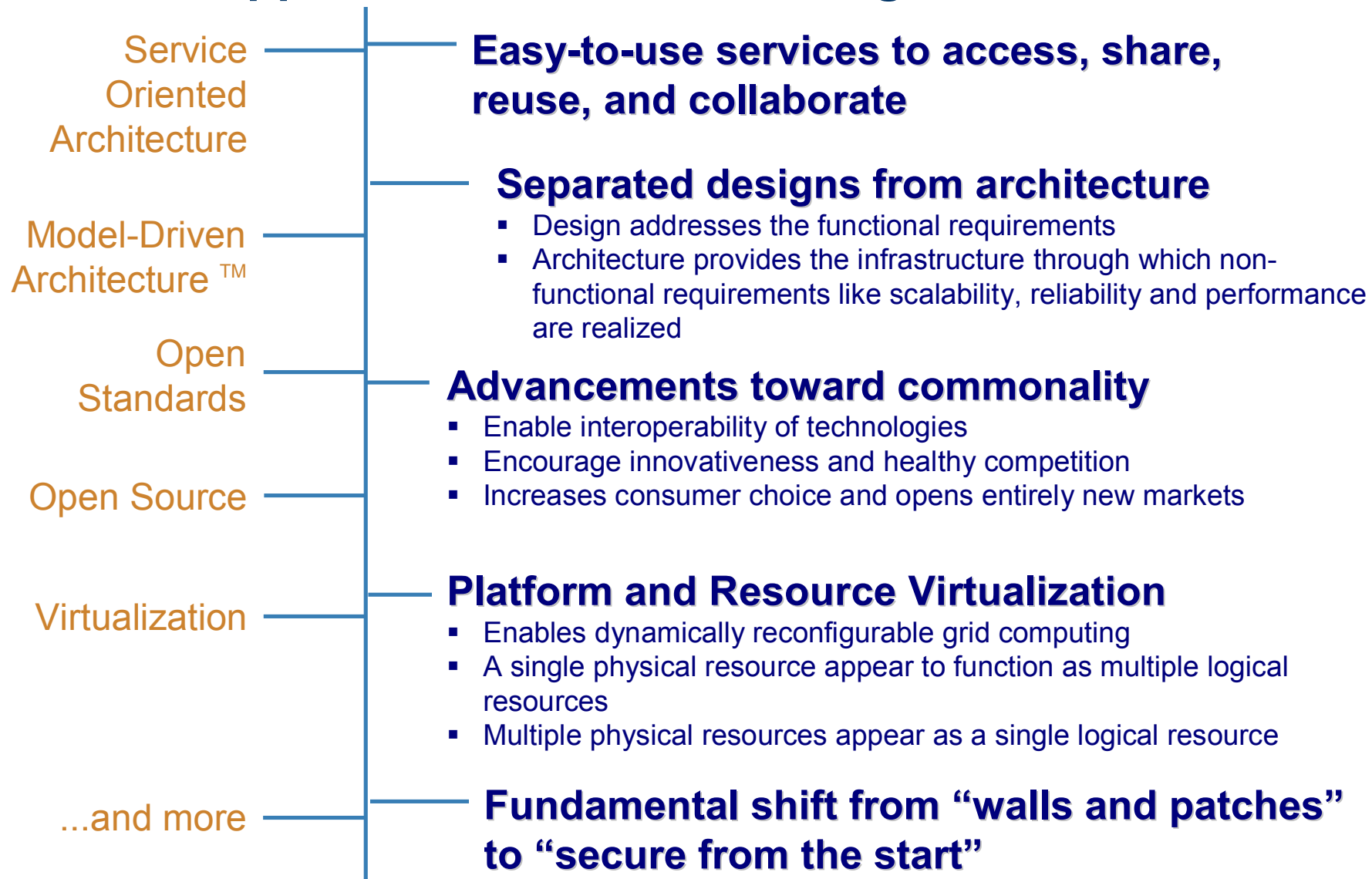


## ...new net-enabled technologies...





## ...and new approaches to solution design





## The bottom line...Our world is rapidly changing and if we don't adopt OA now, we won't be ready

*The Navy currently is transitioning to a state of “continuous readiness.” Instead of cyclical preparations before deployments, the Global War on Terrorism requires constant operational capability. “Whether it’s a warfight or a natural disaster—and they seem to be coming more **frequently—we must be much more ready for responding to this very uncertain world than the regimented fashion in the past.**”*

*~ Remarks by Adm. Mullen, December 2006*