



# ASNE Combat System Symposium 2006

*Current Combat  
and  
Warfare Systems  
Engineering*

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# Leadership's Priorities

***"...the Chief of Naval Operations' long range plan for building the future naval force has provided ...insights to the challenges...for the Navy to extend the mission capable service life of its surface combatant warships to a full 35 years. The Navy's success will hinge on the ability to effectively, affordably and routinely modernize the force against an agile, adaptive threat which is known to be leveraging leading edge technologies in its arsenal of weapon systems. "***

***- Honorable John Warner, Chairman, Senate Armed Services Committee,  
in a letter to the Secretary of the Navy, 24 August 2006***



# U.S. Navy's Challenges

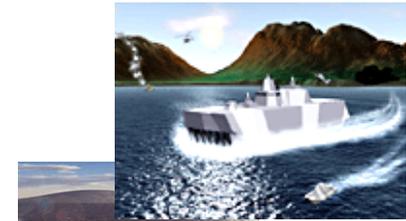
- ◆ **Original MILSPEC approach to combat system development:**
  - Software closely coupled to computing hardware platforms
  - Every ship class had a unique combat system
  - Considerable proliferation of hardware and software baselines
  - Systems difficult to maintain and expensive to upgrade
  - MILSPEC computing systems limit performance and capability growth
  - Resulted in transition to COTS for shipboard systems
- ◆ **Problem posed by COTS obsolescence in current Fleet:**
  - Commercial market technology cycles accelerate obsolescence
  - Currently fielded COTS increasingly unprocurable and unsupportable
  - COTS hardware refreshes force software re-engineering
  - Increasing manning and training costs
- ◆ **Industry implementing Open Architecture (OA) principles to improve integration of systems and components**
  - Surface Navy lagging market

***Traditional Way of Doing Business is Too Slow and Too Expensive***

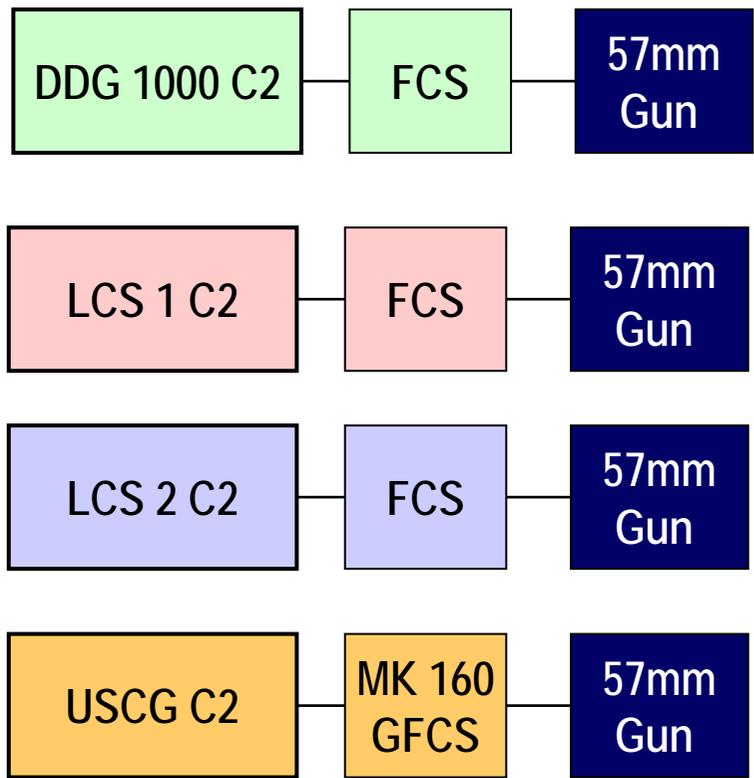


# Platform Focused Model Example

## 57mm Bofors Gun System



### Current State



- Same Gun
- Same Ammo
- 4 Platforms
- 4 Different GFCS

### Results

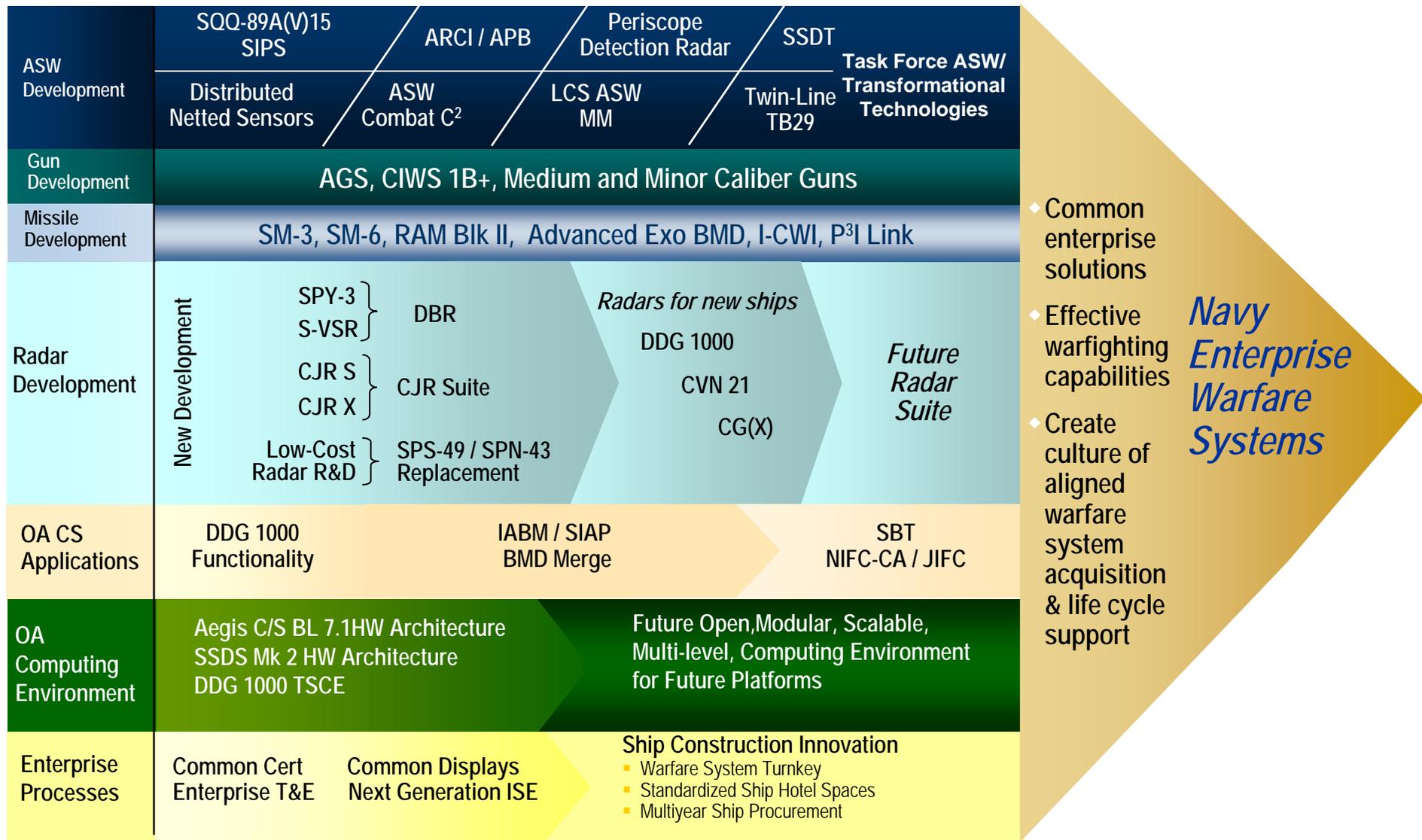
- 4 Design & Development Efforts
- 4 I&T Efforts
- 4 Support Programs
- 4 Safety Review
- 4 WSERBs
- 4 Certs
- 4 Training Programs

Same Component

Different Components

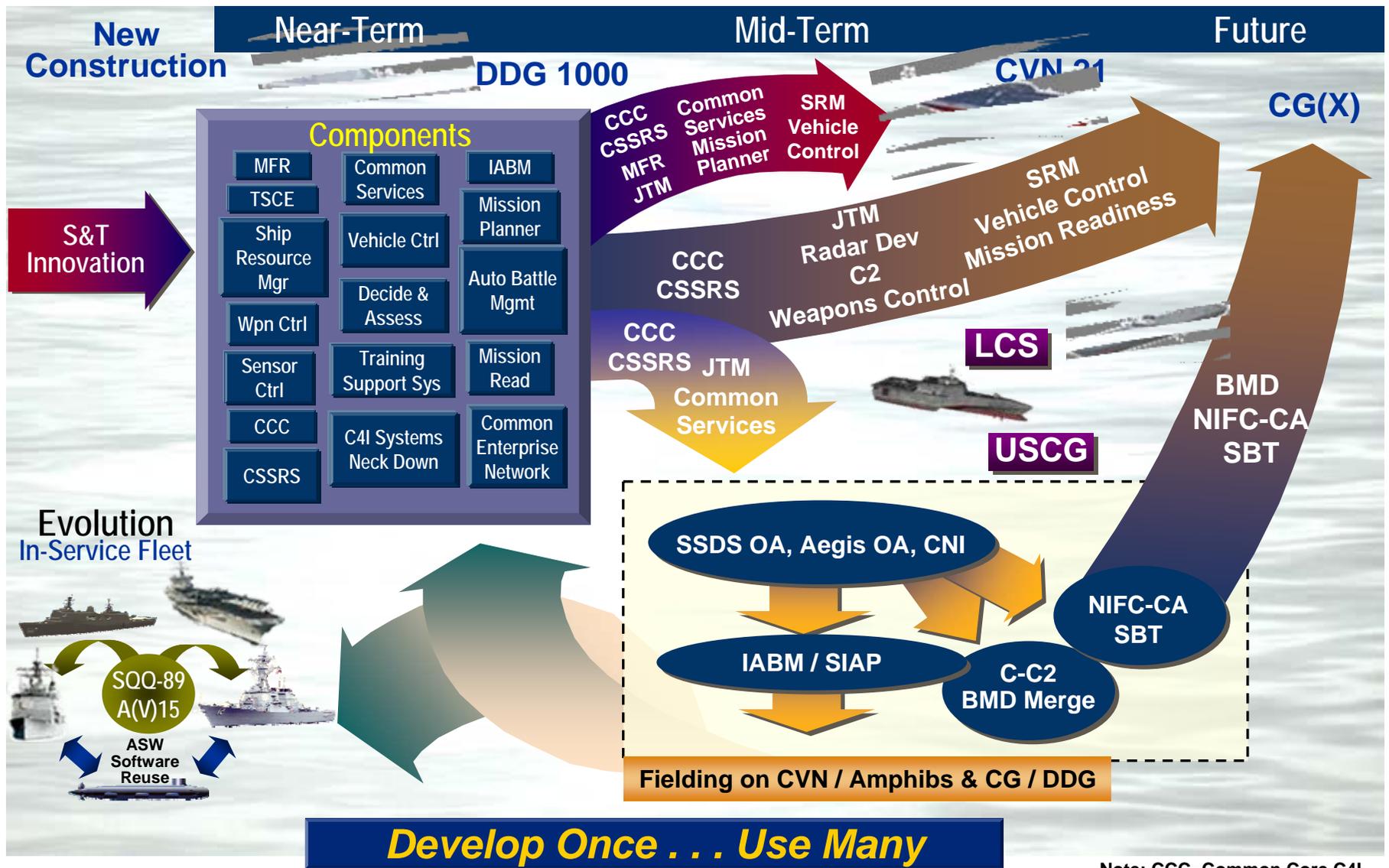


# Transition to Capability / System Focused Model





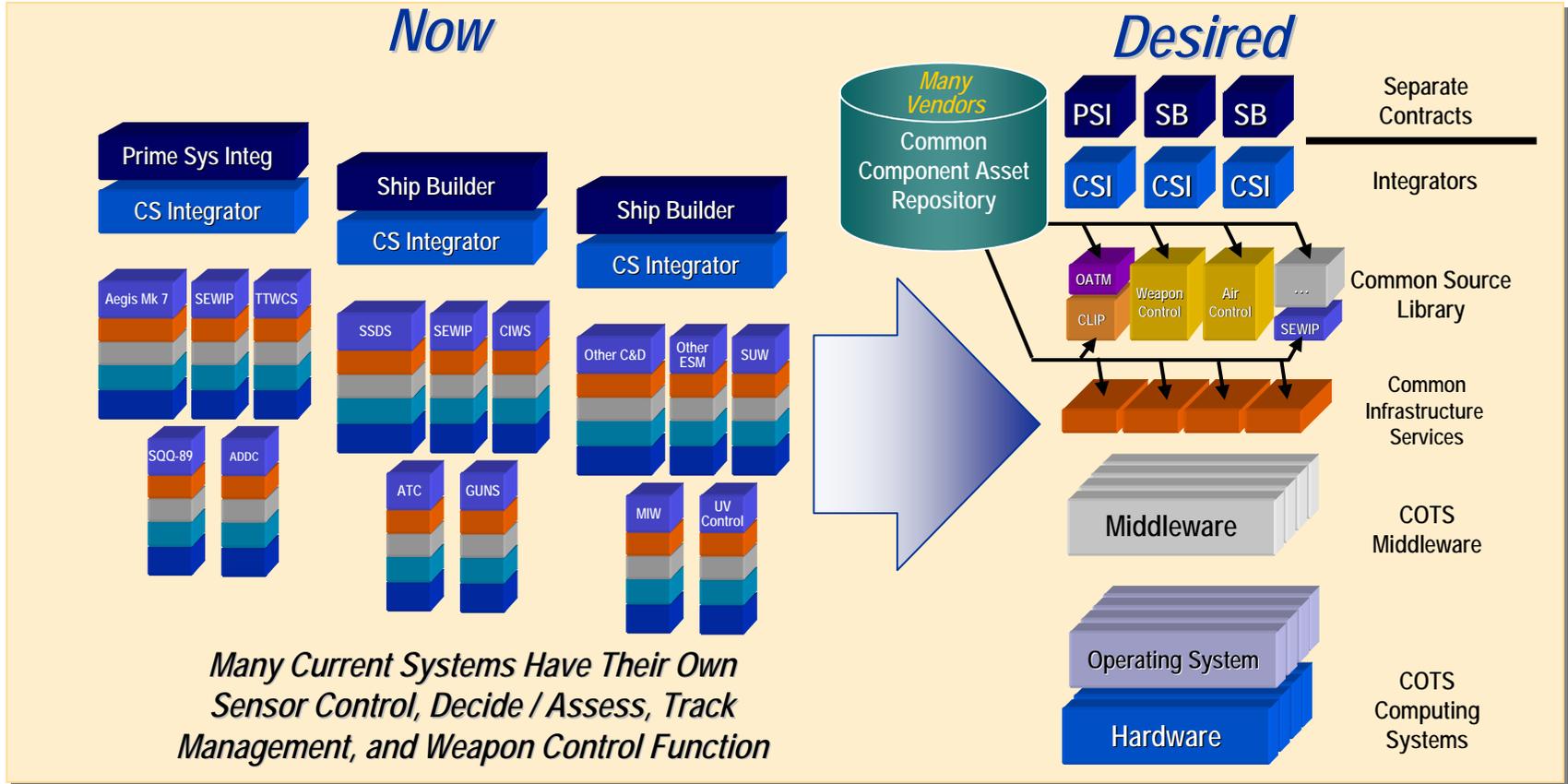
# Desire Modularity, Reuse and Interoperability



Note: CCC=Common Core C4I



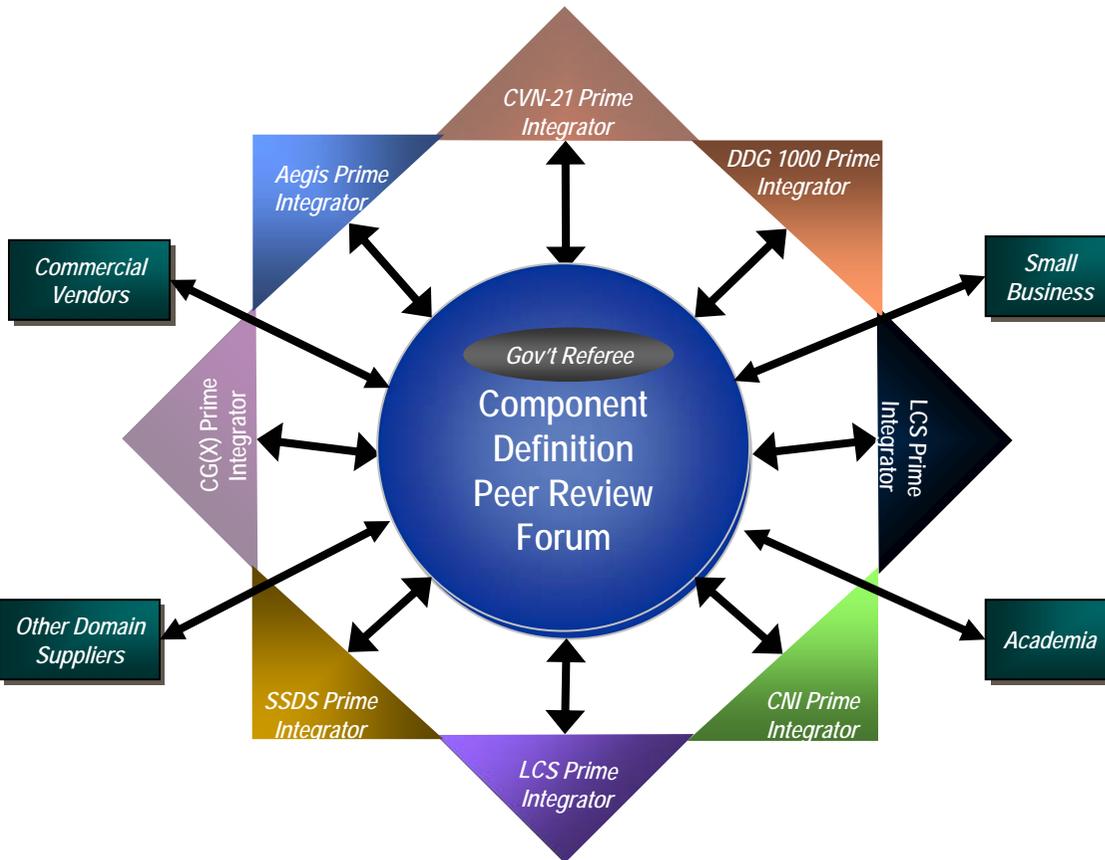
# Surface Domain OA Vision



- ◆ Define a standard combat system architecture framework
- ◆ Transition from baseline-specific architectures to common architecture
- ◆ Horizontally integrate combat system development across surface platforms
- ◆ Create an open business environment to provide cost effective and *best of breed* products
- ◆ Establish linkage and create processes between fleet and S&T to ensure transition of relevant warfighter capabilities



# Surface Domain Open Development Interaction Model



**“The Arena”**

## Gov't Purpose Rights (or greater) source code

- Intent is to make available to integrators and potential component developers within SHARE

## Open access to facilities

- Small businesses can demonstrate product capabilities
- Integrate products with existing combat systems
- Prototyping

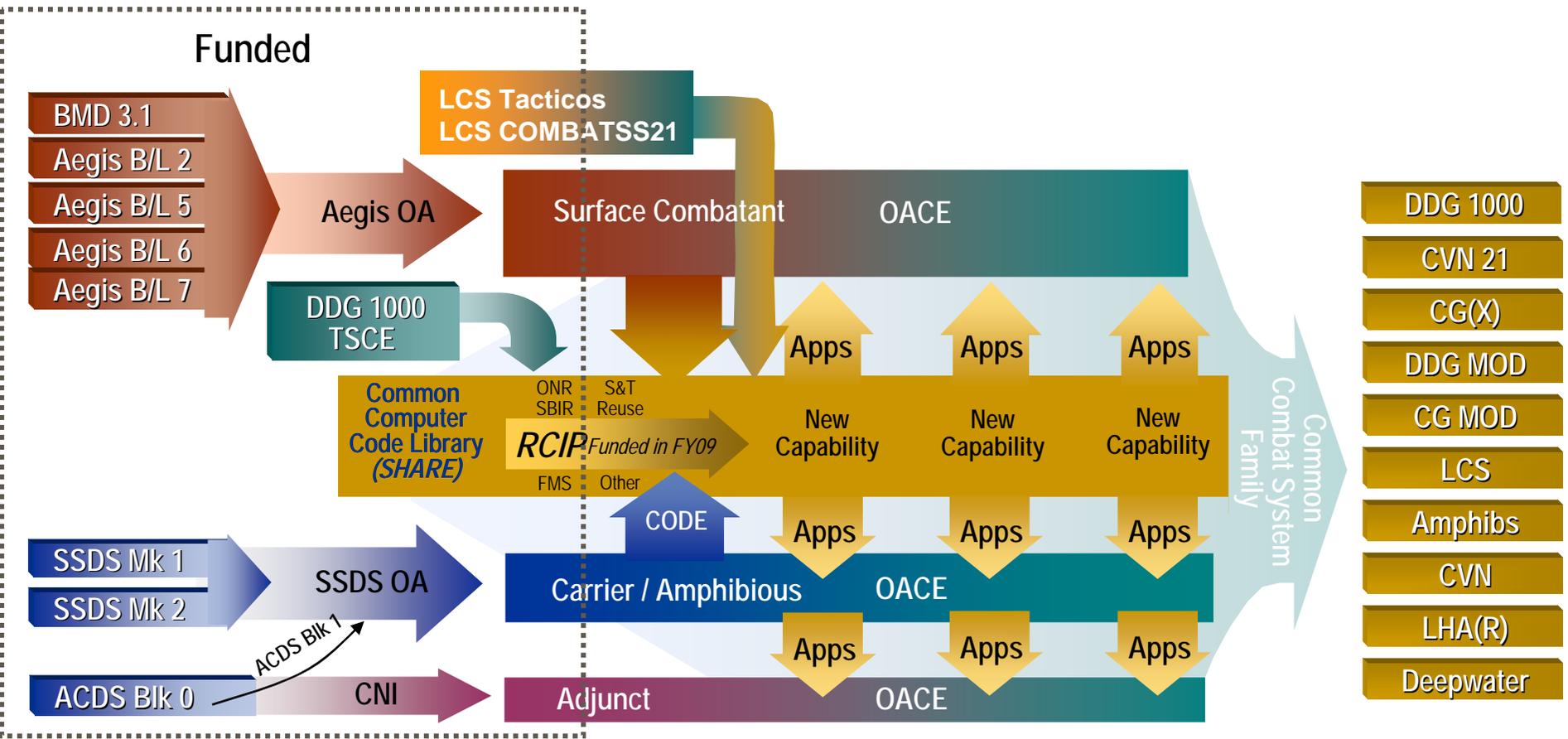
## Open peer review process allows:

- Primes to participate in product selection (retain end-to-end performance accountability)
- Other contractors to compete for future extensions or subsystem integration efforts



# Surface Domain is Necking Down to Family of OA Combat Systems

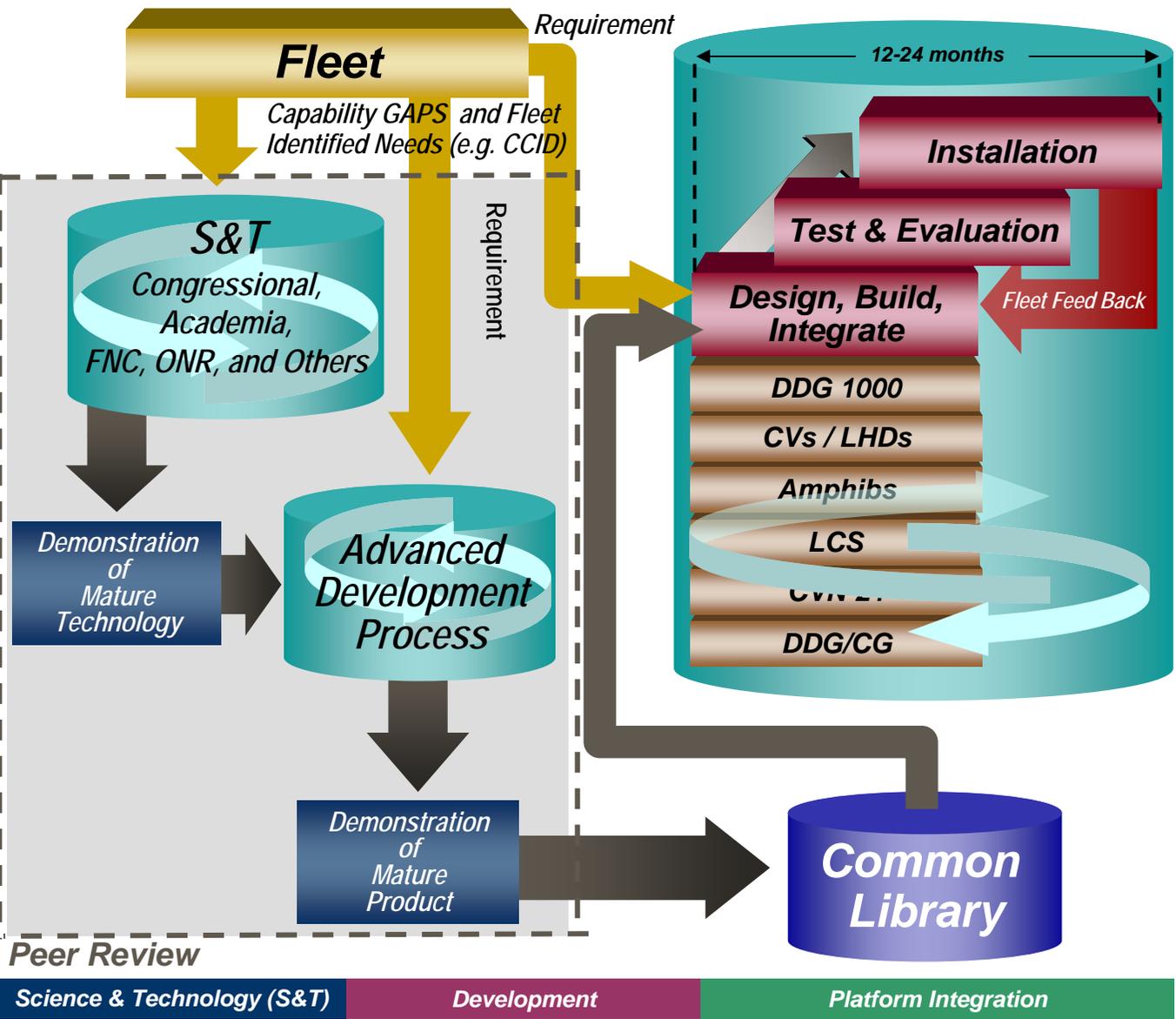
Open Architecture Computing Environment is technically understood and funded



**Foundation for Increased Competition and Rapid Introduction of Enhanced Warfighting Capability**



# Surface Domain Rapid Capability Insertion Process (RCIP) Model



## Key attributes of RCIP:

- Responsive to fleet input
- Rapid capability development & fielding
- Continuous competition
- Modularized applications

## New capability examples:

- Air Tasking Order Correlator
  - Small business innovative research approach
  - Addresses fleet requested capability
- Common Combat ID (CCID)
  - ONR Future Naval Capability



# We Have Made Progress Towards Being Technically Open, But There is Still Work to be Done in The Business Model

<p><b>AEGIS WEAPON SYSTEM</b></p>  DDG  CG  LCS  Amphib	<ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> <b>Modular architecture</b></li> <li><input checked="" type="checkbox"/> <b>Isolated proprietary components</b></li> <li><input checked="" type="checkbox"/> <b>Widely accepted/supported standards</b></li> <li><input checked="" type="checkbox"/> <b>Use of Commodity COTS</b></li> <li><input checked="" type="checkbox"/> <b>Published Interfaces</b></li> </ul>	<ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> <b>Appropriate Data Rights</b></li> <li><input checked="" type="checkbox"/> <b>Design artifacts disclosed</b></li> <li><input checked="" type="checkbox"/> <b>Incorporating OA language in current and new contracts</b></li> <li><input checked="" type="checkbox"/> <b>Design artifacts published in repository</b> - B5 Specifications</li> <li><input type="checkbox"/> <b>Collaboration / Integrated Teams</b></li> <li><input type="checkbox"/> <b>Expand competition for new &amp; innovative capabilities</b></li> <li><input type="checkbox"/> <b>Rapid capability insertion process</b></li> </ul>
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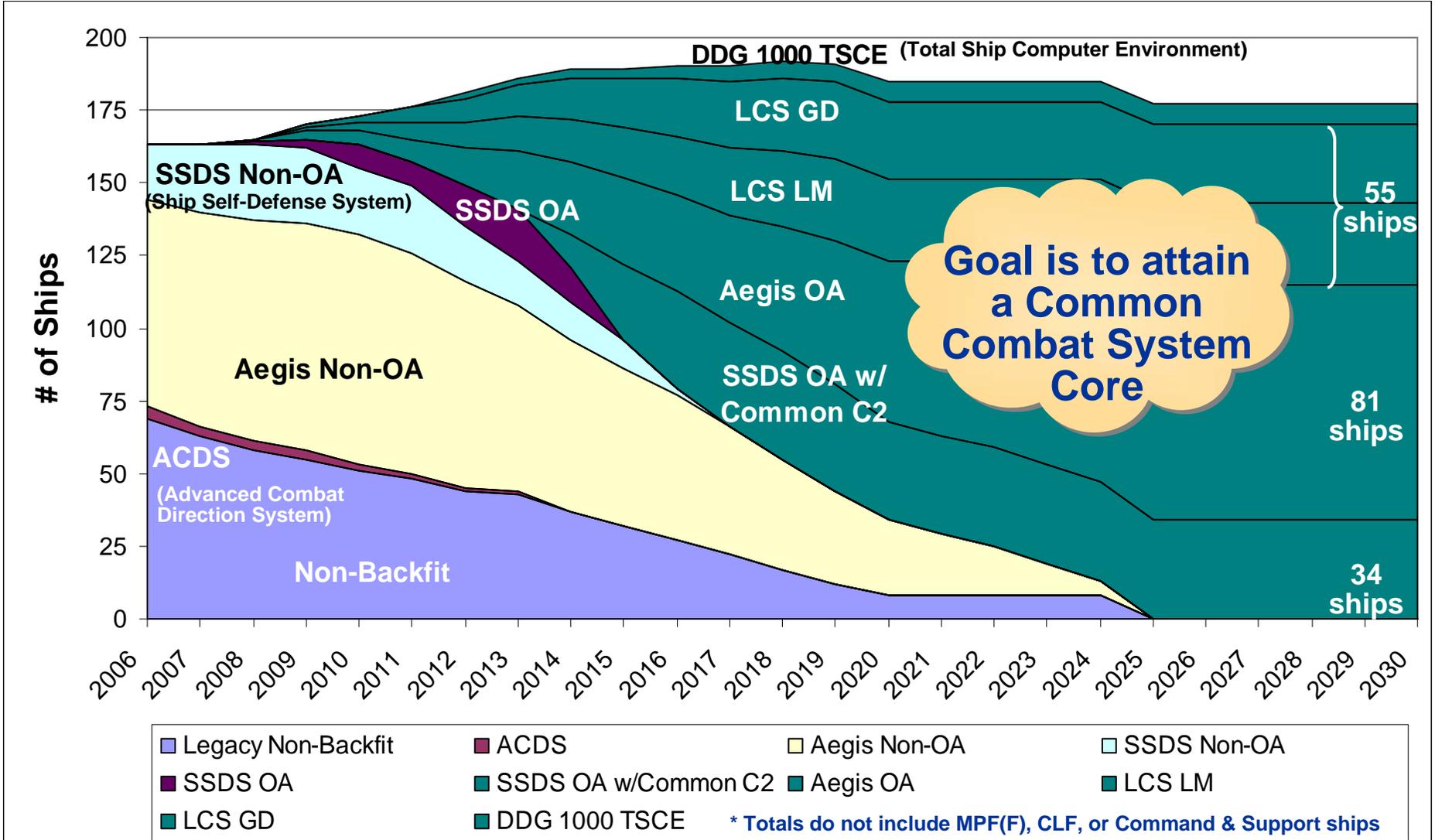
***Reuse Library Established (i.e., SHARE)***

***Executing The Business Solution Now***



# OA Combat Systems Transition

Neck Down Trend Based on Current Programs of Record



**Want to Identify Opportunities for Accelerating Fielding of Open Architecture**



# Summary

- ◆ **The OA technical model delivered near term provides the foundation for competition and rapid capability insertion**
- ◆ **RCIP - Acoustic Rapid COTS Insertion (ARCI)-like approach to be used for future warfighting upgrades**
- ◆ **Implementation of OA Business Model is our immediate focus**
- ◆ **Top Leadership is aggressively driving these changes**

***Much More to Accomplish, Hard Work Ahead***