

Simulation Based Acquisition Revisited

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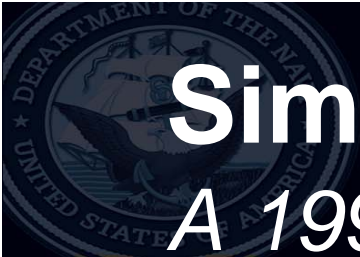
May 17 2007

Report Documentation Page

Form Approved
OMB No. 0704-0188

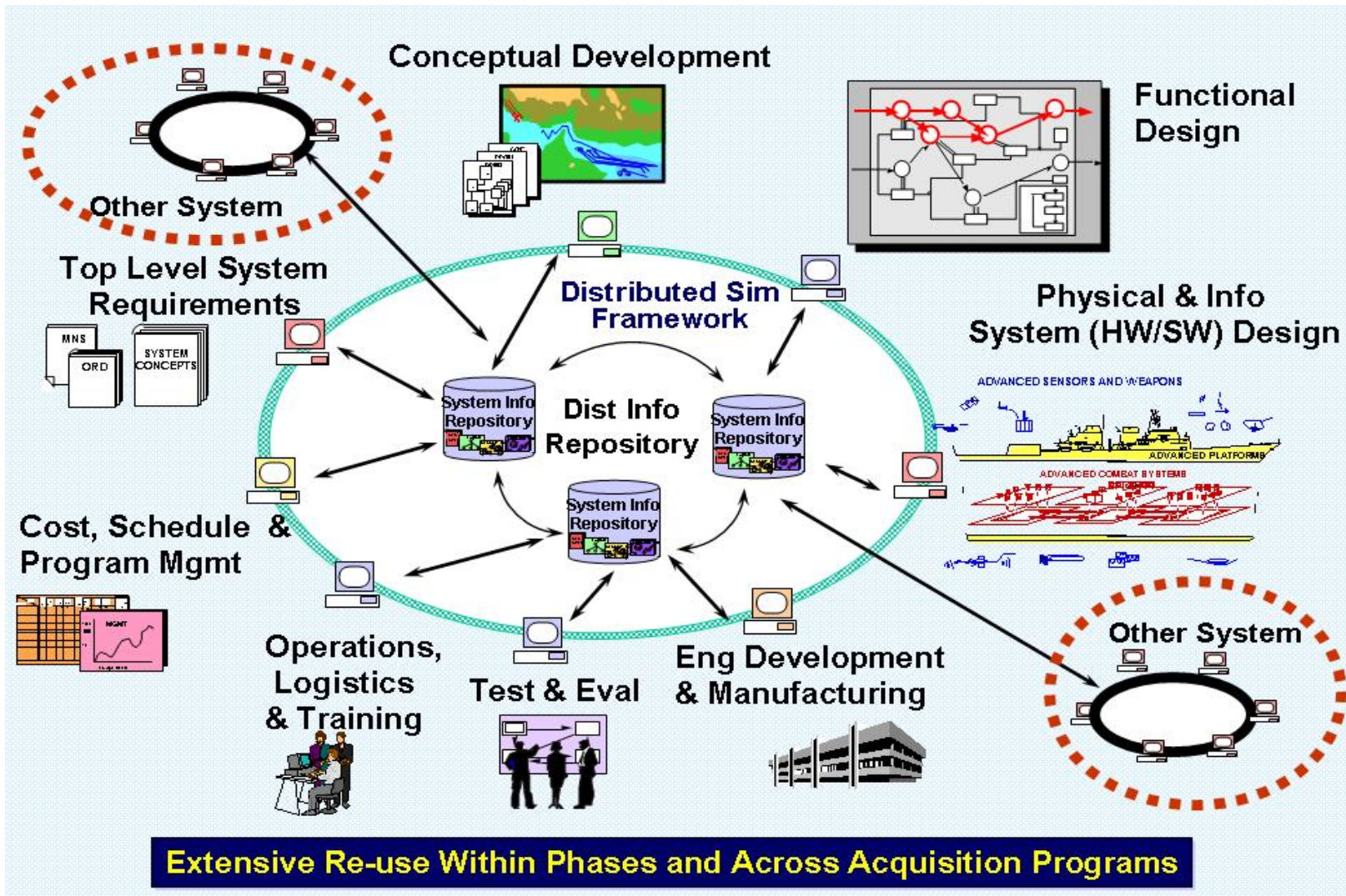
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1. REPORT DATE 17 MAY 2007	2. REPORT TYPE	3. DATES COVERED 00-00-2007 to 00-00-2007			
4. TITLE AND SUBTITLE Simulation Based Acquisition Revisited		5a. CONTRACT NUMBER			
		5b. GRANT NUMBER			
		5c. PROGRAM ELEMENT NUMBER			
6. AUTHOR(S)		5d. PROJECT NUMBER			
		5e. TASK NUMBER			
		5f. WORK UNIT NUMBER			
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Deputy Assistant Secretary of the Navy (Research Development Test & Evaluation), 1000 Navy Pentagon, Washington, DC, 20350		8. PERFORMING ORGANIZATION REPORT NUMBER			
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)		10. SPONSOR/MONITOR'S ACRONYM(S)			
		11. SPONSOR/MONITOR'S REPORT NUMBER(S)			
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution unlimited					
13. SUPPLEMENTARY NOTES 4th Annual Acquisition Research Symposium: Creating Synergy for Informed Change, May 16-17, 2007 in Monterey, CA					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT unclassified	b. ABSTRACT unclassified	c. THIS PAGE unclassified	Same as Report (SAR)	15	



Simulation Based Acquisition

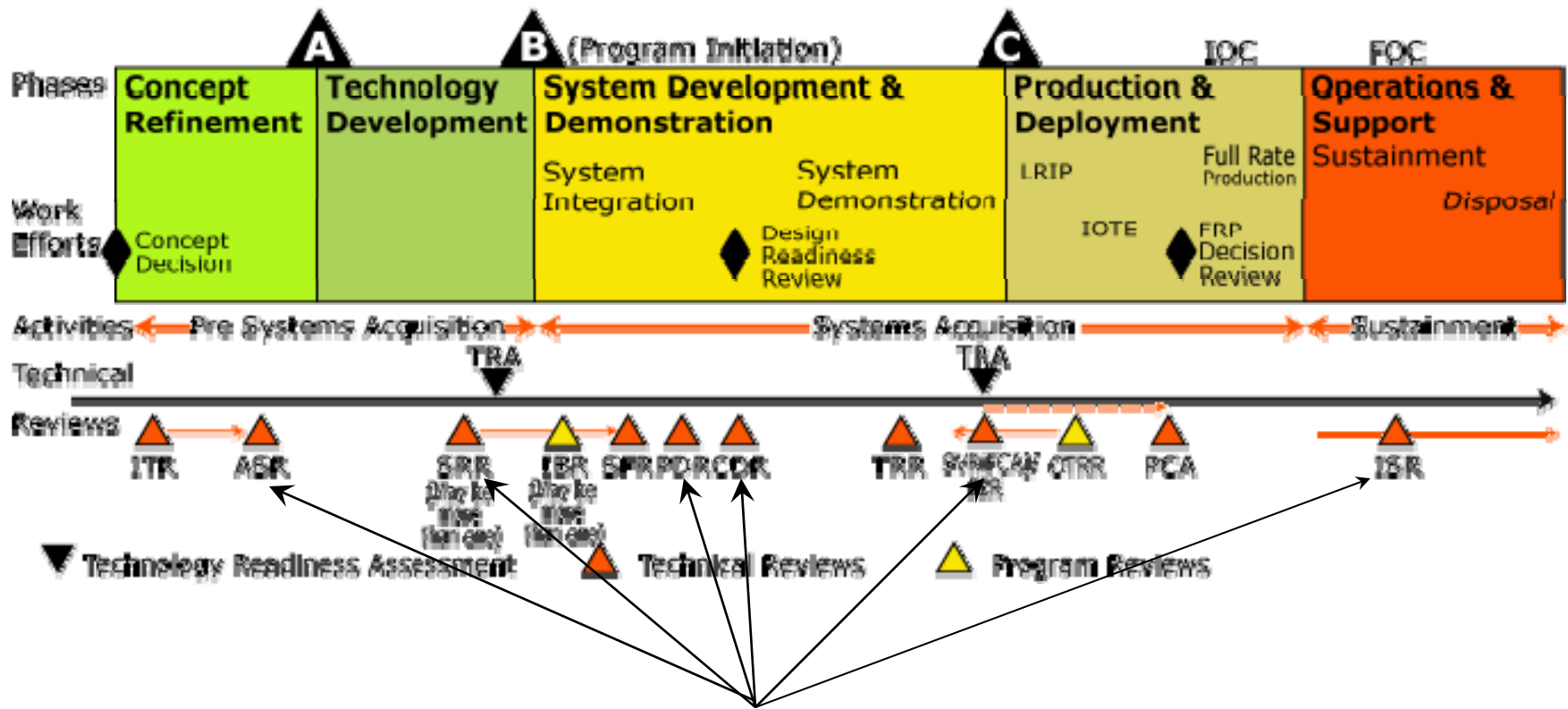
A 1990s vision not yet realized ...





Acquisition Process

Still calls for M&S throughout the phases



Key decision points that should be informed by M&S



Barriers to Implementation

Business

- M&S Business Case for an Individual Acquisition Program
- Model and Data Ownership Rights
- M&S Maintenance

Technical

- Validation, Verification, Accreditation (VV&A)
- Interoperability and Reuse -- Infrastructure/Standards
- M&S in a Service Oriented Architecture (e.g. GIG)

Cultural

- Lack of understanding of M&S capabilities and limitations



Phillip E. Coyle *(former DOT&E)*

- I came to the Pentagon from the Lawrence Livermore National Laboratory ... We never did a test without first trying to calculate - model, as you would say - in rather excruciating detail what would happen. It was literally unthinkable that you would spend millions of dollars on a test without making an equivalent effort first in M&S.
- For the most part, the DOD does not do that. It's quite common in the DOD to spend millions of dollars on a test without making any significant investment in M&S first. *(7 Mar 06 NDIA 22nd National T&E Conference)*



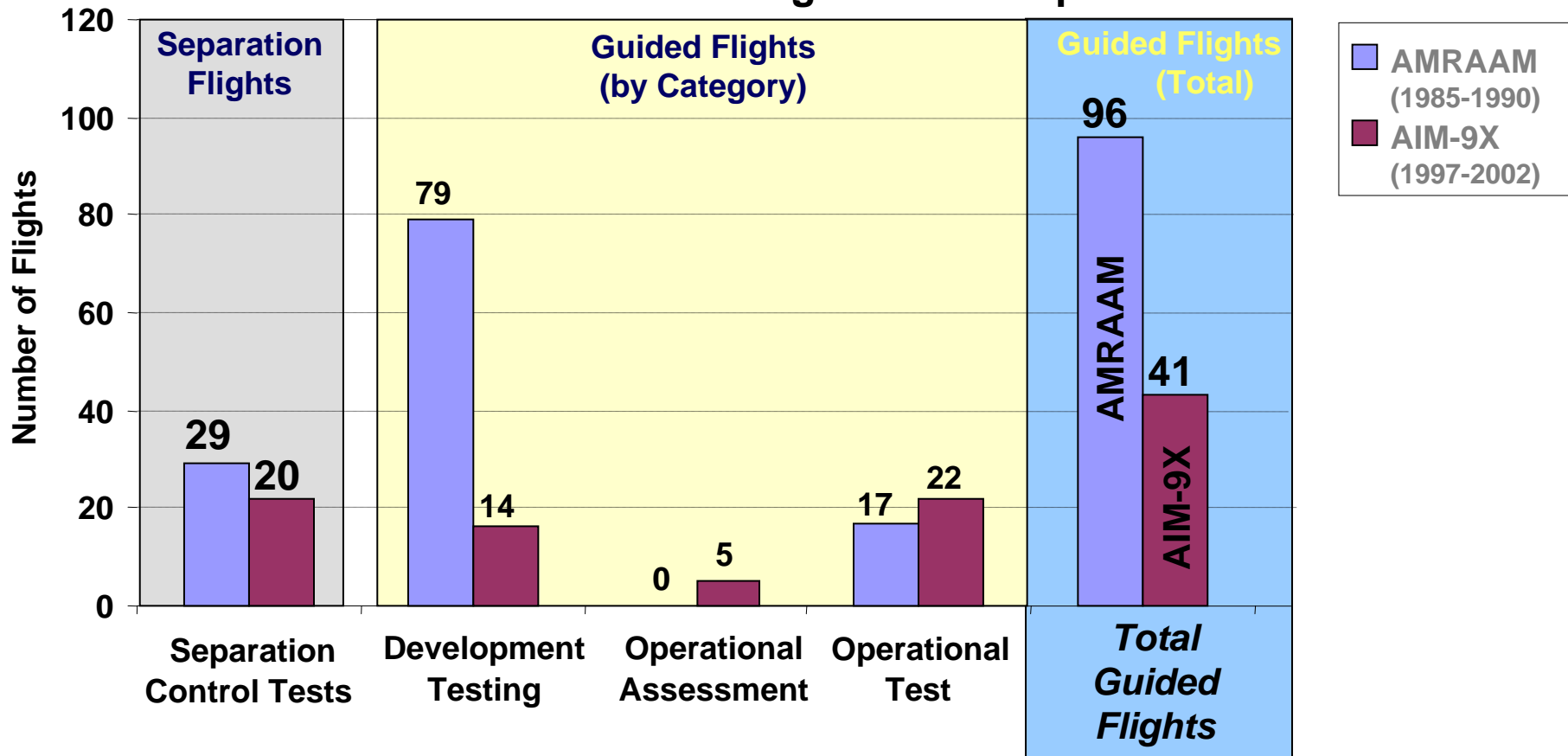
So Where Does Simulation Based Acquisition Make Sense?

- When the investment pays for itself in one program
 - *Example: AIM-9X*
- When reuse enables multiple programs to benefit
 - *Example: Ship Anti-Air Warfare M&S*
- When M&S is more informative than physical test
 - *Example: Full ship shock trials*
- When there is no other practical way to verify effectiveness and suitability
 - *Example: Distributed System of Systems, net-ready KPP*

Raytheon Used M&S Successfully on AIM-9X

Simulation Based Acquisition (SBA) Led To Dramatic Reductions In Weapon System Testing

AMRAAM vs. AIM-9X: E&MD Flight Test Comparison





Full Ship Shock Trials

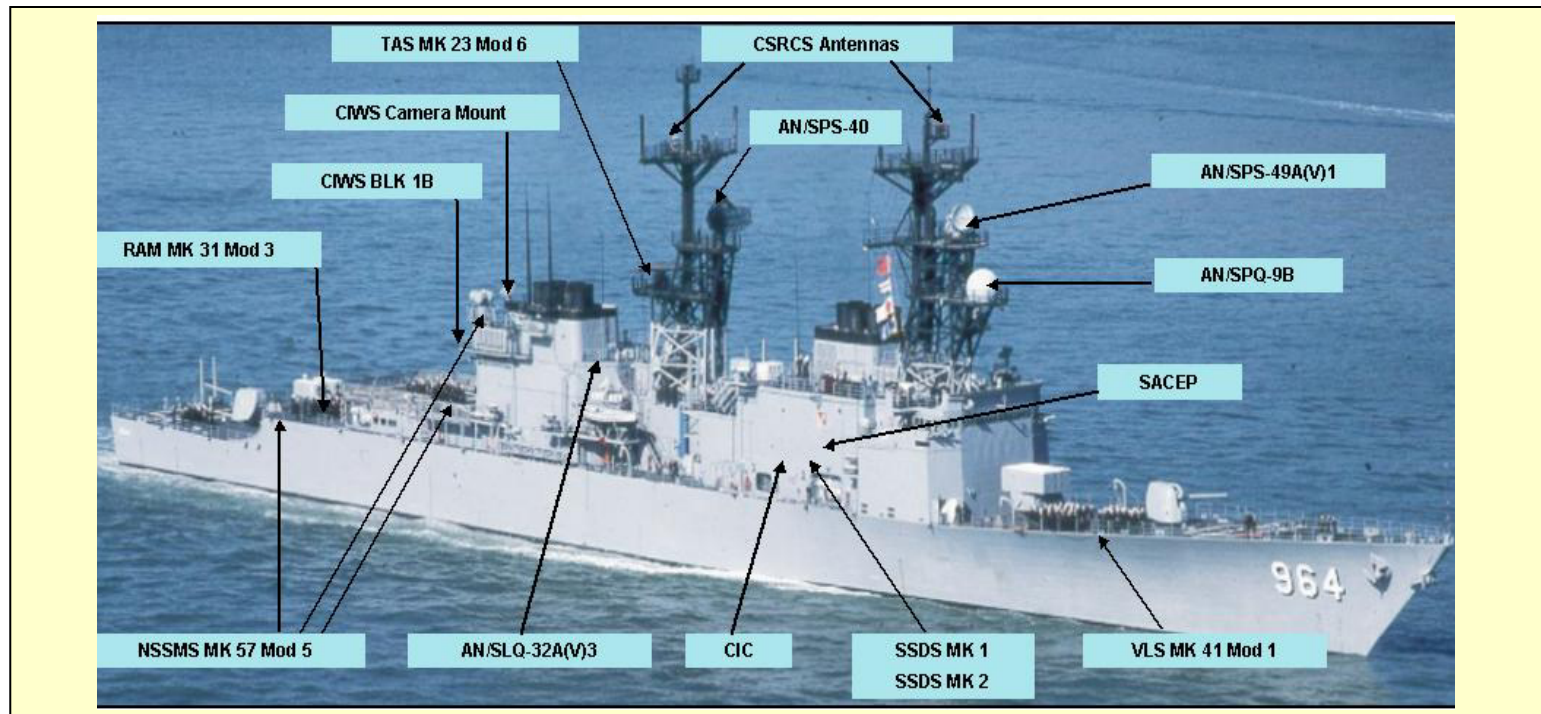
Need more knowledge at less cost



The Navy is going broke doing the right thing using traditional methods.

Ship Self Defense AAW

PEO(IWS)

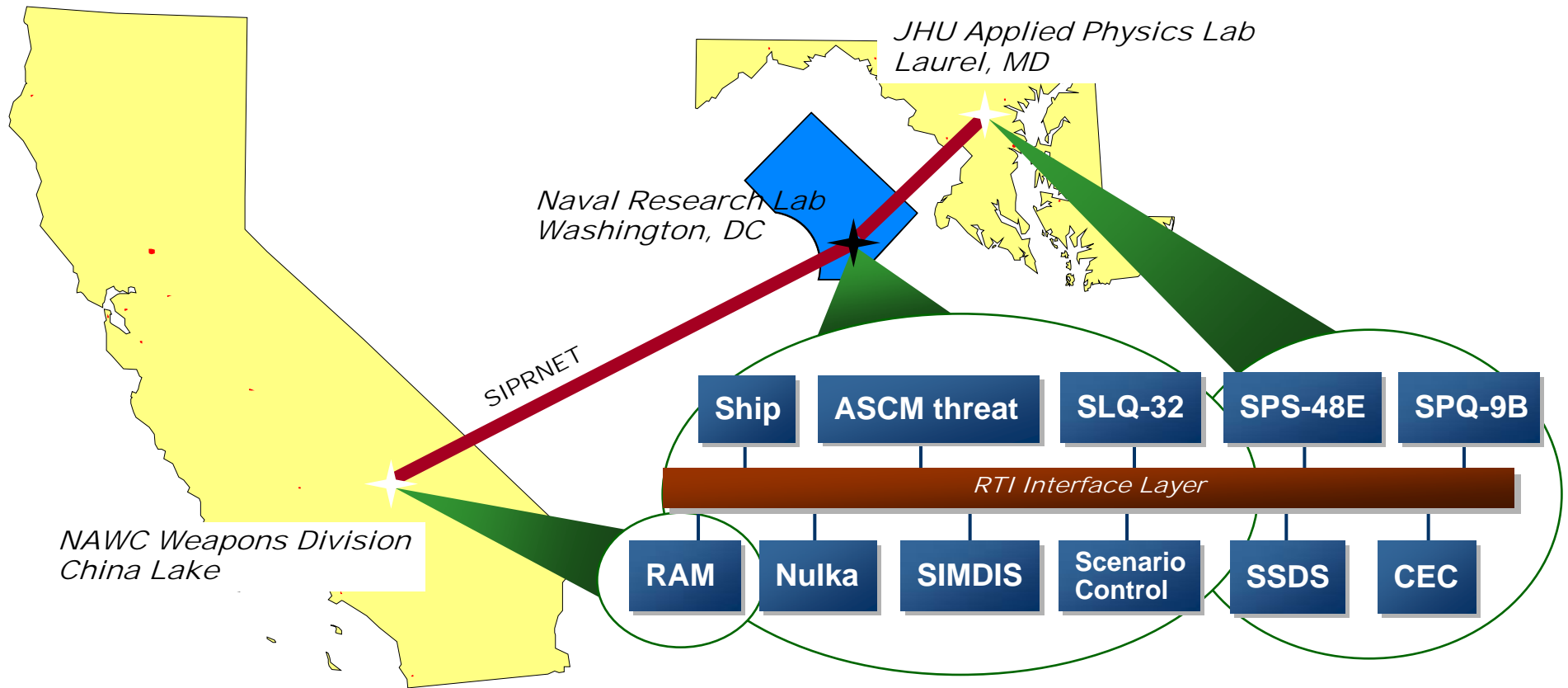


- High degree of commonality in combat systems
 - LPD 17, LHA6, LCS, DDG 1000, CVN 21
- All must demonstrate Probability of Raid Annihilation (P_{RA})
- Opportunity for savings through common T&E and simulation



Navy Enterprise Testbed for P_{RA}

Virtual Test Ship, Virtual Range





Interoperability and Reuse

Key to a viable business case across programs

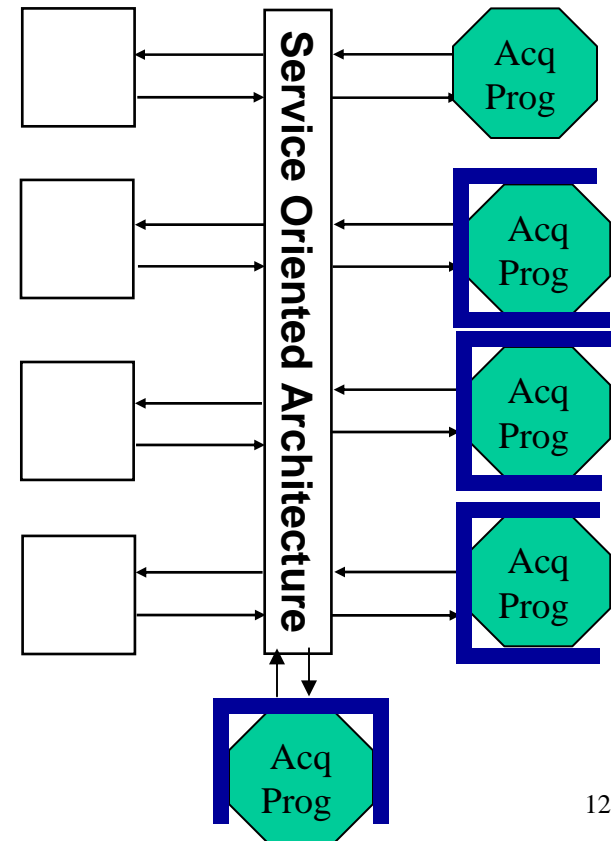
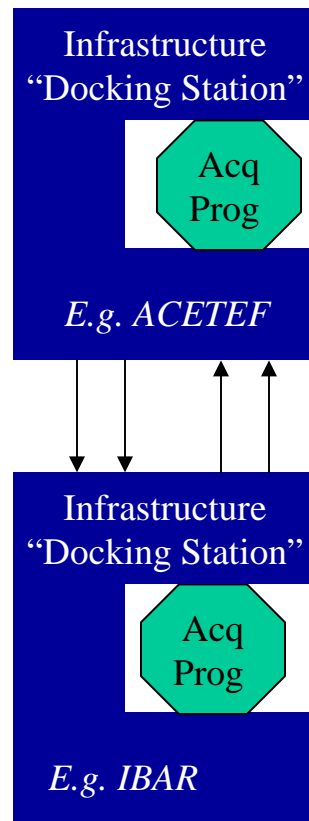
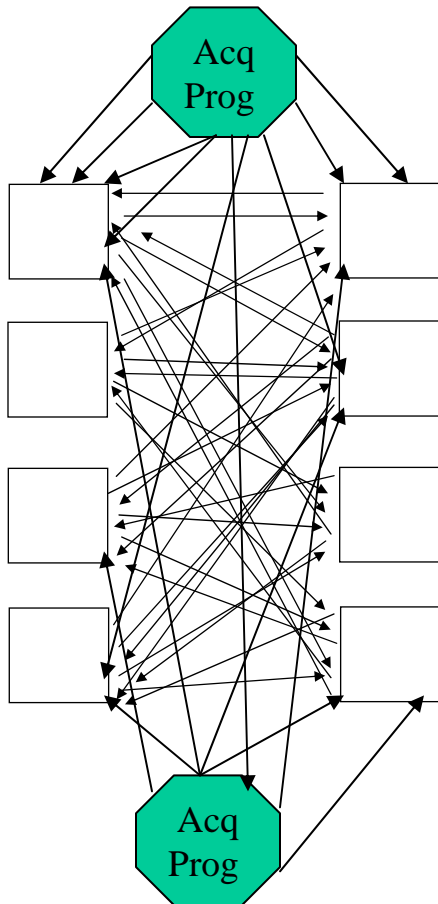
DoD and Navy Programs:

- Processes and Methodology
 - *JTEM*
- Infrastructure
 - *JMETC*
 - *Navy ACETEF, IBAR, DEP, PRA Testbed, ...*
- Standards
 - *DIS, TENA, HLA, XML, SEDRIS, ...*
- Lead Programs
 - *Navy CVN-21, MMA, JSF*



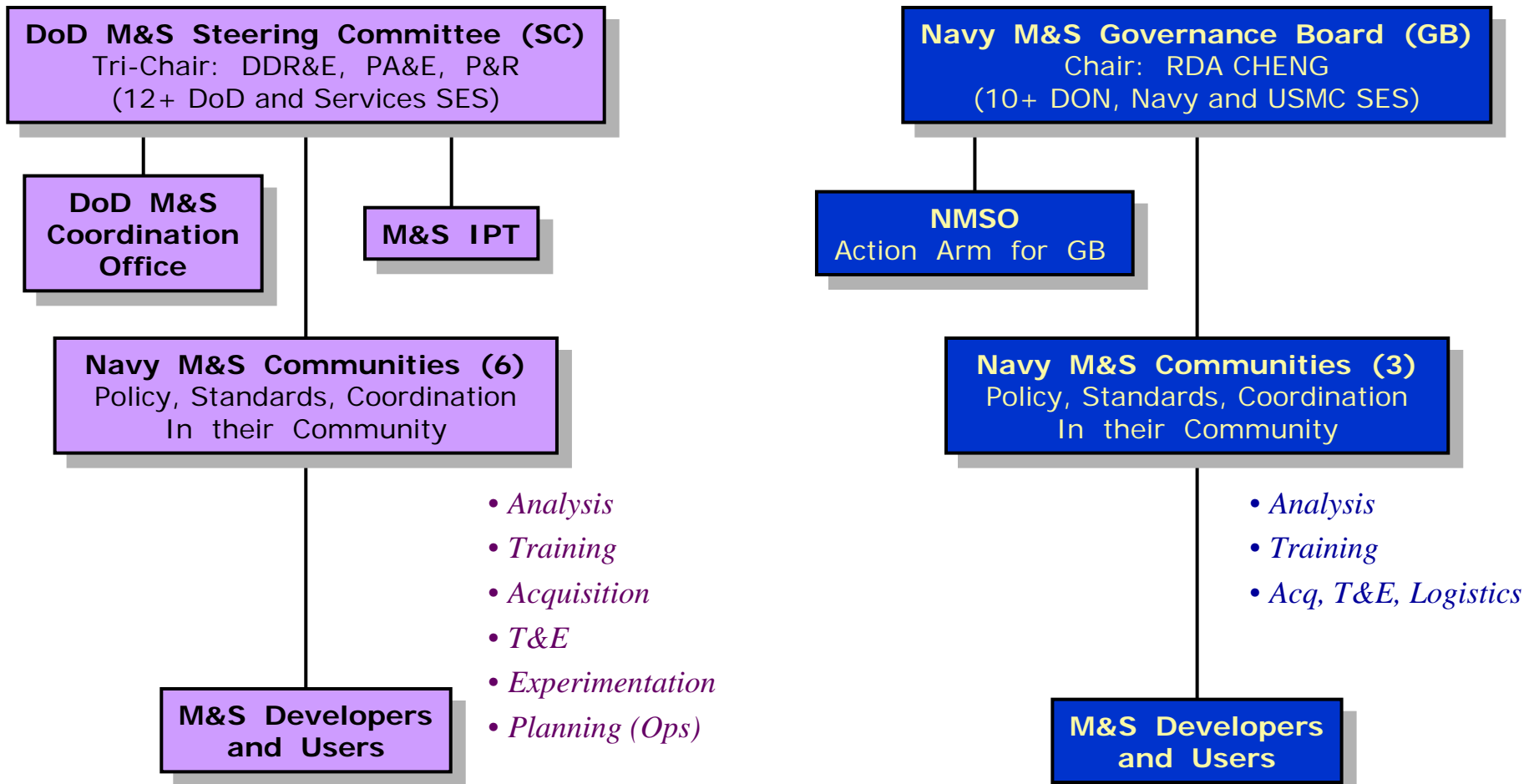
Evolution in Interoperability and Reuse

Moving toward "Train like we fight ... Test like we fight"





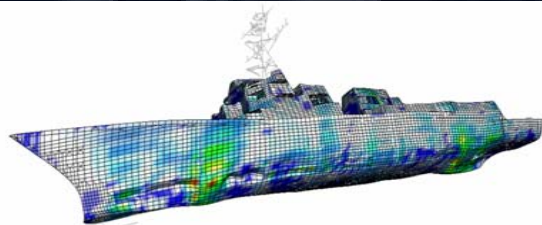
DoD & Navy M&S Governance





Challenges for Acquisition Research

- Making the business case for M&S
- Increasing the government role in Systems Engineering, with M&S providing insight at key decision points
- Contract deliverables and intellectual property rights in M&S
- Understanding commonalities and differences across domains
 - Analysis, Training, Systems Engineering, T&E, Logistics
- Model Driven Architecture (MDA) for software acquisition
 - Leveraging unambiguous, executable functional specs



Questions?