

# ASN (RDA) Chief Systems Engineer



## Navy Brief

## DoD M&S Steering Committee

## DOD M&S Conference



11 March 2008

Mr. Carl Siel  
ASN(RDA) Chief Systems Engineer  
carl.siel@navy.mil

## Report Documentation Page

*Form Approved  
OMB No. 0704-0188*

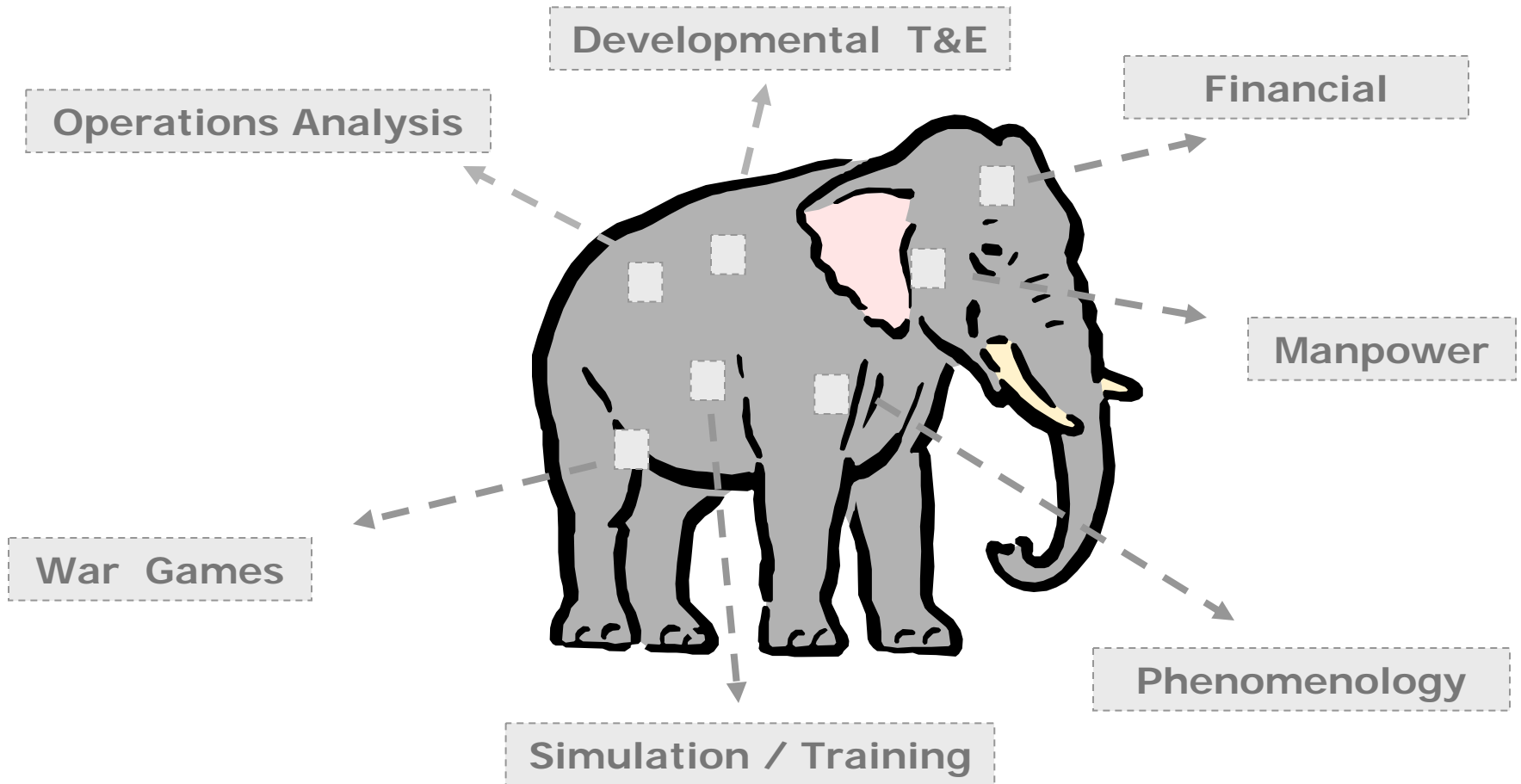
Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.

1. REPORT DATE <b>11 MAR 2008</b>	2. REPORT TYPE <b>N/A</b>	3. DATES COVERED <b>-</b>	
4. TITLE AND SUBTITLE <b>Navy Brief DoD M&amp;S Steering Committee Navy M&amp;S Challenge &amp; Complexity</b>		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) <b>ASN (RDA)</b>		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 <b>Approved for public release, distribution unlimited</b>			
13. SUPPLEMENTARY NOTES <b>2008 DoD M&amp;S (Modeling and Simulation) Conference Presentations held in Orlando, Florida on March 10 - 14, 2008, The original document contains color images.</b>			
14. ABSTRACT			
15. SUBJECT TERMS			
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT
a. REPORT <b>unclassified</b>	b. ABSTRACT <b>unclassified</b>	c. THIS PAGE <b>unclassified</b>	<b>UU</b>
			18. NUMBER OF PAGES <b>16</b>
			19a. NAME OF RESPONSIBLE PERSON



# Using M&S is like describing an Elephant

RDA  
CHIEF  
SYSTEMS  
ENGINEER



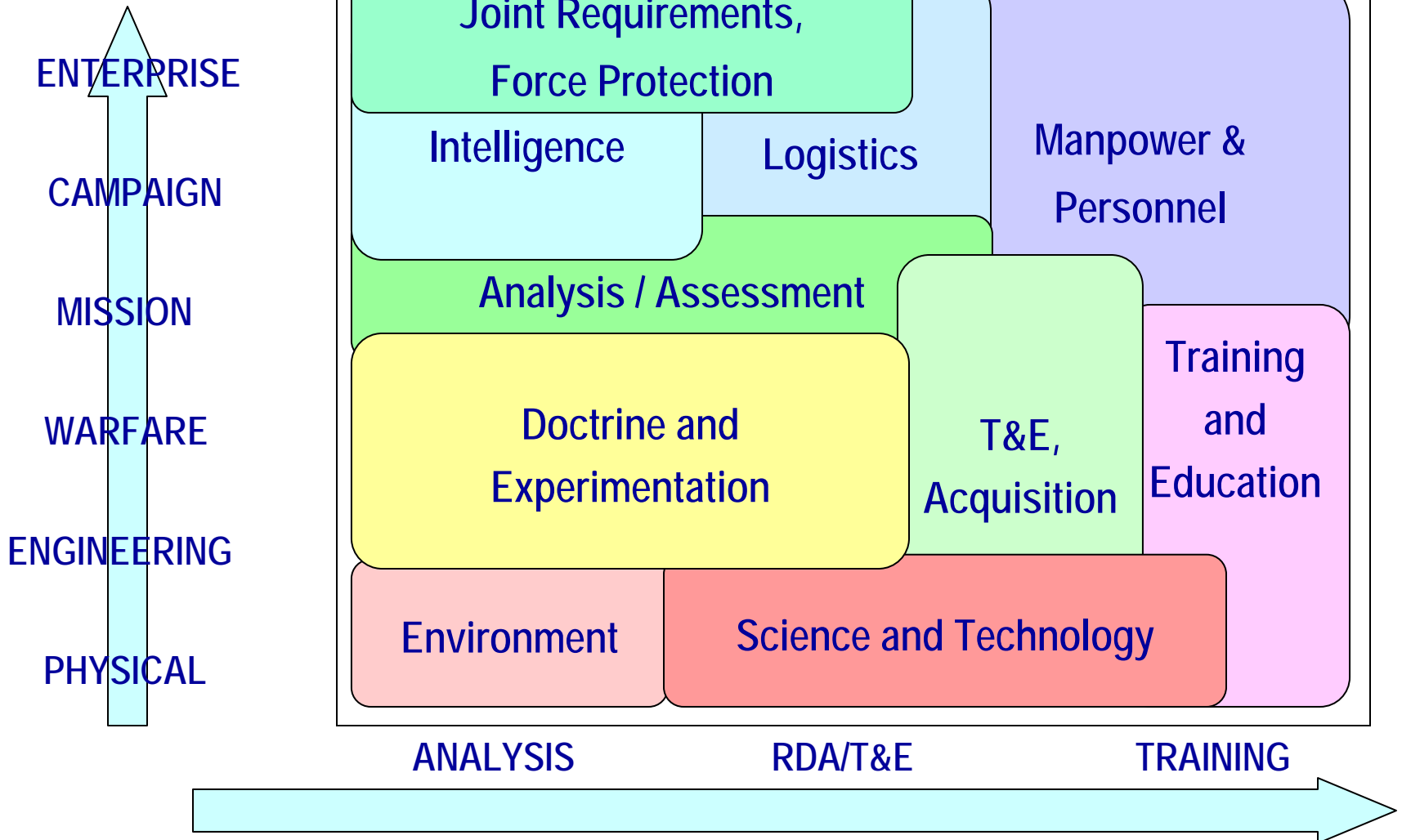
**It Depends on your View**



# Navy M&S Challenge & Complexity

RDA  
CHIEF  
SYSTEMS  
ENGINEER

Level of Abstraction





# Navy M&S Governance

**RDA**  
**CHIEF**  
**SYSTEMS**  
**ENGINEER**

## M&S Governance Board



**Goal Enhance M&S Across, Between & Within the Communities**



# Navy M&S Governance

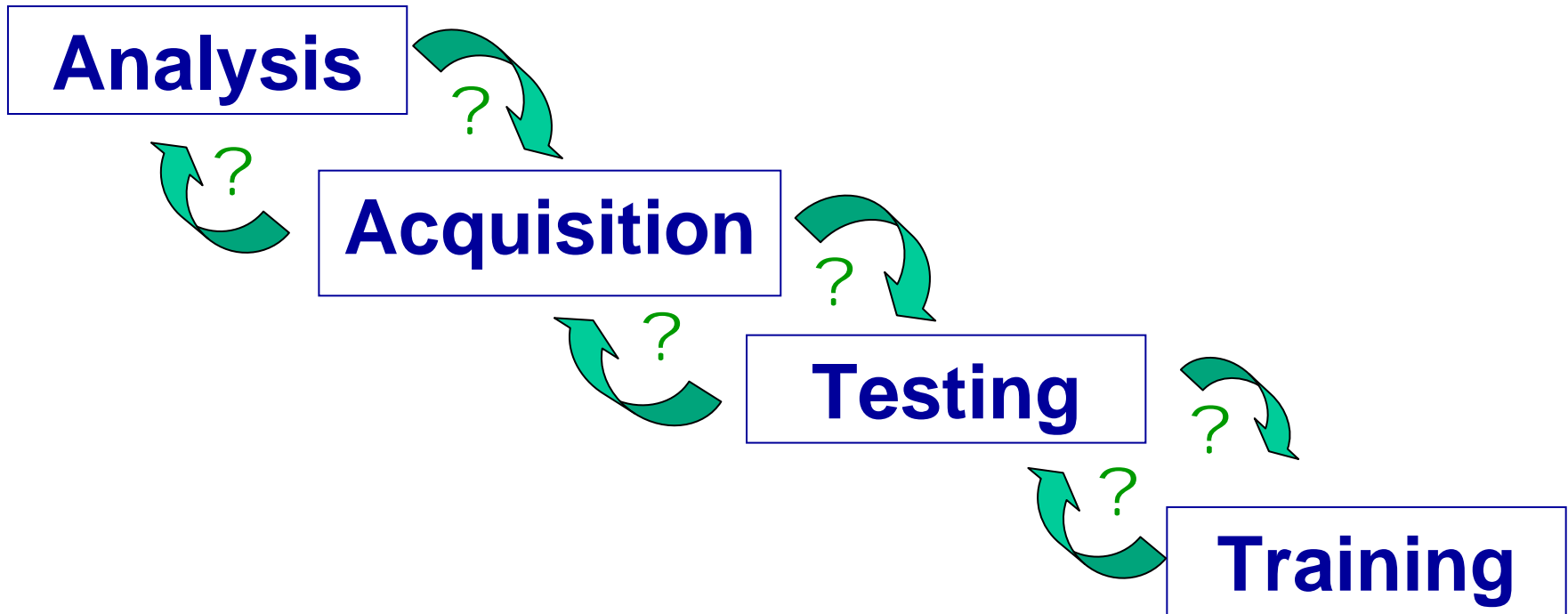
**R**DA  
**C**HIEF  
**S**YSTEMS  
**E**NGINEER

- ◆ **M&S Governance Board Mission:**
  - Promote commonality and interoperability
  - Enhance capabilities Across and Between Communities
  - Coordinate M&S policy and implementation
  
- ◆ **Community Leads will:**
  - Identify & prioritize M&S needs
  - Support interoperability and reuse
  - Pursue and promote M&S initiatives
  - Implement policy, standards, and guidance
  - Engage at the DoD level on community issues



# How Do We Help M&S Between, Across and Between the Communities?

**R**DA  
**C**HIEF  
**S**YSTEMS  
**E**NGINEER



**Enhance the Interaction to Improve Delivery of Capabilities to the Warfighter**



# Study of Studies Findings

**RDA**  
**CHIEF**  
**SYSTEMS**  
**ENGINEER**

- ◆ **Examined previous M&S studies, 1994 – Present**
  - Advocate for a Strategic, Longer term commitment to M&S improvements that span all application and warfare areas
  
- ◆ **Top 3 elements:**
  1. Visibility and Accessibility
  2. Reusability
  3. Simulation Interoperability



# Navy Cross-Cutting Efforts

RDA  
CHIEF  
SYSTEMS  
ENGINEER

## ◆ M&S Tools

- VV&A Documentation Tool – consistent, searchable, and understandable VV&A information
- Standards Vetting Tool – single, repeatable process for all M&S standards
- Collaboration environments for within and across Communities

## ◆ M&S Data

- M&S Catalog – implementation of the approved M&S Discovery Metadata Specification and XML Schema
- Tr-Service Publish/Subscribe, Search Capabilities

## ◆ M&S Services

- Navy M&S Information Service (NMSIS) (visibility)
- VV&A Support Team (education, assistance & consistency)
- M&S education for officers and civilians



# Example M&S Efforts

---

**RDA**  
**CHIEF**  
**SYSTEMS**  
**ENGINEER**

- ◆ **Navy Integrated Warfare Systems**
- ◆ **CVN-21 Virtual Carrier**
- ◆ **Surface Ship Full Ship Shock Trials (FSST)**



# Navy Integrated Warfare Systems

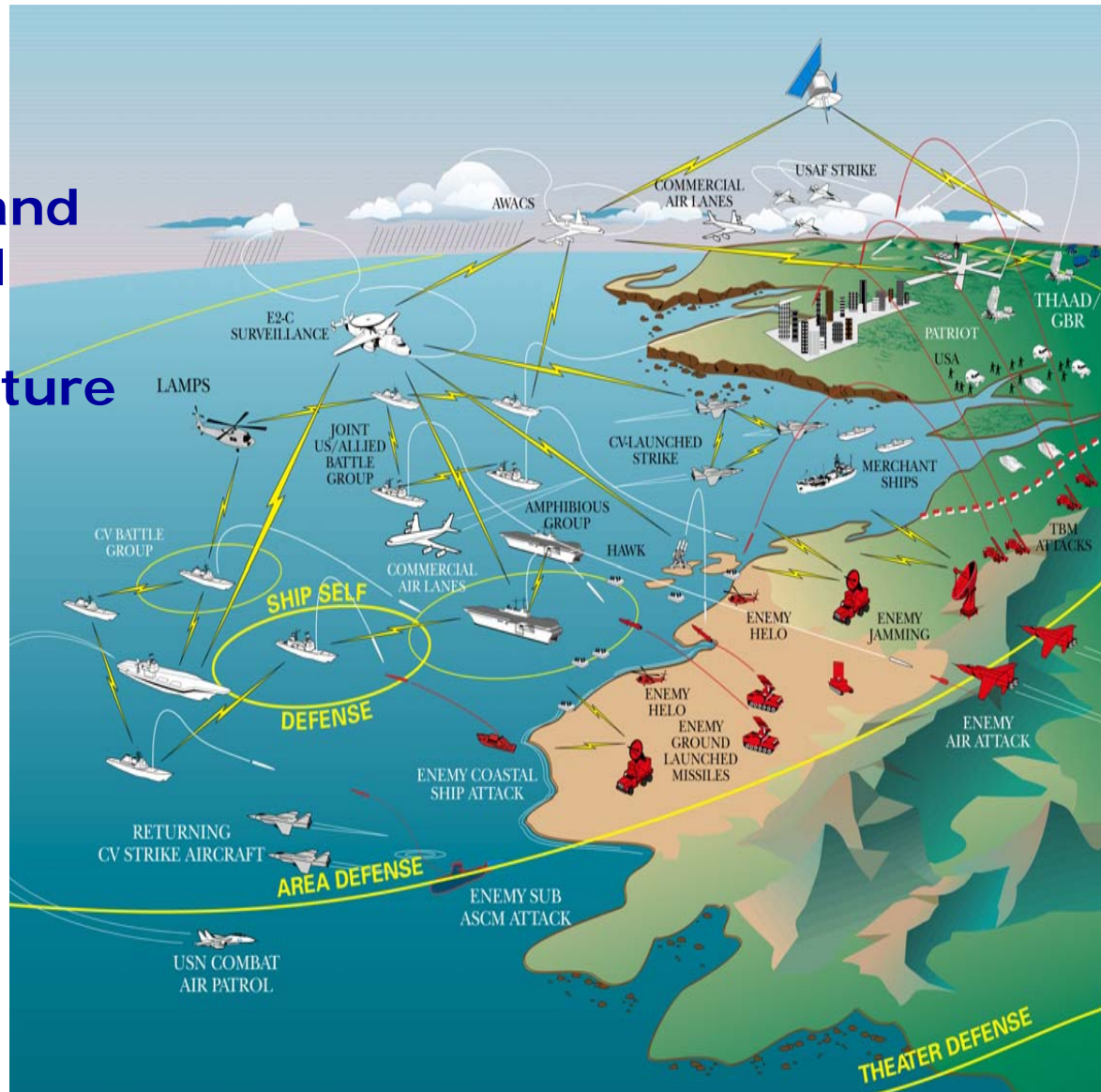
RDA  
CHIEF  
SYSTEMS  
ENGINEER

## Challenges

- ◆ Battle Force, Joint, and Coalition Operational Environments
- ◆ Use of Open Architecture
- ◆ Dwindling Resources

## Being meet by...

- ◆ Use of Analysis M&S Efficiencies
- ◆ Reduction of Combat System baselines
  - Objective Combat System
- ◆ Enterprise T&E





# Navy Integrated Warfare Systems

## Enterprise T&E -- A new paradigm for M&S use in T&E

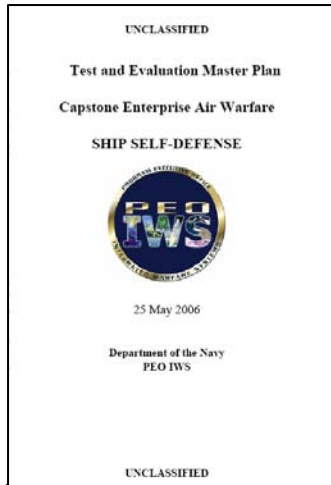
**R**DA  
**C**HIEF  
**S**YSTEMS  
**E**NGINEER

The purpose of the Capstone Enterprise Air Warfare Ship Self Defense (AW SSD) Enterprise Test and Evaluation Master Plan (TEMP) is to consolidate all AW SSD at-sea testing and P<sub>RA</sub> Testbed testing

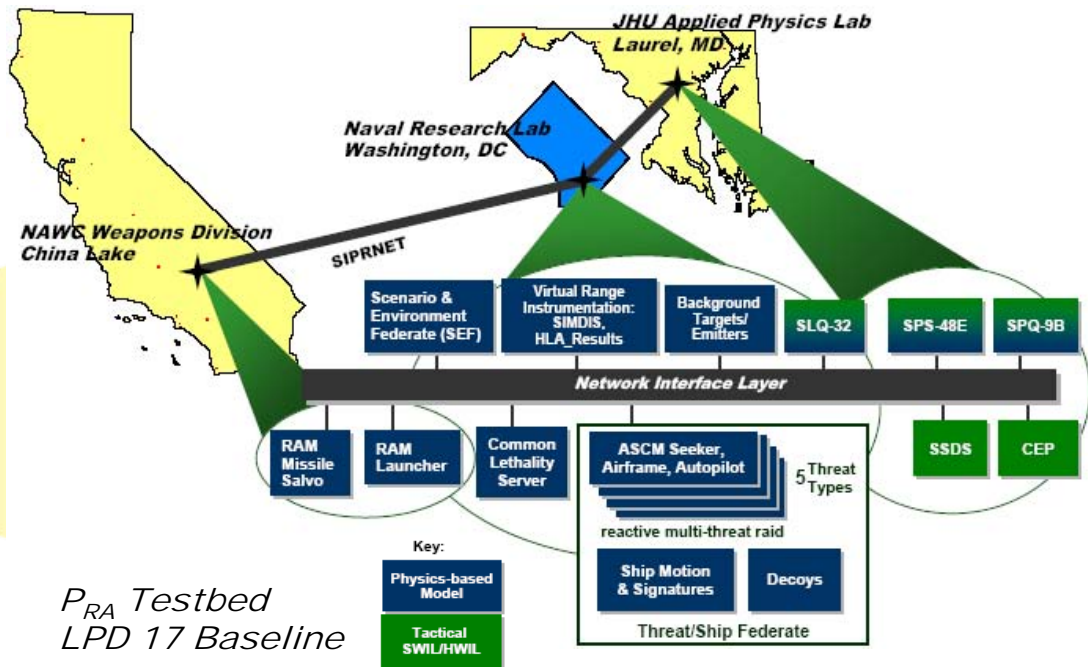
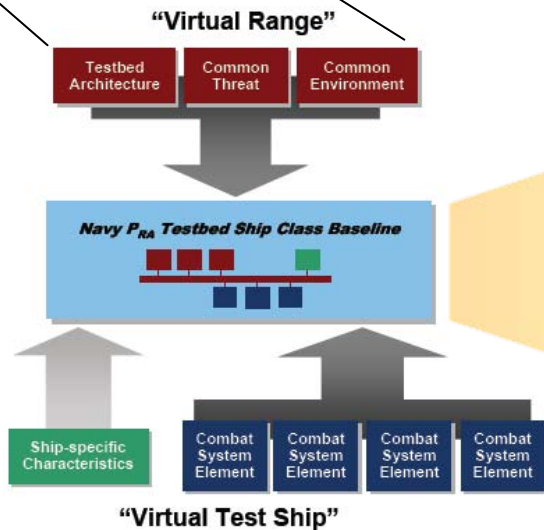
The AW SSD T&E Enterprise Strategy is founded on a two-tiered process to assess AW SSD warfare systems performance:

- 1) Validate models with live testing: Operational Ship testing, Self Defense Test Ship (SDTS) testing
- 2) Assess performance with models

Test Events DT/OT-ET15 thru ET19 are formal PRA Testbed events -- includes DDG 1000, LHA 6, LCS and CVN 21 ship classes



DT/OT-ET15 thru ET19



*P<sub>RA</sub> Testbed  
LPD 17 Baseline*

*Significant cost avoidance and unprecedented use of M&S for OT&E*

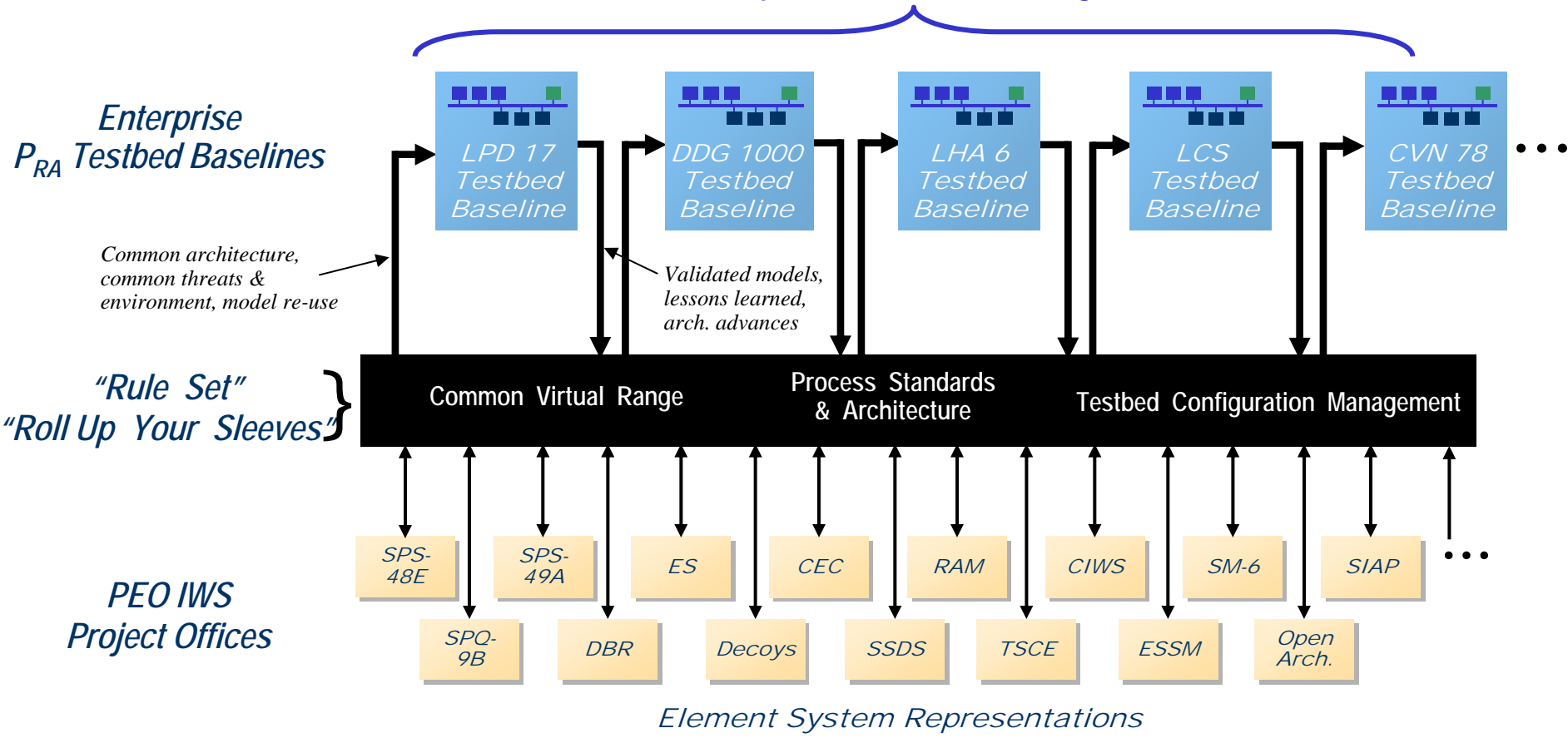


# Navy Integrated Warfare Systems

## Enterprise P<sub>RA</sub> Testbed Evolution

RDA  
CHIEF  
SYSTEMS  
ENGINEER

*Consistent Testbed development  
across ship classes and CS configurations*



*Significant cost avoidance through re-use of models, virtual range, & architecture*



# CVN-21 Virtual Carrier T&E Methodology Report

**RDA  
CHIEF  
SYSTEMS  
ENGINEER**

PEO Carriers Tasking  
Letter – 20 Nov 06

## ◆ PEO Carriers directed six month study:

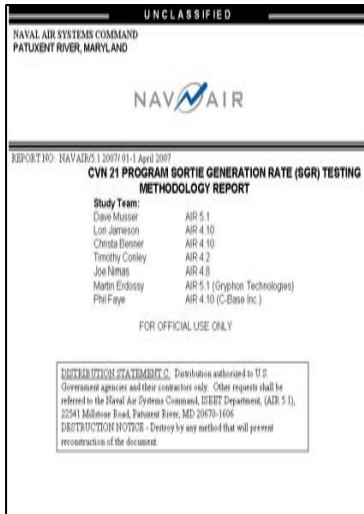
- Future Carrier Program Office with COTF, study of methodologies for testing SGR using a virtual carrier M&S environment.
- *"...an appropriate M&S strategy may bridge the gap between attainable live test opportunities and measuring the full SGR DRM."*
- Establish options and cost for mixtures of live test with use of M&S to support IOT&E for SGR KPP.



SGR T&E  
Methodology Report  
– 31 May 07

## ◆ Report endorses Virtual Carrier (M&S) use for testing:

- A dedicated test of the CVN 21 SGR KPP would require 34 days of operation costing over \$200M O&S
- Use of M&S allows live test data to be gathered during existing Navy training exercises
- Live test data validates models which are then used to thoroughly assess the SGR KPP
- Results meet test requirements with a large cost saving or cost avoidance



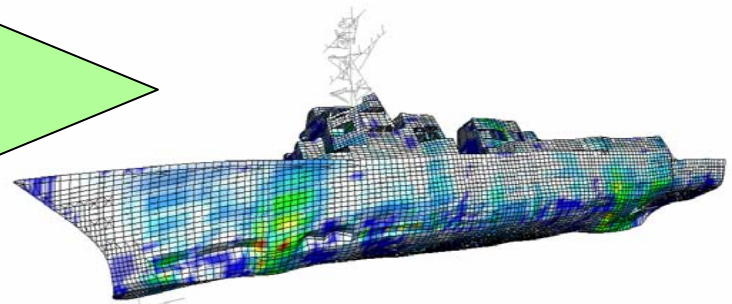
SGR – sortie generation rate  
COTF – COMOPTEVFOR  
KPP – Key Performance Parameter



# Surface Ship Full Ship Shock Trials (FSST)

RDA  
CHIEF  
SYSTEMS  
ENGINEER

LFT&E Transformation  
Full Scale Ship Shock Trial



## Empirical-based Certification

- Expensive
- Single Point Test
  - Not statistically significant
- Limited Confidence
- Slower Development



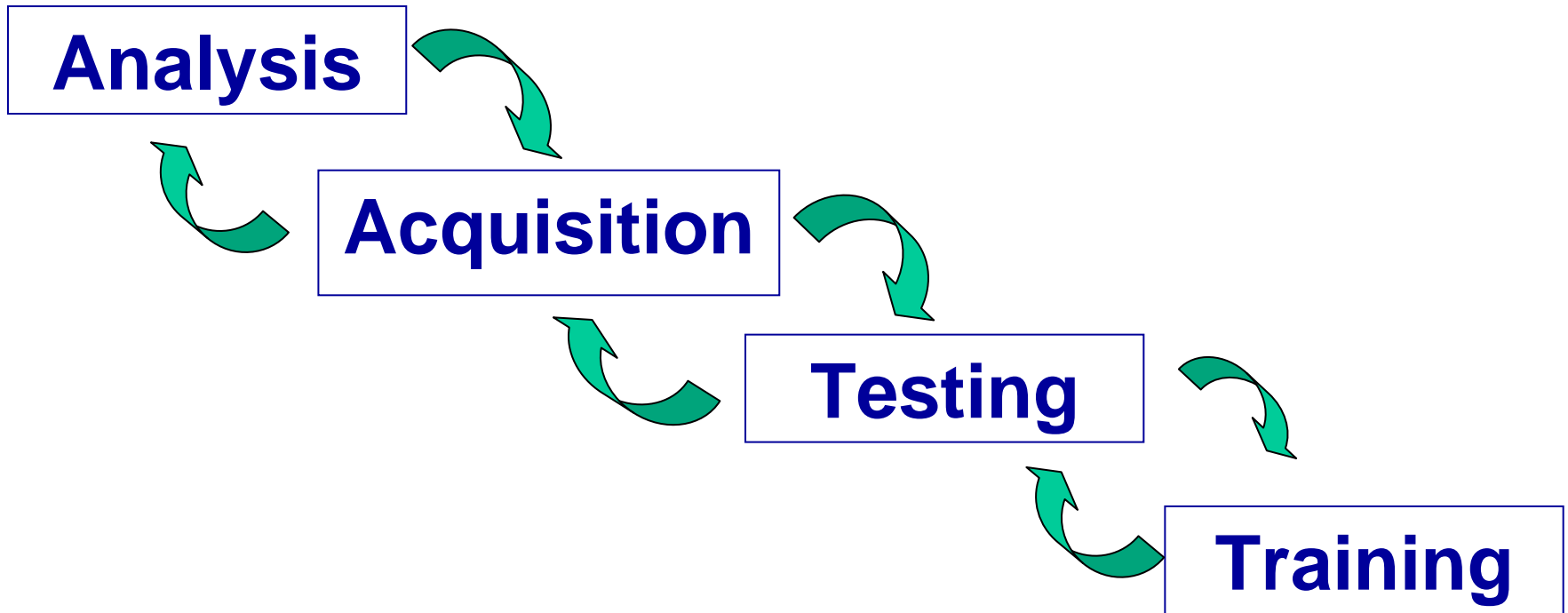
## Science-based Certification

- Affordable
- High Fidelity Modeling & Simulation
- Understand Design Space = Confidence
- Faster Development
- Spiral Technology Insertion Enabler



# Enhancing the Interaction

**R**DA  
**C**HIEF  
**S**YSTEMS  
**E**NGINEER



**Transforming M&S to Enable Delivery of Better Capabilities to the Warfighter**



# Summary

**RDA**  
**CHIEF**  
**SYSTEMS**  
**ENGINEER**

- ◆ **Enhancing M&S is a Complex Challenge**
- ◆ **Working a collaborative management construct with multiple user interests**
- ◆ **Objective continues to be the enhancement of M&S capabilities Across, Between, and Within our Communities to deliver better capabilities to the Warfighter.**