THEATER AIR DEFENSE

TAD

PROGRAM EXECUTIVE OFFICE

Supporting The Acquisition Process:

T&E Modeling & Simulation

RADM Rodney P. Rempt

September 1997

THEATER AIR DEFENSE
TAD
PROGRAM EXECUTIVE OFFICE

ROLLING AIRFRAME MISSILE (RAM) MODEL-TEST-MODEL

THEATER AIR DEFENSE

What are we doing?

- Building a RAM Blk 1 launcher simulator
- Conducting validation testing of the simulator vs. real launcher
- Conducting risk reduction testing in support of upcoming TECHEVAL/ OPEVAL on GUNSTON HALL LSD 44
- Supporting Land Based Engineering Facility (LBEF) testing Oct/Nov 97

Why are we doing it?

- To enable testing or training at facilities requiring a RAM Blk 1 launching system
- To test RAM Blk 1 interfaces with other combat systems

What are the benefits?

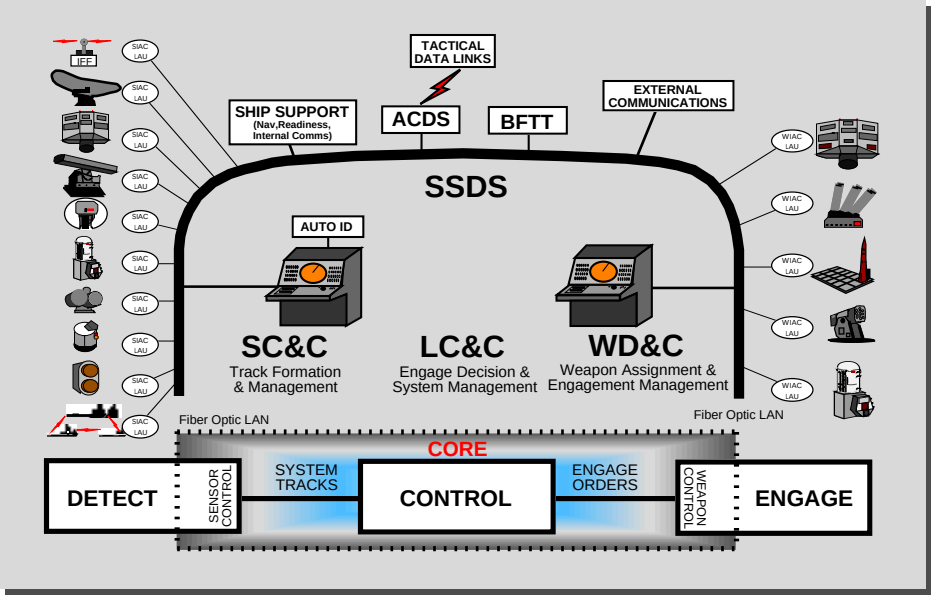
- Streamlines engineering development
- Enables early end-to-end testing of total combat system
- Saves $4.2M per launching system
- Increases training efficiency

M&S supports at-sea testing to achieve a successful Milestone III

THEATER AIR DEFENSE
TAD
PROGRAM EXECUTIVE OFFICE

WRAP-AROUND SIMULATION PROGRAM (WASP)

THEATER AIR DEFENSE



What are we doing?

- Conducting elemental model integration
- Stimulating Ship Self Defense System (SSDS) tactical hardware and software
- Supporting Fleet Quick Reaction Combat Capability engagement doctrine development
- Performing risk reduction testing in support of AT-SEA testing aboard USS ASHLAND LSD 48

Why are we doing it?

- To accomplish risk reduction
- To reduce at-sea testing cost
- To stress the software prior to Fleet introduction
- To increase statistical sample size of test
- To validate QRCC engagement doctrine

What are the benefits?

- Reduces at-sea testing
  - Validate Fleet SSDS/QRCC doctrine
- Supports Fleet test and training
  - Battle Force Tactical Trainer (BFTT) capable

Enables developmental testing of the total combat system prior to at-sea testing

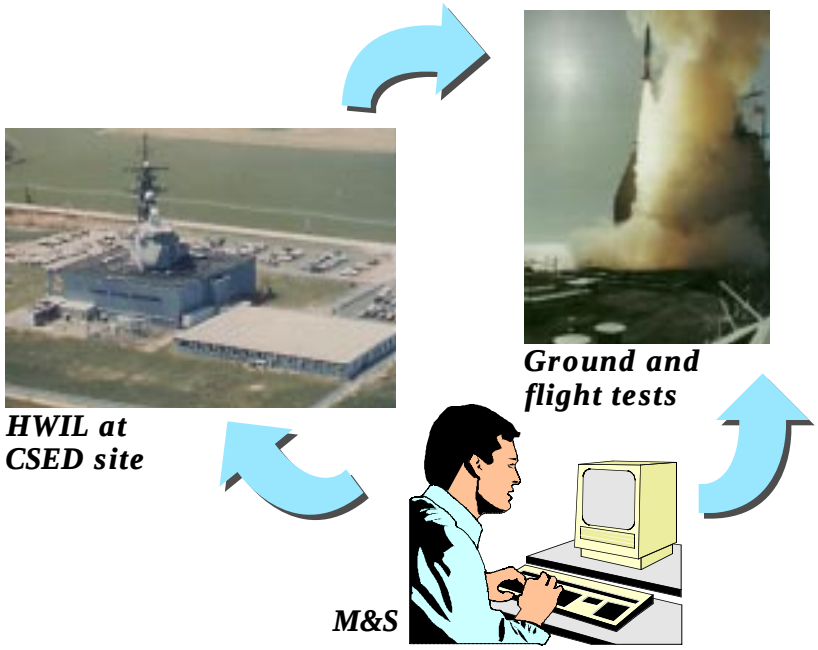
THEATER AIR DEFENSE
TAD
PROGRAM EXECUTIVE OFFICE

AREA THEATER BALLISTIC MISSILE DEFENSE (TBMD)

THEATER AIR DEFENSE

What are we doing?

- Maximizing effectiveness while minimizing cost
- Developing a process for performance verification in support of MS III
- Integrating M&S, Hardware in the Loop (HWIL), and flight testing
- Validating M&S for use in testing



Why are we doing it?

- To support timely introduction of capability into fleet given existing resources
- To minimize requirements for costly, complex test exercises
- To advance software maturity and leverage HWIL testing

What are the benefits?

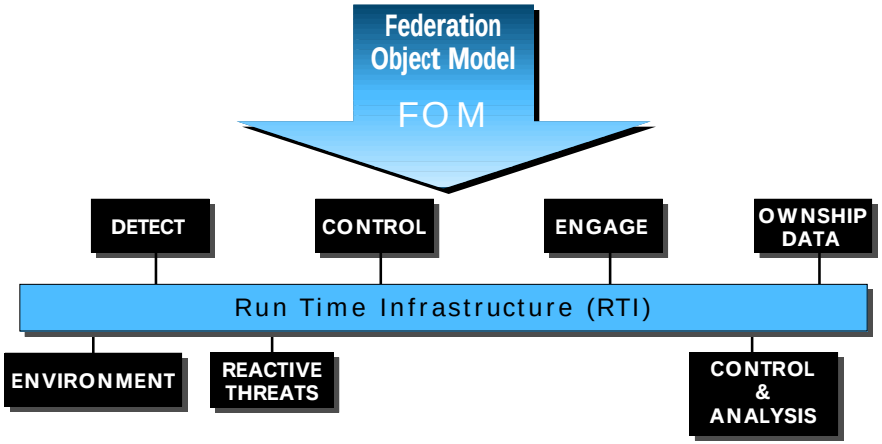
- Reduces risk and ensures optimal test planning
- Maximizes use of available flight test data
- Provides credible simulation tools to support system evaluation and acquisition decisions

Incorporates live, virtual and constructive M&S to verify system performance during EMD

THEATER AIR DEFENSE
TAD
PROGRAM EXECUTIVE OFFICE

INTEGRATED SHIP DEFENSE (ISD) PILOT PROGRAM

THEATER AIR DEFENSE



- ***Sensor integration/HK-SK interaction analysis***
- ***Benchmark capabilities for follow-on application***
- ***Demonstrate hi-fidelity model interaction via HLA(RTI)***

Why are we doing it?

- To reduce cost of at-sea testing
- To provide an assessment capability for the total combat system
- To elliminate inconsistencies in environmental/ threat models at the element level

What are we doing?

- Integrating legacy and future element simulations
- Maturing High Level Architecture (HLA) RunTime Infrastructure (RTI) technology
- Developing end-to-end simulation capability during FY98 effort
- Integrating tactical command and control software with system elements

What are the benefits?

- Provides engineering level assessment tool to support the acquisition process
- Maximizes effectiveness of at-sea testing
- Provides an integrated ship defense combat system representation in the joint synthetic battle space (JSTEB)
- Determines readiness and return on investment of embracing HLA standard and Advanced Distributed Simulation technology

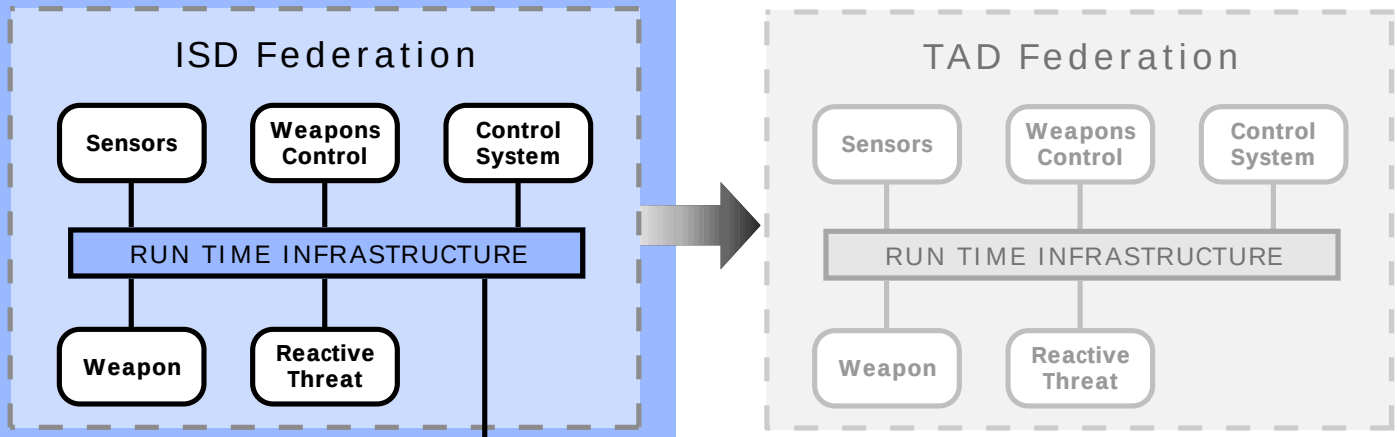
The ISD Pilot is the discovery process for the way ahead

THEATER AIR DEFENSE
TAD
PROGRAM EXECUTIVE OFFICE

PILOT PROGRAM VISION

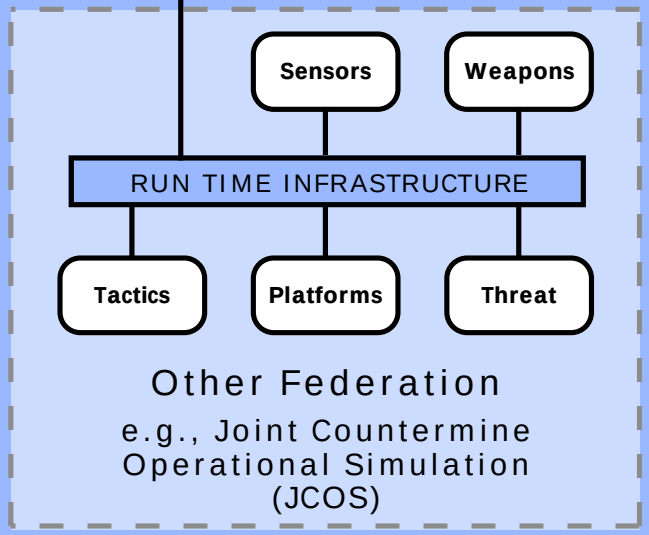
THEATER AIR DEFENSE

ENGINEERING MODELS
- ***HK/EW interactions***
- ***Hi fidelity***
- ***Non-real time***



COMMON SERVICES
- Environment
- Scenario
- Simulation Control
- Analysis Tools

BRIDGE FEDERATE
- ***Spatial coherence***
- ***Time synchronization***



ENGAGEMENT SIMULATION
- ***Expeditionary warfare***
- ***Multi-warfare/Joint OPS***
- ***Mission evaluation of conceptual systems***
- ***Real time/event driven***

THEATER AIR DEFENSE
TAD
PROGRAM EXECUTIVE OFFICE

EVOLVING CAPABILITIES

THEATER AIR DEFENSE

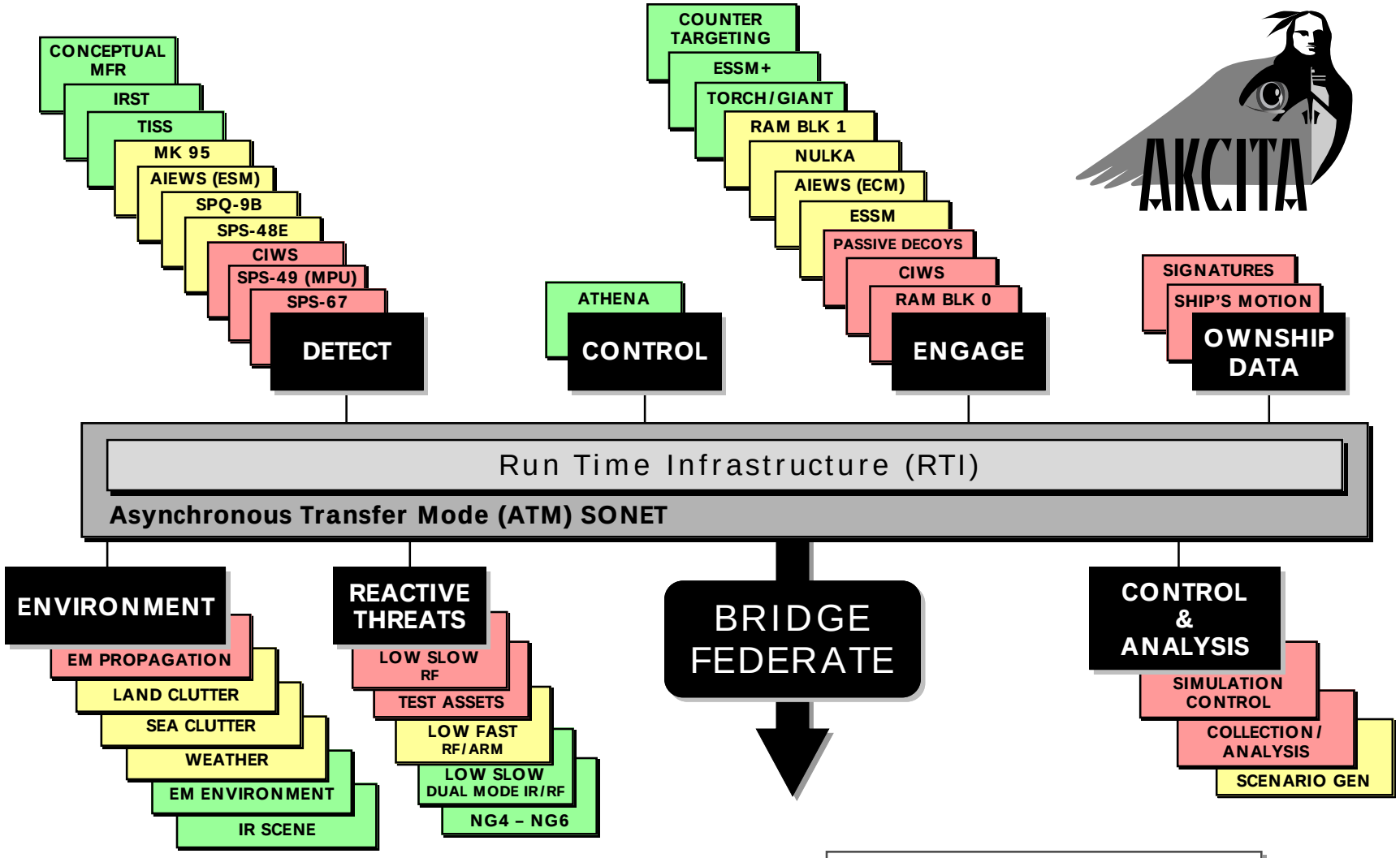
FY 97	FY 98	FY 99	FY 00
Pilot Program Study			
ISD ADS Pilot Program Plan Sept 96	**PHASE I: Develop TAD Federation**	TRANSITION	 Next Generation Combat System
• Technical Foundation established • Vision Cell • Core team established • Need management support	• Uses Defense Modeling & Simulation Office (DMSO) RTI • Existing Combat System simulation • HK/EW Integration Analysis capability • Low slow reactive threat	**PHASE II: Network Evolutionary Programs** • Low fast reactive threat simulation • Distributed Hi-Fi simulation • Wide-band networks • Active ECM	**PHASE III: Integrate Federations** • Bridge Federate • AKCITA conceptual Combat System models • Hi-Fi EW model

PHILOSOPHY: ***Phases transition M&S capabilities of current systems to Next Generation Systems in support of Simulation-Based Acquisition***

THEATER AIR DEFENSE
TAD
PROGRAM EXECUTIVE OFFICE

PHASE III ARCHITECTURE (FY 00)

THEATER AIR DEFENSE



THEATER AIR DEFENSE
TAD
PROGRAM EXECUTIVE OFFICE

SCHEDULE / COST

THEATER AIR DEFENSE

FY 97	FY 98	FY 99	FY 00

PHASE I ISD Pilot Program

- Develop a comprehensive Federation Object Model (FOM)
- Perform conceptual analysis
- Design the Federation
- Perform requirements solicitation
- Design new or modify legacy designs

PHASE II ISD Pilot Program

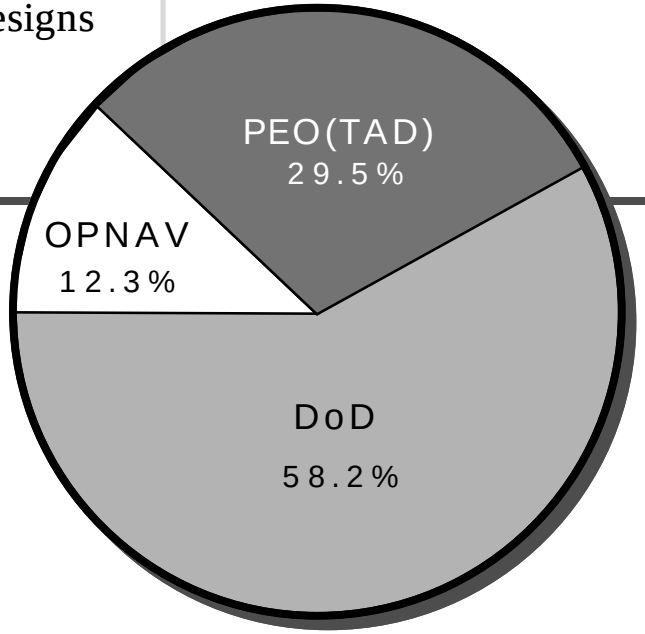
- Expand sensor suites
- Include active ECM
- Network geographically distributed Federates

PHASE III ISD Pilot Program

- Connectivity to other Federations
- AKCITA performance assessment
- RF/IR reactive threat capability

Total Program

$24.4 M



Pooling of resources enables us to proceed

THEATER AIR DEFENSE
TAD
PROGRAM EXECUTIVE OFFICE

LIVE FIRE vs. M&S

HOW MUCH REDUCTION IS ENOUGH?

THEATER AIR DEFENSE

- **The driver**
  - Shrinking missile inventories and rising cost and complexity of test
- **The road to the solution**
  - Identified areas where M&S can replace portions of live fire T&E
    - Combat system capability assessment
    - Tactical doctrine development and training
  - Commissioned live fire test reduction study
    - Assessment agent Naval Warfare Assessment Division
    - Establish methodology and process for determining appropriate utilization of M&S
- **Expand process across PEO(TAD)**

TAD is striving toward optimal balance between live fire and M&S