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THE STATE OF INTEGRATED AIR AND MISSILE DEFENSE

Laurel, MD

JULY 14, 2011

Agenda

WELCOME & ADMINISTRATIVE REMARKS

- Mr. John Reilly, Chairman, SLAAD Division

KEYNOTE ADDRESS 1

- UPDATE ON FINANCING OF IAMD AND EUROPEAN PAA, VADM John T. Blake, USN, DCNO for Integration of Capabilities and Resources, N8

JOINT AIR AND MISSILE DEFENSE COMMUNITY OF INTEREST (JAMD COI) OVERVIEW AND UPDATE

- Mr. Larry Smith, JAMD COI Coordinator, U.S. Army PEO Missiles and Space Program

ROLES AND IMPORTANCE OF CYBERWAR IN IAMD COMMAND AND CONTROL

- RADM Edward H. Deets, III, USN, Commander, Naval Network Warfare Command

AEGIS BMD UPDATE, WITH INSIGHTS INTO THE STATE OF EUROPEAN PAA AND AEGIS ASHORE

- Mr. Scott Perry, Director of Program Integration, Alignment and Evaluation, Aegis BMD MDA
 - Aegis BMD Flight Testing Success .wmv
 - Broll .wmv

ALTBMD - NATO VIEW OF A PATH TO COMMAND AND CONTROL FOR THE EUROPEAN PAA

- Mr. Dave Kiefer, Deputy Program Manager, NATO ALTBMD

IAMD REQUIREMENTS, PLANS, AND PROGRAMS

- RADM Frank Pandolfe, USN, Director, Surface Warfare Division (N86)

THE STATE OF INTEGRATED AIR AND MISSILE DEFENSE AGENDA 14 July 2011

- 7:00 a.m. - 8:00 a.m. **REGISTRATION & CONTINENTAL BREAKFAST**
- 8:00 a.m. **WELCOME & ADMINISTRATIVE REMARKS**
Mr. John Reilly, Chairman, SLAAD Division
Mr. David Cela, Chairman, MD Division
Mr. Conrad Grant, Department Head, Air & Missile Defense, JHU/APL
- 8:05 a.m. **STRIKE, LAND ATTACK, AND AIR DEFENSE DIVISION UPDATE**
Mr. John Reilly, Chairman, SLAAD Division
- 8:09 a.m. **MISSILE DEFENSE DIVISION UPDATE**
Mr. David Cela, Chairman, Missile Defense Division
- 8:13 a.m. **AGENDA OVERVIEW AND INTRODUCTION OF SPEAKERS**
Stephen Woodall, Ph.D., Symposium Chairman
- 8:15 a.m. **KEYNOTE ADDRESS Nr 1 --- UPDATE ON FINANCING OF IAMD AND EUROPEAN PAA**
VADM John T. Blake, USN, DCNO for Integration of Capabilities and Resources, N8
- 8:45 a.m. **KEYNOTE ADDRESS Nr 2 --- MDA in IAMD OVERVIEW**
Lieutenant General Patrick J. O'Reilly, USA, Director, Missile Defense Agency
- 9:15 a.m. - 9:30 a.m. **BREAK**
- 9:30 a.m. **JOINT AIR AND MISSILE DEFENSE COMMUNITY OF INTEREST (JAMD COI) OVERVIEW AND UPDATE**
Mr. Larry Smith, JAMD COI Coordinator, U.S. Army PEO Missiles and Space Program
- 10:15 a.m. **ROLES AND IMPORTANCE OF CYBERWAR IN IAMD COMMAND AND CONTROL**
RADM Edward H. Deets, III, USN, Commander, Naval Network Warfare Command
- 11:15 a.m. **INSIGHTS INTO THE ACQUISITION OF NAVY IAMD CAPABILITIES**
RDML James Syring, USN, Program Executive Officer for Integrated Warfare Systems
- 12:00 – 1:00 p.m. **LUNCHEON/ SLAAD ANNUAL AWARDS/ OSD INSIGHTS ON THE STATE OF IAMD TODAY**
Mr. David Ahern, SES, Director, Portfolio Systems Acquisition, OSD (AT&L)
- 1:00 p.m. **EUROPEAN PHASED ADAPTIVE APPROACH (PAA) IMPLEMENTATION**
Mr. Richard W. Glitz, Technical Director for the Joint Integrated Air and Missile Defense Organization (JIAMDO), J8, Joint Staff
- 1:45 p.m. **AEGIS BMD UPDATE, WITH INSIGHTS INTO THE STATE OF EUROPEAN PAA AND AEGIS ASHORE**
Mr. Scott Perry, Director of Program Integration, Alignment and Evaluation, Aegis BMD MDA
- 2:30 p.m. - 2:45 p.m. **BREAK**
- 2:45 p.m. **ALTBMD - NATO VIEW OF A PATH TO COMMAND AND CONTROL FOR THE EUROPEAN PAA**
Mr. Dave Kiefer, Deputy Program Manager, NATO ALTBMD
- 3:30 p.m. **OVERVIEW OF THE STATE AND FUTURE OF NAVY IAMD**
RADM Stewart O'Bryan, USN, Commander, Navy Air and Missile Defense Command
- 4:15 p.m. **IAMD REQUIREMENTS, PLANS, AND PROGRAMS**
RADM Frank Pandolfe, USN, Director, Surface Warfare Division (N86)
- 4:55 p.m. **CLOSING REMARKS**
Mr. John Reilly / Chairman, SLAAD Division & Mr. David Cela / Chairman, MD Division
- 5:00 p.m. **ADJOURN**

Financing Integrated Air and Missile Defense



Briefing For NDIA SLAAD Symposium 14 July 2011

**Vice Admiral J.T. Blake
Deputy Chief of Naval Operations,
Integration of Capabilities and Resources (N8)**



Overview

- Fiscal landscape
- Lines of effort
 - Operating and sustaining the Fleet
 - Modernizing the Fleet
 - Recapitalizing the Fleet
- Summary



Budgetary Outlook: Navy Priorities

- Build and maintain a rotational and forward-deployed global force
- Deliver core capabilities for deterrence, power projection, and sea control for access to the global commons, to assure allies, and prevail in conflict
- Balance available resources among
 - Modernization
 - Force structure
 - Readiness
 - Forward presence
 - Manpower
- Develop procurement plans that are stable, affordable, realistic and transparent



Budgetary Outlook: Navy Challenges

- Anti-access and Area-denial
- Balancing procurement with sustained operational demand
- Fielding a “whole force” in an austere fiscal environment
- Combatant Commander Demand for Naval Forces
- Preserving fragile maritime industrial base



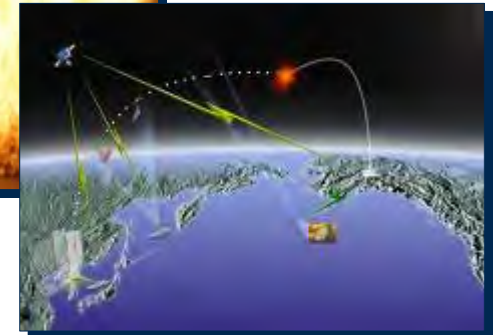
Financial Outlook

- “We plan to reduce the Defense budget by \$400B over the next 12 years.”
- “The Navy Budget for FY 12 is underestimated by \$64B due to rising prices and decreased purchasing power.”



Integrated Air and Missile Defense: Operations and Sustainment

- Aegis Fleet
- Carriers and affiliated airwings
- Ballistic Missile Defense (BMD) elements
- Ordnance stores
- DOTmLPF and associated infrastructure
- O&MN account: Fleet maintenance, beans, bullets, and black oil



***Combatant Commander Demand For Navy IAMD
Capability / Capacity Is Increasing....without bound***



Operations and Support: A macro view

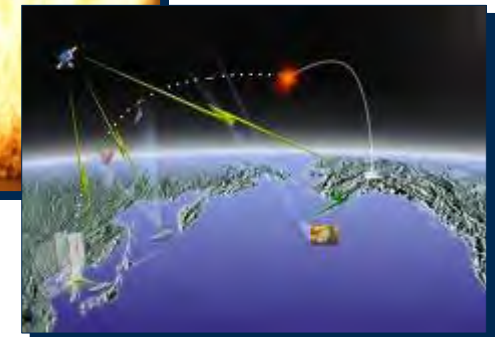
- Defense Department O&S costs are:
 - \$350B for FY12.....63% of DoD total...rising to 71% by 2030
 - Comprised of compensation, medical care, fuel and spare parts, etc.
 - Sensitive to spiraling medical care costs, pay raises for military and government civilians, and rising costs of everything from office supplies to aircraft fuel
- Biggest driver.....average cost to support each service member
 - 1980--\$55K
 - 2001--\$105K
 - 2010--\$211K

O&S consuming an increasing share of a declining topline.....adversely impacts both modernization and recapitalization



Integrated Air and Missile Defense: Operations and Sustainment

- Wholeness reviews require cash infusion to restore Fleet Readiness
- FY12 O&MN increments due to increased OPTEMPO:
 - Steaming days: +\$24B
 - Flying Hours: +\$252M
 - Ship Maintenance: +\$182M
 - AIMD: +\$92M
- BMD O&S transitioning from MDA to Navy: \$150M annually beginning in FY13
- O&MN account is further pressurized by fuel price volatility in execution year



O&S Bottom Line: Adverse trends in Fleet Readiness likely to continue due to real world operations



Integrated Air and Missile Defense: Modernization

- Aegis modernization is centerpiece of Surface IAMD program
- BMD ship Balanced Capability and Capacity plan is bridge to answer COCOM demand
- E-2D is game changer for Naval Aviation
- Three more years of F/A-18 buys required in APN



***Modernization Bottom Line: Urgently required to keep
Fleet warfighting capability relevant in IAMD***



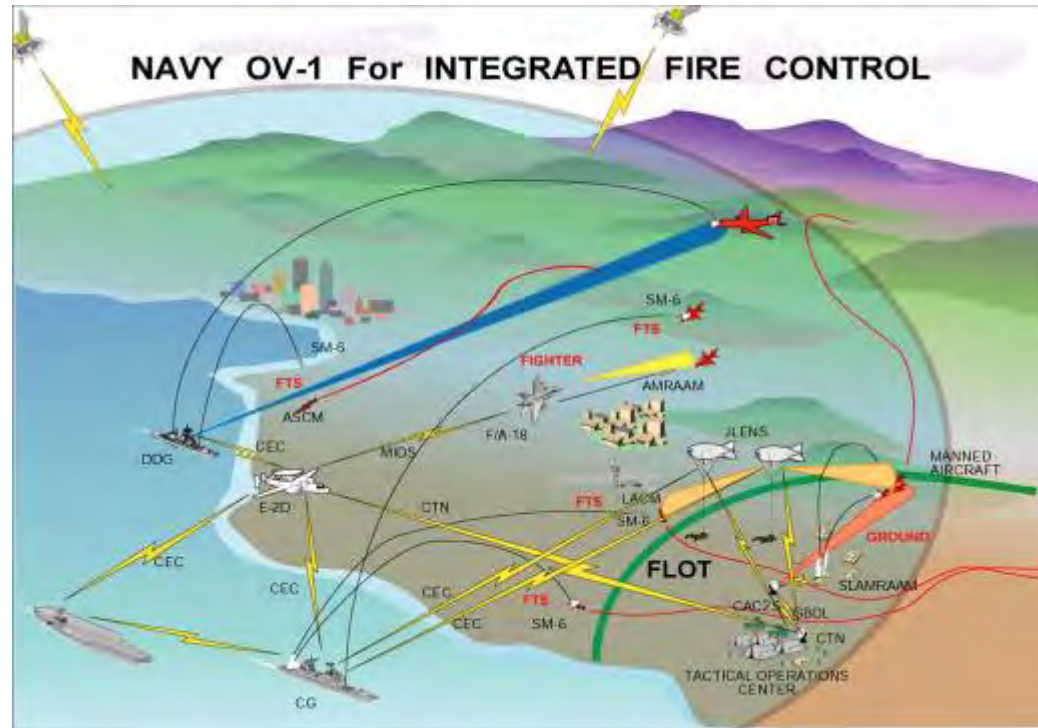
Aegis Multi-Mission Surface Combatants

Warfighting Mission Area	22 Ships  CG Multi-Mission	62+ Ships  DDG-51 Multi-Mission
BMD	 (9 of 22)	
Air Warfare		
Undersea Warfare		
Precision Land Attack		
Naval Surface Fire Support		



NIFC-CA/System Description

- **Mission:** NIFC-CA provides an Engage-On-Remote and Over-The-Horizon air defense capability using a sensor network in support of the full kinematic range of active missiles against manned aircraft and cruise missiles, overland and at sea.
- **Employment:** NIFC-CA uses the full capability of CEC and Link-16 to engage threats at significantly greater ranges.





Integrated Air and Missile Defense: Recapitalization

- DDG re-start key to future large surface combatant strategy
- DDG Flight III essential to pacing emerging A2AD threat
- BMD is a growth industry....DDG 112 and up built from keel up with advanced capability
- JSF key to keep Navy Air competitive with the threat



Recapitalization Bottom Line: New technology landing pad to cope with burgeoning IAMD threat



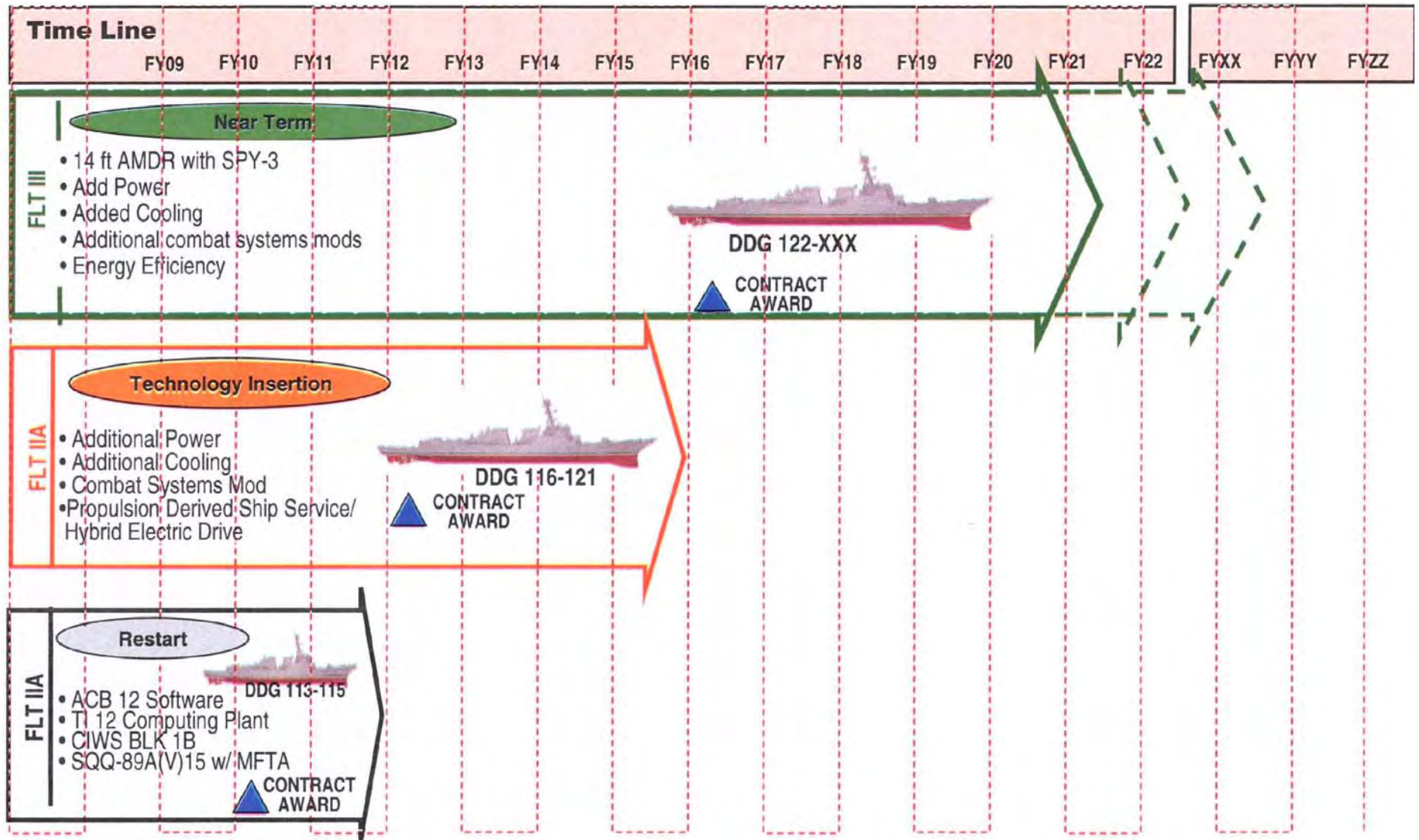
Air and Missile Defense Radar

- **Description**
 - The Air and Missile Defense Radar (AMDR) suite is being designed to support maritime Integrated Air and Missile Defense (IAMD)
 - AMDR is envisioned as a radar suite scalable to accommodate mission requirements for multiple ships
- **AMDR will consist of S-band (AMDR-S) and X-band (AMDR-X) radars and a Radar Suite Controller (RSC)**
 - AMDR-S- volume search, tracking, Ballistic Missile Defense (BMD) discrimination, and missile communications
 - AMDR-X- horizon search, precision tracking, missile communication and terminal illumination
 - RSC- interface between AMDR-S, AMDR-X, and combat system, and resource coordination
- **Program Status- proceeding to Milestone A**
 - AMDR Concept Studies- Completed
 - Three fixed-price concept development contracts
 - Each contractor developed conceptual design and technology maturation plans
 - AMDR-X RFI
 - Currently evaluating responses
 - AMDR-S/RSC Technology Development
 - Award anticipated Q4 FY10 (up to 3 Fixed Price Incentive contracts)
 - Focused on demonstrating AMDR key Technologies are scalable and sufficiently mature





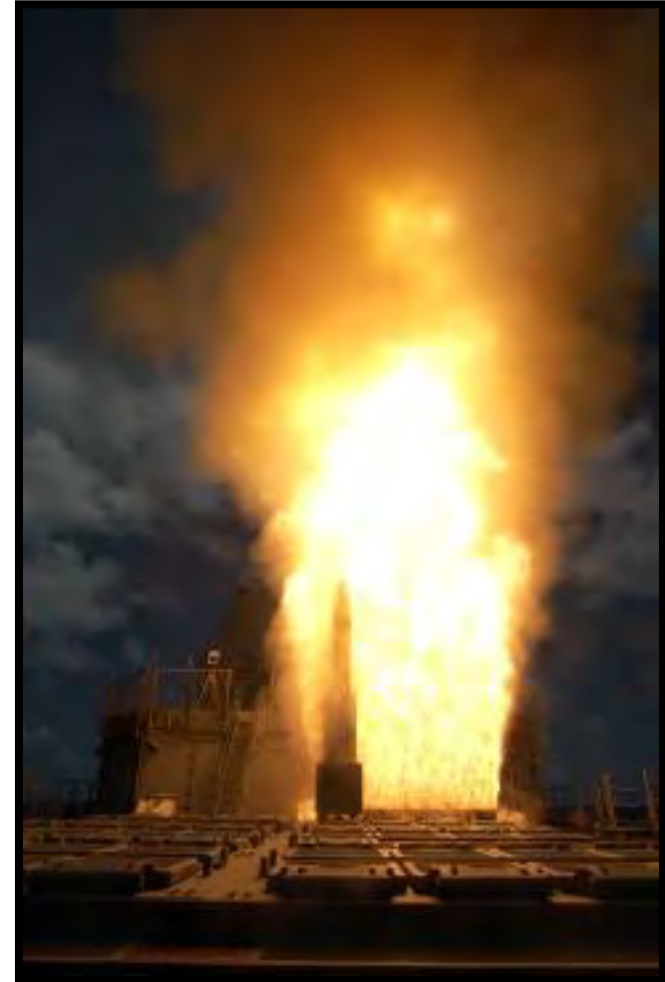
DDG Evolution





IAMD Summary

- **Operate**, maintain, and retain the legacy IAMD Fleet and Fleet Air Arm
- **Modernize** the IAMD Fleet of Multi-mission Surface Combatants and Tactical aircraft to pace the threat
- **Recapitalize** to remain relevant to the Joint IAMD Fight at Sea, Ashore, and Over Land





NATO
+
OTAN

ALTBMD

Dave Kiefer

ALTBMD Deputy Programme Manager

Dave.kiefer@tmd.nato.int



NATO UNCLASSIFIED

- **Who we are**
- **Where we are today**
- **Where we're headed**

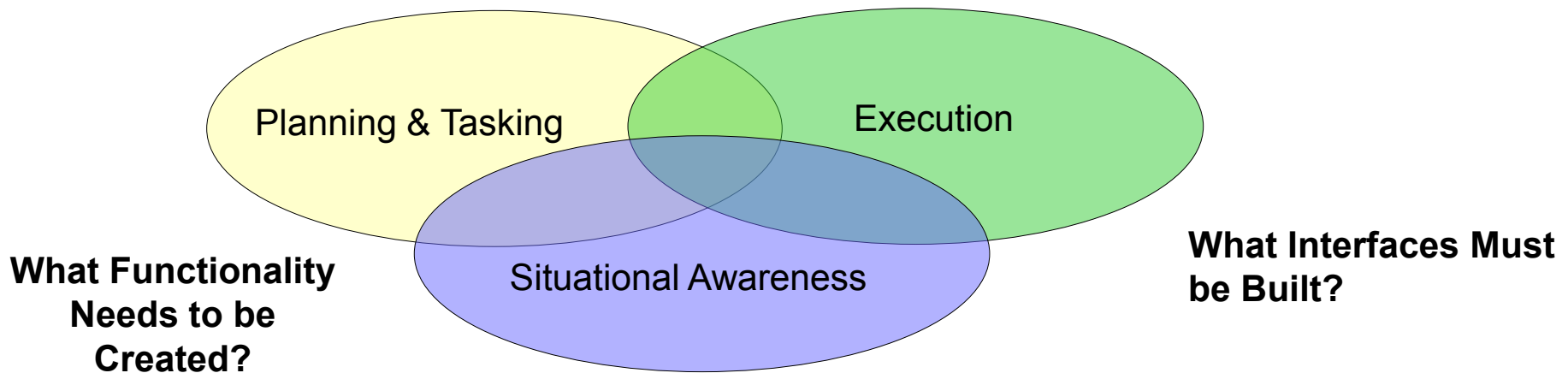
ALTBMD – Still our Mission

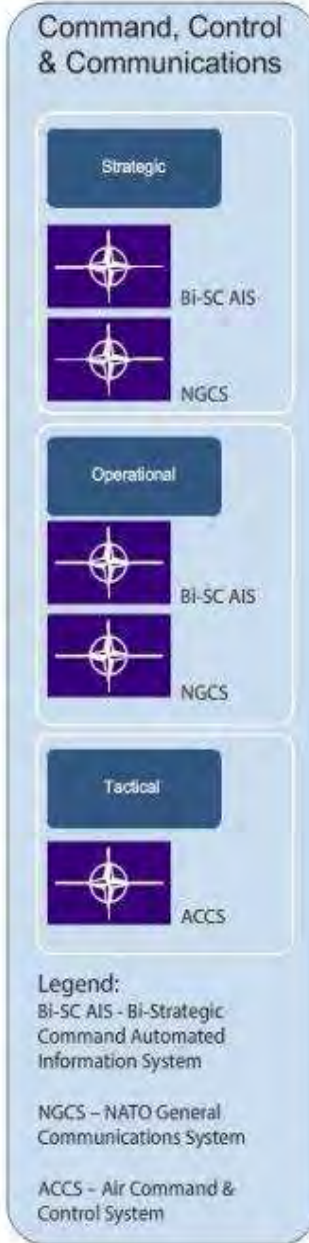


- A verified architecture providing the NATO Commander with the capability to “defend NATO forces, deployed either within or beyond NATO’s Area of Responsibility, against the threat posed by Tactical Ballistic Missiles (TBMs) with ranges up to 3,000 km.”

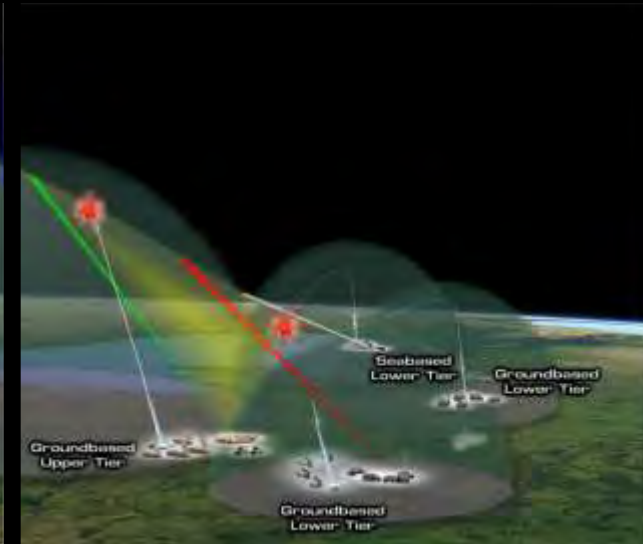
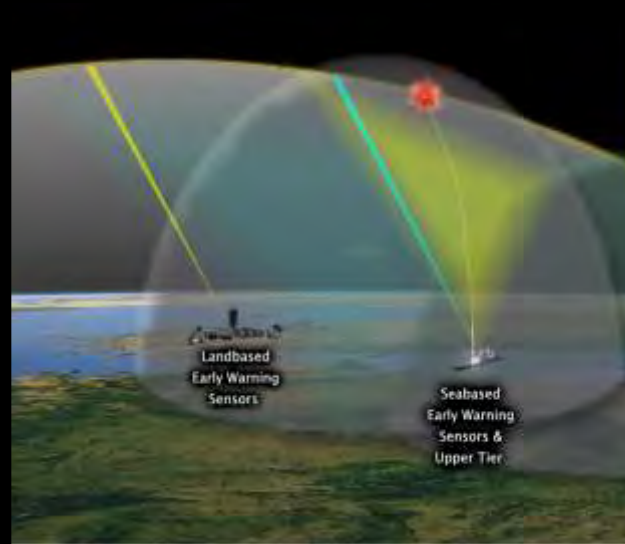
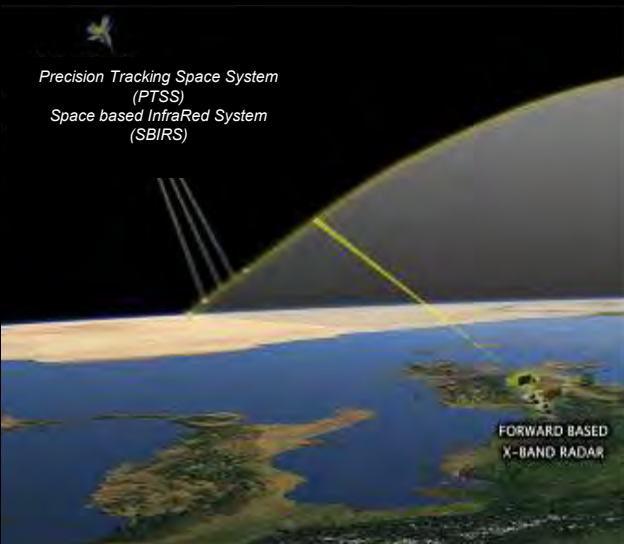
ALTBMD's Job

- **Modify NATO C2 systems to enable the NATO Commander to perform Missile Defence Missions**
 - **Modifications must fit into an overall NATO Command and Control System**
 - **Must Integrate national weapon systems assigned to NATO missions**
 - **Must Help the Commander perform his three primary functions**

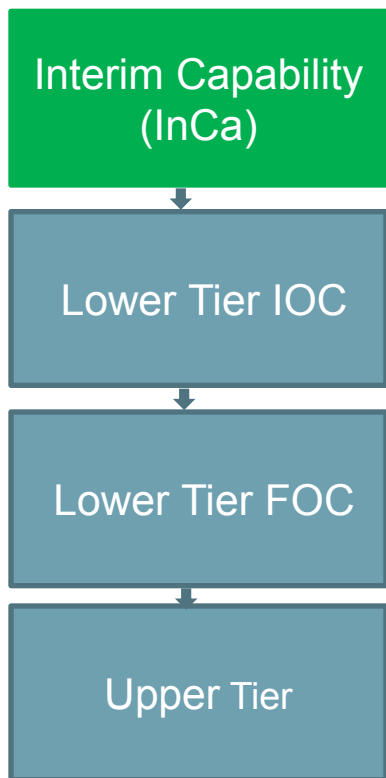




ALTBMD Reference Capability



ALTBMD Program Phases



Phase	Capability	Date
InCa 1	Basic TMD Planning and Tasking	Training Completed Operational Spring 2010
InCa 2	Integrated coherent planning with interface to national assets Based on ALTBMd ACCS Real Time Prototype	December 2010.
Lower Layer IOC	Planned: Initial lower layer systems Current: Two steps to IOC 2013 and 2014	2014
Lower Layer FOC	Additional lower layer systems, implement in the static NATO Command Structure	2016
Upper Layer	Incorporation of upper layer systems	2018

- **Who we are**
- **Where we are today**
- **Where we're headed**

- **After the announcement of a delay of a component of the ALTBMd programme in fall 2008, the NATO Military Authorities defined the Minimum Military Requirements for an Interim Capability for the NATO TBMD mission in 2010 to:**
 - Provide planning and tasking capability
 - Provide situational awareness
- **The Interim Capability has been developed and is fielded**

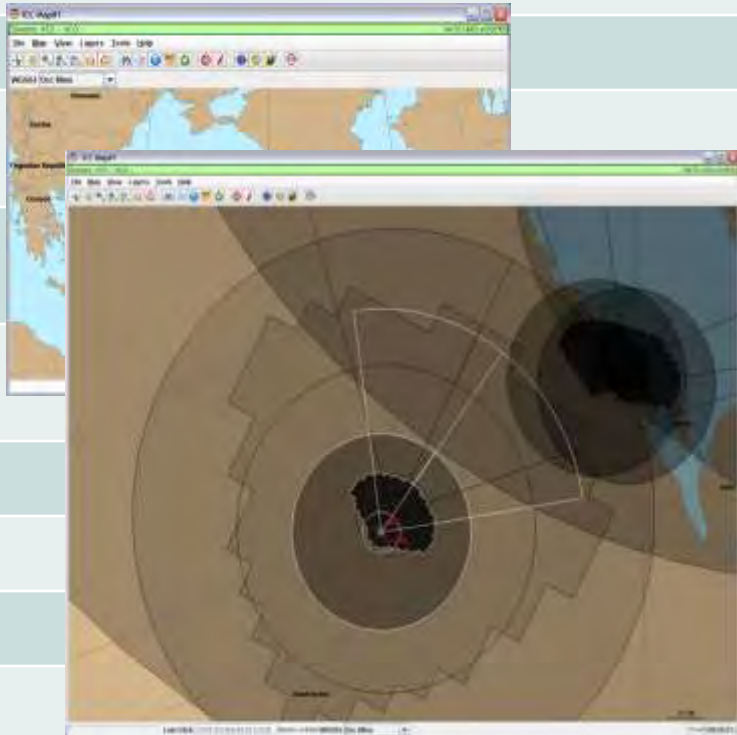
**Three NATO Prototypes make the Interim Capability Possible:
ACCS Prototype 1C, PlaTo and DEPT**

Fielding Capability (December 2010)

Interim Capability 1:

TBMD planning tools:

- Delivered: 2009
- Validated and accepted: May 2010



Interim Capability 2:

TBMD planning tools:

- Enhanced planning capability

TBMD situational awareness:

- Deploying truck mounted situational awareness tool
- Elements yested in JPOW 2010
- Tested with multiple national systems in early December'10
- Delivery December 2010 // operational validation expected later in 2011



InCa 2 Real Time ALTBMD InCa Van



Delivered to operational users

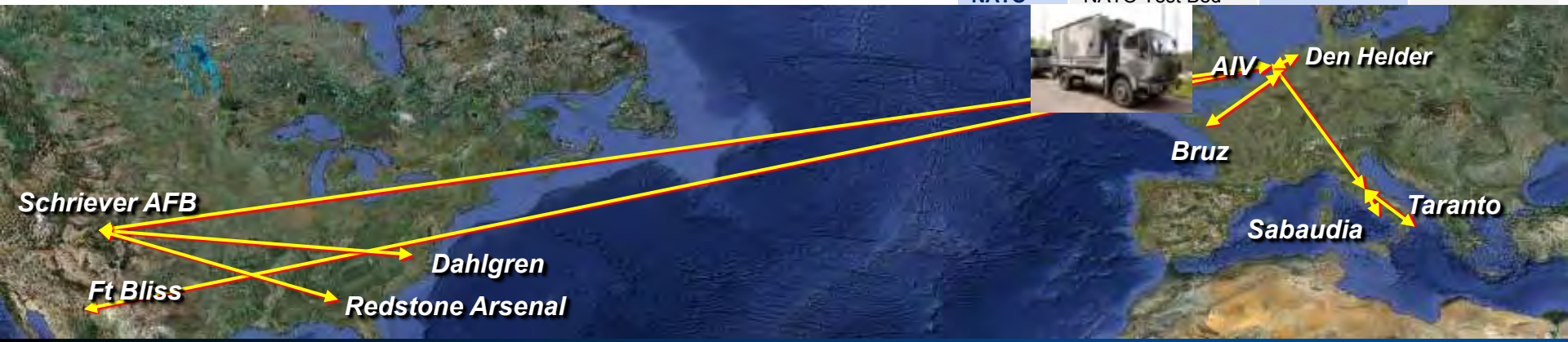
Objectives:

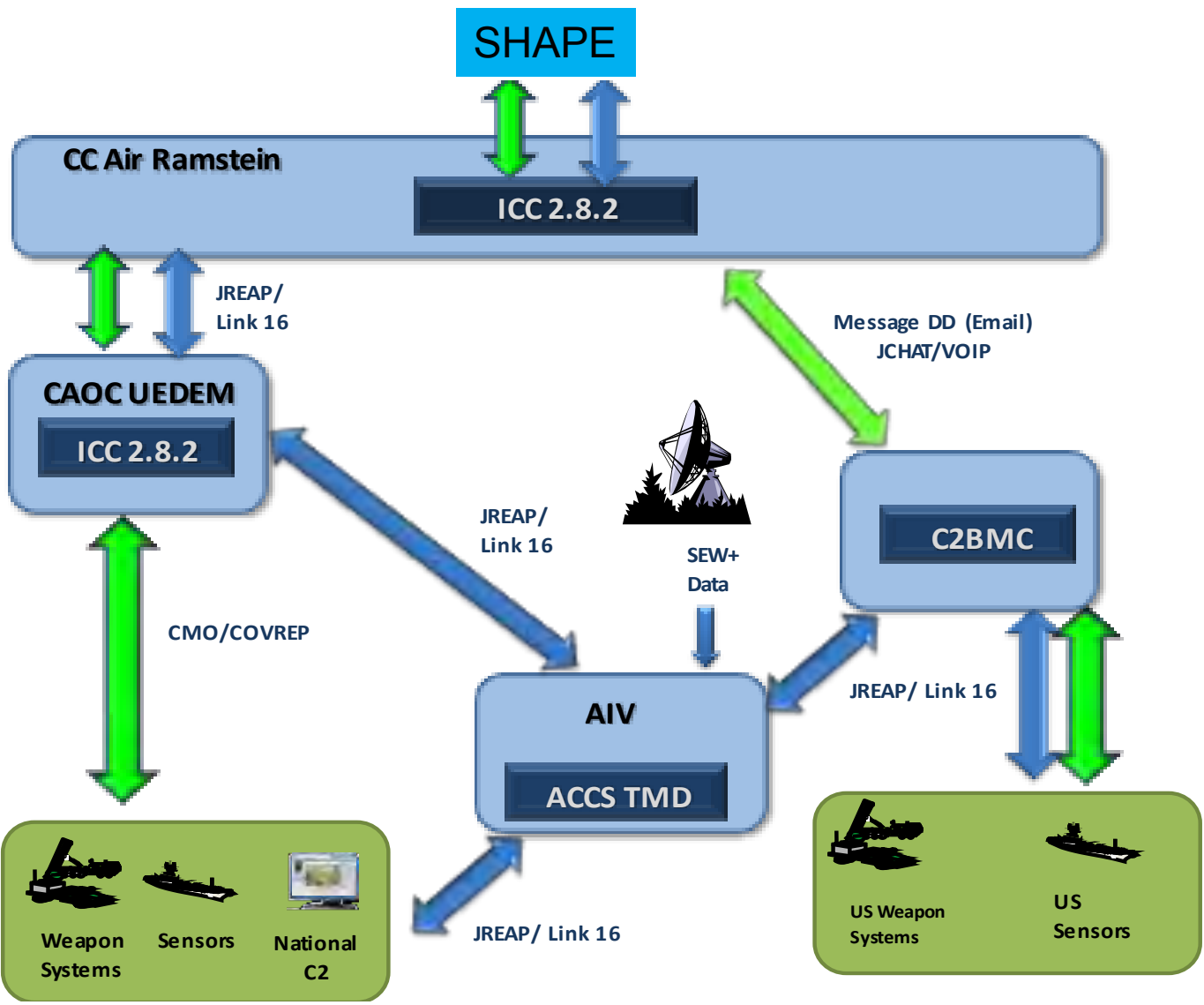
- Technical verification of the InCa 2 RT components with National systems
- Operationally assess InCa

Outcome

- Technical Verification Successful
- SHAPE: Operationally viable. Approved for deployment to Uedem

Participants			
DEU PATRIOT	El Paso, Texas (FMSD/PACTOS)	NLD ADCF/EW	Den Helder, Netherlands
DEU SAMOC	El Paso (Also a viewer in the ITB)	NLD PATRIOT	AFB De Peel, Netherlands
FRA SAMP/T	Bruz, France	USA Aegis BMD	Dahlgren, Maryland
ITA Horizon/PAAMS	Taranto, Italy	USA C2BMC - TPY2	Colorado Springs (Also a viewer in the ITB)
ITA SAMP/T	Sabaudia, Italy	USA PATRIOT	Huntsville, Alabama
NATO AIV	NATO The Hague	USA Shared Early Warning	Colorado Springs (Including Peterson AFB)
NATO	NATO Test Bed -		



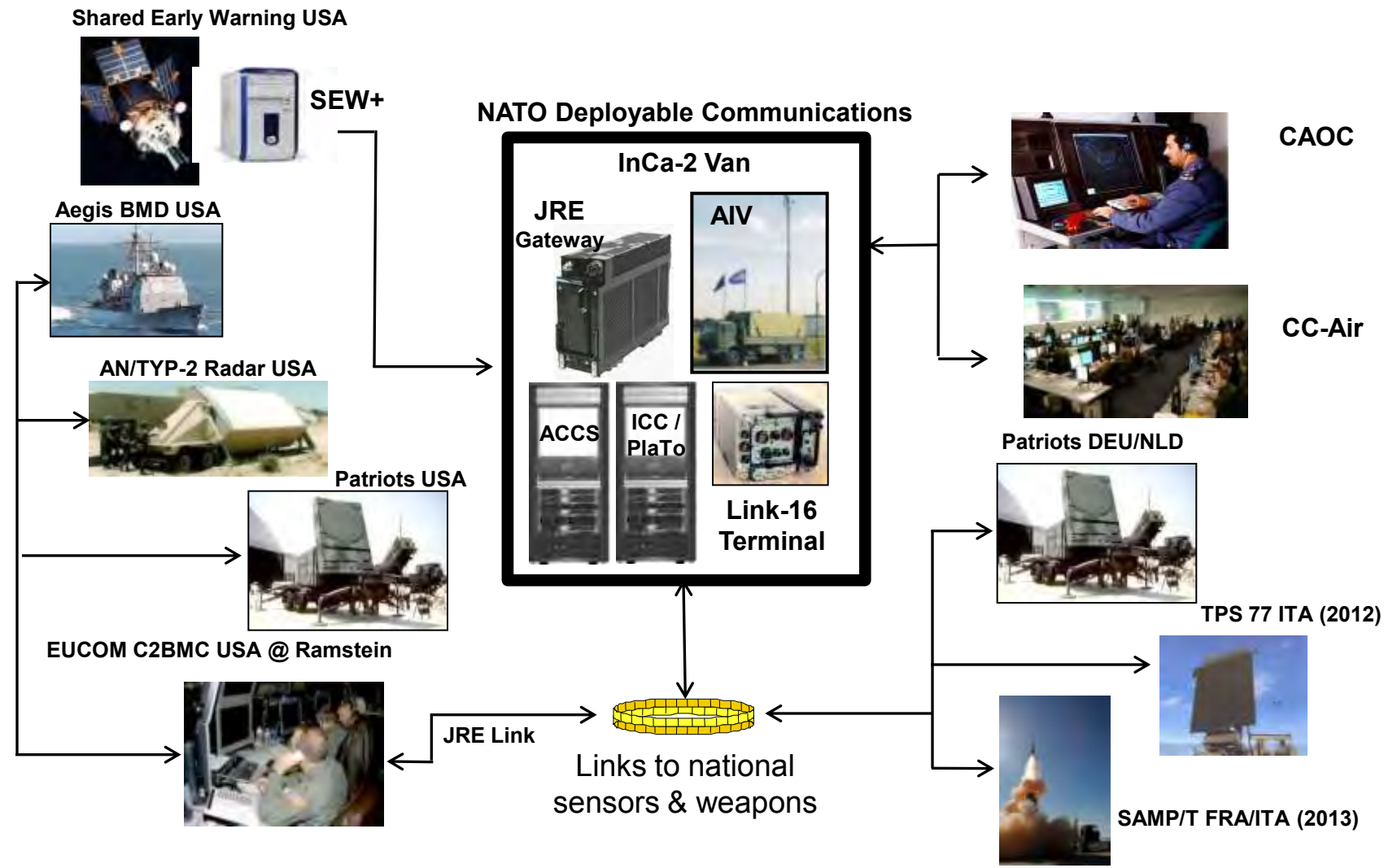


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- Planning

**Operational Validation during
Exercise Steadfast Juncture 2011
05 – 12 NOV 2011**

- Situational Awareness



**Operational Assessment during
Ensemble Test 1
09 DEC – 10 DEC 2010**

~

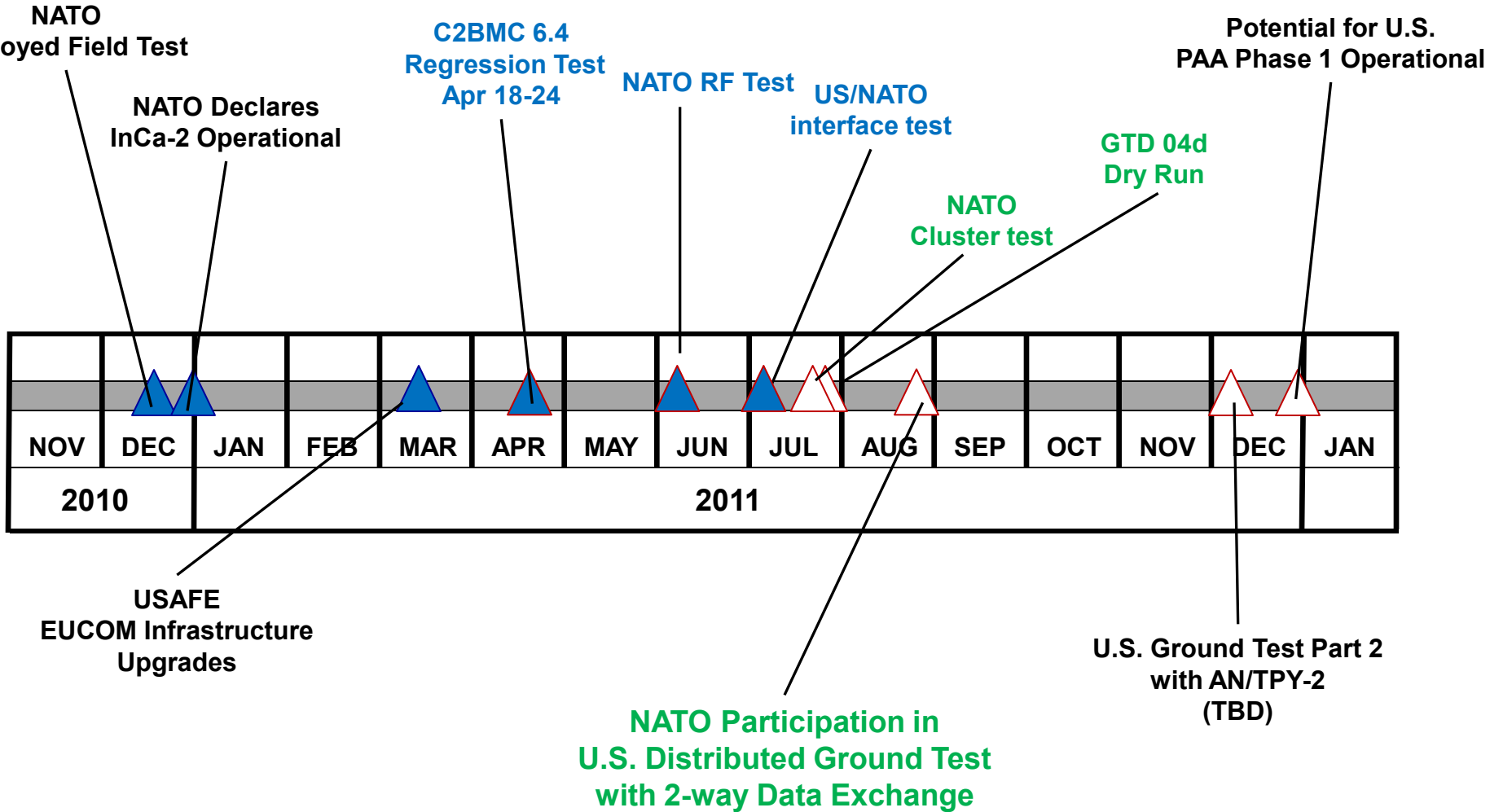
Upcoming

**Operational Validation during
USA European Phased Adaptive Approach Ground Test
GTD-04d**

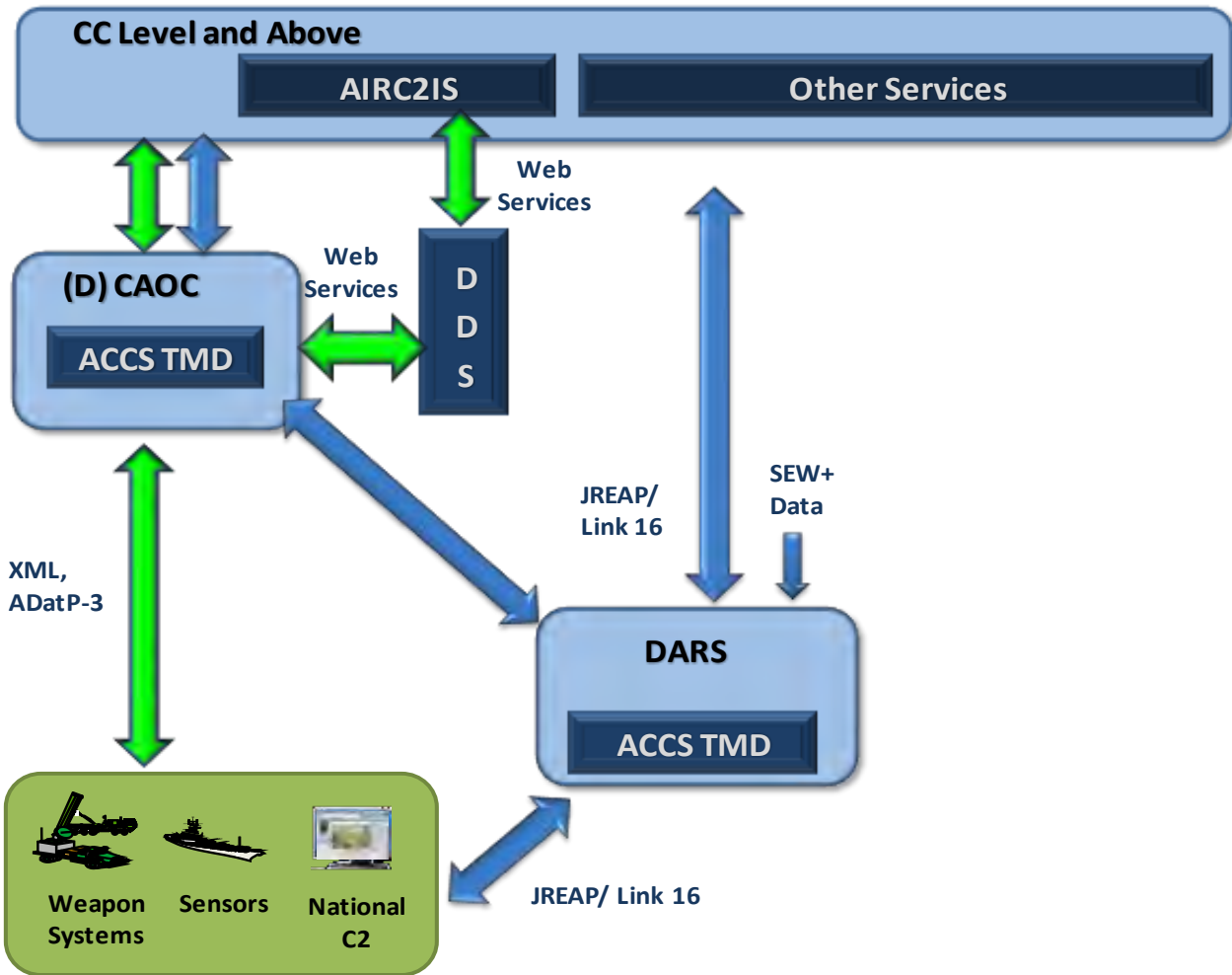
**Operational Validation during
DEU Tactical Firing on CRETE/GRC**



Test Of this Capability – GTD-04d



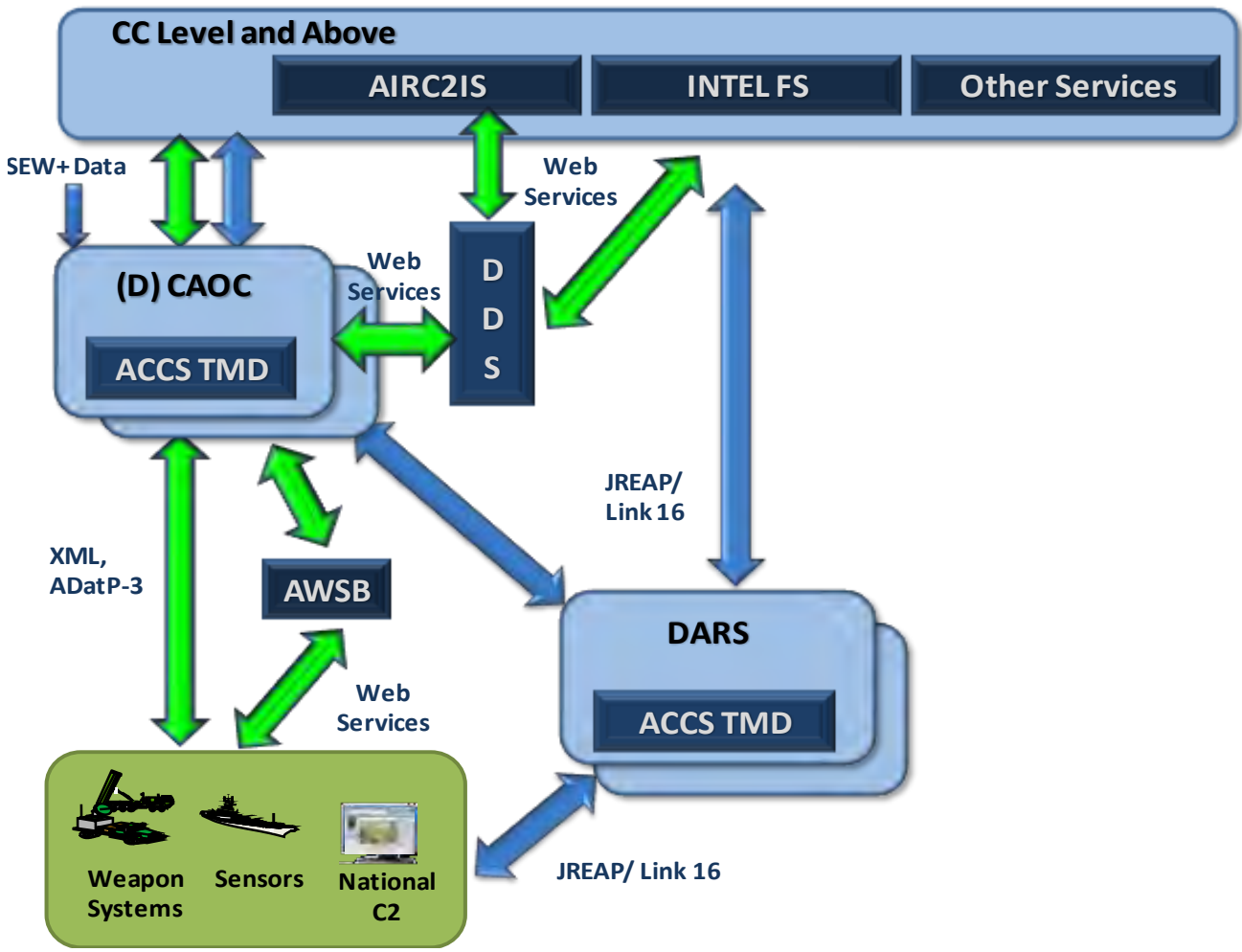
Initial Operational Capability (IOC)



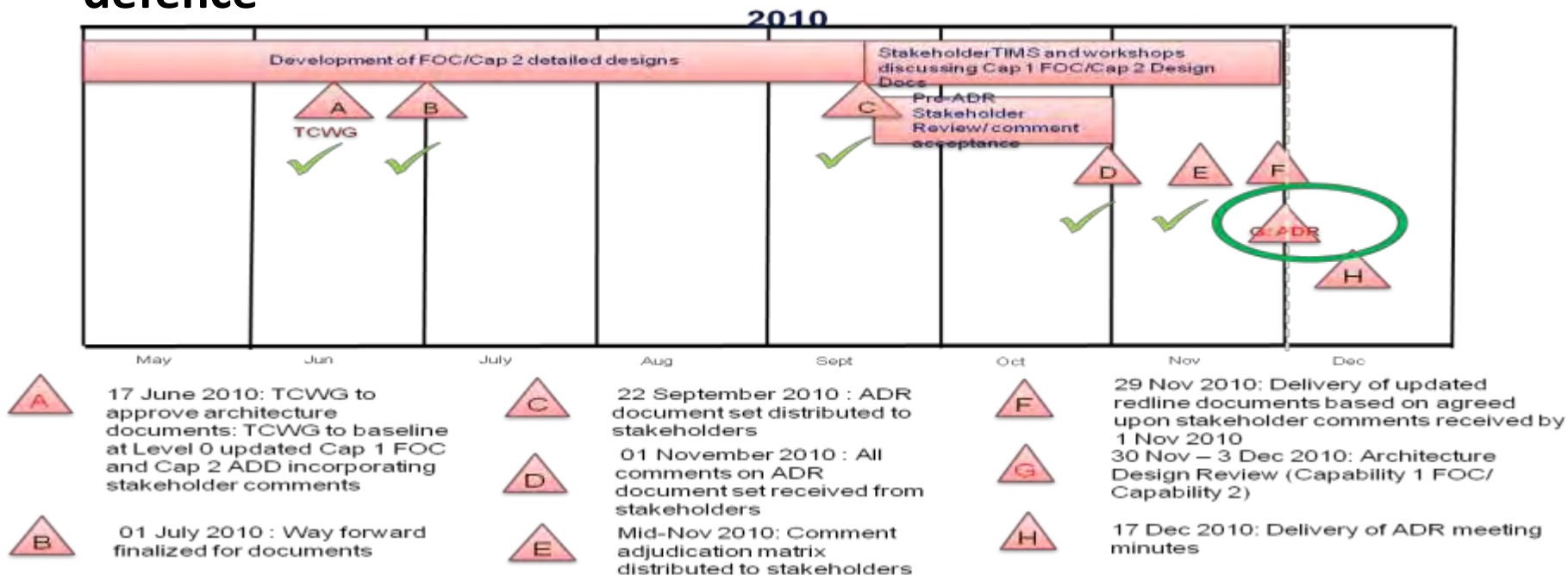
- **ACCS TMD1 – To be procured in 3 steps**
 - Preliminary System Definition (PSD) – Contract Signed 31 Jan 2011
 - TMD1 Increment 1 verified Q3 2013
 - TMD1 Increment 2 verified Q4 2014 – Completes full IOC functionality
- **Bi-SC AIS TMD1**
 - Air C2IS Increment 1 – Contracted
 - Supporting Projects for Capability 1: TOPFAS, NCOP
- **NGCS TMD1** : Project to be implemented through 10 independent Work Packages
 - Two Work Packages partially implemented with InCa 2 (Static Information Exchange Gateway - IEG, InfoSec)

IOC Implementation phase has started

Final Architecture



- Initial architecture defined in 2010
- Documentation updates to be completed in 2011
- Cap 1-FOC and Cap2 architecture will be the basis for the expansion of ALTBMD to a capability for territorial missile defence



- **Who we are**
- **Where we are today**
- **Where we're headed**

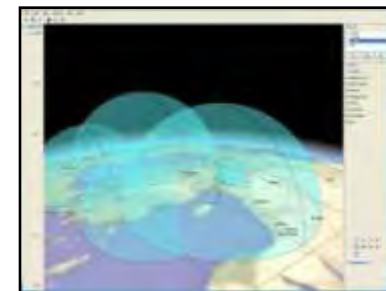
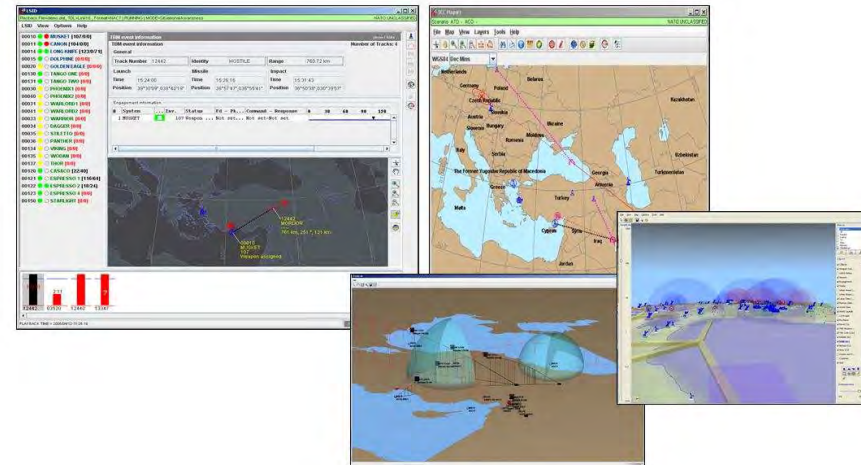
•Lisbon Summit, November 2010 Communiqué:

The threat to NATO European populations, territory and forces posed by the proliferation of ballistic missiles is increasing. As missile defence forms part of a broader response to counter this threat, we have decided that the Alliance will develop a missile defence capability to pursue its core task of collective defence....

To this end, we have decided that the scope of NATO's current Active Layered Theatre Ballistic Missile Defence (ALTBMD) programme's command, control and communications capabilities will be expanded beyond the protection of NATO deployed forces to also protect NATO European populations, territory and forces.

**Conference of National Armaments Directors:
“Expansion of ALTBM Programme for
NATO territorial missile defence is feasible
and has been recognized as the most
effective way to achieve this capability.”**

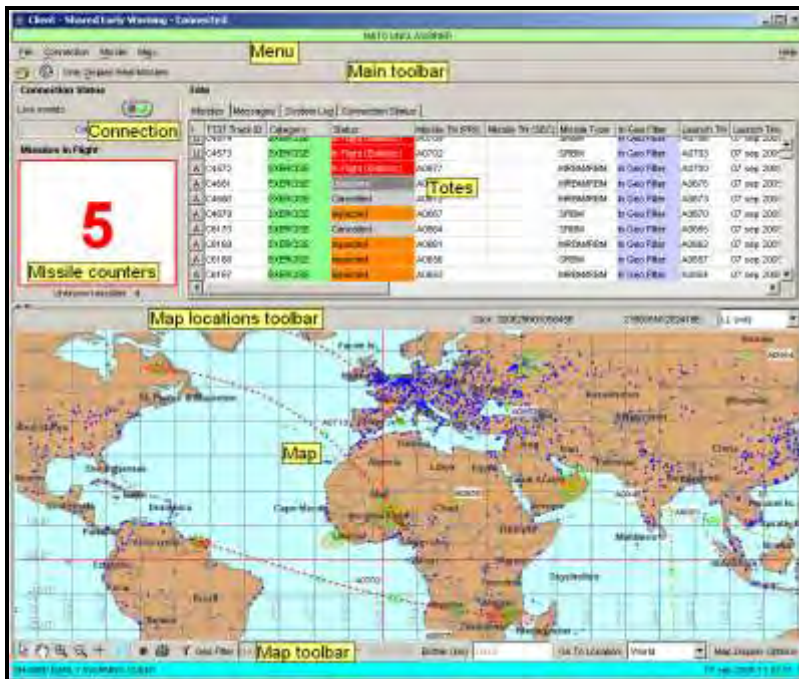
- In response to Approved Summit Task,
 - Identify NATO territorial BMD requirements including new functions for:
 - Enhanced situational awareness
 - Consultation
 - Enhanced Coordination / collaborative planning
 - Engagement coordination
 - Consequence mitigation
 - Review the ALTBMD NATO Staff Requirement
 - Document additional requirements or modifications to ALTBMD NSR



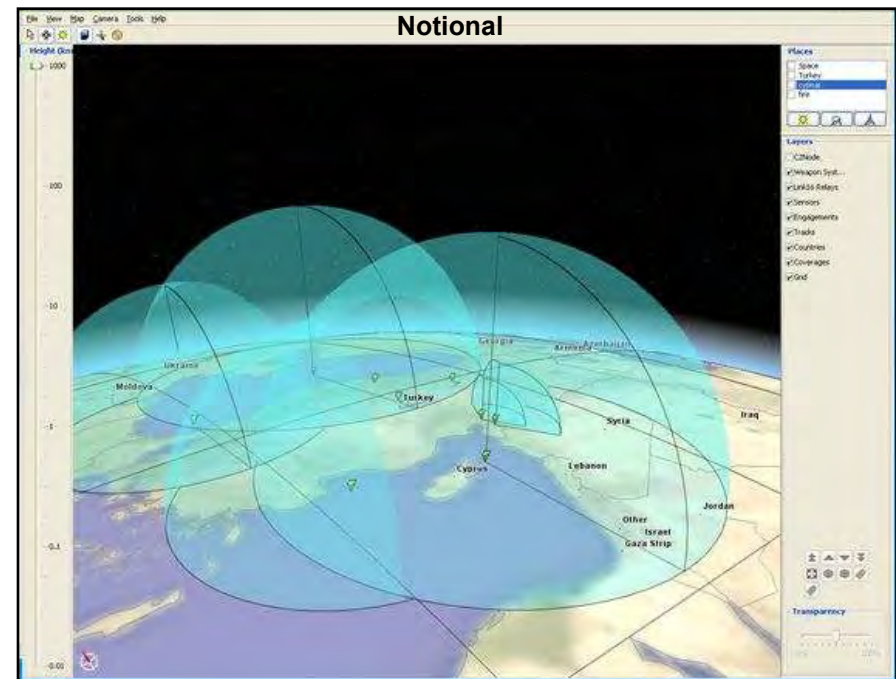
- Support to political/diplomatic/legal efforts
- Consensus building
- Options for military responses – risk analysis
- Pre-authorisation and conditions of BM engagements to meet stressing timelines
- Communicating NATO intentions
 - To potential opponents, third parties
- Potential impact of debris in other NATO or neutral nations
- Guidance for planning operations
 - Authorisation of plans
- High Level Situation Awareness



- **Display events to pol-mil decision-makers**
 - Displays of recent and current missile events
 - Support to strategic planning, prioritisation, option/risk assessments
 - Provide Information to NATO Capitols



(NATO Shared Early Warning Client)



Engagement Coordination and Monitoring

Track Number	Identity	HOSTILE	Range
12442	MORSDOR	HOSTILE	760.72 km

Engagement information table:

#	System	Inv.	Status	Id	Pk	Command	Response	0	10	60	90	120
1	30009ET	107	Weapons	...	Not set	...	Not set	Not set

Notional

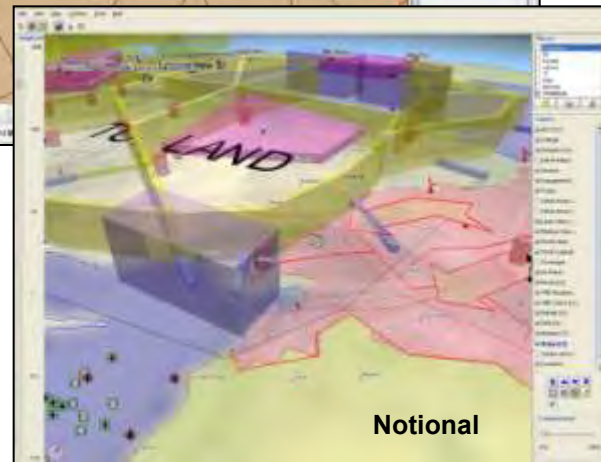
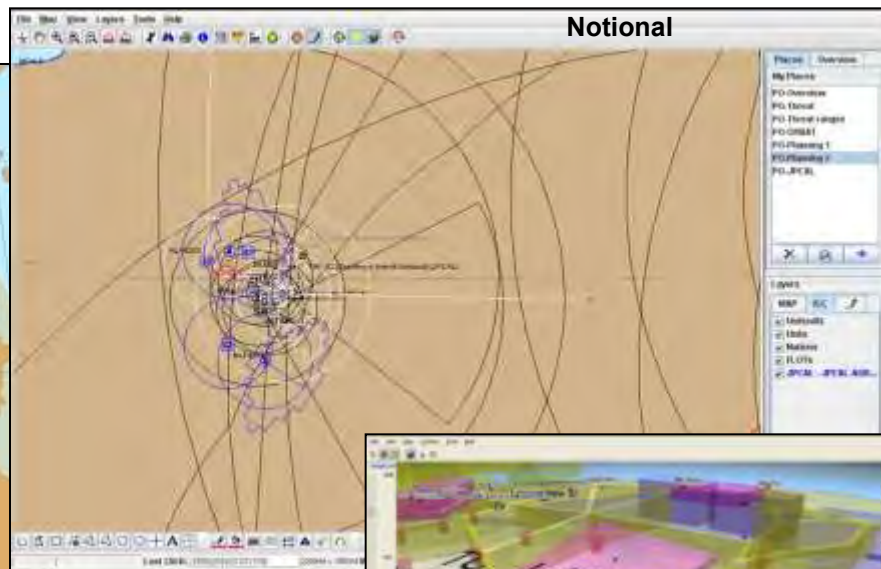
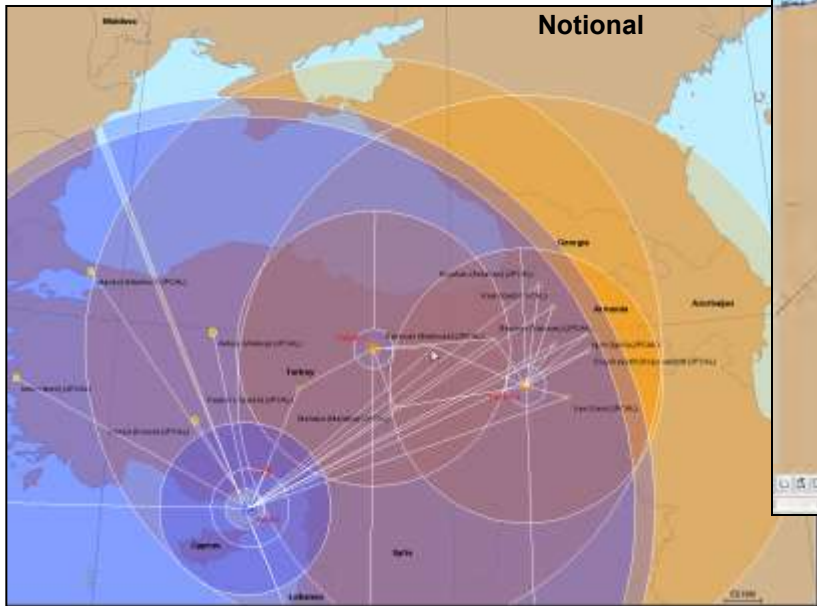
Notional

Notional

Notional

- Integrated Air and Missile Defence Real-time Picture throughout NATO C2
- Provide Battle Management Tools

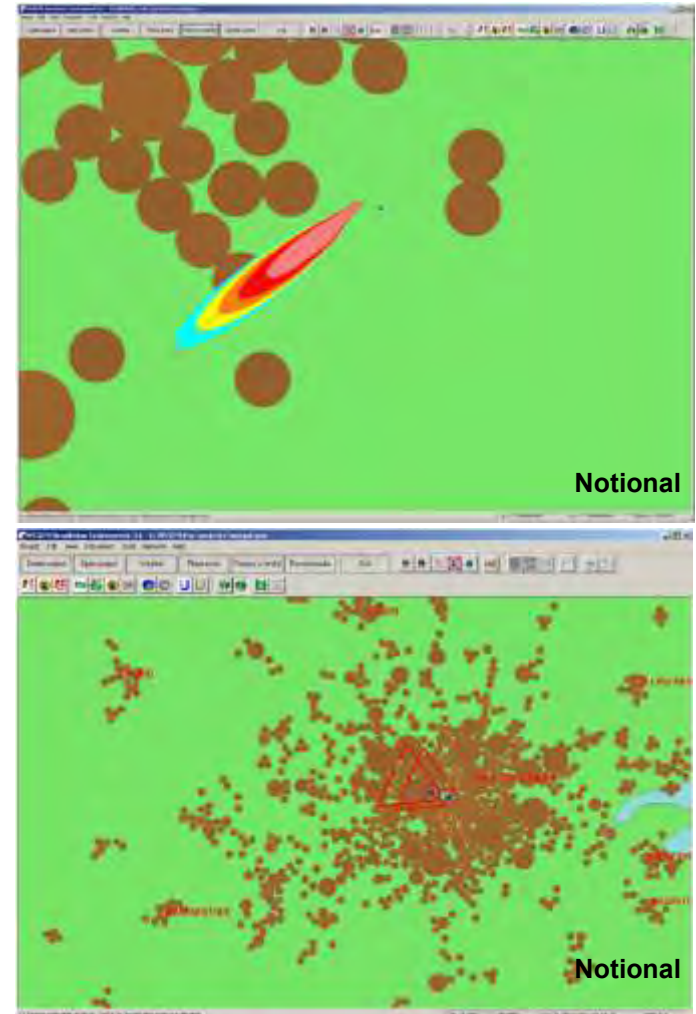
Defence Design and Engagement Planning



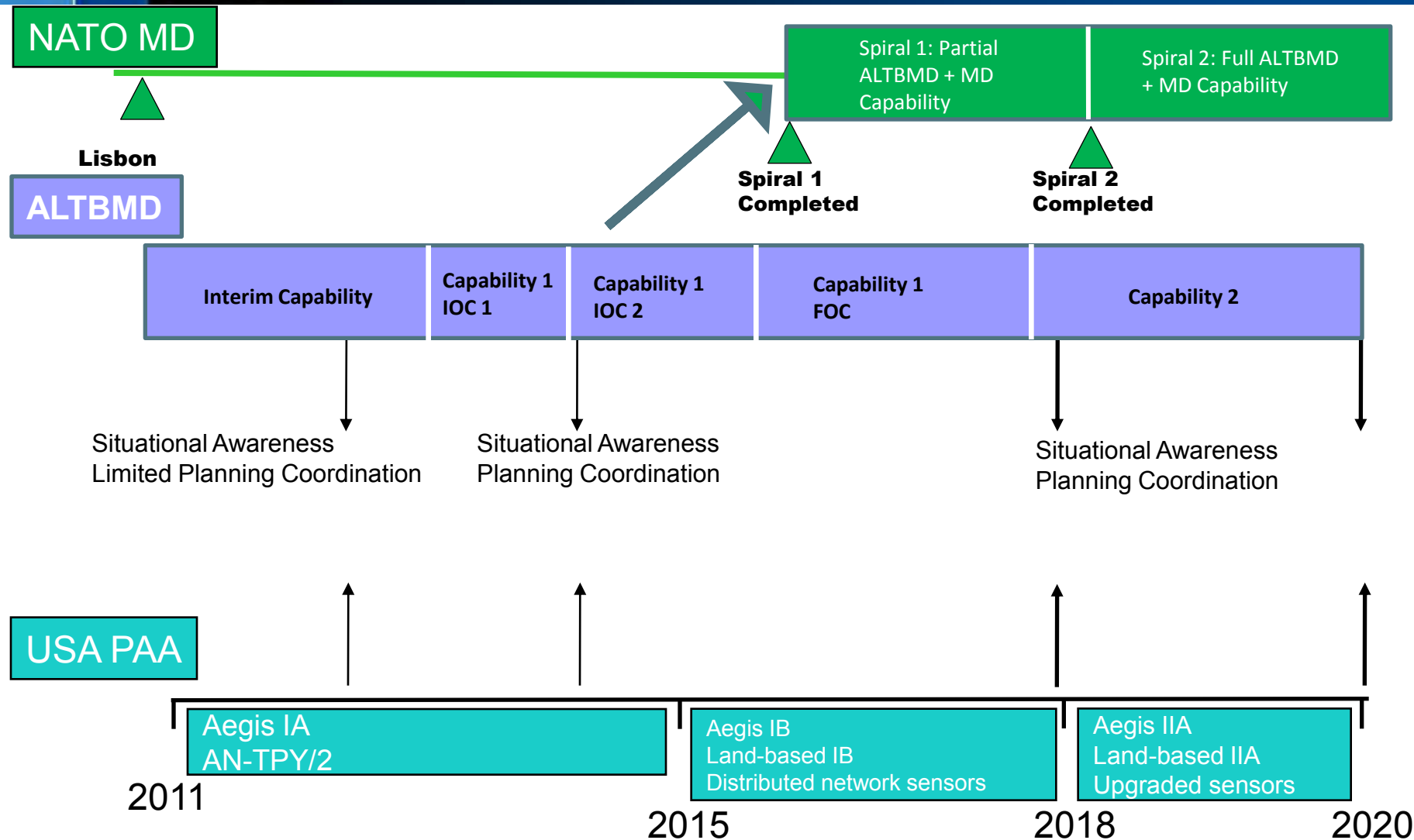
- Optimise the use of offensive and defensive assets to provide effective Missile Defence
- Integrated Air and Missile Defence Planning

Predictive COI Analysis Post-Engagement COI Analysis COI Warning Dissemination

- Support Passive Defence operations
- Provide INTEL with Enemy WMD & COA Updates
- Civil Emergency Planning and Response
- Provides Ground Hazard Predictions and Actual Information



Alignment of NATO MD with USA PAA

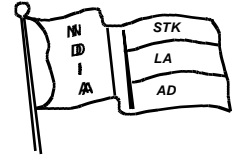


InCa = Interim Capability LL IOC = Lower Layer Initial Operational Capability
 FOC = Full Operational Capability UL = Upper Layer

ALTBMDF Programme has now delivered an Interim Capability to support NATO Air Command and Control Operations

- **Lower Layer IOC has entered implementation stage**
- **Extensive testing of the combined US/NATO interim operational capability is underway and, if successful, will validate a first operational capability that could be used for territorial defence based on USA EPAA and NATO InCa**
- **Expansion of ALTBMDF Programme for NATO territorial missile defence is feasible, has been recognized as the most effective way to achieve this capability and will begin this year with a re-evaluation of the architecture level requirements.**





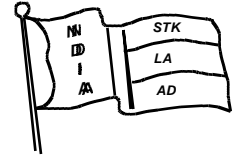
WELCOME ABOARD !

**STRIKE, LAND ATTACK, & AIR DEFENSE DIVISION
AND
MISSILE DEFENSE DIVISION
*ANNUAL SYMPOSIUM***

***THE STATE OF INTEGRATED AIR AND
MISSILE DEFENSE (IAMD)***

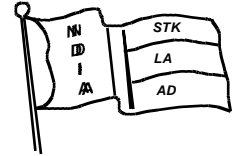
14 July 2011

**JOHN REILLY
CHAIRMAN, SLAAD**



2ND YEAR of TEAMED SYMPOSIUM

- **2ND ANNUAL “STATE OF INTEGRATED AIR AND MISSILE DEFENSE (IAMD)” SYMPOSIUM**
 - **SECOND, FOLLOW-ON TEAMED SYMPOSIUM EFFORT BY THE NDIA SLAA AND MISSILE DEFENSE DIVISIONS**
 - **SUSTAINS A NEW VENUE IN NDIA FOR AN ANNUAL SYMPOSIUM FOCUSING ON THE LATEST STATUS OF KEY JOINT AND SERVICE PROGRAMS AND TECHNOLOGIES CONCERNED WITH INTEGRATED AIR AND MISSILE DEFENSE (IAMD)**
- **OUR SYMPOSIUM VISION:**
 - **ANNUAL --- IN 2012, OUR 3RD ANNUAL IAMD SYMPOSIUM!**
 - **VENUE: KOSSIAKOFF CONFERENCE CENTER, JOHNS HOPKINS UNIVERSITY APPLIED PHYSICS LABORATORY, LAUREL, MD**
 - **CLASSIFICATION LEVEL ~ SECRET**
 - **NO PRESS / MEDIA --- SPEAKERS MAY SPEAK CANDIDLY**
 - **NON-ATTRIBUTION**



STRIKE, LAND ATTACK, AND AIR DEFENSE DIVISION

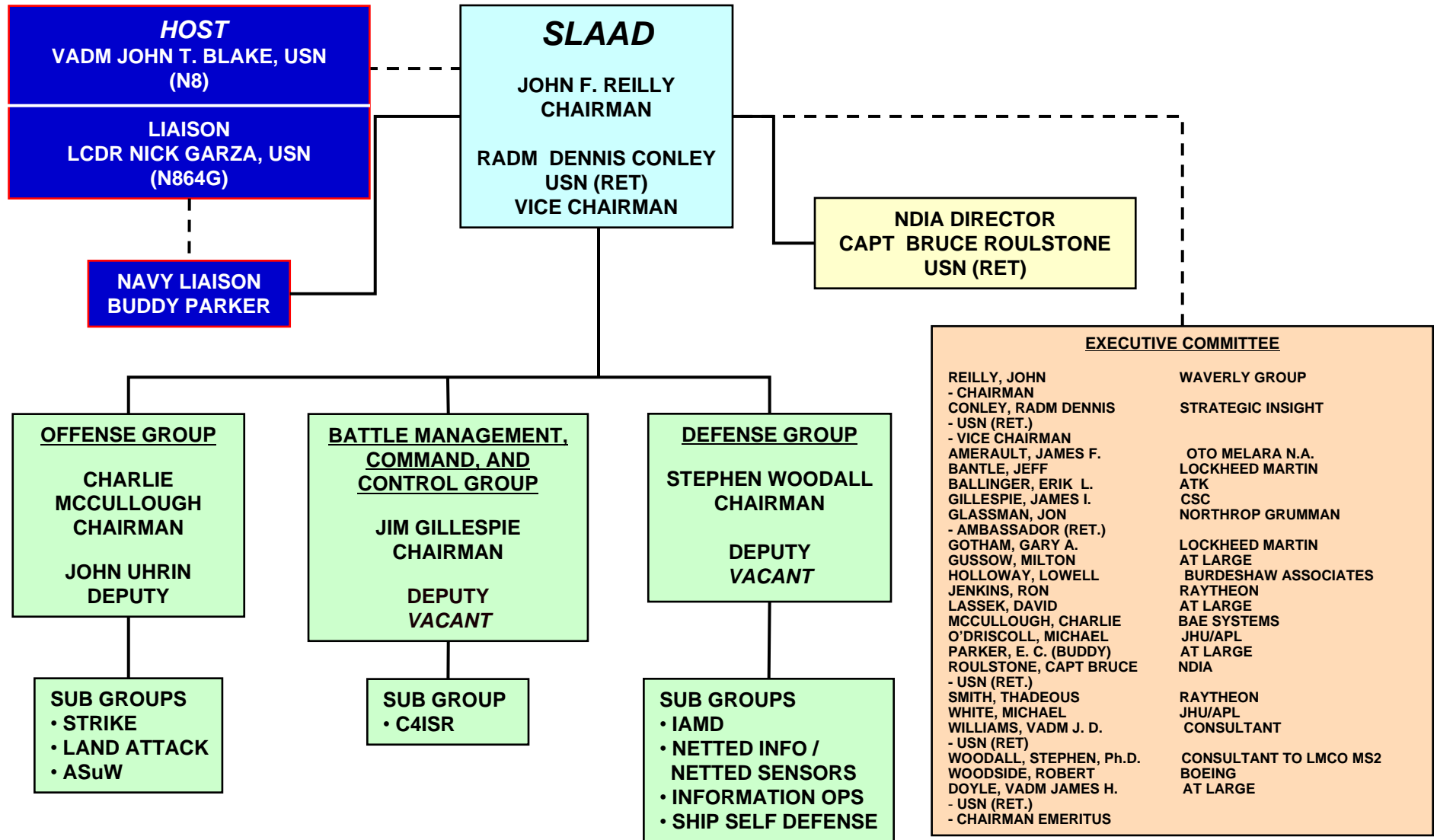
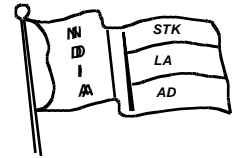
- **MISSION AND PURPOSE**
 - PROVIDE OPEN AND OBJECTIVE COMMUNICATION CHANNEL AMONG U.S. NAVY, DEPARTMENT OF DEFENSE, AND INDUSTRY
 - ADDRESS THREAT, OPERATIONAL CONCEPTS, COMBAT ARCHITECTURES, SYSTEM TECHNOLOGY, SYSTEMS INTEGRATION, ACQUISITION, AND MANPOWER ISSUES
- **FOCUS**
 - CONDUCT FORMAL STUDIES AND ANALYSES RELATED TO STRIKE, LAND ATTACK, AND AIR DEFENSE ISSUES
 - PREPARE AND DISTRIBUTE STUDY REPORTS TO GOVERNMENT AND INDUSTRY
 - SCOPE THE STUDIES TO PROVIDE UNBIASED, USEFUL AND TIMELY RESULTS
 - STUDY PARTICIPATION BY INDUSTRY AND GOVERNMENT IS VOLUNTARY
- ***SINCE 1982, SLAAD HAS PERFORMED OVER 100 PRO BONO STUDIES FOR THE DEPARTMENT OF THE NAVY***

NDIA

**Strike, Land Attack, and
Air Defense Division**



STRIKE, LAND ATTACK, AND AIR DEFENSE DIVISION





Joint Air and Missile Defense Community of Interest (JAMD COI) Net-Centric Migration Activities

Joint Air and Missile Defense Community of Interest (JAMD COI)

“The Hub of Net-Centric Migration Activities for Joint IAMD”

Co-Directors



Ole Knudson
BG, USA
Program Executive Officer,
Missiles and Space (PEO MS)

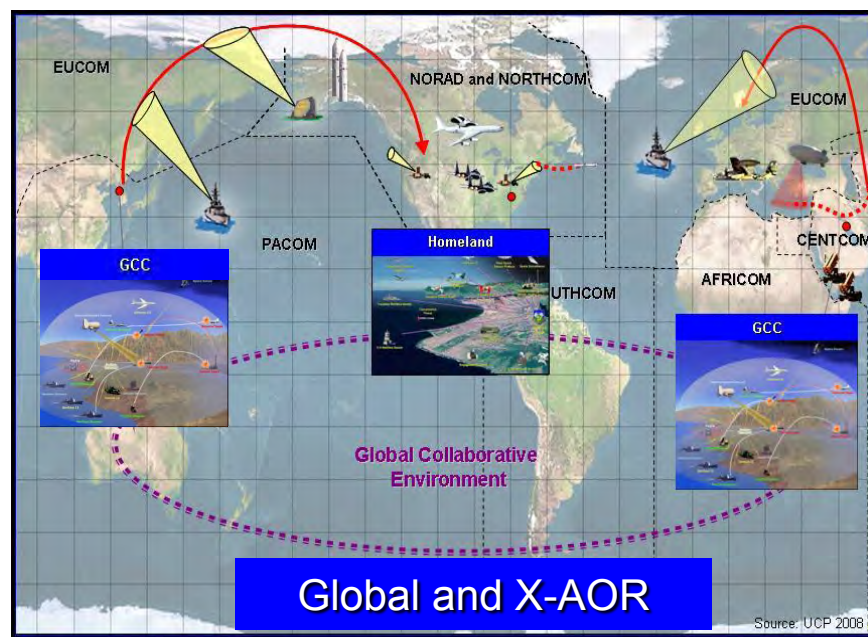
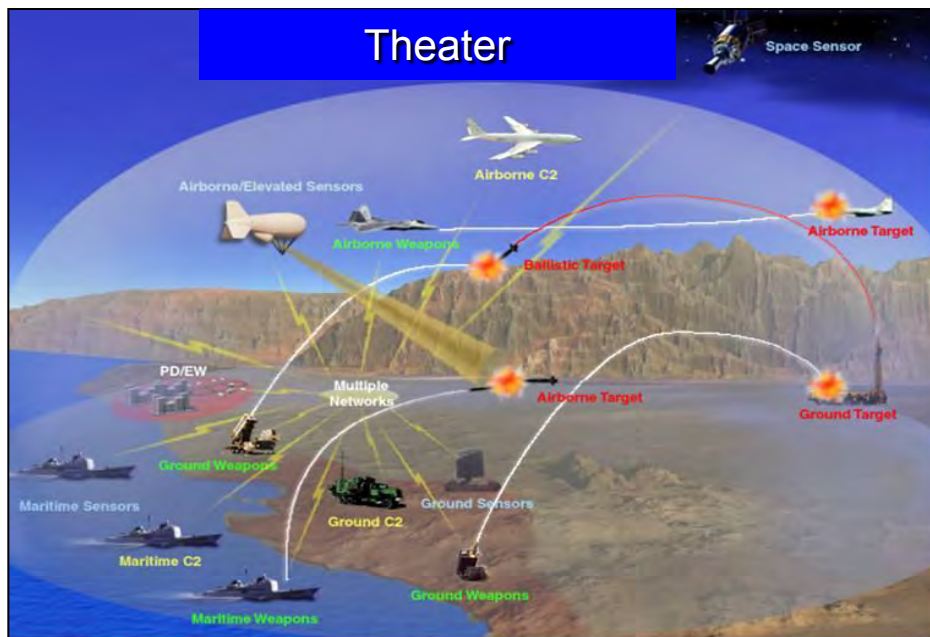


Kerry Kelley
Senior Executive Service (SES)
J6
USSTRATCOM

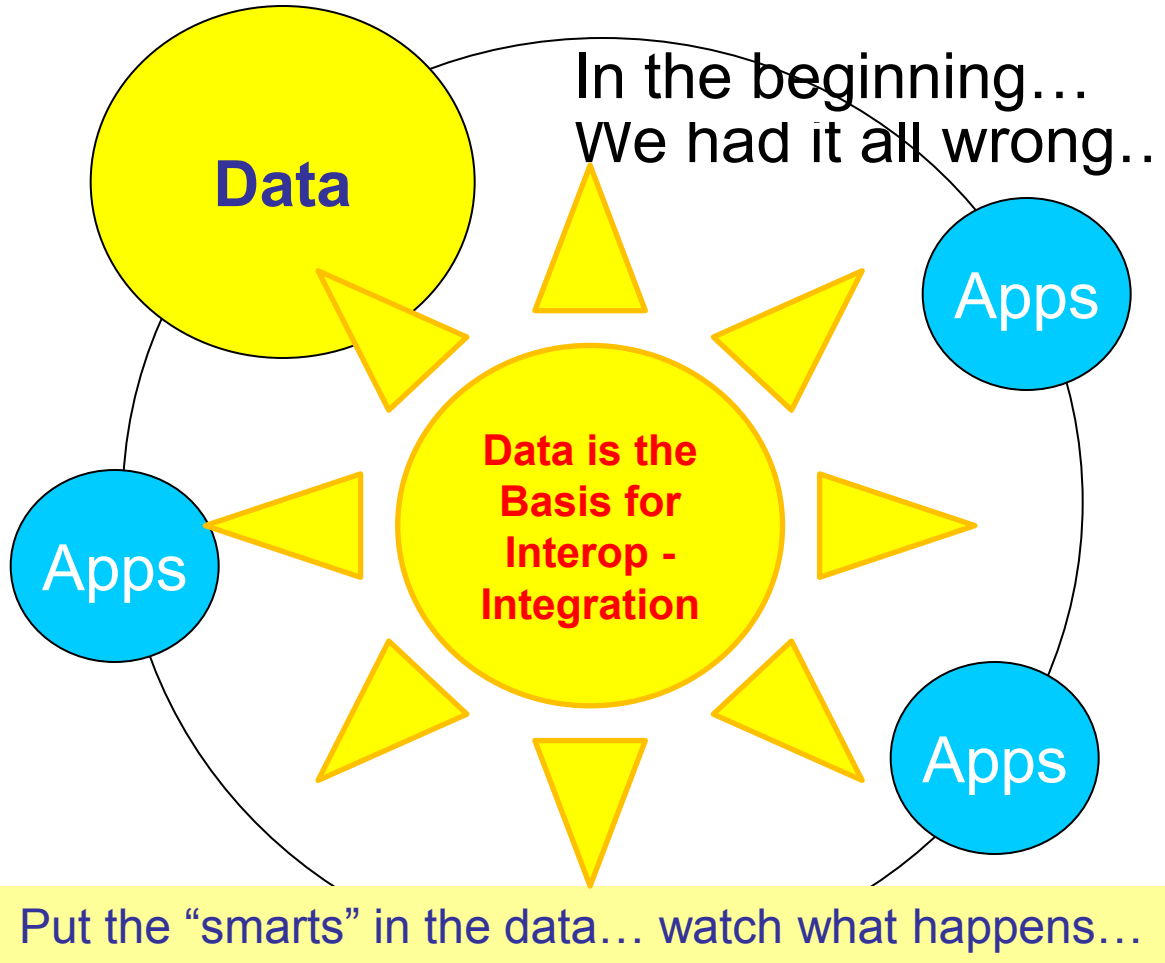
Distribution Statement A – Cleared for Public Release

Joint Air and Missile Defense Community of Interest Mission

- Support migration of the Joint and Multinational IAMD communities toward Net-Centric Operations and Warfare through *the development of a single common data standard/ vocabulary for the JIAMD community as well as other JIAMD Net-Centric Products*
- Establish a strategy for programs within the JAMD COI portfolio to *actively address the Net-Ready KPP* and to *support the PMs with Net-Centric expertise and artifacts/tools*
- Establish a framework that *supports PMs in leveraging DoD and industry technologies* to bring services-oriented architecture (SOA) capabilities to the Joint IAMD Warfighter (i.e., web technologies)

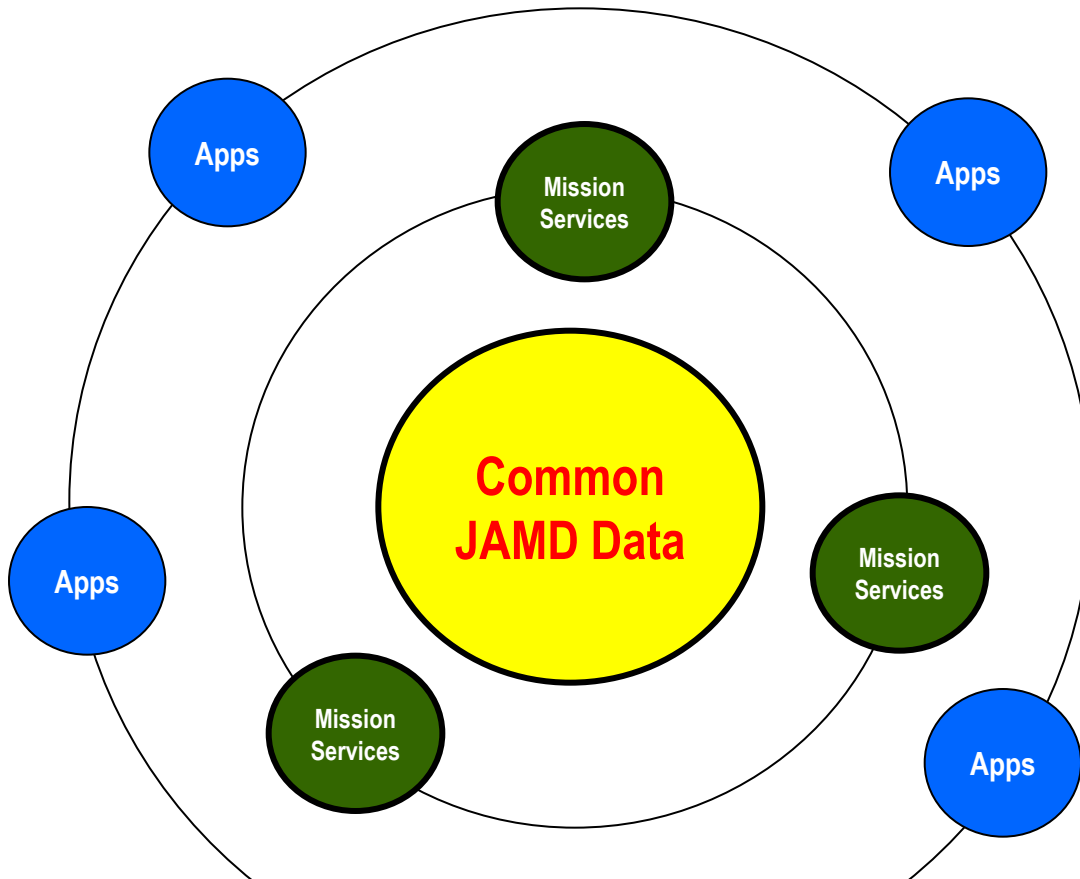


“Copernican Shift” in Interoperability - Integration



***“It’s the data, stupid! Break down the vertical cylinders of excellence.”
-Gen. Cartwright, JIAMD Summit-07***

The Role of Common Data / Mission Services



The Service-Oriented Architecture (SOA) component of the Net-Centric Data Strategy Requires...

...Building Applications that leverage common Mission Services built on common data!

Develop Mission Services Based on Common Data...

Break Down the Stove Pipe CPs, Dedicated Radios and Networks... Mission Services Available to All Authorized Users.



Key Components of the DOD Net-Centric Data Strategy

Department of Defense
Chief Information Officer

Make Data Visible

Is an information resource **discoverable** by end-users?

Make Data Accessible

Is it connected to the network(s), and are tools readily available to use and allow assured access to it?

Make Data Understandable

Can it be used intelligibly? Are the **semantics well documented**?

Make Data Governable

Are **data processes governed with sustained leadership**?

Enable Data to Be Trusted

Is the **authority (pedigree, security level, and access control level)** known and available?

Make Data Interoperable

Can it be easily combined or compared with other information and/or mediated?

Be Responsive to User Needs

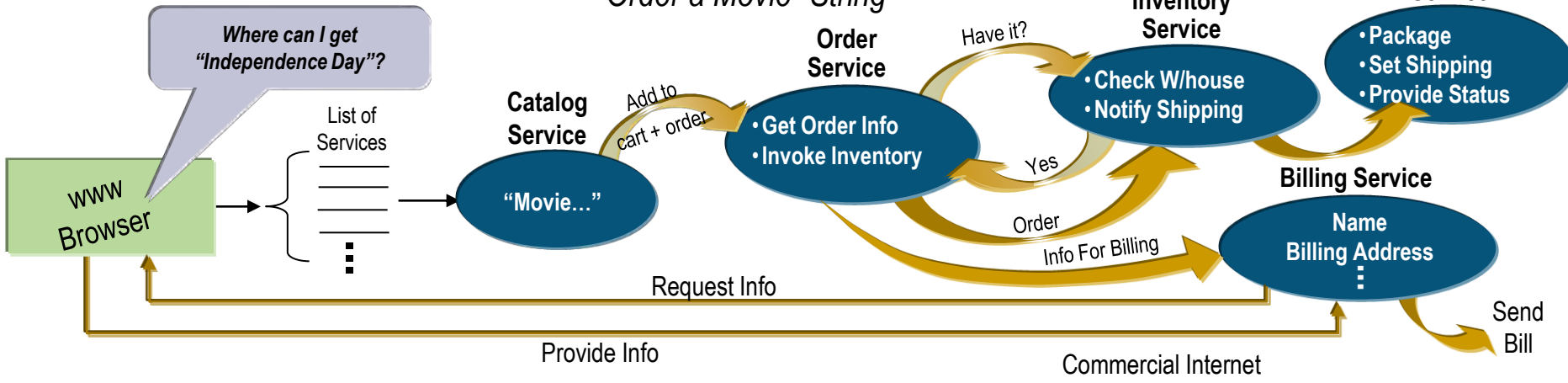
Are users involved in COIs? Are robust, direct user feedback mechanisms in place to guide development?



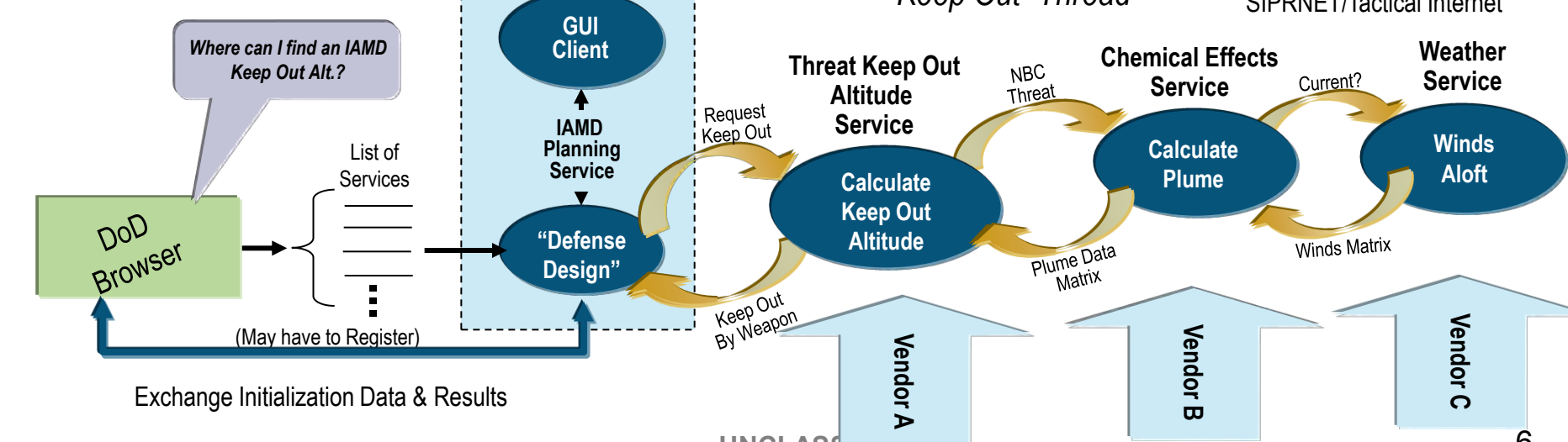
JIAMD Mission Services (Use Commercial Approach)



Commercial Services Utilization



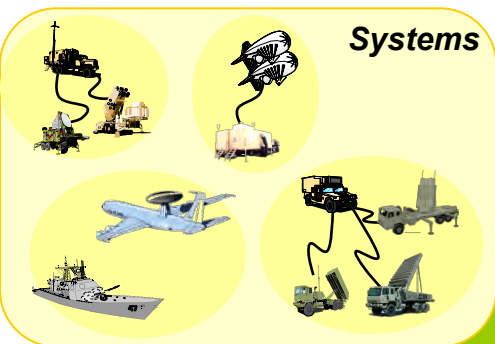
JIAMD Services Utilization



Net Ready Migration

-Notional Example-

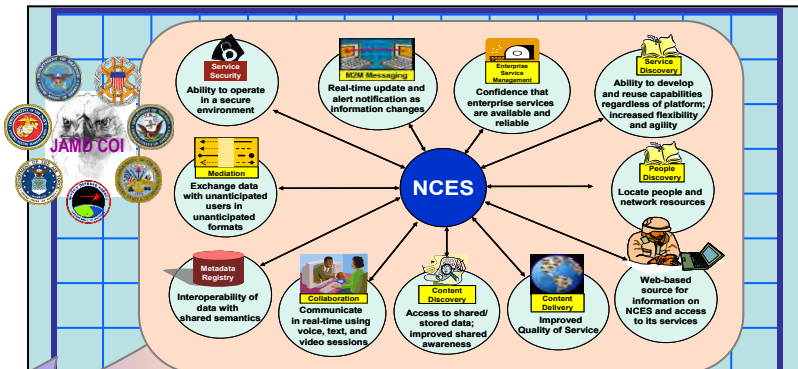
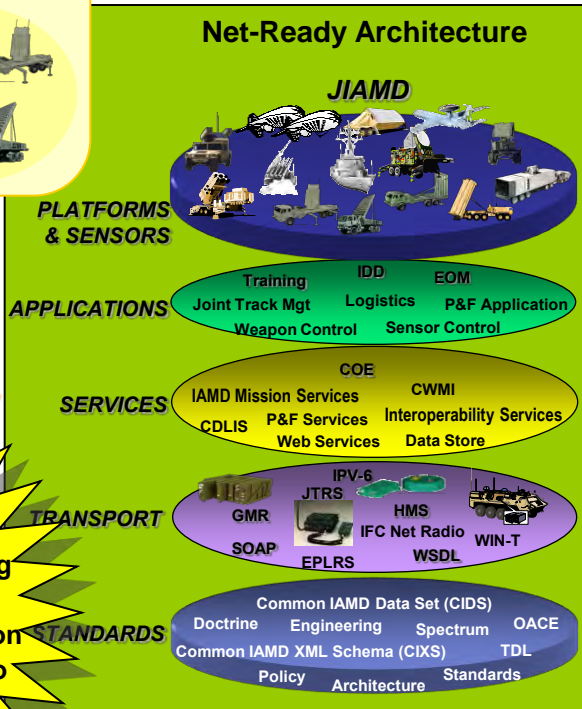
(Note: This chart may be slow to animate)



Systems

Mine Components and Services

NET READY =
Provide/Consume Data and Mission Services using Web Technology/SOA Distributed to Many Users on the GIG/Tactical Internet to Accomplish the Mission!



Utilize Joint Data, Services and Web Technology

Incremental Drops

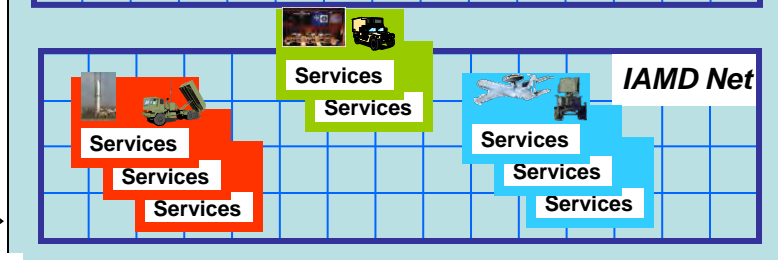
Provide Data and Services to External Users

AOC Services, JFLCC Services, BCT Services

GIG / Tactical Internet

Transform into Net-Ready Components and Services

Incremental Drops



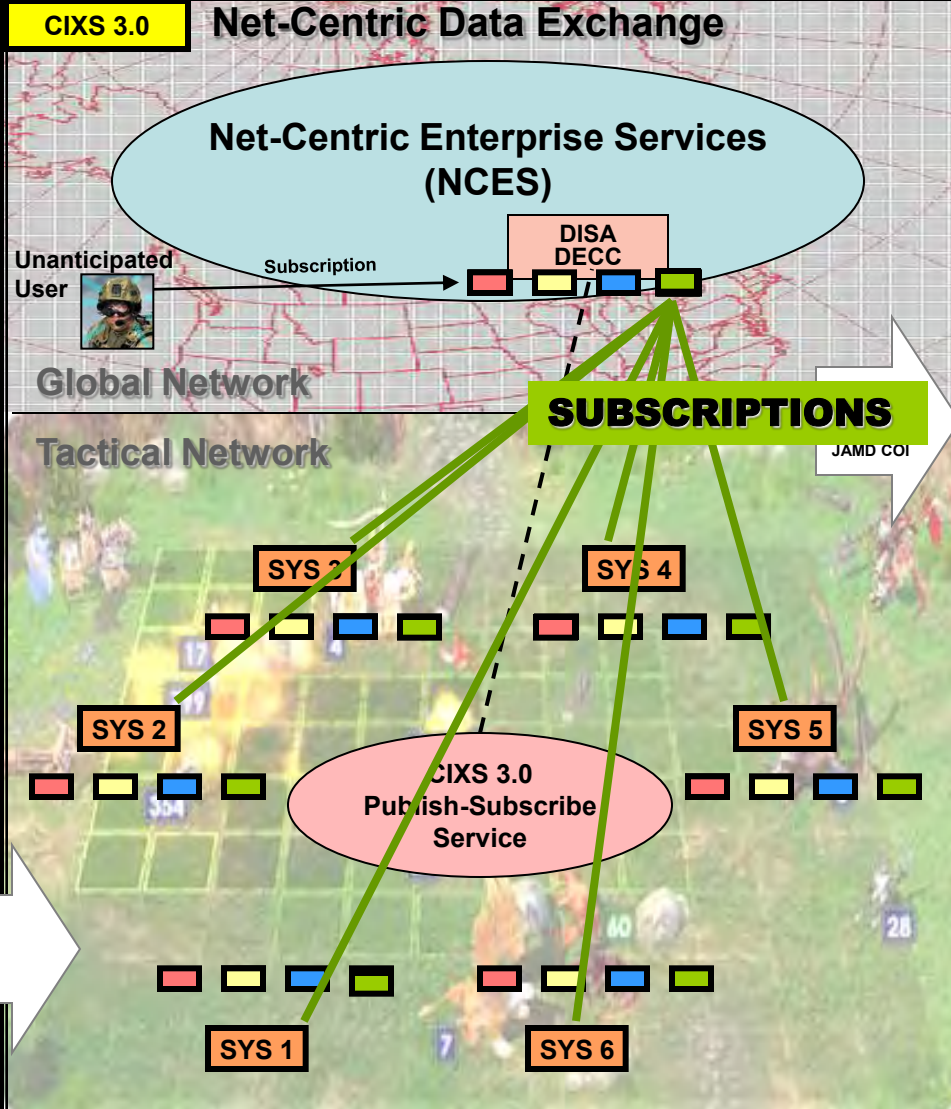
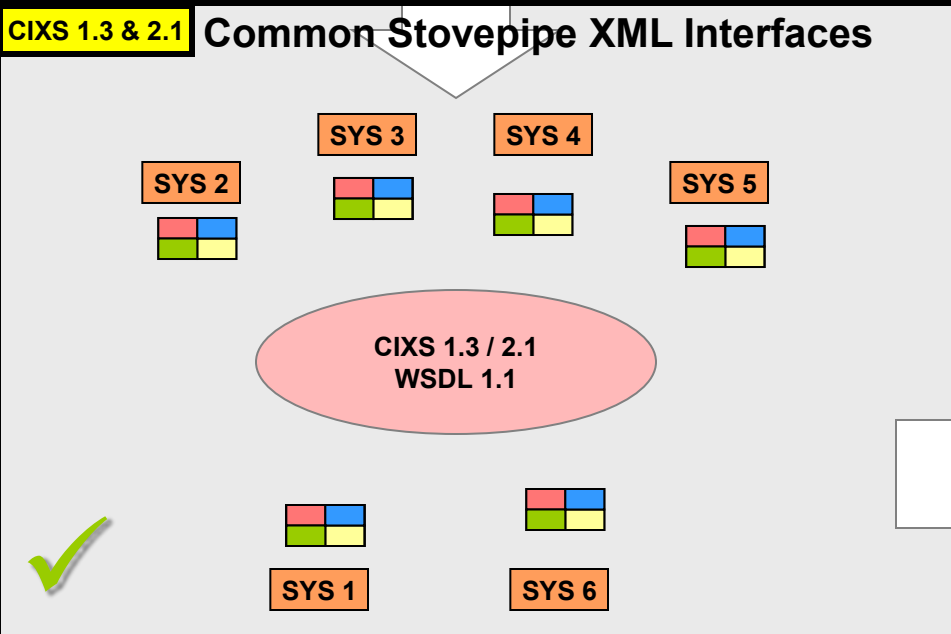
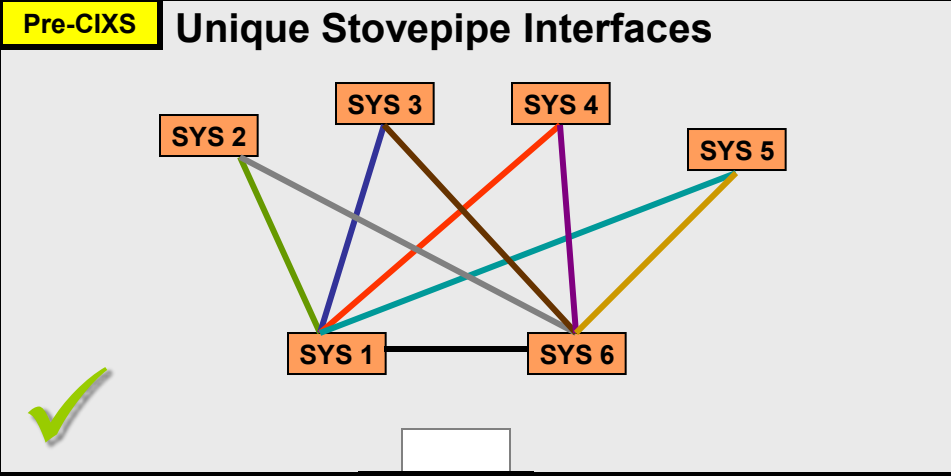
LEGEND

- GIG: Global Information Grid
- NCES: Net-Centric Enterprise Services
- IFC: Integrated Fire Control
- SOA: Service-Oriented Architecture

Evolution of IAMD Data Exchange

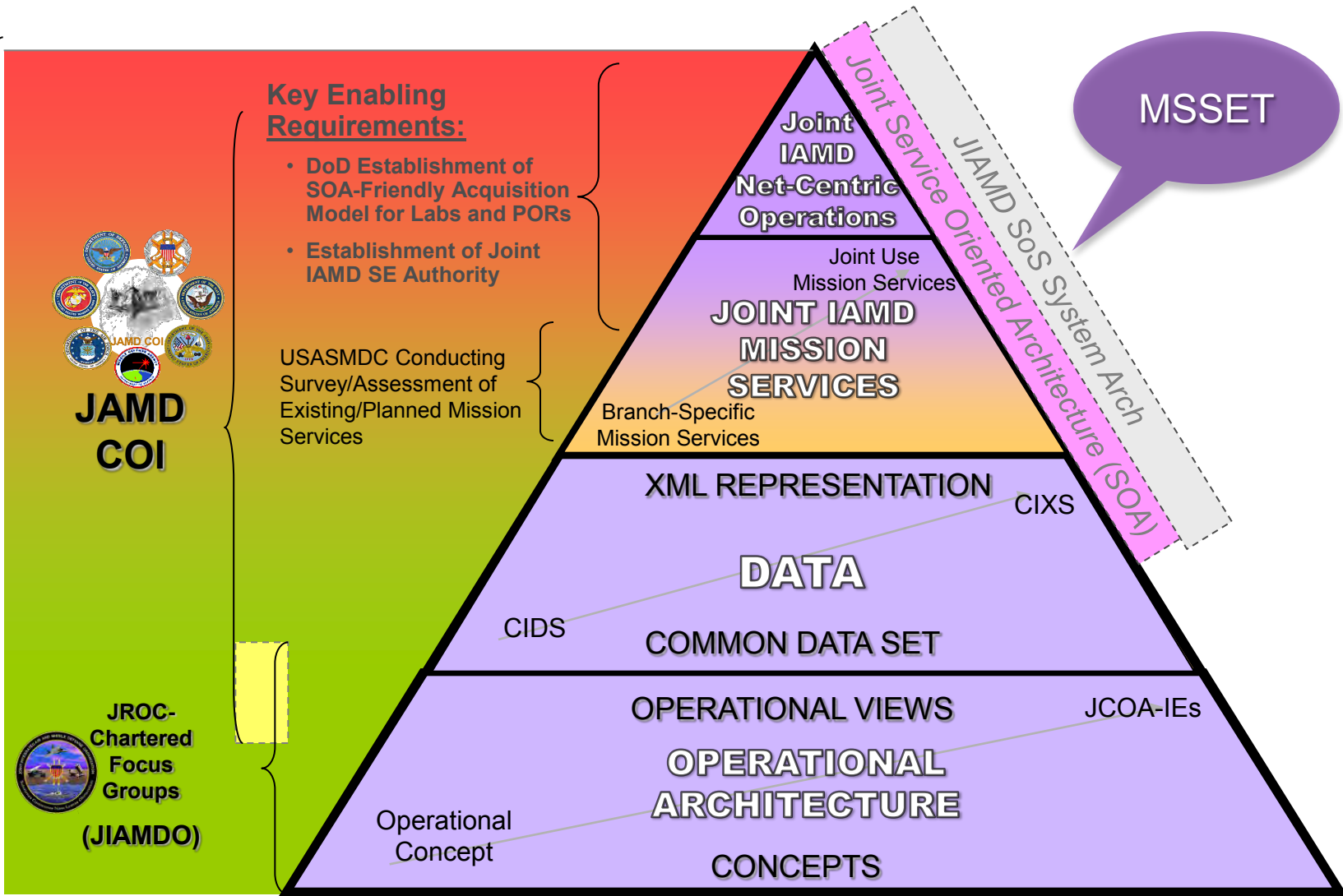
From Legacy Stovepipes to a Service Oriented Architecture

(NOTIONAL)



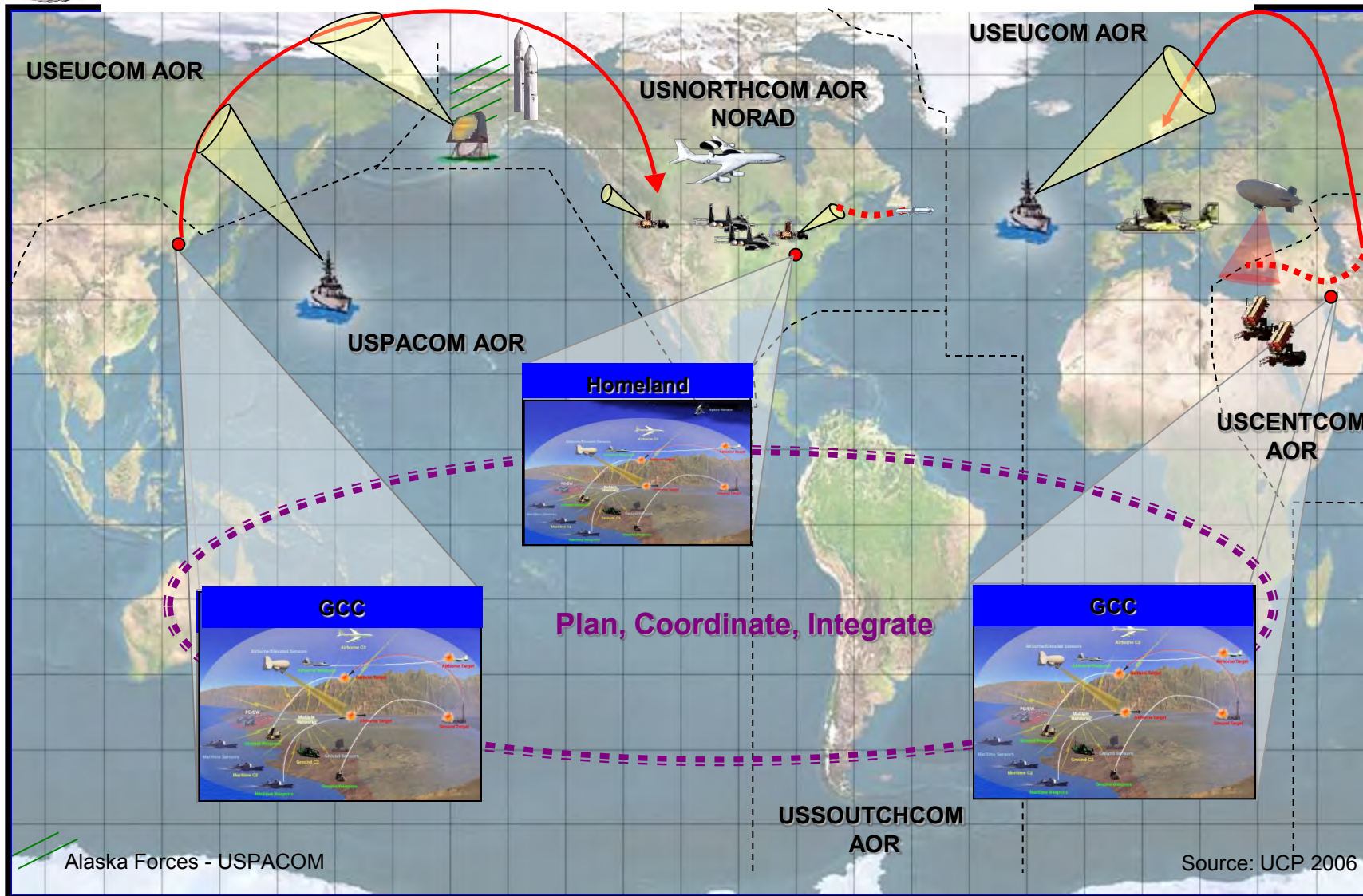
JAMD Net-Centric Migration

Hierarchal Dependencies



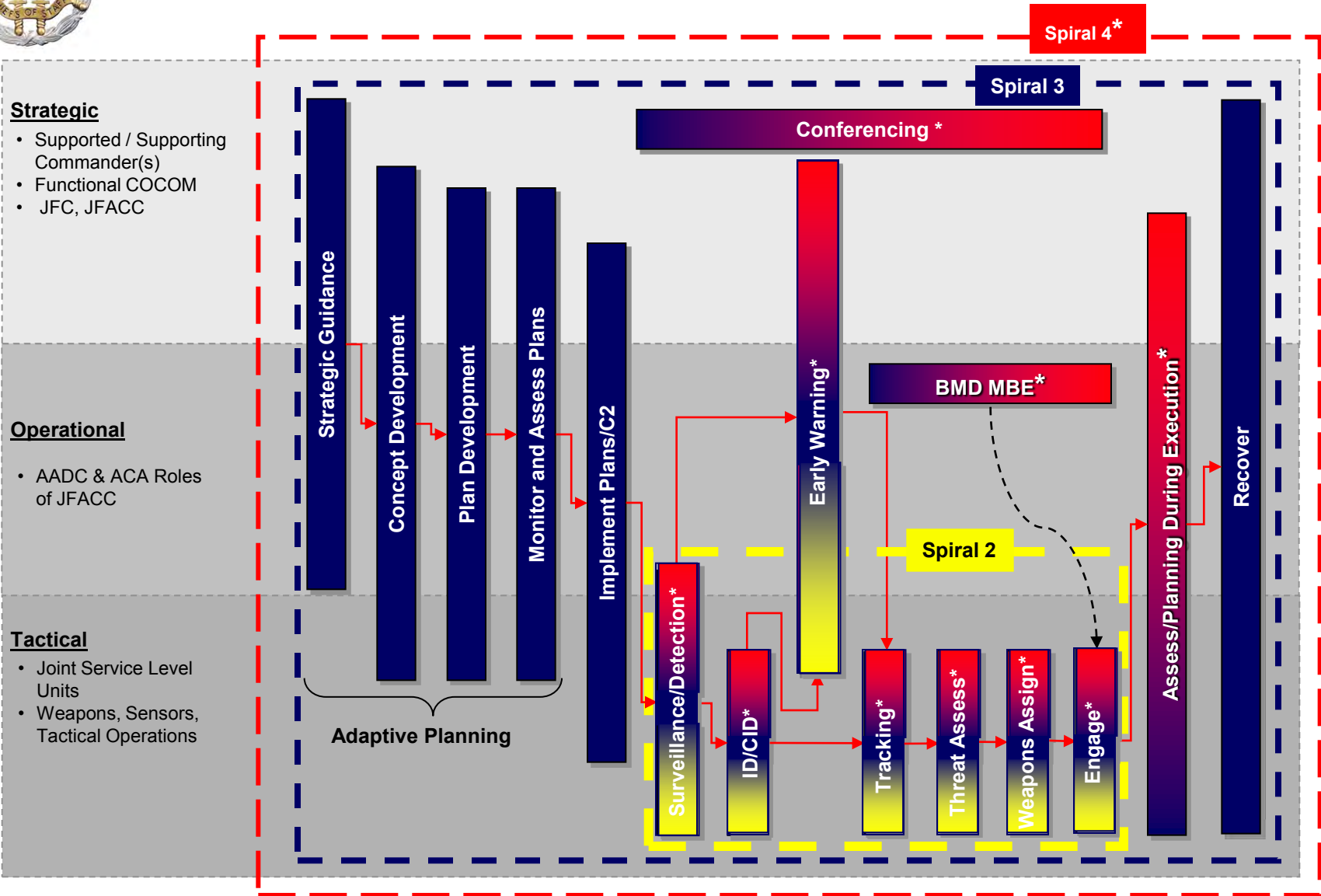
Acronyms: **AMD IA**-AMD Integrating Authority; **POR**-Program of Record; **CIDS**-Common IAMD Data Set; **CIXS**-Common IAMD XML Schema; **JCOA-IEs** - Joint Critical Operational Activities -Information Exchanges; **JIIM**- Joint, Inter-Agency, Inter-Governmental, Multi-National

2015 Integrated Air and Missile Defense





JIAMD Operational Architecture Scope (U)



Strategic

- Supported / Supporting Commander(s)
- Functional COCOM
- JFC, JFACC

Operational

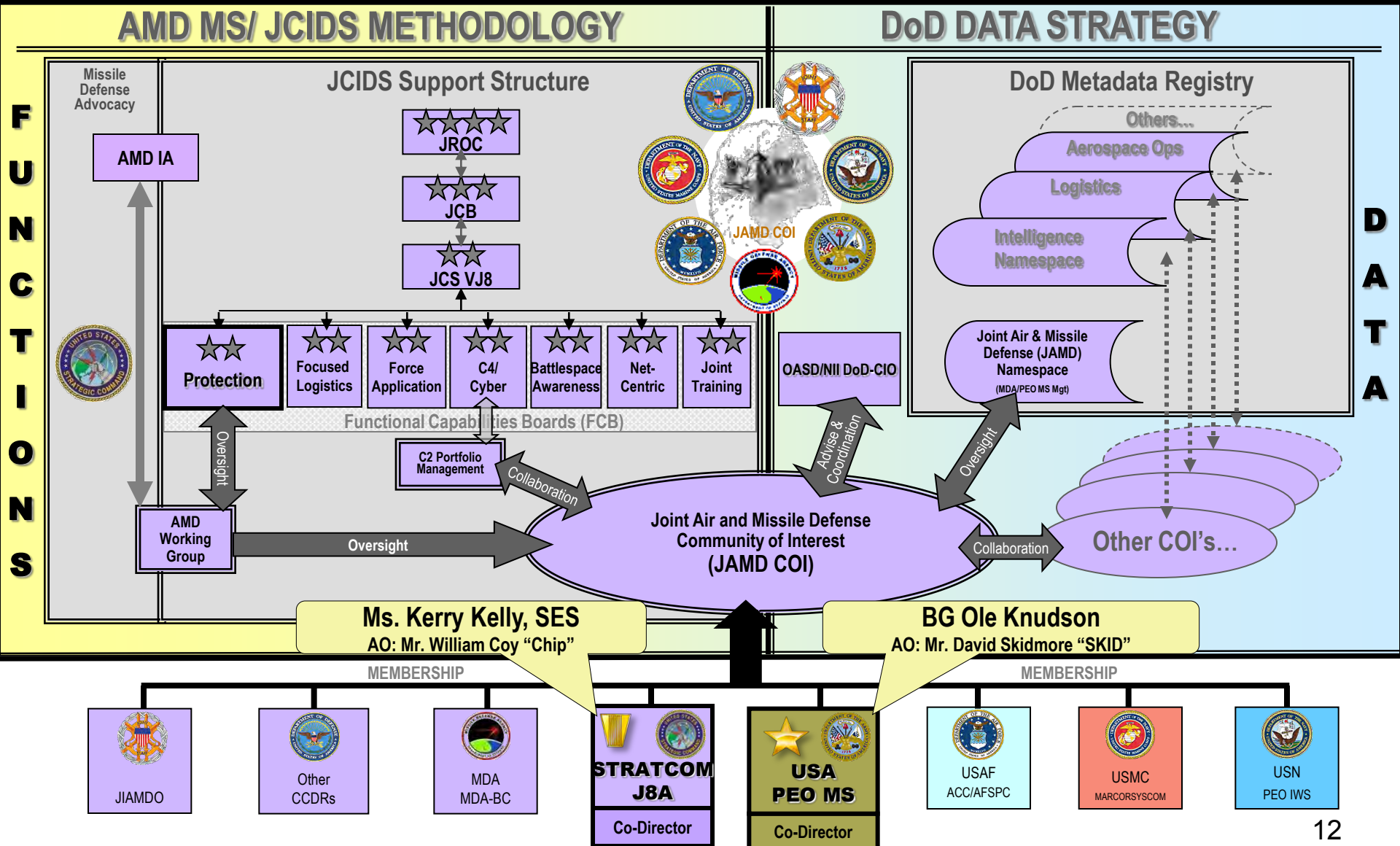
- AADC & ACA Roles of JFACC

Tactical

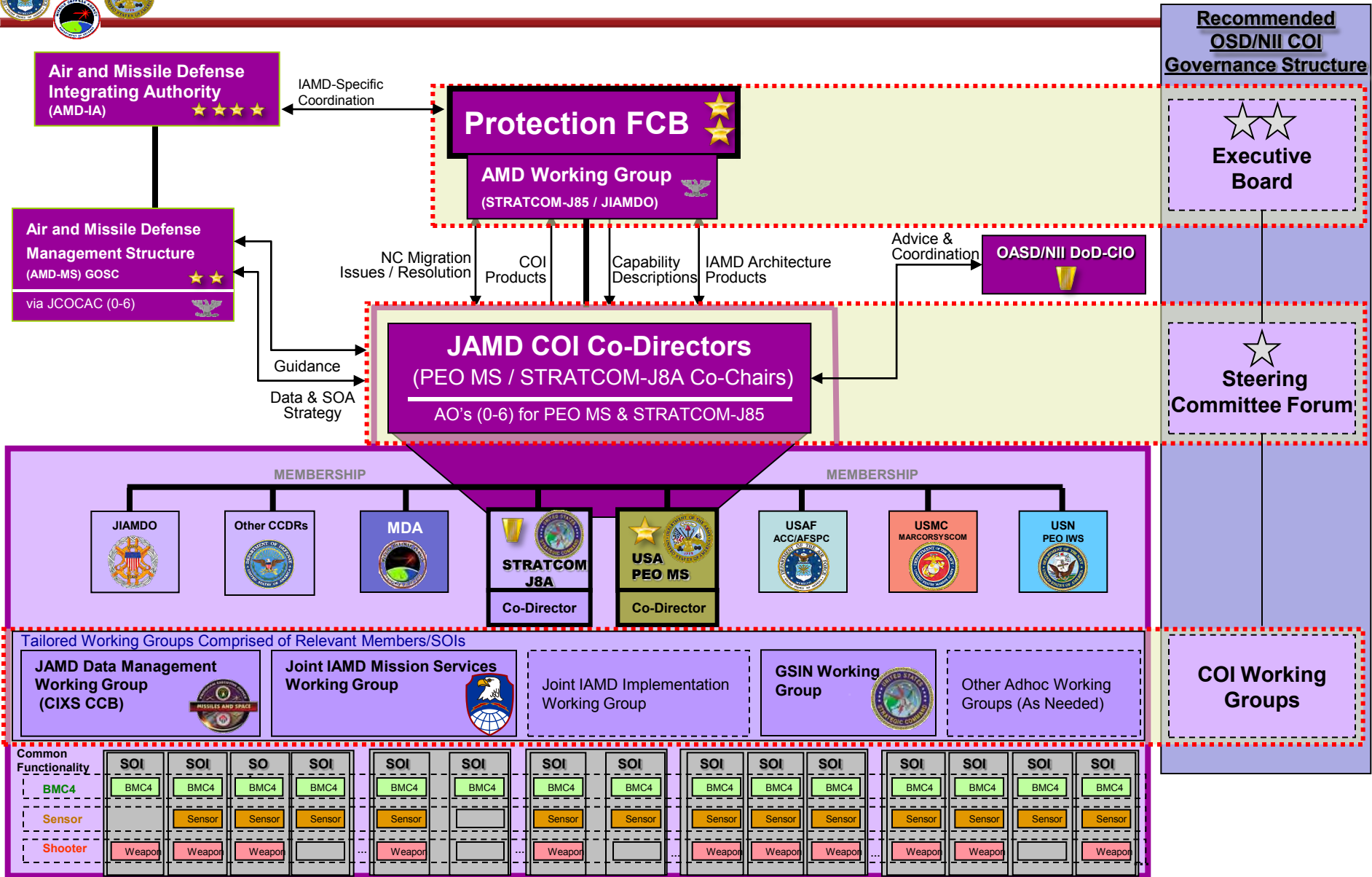
- Joint Service Level Units
- Weapons, Sensors, Tactical Operations

Joint Air and Missile Defense Community of Interest

JAMD COI Collaboration



JAMD COI Governance/Advocacy

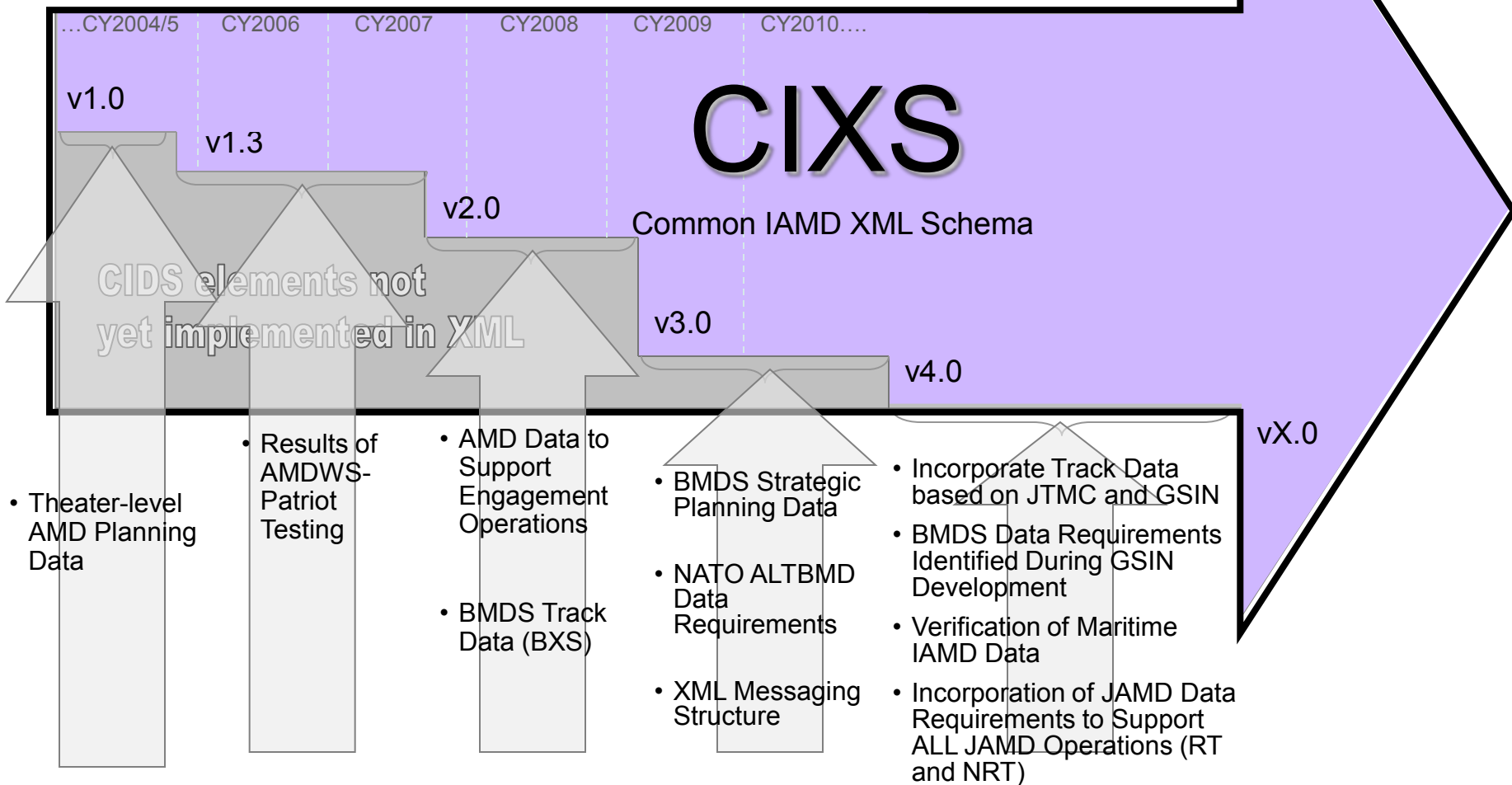


SOI = Systems of Interest
Derived from the Fundamental Systems List (FSL)

CIXS

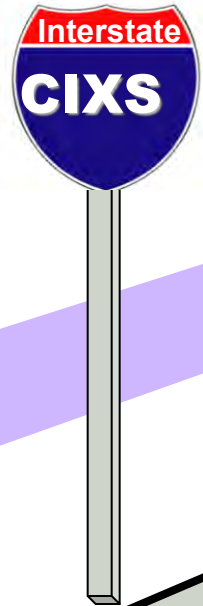


Net-Centric Standard for the JAMD Community

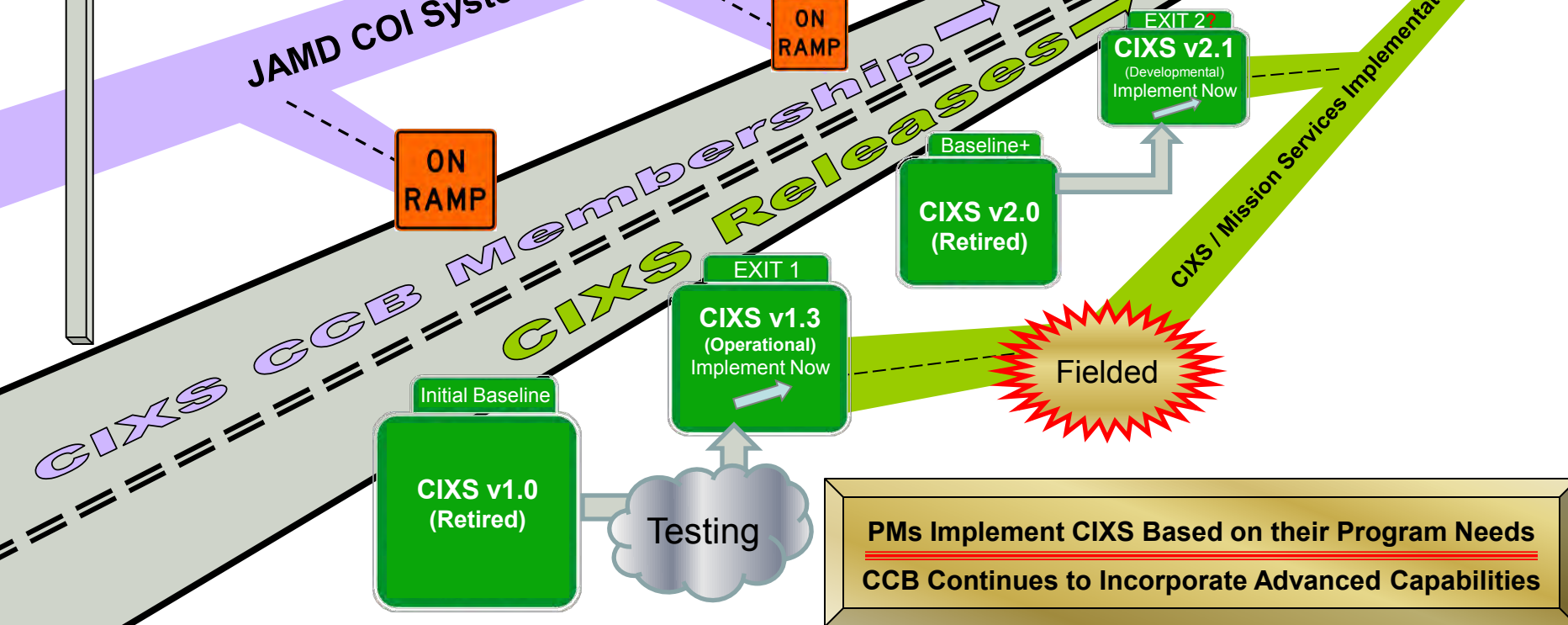


Common IAMD XML Schema (CIXS) Development

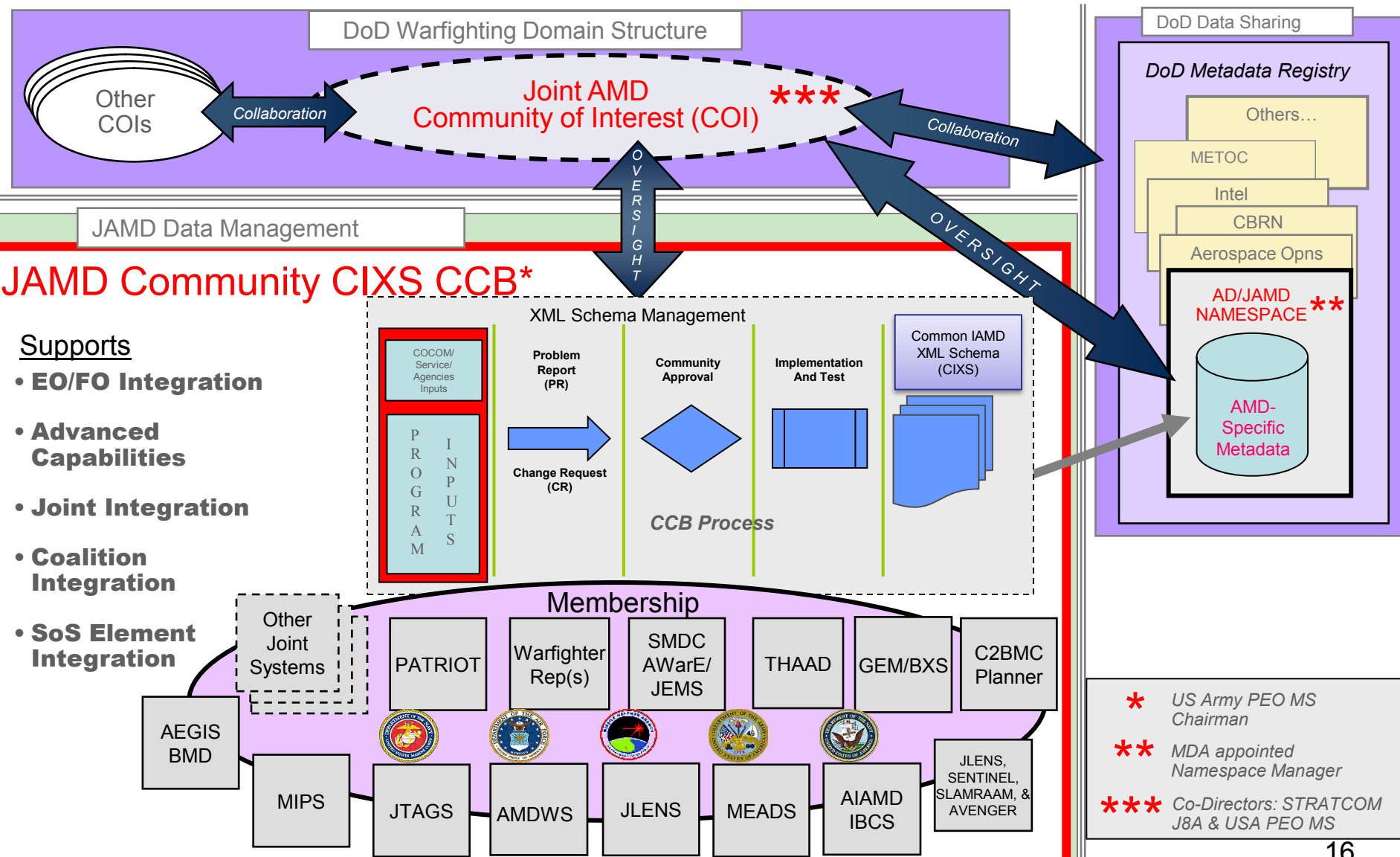
Net-Centric Operations and Warfare



JAMD COI Systems of Interest (SOI) (per IAMD Arch FSL)



JAMD Data Management Process



Guiding Principles

- Accept DoD *Net-Centric Data Strategy as directive*
- *Data Development is “Capabilities Based”* IAW JCIDS and *determined by each community’s warfighter functional requirements*
- **Use the most effective & efficient means of transferring technical data (*machine-to-machine*)**
- **Present the user anything he/she wants via the warfighter display (GUI)**
- **Capture objective data definitions and metadata using XML** to support:
 - Near-term implementation
 - Future implementations of advanced capabilities
 - Data exchange in support of Service Oriented Architectures and Militarized Web Technology
- Implement objective data in **XML as technology allows** (e.g. OTA bandwidth limitation)
- **A common data set that supports all activities of the JAMD Warfighter.**
 - **Enables planning/weapon systems initialization integration**
 - **Seamless near real time replanning with engagement operations**
- **Use legacy TDL/MTF elements if they support operational data requirements** to achieve NCOW objectives
- **Eliminate costly redundant and inconsistent legacy data elements**
- Intent of Joint Capabilities Integration and Development (JCIDS) can only be met by **collaborative Joint Material Development** (e.g. Joint Track Manager-JTM)

- GUI – Graphic User Interface
- JCIDS – Joint Capabilities Integration & Development System
- MTF – Message Text Format
- OTA – Over the Air
- TDL – Tactical Data Link

Guiding Principles Evolved From Joint Data Development Experience

JAMD COI Product Set

Examples



- **CIDS/CIXS:** Common Data / XML Schema for all JIAMD activities
- **JAMD Vocabulary:** List of operational terms and definitions for entities and concepts within the JAMD domain; coordinated among the Services/MDA
- **JAMD Discovery Taxonomy:** A hierarchal categorization of JAMD data to enable search and discovery based on functional use; Synchronized with the DoD Core Taxonomy
- **JAMD Net-Centric Assessment Toolkit:** Tool to support PM self-assessment of their program's net-centric profile; Enables PMs to access the impact of net-centric investments on the program's mission effectiveness; Results support Enterprise level assessments
- **JAMD Web Service Standards and Implementation Guidance:** Provides recommendations regarding the use of web services from the W3C web service stack as well as implementation guidance based on actual implementation experience and pilots
- **JAMD Mission Services Survey:** Listing of known JIAMD Mission Services and associated analysis as related to the JIAMD Operational Architecture.
- **JAMD Pedigree Logical Data Model:** Provides recommended pedigree data/attributes for use in JAMD data exchange. Includes pedigree business rules, use cases, and conceptual data model. ∴



JIAMD Web Service Survey & Assessment

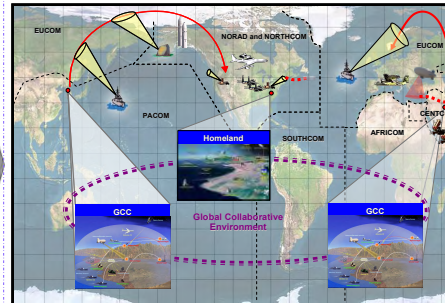
2009-2010 Assessment

JIAMD 2009 WS Survey

- Web Services Responses Include:
 - USAF 22
 - US Army 22
 - US Navy 7
 - ALT BMD (NATO) 6
 - MDA 6
 - STRATCOM 2
 - IBS 1
 - DISA 1
- Total JIAMD Web Svcs. 67

Map to

IAMD ARCHITECTURE



JIAMD Activities: 544

Also Done

IAMD Activities Mapped to COCOM Capability Gaps

GAP TABLE

IAMD Activities

IAMD Capability Gaps

Next Step: COMPARE

ANSWERS for IAMD Architecture

Table 1 - What IAMD activities are satisfied by JIAMD Web Services?

Table 2 - What JIAMD Web Services support the same IAMD activities?

PLANNING:	177
ENGAGE:	186
ASSESS:	18
Activities Mapped:	197*

*Many activities mapped to more than one category

Results

IAMD Activities Covered by JIAMD Web Services

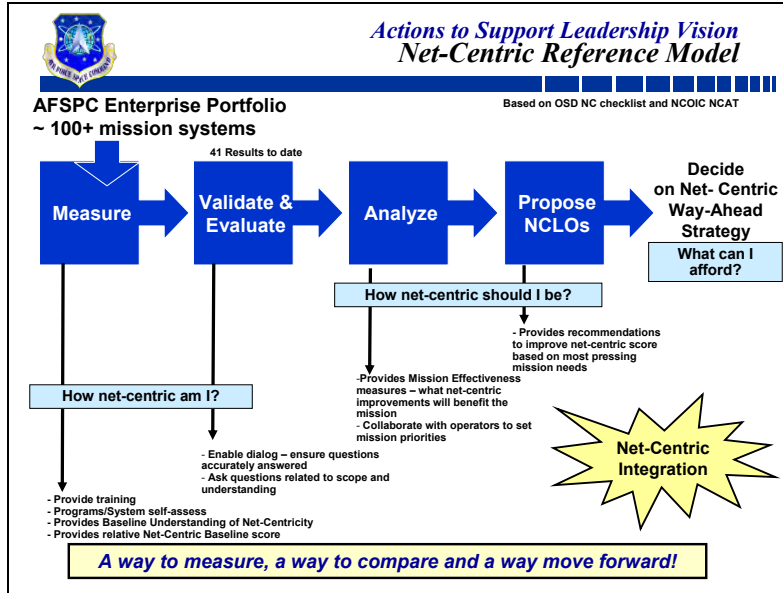
TABLE 1 IAMD Activities

JIAMD Web Services

TABLE 2 - Reverse Mapping

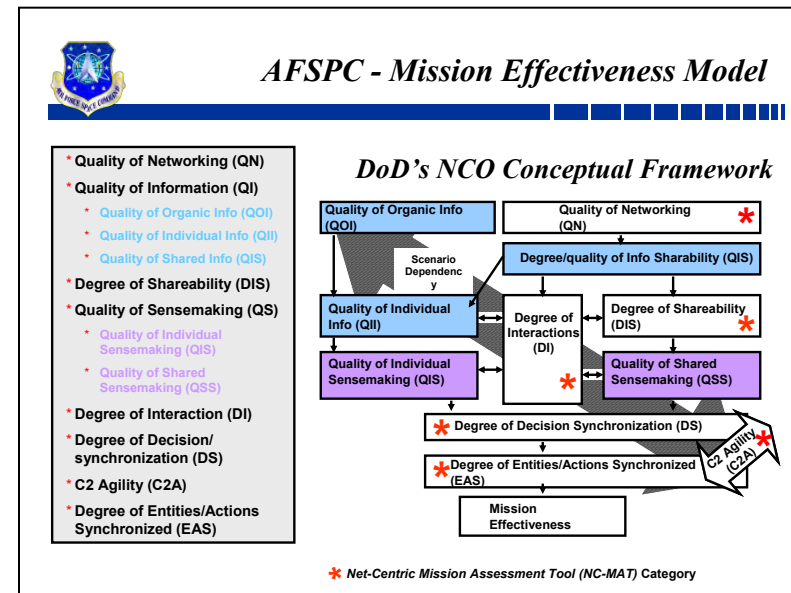
What Web Services Will Satisfy JIAMD Gaps?

Net-Centric Assessment Tool



- Leveraging the USAF Space Command (AFSPC) Net-Centric Assessment Tool to support Net-Centric assessment of JAMD programs
- Based on PM self-assessment using the DoD NC Checklist as the baseline
- Provides recommended actions to PM to increase mission effectiveness through Net-Centric improvements
- Currently being updated to reflect current DoD guidance

- Mission Effectiveness Model (MEM) enables PMs to prioritize enhancements to net-centricity
 - What is the projected impact on mission effectiveness of a proposed net-centric enhancement?
 - What options provides the greatest ROI?
- AFSPC POC is Mr. Ed Strecker, (719) 554-5549, Edward.strecker@peterson.af.mil



Joint Air and Missile Defense Community of Interest

Multinational Integration Activities



- **NATO ALTBMD Programme Office**



- Collaboratively developed XML messages to support evolution of CIXS 3.0
- Released CIXS 3.1 to NATO in Mar 2009 in support of ALTBMD schedule; CIXS 3.3 Released Jul 2010
- Participated in Web Service Workshops on 3-4 June and 7-8 Oct 09 to establish common approach for Web Service development.
- CIXS data workshop with NATO 7-9 Sep 2010 to satisfy NIDD IER requirements
- CIXS 3.4 on contract for NATO ACCS

- **NATO C3 Agency (NC3A)**



- Released Common IAMD XML Schema (CIXS) to NC3A Nov 2005
- Collaboratively planned Multinational IAMD Planning Pilot executed at JPOW-X
 - Implemented CIXS in NATO Planning Tool (PlaTo)
 - Demonstrated new defense planning Web Service utilizing CIXS 1.3 – Very Successful
- Conducted pilot during JPOW-2010 using CIXS 3.1 pub/sub web service – Very Successful

- **NATO Joint Capability Group for Ground-Based Air Defense (previously LCG-4)**



- USA PEO MS providing IAMD Net-Centric Integration expertise in support of JCG-GBAD activities
- Germany, Britain, and US SHORAD conducted experiment as part of 2010 Tri-Partite MOU, using CIXS for sensor and weapon data exchange

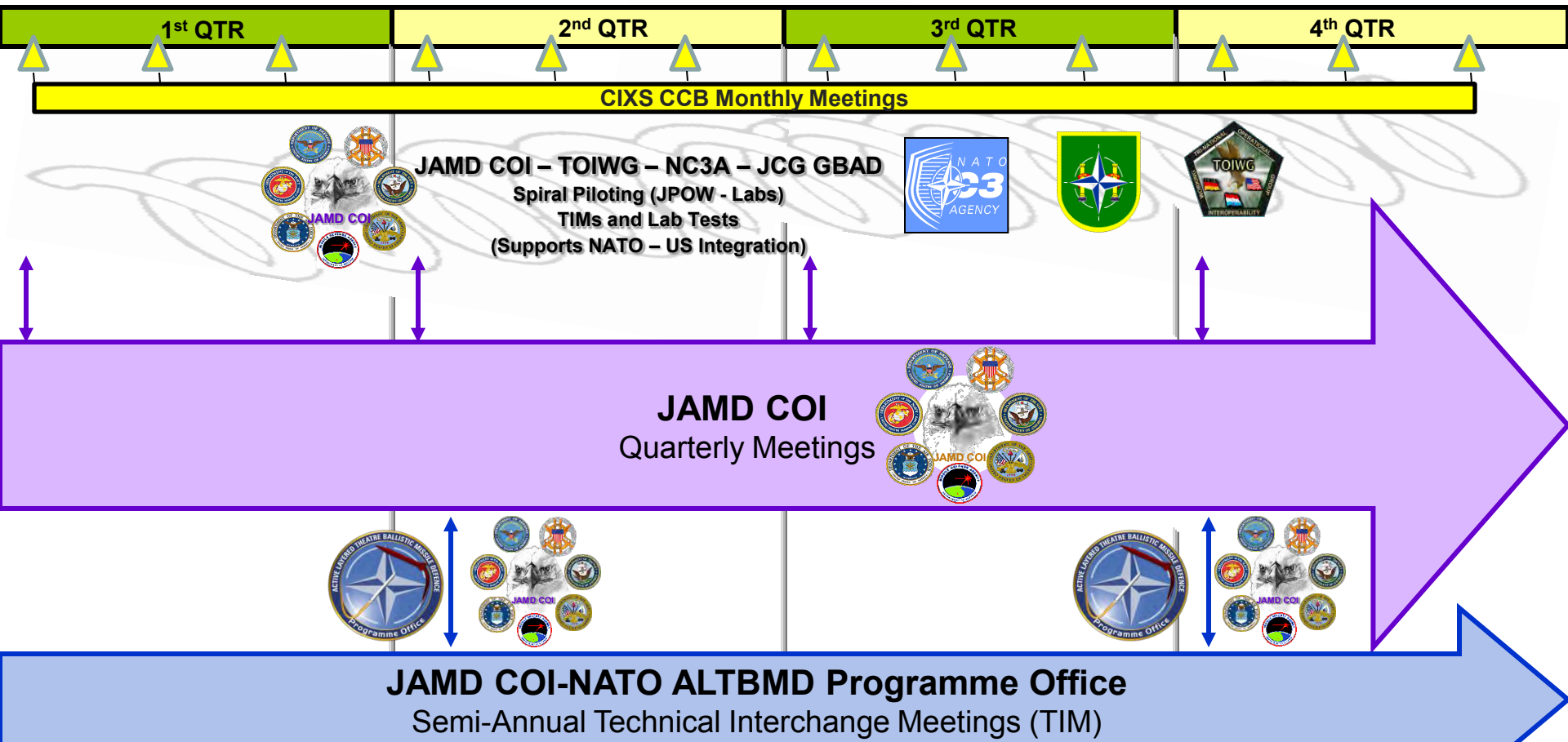
- **Plus...**



Joint Air and Missile Defense Community of Interest



NATO Coordination Schedule



- Acronyms**
- ALTBMD:** Active Layered Theatre Ballistic Missile Defense
 - COI:** Community of Interest
 - JAMD:** Joint Air and Missile Defense
 - JPOW:** Joint Project Optic Windmill
 - JCG GBAD:** Joint Capability Group – Ground-Based Air Defense
 - NC3A:** NATO Consultation, Command & Control Agency
 - TOIWG:** Tri-national Operational Interoperability Working Group



NATO ALTBMD Programme Office Coordination

- Conducted Data Workshop with NATO ALTBMD on 07-09 September 2010
 - Primary objective was to resolve data for C2BMC – NATO ACCS interface by December deadline
 - Secondary objective was to conduct the JAMD COI – NATO ALTBMD TIM
- Conducted Data Workshop with NATO ALTBMD on 08 March 2011
 - Assessment resulted in 23 change requests being submitted to CIXS CCB for action
 - Results will be reflected in new baseline (CIXS 3.5)

JAMD COI DKO Workspace

(URL: <https://www.us.army.mil/suite/page/498325>)



Home ▾ My Account ▾ Favorites ▾ Quick Links ▾ Self Service ▾ Search... AKO Content ▾ Search

Joint Air and Missile Defense (JAMD) COI Home (Related Content ▾) [Remove from Favorites](#) Options ▾
 AKO Home > DoD Organizations > Office of the Secretary of Defense > DoD CIO > Joint Air and Missile Defense (JAMD) COI > Joint Air and Missile Defense (JAMD) COI Home

Welcome to Joint Air and Missile Defense (JAMD) COI Options

Joint and Missile Defense (JAMD) COI Leader's Message Options

Welcome to the JAMD COI Workspace

On behalf of the Co-Directors of the Joint Air and Missile Defense Community of Interest: Ms. Kerry Kelly, US STRATCOM and BG Ole Knudson, USA PEO Missiles and Space: WELCOME! Our Mission: Joint (Integrated) Air and Missile Defense Customer: Any Warfighter - Anywhere - All the Time!



US STRATCOM Missiles and JSA USA PEO Missiles and Space

[AO for JAMD COI](#)

Joint Air and Missile Defense (JAMD) COI Announcements Options

2 Feb 2011 18:19 GMT

Last JAMD COI meeting was hosted by the Army Program Executive Office Missiles and Space (PEO MS) on 25-26 January in Huntsville, AL. Presentations from that meeting are available in the document library. [JAMD COI Meetings](#)

Next JAMD COI meeting is tentatively scheduled to be hosted by the Joint Forces Command (JFCOM)/Lockheed Martin on 27-28 April in Suffolk, VA.

[Current](#) | [Previous](#) | [Next](#) | [Archived](#)

JAMD COI Calendar Options

Upcoming Events

[Full Month View](#) [Add Event](#)

Event: Joint Air and Missile Defense Community of Interest Meeting (JAMD COI)
Time: 4/27/2011 - 4/28/2011 (All-Day)
Location: Suffolk, VA (JFCOM - Lockheed Martin)
Summary:

Joint Air and Missile Defense (JAMD) COI Links Options

Joint Air and Missile Defense (JAMD) Namespace

Link to the Joint Air and Missile Defense (JAMD) Namespace within the DoD Metadata Registry and Clearinghouse (MDR&C). If already signed into the MDR&C, this link will take you directly to the JAMD Namespace. If not already logged into the MDR&C, you will be directed to the Homepage. Once logged in to the MDR&C, choose View-Namespaces, open the DODENT-DoD Enterprise folder, and select "JAMD-Joint Air and Missile Defense." The JAMD Namespace contains the Joint Air and Missile Defense Community of Interest (JAMD COI) Common IAMD XML Schema (CXDS) and supporting WSDL and Common IAMD XML Message Set. Dr. Timothy Kearns (MDA BCE/ MITRE), 719-277-4174 is the JAMD Namespace Manager; Mr. Joe Velasquez, 256.864.7038, (PEO MS/BAE Systems) is the Namespace Administrator. Metadata is posted to the JAMD Namespace as authorized by the CXDS CCB. The CXDS CCB serves as the Data Management Working Group under the Joint oversight of the JAMD COI.

JIAMD Web Services Forum

This forum is the home for the Joint Integrated Air and Missile Defense (JIAMD) community to coordinate operational development of Web Services to support the JIAMD Warfighter. This site identifies current Web Services that exist and those planned to support JIAMD capabilities. The site will also provide a forum for the collaboration of work efforts and other assessment and reference products. The JIAMD Web Services Forum serves as the Joint IAMD Mission Services Working Group for the JAMD COI.

Joint Air and Missile Defense (JAMD) COI Knowledge Center Options

Joint Air and Missile Defense (JAMD) COI Files [Joint Air and Missile Defense \(JAMD\) COI](#)

Show 10 [20] 50 100

[Add File](#) [Add Folder](#) [Copy](#) [Delete](#) [Recycle Bin](#) [Download](#) [Move](#) [Send Link](#) [Tiles View](#)

<input type="checkbox"/>	Name	Type	Creator	Size	Date/Time GMT	Version
<input type="checkbox"/>	JAMD COI	Folder	gerald.skidmore	829 files	May 1, 2009 5:07 PM	
<input type="checkbox"/>	JIAMD Summit	Folder	gerald.skidmore	114 files	Mar 2, 2009 10:39 PM	



Summary

- **JAMD COI is focused on the Development/Coordination of Common IAMD Data and Mission Services for the JAMD community**
- **JAMD COI is leading our community's migration to JIIM IAMD Net-Centric Operations and Service Oriented Architectures (SOA)**
- **Working Closely With:**
 - DoD
 - CDRs
 - USA/USN/USMC/USAF
 - JPEO IAMD / MSSET
 - Joint staff
 - MDA
 - Other COIs (e.g. AO, C2 SSA)
 - NATO NC3A / JCG-GBAD / ALTBMD Programme Office
- **Net-Centric SE Activities support PMs in satisfying NR KPP requirements to realize JIAMD Capabilities**
- **JAMD COI is working closely with Multinational IAMD partners to facilitate interoperable and interdependent IAMD capabilities**
- **Working to Align Initiatives in support of:**
 - Joint Track Management Capability / Combat ID / Integrated Fire Control / Automated Battle Mgt Aids
 - Air and Missile Defense Integrating Authority / AMD Governance
 - NATO Territorial Missile Defense - European Phased Adaptive Approach

JAMD COI, JAMD Namespace, and CIXS CCB are Key Enablers to Implement the DoD Net-Centric Data Strategy and Satisfy the NR KPP

Points of Contact/Questions



Government Action Officers



Mr. William Coy “Chip”

IAMD Chief Advocate

USSTRATCOM-J85

Email: COYW@stratcom.mil

Phone: 402-232-4434

Mr. David Skidmore “Skid”

Technical Director for Net-Centric Integration

U.S. Army PEO Missiles and Space

Email: gerald.skidmore@us.army.mil

Phone: 256-313-8397

Technical Support

Mr. Matthew LeVee, CIV

Program Analyst

Missile Defense Advocacy

USSTRATCOM/J851

Comm: 402-232-0812

DSN: 272-0812

Mr. Larry Smith, CTR

PEO MS Support/JAMD COI Coordinator

BAE Systems

Email: larry.d.smith@baesystems.com

Phone: (256) 864-7060

Dr. Tim Kearns, CTR

JAMD Namespace Manager

MITRE - MDA

Email: kearns@mitre.org

Phone: (719) 277-4174

Ms. Christine Schmidt, CIV

JFCC-IMD/J66

Email: christine.schmidt@jfcc-imd.stratcom.mil

Phone: (719) 721-7991

Mr. Jose “Joe” Velasquez, CTR

JAMD Namespace Admin/IAMD XML CCB Coord

BAE Systems

Email: jose.velasquez@baesystems.com

Phone: (256) 864-7038

2nd Annual IAMD Symposium

IAMD Requirements, Plans, and Programs



RADM Frank C. Pandolfe
Director, Surface Warfare Division
OPNAV N86

- **Evolving Threat**
- **Anti-Air Warfare**
 - AAW Weapons
 - NIFC-CA
- **Ballistic Missile Defense**
 - BMD Weapons
 - Modernization and Shipbuilding
 - Aegis Ashore and SBX
- **Summary**

The Evolving Threat - AAW

- Quiet diesel and nuclear submarines armed with anti-ship cruise missiles
- Manned aircraft
- Swarming fast attack craft with short range ASCM
- Coastal defense cruise missiles



Countered With New Ships, Sensors, Weapons

MISSILE SYSTEMS

RAM Blk 2

ASMD

ESSM

AAW (SR)

SM-2 BLK IIIB

AAW (MR)

SM-2 BLK IV

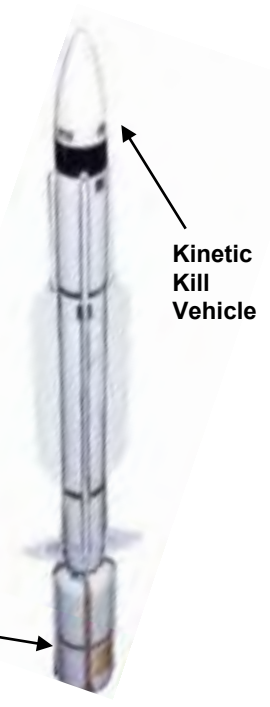
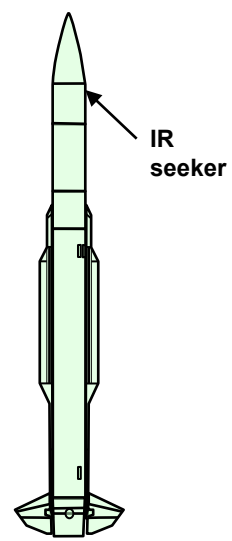
AAW (ER)

SM-6

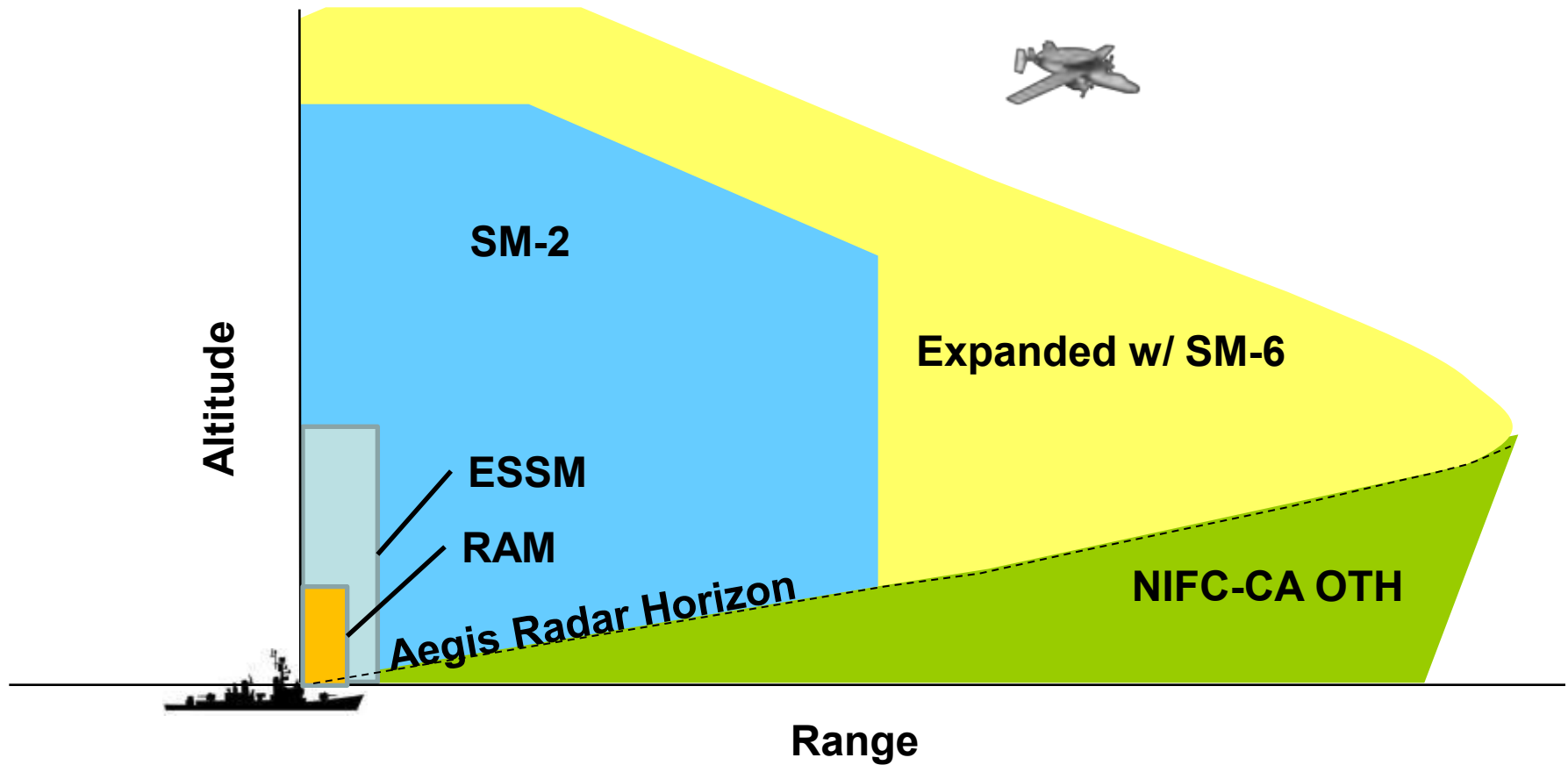
Advanced IAMD

SM-3

BMD



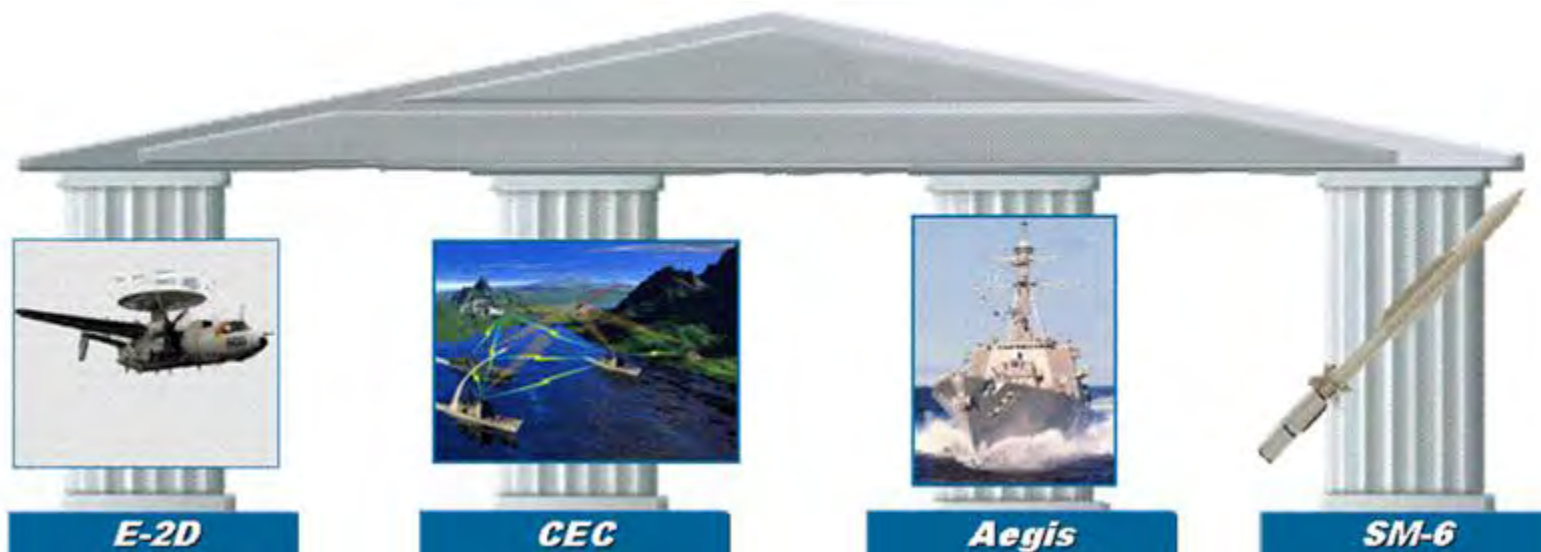
IAMD Engagement



PB12 AAW Funding Profiles

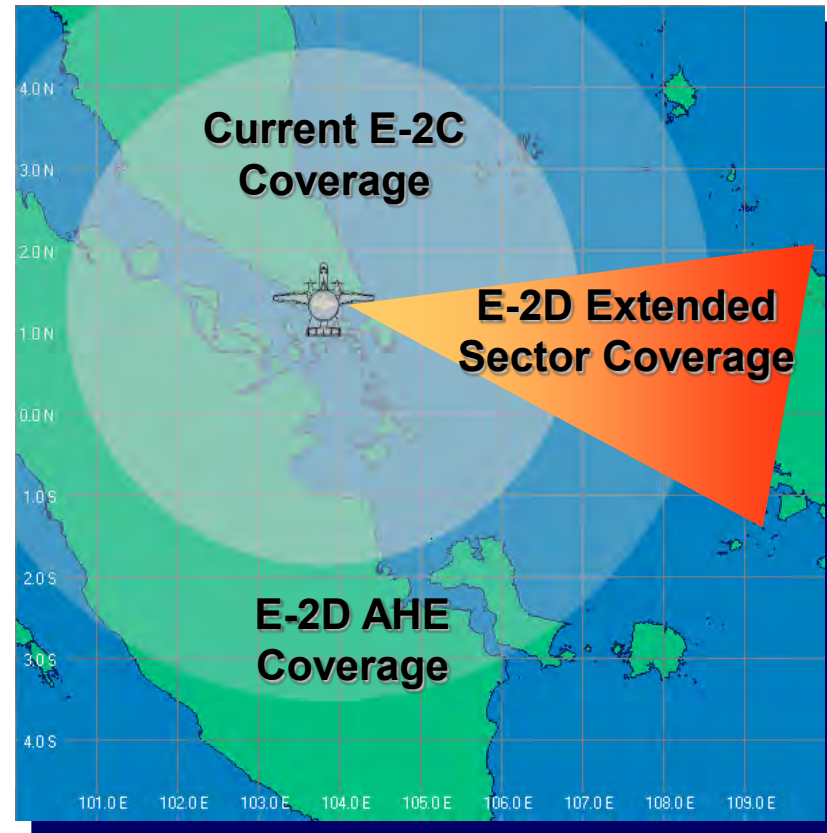
	PB12	<u>FY10</u>	<u>FY11</u>	<u>FY12</u>	<u>FY13</u>	<u>FY14</u>	<u>FY15</u>	<u>FY16</u>	<u>FY12- FY16 Total</u>
RAM	Proc Qty	90	90	61	62	64	90	90	367
	TY\$M	109.2	88.3	71.8	69.8	70.5	84.8	86.9	403.1
ESSM	Proc Qty	43	33	35	35	51	94	94	309
	TY\$M	71.6	63.6	62.8	62.7	81.9	126.1	128.3	461.8
SM-6	Proc Qty	11	59	89	121	129	152	168	659
	TY\$M	211.1	356.1	449.7	560	587.6	658.4	735.3	2991

Naval Integrated Fire Control – Counter Air (NIFC-CA)



- Provides Engage-On-Remote and OTH capability to counter manned aircraft and cruise missiles
- Links E-2D elevated sensor to Aegis ships and Navy fighter aircraft to expand Air Defense battlespace
- Utilizes full kinematic range of active missiles

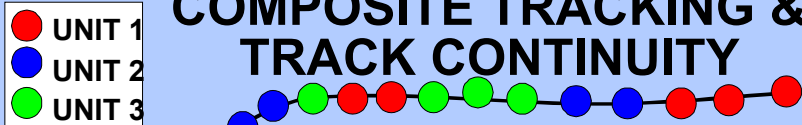
- Long-range detection of air and cruise missile threats
- Sea target tracking out to the horizon
- Precision tracking of maneuvering targets against ground clutter
- Integrates air and missile defense with strike support
- NIFC-CA IOC FY15
 - Aligned to IOC of first E-2D squadron



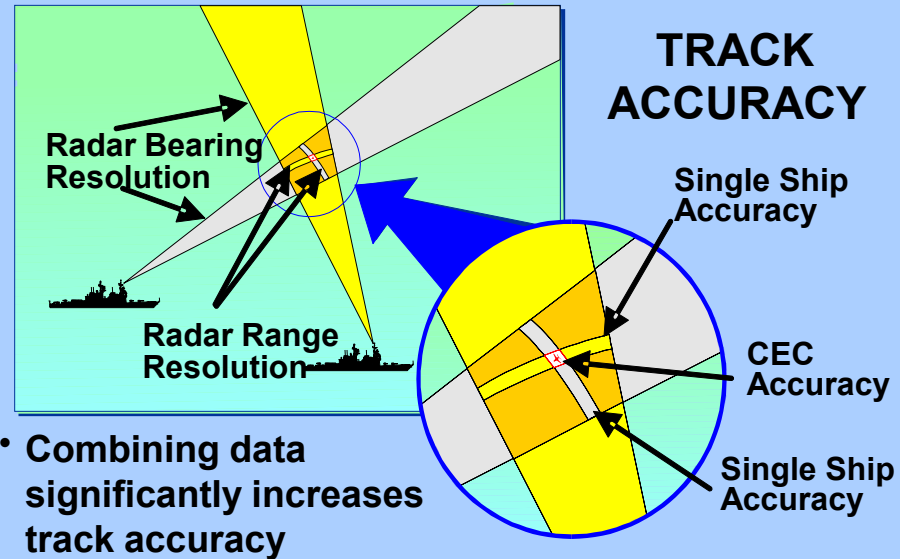
Key Enabler for NIFC-CA Capability

Cooperative Engagement Capability (CEC)

COMPOSITE TRACKING & TRACK CONTINUITY



- Sensor data distributed to all units
- CEC combines filtered data for units with common algorithms
- Provides identical track picture and track numbers
- Superior picture compared to single source



- Combining data significantly increases track accuracy

Real Time Force Level Sensor Fusion

- Integrates platforms via a real time sensor fusion network
- Fuses local and remote sensor measurements into Composite Tracks
- Exploits sensor capabilities, geometric relationships, and frequency diversity to overcome tracking discontinuities and improve tracking accuracy

Advanced Capability Build 12 (ACB-12)

- Road to Open Architecture
- Common Processor & Display System
- OA System Track Manager / Track Server
- Enables Rapid Capability Insertion Process
- Allows full kinematic range of the SM-6 missile (NIFC-CA)
 - All sensors considered
 - SM-6 Active Homing
 - Fire-control quality data in real-time
- Foundation of DDGs 113+, DDG/CG Modernization, Aegis Ashore



STANDARD MISSILE-6

■ Mission:

- Provides theater air defense, fleet area defense, and ship self-defense for sea and littoral forces

■ Description:

- Solid propellant, tail-controlled, surface-to-air missile
- Separable booster with increased air defense range
- Allows for OTH engagements

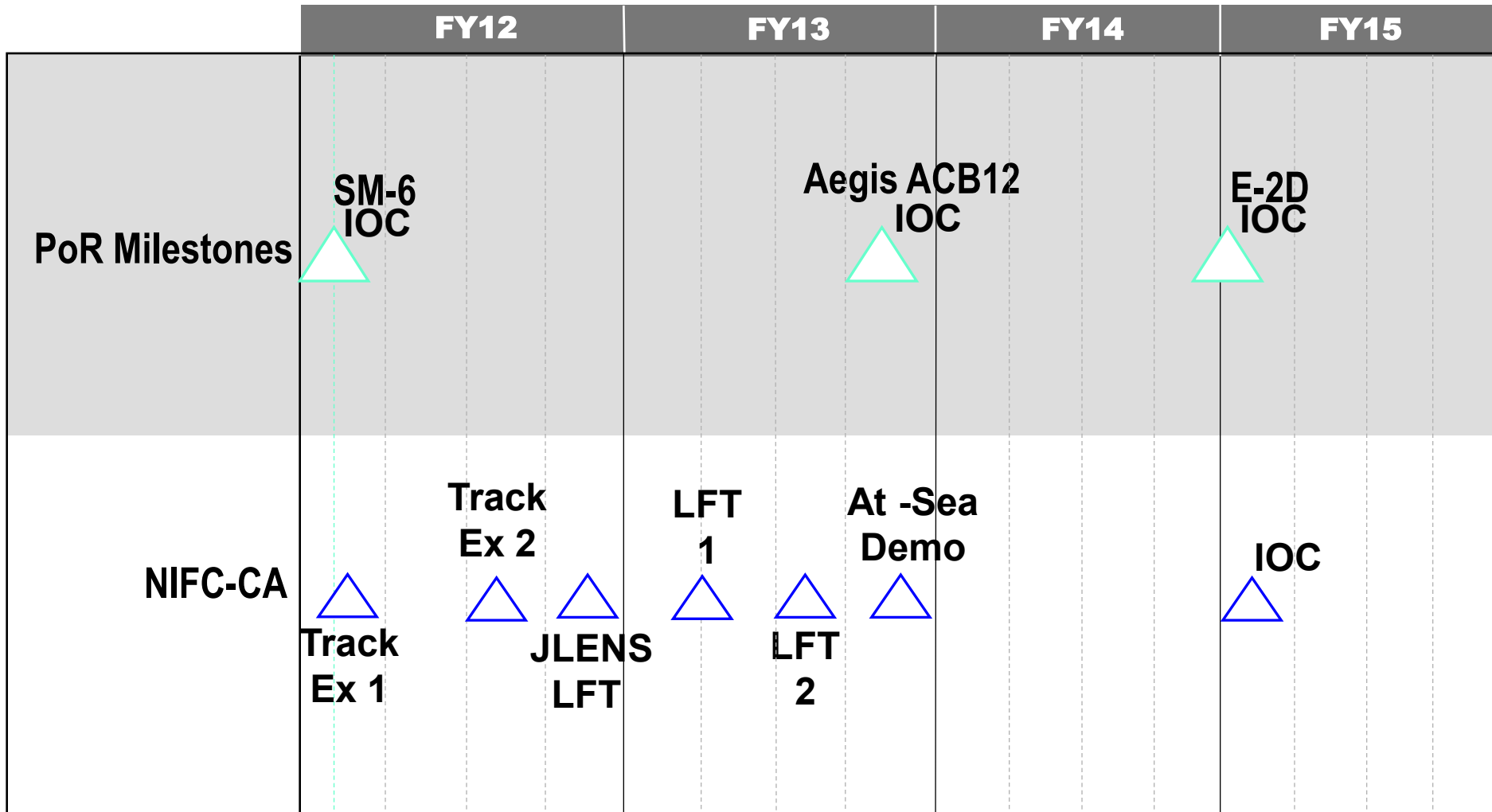
■ Employment:

- Primary air defense weapon for U.S. Navy AEGIS Cruisers & Destroyers

■ IOC 2012 / FRP late 2012



NIFC-CA FTS Program Plan



LFT- Live Fire Test

JLENS – Joint Land Attack/Cruise Missile Defense Elevated Netted Sensor System

Ballistic Missiles

Short Range Ballistic Missiles



CSS-6 Mod 2



Shaheen



SCUD B

Medium Range Ballistic Missiles



Ashura



No Dong



Agni II



Shahab 3

Long Range Ballistic Missiles






CSS-4



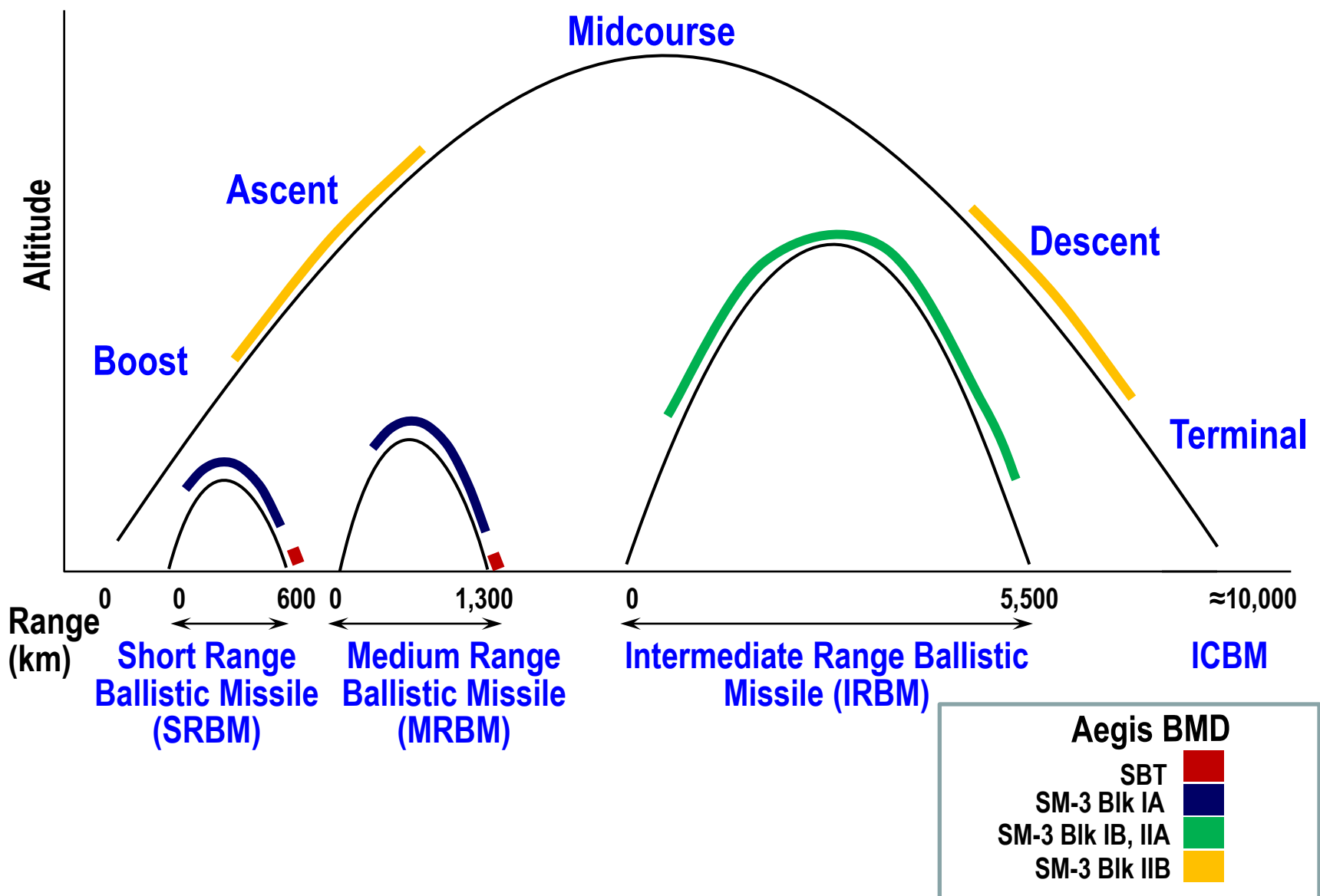
Taepo Dong II

Increasing Numbers and Complexity

Aegis BMD SM-3 Evolution

SM-3 BLK IA	SM-3 BLK IB	SM-3 BLK IIA
<ul style="list-style-type: none"> ▪ BLK IA KW <ul style="list-style-type: none"> • 1-Color Seeker • Pulsed DACS ▪ 13.5" Propulsion <ul style="list-style-type: none"> • 2nd & 3rd Stage ▪ MK 72 Booster ▪ MK 41 VLS Compatible 	<ul style="list-style-type: none"> ▪ BLK IB KW <ul style="list-style-type: none"> • 2- Color Seeker • All-Reflective Optics • Advanced Signal Processor • TDACS ▪ 13.5" Propulsion <ul style="list-style-type: none"> • 2nd & 3rd Stage ▪ MK 72 Booster ▪ MK 41 VLS Compatible 	<ul style="list-style-type: none"> ▪ 21" Nosecone ▪ Large Diameter KW <ul style="list-style-type: none"> • Adv Discrim Seeker • High Divert DACS (Design TBD) ▪ 21" Propulsion <ul style="list-style-type: none"> • 2nd & 3rd Stage ▪ MK 72 Booster ▪ MK 41 VLS Compatible 
IOC 2006	IOC 2012	IOC 2018

The Evolving Threat - BMD



UNCLASSIFIED

CG Modernization



Navy Precision Fires

5"/62 Gun / MK 160 GCS



Force Protection

SPQ-9B
CIWS BLK 1B

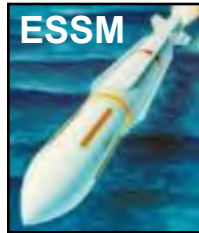


ASW

AN/SQQ-89A(V)15
Multi-Function Towed Array



ACB



ESSM

SM-6



SM-3



Improved Air and Missile Defense

- Aegis Advanced Capability Build (ACB)
- Cooperative Engagement Capability (CEC)
- Naval Integrated Fire Control – Counter Air (NIFC-CA)
- Integrated Air & Missile Defense with BMD (CGs 65-73)
- SM-6 & SM-3
- Evolved Sea Sparrow Missile (ESSM)

Hull, Mechanical & Electrical



All Electric



Smart Ship



MH-60R Support

DDG Modernization

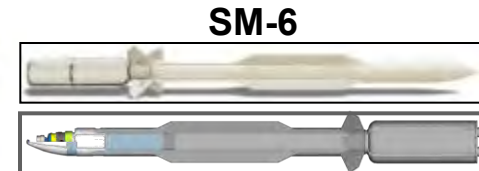
Force Protection

CIWS BLK1B



Navy Precision Fires

MK 160 GCS



SM-6

SM-3

ASW

AN/SQQ-89A(V)15

Multi-Function

Towed Array

Hull, Mechanical & Electrical



Advanced Galley



Machinery Control System



MH-60R Support

Improved Air and Missile Defense

Multi-Mission Signal Processor

Surface Electronic Warfare Improvement Program

Aegis Advanced Capability Build (ACB)

Cooperative Engagement Capability (CEC)

Naval Integrated Fire Control – Counter Air (NIFC-CA)

Integrated Air & Missile Defense with BMD

SM-6 & SM-3

Evolved Sea Sparrow Missile (ESSM)

DDG 51 Restart / Flight III

- **Flight IIA Restart**
 - New construction
 - Hulls 113-121
 - BMD capable



- **Flight III**
 - Integrated Air and Missile Defense
 - Air and Missile Defense Radar
 - Replaces CGs



Air and Missile Defense Radar



AMDR X-Band

AMDR S-Band

■ AMDR:

- AMDR S-Band – volume search, tracking, Ballistic Missile Defense discrimination, missile communication
- AMDR X-Band – horizon search, tracking, missile communication, terminal illumination
- Radar Suite Controller – resource coordination between AMDR-S, AMDR-X, and combat system

PB-12 Balanced Capability & Capacity Option (BCCO)

	By 2011	FY11	FY12	FY13	FY14	FY15	FY16
CG							
DDG							
Funded Ships		24	29	32	36	38	41
Ready for Tasking		23	28	29	30	29	36



Aegis Ashore

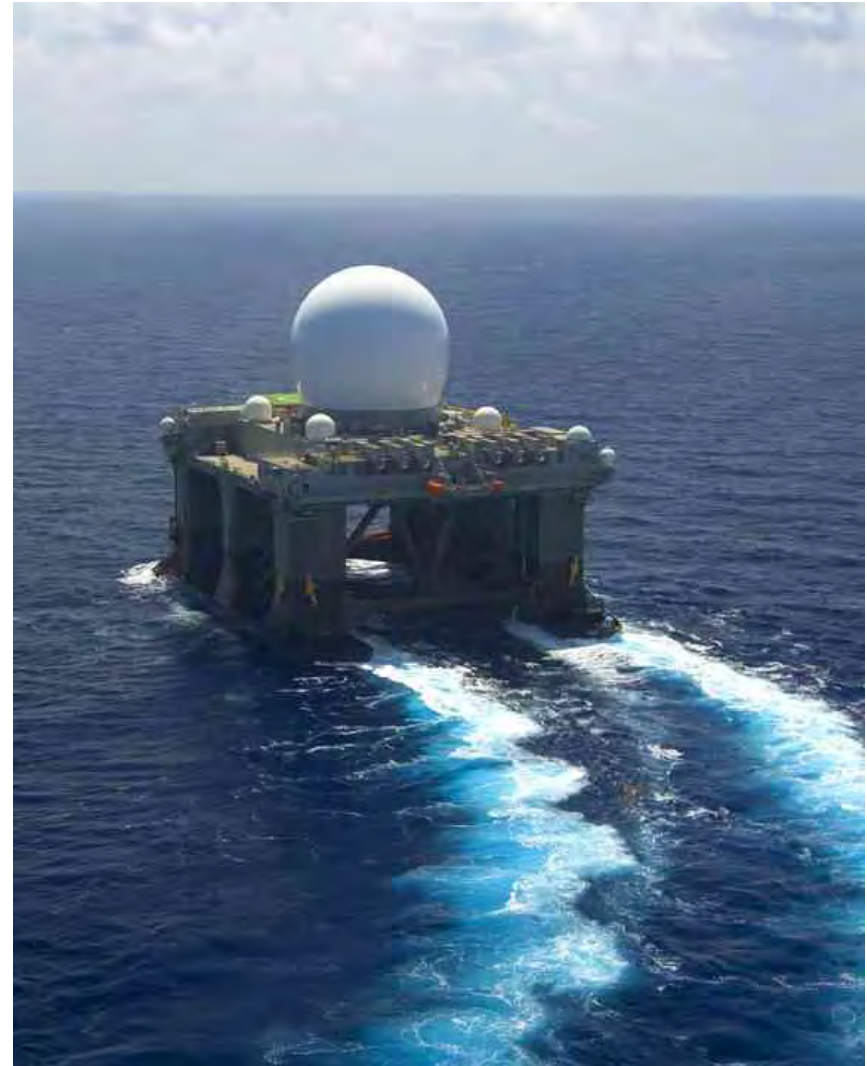
- EPAA Phase 2 BMD mission
- BMD 5.0 functionality for detection, discrimination, SM-3 engagement and control
- Aegis Weapon System (AWS) hardware and SPY-1D(V) array faces
- Vertical Launching System (VLS) with 24 SM-3 Block IB missiles; future upgrades to Block IIA and IIB



UNCLASSIFIED

Sea Based X-Band Radar

- Strategic asset for the homeland missile defense mission
- X-Band Radar with 45,000 transmit/receive modules and 4,800 km range, 8 knot transit speed
- Provides cued track and discrimination for the Ground Based Midcourse Defense (GMD) fire control system
- MDA transitioning responsibilities for vessel operations and sustainment to Navy
- MDA retaining responsibility for O&S of the XBR



BMDS - Ballistic Missile Defense System

Sensors



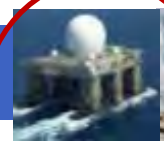
Overhead Persistent Infrared



UAV Based Sensor



Precision Tracking Space System



Sea-Based Radars



Early Warning Radar



Midcourse X-Band Radar



AN/TPY-2



SPY-1

Boost

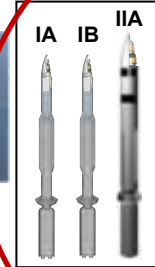
Ascent

Midcourse

Terminal



Airborne Laser (Testbed)



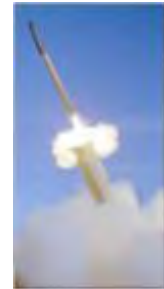
SM-3



Aegis BMD



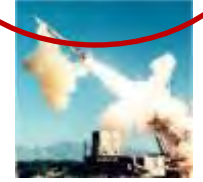
Ground-Based Midcourse Defense



Terminal High Altitude Area Defense



Sea-Based Terminal



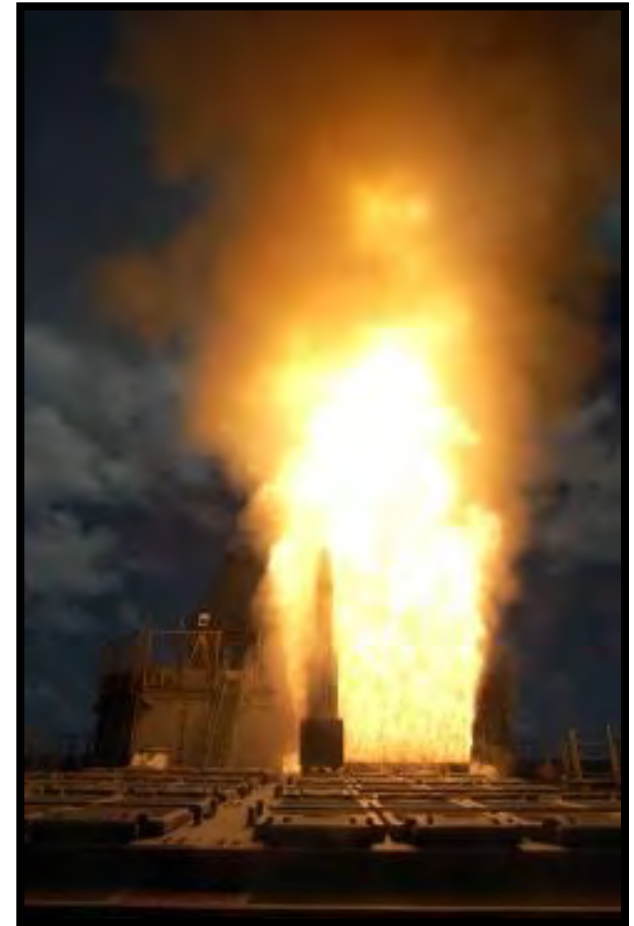
Patriot Advanced Capability-3

Command and Control, Battle Management & Communications



NMCC STRATCOM NORTHCOM PACOM EUCOM CENTCOM

- Evolving AAW weapons and combat systems pace littoral threat
- Fielding BMD systems to counter proliferating ballistic missiles
- Growing capability and capacity to answer COCOM demands for Navy IAMD



IAMD... Key to Assuring Access



Integrated Air and Missile Defense Symposium



Promoting National Security Since 1919



*Rear Admiral Ned Deets
Commander
Naval Network Warfare Command
14 July 2011*



What You Can Do

- Situational Awareness
- Common Operational Picture
- Automation
- Defense Beyond the Firewall
- Baselining
- Anomaly Detection
- Integration of Enterprise Network Enclaves
- Bake IA into all new PORs/Systems





Information as a Weapon

“We must maintain our preeminence in networks, intelligence, and information. There is no other Service or nation that is as good as we are.”



***Admiral Gary Roughead
Chief of Naval Operations
17 July and 23 October 2009***

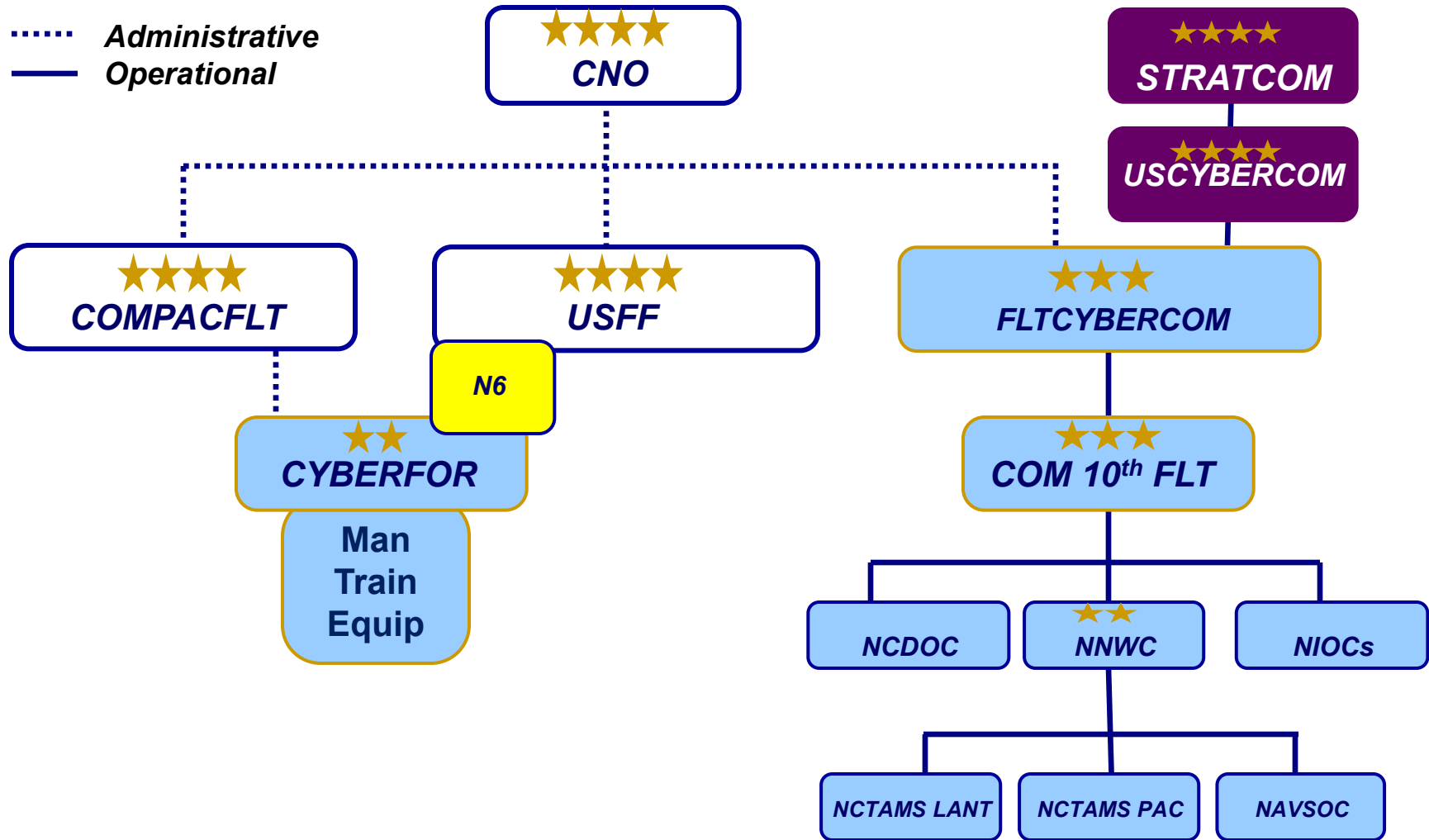
***“Aligning intelligence and operations and optimizing the network in many ways takes priority over the platform.
If we don’t get the intelligence and information right, then the platform is sub-optimized.
Therefore we need to elevate the priority of information. Since we already think and operate this way, it’s time aligned organizationally to sustain it ... to achieve prominence and dominance....”***

Information becomes a main battery of the U.S. Navy; this transition to an information-centric force represents a new vision of who we are as a seapower, as a Navy, and as warfare professionals



Common Model

..... Administrative
— Operational





10th Fleet Missions and LOOs

Missions

Central operational authority for networks, cryptology/SIGINT, IO, cyber, EW and space in support of forces afloat and ashore

Navy Component Commander to USCYBERCOM
Service Cryptologic Component Commander



Lines of Operation

- Assuring Navy's ability to Command and Control its operational forces in any environment
- Achieve and sustain the ability to navigate and maneuver freely in cyberspace and the RF spectrum
- On command, and in coordination with Joint and Navy commanders, conduct operations to achieve effects in and through cyberspace



It is what it is....

- ...and it is a weapon system & all weapon systems are connected
- Non-kinetics may beat kinetics in the 21st century
- Business and admin systems have evolved into warfighting systems
- We can't function today without the Internet
 - *Our Millennials expect it*
 - *Our Millennials will use it to innovate and evolve cyber warfare*
 - *DoD users make 1 billion+ Internet connections every day*
- Convenience and security must be in balance





The Challenging Battlespace

- **Most rapidly changing battlespace**
- **More than Moore's Law**
- **The Information Battlespace is more than the networks**



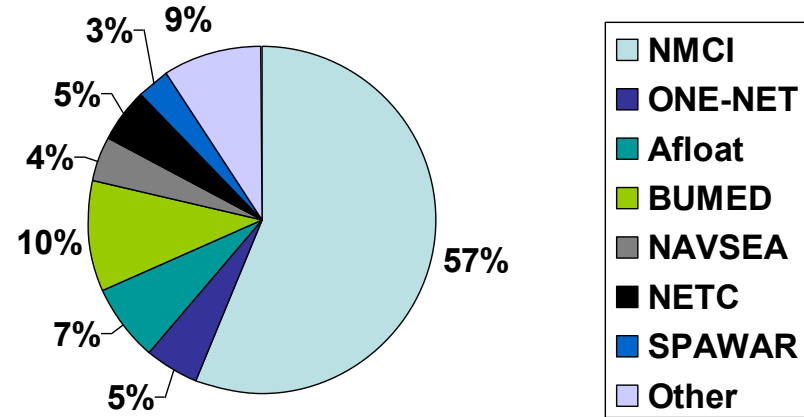


Challenge: Complex Networking Environment

- **Size --- 750,000 Users**
- **POR Vulnerabilities**
- **Reporting Processes**
- **Data Capture**
- **Data Visibility**
- **System Diversity**
- **Security**
- *Compatibility*
- *Platform centric acquisition*
- *Program alignment*
- *Install timelines*
- *Environment*
- *Training*
- *Finite manpower/Infinite demands*
- *Bandwidth-data choke point*
- *Life cycle costs*

Enterprise 62%

NIPR*

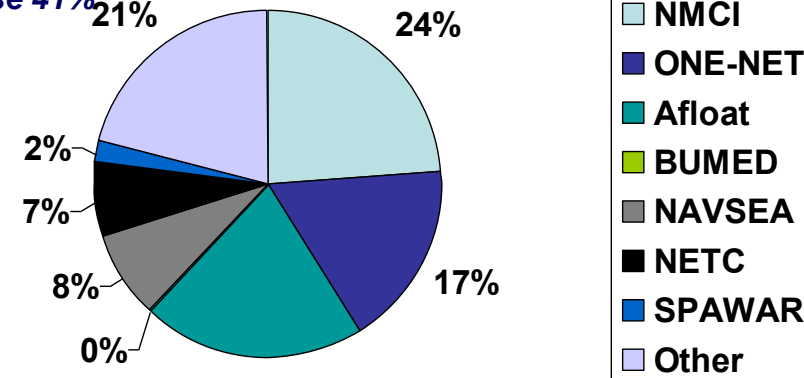


Non-Enterprise 38%

Total Assets ~ 448K

SIPR*

Enterprise 41%



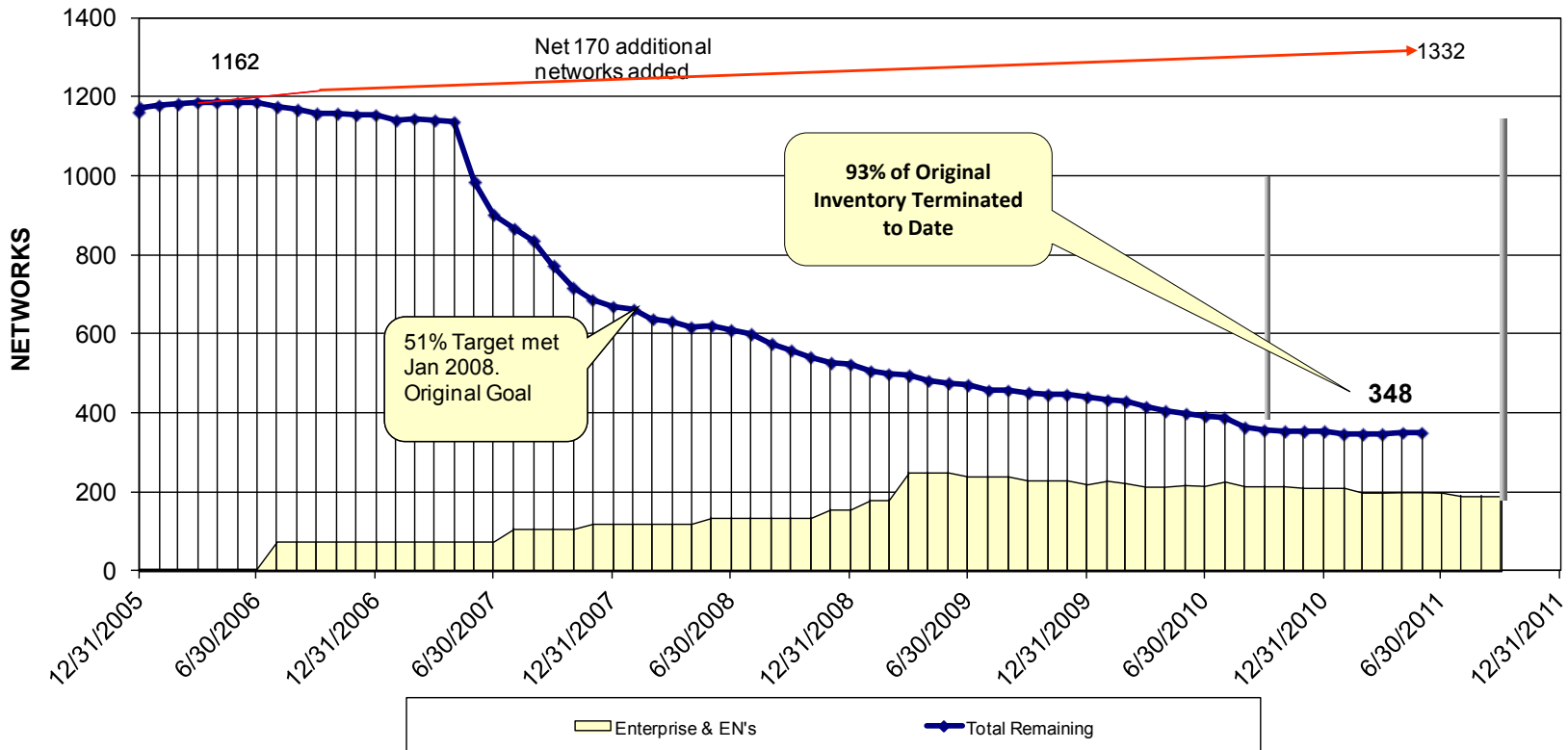
Non-Enterprise 59%

Total Assets ~ 57K

* As of 1 Mar 11



Cyber Asset Reduction and Security (CARS) Achievements



Initial Goal: Reduce Network Portfolio by 51%

Network Reductions: 984

Server Reductions: 19,477

Device Reductions: 32,208



Challenge: The Threat

CNN.com/technology

Chinese hackers: No site is safe

- Chinese hackers claim to have broken into Pentagon's system
- The hackers met with CNN on an island near a Chinese naval hub
- Hackers say Beijing secretly pays them at times, something the government denies
- Official: "The Chinese government does not do such a thing"



- Hackers
- Disgruntled Insiders
- Industrial Espionage
- Foreign Espionage
- Terrorists
- State Sponsored Attacks

Guardian Unlimited

Russia accused of unleashing cyberwar to disable Estonia

- Parliament, ministries, banks, media targeted
- NATO experts sent in to strengthen defenses



Verizon Data Breach Study

How do breaches occur?

“Due to the lower proportion of internal threat agents, “Misuse” lost its pole position among the list of threat action categories. Hacking and Malware have retaken the lead and are playing dirtier than ever. Absent, weak, and stolen credentials are careening out of control. Gaining quickly... .. - Physical.”

- 50%** - Utilized some form of hacking (+10%)
- 49%** - Incorporated malware (+11%)
- 29%** - Involved physical attacks (+14%)
- 17%** - Resulted from privilege misuse (-31%)
- 11%** - Employed social tactics (-17%)

Source

2011 Data Breach Investigations Report



What commonalities exist?

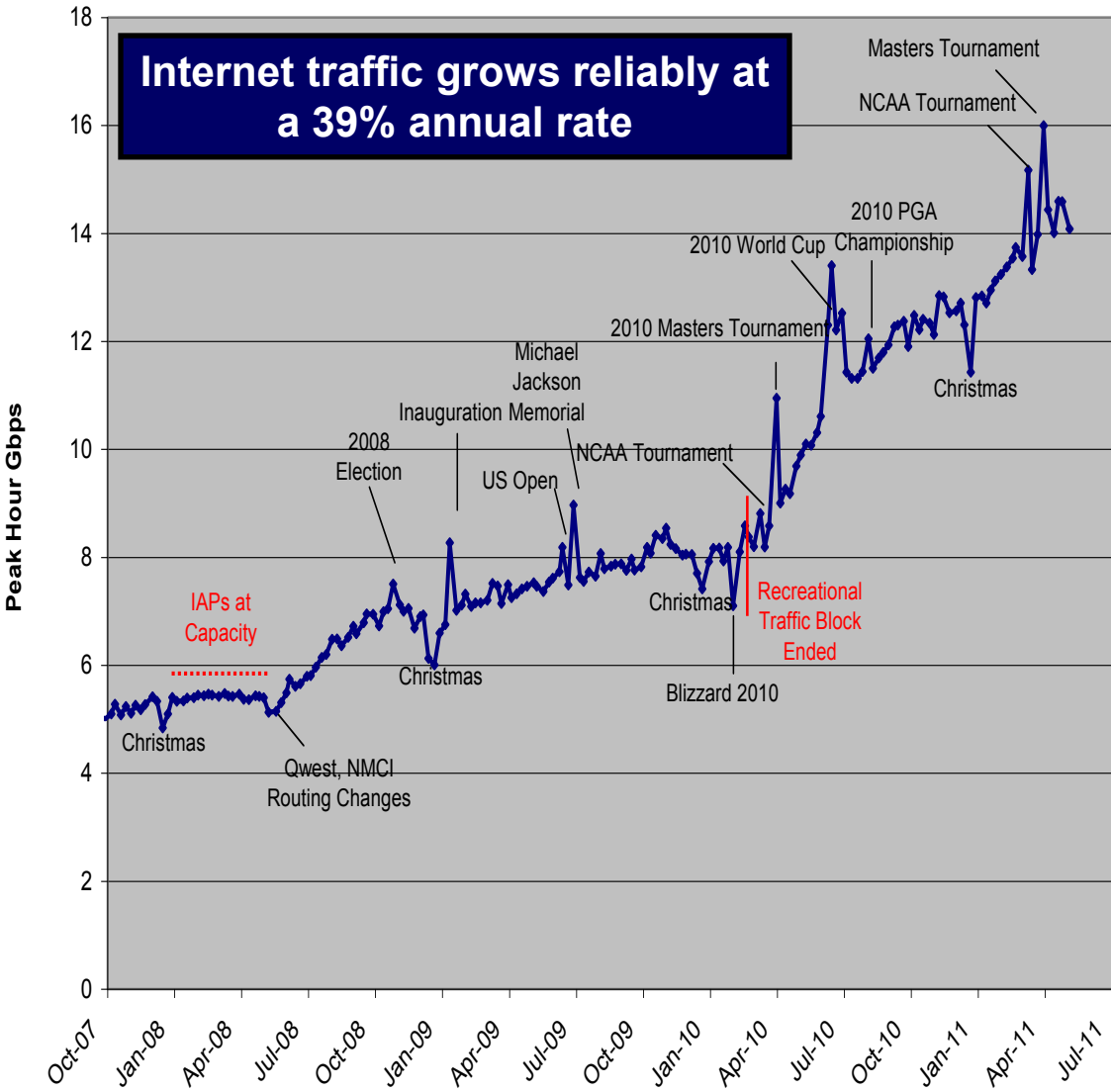
“Breaching organizations still doesn't typically require highly sophisticated attacks, most victims are a target of opportunity rather than choice, the majority of data is stolen from servers, victims usually don't know about their breach until a third party notifies them, and almost all breaches are avoidable (at least in hindsight) without difficult or expensive corrective action. “

- 83%** of victims were targets of opportunity (+-0)
- 92%** of attacks were not highly difficult (+7%)
- 76%** of all data was compromised from servers (-22%)
- 86%** were discovered by a third party (+25%)
- 96%** of breaches were avoidable (+-0)

A study conducted by the Verizon RISK Team with cooperation from the U.S. Secret Service and the Dutch High Tech Crime Unit



Challenge: Exposure

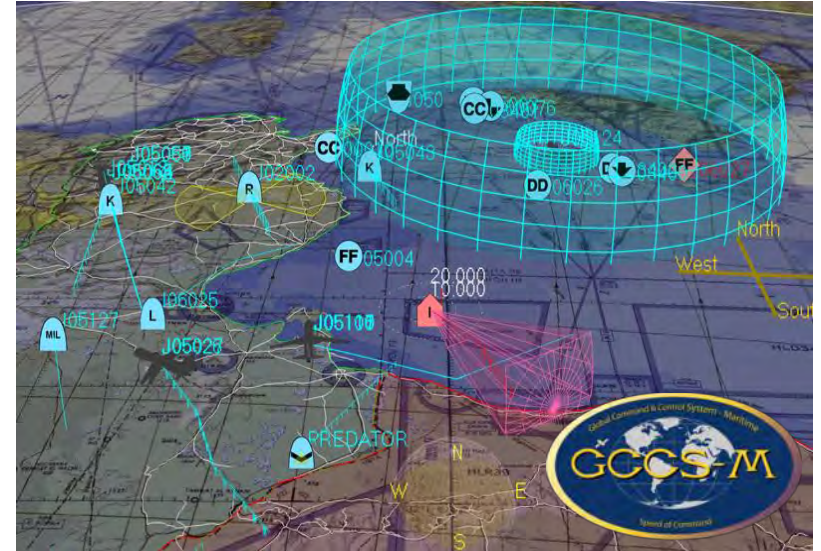


Top 20 Sites Visited by Navy Users (May 2011)

Domain	Description
1 google.com (High BW)	YouTube and Google Video
2 google.com (Low BW)	Search, Email and Maps
3 pandora.com	Internet Radio
4 streamtheworld.com	Streaming Radio (Including CBS Radio)
5 facebook.com	Social Networking
6 yahoo.com	Search Engine, Portal, News, Personal E-
7 amazon.com	Shopping
8 wordpress.com	Blog Hosting
9 microsoft.com	Software and Software Updates
10 CNN	News
11 verisign.com	PKI and Encryption
12 msn.com	News, Portal
13 live365.com	Internet Radio
14 craigslist.org	Shopping
15 ebay.com	Online Auctions, Shopping
16 windowsupdate.com	Software Updates
17 blackboard.com	Educational Software
18 usmc-mccs.org	Marine Corps Community Services
19 wikipedia.org	Reference
20 navyfcu.org	Banking/Financial



Challenge: Risk Assessment





Social Networking -What's the Risk?



Risk is acknowledged

“So we’ve joined that conversation.....”

We’re burning the boats. There’s no going back. We’re committed irreversibly (to Social Networking).”

CNO Roughead (May 2011)





Accountability for Network Security



COMUSFLTFORCOM 261555Z May 09

(U) LET ME BE CLEAR. IT IS YOUR RESPONSIBILITY TO PROTECT YOUR NETWORK AND PRECLUDE THIS SORT OF ACTIVITY. DOD AND NAVY POLICY EXPRESSLY PROHIBIT THE USE OF THUMB DRIVES ON DOD COMPUTERS. IPODS, PERSONAL BLACKBERRIES, AND CELL PHONES ARE STORAGE DEVICES AND MAY NOT BE PLUGGED INTO A NAVY COMPUTER, EVEN FOR CHARGING. THESE STORAGE DEVICES CAN CARRY MALWARE AND SPREAD INFECTIONS.



**Admiral Jonathon W. Greenert
Commander
U.S. Fleet Forces
Sep 07 – Jul 09**



The Three C's

- **Culture**

- Accountability
- Commander's "Daily View"
- Damage Control, Force Protection
- Warfare Area

- **Conduct**

- C2
- Inspection Mentality
- Operational Reporting
- Physical Security
- Warfighting, Not Support

- **Capability**

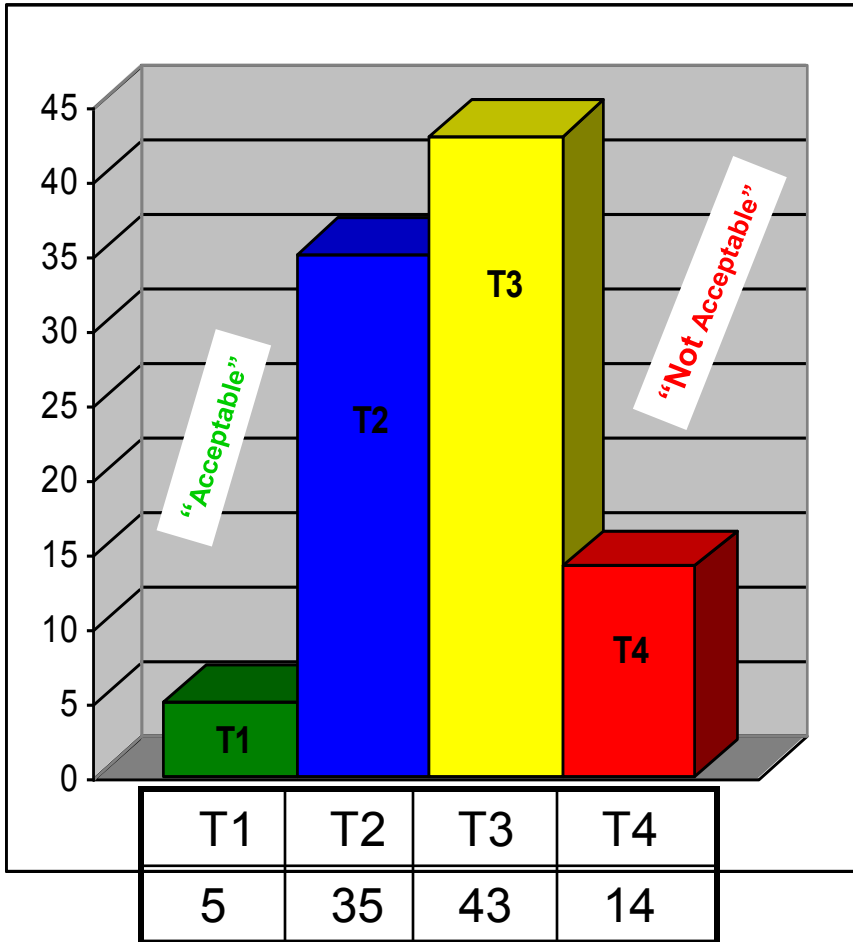
- Automation
- Situational Awareness
- Proactive Defense
- Training from SN to ADM





Afloat Assessment Breakdown

Culture Conduct Capability

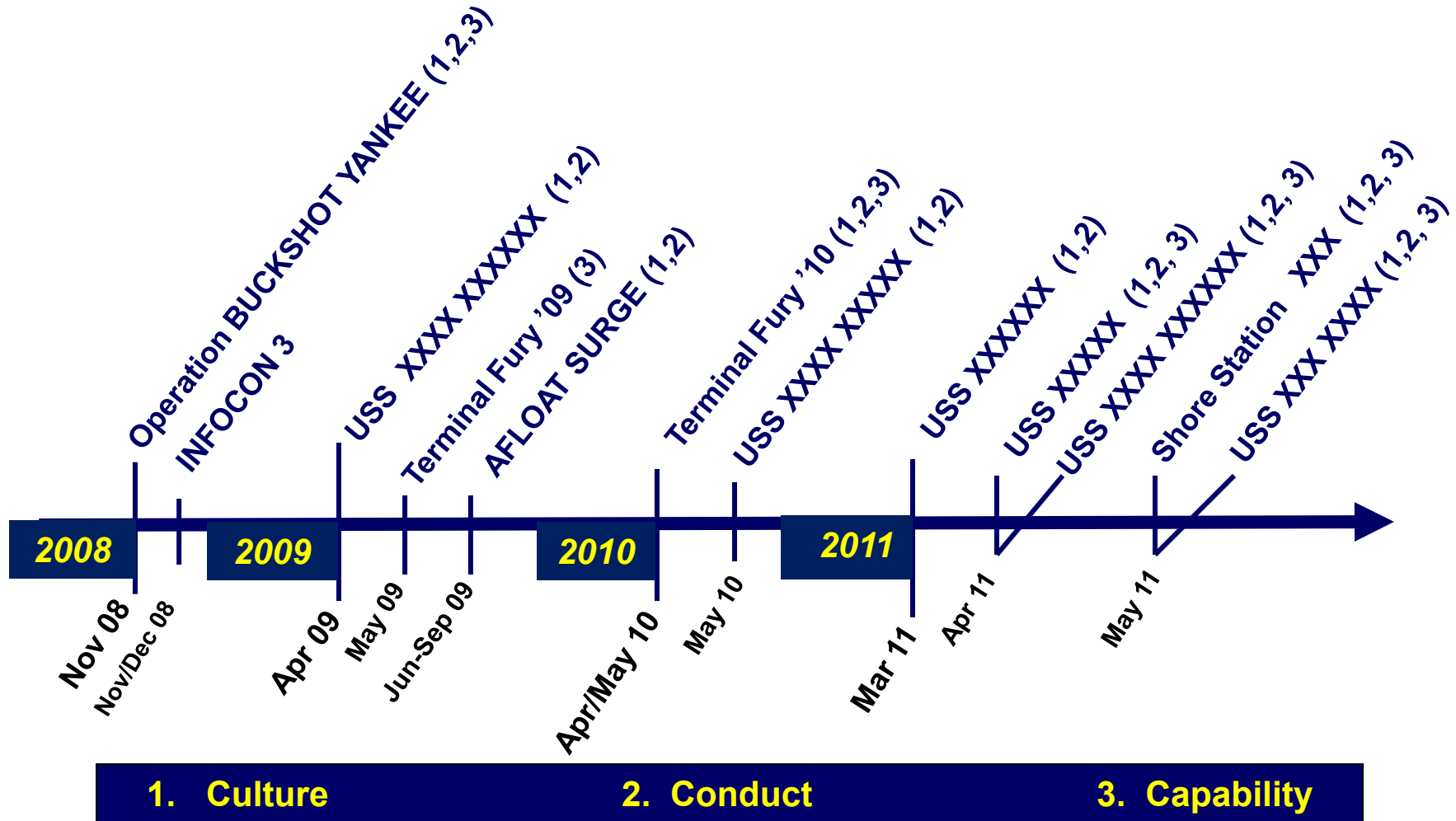


Findings

- USB Devices (Conduct)
- Patches (Conduct, Capability)
- Malware (Conduct, Capability)
- Unauthorized Software (Culture, Conduct)
- Root Level Access (Culture, Conduct)
- Weak / No Access Control Lists (Culture, Conduct)
- Unnecessary Open Ports (Conduct, Capability)
- Weak / Default Passwords (Culture, Conduct)



Challenge Continuum





The Cyber COP





Inspections

Situational Awareness

**COMFLT CYBERCOM
FT GEORGE G MEADE MD
282138Z JAN 11**



**“A COORDINATED COMPACTFLT, USFF,
AND COMFLT CYBERCOM MESSAGE.**

**IMPLEMENT CNO DIRECTED CYBER
SECURITY INSPECTION AND
CERTIFICATION PROGRAM (CSICP).”**

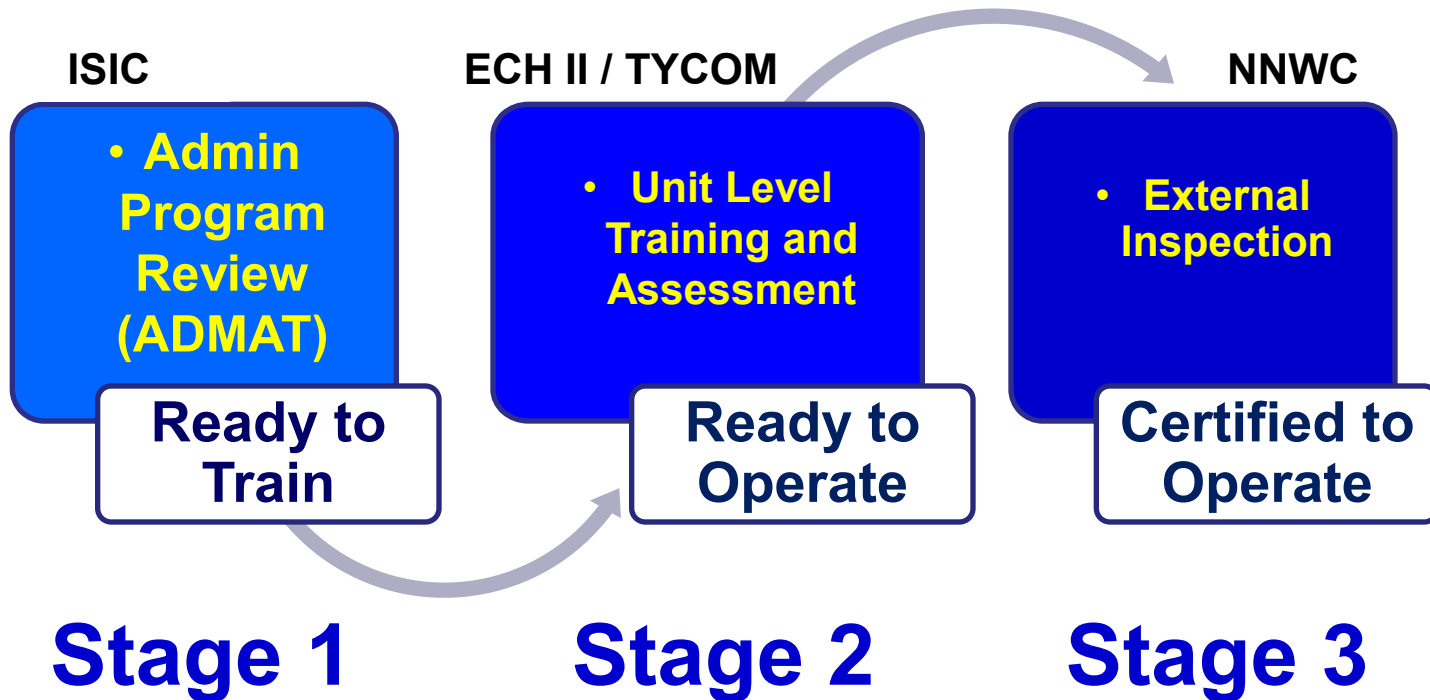
**“THE PROGRAM WILL ENSURE HEALTH
AND SECURITY OF NAVY NETWORKS
AND CONNECTED COMBAT SYSTEMS.”**

**“NAVY NETWORKS ARE A COMBAT
SYSTEM AND WILL ADHERE TO THE
SAME INSPECTION AND CERTIFICATION
RIGOR AS ALL OTHER COMBAT
SYSTEMS.”**



CSICP Cycle

The Vision : Three year cycle tied to Network Authority to Operate (ATO) process with an annual drumbeat...





Achieving C2

Network Command & Control (C2) is the exercise of authority and direction by a properly designated commander over assigned and attached forces in the accomplishment of the mission. Network C2 functions are executed through an arrangement of personnel, equipment, communications, facilities, and procedures employed by a commander in planning, directing, coordinating, and controlling forces and operations in the accomplishment of the mission. Situational awareness is implicit within C2 since it is not possible to appropriately exercise C2 without an understanding of the status of assigned forces.

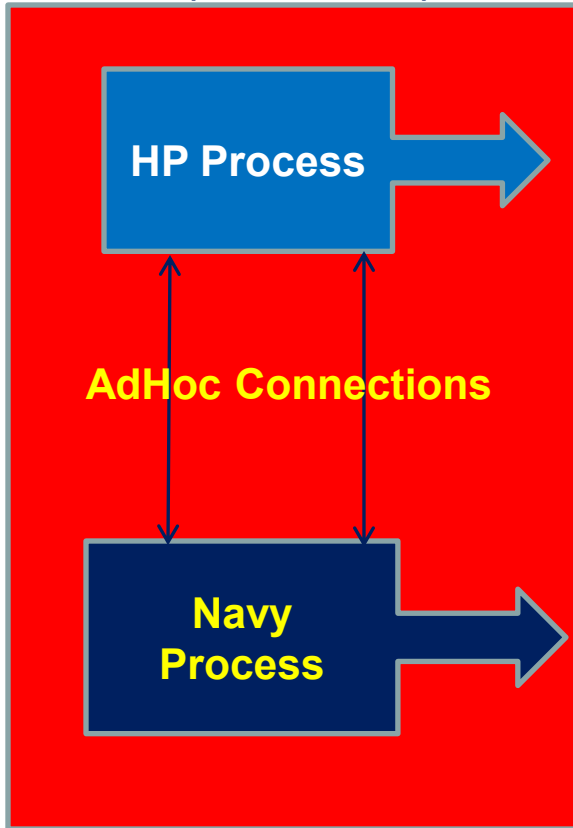


Largest, Most Mature Network Forcing Function for Achieving C2 of all Navy Networks

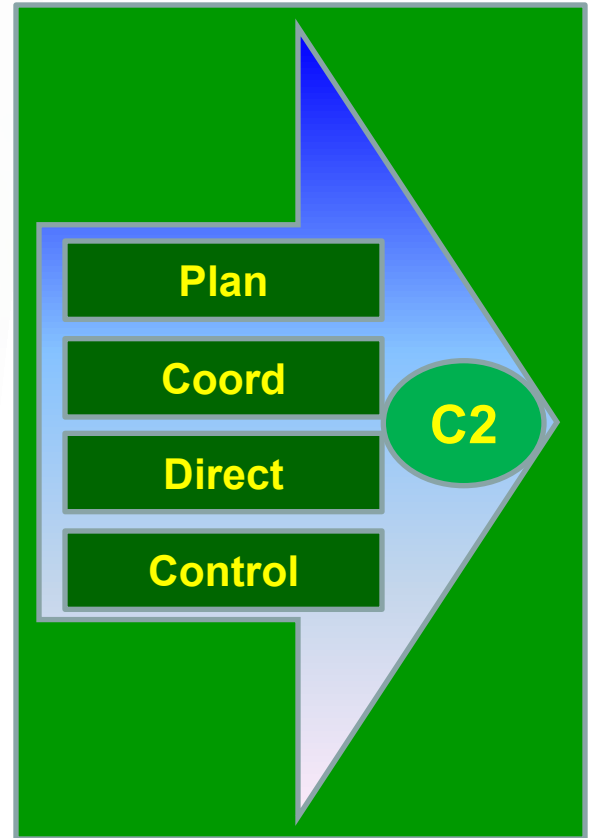


Command and Control (C2)

Adhoc Processes (Prior to 2011)



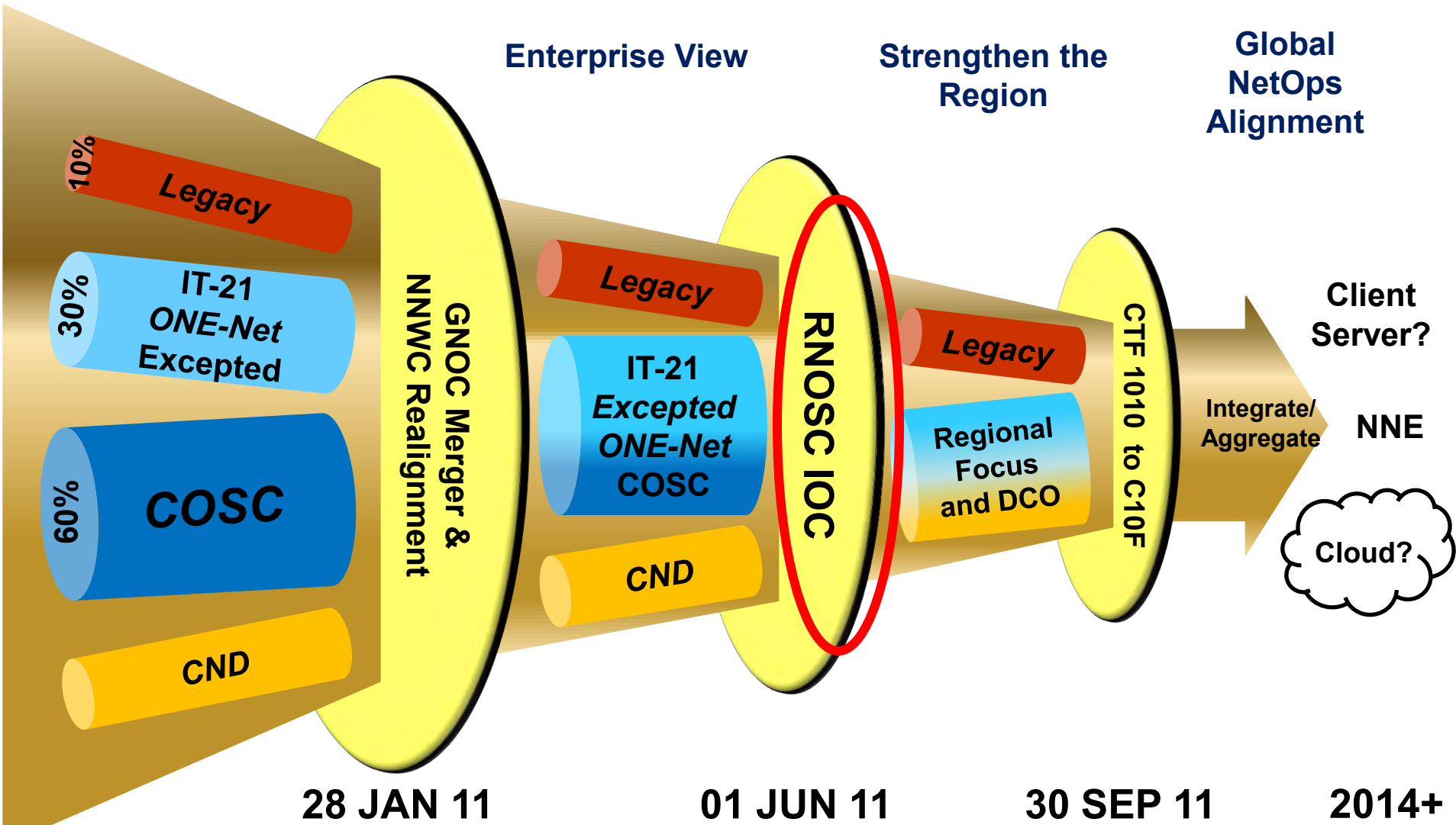
Merged Processes For C2 of all Navy Networks



Network Command and Control = Shared Situational Awareness and Unified C2



Operational Alignment For C2





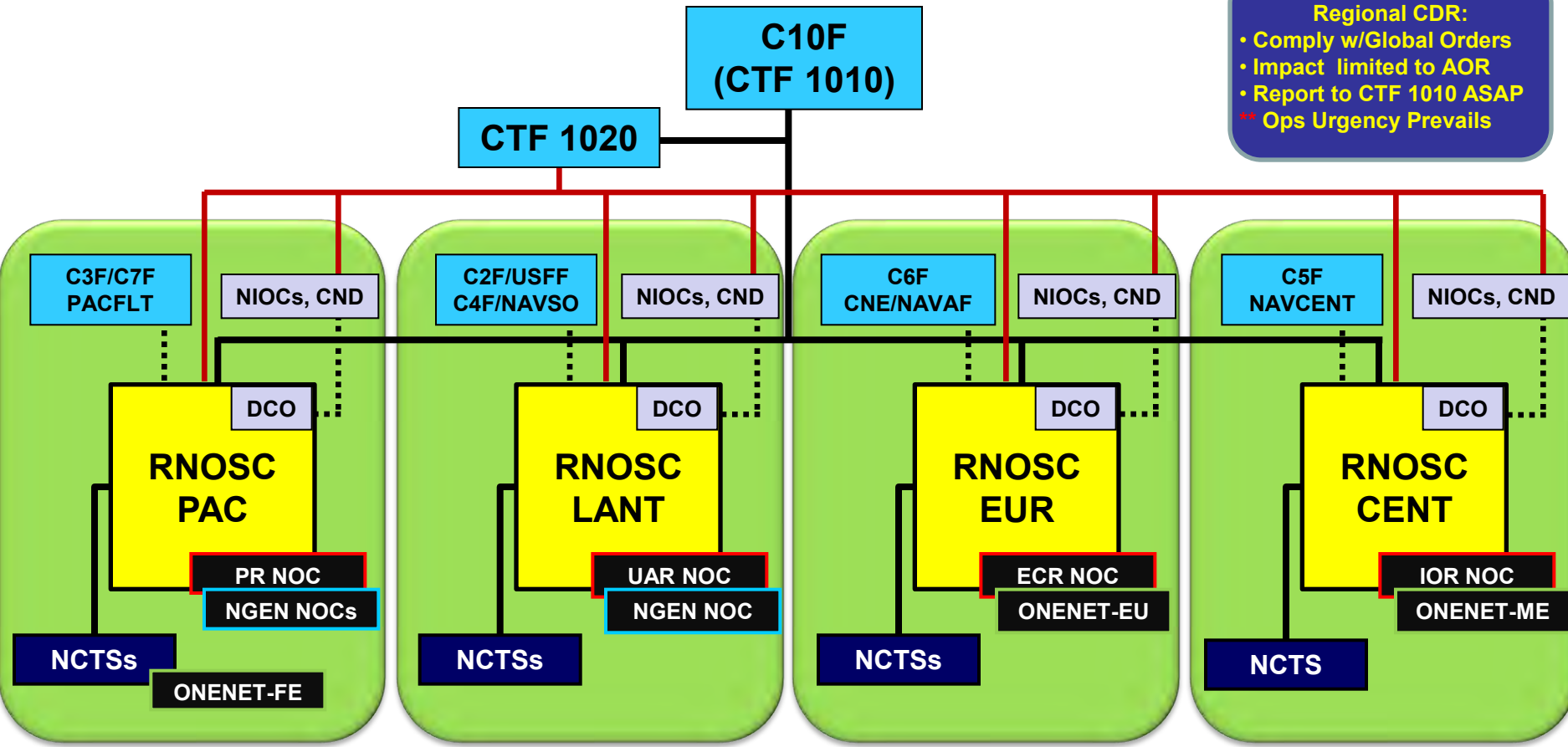
Regional Network Operations and Security Command (RNOSC) C2

UNCLASSIFIED



Regional CDR:

- Comply w/Global Orders
- Impact limited to AOR
- Report to CTF 1010 ASAP
- ** Ops Urgency Prevails



— Command – lawful command authority over subordinates by assignment or rank
 — Control – non-command authority exercised over activities of organizations
 Coordinate – delegated authority for coordinating specific functions or activities

UNCLASSIFIED

What You Can Do

- Situational Awareness
- Common Operational Picture
- Automation
- Defense Beyond the Firewall
- Baselining
- Anomaly Detection
- Integration of Enterprise Network Enclaves
- Bake IA into all new PORs/Systems



Questions?

RADM Ned Deets

Edward.Deets@navy.mil

(757) 417-6700

**AEGIS
BALLISTIC
MISSILE
DEFENSE**



*Aegis BMD Update to the
National Defense Industrial Association &
Strike, Land Attack, and Air Defense Division
14 July 2011*



Purpose

Aegis BMD

Aegis Ballistic Missile Defense Update with Insight into the State of the European Phased Adaptive Approach and Aegis Ashore



U.S. Phased Adaptive Approach Contributes To NATO Missile Defense

Aegis BMD

Phase 1 (By 2011)

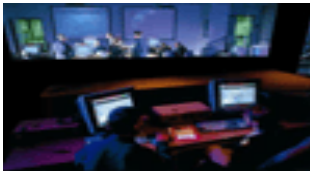
Initial capability against SRBMs, MRBMs, and IRBMs, enhanced homeland defense



Aegis BMD 3.6.1 with SM-3 IA



AN/TPY-2 (FBM)

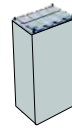


C2BMC AOC Ramstein

ALTBMD Interim Capability

Phase 2 (By 2015)

Robust capability against SRBMs and MRBMs



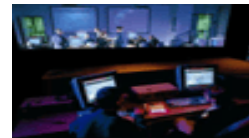
Aegis Ashore 5.0 with SM-3 IB (one site)



Aegis BMD 4.0.1/5.0 with SM-3 IB



AN/TPY-2 (FBM)



C2BMC Updates

ALTBMD Lower Tier

Potential EPAA Enhancements



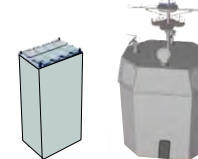
THAAD

Phase 3 (By 2018)

Robust capability against IRBMs



Aegis BMD 5.1 with SM-3 IIA



Aegis Ashore 5.1 with SM-3 IB/IIA (two sites)



AN/TPY-2 (FBM)



C2BMC Updates

ALTBMD Upper Tier

Potential EPAA Enhancements



THAAD



PTSS



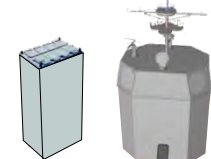
ABIR

Phase 4 (By 2020)

Early intercept capability against MRBMs and IRBMs; and ICBMs from today's regional threats



Aegis BMD 5.1 with SM-3 IIA



Aegis Ashore 5.1 with SM-3 IIB (two sites)



AN/TPY-2 (FBM)



Enhanced C2BMC

Potential EPAA Enhancements



THAAD



PTSS



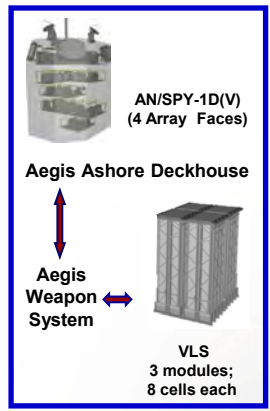
ABIR



Aegis BMD Program

Aegis BMD

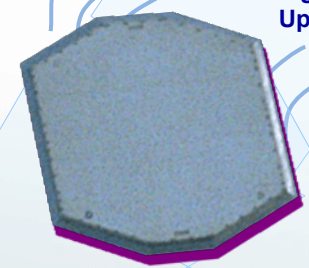
- Autonomous (2004)
- Launch on Remote (Ship to Ship) 2006
- Launch on Remote (BMD Sensors) 2008
- Engage on Remote



Aegis Ashore 2015
Hawaii Test Site 2013



Aegis Ballistic Missile Defense Signal Processor (BSP) Upgrade 2010 (Testing)



Radar System AN/SPY-1



SM-3
Bik I / IA / IB
2004/2006/2013
✓ ✓

SM-3

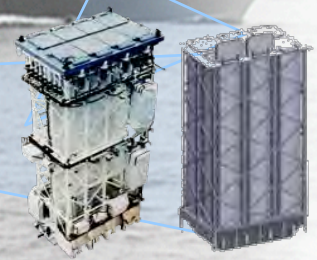


Bik IIA 2018
Bik IIB 2020

Sea-Based Terminal



SM-2 Bik IV 2008 Near Term ✓
SM-6 Incremental 1 2015
SM-6 Incremental 2 2018



Vertical Launching System Mark 41
SM-3 BIK IIB VLS Concept



Aegis BMD's Role In The BMDS



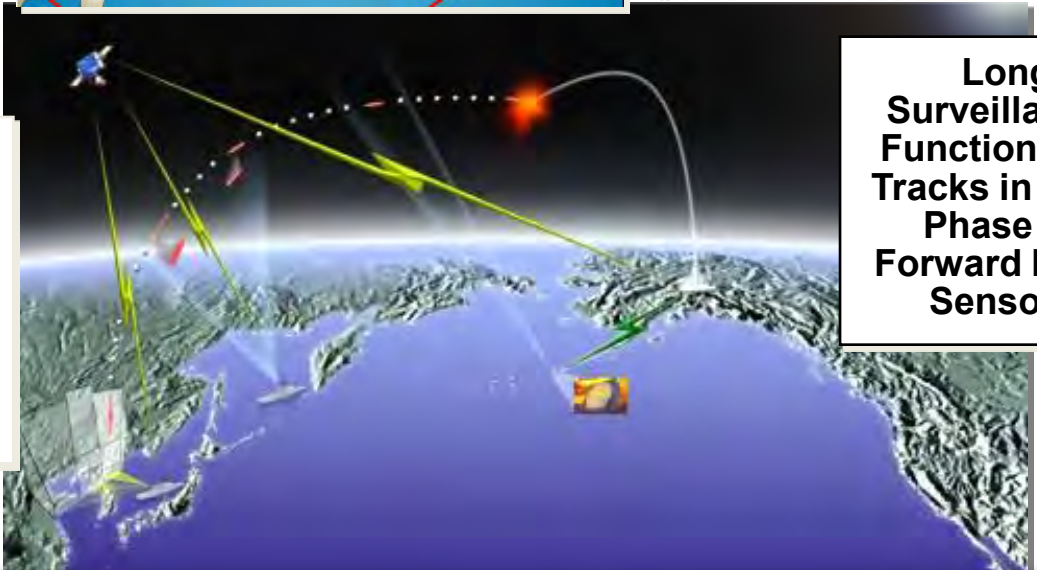
Aegis BMD

Ascent/Midcourse Engagement Capability Defeats Short, Medium & Intermediate Range Ballistic Missiles



Terminal Defense Capability Defeats Shorter Range Ballistic Missiles

Future Adding Early Intercept Capability
Anti-ICBM w/SM-3 Blk IIB (Aegis Ashore)



Long Range Surveillance & Track Function Detects and Tracks in Early Ascent Phase Providing Forward Based BMDS Sensor Support

Proven Against Single Salvo, Dual Salvo & Separating Targets



Aegis BMD Fleet Today

(July 2011)

Aegis BMD

SM-3 Bk I Deliveries	
CY04 	 FM-7 FM-8 PB 08
CY05 	
SM-3 Bk IA Deliveries	
CY06 	 FTM-10
CY07 	 FTM-11 FTM-11a FTM-12 FTM-13 (2) Burnt Frost
CY08 	
CY09 	 FTM-17
CY10 	
CY11 	 FTM-15 SM-3 Block IA SM-3 Block IB

SM-2 Bk IV Deliveries (75)	
FTM-14 (2) Stellar Daggers	

Norfolk BMD Ships	
VELLA GULF	
MONTEREY	
RAMAGE	
STOUT	
*COLE	
*LABOON	

BARRY (FY11)	
MAHAN (FY12)	
ROSS (FY12)	
ARLEIGH BURKE (FY12)	
DONALD COOK (FY12)	

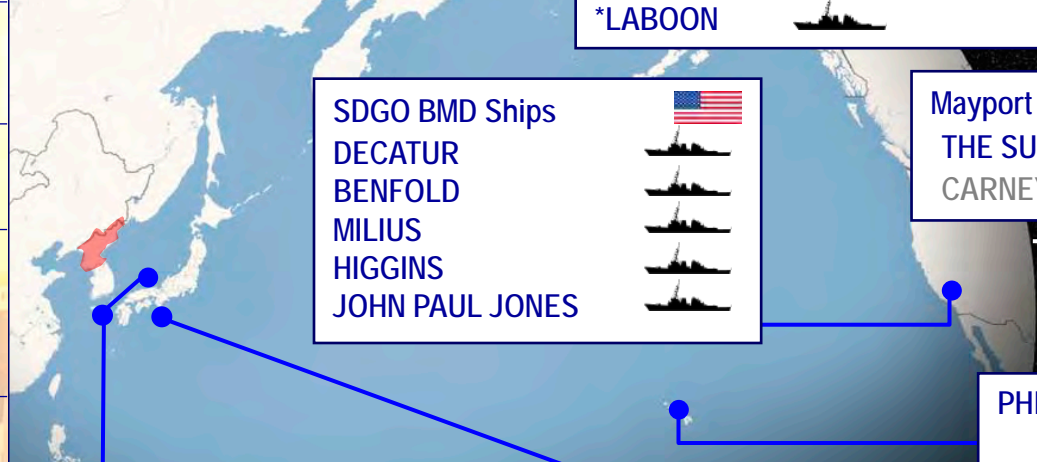
SDGO BMD Ships	
DECATUR	
BENFOLD	
MILIUS	
HIGGINS	
JOHN PAUL JONES	

Mayport Based BMD Ship	
THE SULLIVANS	
CARNEY (FY12)	

Japan Maritime Self Defense Force	
KONGO	
CHOKAI	
MYOKO	
KIRISHIMA	

YOKO BMD Ships	
SHILOH	
STETHEM	
CURTIS WILBUR	
JOHN S. MCCAIN	
FITZGERALD	

PHBR BMD Ships	
LAKE ERIE (4.0.1 EDM)	
PORT ROYAL	
RUSSELL	
O'KANE	
PAUL HAMILTON	
HOPPER	



* Not Yet Certified



EPAA Phase I: USS MONTEREY Deploys to Mediterranean Sea

Aegis BMD



- **First PAA Phase I Deployment**
 - Arrived on station 5 April 2011; assigned Ballistic Missile Defense as Primary Mission
 - Seven Month Deployment
 - Port Visit in Constanta, Romania 06-09 June 2011



- **USS MONTEREY has:**
 - Been on station 101 days as the ATLANTIC Sentry Unit
 - Updated and refined PAA related tactics, techniques and procedures
 - Hosted a Reception and Ship Tours with Teodor Baconschi, Minister of Foreign Affairs; Mircea Geoana, President of the Senate



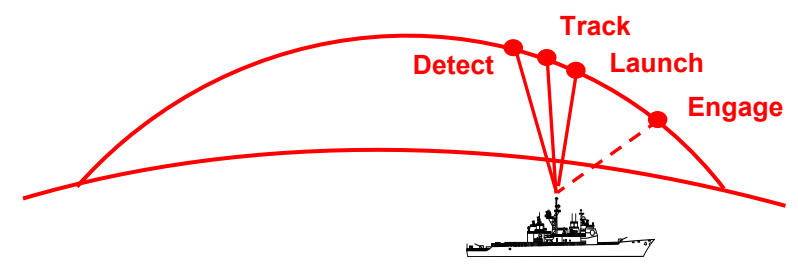
Aegis BMD Concepts of Operation

Exploiting Off Board Sensors

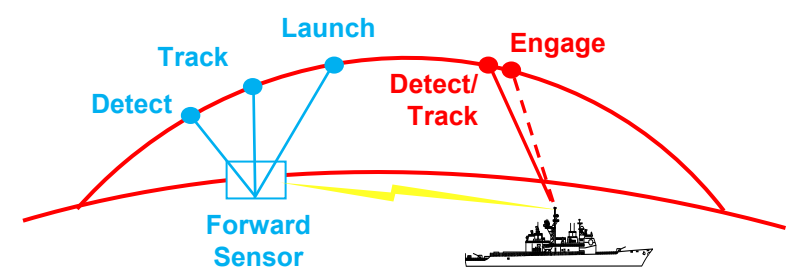


Aegis BMD

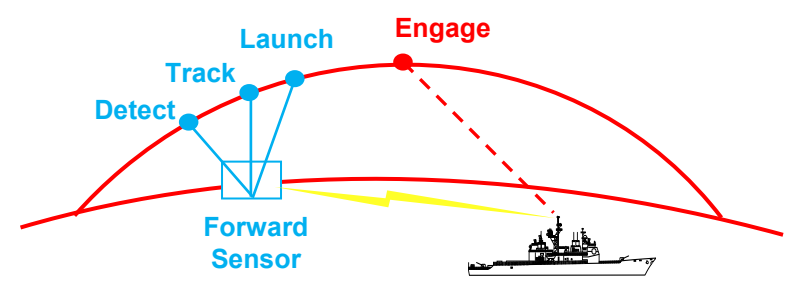
Autonomous Cued



Launch on Remote



Engage on Remote





Aegis BMD Firing Operations

Aegis BMD

Foreign Military Sales

17 Dec 07 JFTM 1	19 Nov 08 JFTM 2	27 Oct 09 JFTM 3	28 Oct 2010 JFTM 4

- First Firing from Japanese Destroyer
- First Japanese No-Notice Launch
- Separating Target
- Engage Separating Warhead with SM-3 Blk IA
- Final JFTM engagement of a separating warhead with SM-3 Blk IA

Terminal Defense

5 June 08 FTM 14	26 Mar 09 Stellar Daggers

- Engage SRBM w/ SM-2 Blk IV
- Simultaneous BMD/ AAW Engagement

Homeland Defense

GT-180 Glory Boost	IFT-9/10	PAC EX I, II, III, & IV

First ICBM Tracking: 19 Sep 02

- First Fleet SM-3 Firing
- First Launch on Remote Operation
- Engage Dual SRBMs
- First IRBM Intercept

Upcoming Events:
FTM-16 **4QFY11**

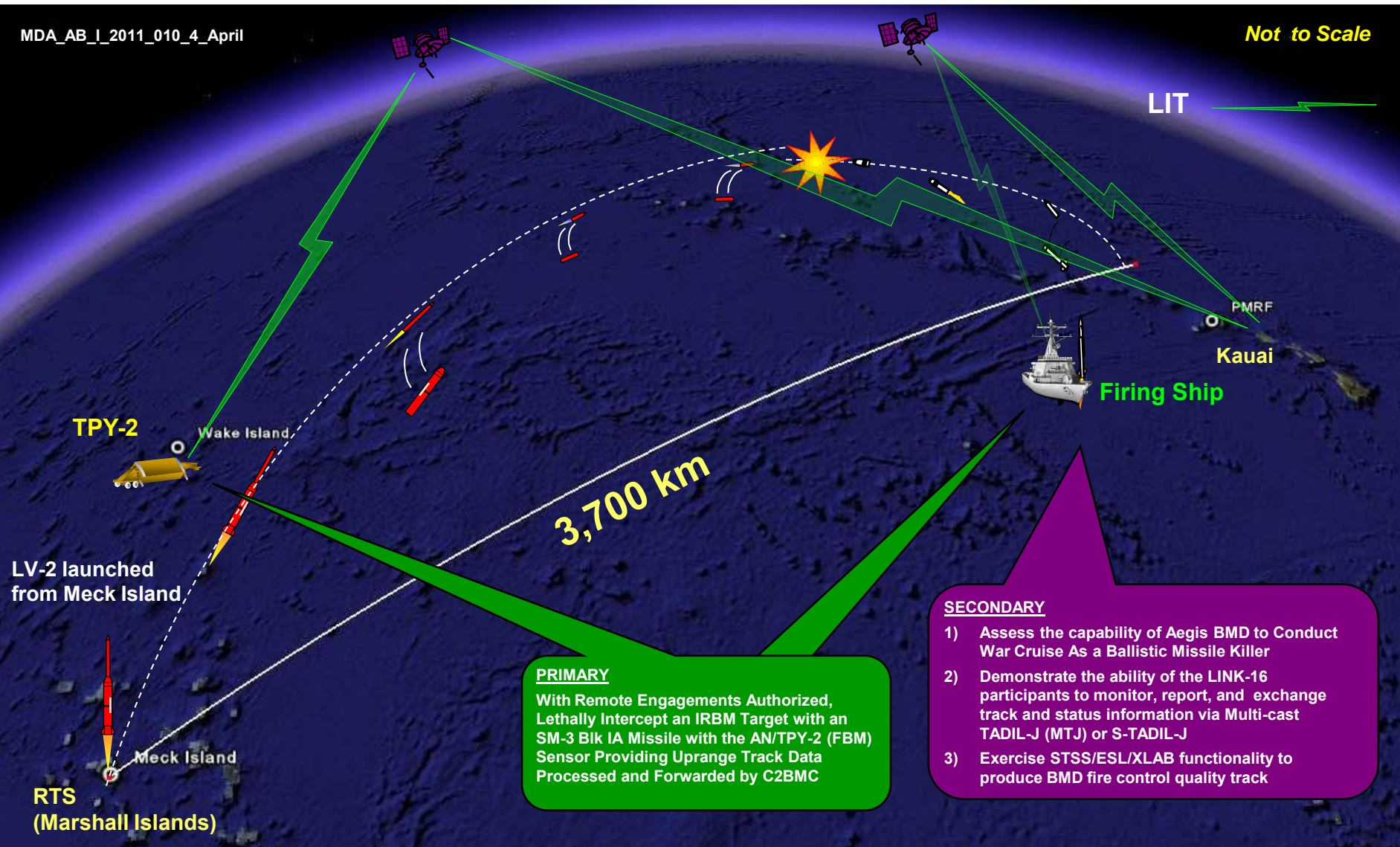
Oct 2008 COMOPTEVFOR Found:
"The Aegis BMD System is Operationally Effective and Operationally Suitable"

Aegis BMD Firings Successes
19 for 22 SM-3 **3 for 3 SM-2**



FTM-15 Mission Scenario and Objectives

Aegis BMD



PRIMARY

With Remote Engagements Authorized, Lethally Intercept an IRBM Target with an SM-3 Blk IA Missile with the AN/TPY-2 (FBM) Sensor Providing Uprange Track Data Processed and Forwarded by C2BMC

SECONDARY

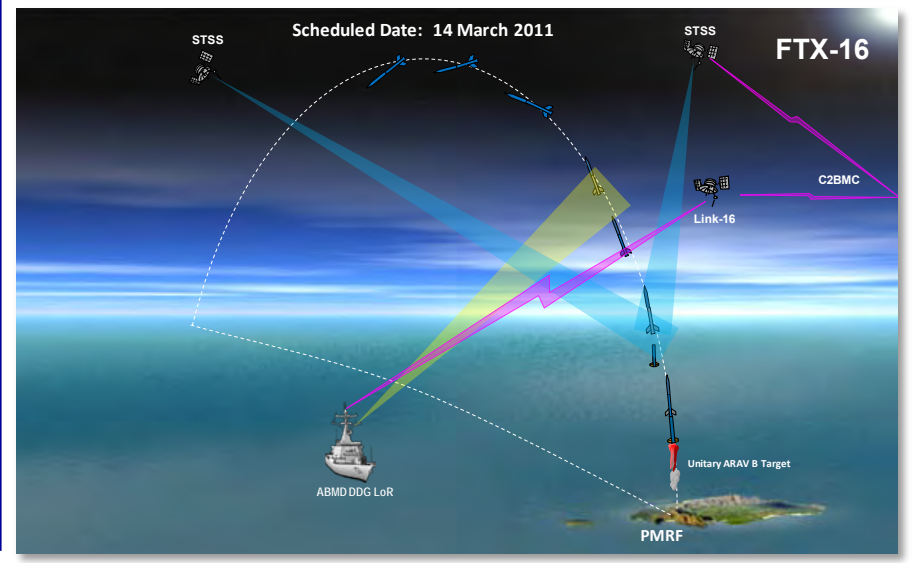
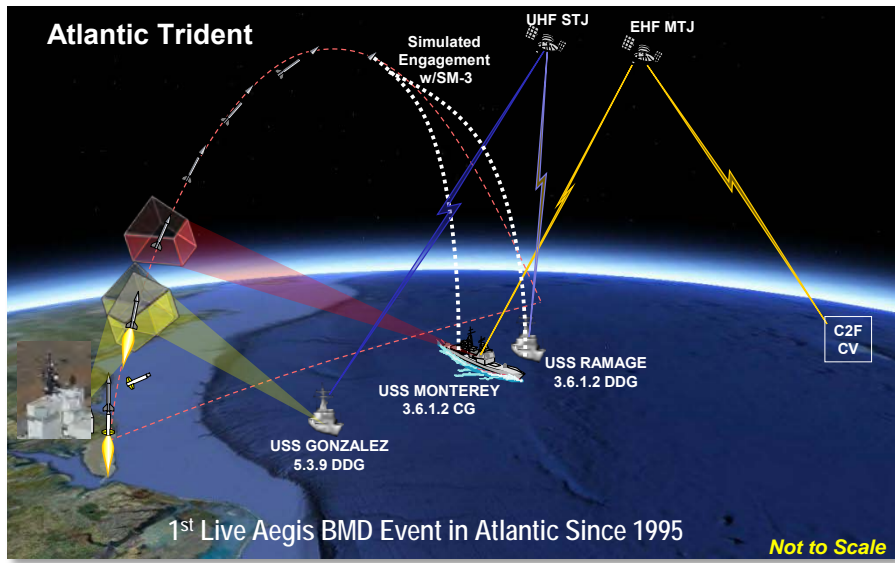
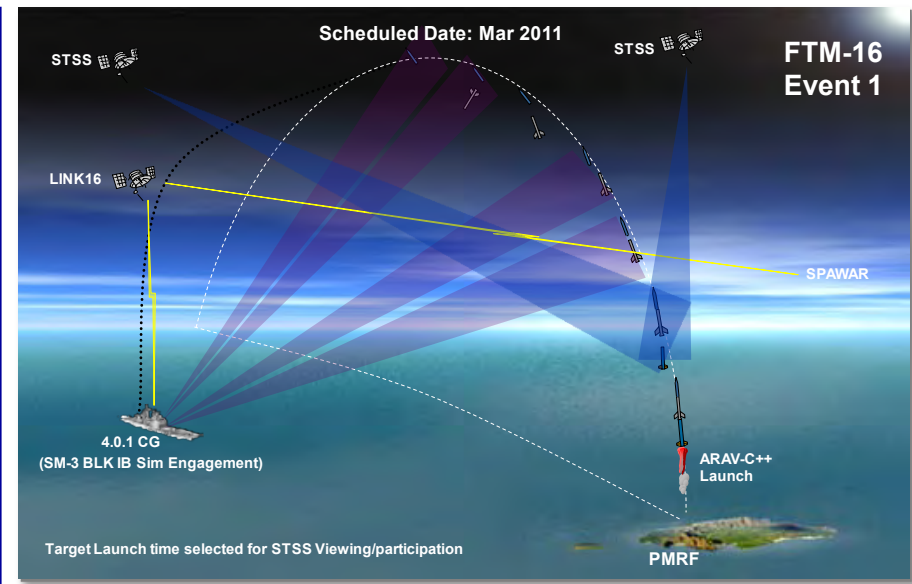
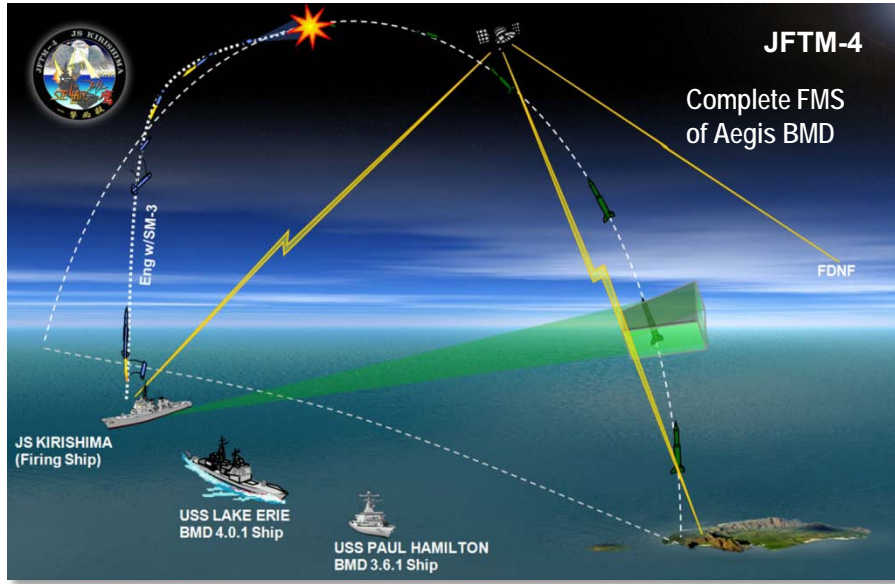
- 1) Assess the capability of Aegis BMD to Conduct War Cruise As a Ballistic Missile Killer
- 2) Demonstrate the ability of the LINK-16 participants to monitor, report, and exchange track and status information via Multi-cast TADIL-J (MTJ) or S-TADIL-J
- 3) Exercise STSS/ESL/XLAB functionality to produce BMD fire control quality track



FY11 Major At-Sea Test Operations

- Complete Through March 2011-

Aegis BMD





Aegis Ashore Missile Defense Site

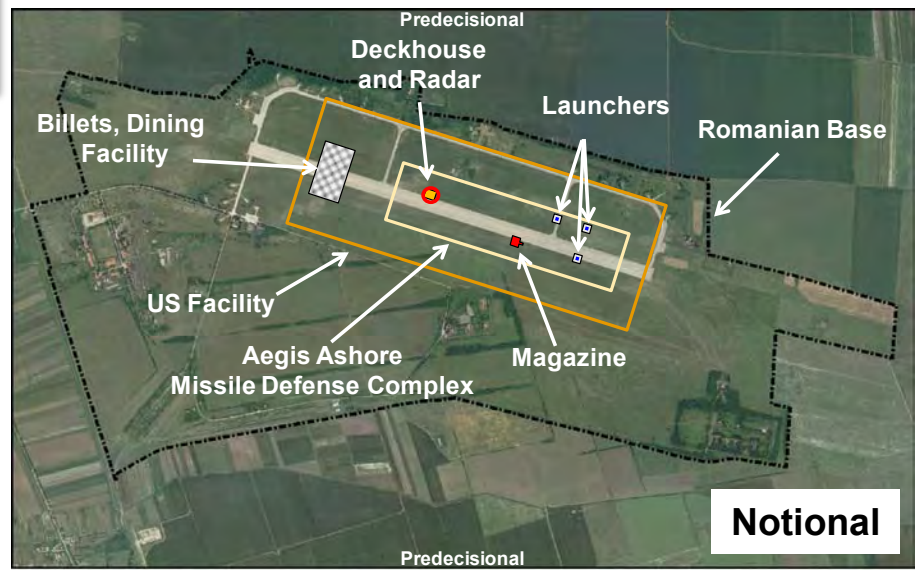


Aegis BMD



Aegis Ashore Conceptual Drawing

Aegis Ashore Proposed Laydown at Romanian Site



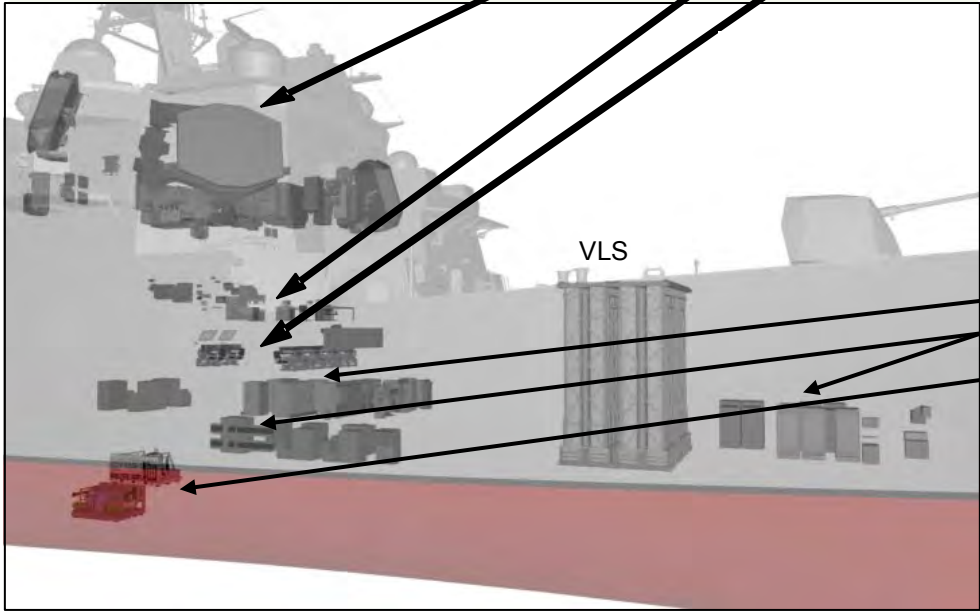
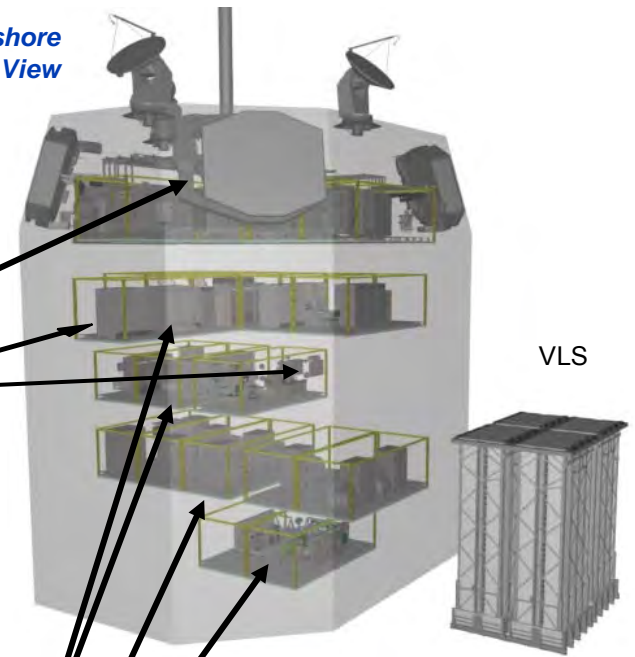


Aegis BMD Transition From Sea To Ashore



U.S. Navy Destroyer (DDG 113)

Aegis Ashore
Conceptual View



SPY Radar and FCS
CSMC
CIC

VLS

Processors
Power Supplies
Water Coolers

Acronyms:	
FCS	Fire Control System
CSMC	Combat System Maintenance Central
CIC	Combat Information Center
VLS	Vertical Launch System

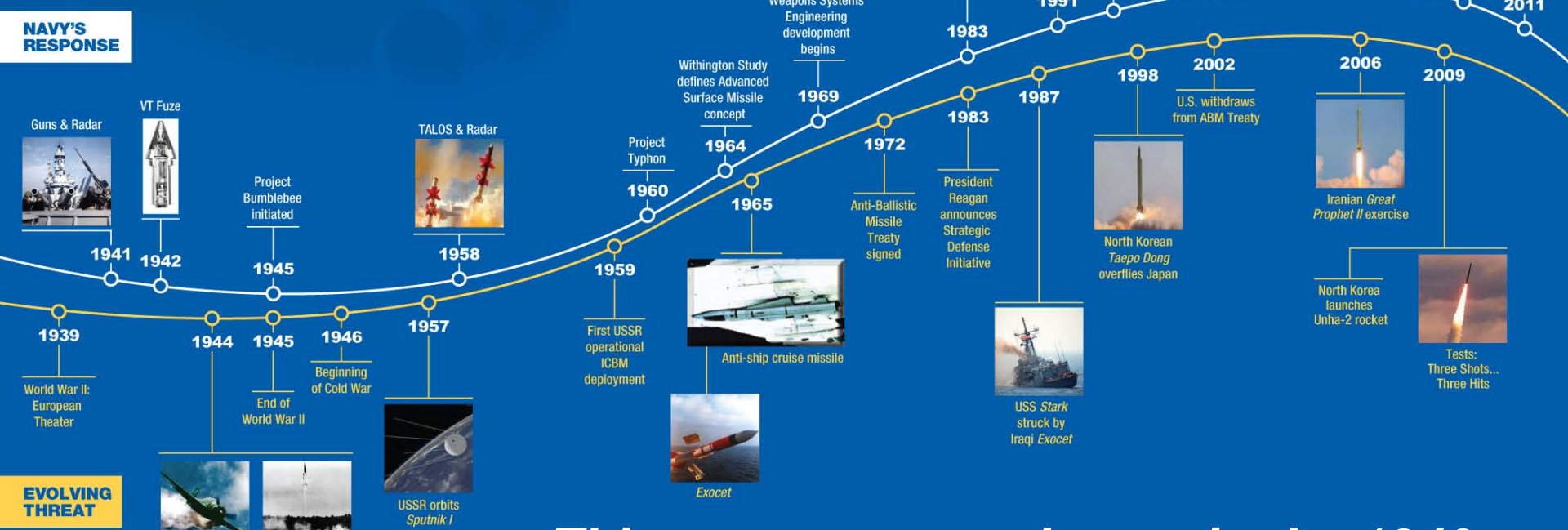


Aegis BMD Life Cycle Management Process

Aegis BMD

- **Deputy Secretary of Defense Memorandum, 10 June 2011 defines funding responsibilities for BMDS elements:**
 - **MDA is responsible for funding research, development, test/evaluation for BMDS capabilities, and procurement and sustainment of BMD-specific mission equipment and initial spares**
 - **Following initial fielding of a BMDS element, MDA will fund the first two years of operations for BMD-specific mission equipment**
 - **MDA will fund construction of mission essential facilities and security infrastructure**
- **Supersedes 2007 Transition & Transfer Memorandum as approved by Deputy Secretary of Defense governing O&S support of prior agreements between MDA and Navy**

- Aegis BMD capability is at sea
- Aegis BMD is operationally suitable and effective
 - Demonstrated ability to defeat short, medium and intermediate range ballistic missiles
 - EPAA Phase I architecture demonstrated
- Force structure capacity and capability increases rapidly over the next 5 years



This success story began in the 1940s, and we are just getting started ...



Aegis Ballistic Missile Defense

Aegis BMD



Forward...At Sea...On Patrol

Enabling Capabilities, Providing Options for U.S. and Allies