



# NDIA 2011 Integrated Warfare Systems Conference

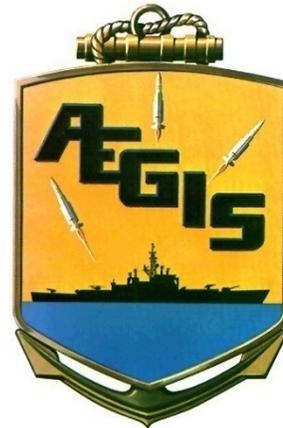
*Integrated Combat Systems (IWS 1.0)*  
*CAPT Jon Hill, MPM*  
*Mr. Nilo Maniquis, Deputy MPM*



# ***PEO IWS 1.0***

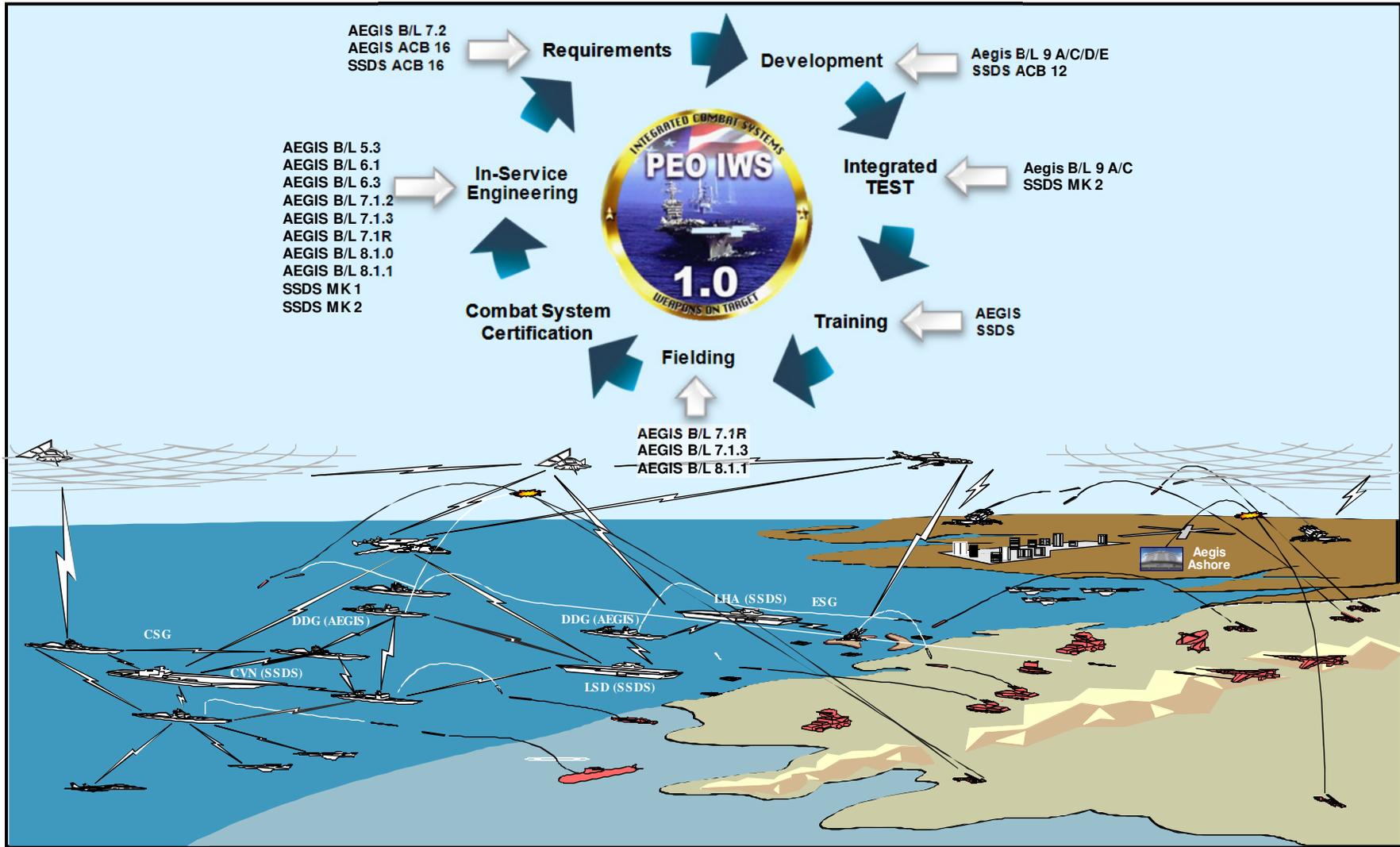
## ***Integrated Combat Systems***

- ◆ **Responsible for integrated combat systems for surface combatants, carriers, and amphibious ships**
  
- ◆ **Responsible for integration of weapon system elements into SSDS combat system, AEGIS combat system, and AEGIS weapon system**
  
- ◆ **Key functions:**
  - Design and development
  - Production and fielding
  - Maintenance and upgrades





# IWS 1.0 - Integrated Combat Systems





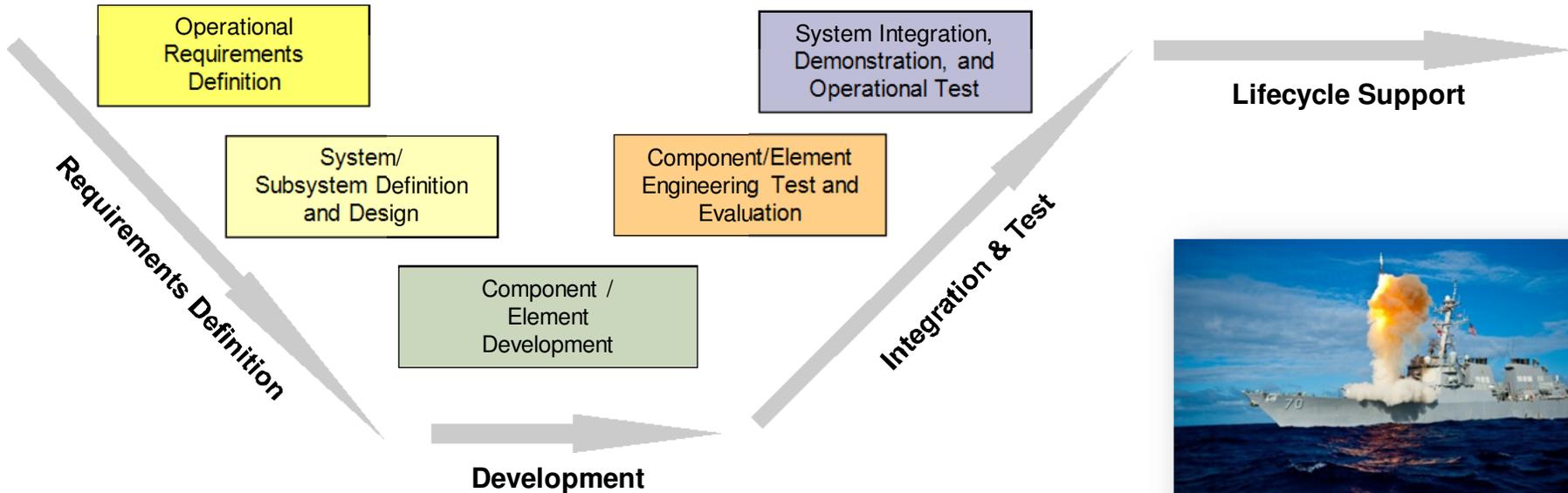
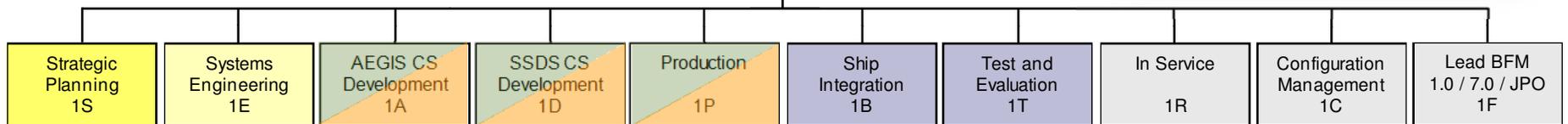
# Integrated Combat Systems (IWS 1.0)

## Functionally Aligned Organization

MPM, Integrated  
Combat Systems  
1.0 MPM

DMPM, Integrated  
Combat Systems  
1.0 DMPM

PM, Fleet  
Readiness  
1.0 FR





# ***PEO IWS 1.0 High Priority Efforts***

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- ◆ **Combat Systems Wholeness**
  - AEGIS Readiness initiatives underway
  - Carrier Wholeness under assessment
- ◆ **Fleet Interoperability (CEPN/Link 16)**
  - AEGIS Baseline 7.1.3
  - Accelerated Mid Term Interoperability Improvement Program (AMIIP)
- ◆ **ACB 12 AEGIS Baseline 9 Completion & Fielding**
- ◆ **Future**
  - ACB 16 and Evolution to ACB 20
  - Science and Technology & Technology Insertion
  - Competition



# The Total Combat System

## A Strong Industrial Base is Critical

**People**

**Paper**

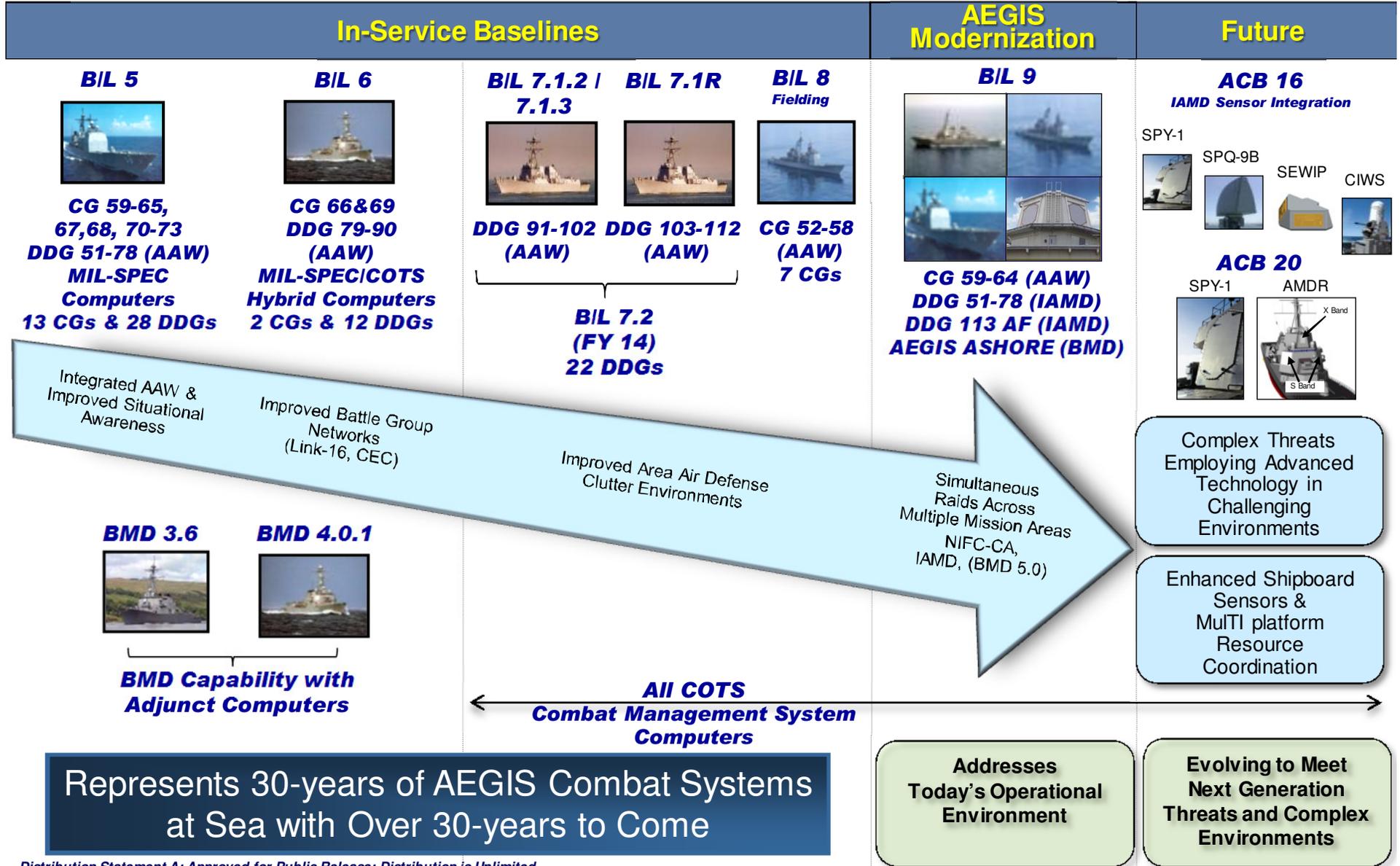
**Parts**

**Production**

**Computer Programs**



# AEGIS Baselines & Capabilities





# ***AEGIS Wholeness Review***

## **Navy Efficiency Efforts**

- ◆ SIAP (2000)
- ◆ Optimum Manning (2001)
- ◆ Revolution in Training (2001)
- ◆ AEGIS COTS Complexity (2002)
- ◆ Increased OPTEMPO (2003)
- ◆ Decreased Live-Fire Missile Events (2003)
- ◆ Reduced Shore Support (2005)
- ◆ In-service AEGIS Baseline Freeze (2005)

## **Task Force Evaluations**

- ◆ B/L 7.1.2 Issues and Recommendations (NSWC/ATRC/RMC/NAVICP)
- ◆ AWS / SPY Readiness Task Force Report (SEA 21)
- ◆ Fleet Review Panel of Surface Force Readiness (VADM Balisle, USN(Ret))
- ◆ Standard Missile-2 Independent Review Team for ASN(RD&A) (Mr. Giacchi)

- Interoperability
- Maintainability, Supportability, Sustainability
- Manpower, Personnel, Training
- Fleet Proficiency – AAW Readiness
- ACB 12

**Leading Indicators Begin to Expose Seams and Unintended Consequences impacting AEGIS Wholeness**

**Integration of a Body of Studies into a Single AEGIS Wholeness Plan**



## ***PEO IWS Combat Systems Engineering Development, Modernization, and Fielding Precepts***

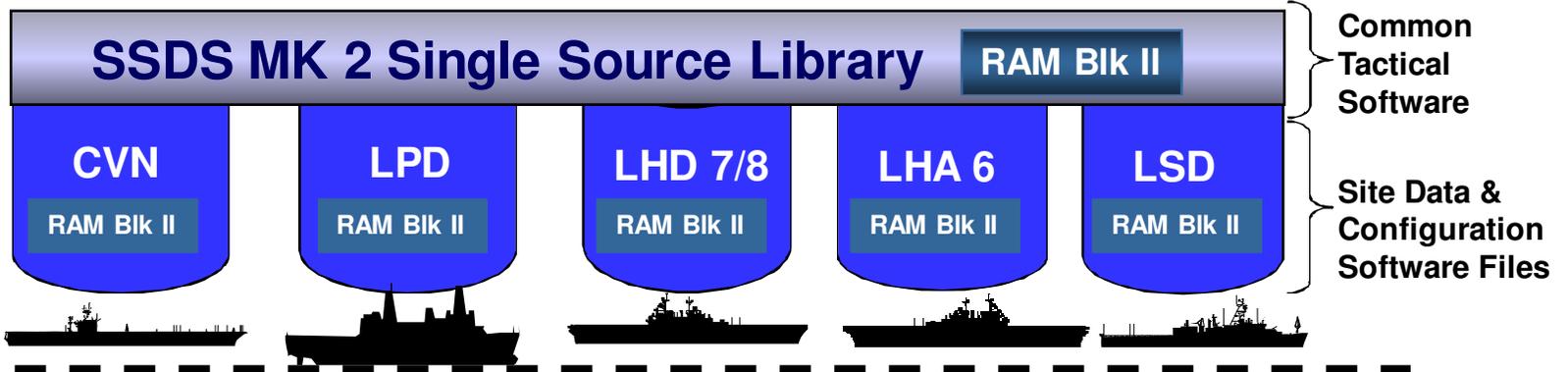
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- ✓ Decouple Combat Systems development from Ship Development**
- ✓ Decouple Combat System Application Software from the underlying COTS Computing Hardware**
- ✓ Use a Product Line Approach to develop new capabilities and software upgrades**
- ✓ Build once and apply to many baselines**
- ✓ Exercise Government Purpose Rights (GPR) to the maximum extent practicable to allow multiple Developers to contribute new Combat System technology and extend legacy capabilities**



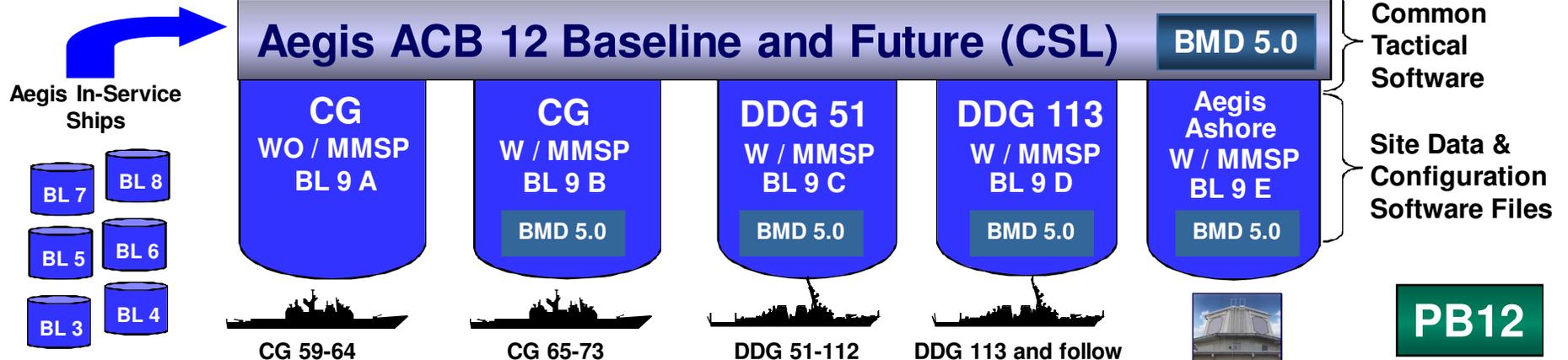
# Common Source Software Library (CSL)

One Software Change Fits ALL SSDS Ship Classes Since the 1990s

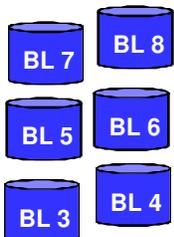


Aegis BL 9 Supports five Different Combat Systems Configurations & Begins Fielding in FY12

In-Service Baselines (BL) are supported from CSL after modernization availability



Aegis In-Service Ships



CG 59-64

CG 65-73

DDG 51-112

DDG 113 and follow





# ***Common Source Library . . . Build Once and Apply to Many Baselines***

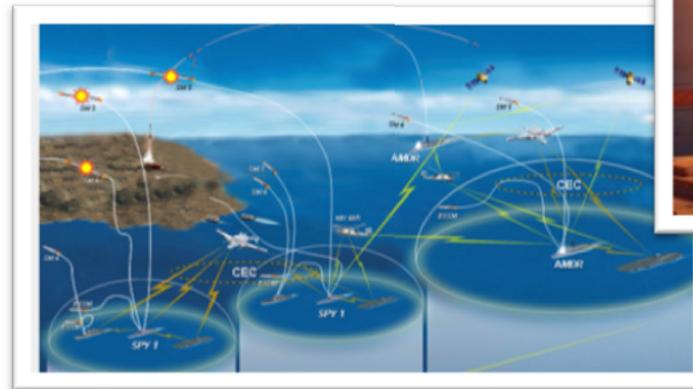
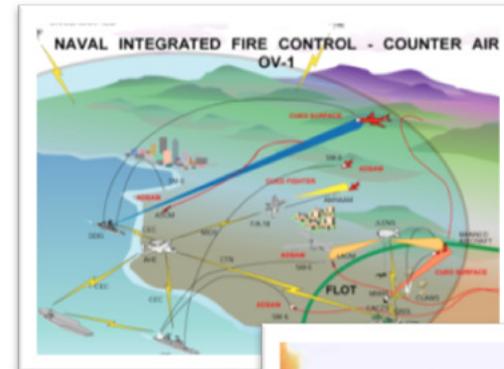
- ◆ **Common Source Libraries allow reuse and commonality within a combat system family for modernized ships and new construction ships**
- ◆ **Modernized ships and new construction ships will have the same combat system capabilities**
- ◆ **Investing in disciplined cross-program Configuration Management is critical to leveraging Common Source Library (CSL) components across the enterprise**
- ◆ **Advanced Capability Build (ACB) Process can only be implemented via a CSL**
- ◆ **CSL is critical to improving fleet interoperability issues**
- ◆ **The increasing number of ships supported from CSL will simplify 3rd party competition and integrate product line architectures**

***Surface Navy Combat Systems will achieve commonality and reuse through implementation of Common Source Libraries***



# *Integrated Air & Missile Defense*

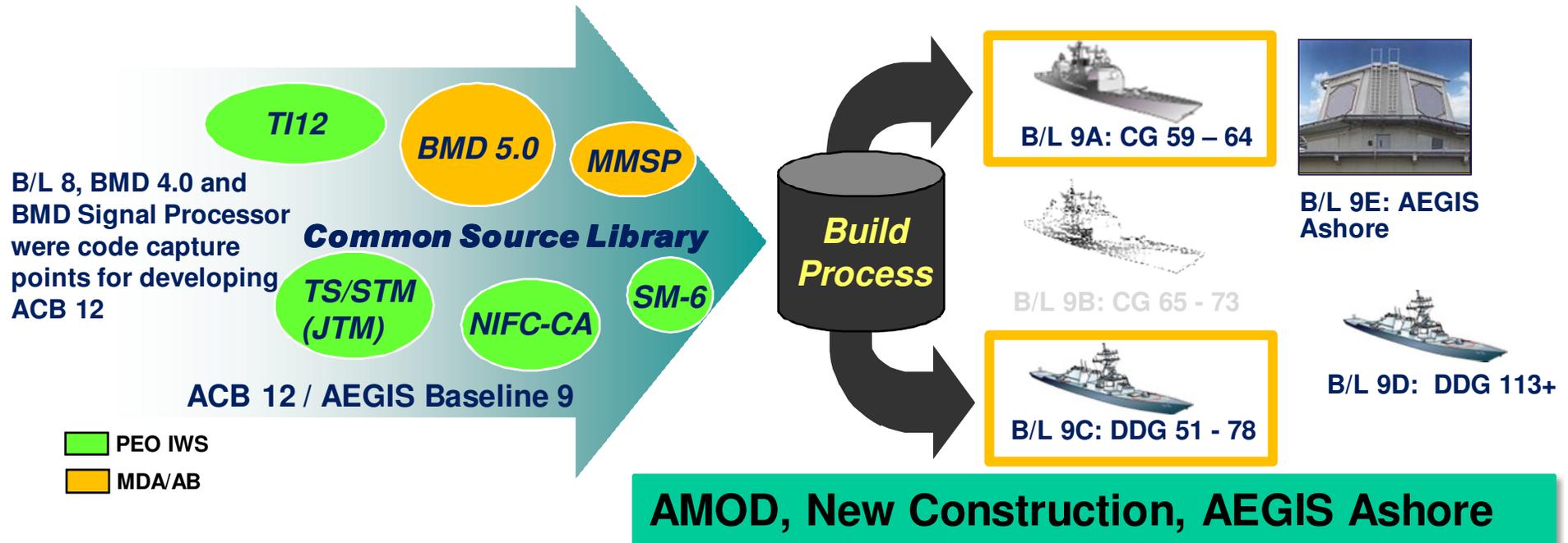
- ◆ **Navy Integrated Fire Control (NIFC-CA)**
- ◆ **Standard Missile Improvements**
- ◆ **Ballistic Missile Defense (BMD)**
- ◆ **Advanced Radar Developments**



***Combatant Commander Demand for Navy  
IAMD Capability / Capacity is Increasing***



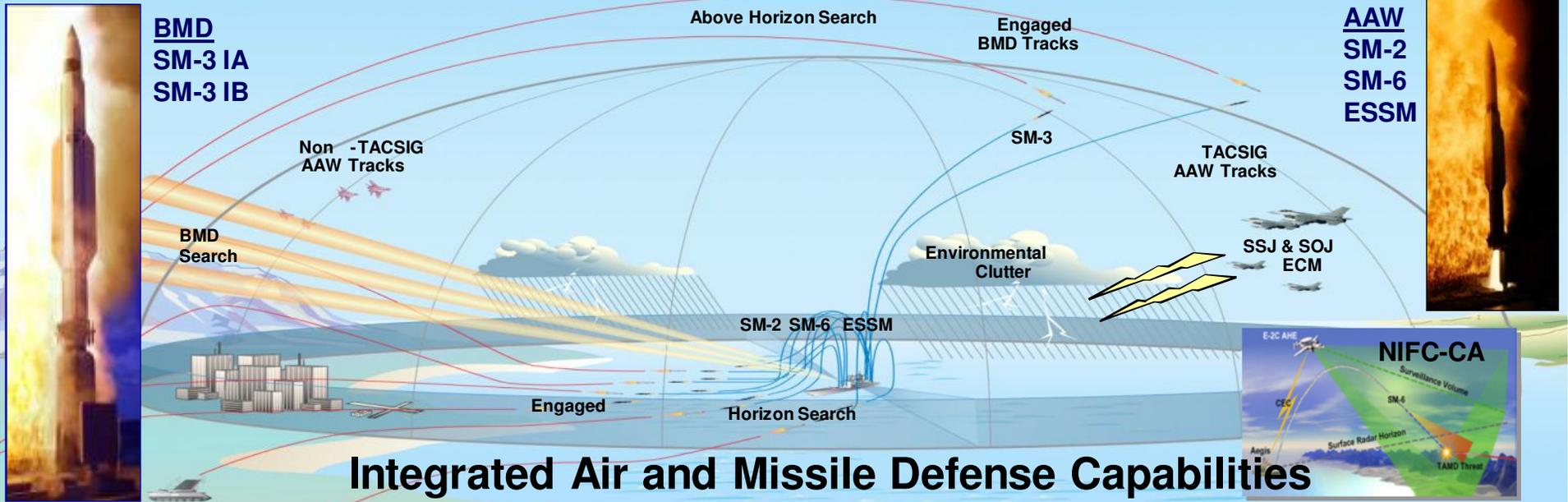
# ACB 12 / AEGIS Baseline 9 (B/L 9)



- ◆ Integrates AEGIS AAW and BMD capability into one computer program and equipment suite
- ◆ Foundation for all future AEGIS IAMD:
  - B/L 9A – CGs 59-64 (AAW Only)
  - B/L 9B – CGs 65-73 (IAMD): Cancelled (Impacts BMD Capacity and Force Structure)
  - B/L 9C – DDGs 51-78 (IAMD)
  - B/L 9D – DDG 113 and Follow (IAMD)
  - B/L 9E – AEGIS Ashore (BMD Only)



# Advanced Capability Build (ACB 12)



### ACB 12 / TI 12

Processing Upgrades



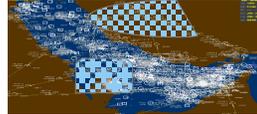
Display Upgrades



SPY-1 / SIGPRO Upgrades  
MMSP



Track Management Upgrades

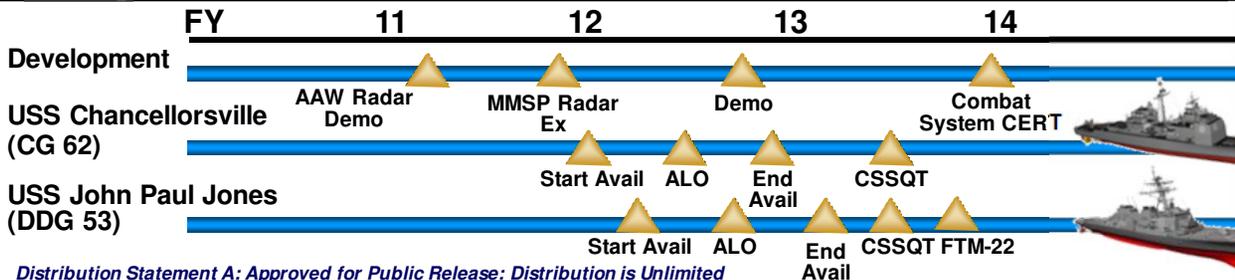


ACS Upgrades  
Guns  
SPQ-9B  
BMC4I  
CIWS



Common Source Library

CSL



Distribution Statement A: Approved for Public Release: Distribution is Unlimited

- ◆ Aegis Modernization
  - CG 59-73
  - DDG 51-78
- ◆ DDG 113 +
- ◆ Aegis Ashore



# AEGIS Combat System Evolution

## Improved Multi Mission & IAMD

Programmatic, Vision, Pending Funding Decisions

### ACB 12

#### Integrated Air & Missile Defense

**Radar**

- SPY-1 Open Architecture
- MMSP
- AAW, BMD & IAMD Modes

**Combat System**

- AEGIS OA
- BMD 5.0
- NIFC-CA
- I/O Trident Warrior
- TI-12 Equipment

**Missiles**

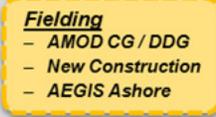
- ESSM, SM-2
- SM-3 BLK IA/IB
- SM-6

**EW**

- SLQ-32

**Mission Planning**

- BMD 5.0 Mission Planner

### ACB 16

#### Improved Coordination of Netted Force Operations to Counter Mid-Term Threats

**Radar**

- Layered Defense Sensor Integration –SPQ-9B

**Combat System**

- AWSC Integration
- Combat ID Improvements (IFF Mode 5/S)
- C5I Upgrades (CANES, JTT-M, GCCS-M, CDL, CDLMS)
- Improved BMD with EOR and SBT (BMD 5.1)

**Missiles**

- ESSM, SM-2
- SM-3 BLK IA/IB
- SM-3 BLK IIA
- SM-6

**EW**

- SEWIP BLK II & III Integration (w/RDDL)

**ASW**

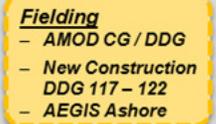
- Periscope Detection ( SPQ-9B)
- Open ASW Interface with MH-60R Integration

**Readiness**

- Total Ship Training Capability





### ACB 20

#### Improved Joint Weapon & Sensor Coordination to Counter Far-Term Threats

**Radar**

- AMDR, Active X & S Band
- AMDR CW illumination
- SPY-1

**Combat System**

- Support AMDR & SPY-1 Ships
- Improved IAMD raid handling capability
- BMD 6.X
- Multi-Sensor Integration
- PLA Components & Arch
- Sensor Coordination
- TI-20 Equipment

**Missiles**

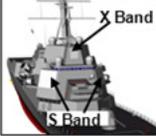
- ESSM, SM-2
- SM-3 BLK IA/IB
- SM-3 BLK IIA
- SM-6

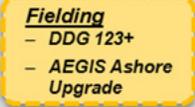
**EW**

- SEWIP BLK II / III

**Mission Planning**

- Advanced AAW & BMD Mission Planner



**Integrated Air & Missile Defense**

- Multi-Mission Radar Utilization
- Active Missile with OTH Targeting
- Improved Fleet Interoperability

**Improved Coordination of Netted Force Operations to Counter Mid-Term Threats**

- Multi-Sensor Coordination
- Extended Range BMD Engagements
- Multi-Ship Engagement Coordination
- Joint Sensor Netting (IAMD)
- Increased ASW/SUW Surveillance
- Employment of Advanced EW
- Coordinated IAMD Tracking

**Improved Joint Weapon & Sensor Coordination to Counter Far-Term Threats**

- Advanced Force Level Resource Management (Radar/EW)
- Integrated Active and Electronic Defense
- IAMD Mission Planning
- Joint Integrated Fire Control



# SSDS Combat System Evolution

## Improved Ship Survivability & Interoperability

Programmatic, Vision, Pending Funding Decisions

### ACB 12 Improved Situational Awareness

**Radar/Sensor**

- DBR Integration
- SPS-48G Integration
- MH-60R / PLVC Ph 0
- CIWS 1B BL2 Integration (LSD class)
- IFF Mode 5/S Implementation

**Combat System**

- System Track Manager/ Track Server
- CEC (USG-2B)
- CV-TSC Incr. 2
- CANES
- GCCS-M (1-way)
- CPS & CDS
- IA Hardening

**Weapons**

- ESSM (Uplink)
- Improved CIWS Integration (LSD Class)

**EW**

- SEWIP BLK II

**Fielding**

- CVN -LPD
- LHA -LSD
- LHD






### ACB 16 Improved Coordination of Netted Force Operations

**Radar/Sensor**

- CIWS 1B BL2 Sensor Integration (CVN, Amphib Class)
- SPS-48G Elevation Upgrade

**Combat System**

- C5I/C4I Updates
- Interoperability Improvements (IFF Mode 5/S)

**Weapons**

- CIWS Integration

**EW**

- SEWIP BLK II (incl RDDDL)

**Training**

- Integrated Training / Fleet Synthetic Training

**Readiness**

- Total Ship Training Capability

**Fielding**

- CVN -LPD
- LHA -LSD
- LHD




### ACB 20 Improved Command & Control

**Radar/Sensor**

- DBR Engage on Remote Support
- SPQ-9B 3D support
- IFC sensor support via CEC

**Combat System**

- Integrated HK/SK weapon scheduling
- CVN 68 Class Radar Upgrades
- Expanded Fault Det/Isolation
- Improved Network Health/Diagnostics
- Force Level Sensor Coordination
- Space Track Processing (CEC)
- Advanced IA Protection

**Weapons**

- ESSM Block 2 integration (CVN 78)
- NSSMS 2T Uplink (CVN 78)

**EW**

- SEWIP Block 3 integration
- SEWIP Block 2 Backfit
- SEWIP Block 2/HGHS integration
- RDDDL Backfit

**Training**

- Training Upgrades

**Fielding**

- CVN -LPD
- LHA -LSD
- LHD



**Improved Situational Awareness**

- Adv. Senor Integration (DBR)
- Improved Fleet Interoperability
- Increased ASW/SUW Surveillance
- Employment of Advanced EW

**Improved Coordination of Netted Force Operations**

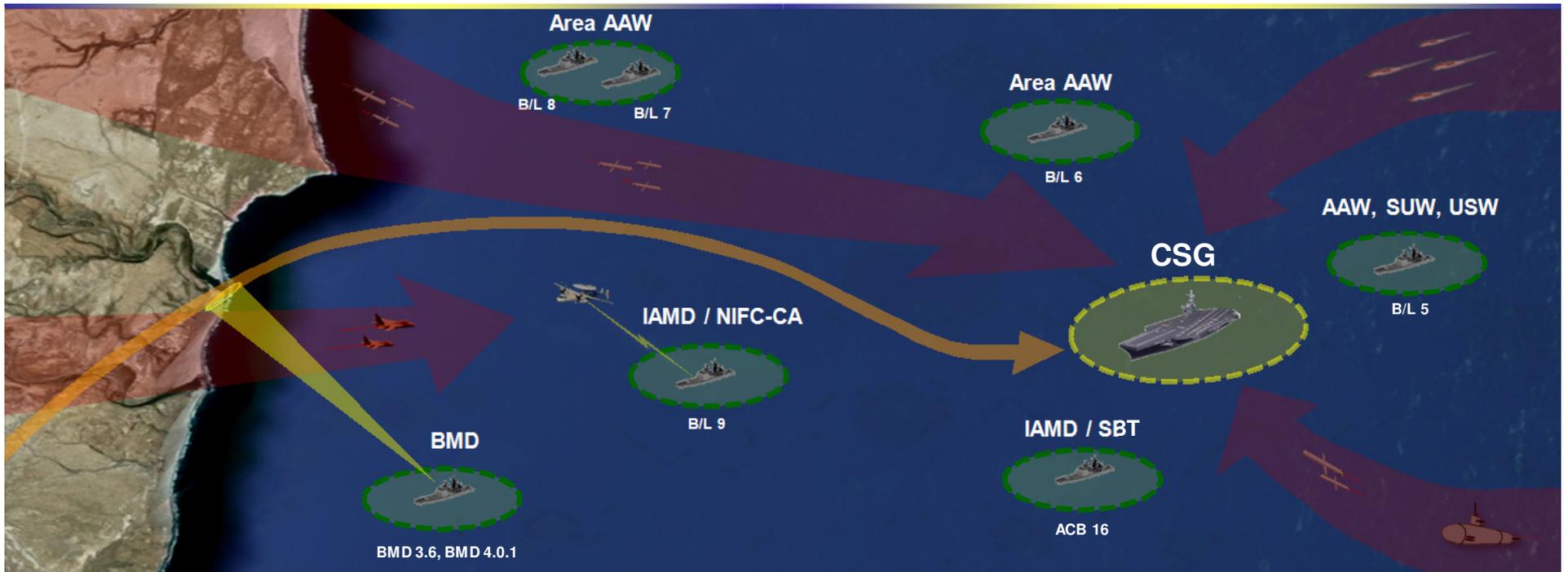
- Integrated Tactical & Operational Picture
- Joint Digital Air Control
- ASW Ship Defense
- Coordinated IAMD Tracking
- Joint Sensor Netting (IAMD)
- Multi-sensor Coordination
- Improved EW Capability for Advanced Threats

**Improved Command & Control**

- Integrated Hard and Soft Kill
- Increased OTH Surveillance (UxVs)
- Integrated Mission and Tactical Planning
- Joint Integrated Fire Control
- Spectrum Management



# Strike Group Composition Support



## ◆ Mix of AEGIS Baselines / Ships Provide Mission Capability Options

- Guarded Unit Defense → Forward BMD SAG
- SRBM / MRBM / Limited IRBM Defense → Independent BMD SAG
- Sea-Based Terminal (SBT) Protection → Layered IAMD Support
- NIFC-CA Operations → Extended Strike Group Reach
- Littoral Operations → Clutter Environments and Restricted Operational Areas

## ◆ Focus Development Efforts and Upgrades on Deployers



# *S&T and Technology Insertion*

- ◆ **Select investments and potential technology insertion for near, mid and far-term applications based on combat system capabilities vision**
  - **Prioritize to Address Fleet Issues & Concerns**
  - **Systems Engineer and Test prior to integration**
  
- ◆ **One Key Focus Area:**
  - **Development of an Automated Test / Analysis (ATA) capability provides reproducible and quantitative evaluation of system performance in order to support improved quality and affordability**

***Focus efforts toward improving capabilities for in-service and future combat systems***



# **Combat System Engineering Agent (CSEA) Competitions**

- ◆ **CSEA Competitions**
  - Government control of design decisions, interfaces, and the open system architecture
  - Acquisition of appropriate data rights
  - Directs use of Common Source Library (CSL)
- ◆ **Expected benefits to the Navy**
  - Encourage innovation, incentivize superior performance, and reduce costs
  - Improve the Navy's ability to encourage participation from third party developers
  - Allow the Navy to provide mature technology and high quality products and engineering services to the fleet at a competitive price

## **AEGIS CSEA RFP**

- ◆ Update released through FEDBIZOPS  
19 OCT 2011
- ◆ Key Dates
  - Proposals due 15 DEC 2011
  - Projected Contract Award 1 OCT 2012

## **SSDS CSEA RFP**

- ◆ Projected RFP Release Late 2012
- ◆ Projected Contract Award 2014



# ***Ship Integration & Test (SI&T) Agent Competition***

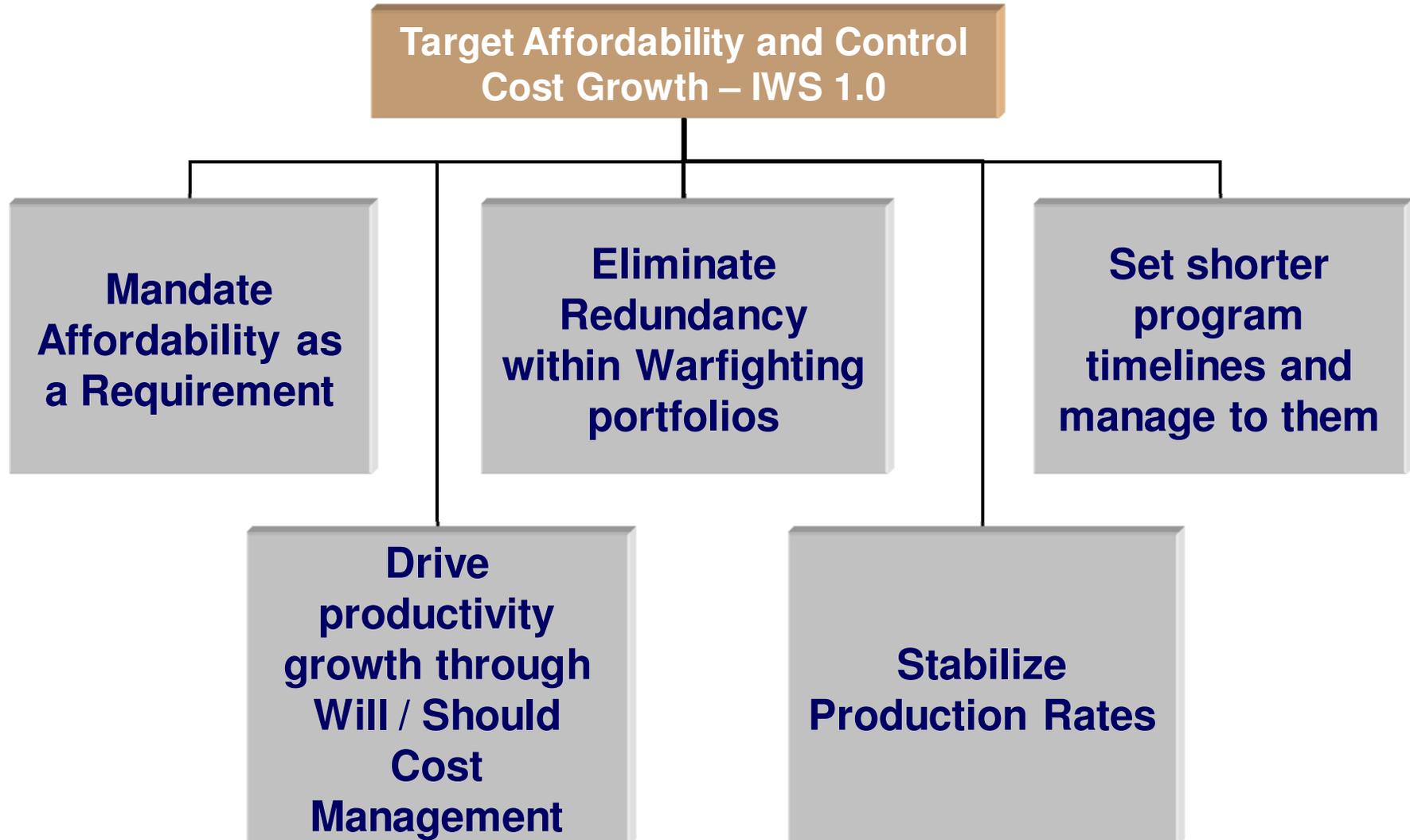
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- ◆ **Competition**
  - Government control of design decisions and interfaces
  - Acquisition of appropriate data rights
- ◆ **Expected benefits to the Navy**
  - Encourage innovation, incentivize superior performance, and reduce costs
  - Allow the Navy to provide mature technology and high quality products and engineering services to the fleet at a competitive price

- ◆ **Projected RFP release 2012**
- ◆ **Projected contract award late 2013**



# Affordability & Better Buying Power





# Questions & Answers

UNCLASSIFIED