

NDIA State of IAMD Symposium



Navy IAMD Capabilities

RADM Horn, USN
PEO IWS
July 11, 2013



PEO IWS Mission & Objective

Mission

Leading a World Class Collaborative and Innovative Workforce Partnering with Surface Ship Programs and Industry to provide dominant Naval Combat Systems which are affordable, integrated, common, and sustainable.

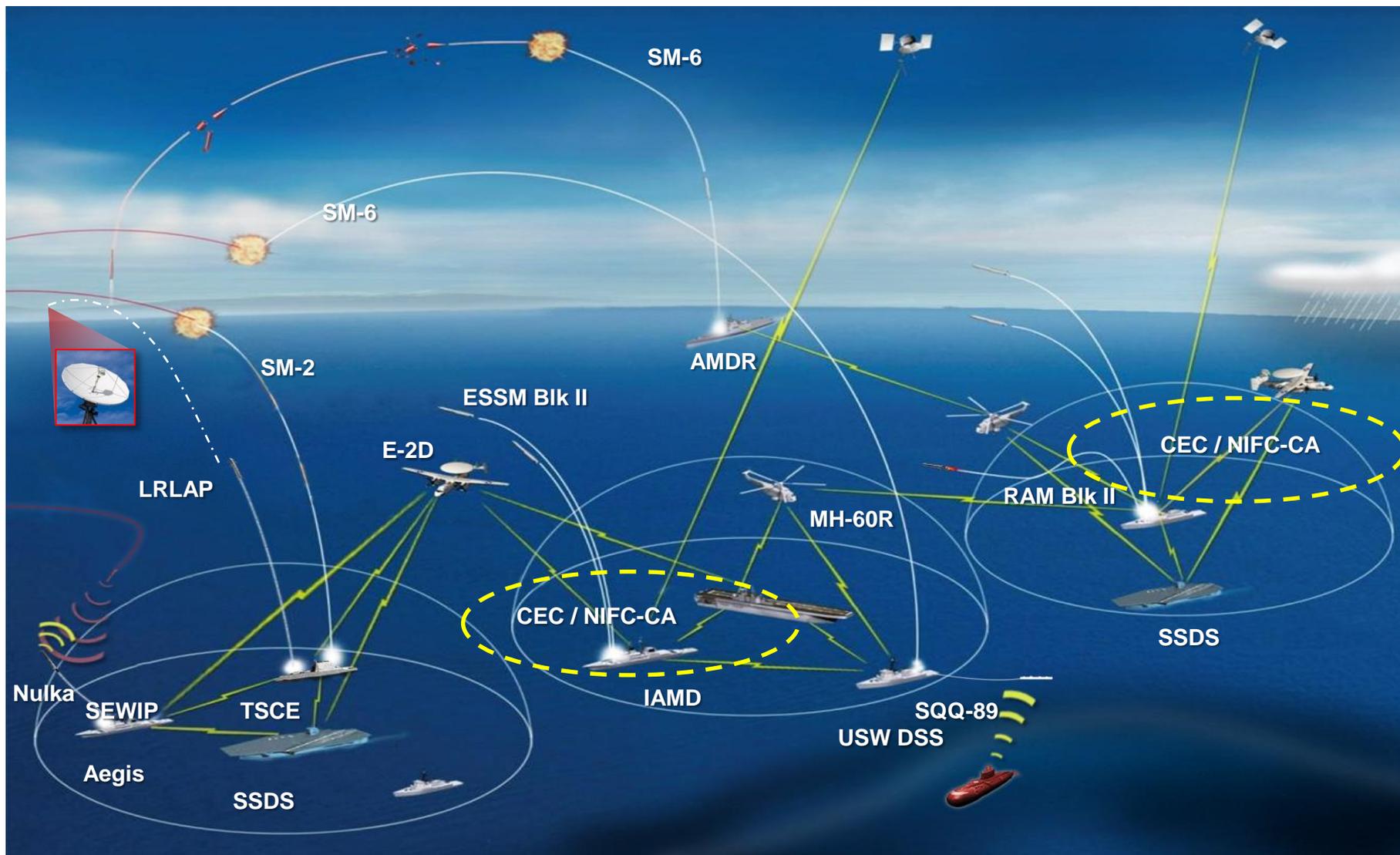


Objective

To develop, deliver, and sustain operationally dominant combat systems to Sailors and Marines. It is our “Main Thing.”



Combat System Concept of Operations





AEGIS Baseline 9 Development

- **AEGIS BL 9 Common Source Library delivery to four AEGIS Combat System Configurations**

- Modernization of Air Defense Cruiser, & IAMD Destroyers
- New Construction of IAMD Destroyers & AEGIS Ashore

- **B/L 9 integrates AEGIS Anti Air Warfare (AAW) and Ballistic Missile Defense (BMD) capability into one computer program and equipment suite for the Navy's first true Integrated Air and Missile Defense (IAMD) capability**

- B/L 9A Air Defense CG – NIFC-CA, CEC, SM-2, SM-6, ESSM, AMIIP
- B/L 9C IAMD DDG – Same as B/L 9A plus IAMD w/ MMSP, BMD 5.0/5.0 CU, SM-3 Blk IA/IB
- B/L 9D New Construction IAMD DDG – Same as B/L 9C
- B/L 9E AEGIS Ashore – BMD only, BMD 5.0/5.0 CU, SM-3 Blk IA/IB, Remote Launcher Mods



SCHEDULE

- MAR 13: Awarded CSEA Contract to Lockheed Martin
- MAY 13: DDG 53 AEGIS AMOD IAMD BL9C Sea Trial #1
- MAY 13: CG 62 Successful ESSM Engage of BQM-74
- JUN 13: CG 62 BL9A B13.0.2 NIFC-CA LF-04 TRACKEX
- JUN 13: AEGIS Ashore Successful Live-Fire TRACKEX
- JUL 13: AEGIS BL9 DDG 113 IAMD Successful TRACKEX

PLANNED

- JUL 13: DDG 53 Sea Trial #2
- AUG 13: CG 60 Sea Trials
- AUG 13: CG 62 PAU #2
- SEP 13: DDG 53 CS Sea Trial #3
- SEP 13: CG 62 Post-Availability SM-2 (PASM-2)
- SEP 13: CG 60 MISSILEX Post Avail SM-2 Live-Fire
- SEP 13: USS NORMANDY Sea Trials
- NOV 13: Concurrent CG 62 CSSQT/DT & DDG 53 PAU-1

ISSUES

- Backlog of Computer Programs Fixes
- Fielding Plan
- At-Sea Post-Availability Testing Unfunded
- No signed Baseline 9 TEMP
- Fleet Synthetic Training involving NIFC-CA
 - No signed CONOPS
- At-Sea Testing continues to include further Live Fire Testing of SM-2, SM-3, SM-6, and ESSM.



Air and Missile Defense Radar (AMDR)

- **First purpose-built maritime Integrated Air and Missile Defense (IAMD) radar suite**
- **Simultaneous robust BMD and Air Defense**
- **Scalable in size/sensitivity**
- **The AMDR suite will include:**
 - S-band radar providing sensitivity for long range detection and engagement of advanced threats
 - The X band radar is a horizon-search radar based on existing technology
 - Radar Suite Controller
- **Stage of Development: Engineering & Manufacturing Development Phase**



SCHEDULE

- AUG 10: Milestone A
- APR 12: Defense Acquisition Board
- MAR 12: Gate 4/5 Review
- SEP 12: Three Fixed Price Incentive Firm Target (FPIF) Technology Development Contracts (Lockheed Martin, Northrop Grumman, Raytheon)
- MAR 13: In Source Selection for Engineering & Manufacturing Development Phase; MS B DAB

PLANNED

Imminent: Intend to award one Engineering and Manufacturing Development (EMD) Contract in FY13 after Full and Open Competition

ISSUES

- System of Systems Integration
- T&E Planning



Standard Missile 6

- Designed to provide ship self-defense, fleet area defense, and theater air defense for sea and littoral forces
- Surface-to-air supersonic missile, launched from AEGIS Cruisers and Destroyers, capable of successfully engaging manned and unmanned, fixed or rotary wing aircraft and land attack or Anti-Ship Cruise Missiles.
- Stage of Development: Ending System Design & Development; Low Rate Initial Production Phase



SCHEDULE

- SEP 12: Successful Joint Fire Control Test – JLENS
- APR 13: Successful Naval Integrated Fire Control Test
- MAY 13: Test Community - SM-6 “Operationally Effective”
- MAY 13: Completed FRP DAB
- JUL 13: SM-6 FY12 Production Contract Definitized
- JUL 13: 44 SM-6s delivered (to date)

PLANNED

- 4thQ13: IOC
- AUG13: At-Sea Baseline 9/SM-6 Integrated Fire Control Test
- AUG13: Anticipated Award of FY13 FRP Contract
- NOV13: FOT&E Commences

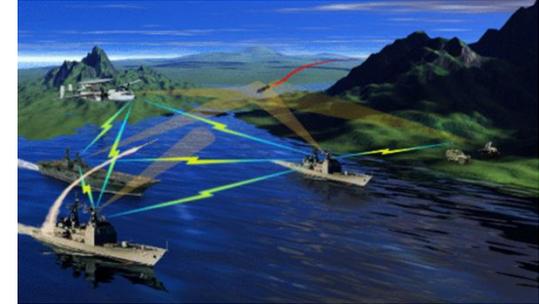
ISSUES

- Procurement Profile Stability
- SM-6 is forecasting increasing rates of obsolescence that need to be addressed.



Cooperative Engagement Capability (CEC)

- Real-time sensor netting system that enables high quality situational awareness and Integrated Fire Control (IFC) capability, which revolutionizes naval air defense by providing improved accuracy, continuity, and identification consistency.
- Significantly improves Naval Carrier and Expeditionary Strike Group's Area Air Defense capabilities by extracting and distributing all ship/air sensor-derived data into a single fire control quality air track picture
- Fire Control quality data is transferred to the ship's combat system permitting engagements to begin without actually tracking the target with own ship sensors
- Stage of Development: Production & Development Phase



SCHEDULE

- MAY 12: CEC on E2D Low Rate Initial Production Defense Acquisition Board
- JAN 13: Completed installation CEC Near-Term Interoperability ECP on AEGIS, SSDS, & E2C
- FEB 13: Completed Accelerated Mid-Term Interoperability Improvement Project (AMIIP) CEC Cert for AEGIS Ship classes, Fleet Wide Installation ongoing.
- APR 13: NIFC-CA Live Fire Test (LFT-1) with AEGIS

ISSUES

- Complete Fielding of CEC/AMIIP (FY13- FY16)
- Complete development and Field FCLIP on SSDS Ship Classes (FY13-FY17)
- Continue to refine design to support NIFC CA Development, Testing, and Fielding (FY13-FY18)
- Develop CEC product to support USMC Common Aviation Command and Control (CAC2S) (FY13-15)
- Develop CEC ECP in collaboration with E2D AMIIP development (FY14-FY17)



Evolved Sea Sparrow Missile (ESSM) Blk 2

- **ESSM Block 2 upgrade replaces the largely obsolete guidance section with a dual mode Active/Semi-Active X-Band seeker capable of defeating future threat capabilities within the existing envelope, including;**
 - Increased raid sizes and adverse environments including countermeasures.
 - Threat types include; advanced ASCMs, ASBMs, surface and asymmetrical.
- **Proposed seeker upgrade provides low risk and good benefit for cost by leveraging advanced seeker technology from existing family of missile products.**
- **International cooperative development program under MOU with US paying 40% of development costs.**
- **Stage of Development: Technology Development / Risk Reduction Phase**



SCHEDULE

- SEP 12: Completed Pre-SRR
- DEC 12: Completed SRR
- DEC 12: Awarded Risk Reduction Contract to Raytheon

PLANNED

- OCT 13: SFR
- SEP 14: PDR
- DEC 14: MS B

- FY15-19: E&MD
- FY17: MS C (LRIP)
- FY18-19: DT/OT
- FY20: IOC

ISSUES

- Complete Risk Reduction activities
- Identify international workshare arrangements
- Participating Nations sign E&MD MOU by Summer 2014



Rolling Airframe Missile (RAM)

- **Anti-Ship Cruise Missile Defense** against current and evolving threats
- **Cooperative program** between U.S. and Germany
- **Target designation** from installed shipboard sensors, no Fire Control Illuminators required
- **Block 0 Missile** - Dual Radio Frequency (RF)/Infra-Red (IR) Guidance System
- **Block 1A Missile** – Added capability of IR All-The-Way Guidance
- **Block 2 Missile** – Kinematic & Evolved Radio Frequency Receiver upgrades
- **Stage of Development: Production & Deployment Phase**
 - RAM Block 2 in IOT&E Government Testing and Low Rate Initial Production



SCHEDULE (Block 2 Missile)

- APR 07: MS B completed & ADM approved
- MAY 07: SDD contract awarded completed
- JAN 12: MS C completed
- FEB 12: MS C ADM approved
- JUL 12: LRIP I contract award
- NOV 12: SDD contract completed
- DEC 12: LRIP II contract award
- MAR 13: Block 2 Production MOU signed
- MAR 13: Contractor flight tests completed
- MAY 13: IOT&E flight testing commenced (3 for 3 to date)

PLANNED

- 2014: IOC Complete IOT&E Flight Testing
- 2016: Full Rate Production (FRP) Decision Review

ISSUES

- Incorporation of Fire Control Loop Improvement Project (FCLIP) enhancements to SSDS
- Completion of Multi-Stage Supersonic Target (MSST) development to provide assets for final phase of RAM Block 2 IOT&E flight testing
- What remains to be accomplished
 - Completion of RAM Block 2 IOT&E
 - Block 2 missile transition from low rate to full rate production



Surface Electronic Warfare Improvement Program (SEWIP) Blk 2

- **Mission:** Provide shipboard Electronic Warfare (Electronic Support and Electronic Attack) for early detection, analysis, threat warning and protection from anti-ship missiles
- **An integrated shipboard combat system that provides a full suite of Electronic Warfare capabilities that can be managed and controlled manually from a console or semi-manually/auto by the host combat management system**
- **SEWIP Block 2 is developing an upgraded antenna, receiver, and combat system interface for SLQ-32. The upgrades are necessary in order to pace the threat, and improve detection, accuracy, and mitigation of Electromagnetic Interference (EMI).**
- **Stage of Development: Engineering & Manufacturing Development Phase**



SCHEDULE

- SEP 09: Competitive Contract Awarded for Development & Delivery of 2 EDMs & TDP
- DEC 11: CPD for SEWIP Block 1B3 Approved
- AUG 12: Block 1B3 MS C/LRIP DR
- JAN 13: Milestone C
- MAR 13: FQT 1
- APR 13: Block 2 MS C/LRIP DR
- JUN 13: FQT 2

PLANNED

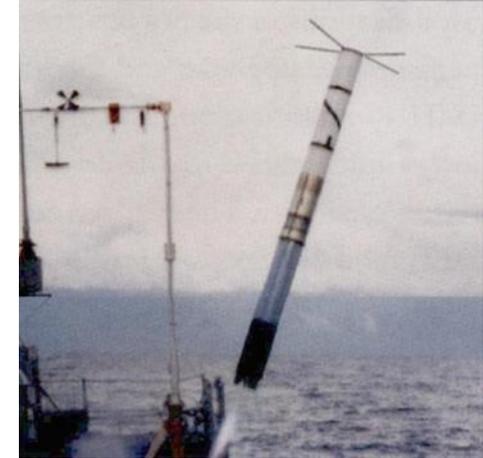
- OCT 13: Gate 6 Review
- JAN 14: 1B3 & Block 2 Tech Eval
- FEB 14: Block 3 MS B DR
- MAR 14: 1B3 & Block 2 IOT&E
- MAY 14: Block 1B3 FRP DR
- OCT 14: Full Rate Production Decision Review

ISSUES



Nulka

- Quick reaction offboard electronic countermeasure decoy to defeat advanced radar homing ASMs; Joint cooperative program between the US and Australia
- Active offboard decoy that uses a broadband radio frequency (RF) repeater mounted atop a hovering rocket.
- Designed to counter a wide variety of present and future radar guided Anti-Ship Missiles by radiating a large radar cross section while flying a ship-like trajectory.
- US developed payload / fire control system, Australia developed hovering rocket.
- Undergoing a program to integrate the MK 53 Decoy Launching System with CVNs
- Stage of Development: Production & Deployment Phase



SCHEDULE

JAN 99: Milestone III (Full Rate Production)
FEB 12: Nulka CVN DLP Software Completed

PLANNED

MAY 14: Nulka CVN Class DT
AUG 14: Nulka LHA 6 Install Certification

ISSUES

- Nulka installs constrained to available resources



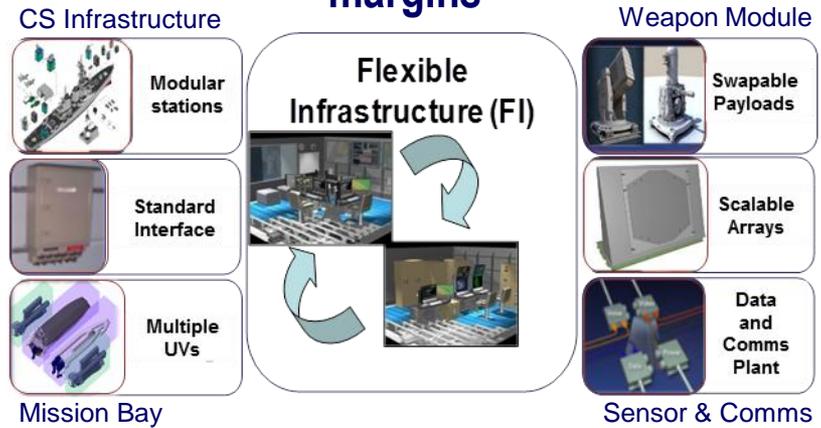
Future Imperatives

- Budgets are Getting Smaller
 - Leverage Commonality
 - Increase Use of Competition
- Modular Combat Systems
 - Issue:
 - At Commissioning, Combat Systems are on average 5 years old
 - In Modernization need to install up to date capability and keep it operationally dominant through smaller / more frequent upgrades
 - Solution: Future Ship, Open Architecture Combat System Approach
 - Establish Standard Interfaces for Combat System (Weapons, Sensors, Processors & Displays)
 - Establish 'Build To' Standards for Combat Systems Flexible Infrastructure
 - Reduce Combat System Footprint through Commonality
 - Enable Combat System Production Delivery later in Ship Construction & Modernization Process
- Increased Integration Testing
 - Robust shore based integration & test facility critical to rapid installation, test and certification
- Maintain Focus on Sustainment
 - Common Equipment on all Classes of Ships



Adaptable Ship, Open Architecture Combat System

Stations with standard interfaces and growth margins



- Allow Combat System Development Test & Integration separate from the shipbuilding activities
- One Navy Combat System Developer
- One PEO Focused on Combat System Modernization & Sustainment

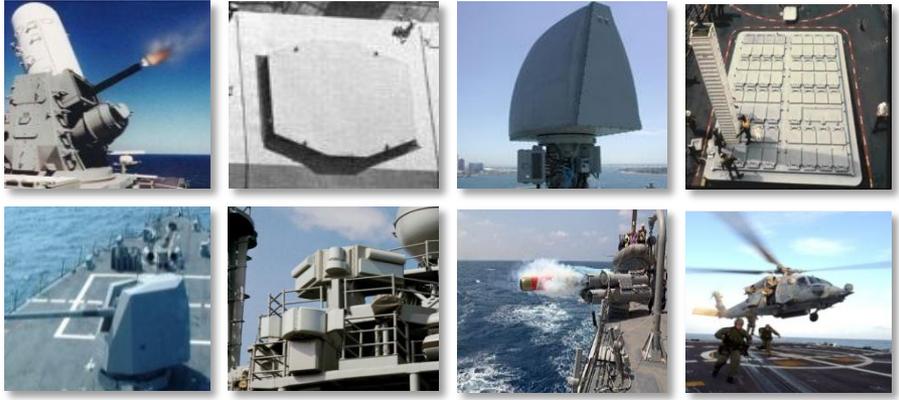


Computer program for multiple ships from a single library of components

Common Source Library
 "Fix it Once..."
 "...Use Many"



Robust development, test tools and sites to allow for decoupled payload - platform development





QUESTIONS?



Back-Up



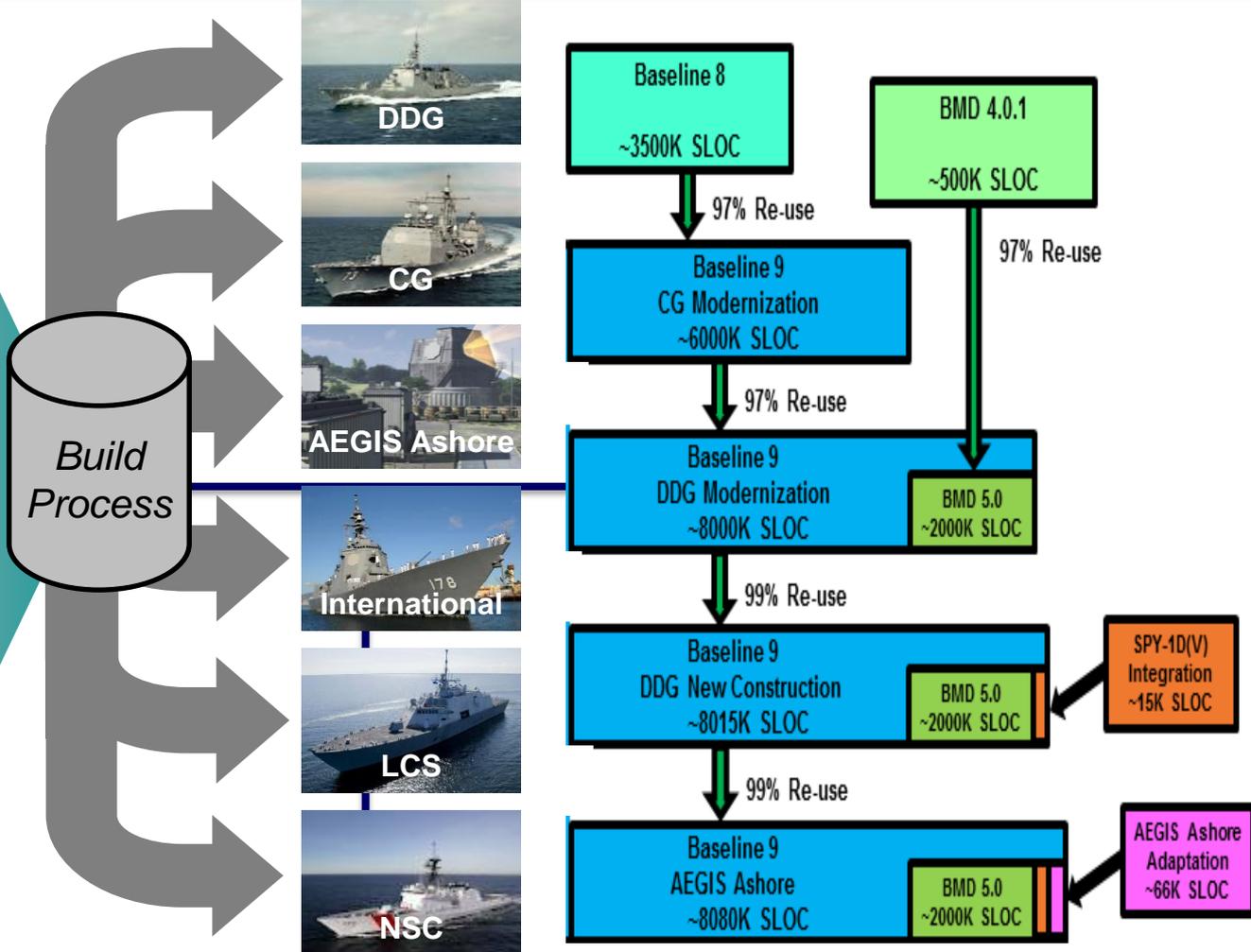
AEGIS Common Source Library (CSL) REUSE within Baseline configurations

Common Source Library

Key Elements of Common Development:

- Common Mission Capabilities
- Single Set of Specifications
- Common Program Plans
- Single Set of Processes & Metrics
- Integrated Team Structure
- Enterprise Products

“Fix Once”
“Use Many”



*AEGIS / MDA AB Cross Program Governance
In Place to Coordinate Multiple Programs Using CSL*



AEGIS Combat System Evolution Improved Multi-Mission & IAMD

Updated April 26, 2013
Programmatic Vision, Pending Funding Decisions

AEGIS Program Office (IWS 1.0) core slide (04262013) CM maintained by SI

AEGIS B/L 9

Integrated Air & Missile Defense

Radar

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

Combat System

- AEGIS OA
- BMD 5.0 cu
- NIFC-CA
- I/O Trident Warrior
- TI-12 Equipment Suite
- IFF Mode 5 Equipment

Missiles

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

EW

- SLQ-32

Mission Planning

- BMD 5.0 Mission Planner

SPY-1



Fielding

- AMOD CG / DDG
- New Construction DDG 113 - 118
- AEGIS Ashore

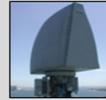
ACB 16

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

Radar

- Layered Defense Sensor Integration -SPQ-9B

SPQ-9B



SPY-1



Combat System

- AWSC Integration
- Combat ID Improvements (IFF Mode 5/S)
- C5I Upgrades (CANES, JTT-M, GCCS-M, CDL, CDLMS)
- BMD 5.1 with EOR and SBT
- TI-16 Equipment Suite

Missiles

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

EW

- SEWIP BLK II Integration

ASW

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

Readiness

- Total Ship Training Capability

Fielding

- AMOD CG / DDG
- New Construction DDG
- AEGIS Ashore

ACB Next

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

Radar

- AMDR S Band
- SPY-1

Combat System

- AMDR & SPY-1 Ships
- Improved IAMD raid handling capability
- BMD 5.1.x
- Multi-Sensor Integration
- PLA Components & Arch
- Sensor Coordination
- TI-Next Equipment Suite

Missiles

- ESSM, BLK II, 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

AMDR



SPY-1



Multi-Ship IAMD Coord.



Fielding

- AMDR New Construction DDG
- AMOD DDG
- AEGIS Ashore Upgrade

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 Engagement
- Multi-Ship Engagement Coordination
- Increased ASW/SUW Surveillance
- Deployment 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



Challenge: Commonality; Integration; Affordability; and Interoperability

- Commonality
- Integration
- Affordability
- Interoperability