Program Executive Office
Command, Control, Communications, Computers and Intelligence (PEO C4I)

Strategic Management of C4I Capability Baselines to Achieve Cost and Schedule Efficiencies

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CAPT William W. DeBow
Major Program Manager,
PMW 760
william.debow@navy.mil
619.524.7279

Statement A: Approved for public release, distribution is unlimited. (21 October 2016)
Alignment of PEO C4I Baselines with Strategic Priorities

• CNO Tenet: Strengthen Naval Power At and From Sea
  ➢ Maintain a fleet that is trained and ready to operate and fight decisively
  ➢ Further advance and ingrain information warfare. Expand the Electromagnetic Maneuver concept to encompass all of information warfare, to include space and cyberspace
  ➢ Explore alternative fleet designs. This effort will include exploring new naval platforms and formations – again in a highly “informationalized” environment

• CNSF: “Distributed lethality” is about
  ➢ Increasing offensive power
  ➢ Defensive hardening of individual ships
  ➢ Employing the ships “in a more distributed manner

• Strike Group Interoperability
• Cyber Secure / CYBERSAFE Environment
PMW 760’s C4I Builds and Baselines effort:

- Provides the design, integration, testing, configuration management and training / ILS support for end-to-end modernized capabilities

Reducing Variance, Increasing Cost Efficiencies & Improving Readiness of Deployed Capabilities
PMW 760 will instill System of Systems (SoS) engineering, testing, training, ILS and Configuration Management rigor into delivery of C4I Baselines

**SoS Systems Engineering Benefits**
- Reduced installation time and cost
- Validated capability ISO integrated systems (e.g., combat systems)
- Reduced variance in fielded baselines
- Integrated and repeatable end-to-end tests
- Timely and relevant end-to-end training
- Increased Fleet reputation

<table>
<thead>
<tr>
<th>C4I Capability Baseline Target</th>
<th>Class</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>DDG Baseline 1.0</td>
<td>DDG Class</td>
<td>FY18</td>
</tr>
<tr>
<td>CG Baseline 1.0</td>
<td>CG Class</td>
<td>FY18</td>
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<tr>
<td>LPD Baseline 1.0</td>
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<td>LSD Baseline 1.0</td>
<td>LSD Class</td>
<td>FY18</td>
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<tr>
<td>FF Baseline 1.0</td>
<td>FF 33 Class (NEWCON)</td>
<td>FY22*</td>
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</tbody>
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* GFE Delivery In-Line to NEWCON

CSRR is the PEO C4I model for Platform PMW systems integration
PEO IWS’s Advanced Capability Build (ACB) delivery is the model for AMOD (BL 9C.2) and AEGIS Ashore
PMW 760 utilizing CSRR / ACB concepts for Platform C4I Design & Integration
Pursuing Combat Systems engineering expertise to deliver C5I integrated solutions – IWS and MDA
PMW 760 Overview
Ship Integration Program Office

- **New Construction (NEWCON) C4I**
  - Participating Acquisition Resource Manager (PARM) for C4I to PEO Ships, PEO LCS, and MDA
  - Deliver integrated and tested PEO C4I portfolio as part of overall ship acquisition

- **Modernization (MOD) C4I**
  - Plan C4I alteration installs into CNO and other avails
  - Integrate into NAVSEA “One Book” modernization planning efforts
  - Act as a source for Platform C4I Baseline Configuration Management
  - Transition planned alterations to SPAWAR Fleet Readiness Directorate (FRD) for installation
Strategic Management of C4I Capability Proposal

Capstone C4I Requirements

Establish C4I Builds linked to Capstone Requirements

Consistently fund and field full builds

Study Team / CNA

Evaluate and validate efficiencies

Reliably deliver Capability to the Fleet

Business Efficiencies from Reduced Variation

- Better reliability, operational availability
- More thorough testing of fewer combinations of systems
- Better training of end to end capability
- Combined training pipelines, NEC / Training Cert reduction
- More manning flexibility – ships are more alike, skills transfer from ship to ship better
- Efficiencies in logistic products – parts, manuals, etc.
Magnitude of the Challenge

CSRR Program

• System of Systems (SoS) POR & funding
• Integrated end-to-end process (NEWCON and MOD)
  ➢ Requirements, Design, Integration, Test process
  ➢ 2 year block upgrade cycle
• CSRR Technical Direction Authority (TDA) and Design Agent through NUWC NPT
  ➢ Land based integration and testing
  ➢ Common logistics
  ➢ Common training (Multiple Reconfigurable Training System [MRTS])
  ➢ Configuration Management (by class)
  ➢ Class drawings vs. hull drawings

CRR / Surface Programs

• System / Product level designs
• No C4I “integration” funding resources
• Separate MOD process (NMP) and NEWCON process
• No single Design Agent
  ➢ No end-to-end land based integration and test for MOD
    – NEWCON does incorporate a radio room (not network) integration and test effort
  ➢ No SoS T&E plan for MOD
  ➢ System-level hull drawings vice Class drawings
  ➢ No SoS ILS support plan
    – Non-integrated (system-level) training
  ➢ Manning requirements assume non-integrated operations & maintenance for each system
C4I Capability Baseline
Design, Integration and CM Strategy

Prior to A-36

A-30
Platform BL Stage I

A-20
Platform BL Stage II
System IRD Required

A-10
Platform BL Stage III

A-9
A-9 Transition

A-4
SIDs
Install SOW Finalized
Global install Contract

A-0
ILS Cert

A+

Capability Baseline Design, Integration & CM Strategy

Advanced Planning

Design Integration

Integration Documentation

Integration Testing (E2C, et al.)

Delivery / Support / Training

Platform Baseline CM

- POM / C4I CBs
- Variance and Platform Wholeness Metrics
- Reference Target Architectures (RTAs)
  - Platform RTAs
- DoD Funct Implement Arch (DFIA) (CYBER)
- CBR – Initial (CBR-I)

- C4I CB Elements
  - FID Elements
  - Platform Arch
  - As Is Arch / FID
  - To Be Arch / FID
  - Platform ECR Stage 1
- CBR – Design (CBR-D)
  - Dependencies
  - Interoperability
  - Install
- Training Planning

- CBR – Readiness (CBR-R)
  - Platform BL Pre-Install Testing (e.g., E2C) w/ Report
    - Event Management Plans
  - C4I CB-based (e.g., BMD 5.1)

- SPEG-Compliant System SOVTs
- System of Systems (SoS) Test Plan / Procedures
- Platform Test Arch
  - As Is Arch
  - To Be Arch
  - Technical and Install Dependencies
  - QRGs and Tech Aids

- C4I System SOVTs
- Integrated Platform C4I SOVT / SOT
- Total Ship Interop Test w/ C4I
- C4I SoS Training
- SoS ILS
  - Capability QRGs and Tech Aids

- C4I HW / SW Variants
- C4I Test Pedigrees
- C4I Dependencies
  - Technical / Install / Other
- RTA – Platform – System Trace

- WSIA
  (SPAWAR C4I Authorization)

- WSCRR
  (SPAWAR C4I Certification)

- Capability Testing
  E2C Event Start

- NWSCP Certification
  WSCRR

- Capability Baseline Design, Integration & CM Strategy

- CBR – Initial
- CBR – Design
- CBR – Readiness

CB – Capability Build
WSCD – Warfare Systems Certification Decision

CBR – C4I Capability Build Review
WSCRR – Warfare Systems Certification Readiness Review

WSIA – Warfare Systems Installation Authorization

D-3: 3 Months prior to Deployment
C4I Capstone Requirements Will Drive C4I Baselines

FY18-19 DDG Objective Platform Class Baseline (OPCB)

Mission Areas

<table>
<thead>
<tr>
<th>AAW</th>
<th>ASW</th>
<th>SUW</th>
<th>BMD</th>
<th>STW</th>
<th>NCO</th>
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Mission Functional Decomposition

Communications
- Narrowband
- Wideband
- Protected
- Broadcast
- Tactical Data Links
- Tactical Comms

Networks
- Terrestrial Transport/Backhaul
- Network WAN Gateway
- Networks Afloat
- Networks Afloat Management
- Communications Circuit Management
- Terrestrial Transport/Backhaul

Application Services
- Business Apps
- Logistics
- Organizational Messaging
- Strategic Messaging
- Intelligence Surveillance and Reconnaissance
- Information Operations
- Environmental
- Maritime C2
- Navy Air Operations Command and Control (NAOC2)

Common Services
- Computing Systems Management
- Data Management
- Position Navigation and Timing
- Visualization
- Communications Services (Voice)
- Core Services (Tactical Edge)

Information Assurance
- Cross Domain Solutions (CDS)
- Integrity/non-Repudiation (INR)
- Computer Network Defense (CND)
- High Availability Enterprise (HAE)
- Confidentiality and Encryption

Testable Sequences / Threads (E2C Lab)

Drive investment decisions across the Portfolio
Baselines Methodology
End-to-End Mission Mapping to Architecture

• The mission threads are from the classified ExAMS database.
• The systems functions are decomposed from the mission threads.
• Map the system functions to test sequences.
• The test sequences define the systems.
• The platform architecture characterizes integration of systems on the platform.

Consumers - Activities
• APM-Es - E2C
• FRD / C4I – SOT
• NAVIDFOR – CSI
• Ship’s Force – M&C

Leverage Data

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<tr>
<th>Mission Areas</th>
<th>Associated Threads</th>
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<tr>
<td>SUW</td>
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<tr>
<td>ASW</td>
<td>NGLOS</td>
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<td>WIAE C4ISR ASW 760</td>
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<tr>
<td>STW</td>
<td>WIAE C4ISR STW</td>
</tr>
<tr>
<td>BMD/IAMD</td>
<td>MT4026ID/JSD BMD RI</td>
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<tr>
<td>AW</td>
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<tr>
<td>MIW</td>
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Persistent CM for Platform C4I Baselines: Background

• Problem Statement(s):
  ➢ CM: Relentless change to hardware and software elements, virtual machine configurations and services settings makes it nearly impossible to manage a platform’s “near real-time” baseline.
    – Holding ships accountable for remaining “in baseline” mandates a tool that quickly and accurately answers:
      1) “What is my real-time platform baseline configuration?”
      2) “How is my current baseline different from the originally installed and tested baseline?”
  ➢ Cyber: Inability to rapidly and accurately identify the Platform C4I Baseline makes assessments against vulnerabilities nearly impossible
    – Maintaining a platform as-tested and certified Platform C4I CM baseline is the critical foundation for rigorous cyber initiatives

• Effort
  ➢ PMW 760 is leveraging existing funding for PCM Phase I development and demonstration in 2016/2017
Persistent CM
For Platform C4I Baselines:
Concept of Operations

FLEET DEPLOYED CONOPS (FY18 END-STATE)

- HACSIM
- SOVT
- CANES
- ADNS
- GCCS-M

- AVAIL START
  - A-0
- AVAIL END
- INT/TEST
  - 10wks
- TEST
  - 1wk
- SoS TEST
- C5I TEST
- DGSIT
- DEPLOYMENT
  - IAVA 1=>n
- OPERATIONAL CAPABILITY
  - IMPACT
  - OPERATIONAL CAPABILITY
  - REVERT TO BASELINE
  - LOSS OF OPERATIONAL CAPABILITY
  - RESTORED

- SPANWAR 5.9 CERT
- BLx
- PBL1
  - Platform Baseline (PBL)
- PBL2
- PBL3

- Denotes Automatic Platform Baseline Audit Opportunity

* PMW-760 tracked via PPCM output reports
DDG Variance
Reduction Measurement

8-System Analysis
- Network
- ADNS
- GCCS-M
- EHF
- SHF
- GBS
- COMSAT
- ISR (e.g., SSEE)

C4I Score
Measures the “modernity” of a hull’s configuration on a 4-point scale

Box size reflects # of hulls in common config.
Color reflects C4I Score range

Migrating to Common, Modern Baselines (Large Green Boxes)
<table>
<thead>
<tr>
<th>Contract</th>
<th>Awarded</th>
<th>Scope</th>
<th>Small Business Impact</th>
</tr>
</thead>
</table>
| Ship Integration Program Office (PMW 760) Program Management & System Engineering | Dec 2011     | • Program / Project Management  
• Acquisition  
• Systems Engineering  
• Contract Management  
• Logistics  
• Administrative Support                                                 | Large Business Prime; Small Business Targets   |
|                                                                         | 5 year PoP   |                                                                                                                 |                                               |
| AEGIS BMD & AEGIS Ashore Systems Engineering                             | July 2016    | • Systems Engineering  
• Program Management  
• Configuration Management  
• Logistics  
• Modernization/Execution (Design Center)  
• Integration/SoS Testing and Training                                    | Small Business Prime                           |
|                                                                         | 5 year PoP   |                                                                                                                 |                                               |
| Navy Modernization / Execution (Design Center)                           | Feb 2008     | • Integration  
• Engineering  
• Configuration Management  
• Procurement  
• Fabrication / Assembly  
• Test / Inspection  
• Installation (New Construction)                                        | Large Business Prime; Small Business Targets   |
|                                                                         | 8 year PoP   |                                                                                                                 |                                               |
| Enterprise Platform Integration Contract (EPIC)                          | Sep 2014     | • Same as EPIC; follow-on                                                                                       | Large Business Prime; Small Business Targets   |
|                                                                         | 5 year PoP   |                                                                                                                 |                                               |
C4I System of Systems Baseline
Navy/Fleet Benefits

- Supports CNO Tenet: Strengthen Naval Power At and From Sea, CNSF Distributed Lethality Concept and Strike Group Interoperability

- Fleet Benefits
  - Validated capability ISO external integrated systems (e.g., IWS)
  - Move from C4I to C5I approach
  - Increase Cost Efficiencies
    - CM rigor - Reduced variance in C4I suite
    - End-to-end testing and evaluation
    - Relevant end-to-end training
    - Reduced installation time

- C4I Builds better link material solutions to delivery of overall C4I capability
  - Deliver end to end solutions
  - Capstone requirements would help rigorously link systems to overall C4I capability

- C4I Builds reduce variance by Platform
  - Variance reduction requires consistently fielding complete builds over a period of time
  - Efficiencies that support a business case for change derive largely from variance reduction

- Engineering design and integration efforts maintain internal and external System of Systems alignments
We Deliver Information Warfare Capabilities to the Fleet.

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