USN C4I Migration to a Service Oriented Architecture and Common Computing Environment

PMW-120/Distributed Common Ground System - Navy

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CAPT Rock Madsen
PMW-120 DCGS-N
703-988-8302
dmadsen@dcgsn.org
Background

- Early in DCGS-N development recognized need for COP for C2 and ISR
- Highlighted USN C4I system issues:
  - Information sharing constraints
    - Stovepiped PORs
  - Cost
    - Multiple support infrastructures (training, refresh and upgrades)
    - Overlap of requirements
  - Hardware footprint
  - Bandwidth constraints

Lack of Agility and Responsiveness
Consolidated Afloat Networks and Enterprise Services (CANES) Vision

Today’s C4I Architecture

- Multiple / Unique Networks
- Multiple Classification Levels
- Multiple Operating Systems
- Multiple Protocols
- Inefficient use of server/storage resources
- Security Vulnerabilities

No enterprise network mgmt

Network is not adaptable to the user (User must adapt to the network)

CANES adapts to users with role-based ID mgmt

CANES Afloat C4I Architecture

- Common POR Network
- Inoculated Network
- Cross Domain Interoperability

Service Levels

- Ubiquitous Information Exchange using SOA
- Applications just bring software

Hotel Services (Core Services)

Network Operations Center
ISNS Increment I+ and Compose 3.5 Integrates Core Hardware Infrastructure, Application Re-Aggregation TBD

25-65 Racks | Hardware Racks | 6-10 Racks
12-36 Sailors | SYS ADMIN | 6-18 Sailors
Current Programs (e.g. GCCS-M, DCGS-N) are dis-aggregated into smaller programs. Need to define a new program around information/data domains and prepare for software integration and test of Navy and joint (e.g. I3, NECC, JMPS) programs into CANES.

Mission/COI decision support services represent a new “requirements” approach.

USW/ASuW/MDA/BMD/STRIKE/Riverrine/SOF decision support service (mission applications) are hosted in CANES Increment 1: [Enterprise Service Bus].

COI information/integration services are hosted in CANES lite.

Hardware racks (Vendor 1) are 6-10, and 6-18 sailors are 3-12.

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Leaning Forward - (PR 09)

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Stand alone HW environments

Independent SOA environments

Common Computing Environment

Common SOA Core Services

Joint Targeting Toolbox (JTT)

CANES Incr 1 LRIP

DCGS-N Tier II / Tier III

“CANES-Lite”

CANES INC 1

SCI Networks

ISNS Incr 1

Common Geospatial Services (CGS)

Analyst Workshop (AWS)

DCGS-N Tier II / Tier III
Risks

- **Issue:** Gov’t Integration Agent
  - **Mitigation** – Compete Enterprise Integrator role

- **Issue:** System Integration Complexity
  - **Mitigation** – Total system approach to business logic, mission threads, data and information management, COI integration, and information presentation to user – Who is responsible?

- **Issue:** Test and Evaluation Complexity
  - **Mitigation** – Requires new T&E Strategy & COTF Buy-in

- **Issue:** Resource Allocation Rules
  - **Mitigation** – Prioritize functions and capabilities recovery

- **Issue:** Integrated Logistic Support
  - **Mitigation** – Develop new operator and maintenance strategy
Challenges

- Requires organizational change and leadership commitment
- Leveraging and aligning efforts
  - Significant opportunity but increases external risk and dependencies
- Cost avoidance needs to be reinvested
- Infrastructure and application reduction and rationalization
  - Follow PEO IWS ARCI model for Submarines
- Governance process for introducing new services or hardware into Afloat environment
  - Leverage lessons learned from NMCI and FAMs
- Timing and transition of programs into common environment
  - Need to avoid all or nothing approach
- Lack of documentation, training and CONOPs
  - Leverage and work with Industry partners
Collaborate on afloat (ashore) SOA way forward
- Quantify key items/actions to promote
- Synchronize the artifacts to share/leverage
- SOA governance
- Leverage previous and on-going efforts
  - DDG-1000 TSCE, NMCI, ARCI
- Lowest TOC the goal (reduced O&S $$& manpower)

We all agree SOA is good
- Must distill the essential details

The Devil is in the details…
Back-Up Slides
Migration Strategy for SOA/CCE

**MIGRATE TO SOA**

- Targeting application complete (CGS)
- Non-segmented I3 application (Analyst Workstation/Joint Targeting Toolbox)
  - Working with JDISS Program Office
- SHARP Display System (SDS) candidate FY10/11
- IPL/IESS Cohost FY10/11
- Gale Lite (ELINT) client candidate FY10/11
- Navy DCGS-N multi-node enterprise development underway
  - Existing modeling tools and engineering may extend to C4 domain

**MIGRATE TO CCE**

- CGS and I3 applications (AWS/JTT) hosted on CCE in FY09
- IPL and NGA products
  - Working with NGA for non-hardware specific application
  - Likely will not migrate until full CANES in FY11
- Providing PMW-160 multi-function workstations requirements
  - Stereo workstations will likely still be hardware specific buys
- If CIP required onboard that too will be hardware specific in the interim until NGA fields alternative solutions or migrates to a software-based CIP
  - Need Sponsor help with CIP P.O.

Notes: Requires CARRIERS and Large Deck AMPHIBS be among first for ISNS Inc 1 installation
Accurate cost savings estimate cannot be projected until we have a final Tier 2 configuration
**PEO C4I SOA Reference Architecture**

**COI Services & Applications**

**Business Mission Area**
- Military Personnel
- Financial Management
- Logistics
- ...

**Warfighting Mission Area**
- Command and Control
- Navigation
- Weapon Systems
- HM&E
- ...

**Intelligence Mission Area**
- ISR
- ...

**Basic Information Services**
- Operating Systems
- Email
- Office Productivity
- Software / Patch Delivery
- Browser
- ...

**Foundational Services**
- Mediation
- Metadata
- Orchestration
- Discovery
- Messaging / Middleware
- IA / Security
- ...

**Other Enterprise Services**
- Enterprise Collaboration
- Content Discovery & Delivery
- User Assistance (Portal)
- ...

**Network Infrastructure** (i.e. LAN)

**Long Haul Communication Infrastructure** (i.e. WAN)

**Enterprise Services Bus (ESB)**

**Governance and Standards** – NESI, FORCEnet

**Service Definition Framework**

- **Key Characteristics**
  - Plug and Play
  - Maximum Reuse
  - Ubiquitous Info Access
  - Open Standards Based
  - Data Sharing and Discovery
  - Systems Consolidation
  - Managed Risk
  - Meets Security Standards
  - Supports all Sources
  - Visualization Neutral
PMW-120/DCGS-N Transition Overview

- DCGS-N 1.1 (Tier 1)
  - Implemented DIB and enterprise
  - SOA migration over time reduces cost and risk
  - Common Geospatial Service (CGS) developed with SOA in mind
  - Some applications may not easily convert to a SOA environment

- DCGS-N Tier 2*
  - Reduce risk with ISNS Early Adopters and EDMs in FY09
  - Implement in CANES environment

DCGS-N maps well to CANES SOA architecture
Accelerated Migration Timeline
FY 08/09 Early Adopter “Quick Wins”

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<td>DMS Proxy</td>
<td>OOMA Shipbrd</td>
<td>Medical Apps</td>
<td>GCCS-M SFA (Client-side)</td>
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