<table>
<thead>
<tr>
<th>Purpose/Agenda</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Purpose</strong></td>
</tr>
<tr>
<td>• Discuss Challenges with Multiple SOA Approaches</td>
</tr>
<tr>
<td><strong>Agenda</strong></td>
</tr>
<tr>
<td>• Intro &amp; Background</td>
</tr>
<tr>
<td>• SOA Approach</td>
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<tr>
<td>• Lessons Learned</td>
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</table>
Support to the BCT is the central focus of DCGS-A.
DCGS-A Variants

**Fixed:**
- Regional Focus
- Continuous Collection & Analysis
- Dedicated Support (Overwatch) to Operationally Engaged Units
- Ensures Information Superiority
- TIBs Only

**Mobile:**
- Deployable and Modular
- Scalable to Meet Mission Needs
- Operations on the Move
- All Echelons

**Embedded:**
- Software Capability
- Spiral-out Common ISR Mission Tools
- Integrated into Complimentary Systems – ACS, FCS, NECC, etc.
- Integrated into DCGS-A at All Echelons

DCGS-A Comes in Three Variants: Fixed, Mobile and Embedded

DCGS-A SW Foundation will be DIB, SOSCOE and NCES complaint
**DCGS-A Development Evolution**

**2005-06**
- V2
  - Access to over 120 databases in OIF/OEF
  - Improved SA
  - Enhanced analyst Tools
  - SCI to Bde/Bn
  - Successfully fielded to Iraq in Dec 05;
  - Primary Intel System
  - Transitioned to DCGS-A
  - V2 TPE and training sets supported by supplementals

**2006-07**
- V3
  - Two-way Battle Command Interoperability
  - Joint Interoperability
  - Displace ASAS Light
  - Builds upon, improves on V2 in OIF/OEF
  - Adds other capability as prioritized by the TCM
  - Failover & COOP Site
  - Upgrade to Fixed Sites

**2007-08**
- V4
  - Provides on the move
  - Full spectrum BCT solution
  - Enhance common tools
  - Semi-automated Fusion
  - Start POR Migration
  - Builds on V3 SW
  - Designed to meet threshold CDD requirements
    - Net-ready & Automated fusion KPPs
    - FCS interface/interoperability
    - NCES/NECC interoperable
  - Completes steps skipped during QRC process
  - Upgrade to Fixed Sites

**2009+**
- V5
  - Completes Capabilities:
    - Automated Fusion
    - Fully Integrates PORs
    - Ground Stations and ACS
    - Enterprise Network
    - Integrated ISR Component to FCS
    - Embedded Battle Command
    - Interoperability with future sensors
    - Battle Command integration (FCS & NECC)
    - Integrates IPV6, JTRS, WIN-T

V3 made available to other Services
1. Leave Legacy Systems In Place, but Put them In the SOA Framework Via Adaptors

2. Pull Key Functions From Legacy and Convert to Services

3. Phase In SOA While Legacy Systems Are Phased Out
Software Capability Progression

**V2**
- JIOC-I

**Integrated Capability**
- Data Service Interface

**V3**
- FY07
  - ASAS-L/ACT-E
  - FCS EI1 SDM/L1F
  - Metadata Cat
  - IWEDA Client
  - DTSS Services
  - MFWS

**V4**
- FY08
  - HUMINT (HDWS, CHIMS)
  - Fusion & Analysis (BLK II ACE)
  - Prophet Control
  - Terrain Svcs (DTSS)
  - Wx (IMETS)
  - MTI & Video (CGS)
  - IMINT & SIGINT (DTES)
  - Theater/Natl DDL (TES)
  - FCS EI2 SDM/L1F/Terr

**V5**
- FY10
  - BCT BC (FCS EI3+)
  - Joint BC (NECC)
  - GR IPF
  - Prophet Triton
  - Wx (JET)
  - Urban Fusion (RAID)
  - FLT (Sequoyah)
  - Enhance Trackwolf
  - NCES/SoSCOE

**Capability Planned Leveraging of Developments**
**Limited access to stovepipe data…**

- PORs
- "Stovepipe" ISR Systems

**DCGS-A builds on the V2 success…**

**Warfighter View – DCGS-A v2 Provides**
- Provides access to over 120 databases throughout OIF/OEF
- Improved SA
- Enhanced Analyst Tools
- SCI to Bde/Bn
- Successfully fielded to Iraq in Dec 05:
  - Primary Intel System

**DCGS-A v2 is not…**
- Replacement for any POR
- Full-spectrum capable
- Single source processor
- Automated fusion
- Ground station

**Fielded Equipment (V2)**

<table>
<thead>
<tr>
<th></th>
<th>WSS</th>
<th>VIZ</th>
<th>BAL</th>
<th>MB</th>
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<tbody>
<tr>
<td>OIF</td>
<td>42</td>
<td>3</td>
<td>448</td>
<td>0</td>
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<tr>
<td>OEF</td>
<td>5</td>
<td>1</td>
<td>110</td>
<td>2</td>
</tr>
<tr>
<td>Trng Sets</td>
<td>66</td>
<td>31</td>
<td>507</td>
<td>11</td>
</tr>
<tr>
<td>Totals</td>
<td>113</td>
<td>35</td>
<td>1065</td>
<td>13</td>
</tr>
</tbody>
</table>
V3 Capabilities

• V3 Provides:
  – Ease of use via MFWS Functionality to Include: Visualization; Mapping Services; Tools to Support Data Mining, Correlation, Alerting, Analysis and Presentation
  – A Common Framework Leveraging the Advanced Analytical Capabilities of JIOC-I and Incorporates them into a DCGS-A Enterprise
  – ABCS Interoperability
  – Includes Portal Access to DCGS-A Data / Products via Existing Networks

• Providing a Means to Support Rehosting on/Displacement of ASAS-Light

Warfighter View:
- Battle Command Interoperability
- Joint Interoperability – DCGS Integrated Backbone (DIB) enabled
- Displace ASAS Light

V3 is a Software Only Build to OIF/OEF

V3.1 begins migration of ASAS FoS (ASAS-L and ACT-E) into DCGS-A
V4 Capabilities for SWB 10-12

- ISR Component to Battle Command
- Provides actionable intelligence
- Running estimate
- Planning and collaboration
- Modular and scalable
- Mobile and Transportable
- Enables distributed operation
- V4 supports EBCT

Completes POR Capability
V4 Increment 1

SOA Goals...

- **Integrated Portal**
  - Create an integrated Portal available to both internal and external users
  - Portal presents both domain-specific and multi-domain JSR 168 compliant portlets
    - JSR 168 promotes capability of using portlets in different Portal frameworks
- **Integrated Data Access**
  - Develop single multi-domain search interface compliant with NCES Content Discovery and DDMS
    - Establishes architecture for integration of NCES compliant data sources and integration of DCGS-A nodes into larger enterprise searches
- **Introduction of SOA Infrastructure Toolset**
  - Commercial Enterprise Service Bus (ESB) used to realize Multi-INT objectives though content-based routing and orchestration of domain services using BPEL 1.1 compliant workflow
    - BPEL compliance promotes capability of porting workflow to different workflow engines
  - Use of UDDI compliant service repository
    - UDDI Repository wrapped in NCES defined services to abstract complexities of UDDI and promote portability to different repository implementations
- **Establishment of SOA Governance Procedures**
  - Government and industry jointly own process for specification and validation of service interface standards
- **Implementation of a Layered DIB Compliant Architecture**
  - User Facing Layer – Portal and Desktop Visualization Framework (MFWS/VIPER)
  - Processing Layer – Service Orchestration
  - Data Layer – Publication of Metadata to DIB MDC for inter-service DCGS interoperability
  - Core Layer – SOA security model based on NCES Security Services
SOA governance manages and controls complexity by specifying, validating, cataloging, publishing, and monitoring service interfaces.

<table>
<thead>
<tr>
<th>Governance Activity</th>
<th>Design Time</th>
<th>Run Time</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Specify Service Interface Standards</strong></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>• Industry standard for interoperability / syntax (WS-I Profile, WSDL, XML Schema)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Domain Specific Services / Data Types</td>
<td></td>
<td></td>
</tr>
<tr>
<td>–WSDL (ports, operations, parameters), Schema (data types)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Validate Service Interfaces Adhere to Standards</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Catalog Services</strong></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>• Store Service Interface Artifacts (WSDL, Schema, Usage Documentation) in Service Spec Catalog</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Maintain version control / version identification for services during lifecycle</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Publish Service Interfaces To Registry</strong></td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>• Service metadata for discovery</td>
<td></td>
<td></td>
</tr>
<tr>
<td>–Descriptive data for query, Version Identification</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Service execution/binding information</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Service availability/Quality of Service information</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Monitor Service Interfaces</strong></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>• Collect service statistics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>–Usage, Availability, Performance / Quality of Service</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Update service statistics in registry</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Monitor SLA contracts</td>
<td></td>
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</tbody>
</table>
## DIB/MDC Variants

<table>
<thead>
<tr>
<th>Name</th>
<th>Sponsor</th>
<th>Tools*</th>
<th>Architecture</th>
<th>Standards</th>
<th>Documentation</th>
<th>Delivery</th>
<th>Enhancements to DIB 1.0</th>
<th>Availability/Licensing</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIB 1.0</td>
<td>Air Force</td>
<td>• WebLogic 8.1 sp3&lt;br&gt;• Oracle 9i&lt;br&gt;• MDC (WebLogic / Oracle)&lt;br&gt;• Supports Solaris 8</td>
<td>Documented in DIB delivery document</td>
<td>Listed in DIB 10.2 design reviews</td>
<td>Delivery, install, and programmer guides/docs</td>
<td>Boxed CD Set</td>
<td>N/A</td>
<td>• 80 CPU licenses of WebLogic owned by Army and available to DCGS-A (second purchase of 200 licenses ongoing)&lt;br&gt;• Oracle Army enterprise licensing available&lt;br&gt;• Installable MDC delivered on DIB CDs</td>
</tr>
<tr>
<td>RDE 1.5</td>
<td>Raytheon DCGS-A V3</td>
<td>• MDC (JBoss 4.0.3 / Oracle 10g)&lt;br&gt;• Win 2003/RHEL</td>
<td>No changes documented</td>
<td>Documented in DCGS-A V3 CDR slides</td>
<td>“Reconfiguration of the MDC after a Clone”</td>
<td>Installed on V3 hard drives</td>
<td>• MDC Query Enhancement&lt;br&gt;• MDC Events&lt;br&gt;• MDC Results Folder</td>
<td>• JBoss open source licensing available</td>
</tr>
<tr>
<td>DIB 1.2 Beta1</td>
<td>DIB Mgmt Office (DMO)</td>
<td>• WebLogic 8.1 sp5&lt;br&gt;• Oracle 10g&lt;br&gt;• MDC (WebLogic / Oracle)&lt;br&gt;• Supports Solaris 8, Win 2003, RHEL 4.2</td>
<td>No changes expected</td>
<td>No changes expected</td>
<td>Documentation updates expected</td>
<td>Installable CDs expected</td>
<td>• MDC Enterprise Bridge&lt;br&gt;• MDC Events&lt;br&gt;• MDC Results Folder&lt;br&gt;• MDC OpenMap&lt;br&gt;• MDC Runtime XSDs</td>
<td>• Army purchased WebLogic licensing (listed above) is upgradeable at no cost&lt;br&gt;• March 2007 beta availability&lt;br&gt;• Fielding at DCGS-A Fixed Ft. Gordon</td>
</tr>
<tr>
<td>DIB 1.2</td>
<td>DMO</td>
<td>• WebLogic 8.1 sp6&lt;br&gt;• Oracle 10g&lt;br&gt;• MDC (WebLogic / Oracle)&lt;br&gt;• Supports Solaris 10, Win 2003, RHEL 4.2</td>
<td>No changes expected</td>
<td>No changes expected</td>
<td>Documentation updates expected</td>
<td>Installable CDs expected</td>
<td>• 1.2 Beta1 Updates&lt;br&gt;• MDC Radial Search Fixes&lt;br&gt;• MDC Search Limit Fixes&lt;br&gt;• NSA guided install fixes</td>
<td>• Army purchased WebLogic licensing (listed above) is upgradeable at no cost&lt;br&gt;• December 2007 availability</td>
</tr>
<tr>
<td>DIB 2.x</td>
<td>DMO released RFI for evolution of DIB late 2006</td>
<td>“Emphasize DIB standards and architecture, not product implementation”</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>Use of DIB 1.2 Beta1 lines DCGS-A up with DMO plans and makes use of existing Army WebLogic purchases</td>
</tr>
</tbody>
</table>

* Only primary tools are shown
DCGS-A Specification Refinement Process

Use of Service Interface Spec help maintain open system

Government and Industry jointly own Governance Process for Service Interface Standards
Future Challenges

- **FCS SoSCOE**
  - IDL Based SOA
  - Optimized for the tactical radio net environment

- Leveraging each others developments

- Interoperability
  - Both have legacy messaging interfaces
    - USMTF, JVMF
  - Web-services to OMG IDL
    - Use of Proxies
  - Discovery
    - UDDI, JXTA
• Leverage systems that you have
• Start with most pressing mission critical functions
• Use proof of concepts and demos
• Use right technology for right tasks
• Collaborate
Questions
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Support to PM DCGS-A
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