Business & Enterprise Systems

Operate - Integrate - Innovate

AFCEA Belvoir Industry Days

Sherri Hanson
Director of Logistics & Chief Data Officer
BES Directorate Overview

MISSION
Operate. Integrate. Innovate

VISION
Delight the User!

BUSINESS AREAS
- Civil Engineering
- Communications
- Transportation
- Contracting
- Accounting
- IT Services
- Acquisition
- PPBE
- Legal
- IG
- Logistics
- Maintenance
- Supply Chain
- Personnel
- Pay
- Medical
- Infrastructure
- Operations
- Munitions
- Wing Operations

BES at a Glance
- 141 Programs
- ~3.3M Total Users
- 3 States
  - AL, OH, and TX

BES by the #'s
- $1.157B PORTFOLIO VALUE
- $25.5M PROC
- $391.1M RDT&E
- $737.5M O&M/Dir Cite
- $3.6M REIMBURSE

FY20 Accomplishments
- Delivered 23,493 Capability Requirements to Warfighter
- ** 96% Planned vs. Actual
- 462 Contract Actions, valued at $744M

89 DISTINCT CUSTOMERS and 200+ STAKEHOLDERS
Most at the GO/SES level

WE run the SYSTEMS that run the AIR FORCE

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Current Landscape

- **Tons of data to manage and analyze**
  - Order of terabytes per day; approaching petabytes

- **Multiple, disconnected, non-compatible databases**
  - Little to no data sharing between operational/tactical/strategic levels

- **Heavy dependency on human process chain**
  - Very few business processes well-defined
  - Pen & paper, by-hand database entry

- **Individualized systems lack ability to integrate easily**

- **Lack of data governance and management**
  - Large amounts of “dirty” data = high price tags and labor intensive efforts to cleanse
  - Lack of real-time data flow
  - Numerous concerns related to making decisions based on old and “hopefully clean” data
Transition from this into… THIS!

- Facilitate cleaner data from start
- Enable access to data drilldown (ie: by tail number)
- Leverage existing databases & already-made investments
- Integrate systems via “bridge code” to enable cross-data sharing and access (i.e., depot and field total awareness)
- Promote real-time data feeds to enhance decision making
Potential Integrations…Telling the Story

- Overarching A4 IT layout
- “Thread” of data from Point A to Z
- Great, working example = CBM+!!!!
- Pulls data from multiple sources to drive decisions

Product Support Enterprise OV-1

- Digital System Models
- Digital Twins
- Engineering Data (structured and unstructured)
- Supply Data (structured and unstructured)
- Maintenance Data (structured and unstructured)
- Supply Chain Mgt.
- Engineering Mgt.
- Operations Mgt.
- Financial Mgt.
- CBM, Workload Mgt., MRO, MRO-2, MRO-3, Plan, Sourcing of Material, etc.

Virtual Information Broker

- Transforming disparate structured and unstructured data into actionable integrated information i.e., Analysis, Assessments, etc.
- Supply Chain Mgt.
- Operation / Flight Data (structured and unstructured)
- WEAPON SYSTEM LIFECYCLE
- Technology Development
- Engr. and Mfg. Development
- Production and Deployment
- Operations and Support
- Materiel Solution Analysis
- Outcomes
- Visibility Assessment, MSEU, etc.
- Production Health, MRO, MRO-2, MRO-3, Plan, Sourcing of Material, etc.

Point A to Point Z --- Data to Information Pathway
How do we get there?
DoD Guiding Principles, Essential Capabilities & Goals

AF Enterprise Initiatives (CDO/CIO)

PEO BES Data Initiatives

AFMC Digital Campaign
Data Strategy Drivers

Figure 1: Data Management Functions (DMBOK2, p. 44)
Data Steward: Data steward responsibilities are assigned to specific personnel across a multi-level data stewardship hierarchy. Whether represented by a single employee or by responsibilities distributed through an organizational hierarchy, data stewards are legally accountable across the data lifecycle on behalf of the Component for:

- Establishing protection, sharing, and governance guidelines for data and datasets within an assigned subject area
- Maintaining data names, business definitions, data integrity rules, and domain values within an assigned subject area
- Complying with legal and policy requirements and conformance and data policies and data standards
- Ensuring application of appropriate security controls
- Analyzing and improving data quality
- Identifying and resolving data related issues.

Data Stewardship: The formal, specifically assigned, and entrusted accountability for business (non-technical) responsibilities ensuring effective control and use of data and information resources.
AF Enterprise Efforts

- Data Services Reference Architecture
  - Signed by Under Sec March 2019
  - Data & Interface Management
  - Reference Database Architectures
  - Interface Metadata Standards

- Data Governance
  - AF Data Architecture Working Group
  - Data Board
  - Data Council
AFMC Digital Campaign

Create a technical environment that provides for the delivery of cutting-edge capabilities at ever increasing speed and efficiency by designing, sustaining, and modernizing them in an integrated digital domain.

The Digital Campaign consists of six Lines of Effort (LOEs).

- LOE 0: Integrated Environment – IT Infrastructure
- LOE 1: Integrated Environment – Models and Tools
- LOE 2: Standards, Data and Architectures
- LOE 3: Lifecycle Strategies and Processes
- LOE 4: Policy and Guidance
- LOE 5: Workforce and Culture
### Data Lake vs Data Warehouse vs Data Hub

<table>
<thead>
<tr>
<th>Feature</th>
<th>Data Lake</th>
<th>Data Warehouse</th>
<th>Data Hub</th>
</tr>
</thead>
<tbody>
<tr>
<td>Repository Where Transactional Data Persists?</td>
<td>YES</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Foundation for Analytic Workloads?</td>
<td>YES</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Primary Focal Point of Governance?</td>
<td>NO</td>
<td>NO</td>
<td>YES</td>
</tr>
<tr>
<td>Enables Data Flow Between Diverse Endpoints?</td>
<td>NO</td>
<td>NO</td>
<td>YES</td>
</tr>
<tr>
<td>Architectural Pattern (Not a Product/Tool)?</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Best Used in Combination With Other Patterns?</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
</tr>
</tbody>
</table>
Hubs, Lakes and Warehouses Work Together — They Aren’t Exclusive Choices

Operational and Analytical Data Sharing

ERP
CRM
SCM
HCM

Data Lake

Data Hub

External Suppliers
Customers
Partners

Data Warehouse
BES Data Framework Findings

- Multiple functional efforts on-going not aligned
- Multiple functional data frameworks
- Multiple data catalogs (A4, CDO, A1)
- No federated data architecture and associated data standards
- Immature plans for data fabric
- Individual functional data stewardship
- Confusion between data storage in cloud, VAULT, warehouse
- No common access to data
- Opportunities to improve Air Force enterprise data governance
Implement Agile Data Oversight Process and Council

Develop an internal BES Enterprise Data Oversight Board – meets quarterly

- **Objective**: Track implementation of BES Data Framework initiatives to understand progress to achieving CO Data Implementation Plan and DoD Data Strategy
- **Purpose**: To increase communication and situational awareness regarding data initiatives/challenges across every systems and across functional areas
- **Output**: Measure effectiveness of data framework initiatives to meet DoD Strategy using metrics
- **Members**: Senior leaders across BES portfolio chaired by PEO – meetings led by BES Chief Data Officer (Sherri)
- **Timing**: First meeting should be two hours to define why data management is important to the AF, what the DoD Data Strategy is trying to achieve, how the CO Data Implementation

PEO BES submit BES Data Framework to SAF/AQ, SAF/MG, SAF/CN as well as functional owners (SAF/AQ, HAF/A4, HAF/A1, and HAF/FM) to obtain feedback and comments and recommend establishing a formal enterprise governance structure

- Need to identify value and purpose of Governance along with roles and responsibilities, voting members and battle rhythm.
- Leverage information from BES Data Oversight Board to influence future enterprise decisions/courses of action regarding data management.
Action Plan #2
Create a BES Data Stewardship Program

01 Create and document recommended program
- PEO should sign-out document to BES team
- Align goals to Enterprise Data Management Goals in DoD Data Strategy

02 Determine audience for Data Steward Program
- Various levels to consider: Executive, Strategic, Operational, Tactical
- Align BES personnel to levels
- BES Senior Leaders, BES PMs, BES Chief Engineers, ALL

03 Determine subject areas/objectives for each level
- For example: Awareness should include awareness of DoD Data Strategy (VAULTIS), USAF CDO Implementation Program, ties to NDS
- Subject Areas are the Functional Areas – A1, FM, A4, IG, PK
- Data Custodians manage sub domain areas within Subject Areas

04 Research other USAF Data Steward Programs
- Determine gaps and specific responsibilities for BES PMs, BES CE
- Build targeted brief and training for BES team & Functional Areas
Action Plan #3
Develop a BES PEO Data Fabric for Data Consumer Self-Service

Define high level mission, org/technical responsibilities, application requirements, personas, tools for all BES PEO Customer Subject Areas (A1, FM, A4, IG, PK)

Gather and analyze relevant, high value AF enterprise Use Cases for all Subject Areas and develop prioritization across/within BES

Develop evaluation criteria for Data Fabric platforms; Evaluate candidates; Select platform product

Data Quality (DQ) – ID & Prioritize Critical Data Elements (CDEs) across Use Cases

Harmonize data via remediation, fusion, and alignment

Re-prioritize Use Cases and Iterate Next set

Evolve reusable framework to manage, grow Data Fabric

Connect Data Prep tool to Data Fabric to curate, ingest data

Define Policy Management for Use Cases (governance, security, privacy, auditability)

Synchronize external Data Catalog and Data Fabric metadata

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Adapted from Stardog “How to build a data fabric”
**Action Plan #4**

Orchestrate Functional Area prototypes into the BES Data Fabric

For each Functional Area (A1, FM, A4, IG, PK), prototype subject area domains, sub-domains, metadata sources

Build MVP (Minimum Viable Product) – build info models, connect models to data catalog (metadata)

Evaluate pros and cons of the Data Fabric Prototypes

Determine Go/No-Go to implement an orchestrated roadmap for the Data Fabric

**01** Identify a small set of Use Cases, their needs that are representative of each Functional Area (and possibly some that span Functional Areas)

**03** Build MVP (Minimum Viable Product) – build info models, connect models to data catalog (metadata)

**05** Evaluate pros and cons of the Data Fabric Prototypes

**07** Develop detailed roadmap and schedule to sustain, evolve, and grow BES Data Fabric

Adapted from Stardog "How to build a data fabric"
Identify & Define
Identify, implement metrics: Define, Measure, Analyze, Improve, Control for each of the VAULTIS variables for each of the functionals in the BES portfolio (A4, FM, A1, PK, IG)

Measure, Analyze, Improve, Control
Implementation and adherence to Data Management standards and processes
- Data Risk Events
- Data Remediation Costs

Scorecard
Establish a Data Governance Metric Scorecard
Track & Review performance metrics
Purpose, Objectives, and KPIs
Next Steps

- Governance (reviewing existing charters)
- Data Stewards (internal to BES)
- Identify on-going efforts to determine use cases