An Integrated Platform for Mission Performance: GSFC’s Meta Information System

Management Systems Branch
Safety and Mission Assurance Directorate
Goddard Space Flight Center

10/26/2016
Today’s Topics

• Overview / Goals
• Process Performance
• System Design & Data / Information Management
• Analytics
• Challenges Ahead
• Discussion
Overview

- Meta information system project started in November 2012
  - In-depth study of legacy, stand-alone applications showed that capabilities for supporting process performance, data/information management and analytics not effective, integrated nor on par with best practices and state-of-the-market solutions
  - Commercial software licensed from Intelex for NASA use in February 2013
- Initial Meta applications deployed in May 2014 ... and since then functionality/data/information from six legacy applications incorporated into an integrated system
- Now operating ten Meta applications ... with more on the way!
- Steadily increasing user base (NASA civil servants, support contractors) with 1,196 current users
- Currently managing 6.8 gigabytes of data and 42,856 records
- Securely operated with 24/7 access on-site and remotely
- System planning, management and operation with process owners/stakeholders, users and a lean, dedicated team to provide end-to-end support
- Meta: short-hand reference to metamorphosis – process of transformation
Purpose / Goals

An integrated, state-of-the-market information system for process performance, data/information management, and analytics supporting the GSFC Management System, GSFC Supply Chain Management, NASA mission performance and the following goals:

• conformance of GSFC mission products and services with requirements on a sustainable basis;

• product and process improvements throughout the GSFC enterprise (i.e., GSFC organizations and mission project supply chains);

• informed decision-making; and,

• reduction of risks in GSFC mission performance.

Meta operates *smart* (controlled, streamlined, data-rich) processes
GSFC Supply Chain Management

**Mission Performance**
Spacecraft, Instruments, Ground Systems

**Outcomes**
- Quality Products and Services
- On-Time Delivery at Acceptable Cost
- Innovative Problem-Solving / Continual Improvements
  - Risk Reduction

**Core Functions**

**Supplier Development**
- Technology Investments
- Procurement Policy
- Small Business Programs
- Outreach

**Acquisition / Team Building**
- Acquisition Strategy
- Proposal Team Building
- Procurement (GSFC and contractor tiers)

**Performance Management**
- Project Management / Contract Oversight
- Mission Assurance Requirements
- Surveillance and Inspections
- Parts to System-level Testing

**Assessment & Risk Management**
- Project Lifecycle Reviews
- Supplier Assessments / Analyses
- GIDEP / NASA Alerts
- Risk Management

**Information Systems for Process / Data Management and Informed Decision-Making**

Colors:
- Red = SMA (Code 300)
- Blue = FPD (Code 400)
- Gold = AETD (Code 500)
- Green = Procurement (Code 210)
Applications

- Operational applications:
  - Management System Assessments
  - Supplier Quality Management Assessments
  - Process Findings (from the above and other internal sources)
  - Product Findings (Problem Reporting / Problem Failure Reporting)
  - Product Findings (Spacecraft On-orbit Anomaly Reporting)
  - Supplier Insight
  - SMA Risk Management
  - SMA Watchlist
  - Mission Projects
  - Meta Help Desk

- Additional applications on the way, including:
  - Product Inspection Tracking (pilot deployment)
  - GSFC Review Management (full deployment)
  - Integrated SMA Project Team (CSO) Reporting (definition / design)
  - Mission Products (definition)
• Awarded to the Meta Team “for revolutionizing how Goddard Space Flight Center manages information, modernizing legacy systems and providing cross-cutting data analysis capabilities for risk-informed decision-making.”

• The medal is awarded to “teams by NASA Center Directors for a stellar achievement that supports one or more of NASA’s Core Values.”

NASA’s Silver Achievement Medal
Presented at the 2016 Agency Honor Awards Ceremony @ GSFC
Process Performance
Application Building & Upkeep

- Concept / Requirements Definition … including integration across applications and data linkages with other information systems
- Solution Design
- Configuration, Testing, Acceptance and User Training
- Operational Readiness and Deployment
- Post-Deployment User Assistance/Help Desk and Improvements

Success Factor: blending process knowledge and IT/software expertise to build and operate smart processes
Silo Approach: traditional thinking + fragmented IT/software solutions

Meta Approach: systems thinking + integrated, scalable architecture + configurable IT/software solutions
Meta applications for smart processes

Meta selectively integrates data/information across applications (processes), creating synergistic value for users

Support goals/desired outcomes
Success Factor: systems thinking and enterprise knowledge combined with robust, object-oriented software to create an scalable platform for integrated process performance and data/information management.
# Data / Information Management
## Audit Trail

### Who, what, when, how......

<table>
<thead>
<tr>
<th>Audit</th>
<th>Audit Operation</th>
<th>Object Name</th>
<th>Database Operation</th>
<th>Operation Name</th>
<th>Operation</th>
<th>Audit Fields</th>
<th>Description</th>
<th>Field Name</th>
<th>Field Name</th>
<th>Old Value</th>
<th>New Value</th>
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<th>Record ID</th>
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<tbody>
<tr>
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<td>View in Inventory</td>
<td>InBriefUpload</td>
<td>SA-55864-2016-2</td>
<td>ATK Space Systems, Inc. (Orbital ATK, Inc.) - Goleta, CA - CAGE: 55864</td>
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<td>Assessments</td>
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</tbody>
</table>
### Data / Information Management

**Application Inventory, Filter/Search/Sort & Export**

- Filter/search with column text fields
- Advanced Search
- Quick sort (ascend/descent) on headings
- Export to xls file (Excel)

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#### Home > Suppliers

<table>
<thead>
<tr>
<th>Supplier</th>
<th>Abbreviation</th>
<th>CAGE</th>
<th>Affiliated Projects(s)</th>
<th>Current Supplier Address</th>
<th>North American Industry Classification (NAICS)</th>
<th>Supplier No.</th>
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<td>• JPS-2 Instruments</td>
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Analytics

- Built-in capabilities for analytics to support process management, in-depth analysis and decision-making
- Standard and customizable search filters
- Standard and customizable output features (data export to xls, pdf, Word)
- Real-time dashboards (data visualizations and tables) for process management and process outputs (results)
  - Drill-down to records
  - Configurable displays

Success Factor: pro-actively engage process owners, users and stakeholders in the upfront planning, design and operational refinement of dashboards
Problem Reporting

XYZ Project

PR Count

Actual Date

Days Open

PRs in Open Status

PRs in Closed Status

Moving Average Days Open

Total Remaining Open: 9
Average Days Open: 59
As of 8/25/2016
Challenges Ahead

• Continue to reduce process gaps and fill data holes to create unprecedented process / data integration, increasing value for all users as utilization grows (*snowball effect*)
  – Data linkages with other systems and information resources

• Further build-out, refine and *socialize* dashboards / system outputs for process management, analysis and informed decision-making

• Maintain and foster steady growth in system utilization

• Stay abreast of user / stakeholder needs and new capabilities to remain state-of-the market
Mission Performance

State-of-the-market
Scalable
Modernization
Transformation

Customer Engagement

Legacy Data
Information Silos

Process Performance

Analytics
Data / Information Management

System Management

Operational Security

Process Improvements

Solution Design

24/7 Access

Process Gaps

Data Holes

Data/Process Integration

Object-Oriented Software

USER OUTREACH / ASSISTANCE
Discussion