Copyright Material

Use of any part of this work or derivations of is prohibited without prior approval of author.

• Presenter
• David M. Hammond, RLA, APA
• Office of Civil Engineering
• U. S. Coast Guard

11 January 2007
The Strategic Process Behind BIM Enabled Decision Processes

• Presenter
• David M. Hammond, RLA, APA
• Office of Civil Engineering
• U. S. Coast Guard
Linking Facilities to Missions
Missions to Public Outcomes
Overview
Standards based Building Information Modeling

Experiences of a Government Owner-Operator with new business practices and technologies:

- What we intended to achieve
- What we did differently to achieve it
- How we will measured success
What we intended to achieve

Organizational Transformation

• Move from a locally focused sub-optimized facility engineering perspective…

• To an enterprise-wide asset and portfolio management organization focused on managing $7.5B PRV for CG-wide Strategic Outcomes.

• Link Facilities to Mission Outcomes.

• Achieve 17% to 25% recurring savings in how we deliver services.

• Achieve CFO Act Audit Certification (Sarbanes/Oxley).
What we did differently

• Reengineered Processes

• Identified Enabling IT

• Instituted Organizational Change
Be an Info-Centric Organization
Framework for Integrated Decision-Making

Essence of this *IT-Enabled* Enterprise Framework:

- Moving away from building-centric and project focus
- Moving to a portfolio-based, business process linked to strategic outcomes
- Integration of individual asset portfolios; i.e., Buildings, Cutters, Aircraft, Logistics, IT and HR
- Continuous horizontal flow across the organization
- Break down of the traditional structure of professional and trade disciplines and traditional stove piped software development
- IAI-IFCs and IFGs important because they enable the horizontal process flow through an open architecture and international standards
Cross-Functional Mgmt Recognizes that:

- *Process*, or how we *get things done* must be treated as a strategic corporate priority.

- Competition is won by treating all parts of the organization as a single unified whole.

- Critical cross-functional shore infrastructure processes managed by process managers.
Process Reengineering
Vertical Value Chain Alignment

Process Alignment
• Link and align daily tactical activities to agency-wide strategic outcomes.

Value Chain
• Link facility capabilities to operational requirements: our customers;

• Link operational capabilities to mission requirements

• Link mission capabilities to public demand for goods/services: our customer’s customer.
Operational Metrics + Data = Decision Support

Asset and Portfolio Performance

Mission Readiness Index

Mission Dependency Index

Faculty Condition Index

Space Utilization Index

Additional Assessments

Systems Criticality Index

Most Important Mission

Most Important Building

Most Important System
Mission Driven Decisions
Linking Facilities to Missions

SCI Says Roofs and Electric....
MRI says deficiency and Highest priority

Now Electricity and Roofing with greatest deficiency versus Performance Requirement take Priority

Provided by MACTEC

11 January 2007
DHS-CAO Forum
U.S.C.G.
Facilities Maintenance Dollars, Time, and Building Systems. Animations shows how systems can fail over time with current spending methods.

Provided by AEC Infosystems, Inc
Decision Strategies
Capital Assets are Part of the Common Operational Picture

Managing Operational Requirements, Infrastructure Capability, and Organizational Needs.

Provided by AEC Infosystems, Inc
Capital Asset Management Portal
Access to Aggregated Database and Graphics

CAMP combines and displays portal tools and data views supporting Portfolio Management and Integrated Decision-Making and Value Chain.

• Portfolio Management Links Supply and Demand Side of Scenario Based Mission Planning:
  • Real Time Mission Readiness
  • Scenario Based Business Case Development
  • Automated Planning Documentation and Web-enabled Approval Process
  • Value Chain as Web-enabled Workflow
Left Shift in Decision Support
Simultaneous Life Cycle-Spanning Business Case

[Diagram showing the time phases of decision support with emphasis on early decision-making and cost effectiveness.]
Combined BIM and GIS Workflows
Multiple Data Sources Accessed through CAMP
Security
BIM Based Scenario Planning
Combined BIM and GIS Workflows
Multiple Data Sources Accessed through CAMP

Onuma Planning System

Google Earth

ArchiCAD / XML

Sketch Up
Rapid Design Tools Fit Into BIM
Rapid Project Execution of Chosen Business Case

Provided by Onuma, Inc. AEC Infosystems, Inc
Rapid Planning Tools Fit Into BIM
Integrated Planning & Business Case Decisions

PROGRAM ELEMENTS (ROOMS) IMPORTED TO EXISTING FLOOR PLAN FROM SECTOR PLANNER

PROGRAM ELEMENTS MOVED INTO FLOOR PLAN OF EXISTING FACILITY/BUILDING

APPROXIMATE FIT OF 'IDEAL' PROGRAM INTO EXISTING BUILDING.

SHOWING DETAIL OF PROGRAM ELEMENTS PLACED INTO FLOOR PLAN

FINAL ADJUSTMENTS MADE ACCORDING TO PROGRAM ELEMENTS, FURNITURE, EQUIPMENT & FLOOR SPACE.
Inefficient Workflows

“Stove-Piped” Data Collection Diagram

Efficient Integration of Numerous Data Points is Required

Provided by Onuma, Inc. AEC Infosystems, Inc.
Efficient Workflows
Integrated and Interoperable Data Collection

Leveraging BIMs to Integrate Disparate Data Points

Provided by Onuma, Inc. AEC Infosystems, Inc
BIM Levels of Information
Stepped Strategy of Data Collection and Modeling

Minimal level of data modeling necessary to integrate BIMs with other data?

Surprising little is needed to get the highest value from the BIMs.

Value comes over time in a logical stepped sequence of data collection.

All of the levels can reference data that exists in other levels of detail.
How we will measure success

• Organizational Performance

• HPO Contract Performance

• Asset and Portfolio Performance

• Continuous Performance over Time
Quality Control Plan (QCP)
Quality control processes

- Balanced Score Card (BSC)
- Operational Metrics
- Performance Requirement Summary (PRS)
- Continuous Performance over Time
Balanced Score Card
Organizational Performance

CUSTOMER
- Deliver shore facility asset management services to enable CG operations
- Provide one voice, seamless infrastructure support
- Link shore infrastructure to mission requirements

INTERNAL PROCESSES
- Provide full-service management
- Provide best value products
- Anticipate & advocate customer needs
- Improve real management
- Develop tools & processes
- Develop & sustain knowledge management systems

EMPLOYEE GROWTH & LEARNING
- Expand core operational knowledge
- Value the work we do
- Anticipate & advocate customer needs
- Minimize shore TOC
- Maximize mission

FINANCIAL
- Maximize mission
- Minimize shore TOC
- Expand core operational knowledge
- Value the work we do
- Link shore infrastructure to mission requirements
Mission Dependency (MDI)
Linking Facilities to Missions

This critical Facility Assessment links facilities to mission from an Operational Risk Management perspective.

MDW = Mission Dependency Within a Command Entity

<table>
<thead>
<tr>
<th>Facility Name</th>
<th>Q1/Q2 MDw</th>
<th>MDw Ave</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Hub</td>
<td></td>
<td>3.87</td>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sites Requiring Air Station Support</th>
<th>Q3/Q4 MDw</th>
<th>MDw Ave</th>
<th>(Number of Missions) N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Station Catham</td>
<td>4.75</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Station P-town</td>
<td>4.33</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Station Woods Hole</td>
<td>3.67</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ATN Woods Hole</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group Woods Hole</td>
<td>6.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>MDW total</strong></td>
<td><strong>19.33</strong></td>
<td><strong>3.87</strong></td>
<td></td>
</tr>
<tr>
<td><strong>MDW Ave</strong></td>
<td><strong>3.87</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Created by Naval Facilities Engineering Service Center, Port Hueneme CA and co-developed with the USCG</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Linking Facilities to Missions
Missions to Public Outcomes