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SAME
Creating Value in a Changing Industry
BIM: Reality Check and Future Agenda

GSA Program

Public Buildings Service
March 26, 2013
GSA’s mission:
To deliver the best value in real estate, acquisition, and technology services

PBS has two fundamental activities:

Space acquisition through new construction or leasing to

65 agencies, 335 bureaus, commissions

Life-cycle asset management of acquired space
GSA Public Buildings Service

Challenges:
• Dynamic Economic Environment
• Increased Security Requirements
• Speed of Delivery
• Resilience
• Energy Efficiency
• Lack of necessary funding
PBS Portfolio

- Owned Portfolio Replacement Value $70 Billion
- Average building age 47 yrs
- 1972 FBF – revolving fund: use current revenue to pay for liabilities
- Proper investment: 2 to 4% of replacement value toward upgrades annually ($1.4B to $2.8B a year)
Sequestration

- GSA is in a "sequestration-free zone," according to subcommittee chairman Rep. Ander Crenshaw (R-Fla.)

- GSA funds come from
  - agencies’ rental payments
  - charges for using GSA contracting services,
  - i.e. the Industrial Funding Fee (FBF, ACF Acquisition Services Fund), rather than appropriated funds.
Freeze the Footprint

• Policy: Agencies must offset annually “any growth in total office and warehouse space” with “corresponding reductions” in total space.
  • Any property declared “excess to GSA” will be considered an offset
  • better utilize existing space through consolidations, higher occupancy rates (co-locations), and disposals
  • “Revised Real Property Cost Savings and Innovation Plan” by May 15, 2013
GSA inventory: 1530+ Owned Buildings

- Historic: 26%
- Mid-20th Century: 56%
- Recent Design/Construction: 8%
Innovation

Create a Culture of Innovation

- GPG - Energy generation at site
- Flexible / Mobile work environments
- Smart Buildings Network
- Alternative Financing & Exchange Authority
Industry

- As of 2019 all new public buildings in Finland must be nearly zero energy buildings and as of 2021 the EU directive will also apply to all other new buildings.
- nearly zero energy buildings. Granlund coined the term "nZEB ready".
Savings

- Improve Federal Utilization of Space
  - Reduce leased space
  - Increase Utilization in Federal owned space
  - Accelerate disposal
  - Support civilian property realignment initiative
Efficiency

- Optimize GSA Inventory
  - Green the inventory
  - Improve building efficiency

- Create a High Performing workforce
  - Invest in IT that enhances employee productivity and identifies best performance
Reinvestment Funding

Repair & Alterations Funding (BA54/BA55)

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Recapitalization of the Portfolio

R&A Appropriation Funding History with FRV Comparison


2% FRV 2% - 4% FRV Total Appropriated BA 54/55 (millions)
Capital Construction as a Percentage of Total Budget

Capital and Operating Budgets

- Capital Budget
- Building Operations and Purchase Contract Budget
- Rental of Space Budget
PBS Initiatives

- P-100 -- PBS Facilities Standards
  - Performance based
  - Modeling based verification

- Plot sustainable location characteristics for GSA properties

- GSA’s BIM Program updates - FM
GSA’s P100 Performance Standard

P100 Transformation Goals

• Optimize performance
  • Energy, Water, Waste, etc.
  • Health and Productivity
  • Space Efficiency and Flexibility
  • Life Cycle Cost and Environmental impact effectiveness
  • Financial Performance
GSA’s P100 Performance Standard

P100 Transformation Deliverables

1. Performance Criteria
2. A Means to Verify Performance
3. A Means to hold parties Responsible for Performance
4. A process to keep it updated and accurate
BIM Program

→ Pilot Program

→ GSA National Policy

→ National Standards

→ International Agreements
International Collaboration among Public Owners

- public owners from United States, Finland, Netherlands, Norway, Denmark (January 2008)
- joint statement in support of BIM, open standards and collaboration
- expanded to Estonia, Iceland, and Mexico (September 2011)

January 2008 Signing

September 2011 Signing
Project Purpose

- Revit Model
- Bentley Model
- ArchiCad Model
- Digital Project Model

common IFC file format

- space program review
- simple energy load analysis
- circulation & security review
- cost estimate

provide significant automated feedback for early stage concept design
Priorities—The GSA BIM Guide Series

01—Overview
02—Spatial Program Validation
03—3D Imaging
04—4D Phasing
05—Energy Performance and Operation
06—Circulation and Security Validation
07—Building Elements
08—Facility Management
The 3D-laser scanning process:
From Building Features to 3D model
Courthouses have three distinct circulation systems: for public, staff and defendants. Security and the integrity of the court process are critical issues. Circulation and security dominate early planning and the design concept, and affect many details.
3D circulation rules define all paths within the building going through space that can be used for circulation.

On a 6-story courthouse, approximately 27,000 routes tested using 302 circulation rules in approximately 10 seconds.
typical building – complex solution

Invest in clean, renewable energy resources

- Geothermal, photovoltaic solar electricity, solar thermal water heating, and wind power
<table>
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<tr>
<th>Design</th>
<th>Build</th>
<th>Operate</th>
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<tr>
<td>□ Return on Investment</td>
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<td>□ BIM Server</td>
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Early Concept Design
Energy Analysis Reports
- 4 projects were managed by separate AE/GC teams
- Each project complied with GSA National BIM Guides, but a higher level of consistency was required
- Examples of variances:
  - Geometry
  - File Naming
  - View Naming etc.

- Improved scan-to-model procedures allowed design team to model only what was needed
- Refined templates provided requisite level of model attributes in IFC and COBie formats
- Prototype for data set management was developed for FM

- Wiki style BIM standards website
  - GSA National BIM Guides
  - Statement of Work
  - BIM Execution Plan
  - Templates
  - Level of Detail
  - Guide to deliverables

- BIM Standards website available to the other regions and basis for National BIM Toolkit Site
Executive Summary - EGWW

VDC Score: 70%

Planning
- Objective: 52%
- Standard: 71%
- Preparation: 80%

Adoption
- Process: 73%
- Organization: 72%

Technology
- Maturity: 92%
- Coverage: 80%
- Integration: 51%

Performance
- Quantitative: 68%
- Qualitative: 67%

CIFE, Stanford University © 2012
Life-Cycle BIM for Facility Management

- Final Concept BIM
- Design-Intent BIM
- Construction BIM
- As-Built/Record BIM

Equipment Information, Type, Warranty; Fabrication Model
IFC + NavisWorks + COBIE + Native (tekla / cadduct / quickpen)
BIM / BAS / CMMS Integration

Viewpoints: System, Search Asset, Room Data Sheet, Work Orders, BAS Information

Properties: Asset, Type, Document

Parameters: Name, Area served, Description, Tag Number, Mark, USC Equipment, Design Option, Comments, Type Name, Alternative Manual, Instance Description, Oper Wt, Type Description, System Served, Master Format, Instance Name, Notes, USC BMS ID


Graphs: Time Series, Percentile, Bar, Pie, Area, Line, Scatter

Parameters: VAV Box D01, VAV Do.

Values: 41.50, 105.05, 70.00, 62.67, 190.70, 190.70

Graphs: VAV Box D01

Values: 100.704, VAV D01, 37.50, PFRPCF, 2738001, VAV-D01, AHU-D01, SCV-VA...
BIM-FM across GSA  (Region 4 Prototype)
Many Files -> Middleware -> FM Apps

BIM & Facility Management

FM App A
FM App B
FM App C
FM App D
FM App E
FM App F

COBIE2
BIM Server

• Central, secure location to store all BIM models
• Allows users across GSA business lines to see what has changed in previous versions of BIMs
• Completed market analysis and looking at various procurement options
• Coordinating with Statsbygg (Norway) to share lessons

Phase 1
Procure BIM server
3D-4D Building Information Modeling

In 2003 the General Services Administration (GSA), through its Public Buildings Service (PBS) Office of Chief Architect (OCA), established the National 3D-4D-BIM Program. OCA has led over 30 projects in its capital program, and is assessing and supporting three dimensional (3D), four-dimensional (4D), and Building Information Modeling (BIM) applications in over 35 ongoing projects across the nation. The power of visualization, coordination, simulation, and optimization from 3D, 4D, and BIM computer technologies allow GSA to more effectively meet customer, design, construction, and program requirements. GSA is committed to a strategic and incremental adoption of 3D, 4D, and BIM technologies.

There is a progression from 2D to 3D, 4D, and BIM. While 3D models make valuable contributions to communications, not all 3D models qualify as BIM models since a 3D geometric representation is only part of the BIM concept.

Critical to successful integration of computer models into project coordination, simulation, and optimization is the inclusion of information—the “I” in BIM—to generate feedback. As a shared knowledge resource, BIM can serve as a reliable basis for decision making and reduce the need for re-gathering or re-formatting information. GSA is currently exploring the use of BIM technology throughout a project’s lifecycle in the following areas: spatial program validation, 4D phasing, laser scanning, energy and sustainability, circulation and security validation, and building elements.

http://www.gsa.gov/bim
Questions

Charles Matta, FAIA
GSA – Public Buildings Service
For more information visit: www.gsa.gov