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The USC School of Cinematic Arts:
The Arrival of Spring in the Facilities Industry

BIM: The GSA Story

By Stephen R. Hagan, FAIA, Peggy Ho and Charles Matta, FAIA

THE STORY OF BUILDING INFORMATION modeling (BIM) at GSA has been both an extraordinary story of aligning business needs with technology, as well as a case study in how to combine social, business and technology efforts in an effective organizational transformation. Four purposes of this article are to:

1. Provide a brief chronology of how BIM was introduced and adopted at the U.S. General Services Administration's (GSA) Public Buildings Service (PBS).
2. Illustrate "The GSA BIM Story" with examples of successes, emphasizing that although efforts have been underway for six years, the BIM initiative is just beginning to bear the fruit of its labors.
3. There is a considerable way to go to achieve the promise of BIM in an owner organization as large and complex as GSA.
4. Provide a summary roadmap for other owner organizations considering the adoption of BIM.

THE "MANDATE" HEARD 'ROUND THE WORLD

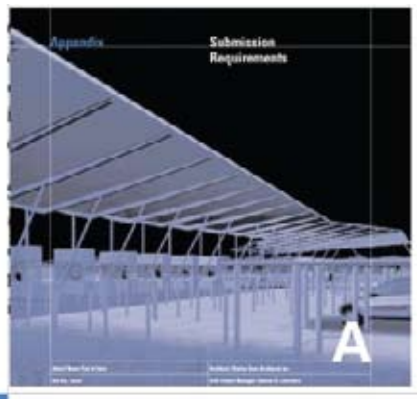
In early 2003, BIM began to gain significant interest at organizations such as the American Institute of Architects (AIA). As GSA PBS held its first Project Knowledge and Technology Showcase during the 2003 PBS Capital Construction Conference in Seattle, a number of technology companies including Autodesk, Bentley, Optira, and Commonpoint featured 3D building information modeling, 3D Scanning, and even 4D schedule + BIM visualization and analysis. Interest within GSA PBS was sufficiently high that an update to the Facilities Standards for the Public Buildings Service (the document known as the 2003 edition of P-100), included a paragraph that stated: "GSA has set a goal to require interoperable Building Information Models (BIM) on FY06 projects in support of improving design quality and construction delivery."

Two important points in that message were:

- The focus on the business problem of improving delivery of capital construction projects (both new and repair and alterations); and
- Beginning with the early design stage.

In spite of this being clearly stated as "a goal", organizations around the world took this as a "mandate" and applauded GSA for "putting a stake in the ground." Interoperability efforts had been underway since 1994 by the International Alliance for Interoperability (IAI), but this is the first time that an organization with the scale of projects and building assets and influence on a construction economy had made such a public and forward thinking statement.

The GSA 3D/4D BIM team began in earnest to bring the "goal" to reality. Three paths were pursued, all ultimately contributing to the BIM program's success. These paths coincided with the statement at the beginning of this article that technology, business, and social dimensions all needed to be pursued to achieve success.



Building Information Model

GSA has set a goal to require interoperable Building Information Models (BIM) on FY07 projects in support of improving design quality and construction delivery. The office of the Chief Architect is developing scope guidelines and offering regional pilot opportunities to help the regions in meeting this requirement. During the initial phase, and in support of design reviews during the concept design stage for the new construction and modernization projects, interoperable BIM delivery shall

294 FACILITIES STANDARDS FOR THE PUBLIC BUILDINGS SERVICE

A.1 General Requirements – Drawings

Revised March 2006 - PBS P100

BIM PROTOTYPING REAL WORLD PROJECTS

The exploration of BIM technology and illustrating its true benefit to GSA was developed in the Center for Federal Buildings & Modernizations by a Stanford University Center for Integrated Facility Engineering (CIFE) Fellow, Calvin Kam, Ph.D., AIA, under the guidance of Charles Matta, FAIA. This collaborative team chose a wide array of ongoing projects where BIM technology might provide a benefit.

From a historic courthouse in Oregon which was undergoing a renovation requiring seismic base isolation underpinning the entire masonry load-bearing structure, to a security upgrade to a plaza in an urban Federal Building in New York City, each BIM case study investigation illustrated how 3D modeling could solve project-level problems and save time and significant amounts of money. Some investigations were at the micro-level of 1/64" of an inch, showing how new security windows could achieve their function while fulfilling visual requirements of one of GSA's most historic structures. Spatial investigations, with the added dimension of 4D time-lines, helped to illustrate how a massive project in Los Angeles could accommodate tenant needs with limited disruption.

Most important to GSA in these studies was realization that BIM could be a real benefit for many building types, both new and renovations, and across the entire life cycle of planning, design, construction and facility management and operations.

THE BUSINESS OF BIM: ENGAGING WITH TECHNOLOGY COMPANIES

While prototype studies clearly demonstrated the value of BIM to GSA, the challenge of implementing BIM for a program with over 200 active projects, valued at over $12 billion, meant that the program needed to be business-focused, easily understood, and achievable with near term successes. A critical decision by the GSA BIM team was to narrow down the BIM effort initially to something universally understood and at the core of GSA's mission: Space. In this case, the real property space that tenants occupy in GSA buildings, that projects are justified based on need of space, and that are the result of new or renovated construction projects, for the

purpose of rent revenue from government agencies to GSA. Spatial BIM, then, if it could be achieved economically and effectively with commercial software tools, would truly enhance and support GSA PBS's core mission.

The GSA BIM team decided to engage with industry technology leaders and challenge all of them equally to include the GSA BIM Final Concept spatial requirements in their shipping software. The business case had two dimensions. If GSA's BIM requirement was in shipping commercial software, easy to use and implement, the impact on the architect-engineer firms that were responsible for projects would be minimal. Second, technology companies would sell more software because it was both innovative and met a stated industry-wide need.

The development of a publicly available GSA BIM Guide Series was undertaken, with the following firms participating and fully supportive:

- Autodesk
- Bentley
- Graphisoft
- Onuma
- Digital Alchemy (support to GSA)
- Solibri (support to GSA)

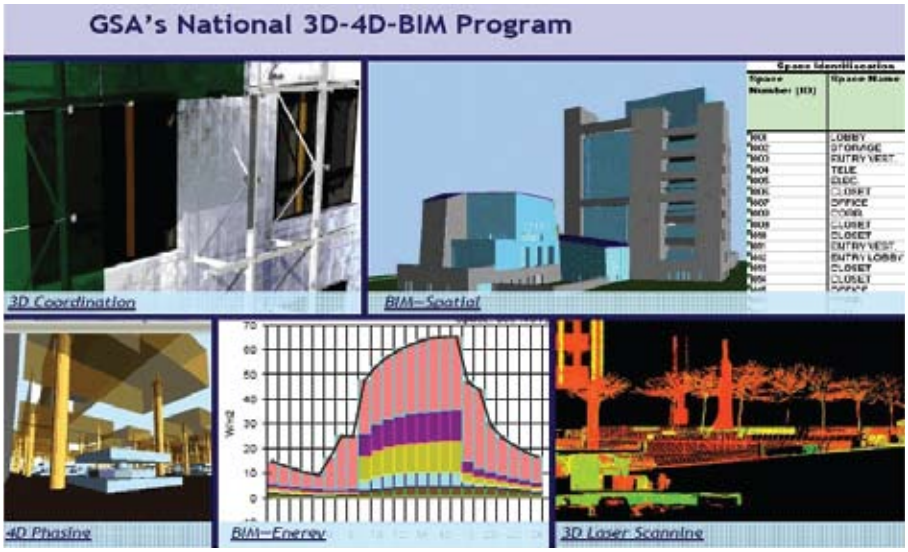
The GSA BIM Guide Series 01 and 02 summarized the overall BIM program and the specific requirements for spatial validation at early design stage.

Commencing in Fiscal Year 2007, this became a formal requirement for GSA's prospectus level projects funded by Congress for design. Each year, about 20 new projects are funded, so over the course of the next few years, a large sample of real world projects will provide specific feedback to the GSA BIM program.

The GSA BIM Guide series has grown to series 01 to 07, including the most recently released Guide for BIM and Energy. All can be viewed at www.gsa.gov/bim.

BIM CHAMPION NETWORKS AND REGIONAL BIM CONFERENCES

If technological and business aspects of BIM were critical to the GSA BIM program, cultural change, the "people" and social side of BIM was the third leg of the stool. A network of BIM "champions" was created, about two champions in every one of the eleven GSA PBS regions. A sense of both shared mission, camaraderie and collaboration soon developed among the BIM champions. This was enhanced by Regional BIM conferences that, to date, have occurred in New York City (GSA Region 2), Washington DC (11), Atlanta (4), Chicago (5), Kansas City (6), Seattle (10), and upcoming in Philadelphia (3). Along with internal GSA project managers, asset managers, facility personnel, and attorneys, local architects, construction managers, and constructors who have worked on GSA projects share a continuing dialogue about lessons learned, best practices, and a strategy and roadmap for moving forward.



AWARD WINNING BIM

As of 2008, GSA PBS had 18 projects formally employing BIM, 12 buildings utilize 3D scanning and BIM technology for analysis, over 15 million GSF modeled in BIM, 8 national and international awards, and an international agreement among four countries, focused on BIM and interoperability. Among the organizations recognizing the GSA BIM program for awards were:

- Office of Government-Wide Policy, winner of the 2007 GSA Achievement.
- Award for Real Property Innovation.
- buildingSMART Innovation Award.
- FIATECH Celebration of Engineering & Technology Innovation (CETI).
- 2007 National Institute of Building Sciences Honor Award.
- AIA Technology in Architectural Practice (TAP) BIM Award in 2007, Jury Choice.
- GSA San Francisco Federal Building, Wayne Morse Courthouse in Eugene.
- Oregon, and Herbert Hoover Commerce Building in Washington DC, all have received AIA TAP BIM Awards.

INDUSTRY-WIDE AND INTERNATIONAL OUTREACH

The GSA BIM website, with both documents and resources (www.gsa.gov/bim) continues to provide outreach to many industry groups, national and international.

A ROADMAP FOR OWNER ORGANIZATIONS

GSA's success with BIM to date could be a roadmap for other owner organizations. The most important aspects of the GSA BIM Story could be summarized as follow:

- Make Your Approach to BIM Strategic, clearly articulating the link to an organization's mission;
- Rapidly develop Prototype Studies of real-world projects, engaging your organization in the research and documenting the results;
- Get High level management support;
- Also foster Project-level team and regional champion buy-in;
- Maintain a balance between technology, business and social (cultural) aspects of business transformation; and
- Get organizational consensus and realization that BIM, in the end, is not just technology but a transformational approach to the business and mission of the organization. ■

Stephen R. Hagan, FAIA is a member of the National BIM Standards Executive Committee and co-chair of the Federal Facilities Council (FFC) Emerging Technology Committee.

Peggy Ho is a Visiting Fellow to GSA's National BIM Program and a PhD Candidate at Stanford's Center for Integrated Facility Engineering (CIFE).

Charles Matta, FAIA, is the National Director, Federal Buildings and Modernizations, Office of the Design and Construction Programs.