New Construction

Building Information Services (BIS) gets involved in the life of a building very early. Once a project is initiated for a building BIS will assign a new building number and determine the physical address with help from the city of Tuscaloosa.

Once the building design is at 60% completion BIS verifies that the room numbering system used by the architect meets the current UA standard. If the standard is not met then we submit changes back to the architect.

When the new building construction reaches approximately 95% completion BIS will request current floor plans from the architect in the form of Computer Aided Drafting (CAD) files. BIS will use these CAD files to develop our space and facility management floor plans. BIS converts the CAD files to a format that can be used by AiM (UA’s facility management software).

Once BIS has the CAD floor plan in the BIS standard we start our process for validating the floor plans:

- BIS will audit the building to verify the accuracy of the CAD floor plan and make any necessary changes to ensure the CAD floor plans are accurate.
- BIS will verify the accuracy of the room numbers and make necessary changes to ensure the accuracy of the CAD floor plans.
- BIS will determine the space usage based on our building audit. We determine the space usage based on the Facilities Inventory and Classification Manual (FICM).
- Once the building has been audited and verified for accuracy, BIS will prepare the drawing to be linked to AiM.
- Once the building has been prepared and linked to AiM, BIS adds organizational data, occupancy data, program codes and applies the appropriate FICM code for each room.
- BIS will then create a new building page on the Building Information Repository (BIR) on Estus. The building page consists of the building name and building number, current photos of the building, space management CAD floor plans, space management PDF floor plans and construction related plans (the plan room in Construction Administration is responsible for adding the construction documents).
- Once the new building page is created BIS updates the campus map located on Estus by adding the location and a clickable link.
**Renovations**

Once the building design for a renovation is at 60% completion BIS verifies that the room numbering system used by the architect meets the current UA standard. If the standard is not met then we submit changes back to the architect.

When the renovation construction reaches approximately 95% completion BIS will request current floor plans from the architect in the form of Computer Aided Drafting (CAD) files. BIS will use these CAD files to develop our space and facility management floor plans. BIS converts the CAD files to a format that can be used by AiM (UA’s facility management software).

Once BIS has the CAD floor plan in the BIS standard we start our process for validating the floor plans:

- BIS will audit the building to verify the accuracy of the CAD floor plan and make any necessary changes to ensure the CAD floor plans are accurate.
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- Once the building has been audited and verified for accuracy, BIS will prepare the drawing to be linked to AiM.
- Once the building has been prepared and linked to AiM, BIS adds organizational data, occupancy data, program codes and applies the appropriate FICM code for each room.
- BIS will then update the BIR on Estus to reflect the new renovation.

**Maintaining Accurate Space**

BIS will audit each building on campus yearly. There are times when physical space changes and space usage changes occur without BIS’s involvement in the process. The process BIS uses to ensure accurate information is as follows:

- BIS will audit the building to verify the accuracy of the CAD floor plan and make any necessary changes to ensure the CAD floor plans are accurate.
- BIS will verify the accuracy of the room numbers and make necessary changes to ensure the accuracy of the CAD floor plans.
- BIS will determine the space usage based on our building audit. We determine the space usage based on the Facilities Inventory and Classification Manual (FICM).
- Once the building has been audited and verified for accuracy, BIS will update the drawing to be linked to AiM.
• Once the building has been updated and linked to AiM, BIS will update organizational data, occupancy data, program codes and applies the appropriate FICM code for each room as needed.
• BIS will then update the building page on the BIR on Estus to reflect any of the changes as needed.

**Space and Facility Reporting**

BIS develops numerous reports each year for various State of Alabama and University departments. The reports are compiled using the information stored in AiM. There is also some general space data that is stored on the BIR on Estus that is pulled from AiM.

• ACHE – Space Data Report
• ACHE – Building Inventory Report
• ACHE – Inventory by Category Report
• ACHE – Capital Requirements and Needs Assessment
• UA Fact Book
• SACS NASF Verification
• Animal Care Facilities
• UA Food Service

**Preparing for the future – Building Information Modeling (BIM)**

**Building Information Modeling** – is a process involving the generation and management of digital representations of physical and functional characteristics of a facility. The resulting building information models become shared knowledge resources to support decision-making about a facility from earliest conceptual stages, through design and construction, through its operational life and eventual demolition.

In the spring of 2011 BIS began implementing BIM as our new standard of Space/Facility Management. This process will be broken into 2 phases. As of November of 2013 BIS is about half way through Phase 1.

BIM will help us better manage our building data from “Cradle to Grave”. BIM offers a great value during the Design, Construction and Facility Operations of a building.
Design

Design is probably the most developed and understood aspect of BIM; with documentation of how it brings value to Facility Management. The power in design is in the applications of BIM as:

- Visualization Tool
- A design tool for improved understanding
- Ultimately, when fully mastered and implemented it is a document efficiency tool for the entire A/E/C industry

Design produces a wide variety of returns on the investment (ROI) in effect the “Value Proposition”, some of those include:

- Improved owner acceptance of design concepts faster and more efficiently. The power of visualization if a very efficient tool in a 3D world as opposed to 2D plans.
- Documentation efficiency is a huge aspect of the Design “Value Proposition” with the full implementation of the power of tools such as families and templates the delivery of a design can be more efficiently delivered.
- Quality analysis with the Power of BIM for things like clash detection during design is the third category of bringing value to a project.

Construction

Recent Autodesk statistics have shown that the growth of software licensing is faster in the construction industry than any other industry. Obviously this must mean that there is a realization that there is value. So where is the value of BIM to construction? Four major areas are emerging:

- Utilizing BIM to improve the overall process of delivering a building from site utilization, estimating to complicated coordination documentation to improve staff efficiency. Traditionally, construction has been a very waste producing process. BIM brings waste reduction to the construction process. Consequently improving the projects profitability.
- Better information presented to the sub-contractors and craftsman in the field means improved project understanding. Improved project understanding and communications equates to improved productivity. Another cost savings!
- The power of BIM to assist with safety analysis is an essential tool to contractors. Using the BIM model to test for issues like fall protection provide a valuable resource to the staff in the field.
- Finally, the overriding theme of the LEAN discussion is to reduce waste at every aspect of a project. BIM becomes the essential tool to eliminate the need for rework, change orders and countless project delays.
Facility Operations

Although many people think about the power of BIM as a design tool, an owner will spend less than 10%–20% of the total cost of a facility on the design and construction phase. They will spend in excess of 80–90% of the total cost of the facility after construction. So the use of BIM during this phase of project is essential to the realization of the “Value Proposition” for Facility Management.

Here are some examples/case studies of what BIM can offer a large University:

- Class room utilization
- Departmental area calculations
- Maintenance information
- Capital improvement data
- Area calculations
- Life safety zone documentation
- Departmental area allocations
- Maintenance information by system
- Systems shut off locations

Renovation Decision Making

One of the first benefits that can be seen is the ability to visualize several different renovation options for a given space. Previous to BIM, customers would be provided several 2-D floor plans of a space and asked to decide which one they liked best. While those who work with 2-D plans every day might be able to visualize a space from a 2-D floor plan, many of the users of new space cannot do this easily. They might make their best guess, but would frequently not be completely satisfied once they saw the completed space. 3-D renderings of potential office layouts make it easier to understand the space and formulate a decision on which option best met a particular need.

Funding Decision Making

Closely related to the above example, BIM can allow for a department to mock up spaces in great detail to inform the decision making process for future project funding. BIM can allow departments to if they should invest in renovating the department with all new finishes. Using a BIM, the actual finishes can be quickly added to the space producing a visualization that was is close to accurate as possible. Instead of using a traditional finish board and asking the decision makers to interpret what the space might look like, the department can now be able to see
renderings and a video walkthrough of how the space would appear, complete with accurate finishes and furniture.

Extending the Educational Mission

As a university, education is our primary pillar for existing. The ability to hire a group of students and to partner with their education can be a benefit to UA and to the students. They can receive real world experience that their formal education cannot provide. In addition, the skills and contacts they could receive working on this project will differentiate them from others once they graduate from UA.

The areas we would target would be Engineering and Interior Design majors.

Building History Documentation

In July BIS was tasked with creating Historical Documentation of the old Cadet Laundry/Plumbing Shop/Arts Construction building. The University didn’t have any plans on the building. We went out and measured the building and created an accurate BIM that consisted of floor plans, exterior elevations, existing photos and 3d renderings. By doing this in house we saved $5,000–$8,000 versus using an outside source.

End User Training

Transitioning to BIM is not primarily a technical challenge, it is cultural change. To aid in the adoption of BIM across UA, BIS will develop and conduct a series of training sessions customized to the specific needs of the UA end user groups. The hands–on training will be broken down as follows:

· **Engineering and Operations**: A three day session covering how to navigate/interact with a Revit model and how to extract information from the model.

· **Furnishing and Design**: A four day session covering everything from scheduling to views to moving walls and placing families, along with how to create renderings and walkthroughs.

· **Project Managers**: A half–day session on navigating DWF versions of the Revit model in Autodesk Design Review.

BIS is also actively involved with Construction Administration in helping them develop new BIM standards for new buildings and renovations.