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Mapping to the Edge of Information

Department of facilities management and CAST researchers use technology to enhance campus efficiency.

FAYETTEVILLE, Ark. – As students leave campus classrooms for summer vacation, university officials across the United States are already planning for fall. University of Arkansas schedulers are trying to figure out how to place tens of thousands of students in thousands of rooms with hundreds of instructors at dozens of different time slots in a given week. Solving some of these complicated logistical issues may one day be as simple as clicking a computer mouse, thanks to the combined efforts of campus planners and geospatial researchers at the University of Arkansas.

The two groups are collaborating on a project to gather data and develop software that will combine basic building information – age, condition of building systems, academic suitability, technological amenities, size and use of rooms, availability, evacuation routes and utility information. This information is used primarily for space management and includes enhanced

features such as architectural drawings and important information on wiring, plumbing, technology, accessibility and locations of elevators and exterior doors.

The researchers and planners hope to merge all of this information into a three-dimensional program that would allow building executives, construction companies planning renovations and utility companies needing to make repairs to access information quickly.

“We want to integrate information that cross-cuts disciplines – from maintenance and construction to student scheduling,” said Fred Limp, director of university’s Center for Advanced Spatial Technologies. “We can look at these things separately, but doing so together reduces cost and increases efficiency.”

University buildings serve many functions, and different people need access to information about them. Most people take for granted the buildings in which they live, work and play, but building information becomes essential in the event of a gas leak, a power outage or any other type of emergency.

“Everything starts with planning,” said Mike Johnson, associate vice chancellor for facilities. “Accurate locations of all elements on campus are absolutely critical.” These include but are not limited to geographic information system maps showing the location of buildings, the sewer system and campus lighting.

At the University of Arkansas, the department of facilities management has many tools in place to address these issues. They have a system designed to their specifications by CAST to analyze, manage and report on room uses and functions of more than 15,000 rooms in the 100-plus buildings on campus, allowing such things as accurate reporting of research space for reimbursement of indirect costs that support sponsored research.

It is called the Room Use Survey System, or RUSS. The registrar’s office uses scheduling software called R25 for scheduling classes, labs, final exams and other activities in the thousands of rooms on campus. In addition to R25, GIS maps and RUSS, facilities management maintains a database with an assessment of the condition of facilities. The systems work well enough separately, but the users and the researchers want to take the data a few steps further to integrate information currently stored in several places into one geographically based spatial information system.

“We want to see it get to the point where all of the information would be integrated into the GIS map in different layers,” said Kevin Santos, senior campus planner. “The idea would be to

take all currently available information about campus buildings and infrastructure and merge it into one program.”

“To become even more efficient with our space, we need to know more about the space we have, so we can make better decisions,” said Jay Huneycutt, director of planning and capital projects programming.

Then Limp and his colleagues want to take the concept one step further – three-dimensional visualization of the buildings and rooms that would allow a person to virtually “see” the building in question. It might even be possible one day, Limp says, to use gaming techniques to populate a building with avatars, much like those in the online virtual world Second Life, to see how people can safely evacuate a particular building in an emergency, for example.

This vision still lies in the future, but visitors to the facilities management Web site can see another project developed by the collaboration – an interactive campus arboretum map at http://www3.uark.edu/PHPL/Planning/campus_landscape/arboretum.html, which allows visitors to “visit” the trees virtually, honing in on an aerial photo of campus until the individual trees can be seen, then clicking on a specific tree to obtain information about it.

In other, less public areas, facilities management and CAST have worked together to create GIS maps of light poles, utility tunnels and sewer, water and gas lines, and they are looking at adding stormwater drainage, said Huneycutt.

“We’re looking at manholes, culverts, where water drains and what basins it drains into,” said Cristina Scarlat, a researcher at CAST. This information is being collected as part of a stormwater management plan required by the Environmental Protection Agency, but it will be integrated with other information to resolve future issues that might arise regarding water, drainage or flooding. These are important components of the campus sustainability initiative.

Working with facilities management at the University of Arkansas offers the CAST researchers a rare opportunity to work on these issues because a university operates much like a small city, said Brian Culpepper, a CAST researcher. Even the federal government recently has started to become aware of the potential power of integrating geospatial information and building information management: Limp was the keynote speaker at the Emerging Technologies Summit in Washington, D.C., this spring, and he spoke about the joint projects with facilities management and CAST.

“Working with facilities management provides us with a model to engage in real research into how this all works,” said Limp, who holds the Leica Geosystems Chair in Geospatial Imaging and is a Distinguished Professor of anthropology. “We think it’s an important research direction.”

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