

USING THE INTERNET TO KEEP TABS ON THE CAMPUS PORTFOLIO

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This article examines how colleges and universities incorporate Internet technology into their facility management processes, the challenges involved, the value realized, and future plans for this technology.

1. OVERVIEW

Increased financial pressures have motivated colleges and universities to improve their administrative services and to become more cost-effective in managing their building portfolio. Many schools look to technology and improved business methods for solutions to:

- re-organizing and consolidating administrative services and systems;
- replacing aging technology infrastructure with integrated platforms;
- employing commercial Enterprise Resource Planning (ERP) software packages (e.g. Peoplesoft and SAP) to integrate FM with finance, asset management and human resources data; and,
- in general, transforming core business processes with web technology in order to improve efficiencies, reduce costs and raise customer service levels.

The web has fundamentally changed the way colleges and universities conduct business, instruct classes, administer student services and operate facilities. Students can register for classes, view grades, schedule appointments with faculty, pay tuition, buy books and, in some cases, can apply to a school only if they fill out an application on-line. Campus-wide, administrative systems are becoming available to help departmental staff perform their jobs in new and better ways. Internet-based solutions are quickly spreading into colleges and universities' facilities management units as well. Facility information such as project status reports, CAD drawings, space inventories, and campus maps are commonly shared campus wide; live links to databases readily support maintenance help desk tasks such as on-line work requests; project Extranets are used to communicate with general contractors and design consultants; and it will soon become standard operating procedure for procurement groups to utilize e-business construction and facility portals (e.g., <http://www.cephren.com>, <http://www.facilitypro.com>, <http://www.purchasepro.com>) to purchase equipment, materials and services from central suppliers.

2. INTERNET IN PRACTICE

In reviewing Internet technology at universities, three main categories of web use emerged - each varying in terms of complexity of web technology employed:

1. **Static Data Retrieval and Reporting:** for purposes of data retrieval and reporting, several web sites simply copy static web pages and large amounts of data to a web server, which is usually maintained by the university's IT group. The web site is typically developed using software tools such as Cold Fusion, Front Page, or Dreamweaver). Examples of this type of use include:
 - Rice University** (<http://dacnet.rice.edu/maps/space/buildings>);
 - Emory University** (<http://www.emory.edu/FMD>).
2. **Dynamic Database Links:** The next level of complexity involves linking reports and queries dynamically to a live FM database. For example, a commercial maintenance management system might have a web module that provides on-line work request forms and status reports to users via a browser. Or a custom developed webpage might be generated using a user-friendly GUI (Graphic User Interface) to link dynamically to a commercial CAFM database. Examples of this use can be found at:
 - California State at Long Beach** (<http://www.ppfm.csulb.edu/>);
 - Yale University** (<http://www.yale.edu/adminsys/facilities.htm>);
 - Stanford** (<http://www-facilities.stanford.edu/>);
 - Duke University** (<http://152.3.18.208/Services/index.htm>);

Iowa State (<http://www.fpm.iastate.edu/>).

3. **Application Service Providers:** The third scenario is the ASP model, an increasingly popular Internet-based method for hosting and using FM software. In the ASP model, the software and data typically reside on the vendor's or service provider's (such as a consultant or the FM department) server computer, and users access the application from an Internet browser. Customers don't need to rely on the in-house IT staff for support, and fees for the hosted service (if provided by a vendor or consultant) are typically charged on a subscription basis each month. Examples of universities using the Internet in this manner include:

University of Wyoming (<http://www.wyoming.edu>);

University of Chicago (<http://www.uchi.edu>);

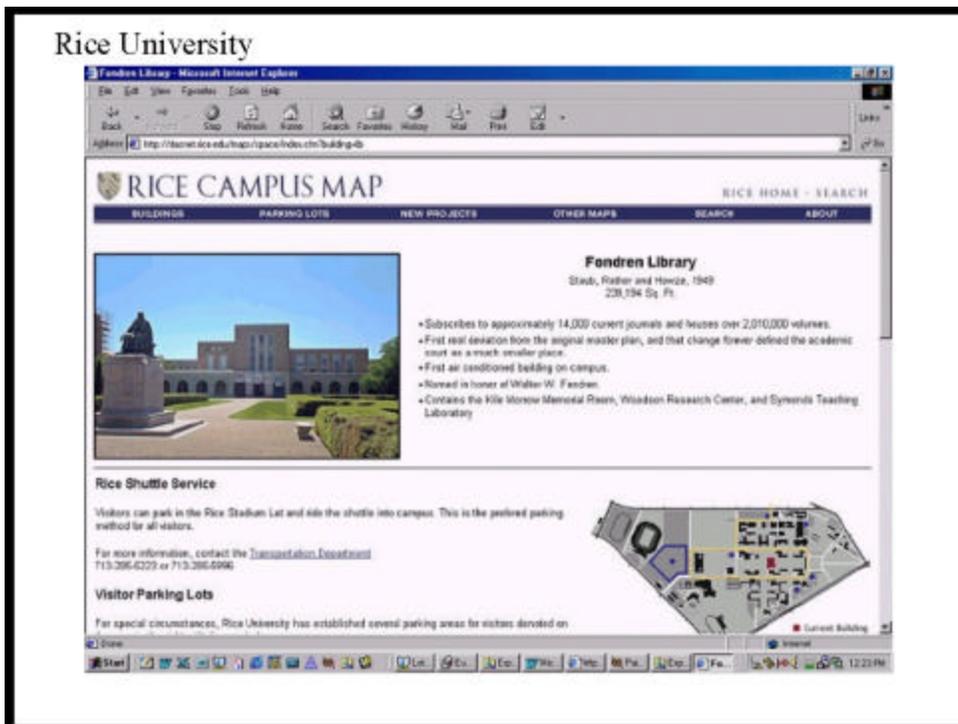
Emory University (<http://www.emory.edu>);

University of North Carolina (<http://www.unc.edu>);

Ontario University System (<http://www.OUS.edu>).

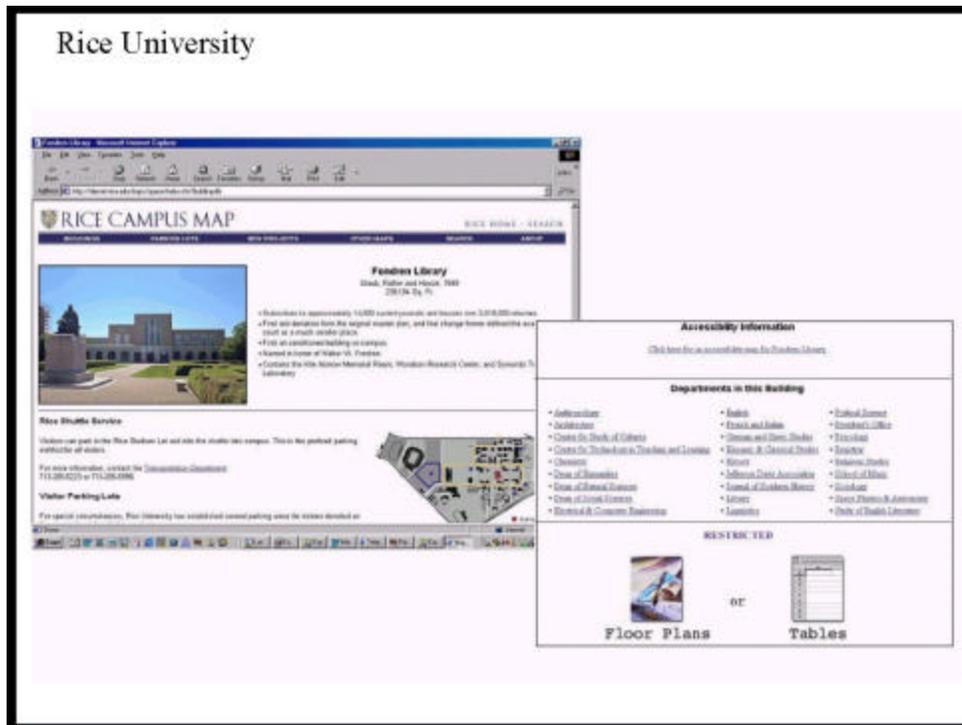
A fourth aspect of web use, not yet deployed by college and university facility management groups, is the e-business model – that is, the procurement (buying and selling) of goods and services on-line. The AEC (architecture, engineering and construction) and MRO (maintenance repair and operations) Internet-based e-Procurement industries are very new and have not impacted university FM operations yet. Some of these vendors include <http://www.mro.com> and <http://www.iprocure.com>. There is no doubt that e-Procurement solutions for higher education will occur in the near-term future. There simply have been no clear leaders in this marketplace yet.

2.1 Rice University (<http://www.rice.edu>)



In 1990, the Facilities & Engineering department at Rice University (<http://dacnet.rice.edu/~faceng/index.cfm>) began to automate its building records and space inventory for its campus of about 3 million gross square feet. Information from a variety of formats including blueprints, spreadsheets, and hand-drawn space occupancy drawings, was organized and space and CAD standards were developed. Using Archibus (<http://www.archibus.com>) as the CAFM database and AutoCAD for CAD, the first computerized reports and drawings were produced in 1995. In 1996, the web site was developed for building pages and space inventory data. Web pages were developed using Adobe Photoshop, Allaire's Cold Fusion and C scripts that convert Archibus data into html format. Web-based floorplans are generated by

producing AutoCAD e-plots (.dwf format). Copies of the Archibus database and CAD dwf files are copied on annual basis up to the web-server. Joe McGrath, an architect by trade, manages the facility information operation, has one CAD drafter, and relies on a student for most of the more technical aspects of web development. The biggest challenge so far has been to devote full-time in-house technical resources to keep up with the rapid advances in web technology and to implement future initiatives. These would include developing dynamic links into the Archibus data (rather than copying the data to the webserver), and improving the method for producing the web-based floorplans.



The web site (<http://dacnet.rice.edu/maps/space/index.cfm#buildings>) is flexible and user-friendly, and provides information to both the Rice community and the general public. Information provided includes:

- General maps and aerial photos of the campus;
- General and architectural building information;
- Visitor maps indicating parking and shuttle bus information;
- Department listings for buildings;
- Building floor plans and specifications (password required);
- Floor plans of buildings and space inventory tables;
- Space inventory database standards manual.

Eventually Rice would like to web-enable the annual space inventory revision process. Departments currently provide annual feedback to the Space Management group about changes in occupancy and space use. Space Management would like to incorporate this process into a web-based workflow application. Another web initiative the group would like to pursue is integrating the CMMS (Computerized Maintenance Management System (MP2 by Datastream, <http://www.dstm.com/>) with the Archibus space inventory database, so that a user could request information on all work orders in a particular building.

2.2 Emory University (<http://www.emory.edu>)

Emory's facility management department (<http://www.emory.edu/FMD>) began its web development five years ago and uses an integrated CAFM system from FIS, Inc. (<http://www.fisinc.com>) as the backbone for its space inventory web application. A campus map provides point and click navigation for building information. The user clicks on a building and is brought to a page that contains a photo, building and contact information, and departments located in the building. It took about one year to plan, develop, collect content and get the site up and running. The web site was

developed using FrontPage. A copy of the FIS space information and the associated web pages are periodically uploaded to the university's web server. Jason Cook, who is the FM group's webmaster, noted that the FM group's data takes up the largest amount of storage space of any other department on the university's web server. Maintaining the data and keeping it up to date are the group's biggest challenges.

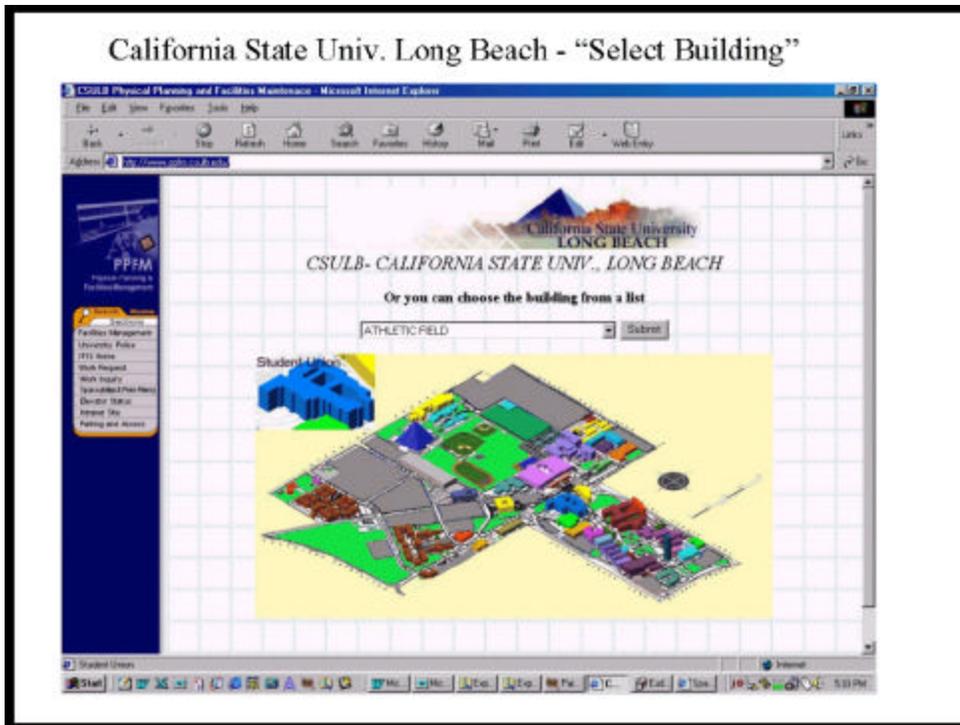
The FM department's Project Management & Construction group recently implemented Framework's Active Project (<http://www.frameworks.com>) to use as their project Extranet tool. The software is installed on a dedicated web server maintained by the Project Management & Construction group. They currently use the application for consolidating capital project information and communicating with consultants and contractors via the Internet.

2.3 Yale University (<http://www.facilities.yale.edu>)

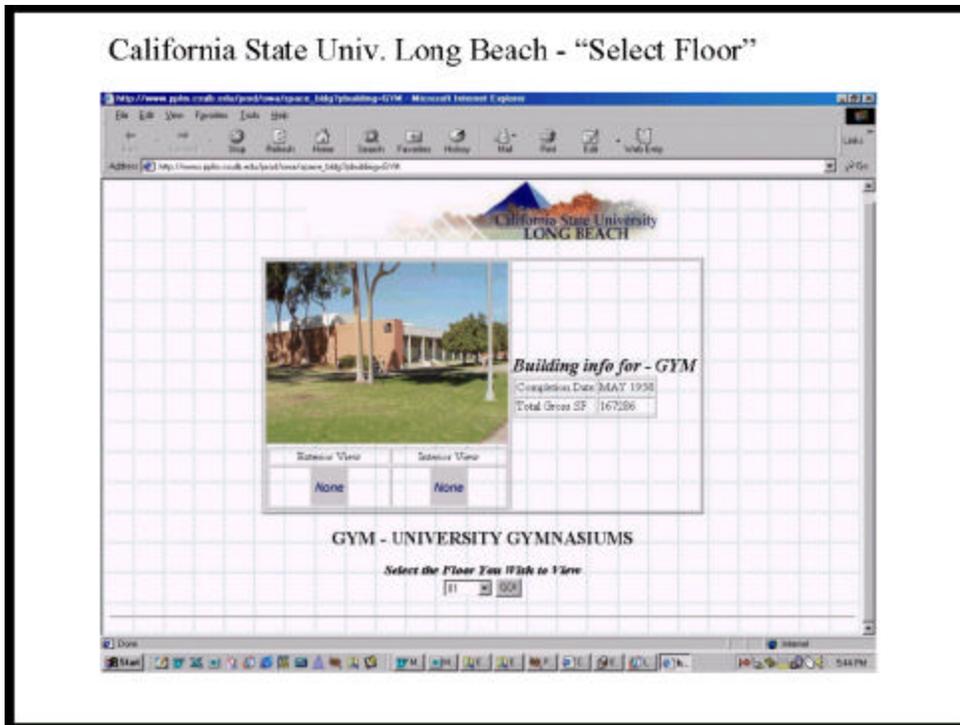
Yale University's Office of Facilities has already exploited the use of the Internet to share information with the other interested partners on Campus. Their existing web site helps students and staff "electronically navigate" the campus. Behind the scenes Facilities is developing the next generation of space management tools for the FAMIS Space Management module. The application based around Oracle's 8i database will run purely on the web providing detailed data collection, reporting and analysis to meet the complex space requirements for the University. The ability to analyze the building portfolio allows for better relations through effective planning between Town and Gown because of the nature "porous campus perimeter" as it weaves into the fabric of New Haven according to Joe Hogan, the Manager of the Space Information System. The online interactive web graphical reporting where campus staff can generate thematic maps of the Campus, buildings and rooms from the database without the need to interact with a CAD system allows for a greater understanding of the space management issues and reduces the burden on Facilities to maintain the data.

For Facilities, the web-based system allows for online space surveys where the departments can update their information with their responses stored in the database. The security on the system allows for a hierarchical drilldown on information based on the organizational structure defined in FAMIS by Facilities. The combination of percentage of use by department, by function, by occupant and by account codes and cost centers provides the sophistication to meet the complex space reporting requirements for a University receiving grants from multiple sources for research.

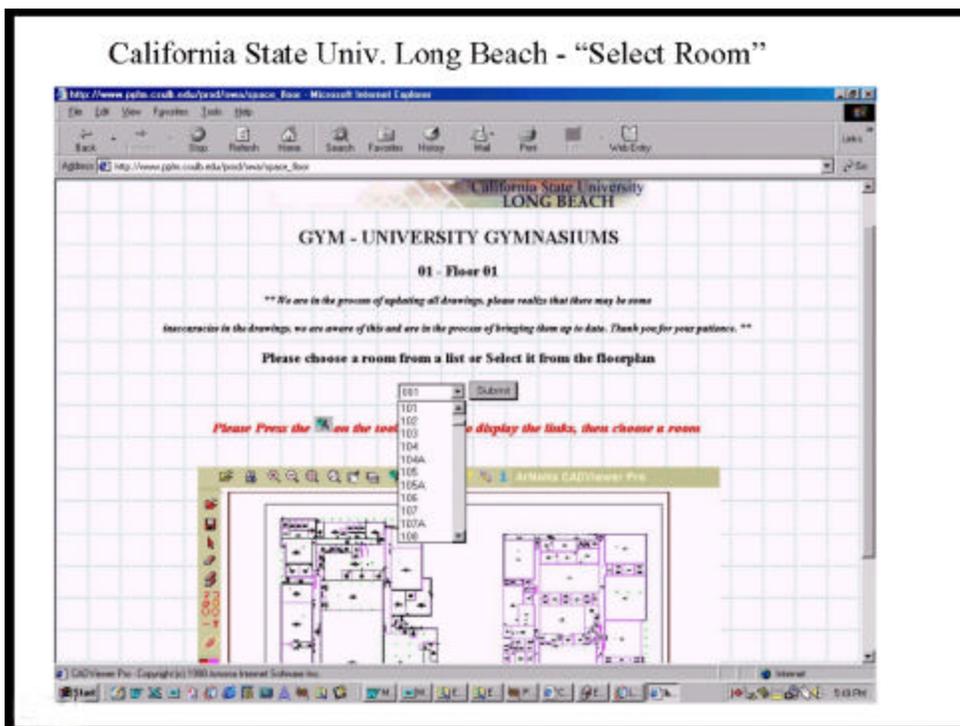
2.4 California State University at Long Beach (<http://www.ppfm.csulb.edu/>)

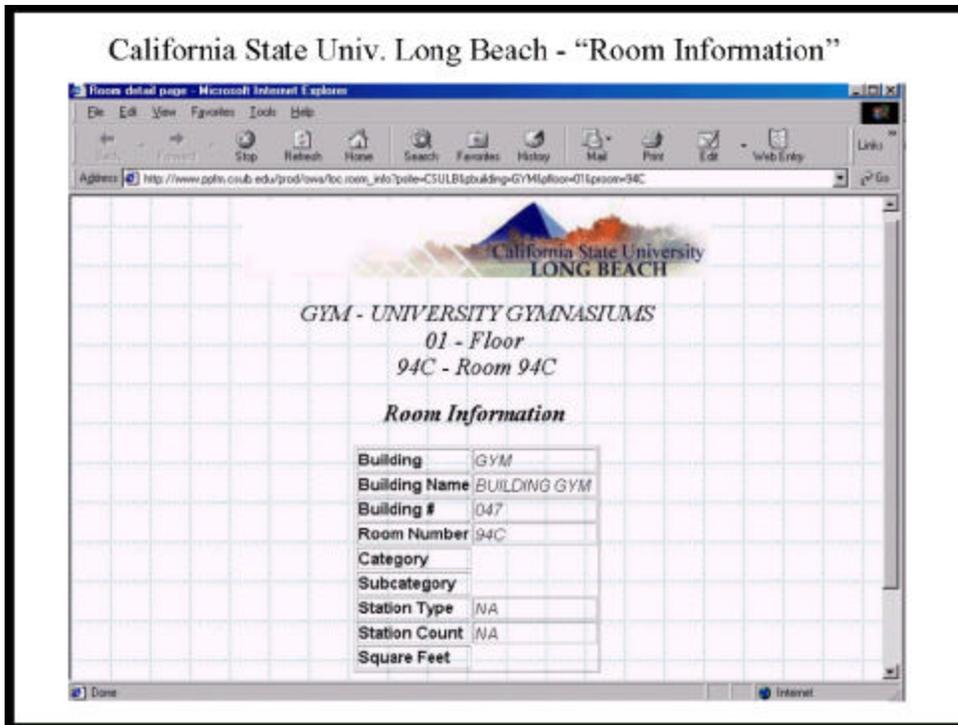


Long Beach has created a Facilities Portal for the customers providing an interactive online environment where approved staff can review information related to space including its occupants, function and certain assets. It is also possible to submit service requests to facilities, get approval online for turning the request into a work order, to track the progress of the work, and finally to review the bill for the work online. Long Beach, using the full suite of FAMIS applications, has taken the FAMIS Web concept and fully exploited its potential. The ability to redline floor plans and then provide that as an attachment to the work request to be stored in the system provides a new level of interaction between the space drawings, the work management system and the fiscal accountability.



Like Yale, the hierarchical organization model defined allows a department to drill down on the work requests and billing for their areas of accountability. For security reason, they cannot look either across at other departments, or to move up the organization tree. Randy Walsh, the Facilities Division System Supervisor, believes that providing wider access to the information helps validate the accuracy of the data providing a higher level of quality control when it comes to report space and more accurate space reports when reporting to the Chancellor and the State.





2.5 University of Wyoming (<http://www.uwyo.edu>)

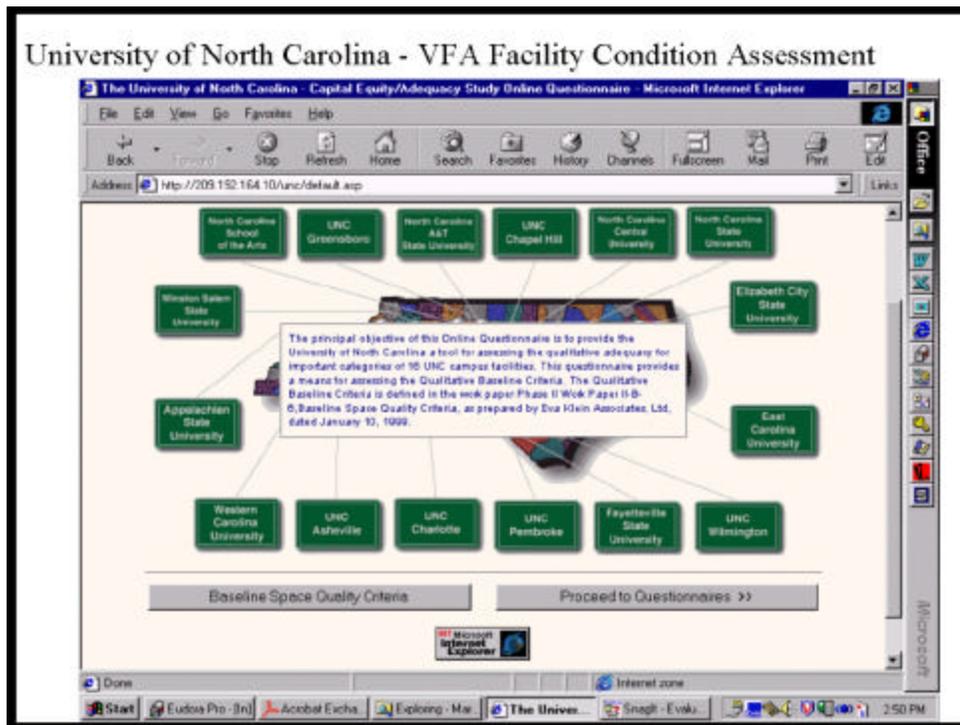
The Fleet Management group at the University of Wyoming has been using Peregrine System's (<http://www.peregrine.com>) FleetAnywhere ASP hosted application since November 1999, as a reservation and management system for its 500 vehicles. The application has an equipment inventory module that allows the system users to check on availability of vehicles. Currently the on-line process consists of requests to reserve vehicles submitted via email by students and faculty. System users (currently there are 4 licensed users from the Fleet Management group) then log into FleetAnywhere, via an Internet browser, input the request, and the system searches the database for available vehicles. This information is then cut and pasted into the reply email to the student or faculty requestor. The Fleet Management group plans to allow students and faculty to access the web application directly to search for vehicle reservation information.

Because the FleetAnywhere product did not have a sufficient billing/invoice module, the UW's in-house team of programmers developed a customized module that integrates with the FleetAnywhere data to allow for departmental recharges. Other implemented functions include work order processing, preventive maintenance scheduling, and parts and fuel inventory.

2.6 University of Chicago (<http://adminet.uchicago.edu/>)

The University of Chicago Facilities Department has been involved over the past two years in a \$500 million capital building campaign. The project managers have been using Bidcom's (<http://www.bidcom.com>) project Extranet tools to help manage the design and construction of nine new buildings. They chose Bidcom over competitor products mainly because of the process-oriented approach to the functionality of the software. The application is ASP-hosted at the vendor site. There are currently 6 projects established on the Extranet site with approximately 25 users per project. Primary uses of Bidcom's software include project communication, submittals of RFI's, notifications of issues, as well as posting of drawings, documents and schedules. Bob Holiday, manager for University of Chicago's Project Management division, sees the main benefits of the system being a central place to consolidate project information and allow contractors, sub-contractors and consultants access, as well as a means to promote accountability, for parties involved in the process.

2.7 University of North Carolina (<http://www.unc.edu/govrel/>)



The University of North Carolina is spread over 16 campuses. They need to track, at a campus level, detailed information about their facilities in order to determine with accuracy whether there is adequate space for a rapidly expanding student enrollment. Using VFA.Facility (<http://www.vfa.com>), a hosted ASP web application that tracks deferred maintenance, building system replacement values, and life cycle cost data, UNC established a web-enabled method of compiling accurate facilities conditions.

The building assessment was performed by having users respond to an on-line questionnaire about various aspects of each campus building, such as structural condition, accessibility, maintainability and climate control. With this data, UNC was able to calculate each building's repair and renewal cost values. The vendor-hosted web application allowed each campus to review its specific deficiencies, requirements and correction data, and communicate this data across the entire University. Instead of dealing with scores of individual campus assessment reports, UNC benefits from having one integrated system-wide facilities condition report that aids significantly in developing the university's 10 year capital plan.

3. CONCLUSION

Universities are on the forefront of FM Internet use. Current applications relate primarily to posting drawings and data associated with space and work management and departmental occupancy information. Newer web applications such as fleet management, project Extranets for construction document management and consultant communication, and conditions assessment, are beginning to find their way onto university computers as well. One additional Internet trend, remote ASP hosting of the FM service or application, should likewise be noted.

About the Authors

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