

# Implementing a Comprehensive Facility Data Information System

*At The University of Florida*

## **The University of Florida**

The University of Florida is a major, public, comprehensive, land-grant, research university. The state's oldest, largest and most comprehensive university, Florida is among the nation's most academically diverse public universities. Florida has a long history of established programs in international education, research and service. It is one of only 17 public, land-grant universities that belongs to the Association of American Universities. Also, the University of Florida's Carnegie Classification is identified as "Doctoral/Research Universities-Extensive" according to the most recent Carnegie classifications (the 2000 edition).

In 1853, the state-funded East Florida Seminary took over the Kingsbury Academy in Ocala. The seminary moved to Gainesville in the 1860s and later was consolidated with the state's land-grant Florida Agricultural College, then in Lake City. In 1905, by legislative action, the college became a university and was moved to Gainesville. Classes first met with 102 students on the present site on September 26, 1906. The University of Florida opened its doors to women in 1947 and was integrated in 1958. With more than 46,000 students, Florida is the sixth largest university in the nation.

Dr. Charles Young serves as President of the University of Florida. On November 1, 1999 internationally recognized leader of higher education, Dr. Young formally accepted the exciting opportunity to take the University of Florida into the 21st century. Chancellor emeritus of the University of California at Los Angeles, Dr. Young changed a regional college with an operating budget of \$170 million into a world-class institution with expenses of \$2 billion.

Mr. Ed Poppell serves as Vice President for Finance and Administration. He is the chief fiscal and business officer of the University of Florida with responsibilities encompassing all campus budgetary units. The Vice President serves as fiscal and business advisor to the President of the University.

The main campus covers almost 2,000 acres of land in Gainesville with 913 structures totaling 17,794,452 gross square feet of space. There are 53 remote sites totaling 17,791 acres with 2,867,686 gross square feet of space. Most spaces on the main campus is assigned to academic or research uses while remote facilities are predominantly for research uses.

The University of Florida's Comprehensive Master Plan sets forth three objectives for facility improvements:

- The University shall, through the coordination of land use decisions and available projected fiscal resources, provide a schedule of capital improvements to maintain the levels of service established in the master plan and to address existing and projected facilities needs:
- To provide the needed improvements identified in the other master plan elements and to manage the expansion or improvement process so that facility needs do not exceed the ability of the university to fund going operation and maintenance costs and infrastructure impact costs.

- To use the capital improvement plan as a means to meet the needs of the university for the construction of capital facilities, to correct existing deficiencies, to accommodate desired future growth and to replace exhausted or obsolete facilities.

## **Narrative Introduction**

The University of Florida successfully implemented a Comprehensive Facility Data Information System. This system utilizes Peregrine Systems Facility Center and Asset Center products, AutoDesk's Autocad 2000i, Map, and MapGuide products, Oracle 8i as the host database repository, and various Web technologies. In this environment, numerous campus wide legacy data systems have been efficiently linked together to provide a comprehensive, integrated, web based, and user-friendly data-sharing environment. Space Management, Site and Property Management, Fixed Asset Management, Cable/IT Management, Maintenance Management, and Research Contracts & Grants data systems which are natively independent, now collectively provide powerful integrated reporting tools allowing management to maximize the decision making process with on-line reports generated to the desktop.

The success of this endeavor has given management creative tools to reduce operating costs, manage resources more efficiently, evaluate employee productivity, and introduce cutting edge technologies into many areas of the university community. Also, numerous reductions in manual processes, paper work duplication, and duplicative data entry across multiple systems have been achieved in departments such as facilities, property records, departmental fiscal offices and plant operations..

Using building space and site property as key references, the "Total Cost of Ownership" of physical assets can now be documented and managed. Also, by integrating infrastructure management data with Research Contracts and Personnel information, productivity analysis and space utilization comparisons can be easily generated. These reports and graphical maps available to the colleges will assist deans, chairmen and directors the ability to make space reassignments based on productivity criteria.

By virtue of this collaborative effort, the participating departments have improved working relationships and have a greater appreciation of the effort generated by their counterparts in the other departments. This has allowed the participants to see the "big picture", and better coordinate future goals from a campus wide and unified perspective.

## **Project Implementation**

The Project was initially implemented in 1996 as a pilot project by several Health Science Center departments having an urgent need to share various space, property, asset, and cable infrastructure database resources across a common environment. This effort was enthusiastically supported by the Health Science Administration as it also provided a foundation for establishing research productivity benchmarking

Startup cost of the project was \$213,000. This cost included the Facility Center software, Oracle Database, Network Fileserver, and Desktop workstations for 15 users. The initial user

group consisted of various users within the Health Center Facilities Planning, Physical Plant, and IT/Cable Management Departments. This first phase of implementation occurred over a period three years with a primary focus of reformatting and importing data from the participating legacy data systems and conversion of building Architectural floor plans into poly lined CAD drawings attached to the database. It should also be noted that during the initial startup period, “no” additional staffing was acquired.

Phase 2 of the project occurred from January 2000 through June 2001. This phase focused on a more comprehensive campus wide approach. The core user group was expanded to 25 seats which included additional users from all around the campus. Additional legacy data sources and business processes were targeted at this time as candidates for inclusion in the system. Also, dedicated staffing specific to the long term project implementation was acquired. This was necessary to facilitate site surveying and CAD work required for building and maintaining the project graphical environment. Costs associated with phase 2 included; 2.5 FTE permanent and 4.0 FTE OPS (part-time student assistant) technical staff positions, additional software licenses & upgrades, additional CAD file servers and desktop PC's. Total cost of this phase was \$150,000 for the additional software/hardware/licensing. Labor costs for the additional staff were approximately \$180,000.

The current third phase of the project continues the campus wide initiative. From July 2001 until the present, several milestones have been reached that further the implementation. They include:

- (1) Web based online update of all departmental space by designated user representatives
- (2) Web based online mapping of campus in support for the UF committees that approve New Constructions project sites for compliance with Land Use Regulations, Historical Preservation, and Lakes, Vegetation & Landscaping requirements
- (3) Web interface to interactively view building floor plans and query numerous data elements such as organizational space assignments, space category distribution, movable decaled property assets, building maintenance work history, fixed building equipment, Research Contracts & Grants data, and cable/infrastructure data for a limited number of buildings.
- (4) Implementation of a database security schema that fully secures the multiple data sources.

This phase also includes several exciting and technologically advanced initiatives. By combining the use of the CAD environment and GPS (satellite based Global Positioning Systems), documentation of major campus terrain elements such as roads, streets, parking lots, sidewalks, trees and landscaping, exterior lighting, security blue light phones, and various other elements is actively progressing. Initially this information is being used to assist the Faculty Committee review and the university's master planning effort. In the near future, the maps generated from the data will assist the University Police department in graphically tracking crimes statistics by location, and improve campus wide security by depicting pedestrian walk routes with relation to lighting and landscaping. The end result of this effort will be a CAD based 3-Dimensional “Virtual Campus” complete with buildings, terrain features, trees & landscaping, lighting, parking, and other important features.

Future implementation strategies include infrastructure and site utilities incorporation into the “virtual Campus” model, tracking of greenhouse gases & atmosphere sustainability project, campus site level cable/IT infrastructure.

## **Process Benefits**

Process benefits include:

- Increased efficiency of data collection;
- Minimized reproduction of paperwork;
- Reduction of duplicate data entry across multiple organizations.

Previously, numerous departments manually keyed much of the same data, but now share common data elements from agreed upon authoritative data sources. Also, management personnel efficiencies are achieved due to readily accessible information from authoritative data sources. This enables departmental managers to more expeditiously make decisions regarding space, personnel locations, property assets, preventative maintenance reports, inventory reports, manpower and supply reports and maintenance work requests.

In addition, the processes necessary for the support of the UF Committees for new building site selections and master planning is greatly enhanced. By having related site data readily available, conscientious decisions with a group consensus can be made regarding the proposed sites in a more expeditious manner.

## **Cost Benefits**

Significant project implementation cost savings have been achieved due to in-house staff performing the entire implementation. No consultants or Software vendor professional services contracts have been utilized throughout the project. Only minimal software training by the vendors has been provided. Additionally, during the 3 ½ years of the phase 1 startup, no additional staffing was provided. Existing staff performed the implementation as well as normal job duties.

## **Technology Highlights**

By linking facilities data (space record, CAD files, maintenance records, etc) to existing campus systems and newly collected GPS data a Geographical Information System (GIS) has been created. The newly created GIS system spans the gap between the textual and graphical realms and provides management a new intuitive representation of the universities information for the first time in a secured self-service delivery methodology. As the Facilities Data Information System has evolved the need for current scalable enterprise technology has increased. The current system includes kerberos authentication, Oracle spatial data, Global Positioning Systems, web based access and a variety of software.

## **Definition of Terms:**

FIS – (Facility Information System)

GIS – (Graphical Information System)

CAD – (Computer Aided Design)

GPS - (Global positioning System)

### **CAD System:**

The system utilizes Autodesk Autocad 2000i as the base CAD engine and Facility Center CAD Integrator as the database connectivity resource effectively “linking” the CAD drawings to numerous tables in the Oracle Database. We currently have 1417 drawing files attached to the database that encompass 991 buildings, 34250 rooms, for a total of 10,348,145 Net Assignable Square Feet and 14,153,715 Building Gross Square Feet.

In addition to the buildings drawings, our Campus wide site maps have all roads, streets, parking lots, sidewalks, blue light security phones attached to the database. Also, by use of GPS technology interface with the CAD system, we have attached a considerable number of pedestrian street lights and trees to the database with the specific goal of having “every tree” on campus surveyed and attached to the database.

### **Authentication:**

The University of Florida has a single sign on concept known as GatorLink. In this system all university students and employees are represented. This is the only single namespace system for end user authentication. The GatorLink system supports kerberos as the primary means of authentication as well as LDAP access. The client-server software used in the Facilities Data System was the first on campus to fully support GatorLink kerberos authentication in a client-server environment. In addition the web-based interfaces utilize the same directory for authentication. This allows user access to any related system with one user id and password.

### **Global Positioning Systems/ Oracle Spatial:**

To support various initiatives the need arose to properly identify site level asset (trees, signage, emergency phones, utilities, etc). To properly locate site assets and collect associated asset data two Trimble GPS units and a laser compass were purchased. The associated data is stored in an Oracle Spatial data system and the attribute data is updated into various third party data systems. In addition the spatial data store is utilized in the GIS system to depict objects graphically on the web as well as in AutoCAD 2000i to build 3D site models directly from the spatial data store.

### **Web Access:**

All data in the Facilities Data System has been web enabled in a secured environment. The web system is comprised of both graphical and textual representations of the data. Through the use of AutoDesk MapGuide a custom web query system has been developed that allows use to not only query information stored in the facilities information database but also query and graphically depict information from external university systems. The GIS also allows users to create text reports based on graphical queries or selections.

### **Software:**

The following software is used as part of the FIS:

Relational Data Bases:

Oracle 8i – main facilities data system

DB/2 – access to legacy data systems in GIS

Third Party Applications:

Peregrine Systems Facility Center – space data tracking, maintenance data, CAD link

Peregrine Systems Asset Center – asset tracking, cable infrastructure documentation

CAD Software:

AutoDesk AutoCAD 2000i – CAD floor plans linked to database

AutoDesk Map – used to control GPS to Oracle Spatial transactions

Easy Site 2 – used to build 3D site elements (contoured sited, roads, walks, etc.)

GPS Software and Hardware:

Trimble GPS units

Laser and compass

Trimble GPS Pathfinder Office

Web Technology:

Apache Web Server – Main web HTTP server

AutoDesk MapGuide – Web GIS system server with custom API interface

Various JAVA technologies