Geographic Information Systems are Solving Complex FM Challenges

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Higher education (HE) institutions assume a wide variety of responsibilities that require suitable, productive, and safe environments. You only have to imagine a campus without its facilities—its buildings, grounds, infrastructure, and associated assets—to quickly appreciate their indispensable role in supporting an institution's overall objectives. In short, facilities are mission critical, as are the professionals who manage and protect them.

Although every institution is guided by its own unique mission statement, common themes often include attracting top students, faculty, researchers, and grants to advance innovation and academic excellence; educating and preparing students to become productive contributors to society; and conducting research that addresses the most pressing issues of the day.

Facilities play a vital role in achieving institutional missions. This means that HE facilities management (FM) and public safety professionals must overcome the daily challenges that often hinder the effective planning, managing, improving, and securing of campus property. They also need to improve processes associated with protecting people, buildings, infrastructure, grounds, and assets with limited budgets and resources. These are not small tasks.

This article discusses the current capabilities of FM and public safety technology solutions that are rooted in geographic information systems (GIS), and how GIS can support the life cycles of an institution's facilities.

BREAKING THE STATUS QUO WITH GIS

As with most modern business challenges, innovative technology plays an important role in whether organizations achieve their missions. In the case of FM at educational institutions, a technological "force multiplier" is needed to accelerate and improve the methods by which schools achieve their overall missions.

In general terms, force multipliers are tools that help people amplify their efforts to produce more and improved output. Employing force-multiplying tools means that people using these tools get more work done with the same amount of effort. Unfortunately, the standard array of status quo, stand-alone FM software applications and data silos will be challenged in supporting educational FM professionals as they work to help their schools achieve their objectives.

WHAT IS A GEOGRAPHIC INFORMATION SYSTEM?

A GIS is a versatile and powerful technology platform that organizes information about the world as layers of data linked together by location and geography. It is designed to capture, connect, and manage all forms of geographically referenced information. GIS lets users visualize, analyze, question, and interpret data to better understand relationships, patterns, and trends. GIS is essential to understanding what is happening (and what will happen) in geographic space. Once we understand what's happening, we can better prepare and respond to it.

WHAT IS A FACILITIES GIS?

A facilities GIS brings the visualization, analytical, and reporting power of GIS to facilities managers. It uses location as the organizing principle for creating order out of complex information. By breaking down and connecting data systems and silos, facilities professionals are able to create and amplify desired strategic outcomes like cost savings, growth, profitability, and risk management. As an integrative technology, instead of replacing existing software investments, a facilities GIS works collaboratively with incumbent data and systems like CAD, BIM, EAM, CAFM, CMMS, IWMS, CCTV, access control, scheduling, and a vast array of related applications.

By georeferencing floor plans and other facilities data to their real-world locations, facilities managers gain a more complete and accurate understanding of their portfolios. Facilities GIS can help professionals manage infrastructure both outside and inside buildings, providing a comprehensive means for optimizing space, efficiently moving staff and classrooms, mapping the condition of assets, and ensuring adherence to specific standards and policies.

As a spatial technology, facilities GIS can be used to explore educational institutions across all scales of geography—systems, campuses, buildings, and even specific spaces and assets. In other words, facilities GIS technology is the force multiplier that will help educational facilities professionals overcome the vast array of challenges to the campus built environment.

GIS SUPPORTS HIGHER EDUCATION FM STAKEHOLDERS

There are many stakeholders in HE FM, needing a specific solution in order to perform their tasks effectively. Facilities GIS technology has been developed to help institutions better solve both tactical and strategic challenges throughout the facility life cycle. Because it is a scalable, modular solution, this technology can be implemented in ways that fulfill the requirements of a variety of stakeholder roles. As a result, facilities GIS helps institutions save time and money, protect lives and assets, and create safe and productive environments for students, faculty, and staff—all while increasing the value of existing enterprise systems and data.

HOW DOES GIS SUPPORT CAMPUS FACILITY LIFE CYCLES?

Facilities GIS technology can incorporate nearly any data source, including floor plans from building information models or computer-aided design drawings, infrastructure and linear asset maps, transportation routes, regional demographics, registrar planning data, and weather/hazard information—the possible data sources are nearly limitless.

Facilities GIS software aggregates data from disparate sources into a comprehensive model. This integration provides a holistic view of local, regional, national, or international property portfolios. As a result, users better understand the micro- and macro-level inner workings of their property and thus can effectively address key life-cycle challenges in portfolio management, operations, and safety and security.

PORTFOLIO PLANNING AND MANAGEMENT

Facilities GIS software helps users substantiate critical decisions about facilities and capital investment or divestment that best align with the school or organization's strategic mission. Users can compare indoor floor plans, outdoor site plans, financial data, asset attributes, and demographics—any data that is relevant to planning and managing the campus facilities portfolio.

Curtin University
Perth, Australia

Challenge: **The ability to access systems and data at the time of an incident to help achieve situational awareness was a challenge identified at Curtin University. While a number of existing systems and data were available, such as CCTV and floor plans, these were typically stored in different systems and accessed in different ways. This situation made it difficult to use these systems in an effective and timely manner during an incident.**

Solution: **To resolve this situation, Curtin University turned to a facilities GIS-based security operations system. This solution integrated several existing systems and data to create a centralized view of the campus map—with the ability to drill down to buildings, floors, and rooms. Curtin then integrated the facilities GIS viewer with their CCTV system so that all CCTV camera locations could be accessed from a map. Now university personnel can simply click on a camera and bring up its live video stream. "In the event of an incident, the ability to have clear visibility of the situation without having to run all over campus is paramount to effective safety and security," says Brian Woodman, portfolio manager for technology and systems. "For instance, if harmful chemicals were found, using the facilities GIS we can quickly identify the required buffer zone on campus and in the surrounding areas. With our integrated facility systems, we can also see which departments and rooms will be in that zone so appropriate action can be taken. So it's all about pulling together multiple data sets in a timely manner that are then presented in an easy-to-use interactive map interface to those who are managing the incident response."**

Broward College
Fort Lauderdale, Florida

Challenge: Wayfinding for students, faculty, staff, and visitors across 11 locations in the greater Fort Lauderdale, Florida area.

Solution: Broward College (BC) uses their facilities GIS to provide an interactive map that can be accessed by both desktop computers as well as mobile devices. Campus visitors can search by keywords to find what they are looking for, or simply pan and zoom to find facility locations and information, including a description of the building, directions, and hours of operation. "We needed to provide students real-time, interactive, and accurate information to replace the static maps that were published on the BC website," says Mark Griffin, district director of facilities planning and capital budgets at Broward. "With 68,000 students and new students arriving all the time, we needed a better way to show points of interest at the level of building footprints on our campuses—buildings, parking, food venues, etc. Our facilities GIS has solved the problem. And we hope to expand our implementation in the future to start better tackling challenges around things like space planning and utilization, capital improvement plans, infrastructure mapping, tree and landscape inventory, and emergency management."

Facilities GIS technology can help you evaluate key performance indicators against benchmarks to discover patterns and trends; identify under- and over-utilized facilities to optimize for peak portfolio performance; and evaluate demographic trends to better understand the optimal locations to place new facilities or expand an existing footprint.

OPERATIONS AND MAINTENANCE

The ability to visualize facilities on a map and query associated information empowers facilities managers to find more ways to reduce costs and prolong the life of assets. Facilities GIS brings focus to previously isolated and complex data by letting users visualize it on graphical maps—just as it is seen in the real world. Facilities GIS technology also provides facilities managers the software features necessary to proactively manage and maintain facilities, spaces, assets, and infrastructure to better control property life-cycle costs. Facilities GIS operations and maintenance technology includes solutions for:

- ***Space assignment and utilization:*** Maximize the productive capacity of facilities; edit, allocate, and assign resources and costs to specific areas and departments.
- ***Asset management:*** Establish and maintain asset locations and attributes—both indoors and outdoors—and create workflows for inspections, service requests, and public safety.
- ***Capital planning:*** Conduct comparative map-based historical inventory assessments over time as well as collect, upload, and consolidate condition assessment data to develop capital improvement plans that are based on accurate data.
- ***Energy/sustainability management:*** Easily find and access environmental documents, generate compliance reports on regulatory requirements, and monitor facility environments to analyze trends in indoor environmental quality over time.
- ***Lease management:*** Author, edit, and geo-locate documents associated with real estate leases to improve operations workflows and better manage lease milestones and deadlines.
- ***Move management:*** Efficiently plan and execute moves/adds/changes based on holistic, accurate location-based data.

- ***Compliance management:*** Plan inspections, collect information in the field, and view compliance status across buildings and within to their individual components.
- ***Service request management:*** Securely and efficiently manage maintenance, environmental issues, and health and safety requests.

SAFETY AND SECURITY MANAGEMENT: SECURING AND PROTECTING PEOPLE AND ASSETS

With facilities GIS technology, staff can use graphical maps to accurately visualize locations of people and assets, how they relate to their environment, and whether there are specific emergency response requirements—all critical insights to managing crises and protecting lives and property. Planners and first responders have immediate access to accurate information about who and what is near and inside buildings. Users can generate impact reports, maps, and intelligence packages that help securely convey emergency action plans to management, first responders, and other stakeholders.

The complete whitepaper upon which this article is based is available at *http://penbaysolutions.com/HEpaper*.

Facilities GIS safety and security management technology includes solutions for:

- ***Risk analysis:*** Discover and document risk areas that affect campus property, personnel, students, and assets using tools for inspection, visualization, analysis, and reporting.
- ***Security planning:*** Develop preplanned scenarios addressing identified threats; upload, update, and georeference existing plans; sketch out new plans; update key facility information to fill in data gaps.
- ***Incident response:*** Bring together multiple sources of real-time intelligence with preplan information to support a fast, accurate emergency response in the event of an incident, whether that incident occurs indoors or outdoors.
- ***Security monitoring and access control:*** Analyze building and facility access by role, personnel, and security clearance; identify security alarms; interoperate with lock control and alarm systems.
- ***Event management:*** Whether a political demonstration or a holiday parade, facilities GIS provides a comprehensive, scalable solution to support event planning, coordination, and operations to ensure the safety of attendees and participants as well as the surrounding population and property.
- ***Security monitoring/CCTV:*** Locate, analyze, and access CCTV points and view sheds while gaining interactive visibility to live video streams.

With facilities GIS property management tools for higher education, information about the entire portfolio as well as its buildings, assets, and occupants is accessible over time for each FM function and role. Every user of the system can set their preferred views and reports with equal ease. Every user can choose their data queries, mapping options, and data sets using straightforward menus. The system easily adapts to show authorized users exactly what they need to know in order to do their jobs most effectively.

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