Salisbury UNIVERSITY

SPATIAL OPERATIONS

Salisbury University achieves sustainability through the implementation of *SpatialOperations*

The Challenge

Salisbury University (SU), located on Maryland's Eastern Shore, has seen varying cycles of evolution since its founding in 1925. Initially starting as Maryland State Normal School, SU has grown overtime to its current state with over 8,600 students. Much of this growth has been done with an eye on the future ensuring the campus facilities are sufficient for its expanding population of students. Part of this includes Salisbury's commitment to investing in technology and building a sustainable and energy efficient campus. SU has established a goal to reduce its net greenhouse gas emissions to zero by 2050. "From instituting environmentally friendly construction practices to supporting environmental studies in the classroom, Salisbury University takes its commitment to sustainability seriously," noted Janet Dudley-Eshbach, President, Salisbury University[1]. In fact, since 2007, SU has built or renovated eight buildings that have achieved US Green Building Council (USGBC) Leadership in Energy and Environmental Design (LEED) certification. The challenge is how will SU continue to actively maintain these facilities at optimal conditions as they grow towards a more efficient and sustainable future. With this focus on energy efficiency and sustainability, SU needed a way to not only record current conditions for their various facilities, but be able to visualize and report on those conditions to make operational decisions that improve the building performance.

The Solution

In order to achieve this objective, SU contracted with Spatial Systems Associates, Inc. (SSA) to implement their SpatialOperations in the new Perdue School of Business building, built in 2011. SpatialOperations is an Esri-based sustainability information system that visualizes, monitors, and analyzes indoor environmental data (temperature, CO_2, humidity), detailed power con- sumption data, water consumption data, and site characteristic/ site sustainability data for a facility or group of facilities. Spatial- Operations is developed to work with individually installed wire- less data sensors or by consuming data from robust building au- tomation systems. In the case of the Perdue Building installation, SU utilizes the Tridium Niagra Building Automation System (BAS) to control its HVAC system as well to record and store CO_2 and humidity information throughout the building. The BAS pro- vides a large quantity of data, but does not have an ideal way to view and interact with present and historical information. To bridge this gap and fully leverage this information, SU deter- mined the implementation of a centralized facilities-based GIS solution was necessary to provide its facility operators the visual and reporting mechanisms they desired.

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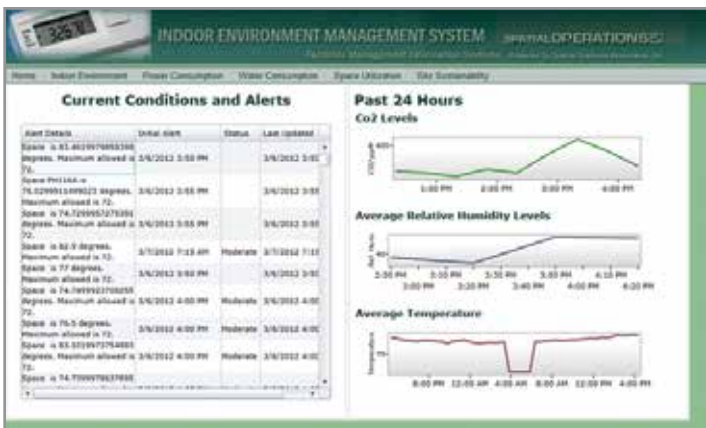> —*Janet Dudley-Eshbach,*
> *President, Salisbury University*

As is the case with many new buildings, CAD data was avail- able for the Perdue Build- ing; however, simply consum- ing CAD data in the GIS environ- ment does not provide the end-user with optimal interaction. Generally, the CAD drawings contain large levels of data (me- chanical, electrical, architectural) that are not easily interpreted and can be challenging for the end-user to work with from a vi- sualization perspective. As a result, the CAD data was imported into SU's Esri enterprise geodatabase environment and attrib- uted with the important annotation information found on the drawings.

[1] (http://www.salisbury.edu/newsevents/fullstoryview.asp?ID=5379)

Understanding and controlling building performance is greatly enhanced by managing and monitoring energy consumption. The Perdue Building is configured in a way to allow for sub-metering of the electrical system to identify the components of energy draw (HVAC, Lighting, Process Power, Elevator). Spatial-Operations consumes the live data being recorded by the Niagra BAS and displays how much energy is being consumed (and by what system) at a given time or period of time. At any time, the SU facilities management group can open Operations and see exactly what percentage each energy component is drawing, when peak levels are occurring, and their carbon footprint based on current operating conditions. By visualizing the information, rather than viewing it in tables, SU can now make operational changes to reduce energy consumption and, in turn, energy costs.

Salisbury University continues to be a leader in seriously taking on efficiency and sustainability measures in the campus environment. SU has made major investments in their facilities to ensure they are operating efficiently; SpatialOperations is a tool being used to actively monitor and manage operational conditions.

Salisbury has been using SpatialOperations to consume their Niagara BAS data since 2011 and can now compare current conditions to the building's growing historical database to ensure optimal conditions are present, as well as to project cost of operation. "The critical component to SpatialOperations will be our ability to compare the building's condition as it ages with its design specifications to make sure we're operating efficiently," said Dr. Michael Scott, Salisbury University. By using the latest tools available, such as SpatialOperations, SU is on their way to meeting their goals for carbon neutrality.

SpatialOperations is an Esri ArcGIS for Sever based web application that only requires the user to have access to the internet and a standard web browser. All of the back-end facility data, as well as the live data feeds, are made available through this platform. Using this technology, SpatialOperations can consume varying map services available from different sources, as well as tie into SU's live data feeds from its NIAGRA BAS database. SU can now interactively navigate the various floors and attribute information for the Perdue Building while also visualizing the current conditions (indoor environment and power consumption) within the facility.

The data is symbolized using color ranges identifying SU's acceptable levels of operation. As the live data is being consumed from the Niagra BAS by SpatialOperations, the web map is updated every five minutes displaying current conditions. In the event these conditions fall outside of the University's specified ranges, alerts are auto-generated and sent, via email, to building operators who can respond to the issue.