

Case study
Frederick
Community College
Frederick, Maryland



Integrated building automation system frees college's support staff

Frederick Community College is an associate degree, two-year institution serving more than 14,000 students each academic year. The 110-acre campus has 10 buildings, including a new library and academic center.

Challenges

- Design a technologically advanced facility to accommodate rising enrollment.
- Increase the operating efficiency and comfort levels of existing buildings.
- Allow greater access to buildings and parking lots through electronic monitoring, instead of requiring security guards to physically verify entry.
- Maintain an efficient staff to support campus growth.

Solutions

- Install a Johnson Controls Metasys® Facility Management System (FMS), security control and digital telecommunications systems.
- Provide remote monitoring of temperature and security points from a central computer, which also optimizes chiller and boiler activity.
- Issue students, faculty and staff a single card for building and parking lot access, borrowing library materials and charging purchases at the bookstore.



Amy Speck checks the height of a plant with Bob Ford, assistant professor of environmental biology, in the greenhouse.

"The ability of Metasys FMS to diagnose problems and avoid exploratory visits by our maintenance staff has had an enormous impact on our operations."

**DR. JON LARSON, VICE PRESIDENT
OF ADMINISTRATION**

Results

- Freed support staff from routine duties that are now handled by Metasys.
- Prevented equipment failure through early identification of problems.
- Reduced energy consumption through tight control of mechanical equipment and the installation of energy-efficient lighting, doors and windows.
- Contributed to recruitment as a result of reliable indoor temperatures, improved safety and exterior appearances.

Student enrollment prompts need for expansion

Frederick Community College has been growing in popularity ever since it opened its doors in 1957, with 77 evening students. From its humble roots in a high school building, the college now has its own modern campus that serves more than 4,300 full-time students and 10,000 others through part-time or continuing education. Enrollment has increased 50 percent over the last 10 years, putting a severe strain on the campus infrastructure.

College officials had no alternative than to construct a new building and remodel nine existing buildings, most of which date back to 1970. To get this ambitious project off the ground, the college turned to county and state funding for support. Recognizing that public funds may be tight, the college did its homework to make sure that the \$17 million investment would yield numerous operational and energy savings – as well as immediate comfort improvements.

In addition to providing more space through a new library and academic center, the project's goals were to gain air-tight control over the operations budget, increase the comfort of the learning environment for students, and create positive first impressions to help attract students and top faculty members.

"We wanted both the new building and the older buildings to run as efficiently as possible so that we could pump the savings back into our operations budget," says Donald Neel, Director of Plant Operations. The installation of a Johnson Controls Metasys FMS has helped achieve this efficiency. The sophisticated system optimizes the functions of all mechanical equipment on campus, monitors access to buildings, and pages on-duty personnel when comfort or security problems arise.

Cutting-edge technology cuts out inefficiencies

Sophisticated equipment comes at a price, however, so college officials had to convince the State of Maryland that an "intelligent building" would be a smart financial investment in the long run. A major selling point was emphasizing the efficiency of using a new fiber-optic network for multiple purposes – building automation controls, security functions, campus-wide data systems and a digital telephone system.

The eight major campus buildings are now linked together through the fiber-optic backbone. The building automation and security systems work seamlessly together and can be adjusted from a single personal computer.

At the same time, each building is wired for standalone HVAC, security and telecommunications systems for extra protection. In the past, a mainframe computer had always handled these critical functions. When it went down, Neel recalls, the entire campus was brought to its knees. The Metasys solution offers the best of both worlds – centralized control without all buildings relying on a single nerve center.

Another efficiency improvement involves identification cards for students, faculty and administrative staff. Everyone has a single I.D. with magnetic coding that – depending on the person – allows after-hours building entry and access to reserved parking lots. It also serves as a library card and as a credit card for student bookstore purchases.

“Everyday life on campus is much more convenient for everyone,” says Dr. Jon Larson, Vice President of Administration. Johnson Controls coordinated its access control system and card reading devices with the firm that was developing the library card system for the new library and academic center. Now each new student or employee is issued a single multi-purpose card, which is generated on-site by a security guard.

If you find that impressive, consider this: The college’s electric bill did not increase after adding the 60,000 sq. ft. library and academic center to the previous campus total of approximately 300,000 sq. ft. This is because the following improvements were made, in addition to the new control system:

- Doors and windows were replaced in all buildings.
- All lighting systems on campus received an energy-efficient upgrade.

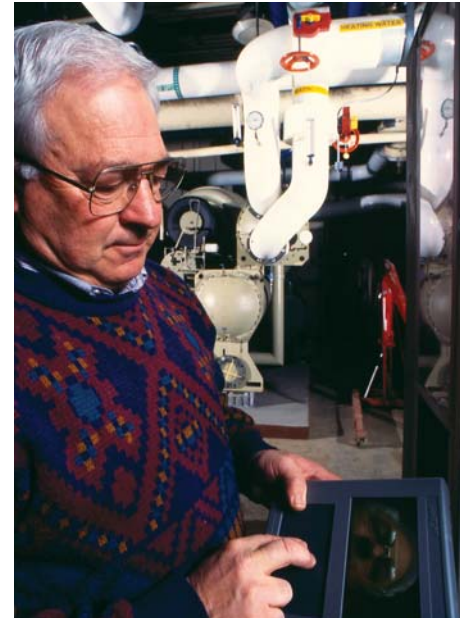
- Motion sensors were installed in certain areas to turn on lights when occupants entered the room.
- In selected rooms of the new library, Metasys automatically adjusted heating and cooling levels depending on whether rooms were occupied or unoccupied.

Better use of security and maintenance personnel

Before the electronic security system was installed, security guards spent three to four hours a day unlocking 100 plus doors in the morning and locking them at night. Their time is now better spent on a variety of activities that directly relate to increased customer satisfaction – that is, students and staff.

Metasys also reduces the amount of unproductive time spent by the maintenance staff. The powerful system pinpoints comfort or security situations that require immediate attention. Many times, a temperature or air flow adjustment can be made at a computer terminal – or a laptop – which the on-call mechanic takes home after hours. If the trouble cannot be solved remotely, the mechanic will have a good idea of what needs to be done and which tools are required.

“The ability of Metasys FMS to diagnose problems and avoid exploratory visits by our maintenance staff has had an enormous impact on our operations,” so that mechanical equipment should last longer as a result.



Donald Neel, director of plant operations, adjusts temperature settings in a remote building from a Metasys panel in the central mechanical room.

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DONALD NEEL, DIRECTOR OF PLANT OPERATIONS

Metasys is the campus nerve center

At the heart of the Metasys FMS are three Operator Workstations and eight Network Control Units that, together, manage the information collected from direct-digital controllers throughout the campus. The HVAC system comprises 20 Air Handling Unit Controllers, four DX-9100 Controllers for the central plant, 212 Variable Air Volume (VAV) Box Controllers, and six Unitary Controllers for fan coil units. Four Metasys Intelligent Access Controllers and seven Johnson Controls card readers manage the campus security system.

Metasys also performs start/stop optimization routines on the college's three chillers and three boilers. Two of the chillers are new 375-ton Trane centrifugal units, while the third is a 350-ton York centrifugal chiller. Heating is provided by two 350-horsepower gas boilers and 50-horsepower gas unit. Demand limiting/load rolling schedules for chillers, boilers and all other pieces of mechanical equipment – also sequenced through Metasys – contribute to additional energy savings, thereby stretching the operations budget.

Not all of the improvements are focused on dollars and cents. According to Neel, noisy overhead fans had been a campuswide problem for years. So he made sure that every VAV box was equipped with a miniature variable

speed drive to run the motor. The result is a smooth transition between each increase or decrease in fan speed – and a quiet environment that is conducive to learning. A Johnson Controls S66 fan speed controller regulates the motor inside each VAV box, which also reduces energy consumption.

The importance of ongoing support

Frederick Community College is justifiably proud of the largest capital improvement project in its history. The buildings have been fine-tuned on the inside, and a re-roofing project has given the campus a pleasing, unified appearance to help attract students, faculty and administrative staff. Just as important, the college can rely on the continued support of its strong partnership with Johnson Controls – a Fortune 200 company that provides an important local presence through its office in Frederick.

“It's a wonderful opportunity to work with people who listen to and comprehend the nature of our problems,” Dr. Larson says of his dealings with Johnson Controls. “They seem to understand exactly what we're talking about and know how to provide the answer – or can direct us to the appropriate resources. We have a very lean administrative staff, so it's extremely important for us to rely on companies like Johnson Controls that can help us achieve our operational and financial goals.”