Success Story:
Southwestern university

Market Served
Higher education

A large university gives Eaton an A+ for PLC control upgrade for critical electrical power distribution equipment

Location:
Southwest, United States

Segment:
Higher education

Problem:
The university could no longer access replacement parts for its obsolete PLC control system for critical electrical power distribution equipment. To reduce risk within its data center, it needed a company that could upgrade the solution, test its accuracy through simulation, and install it without taking other equipment offline.

Solution:
A PLC-based automatic transfer control system, implemented from conception through completion, including engineering the design and build, simulation and testing, and startup and commissioning.

Results:
Since installation of the new PLC solution, the university's data center has enjoyed 100 percent uptime and exceptional reliability for its equipment

"Having worked with Eaton for many years, we had complete confidence that they could meet the many demands of our upgrade project."
University representative

Background

Founded in 1883, the university ranks among the 40 best universities in the world, with top national programs across 18 colleges and schools. Supporting some 51,000 students, it is also a leading research university.

Because countless critical operations are performed daily within the university's data center, downtime just isn't an option. Yet when the its PLC control system for critical electrical power distribution equipment became obsolete —with replacement parts no longer available in the event of a failure—the university recognized the need to replace the aging equipment. "We performed a risk analysis that verified the fact that maintaining our aging PLC hardware would leave our data center exposed to a significant amount of risk," explains a university representative.

Challenge

Eaton®, which had a long-established relationship with the university, proposed an equipment modernization path in which the data center's existing electrical power distribution equipment with a Hot Standby PLC and Eaton PanelMate operator interface equipment would be upgraded with reliable, off-the-shelf hardware capable of serving the university well into the future.

Although the primary goal was to ensure that the installation and new end solution represented a one-to-one match in functionality—encompassing all features associated with the original system—the project was not without challenges. To begin with, the modernization occurred in the midst of the COVID-19 pandemic, when on-site visits were not permitted. In addition, the university required that the new system be verified via simulation prior to it being commissioned inside the data center. Finally, the new PLC solution had to be installed without taking the data center's electrical power distribution equipment offline.

The specifications of the upgrade did not phase Eaton's Power Systems Controls (PSC) team, which provides customized automation and control solutions that enable customers to operate their electrical power distribution

Powering Business Worldwide

systems more safely, reliably, and intuitively. Through its expertise in design, program development, implementation and testing for all power system applications, the PSC team takes projects from conception through final field startup and commissioning, which it did at this university.

"Having worked with Eaton for many years, we had complete confidence that they could meet the many demands of our PLC project," the representative says.

Solution

Eaton recommended that the university replace the outdated Hot Standby PLC system with a modern Hot Standby PLC system and two new operator interface terminals running Eaton Visual Designer Visualization software, configured to look like the previous HMI screens while maintaining existing functionality. Furthermore, a significant amount of redundant I/O added to the volume of work involved in the overall upgrade, as the physical rewiring required substantial time to complete.

"This system incorporated a new controller and operator interface terminal, but much of the existing hardware was left in place," explains Matthew Wilson, Eaton's Lead power system controls engineer. "One of the biggest changes for the user was the upgraded operator interfaces. We had a lot of discussion focused around how to carry special requirements through and improve upon them."

To provide assurance that the new system would operate as expected, the university also expected the new solution to be simulated prior to installation. Complicating that process was the fact that in-person meetings were not allowed due to COVID-19 restrictions. "During the pandemic, meeting in person wasn't a feasible option, so one of the unique challenges we had to overcome was how to carry out simulated sessions in a meaningful way," explains Wilson. "It was extremely important to think through every detail of the installation process and production, so we could ensure there would be no unexpected issues, and that the behaviors and functionality of the updated system matched the original."

To execute the simulation desired, Eaton's PSC team built a dedicated hub that was shipped to Eaton's local field office, along with all hardware and operator interface terminals. The plug-and-play setup enabled Eaton personnel to easily assemble the solution on-site. The university's data center personnel were then able to interact with the hub in simulation sessions that were operated remotely from Eaton's facility in North Carolina.

"We wanted to make sure that the logic, graphics and other functionality was tested and proven before we installed the live system," Wilson explains. "Each session was very helpful on both sides to know what we needed to do."

During three separate simulated sessions, Wilson was able to stage various scenarios that could potentially play out within the data center, demonstrating how the hardware would respond. "The nature of the pandemic presented some real challenges that we were able to overcome," he acknowledges. "It's a real testament to Eaton's ability to deliver the exact solution a customer needs, regardless of the layers of complexity."

The next hurdle was meeting the customer's required parameters for installation of the new equipment. The university needed the control system upgrade to be completed without causing any downtime to the data center equipment. To do so, the university's switchgear assembly had to continue serving loads during the upgrade process. "We had to disable the control system without taking any systems offline except what we were replacing," Wilson explains. "This required a lot of precision and planning."

Eaton's PSC group led the programming of the new equipment, with physical installation completed by Eaton field service representatives (FSRs). Wilson, who likens the new system to an insurance policy, emphasizes that reliability is paramount in this type of application. "The PLC equipment is absolutely essential, because it has to spring into action when the university loses utility power," he explains. "It starts the backup generator and feeds power to the downstream UPSs, so it is very critical. Even if the system is only called on to work once or twice a year, if it doesn't work and the university loses power, they can literally lose their entire data center."

Result

Since installation of the Eaton solution, the university's data center has been operating flawlessly. The value-add provided by Eaton solutions and services can be summarized as follows:

High reliability and uptime

Thanks to the new PLC equipment and Eaton's expert project management, the university was able to meet its stringent uptime requirements while ensuring ongoing availability within its data center. The solution incorporates proven components that will provide the facility with a long lasting, exceptionally reliable solution well into the future.

Modernized equipment

While power systems can continue operating successfully for 20 to 25 years, control systems afford an average lifespan of 10 to 15 years. As such, the university needed to upgrade certain aspects of its system without losing features or functionality.

Complete, turnkey solution

The Eaton team was able to take the university's project from conception through completion, engineering the design and build, simulating, and testing the system, and performing the complicated startup and commissioning.

To learn more contact your Eaton representative or visit
Eaton.com/PSC

Powering Business Worldwide

Eaton
1000 Eaton Boulevard
Cleveland, OH 44122
United States
Eaton.com

Printed in USA
Pub No: CS027027EN / GG
April 2022

Note: Features and specifications listed in this document are subject to change without notice and represent the maximum capabilities of the software and products with all options installed. Although every attempt has been made to ensure the accuracy of information contained within, Eaton makes no representation about the completeness, correctness or accuracy and assumes no responsibility for any errors or omissions. Features and functionality may vary depending on selected options.

Follow us on social media to get the latest product and support information.