
Streamlined HMI is Key to 41 Substation Rollout of SCADA System at Coop



Ease of SCADA implementation enables Carroll Electric Coop to install upgraded, modern SCADA systems in 41 remote substations, with centralized access and control at the home office.

One of the largest electric cooperatives nationally, Berryville Arkansas-based Carroll Electric Cooperative Corporation, faced an ongoing challenge of efficiently managing their large and geographically dispersed network of substations. Without an ability to remotely monitor substation performance or receive notifications from remote equipment, their personnel had to travel to substations for various issues, which delayed response times and issue resolution.

"If we had to make a change or investigate an issue, our linemen, technicians, or engineers

would have to drive to the substation," said David Smith, Engineer - Communications at Carroll. "If it was an outage, customer calls would be coming in as we were trying to determine if there was an issue at the substation."

With a network of 41 substations and over 10,000 miles of line serving over 100,000 accounts across 11 largely rural counties in Arkansas and Missouri, driving out to a substation from Carroll Electric's home office could take as long as an hour and a half. The lack of remote monitoring and management ability was getting in the way of the cooperative's mission to provide the most reliable and affordable service to its members.

"We knew a SCADA system would address our remote management needs," said Smith. "What we wanted was a centralized way to monitor the

megawatts per substation and the amperage per feeder to ensure the loading levels were not exceeding our thresholds. This issue becomes even more of a risk during the colder winter months.”

After undertaking a comprehensive search, Carroll Electric selected the OrionLX system from Pennsylvania-based NovaTech Automation, a substation automation company that has served the power transmission and distribution market for more than 40 years.

The company’s Orion Substation Automation Platform is a communication and automation processor that can connect to nearly any substation device in its native protocol, perform advanced math and logic, and securely present the source or calculated data to any number of clients in their own protocol. The Orion can be integrated with any equipment, including competitors, and is often connected to microprocessor-based relays, meters, event recorders, IEDs, and RTUs. It is then connected to an existing enterprise network or SCADA system.

In this case, the system includes OrionLX RTUs in each substation, which send data back to a master unit located at Carroll Electric’s home office.

“We had two primary criteria for our SCADA selection, beyond the specific functional requirements,” said Smith. **“We needed a system that was easy for us to program on our own and was affordable. We did not want to be burdened with ongoing software, license, or maintenance fees.”**

Ease of programming was important to Carroll Electric’s engineering team for both the initial HMI set-up and for adding new installations in the future. The cooperative began with a single substation pilot for which NovaTech delivered the initial HMI.

The Orion system uses open-source web technologies and pre-configured template pages to simplify the building of interactive SCADA and local HMI screens to view data from connected IEDs and RTUs using standard web browsers.

Beyond interface design improvements, the integration of key features such as an alarm annunciator application is one of the areas that substation automation platforms have advanced significantly.

The alarm annunciator in the NovaTech platform is managed through the same WEBserver software. It includes pre-configured pages for data archiving/sequence of events recording, alarm annunciation, one-line diagrams, IED faceplates, control screens, alarms, trending, and communications diagnostics.

“We gave NovaTech our substation specs, and they wrote the original master and substation files for us,” said Smith. “From then on, we just modified the program to fit each successive substation ourselves.”

Carroll rolled out the Orion system across 41 substations one at a time. For each installation, technicians wire, run ethernet cables, and get the relays set up in their control house before the engineering team set-up and tested each Orion unit.

“It really was pretty easy,” said Smith. “Since the Orion program already had the pictures of our devices in the field, it was not difficult for us to configure the HMI to each new substation’s individual specs.”

One-line diagrams in the Orion HMI show the status of the entire substation at a glance. This enables Carroll Electric’s dispatch team to quickly tell which feeders are open and if there are voltage issues. Feeder breaker zoom screens allow more detailed information to be viewed at the office such as: ground trip blocked, nonreclosing, max amperage, power factor, and fault currents.

Since installing the SCADA system, Carroll has been able to respond to issues more quickly, resulting in shorter outage times for their customers. Previously, their personnel would have to drive out to a substation when there was an issue with a feeder or transformer. Now, most issues can be diagnosed remotely. During extreme cold weather, employees would be posted at various substations to collect amperage readings throughout the day.

Now the monitoring is done from the office. The engineering team remotely logs into the substation devices to view settings, sequence

of events and make changes if needed. "Our monthly substation checks are much more efficient," said Smith. "We can download device settings, event logs, and loading data from the office without having to visit our substations [in person]."

The remote monitoring capabilities that the SCADA implementation has brought to Carroll's engineering team have enabled them to manage the scope of their geographically dispersed network and support the cooperative's mission for reliable and cost-effective service more efficiently.

For more information on SCADA solutions from NovaTech Automation visit novatechautomation.com or call (844) 668-2832.

