

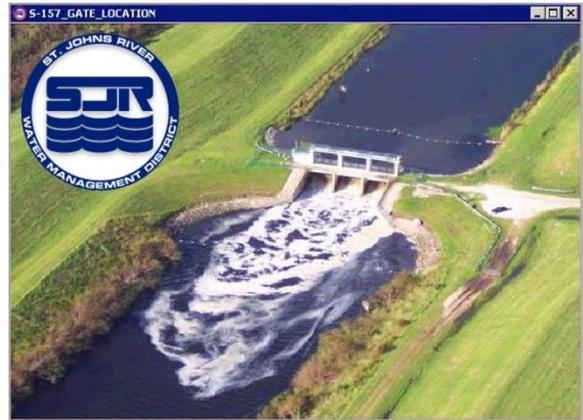
## VTScada Software Provides Advanced Redundancy And Direct Gate Control for Mission-Critical Flood Control System

By Christopher Little

The St. Johns River Water Management District (SJRWMD) is responsible for operating flood control structures and protecting water quality for roughly five million people in Northeast and North Central Florida.

After two hurricanes in 2004 cut network access to two of their remote monitoring sites, the district's Engineering Division decided to implement a redundant cellular-based SCADA system to take over when the primary is unavailable. Campbell Scientific, makers of their remote telemetry units (RTUs) recommended a hosted solution based on VTScada HMI Software from Trihedral Engineering.

This system led to the decision to use VTScada to replace the primary SCADA software which was now deemed to be too expensive to maintain. In 2005, VTScada was selected by the District's Surface Water Management Division to provide direct control of flood water gates used during serious weather events such as the hurricanes that pound Florida for six months of the year.



### A Redundant Water Level Reporting System

The Hydrological Data Services (HDS) division maintains over four hundred Campbell Scientific RTUs that collect data at multiple sites spread throughout the district. Mike Babbit is a SCADA Systems Analyst with the SJRWMD HDS group. "Our telemetry system is made up of separate servers located in our Palatka, Palm Bay and Apopka offices. They are tied together through a wide area network. In other words, we use the internet to move data back and forth. During the storms, the phone lines went down so we had no network connectivity between our headquarters in Palatka and our outlying offices in Palm Bay and Apopka. We had damage at some of our sites, but all were able to continue recording data. We just couldn't get to it."

"After that, we decided that we needed a redundant cellular-based system so that if our primary system failed, we would at least be able to get to a source of data and see the current water levels at the sites. During the storms of 2004, the cellular network remained fully operational. This was important because that information is used to perform flood control in the upper St. John's River Basin." For added peace of mind, Babbit's team also decided that historical process data should be stored out-of-state. "There is no guarantee that any structure in Florida would survive a catastrophic Category Five Hurricane."

The team selected a hosted solution comprised of cellular-based modems and VTScada HMI software from Trihedral Engineering. This subscription service allows managers and operators to use a web browser to access their application as easily as navigating to a web site. All they required is an Internet connection, a special URL (web address) and a valid user name and password. In addition, historical data is hosted in redundant servers based in New Jersey and Nova Scotia. "Campbell Scientific suggested this approach in their proposal. Since we had been working with them for years and we were familiar with their equipment and the capabilities of their data loggers we decided to go with that."

### A New Primary SCADA Software

At this time, the team also began to be concerned about the high yearly cost of maintaining the licenses for their primary SCADA software product. Since operators were now familiar with the VTScada interface, they decided to implement VTScada here as well.

Fortunately, they would not have to rebuild (and debug) the tag database from scratch. "Trihedral had already made this conversion when they replaced the same product at the Southwest Florida Water Management District. It was just a matter of modifying their existing tools for our implementation. They didn't need to re-invent the wheel."

In the new primary SCADA system, over four hundred Campbell Scientific RTUs record sensor information (such as water levels from shaft encoders) using their on-board Loggernet software. These RTUs are connected via Data Radio VHF to the SCADA servers in Palatka, Palm Bay and Apopka using three separate frequencies. VTScada polls each RTU and retrieves the information from Loggernet. VTScada's integrated reporting module generates a report from each server specifically formatted to be imported into the district's Hydron hydrologic database. From here the information is distributed to users across the district.

## Flood Control Gate Operation

One of the many people who depend upon the information from the primary and redundant SCADA systems is John E. Richmond, a Supervising Professional Engineer with SJRWMD. He is responsible for managing storm water by opening and closing sixteen gates at nine structures. "We have to know the water levels in the lakes. With those elevations, we calculate all of the water discharge values needed to go through the structures and decide how much each structure should be open."

What Richmond needed was a Human Machine Interface (HMI) software that could remotely operate the gates. "Previously, whenever we needed to make a gate change, we'd call down to Palm Bay from Palatka eighty-five miles away and say, "Go change a particular structure from two feet to two point five feet. They would have to drive for an hour, make the gate change, and call us to say it's done. Then we might need to call them again the later that day and say, 'Open it more.' That sort of thing."

"I knew that Hydrological Data Services was already using VTScada. That system was already up and running when I started looking for an HMI, in the event we wanted to combine systems at some point in the future. Plus, it had plenty of capability and a lot of possibilities if I wanted to expand." Richmond was also able to benefit from a similar installation in use at their sister utility, Southwest Florida Water Management District. "I got to know some of those guys, because they've been doing this for twenty years. They actually gave me their source code."

In the completed system, operators select the open button for a particular gate on one of the VTScada display screens. The SCADA software then sends a command via a radio to a Motorola Moscad RTU at the corresponding structure. The Moscad in turn commands the shaft encoder to open or close the gate.

"I bought the equipment through Edwards and Kelcey out of Jacksonville. They made all the panels and connected the Moscad I/Os." The remainder of the installation was performed by Star Controls, an integrator based in Coral Springs. "They are top notch when it comes to integrating Moscad RTUs and the VTScada software. They did the final development on the display screens. I took a four and a half day course in Clearwater, Florida, so I can do a lot of tag work myself and tweak screens the way I like them."

The user interface includes a screen for each structure, an overview screen that shows an aerial view of all eight structures and an alarm page. "We also have a page that shows the communications protocol for all eight structures, if communications are up or down, if the electric indicator is good, if it is on DC power or electric power. That's all on one page. It's very easy"

SJRWMD cut the Ribbon on their new system on May 22, 2008 at a ceremony at their Palm Bay Service Center. "VTScada is a big part of our project and I'm very pleased with it"

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John Richmond shows off his new, wirelessly operated VTScada Gate Control System

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