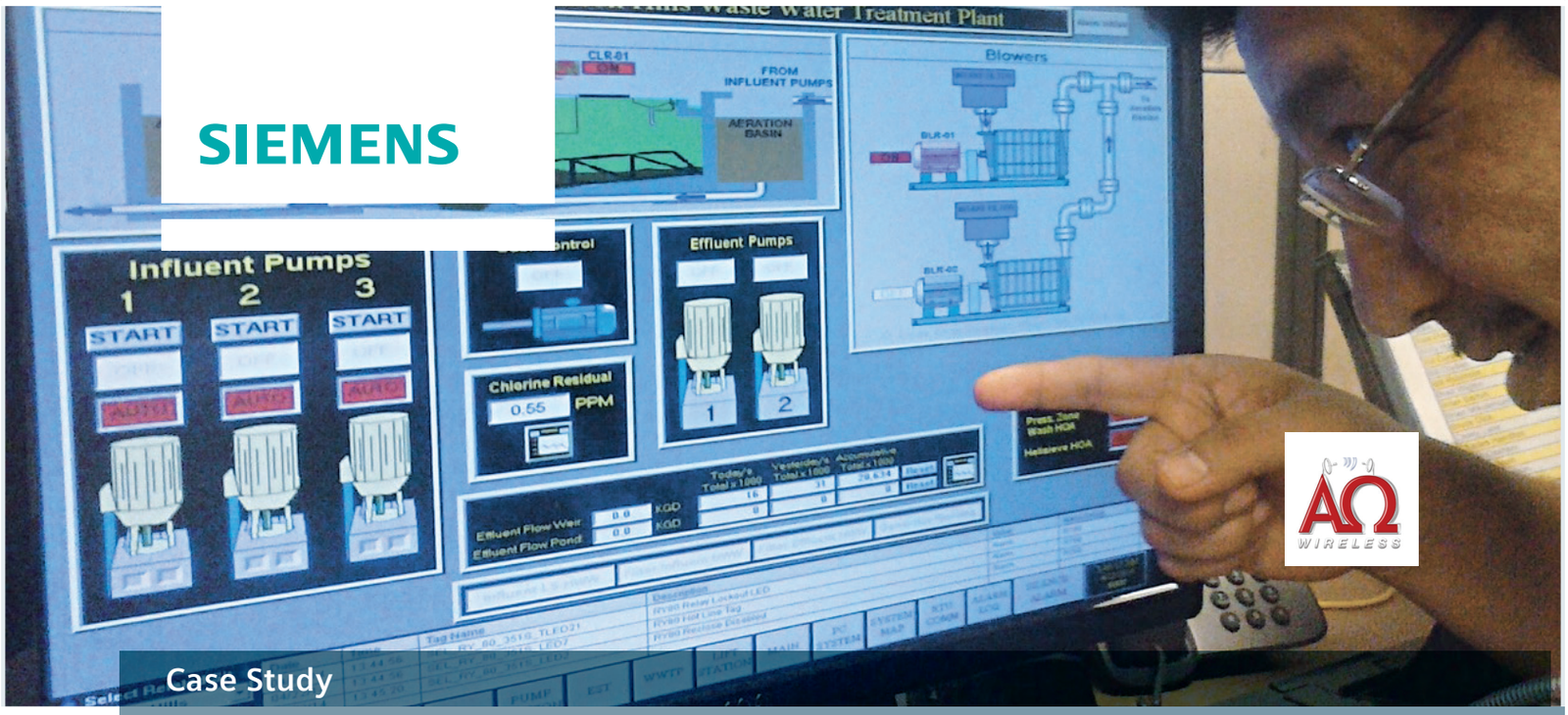
SIEMENS



Case Study

Georgetown, Texas deploys Siemens RUGGEDCOM WIN Wireless Broadband to upgrade mission-critical infrastructure communications.

EST. 1848
GEORGETOWN
TEXAS

Customer: Georgetown Utility Systems, City of Georgetown, Texas; 30 miles north of Austin; population 52,300.

Challenge: Cost-effectively connect remote water treatment sites with faster, more reliable data transmission capable of withstanding the extreme heat of Central Texas summers.

Solution: Deploy high-performance Siemens RUGGEDCOM WIN technology to augment the city's mission-critical broadband network with licensed 4.9 GHz wireless capability.

Results: An extremely reliable, future-ready, high-bandwidth wireless network, with thousands of dollars in labor cost-savings along with hundreds of thousands of dollars in cost-avoidance.

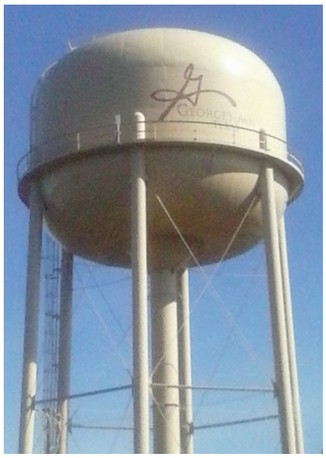
Partner: Alpha Omega Wireless, Austin.

Deep in the heart of Texas, about 30 miles North of the Austin state capital, is historic Georgetown, established in 1848. The once sleepy town's population almost doubled in 12 years to more than 52,000. Fueling its growth in great part has been the demand for housing from the workers and families of Austin's major employers such as the state government, the University of Texas and scores of high-tech companies, including Dell, Apple and Intel.

Of course, all these people need water, sewers, electricity and roads. That's the responsibility of Georgetown Utility Systems, one of the largest and most critical departments in the City of Georgetown's municipal government. But the pace of growth has made providing these services a tall order, according to Ron Marrow, the city's Transmission and Distribution supervisor for SCADA[1]. "It's not enough to just 'stay up' with the city's growing number of citizens, because that would mean we're always behind the curve," he says. "We have to stay ahead of the growth and that takes lots of good planning."

He and a team of three are in charge of all communications and connectivity across the various components and systems that make up the city's water, waste and electrical infrastructure. As such, they've been integrally involved in all the ongoing upgrades and expansions of that infrastructure to keep up with the city's soaring population.

[1] Supervisory Control and Data Acquisition



Challenge: Cost-effectively connect remote water treatment sites with faster, more reliable data transmission capable of withstanding the extreme heat of Central Texas summers

For years Georgetown Utility Systems had used the 900 MHz radio spectrum to monitor the operations of the many components of its water, sewage and electrical distribution systems, using SCADA data communications with speeds of 9600 bits/sec. But Marrow explains that 900 MHz radio communications weren't always reliable, especially over a coverage area of approximately 300 square miles.

Hot weather was especially a problem – and not an uncommon one in Central Texas. The area is known for its long, hot summers, with average temperatures often topping 100 degrees Fahrenheit in July and August. It is common for highs to be near 90 degrees well into October.

"Heat causes atmospheric changes that can disrupt radio data transmissions," he says. "Whenever it got hotter than 90 degrees, for example, communications from a remote waste water lift station would fail, so we'd have to send a technician to take data readings every four hours, to make sure everything's operating and nothing's overflowing. If we'd have an overflow, the actual environmental impact might not be all that big, but the regulatory reporting would be huge, so we'd have to have someone monitoring it in person."

Another issue was the star topology of the city's 900 MHz radio network. "All the remote radios were transmitting back to one central radio," Marrow says. "If that central radio would go down, so would all our communications."

To alleviate that concern, he and his team designed and deployed a redundant, 1 Gbps fiber ring network for the city's SCADA communications, with an eye toward using its multi-megabit bandwidth to eventually enable all kinds of broadband communications, including video surveillance, voice-over-IP and remote, on-demand WiFi hotspots for municipal field workers.

But long before he and his team could implement these services, they had to contend with a more immediate issue: Cost-effectively connecting remote water treatment stations with the city's new fiber ring.

Solution: Deploy high-performance Siemens RUGGEDCOM WIN technology to augment the city's mission-critical broadband network with licensed 4.9 GHz wireless capability

Because in-ground fiber costs up to $25,000 per mile, Marrow says extending the city's fiber to its wastewater lift stations up to seven miles away wasn't economically feasible. Clearly broadband wireless was the only way to go, so the fiber ring's multi-megabit throughput could extend all the way out to the remote sites.

There were several options to consider. One was using one of the commercial cellular networks, but that came with monthly charges. Another was 802.11 WiFi, but that came with limited range. His third option was 802.16e WiMAX, using the 4.9 GHz spectrum that the U.S. Federal Communications Commission (FCC) allocated to public safety and municipal uses, and which also allows for mobile connectivity. While WiMAX over the 4.9 GHz band would provide the range needed, it required FCC licensing – and all the accompanying paperwork that Marrow had no idea how to start.

He did know whom to call, however: Siemens. In building out Georgetown's fiber ring, he deployed scores of RS900G Layer 2 switches from RUGGEDCOM, a harsh environment communications portfolio from Siemens. The RS900G is an environmentally hardened, fully managed Ethernet switch that provides dual fiber optical Gigabit Ethernet ports with Gigabit uplink ports, and 128-bit encryption. In all, Georgetown had deployed more than 200 RUGGEDCOM devices in its fiber network, including routers and media converters, as well.

"We had all these RUGGEDCOM devices in our network already, so it only made sense to keep all the WiMAX components in the family, too," Marrow says. "After all, they had earned their RUGGEDCOM name by holding up to the harsh, hot environments of our Central Texas summers."

In working closely with Marrow on the fiber ring buildout, his Siemens RUGGEDCOM contacts were aware of the issue of extending the fiber's broadband throughput out to the remote sites. They also knew that the WiMAX technology itself had some line-of-sight challenges in the connecting waste water lift stations that are typically placed in low-lying areas amid the Georgetown's rolling, tree-covered terrain. "So we not only needed help securing our FCC license, we also needed some excellent RF engineering, system design and integration," Marrow says.

For both these services, Siemens recommended that Marrow contact Alpha Omega Wireless, a specialty systems integrator and a Siemens-certified Industrial Wireless Solution Provider based in Austin. Marrow met with Joe Wargo, the company's founder and president, and Kelly Ice, its business development manager.

Based on their in-depth interviews with him, they compiled a detailed set of requirements from which they developed a RUGGECOM point-to-multipoint 4.9 GHz WiMAX solution as well as a comprehensive deployment and commissioning plan.

In addition, they processed all the paperwork needed for the city's FCC license to use the 4.9 GHz spectrum, saving the project and Marrow weeks of time, if not months.

The RUGGEDCOM WIN WiMAX solution has three components, all hardened and ruggedized for withstanding the harshest weather conditions: the RUGGEDCOM WIN 7249 small form-factor base station, specifically designed for 4.9 GHz radio transmissions; the RUGGEDCOM WIN 5249 outdoor subscriber unit, also designed for 4.9 GHz spectrum; and the RUGGEDCOM RP100 single-port 802.3xx Power-over-Ethernet (PoE) injector, which powers the other two devices.

All RUGGEDCOM gear is utility-grade that's designed, tested and field-proven to work in environments subject to high electromagnetic interference (EMI), extreme temperatures and environmental pollutants. It's also been put through Accelerated Stress Testing, comprising Highly Accelerated Life Testing (HALT) and Highly Accelerated Stress Screen (HASS), both designed to find defects before environmental conditions do. These tests enable Siemens to provide five-year warranties on everything from RUGGEDCOM's broad portfolio of network components.

Results: An extremely reliable, future-ready, high-bandwidth wireless network, with thousands of dollars in labor cost-savings along with hundreds of thousands of dollars in cost-avoidance

In the first phase of deployment, which took just two days, Alpha Omega Wireless installed the WIN base station in one of the city's outlying, 120-foot water towers to have a clear line of site to its corresponding subscriber units installed in four different remote water treatment stations, the farthest being more than five miles away. Marrow says he was amazed at the difference in transmission speeds when he took his laptop out and logged into the 4.9 GHz SCADA data stream. "It was like night and day," he says. "Before, the data speeds were so slow. It's like going from using a pipe a quarter-inch wide to one that's six-inches wide."

Marrow was extremely pleased with the flawless implementation by Alpha Omega Wireless, backed by Siemens service and support. "They did a fantastic job, from start to finish," he says. "And the RUGGEDCOM system has worked absolutely fantastic since."

Ice explains that it's not by chance that his company has retained 100 percent of its wireless clients since its founding: "We test all the radio components as soon as they arrive to ensure each one works to its specification. Then we follow our proprietary project management methodology, which we built on the rigorous standards of the Project Management Institute."

Marrow says that the city will no longer incur the labor expense of dispatching a technician to waste water lift stations for logging data by hand, whenever the outdoor temperature breaks 90 degrees. With more than 30 days a year of such temperatures, those add up to several thousands of dollars a year in labor that the city could put to better uses. "That's not to mention the technician's discomfort to be inside an enclosure gathering the data, while the sun's baking down on you," he says.

Those savings, however, pale against the city's avoidance of hundreds of thousands of dollars in capital costs, if it had decided to lay fiber in the ground out to the remote sites. In all, Marrow says, one of the biggest benefits of working with Siemens and Alpha Omega Wireless was their expertise, responsiveness and consultative approach to the RUGGEDCOM WiMAX project. "They worked seamlessly together with support that was extremely good," he says. "Throughout it all, my team and I felt like our backs were covered. No matter what issues might arise, we knew both companies would respond as one."