Motorola's MOSCAD – Moving GWC into the Future

By Thomas F. Cleveland
Vice President – Engineering
General Waterworks Corporation (GWC)

"Motorola, in our opinion, is a progressive forward looking company which is committed to being responsive to customers' needs. This requires hard work and a strong desire to understand its customers and to put them first. The development of the MOSCAD RTU and the MDLC Motorola Data Link Communications protocol are examples of Motorola's commitment to quality."

Challenge

Fresh water is often a nation's most precious resource while finding proper ways to treat wastewater is often one of its most pressing problems. For most water utilities, the challenge is to provide an uninterrupted supply of fresh water as well as removing and treating wastewater in an efficient and cost effective manner.

The USA, like other nations, faces tremendous challenges in the areas of water and wastewater management. The nation's population of over 230 million is served by more than 60,000 public or privately owned water companies or utilities. Almost 50% or 30,000 of these utilities are privately owned. 15,000 serve less than 100 people each, while only 430 utilities serve populations totaling more than 100,000.

Any company in the water and waste water sector must have solutions for the biggest utilities as well as for thousands of smaller ones to profitably maintain their water systems. Motorola has successfully provided solutions, with its MOSCAD – the intelligent SCADA system, to water companies around the world serving their multitude of users.

GWC

General Waterworks Corporation (GWC) is a private (investor-owned) company serving almost 1 million people in 14 states across the USA. GWC operates through a constellation of 23 separate water utilities and two combined water and wastewater companies. Its subsidiaries serve markets ranging in size from 100 to nearly 50,000 customer connections.

GWC is an interesting company. Its needs closely reflect those of the entire industry since it operates both large and small utilities – its service and profitability concerns are the same as for everyone else.

In 1987, GWC decided to begin an upgrade program, that would extend into the mid 90's. The company decided that the program would begin with its Jacksonville facility. GWC engineers recommended using a radio controlled SCADA system. At that time it was almost impossible to find a reliable system with good support. They began looking for a partner who could adapt its technical expertise in order to understand and fulfill the needs of GWC's large and small subsidiaries. In the past, GWC found that Motorola emphasized the end product and its support. Motorola now proposed MOSCAD -the intelligent SCADA solution with proven applications for water and wastewater management.

MOSCAD

GWC was impressed by the fact that thousands of MOSCADs have been used by water utilities around the world. MOSCAD solves problems at every stage of water and wastewater processing, by controlling remote wells, pumps, filtration and chemicals, storage tanks, lift stations, pumping and booster stations, etc.

MOSCADs radio communications makes it the most reliable system today, because it is independent of land lines. Its MDLC communications protocol, which links components is another example of Motorola's commitment to its customer base. This protocol has dramatically improved system reliability and flexibility.

MOSCAD offers several important advantages over other remote monitoring and control technology:

- **flexibility** – MOSCAD can send and receive data over radio, leased lines, dial-up lines, microwave links
- **reliability** – MOSCAD features Motorola's Six Sigma quality standard; radio communication keeps the system functioning when leased lines are down.
- **intelligence** – MOSCAD RTUs can independently run most sites without being connected to a central. They can also be remotely programmed from other RTUs or control centers.
- **compatibility** – MOSCAD is compatible with virtually any other manufacturer's system to offer long term compatibility and standardization
- **diagnostics** – On the rare occasion that a MOSCAD component fails, the system locates the problem while automatically reassigning the unit's tasks.
- **modularity** – MOSCAD grows with user needs; the system is easily upgradable

Motorola was able to show how MOSCAD could work for GWC's large and small utilities and provide these important additional benefits:

- help GWC maintain its policy of continuous improvement
- provide a comprehensive solution for all facets of the operation
- improve customer satisfaction
- detect system faults and solve them before they become major disasters
- enable GWC to be profitable in an increasingly regulated environment

After Jacksonville, GWC has used Motorola RTUs to upgrade, replace or enhance existing systems in New Rochelle, New York and Pine Bluff, Arkansas. Below is how Motorola helped GWC meet its objectives in its three major upgrade programs.

Jacksonville, Florida

In 1987, GWC wanted to upgrade the telemetry at the Jacksonville Suburban Utilities Corporation. The antiquated system, that used outmoded autodialer notification units could not handle the rapidly growing customer base in the widespread area it was serving.

In 1987, radio controlled SCADA systems were mostly science fiction. The few available systems were unreliable or not reputable. The Jacksonville team conducted intense economic and engineering analysis and decided to move ahead with a radio-operated system.

Initially, 126 Motorola RTUs were installed to manage 19 water plants, 7 waste water plants and 100 lift stations. Two radio repeaters were installed and by early 1988, the system was fully operational. What a difference these RTUs made! Service people didn't have to inspect lift stations at night or on weekends and GWC knew exactly how every part of the system was performing at any given moment – virtually in real-time.

There was another important bonus. Instead of running out to repair remote lift stations, engineering teams could expand and improve the system -enhancing customer satisfaction. The Jacksonville system did the job until late 1993, when it was upgraded again using even more powerful MOSCAD based solutions with the MDLC SCADA protocol. An additional 22 MOSCAD RTUs and a new central control unit are being installed to help Jacksonville keep its customers satisfied into the next century.

New Rochelle, New York

Located near New York City, this system serves a very widespread bedroom community of almost 100,000 people. This highly congested area demanded real-time monitoring which the existing telemetry could not handle.

In 1989, a competitive bid was issued. Motorola met or exceeded every one of the requirements. Together with teams from the Newburgh, New York Service Center, 26 RTUs were installed. Because of heavy radio congestion, major hurdles had to be overcome. This task was efficiently handled by Motorola whose decades of radio experience clearly gave them the edge.

Today, New Rochelle's water system is on-line all the time, and important data, such as flows, pressure and tank levels are always available. The customers are happier, employee morale has improved and government regulators are pleased with the new system's added benefits.

Pine Bluff, Arkansas

Pine Bluff will be GWC's most advanced SCADA site. Originally its SCADA-type system, installed in 1986 was designed to control HVAC systems. Motorola was awarded a contract to upgrade the facility based on its MOSCAD system design offering local installation and training support.

The new system is based on 17 MOSCAD RTUs, IBM PS/2 central computer system and FIX/DMACS Intellution software. This will change the way Pine Bluff works; GWC is convinced that it will boost customer satisfaction without requiring additional service teams while lowering its overall cost of operations.

More Than Hardware & Software Training, Installation & Support

An important part of every MOSCAD program at GWC is on-site training and installation. Motorola works closely with GWC to make sure that everyone who uses MOSCAD fully understands how the system functions. Long before installation, GWC engineers receive in-depth courses and simulations such that by the time the Motorola installation team is to put the system in place and test it, GWC employees feel right at home with MOSCAD.

Once the system is up and running, Motorola is there with round the clock support. One of the reasons that GWC is standardizing their systems around MOSCAD is the high level of Motorola support. Despite MOSCAD's impressively high reliability in the field, it's critical for GWC company to know that service and support is available 7 days a week, 365 days a year.

GWC & Motorola's MOSCAD – The Winning Combination

GWC has created GWC Team 2000, a set of corporate goals, it is believed will help the company achieve success in the next century. These goals include:

- creating a company that places customers and environment first
- training employees and providing opportunities for them to fulfill career objectives
- to be recognized as the leader in water and wastewater technology and service
- to build a more efficient organization

Thanks to partners like Motorola and the high performance MOSCAD and MDLC, GWC is moving closer to its goals.