

The Fastest, Most Efficient Canal Control System Installation and Commissioning in the West

Water districts are faced with the dilemma of wanting to have the advantage of more automation, not having the budget for it, and dealing with the difficult task of going through the technical learning curve. The conflicting requirements of an efficient, economical, user-friendly system on occasion work out very nicely as in this example:

Central Arizona Irrigation and Drainage District (CAIDD) set out to replace an aging SCADA system in June of 2002. Their existing system used narrowband UHF radio communications. Interference from outside sources rendered it inoperable and unreliable. District personnel worked around the clock to keep the water flowing to their customers. They were highly motivated to replace the SCADA system quickly. In June of 2002, Eddie Key contacted Automata, Inc. regarding a new system. Automata, Inc. had supplied their existing system about 20 years earlier.

Earlier this year Automata, Inc. had completed testing on the automated canal control system developed in co-operation with the USDA-ARS. The Plug and Play automation system is available in 5 functional levels for manual and full automation. Standard communications offered with this new system is robust spread spectrum radio.

CAIDD wanted the new system slightly customized and to simulate the operation of their old system. More specifically they wanted screens to display water levels along certain segments of each canal. Commands were specified to increment or decrement the flow according to the operator's specified amount at any control structure. In order to do that a calibration factor had to be added to the software for each gate. Since no gate position sensor is used, the gate calibration factor relates the gate travel time to approximate change in flow rate. Using this approach, the canal is operated with only water-level sensors at each check structure.

CAIDD opted for the manual system level (minimum capability), to get started. There are five models of the system, each with different functional levels. In order of increasing complexity, the five models are manual supervisory control, upstream level control, demand scheduling, automatic flow rate control, and full down stream control. Both hardware and software can be upgraded in the future. To fully automate or provide any of the flow calculation for the various flow control modes, gate position sensors will have to be added. Software and/or hardware can be upgraded



Bob Strand, USDA relaxes in front of the office housing the central computer after spending all night testing the system.

independently as required. Parts of this system will possibly be upgraded in the future.

Automata's MINI Series RTU using mod bus protocol is the standard RTU for this system. While I/O of the MINI is limited to only two controls and one analog input, an addition analog and digital input is required in the future.

On June 3, 2002, CAIDD gave Automata, Inc. personnel a tour of the area and discussed what radio path testing was required to determine the integrity of each radio path. On the same day, Eddie described the system operation they preferred and the urgency of getting a new system operational. License free spread spectrum radio was instrumental in supplying a new system quickly. Applying for a frequency can be a long and arduous process. Since CAIDD was already experienced with the requirements and operations of SCADA, the investigation and specifications process was accomplished very quickly and efficiently. On June 6, 2002 Automata, Inc. provided CAIDD with a quote for 100 stations, 40 to be supplied ASAP and the remaining 60 at the end of the year. A sub \$1000.00 price tag per station demonstrated the amazing economy of Automata's MINI RTU. Now the ball was in CAIDD's court to keep the momentum going by making an expeditious purchasing decision.

They certainly did keep the momentum going. CAIDD placed the purchase order with Automata within 19 days for the entire system. Planning the components to fit exactly into the existing slots where the old system was located was vital to a speedy, efficient installation and commissioning. Automata personnel worked closely with CAIDD in designing the package for the first site. All existing mounts, conduit, wiring and masts were re-used. Simultaneously, Automata, Inc. supplied equipment for radio path testing. Within a short time, Eddie provided a system design complete with station locations, repeaters, data path specifications, and station ID numbers. If all the planning homework and manufacturing were done correctly, installation would be speedy and the system will be functional to alleviate the labor-intensive operation the district was going through to keeping the water flowing.

An intensive effort was made by the Automata/USDA team to expedite production and do the customization required. By August 16th product began shipping and by September 3rd, the ASAP part of the order was shipped. Installation proceeded simultaneously with production and went very smoothly. A firmware bug was discovered early in one of the custom commands for this particular job. It was corrected quickly and the installed sites retrofitted. The remainder of the installation proceeded smoothly.



Automated Gate Sensor

By September 12, 2002, the installation and gate calibrations were complete. A record speed of eleven days for installation of 42 sites and the Base Station was achieved. Some communication statistics regarding the first week of operations demonstrates the quality

of the installation and equipment. Fifty thousand operations were executed with only 3 communication failures, all from the same site. The communications to one site were weak and needed fixing. Communications to the remaining 42 sites were solid from the first fire. This speaks very highly of the districts planning and path testing. Working with customers until a new system is fully functional is characteristic of Automata's customer support. The system remains in operation and by the end of the year the remaining 60 sites will be installed. In the future, possible higher levels of automation will be implemented. The system featured all the specific requirement of the user with unprecedented economy and was installed and commissioned in record time.

Automata supplies complete systems solutions, including telemetry, software, and sensors. Automata manufactures the DATA \Leftrightarrow LYNX[®] SCADA system, sensors and software used in a wide variety of light industrial and agricultural applications. Hard wire, infrared, narrow band radio, spread spectrum radio, telephone, and fiber optic communications is offered to suit a wide range of environments. These award-winning products are proven management tools in canal automation, agriculture, bioremediation, flood warning, irrigation, pump and well water supply systems. This is the company's twenty-seventh year of business in research, development, and manufacturing.



Canal Automation System Located at the Maricopa Stanfield Irrigation and Drainage District. Approximately 87,000 Acres

For more information about an automated canal system, please contact Lenny Feuer, Automata, Inc. 104 New Mohawk Rd Ste A. Nevada City, CA 95959, 530-478-5882 Ext. 216. Web site: www.automata-inc.com email: sales@automata-inc.com.