



ASHISH RAVAL, VICE PRESIDENT, INTEGRATED SYSTEMS DIVISION

SUMMARY

Prior to accepting responsibilities as director of Sutron's Integrated Systems Division (ISD), Mr. Raval had extensive experience in design and implementation of a wide variety of SCADA projects and control systems including

- ▶ Municipal water
- ▶ Canal and dam automation
- ▶ Hydrological monitoring and control systems
- ▶ Meteorological monitoring and control systems

As Vice President of ISD, Mr. Raval oversees all Sutron projects, ensuring that they are delivered on time and according to customer specifications. His responsibilities also include directly reviewing and approving or modifying

- ▶ All system design for efficacy of real-time data collection and transmission
- ▶ Development and integration of control systems, especially those using remote telemetry
- ▶ System installation and startup to ensure that equipment is properly installed and functioning at or exceeding system requirements
- ▶ Direct large program management
- ▶ New application development
- ▶ Creating equipment specifications and performance requirements
- ▶ Cost analysis
- ▶ Proposals for integrating control systems

His valuable expertise in remote telemetry equipment and systems and extensive knowledge of electronics, instrumentation and controls as well as programming have been critical to the success of the Division since its establishment in 1998.





REPRESENTATIVE EXPERIENCE

PROJECT MANAGER 2006

Advanced Tri-Mode Communications & SCADA for New Orleans Canals & Locks Water Level Monitoring Project, USACE

During Hurricane Katrina lack of communications redundancy left the Corps of Engineers blind to water level conditions in New Orleans drainage canals. The USACE chose Sutron to provide water level monitoring (stage) stations for the new monitoring system on 3 major Canals and to provide Remote Operation & Monitoring (SCADA) of Pumps, Engines & the Closed Circuit Television System at the Interim Pump Stations on 17th Street, Orleans & London Canals in Orleans Parish. Mr. Raval directed Engineering, Installation, Plan Development, and System Installation of Sutron's 12 stations, integrated into a larger PLC-based SCADA system used for

- ▶ Operating the canals
- ▶ Monitoring and operation of interim pump stations
- ▶ Monitoring and control of the pumps, gates, and structures connecting the canals to Lake Ponchartrain

Mr. Raval chose to use Sutron's XPert Dataloggers for the project because they supported the required communications redundancy with a MODBUS connection to the SCADA system along with GOES SATELLITE TELEMETRY and IRIDIUM GLOBAL TELEPHONE access. Stations monitor the following parameters:

- ▶ Water level (Upstream & Down Stream) •
- ▶ Rain (Accumulated Rain) •
- ▶ Barometric Pressure (QNH, QFE, Tendency) •
- ▶ Wind Speed (Gust, Instantaneous, Average) •
- ▶ Wind Direction (Instantaneous, 2-minute Average, 10 minute • Average)
- ▶ Solar Radiation •
- ▶ Relative Humidity •
- ▶ Air Temperature (Ambient Temperature, Maximum, • Minimum, Evaporation)

The SCADA project gives the Corps the ability to operate all of the pumps and gates on each canal and monitor information on pump and gate motor status and alarms. Engine parameters such as oil pressure, temperature, etc are converted to MODBUS format for transmission. Pump alarms are included on the MODBUS signal. Charge-coupled TV (CCTV) remote stations are located in the permanent pump stations on each canal. The SCADA and CCTV operator stations at the interim structures are connected to the remote station by the armored fiberoptic cable used for stage data transmissions.





PROJECTMANAGER - 2001-2008

US Bureau of Reclamation, San LuisValleySCADA Project, Closed Basin Division, 280 RTUs

In 2001 Mr. Raval spear-headed this project and continues to provide support for system expansion and improvement, receive sites and software. The project's purpose is to salvage unconfined groundwater and available surface flows in the Basin that would otherwise be lost to evapotranspiration. The salvaged water is delivered through a 42-mile conveyance channel to the Rio Grande. The Project also delivers water to the Alamosa National Wildlife Refuge and Blanca Wildlife Habitat Area which helps stabilize San Luis Lake and ensure the welfare of fish and wildlife.

170 water salvage wells ranging from a depth of 85-110 feet and enclosed in concrete vaults, hold groundwater, which varies in quality. The system pumps the salvage well water then blends it in order to meet the quality requirements.

A network of 82 observation well sites (132 observation wells) provides water level data for confined/unconfined aquifers. This data is used to operate the Project within the drawdown limits prescribed.

The Project includes approximately 115 miles of pipeline laterals that transport water from the salvage well to the

conveyance channel in Stages 1 through 4. Stage 5 is a total pipe system, merging with the conveyance channel (design capacity increases from 45 cfs to a maximum of 160 cfs) to deliver it to the Rio Grande. Channel bottom widths range from 8 to 22 feet, and water depths from 3.6 feet to 5.6 feet.



PROGRAMMABLE MASTER SUPERVISOR CONTROL SYSTEM

A remote control monitoring system to assist with regulating water deliveries, detect equipment problems, obtain/store data was installed in 1985. The Programmable Master Supervisory Control (PMSC) system consists of a master station and 280 networked, remote computers used for equipment control and data acquisition. Two public utility companies serve the Project area, which is for the most part remote and inaccessible. Public Service Company of Colorado (PSCo) and the San Luis Valley Rural Electric Cooperative (REC) furnish electrical power. 96 miles of overhead primary line serve the Project, 31 miles of underground primary line, and 42 miles of underground secondary service. The Project also has a solarpowered pumping system installed.



PROJECT MANAGER

REAL-TIME HYDROLOGICAL-METEOROLOGICAL OBSERVATIONAL NETWORK

In Feb, 2000, SENAMHI, the National Weather Service of Peru, in conjunction with IMARPE, Hidronav, awarded Sutron, a contract totaling \$1,603,581 to provide the nation with its first complete automatic meteorological and hydrological monitoring system. The project consisted of

- ▶ 38 Automatic Meteorological Stations (GOES satellite communications)
- ▶ 17 Automatic Hydro-Meteorological Stations (GOES enabled)
- ▶ 10 Ocean Meteorological Stations.
- ▶ One Satellite Earth Receive Ground Station (ERS)

The ERS receives data from all 65 remote stations, processes the incoming raw data, decodes and stores it into a database for further analysis. Mr. Raval was responsible for managing the project schedule, budgeting and execution. The project was completed on-time and under budget. The system was accepted as a whole prior to the deadline.

PROJECT ENGINEER

REAL-TIME NETWORK OF HYDROLOGICAL STATIONS

In August, 1998, Sutron was awarded a \$1.7M contract by The Central Water Commission of India to install

- ▶ 55 Hydro-Met Stations equipped with real-time satellite telemetry using the INSAT satellite
- ▶ Two Earth Receive Stations (ERS)

Mr. Raval was responsible for overseeing system integration and testing, installation and commissioning of the entire project. The project was complete on-time and accepted as per the required functional specifications.



PROJECT MANAGER

REAL-TIME FLOW-MONITORING NETWORK FOR PACIFICORP

In 2000, PacifiCorp contracted Sutron Corporation to provide real-time network flow monitoring stations for the North Umpqua hydroelectric project. The Project is located on the west side of the Cascade Mountains and consists of

- ▶ 8 powerhouses
- ▶ 8 dams
- ▶ 44 miles of waterway (canals and flumes) along the North Umpqua River, Clearwater River, and Fish Creek.



The combined rated capacity of the project is 185,500 kW. Mr. Raval was responsible for managing the project and for all communications with the customer. He ensured that all the system documentation was complete and that the project was completed before the deadline and within the budget.

U.S. FISH AND WILDLIFE EARLY WARNING SYSTEM

This system consists of several rainfall and water level monitoring stations linked to a master base station via LOS radio for the purpose of data collection, real-time system monitoring, and early flood warning. Mr. Raval was responsible for project management, system design, and installation. He also configured and developed early warning system software that generates alarm conditions, has dial-out capability, and activates sirens to alert local residents. The custom application allows the user to view real-time trends of data for any specific remote station.

FARMINGTON GATE CONTROL SYSTEM

The gate control system consists of automating two sluice gates at Farmington dam in Sacramento, California with the Sutron 9000 RTUs. This LOS radio system consists of a base station equipped with a PC and a GUI that reports real-time and historical trending of water levels and the gate positions. It also consists of gate control windows so the operator can operate the gates from the PC at any given time. Mr. Raval performed system engineering, system documentation and software programming. He assisted with the start-up.

GOSHEN IRRIGATION DISTRICT SCADA SYSTEM

Mr. Raval designed and installed this canal monitoring SCADA system using LOS telemetry for Goshen Irrigation District, Wyoming. This system consists of seven remote sites (three solar powered) with monitoring and gate control operations at each site. The base station consists of a PC with Win 911 Intouch software to do real-time control and monitoring operations. Mr. Raval provided complete system design, installation, startup, and system documentation.

GREENFIELDS IRRIGATION DISTRICT SCADA SYSTEM

Mr. Raval designed and installed this canal monitoring SCADA system using LOS and telephone telemetry. This system consists of two remote sites with monitoring and gate control operations at each site. He performed project management, system design, installation and system documentation.

EDUCATION

- M.S. Electrical Engineering, University of New Orleans, 1996
- B.S. Instrumentation Engineering, University of Poona, INDIA, 1993





PUBLICATIONS

Master's Thesis: "System Identification: Optimal Design of Recursive Digital Filters," University of New Orleans, August 1996