

ADVANCED TRI-MODE COMMUNICATIONS

NEW ORLEANS CANALS WATER LEVEL MONITORING



June 2007

DURING HURRICANE KATRINA lack of communications redundancy left the Corps of Engineers blind to water level conditions in New Orleans main drainage canals. Sutron Corporation was chosen to provide water level monitoring (stage) stations for the new monitoring system on the 17th Street, Orleans Avenue, and London Avenue Canals.

The 12 stations are part of a larger project to provide a PLC (Programmable Logic Controller) based Supervisory Control and Data Acquisition (SCADA) system for the following:

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

Sutron worked with the Corp's general contractor, Prime Controls, to complete the monitoring stations.

Sutron's Xpert Dataloggers were chosen for the project because of their ability to support the required redundancy in the communications network. The XPerts provide a MODBUS connection to the SCADA system along with GOES SATELLITE TELEMETRY and IRIDIUM GLOBAL TELEPHONE access.

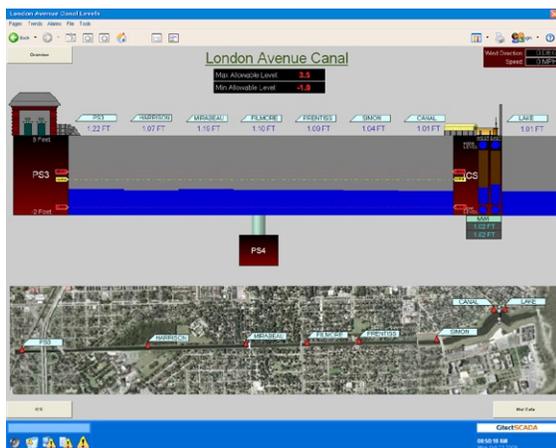
Pressure transducers are used to make the stage measurements. Stations also include basic weather monitoring instruments since wind has a substantial impact on water levels along the canals.

Sutron provided battery and solar power for our equipment and for the fiber converters which are used for data transmission of stage levels and SCADA information.

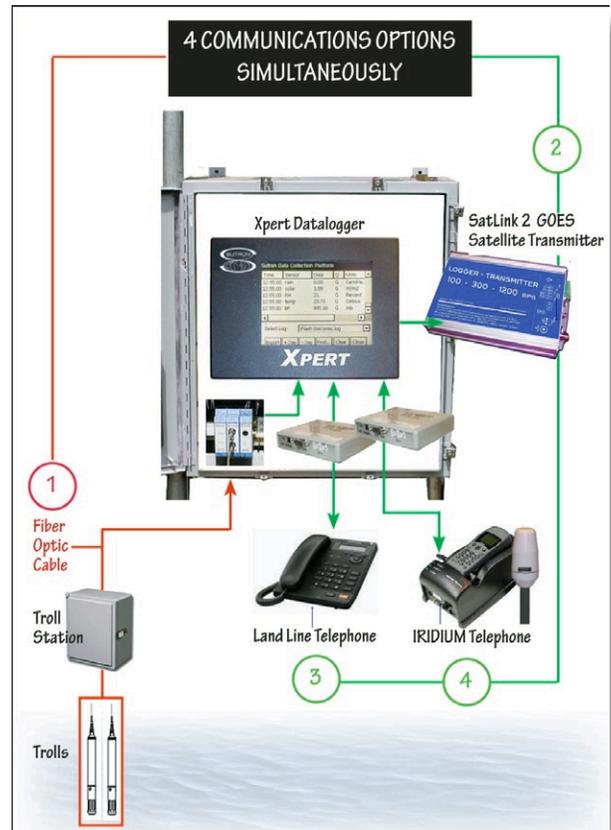
Sutron's Xpert Datalogger offers both MODBUS Master and Slave capabilities. One communication port on the Xpert acts as a MODBUS Master to the stage sensors and another communications port was programmed to be a Slave to the SCADA system.

These multiple communications paths serve the Corp's needs for different data collection intervals and redundancy in a number of ways:

- The primary telemetry path is FIBER OPTIC. Data are pulled by MODBUS over fiber optic cable for the SCADA system. This



Graphical User Interface for the London Avenue Canal



short-time-interval data aids decision making for pump and gate operations.

- The secondary data telemetry path uses the GOES SATELLITE (High Data Rate). GOES provides hourly transmission of 15-minute interval stage data. GOES also

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provides a wide-area dissemination of the water level data and is extremely reliable, an important element especially since no land lines or terrestrial repeaters are involved. Additionally, the data received from GOES is monitored not only in New Orleans but also monitored at COE regional headquarters in Vicksburg, MS.

- The final data path employs IRIDIUM SATELLITE PHONE modems. Each site is directly accessible by Iridium, allowing users to make changes and download data via a land line modem. The stations also automatically dial out using the Iridium modems. Data are sent via Iridium as a backup for the GOES transmissions. Iridium provides two-way communications and is critical when everything else fails. The IRIDIUM system supports both voice and data so users can dial-in and listen to the real-time readings or download data.

Sutron installed the water level stations in each canal and conducted testing in conjunction with Prime Controls. Sutron then trained USACE and Prime personnel in operation and maintenance of the stations and communications equipment.



OWNER:	Army Corps of Engineers
PROJECT:	Engineering, Installation, Plan Development, & System Installation for Remote Monitoring of water levels in the 17th Street, Orleans & London Canals in Orleans Parish, New Orleans, LA
DATES:	2006 with on-going support
CONTACT:	William Emmett, USACE 504-862-1830
VALUE:	Total for Projects @\$1,200,000 +
TELEMETRY:	GOES Satellite via Sutron Satlink II transmitter, Iridium Satellite telephone modem, MODBUS protocol over Fiber-Optic cable
SENSORS:	Water Level (Upstream & Downstream), Temperature, Relative Humidity, Rainfall, Barometric Pressure, Wind Speed, Wind Direction and Solar Radiation
DATALOGGER:	Sutron XPert Lite (Model 9210)
PARAMETERS:	Water level (Upstream & Down Stream) Rain (Accumulated Rain) Barometric Pressure (QNH, QFE, Tendency), Wind Speed (Gust, Instantaneous, Average) Wind Direction (Instantaneous, 2minute Average, 10 minute Average) Air Temperature (Ambient Temperature, Maximum, Minimum, Temp. of Evap.) Relative Humidity

The overall SCADA project provides the Corps with the ability to operate all of the pumps and gates on each canal. Operators can 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 fiber-optic cable used for stage data transmissions.

