Remote Monitoring of Airport Runoff

Ireland

Case Study

TELEDYNE ISCO
A Teledyne Technologies Company

Expertise in Flow

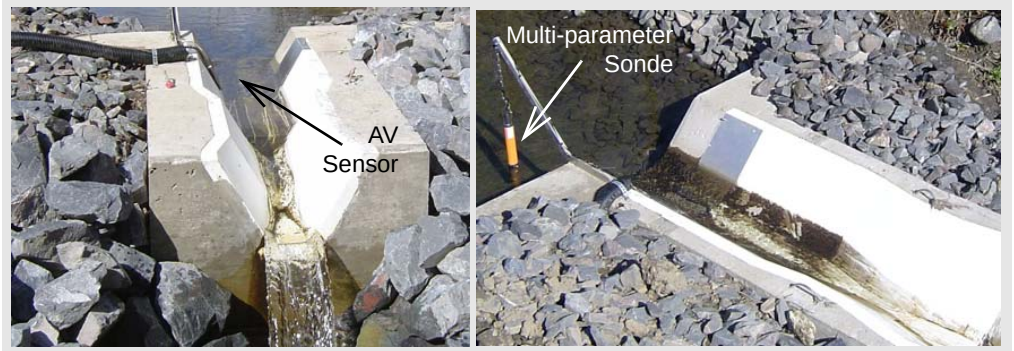
The 2150 Area Velocity Flow Module from Teledyne Isco, Inc. provides a dual flow monitoring system incorporating both level-to-flow and area-velocity flow measurement in one sensor. The 2105G Interface Module allows the user to log and transfer flow and water quality data from remote sites in the field to a secure server database.

Isco 2150 Flow Module

- Open channel area-velocity flow logging
- Rugged IP68 enclosure
- Variable data storage intervals increase potential battery capacity for remote deployment
- Modular stacking, with up to 4 modules monitoring 4 different flows
- Temperature compensated, air vented level transducer for stable level measurement; Temperature logging
- Combined AV and primary level-to-flow conversions available
- Quick communication and fast download rates at 38,400bps.

Remote Monitoring Station w/ Solar Panel:

"The Future of Flow!"™



Monitoring Site with 2150 AV Sensor in Trapezoidal Flume and Multi-Parameter Sonde

Environmental Requirements

An expanding Irish airport currently handles over 23 million passengers per year. The airport has installed environmental monitoring stations at key surface water runoff areas to monitor the water quality and hydraulic activity of the surrounding freshwater systems. Intensive construction activity and the presence of substances like glycol (deicing) and kerosene (fuel) on any site combine to create a potential for environmental impacts. Accurate and reliable monitoring of indicators such as BOD, hydrocarbons, flow, temperature, pH, and DO at key sites around the airport can provide a clear picture of the water quality, and can also act as an early warning system if parameters fall outside acceptable ranges.

Site Challenge

Water Technology Ltd, the Teledyne Isco dealer in Ireland, in conjunction with the contractor, Enva Ireland Ltd, encountered significant challenges when confronted with the requirement to monitor flow in varying conditions; at low levels during dry weather, and during flood conditions. Conventional area velocity Doppler flow meters are unable to pick up a return signal at low levels with low particle concentration, but will measure in fast moving and high level flows during flood events. Conversely, primary devices with level-to-flow meters provide accurate flow readings at low levels but may become submerged during flooding and generate inaccurate results. Building larger primary devices like weirs and flumes not only increases project costs, but may also create a potential for upstream flooding by restricting the flow.

Dual Equation Flow Monitoring

Water Technology Ltd and Enva Ireland Ltd resolved the problem by using the Isco 2150 Area Velocity flow logger. The baseline flow during dry weather conditions is measured by level-to-flow conversion with a trapezoidal flume and the 2150's pressure sensor. A secondary flow rate is programmed to measure flow by the area-velocity method once the flume becomes submerged. The dual equation flow monitoring allows flow measurement in all conditions while avoiding the risk of upstream flooding during heavy rainfall, and reduces installation cost.

Isco 2105G Interface Module

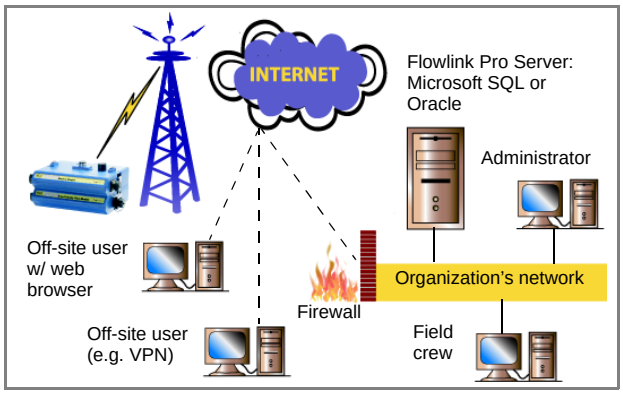
- Inputs: Modbus, 4-20mA, SDI-12, Rain Gauge
- Outputs: Digital Pulse, Modbus, 4-20mA, SMS
- GSM technology allows remote data collection via Flowlink 5.1 & remote system control.
- GPRS communication enables data to be pushed to secure central server via Flowlink Pro client software.

Flowlink Pro Software

- Large database, multiple users
- Pushed data
- Fast transfers, lower costs
- Web access
- Automated tasks
- Graphical and tabular reports of flow monitoring data
- Data editing

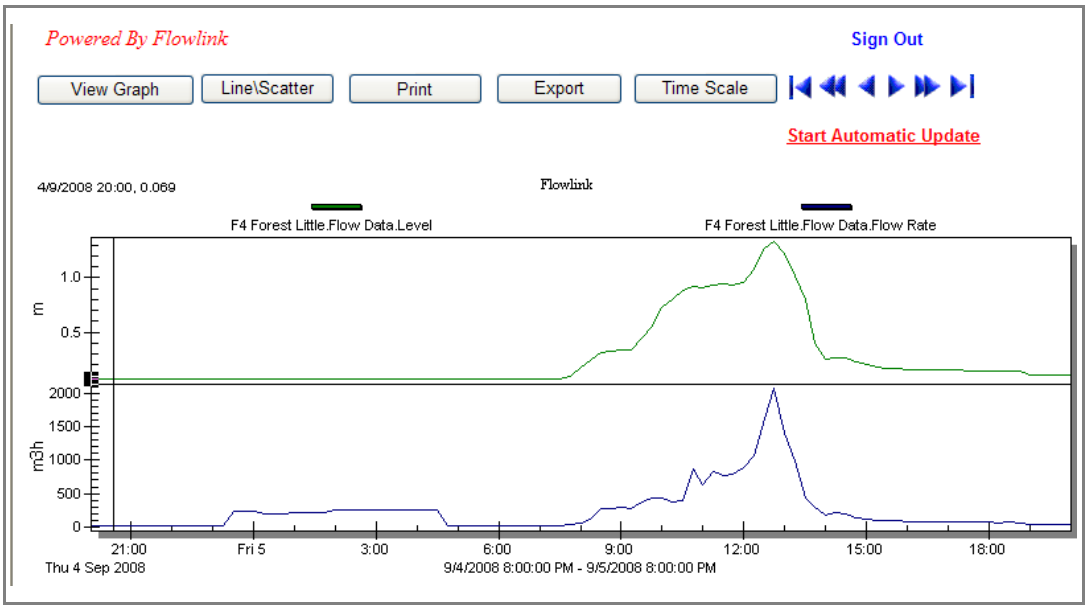
Isco 2105G Interface Module for Data Storage and Transfer

Due to the extensive range of monitoring equipment incorporated at each site, a universal sentinel unit was required to assimilate and log data from all instruments with the capability to "push" this data to a secure server via GPRS and generate SMS alarms at parameter threshold levels. The Isco 2105G module was selected to carry out these functions. A 2105G is installed at each site as the sentinel GSM/GPRS logger.



Flowlink Pro Server/Client Software

All parameter data from the online instruments, multi-parameter sondes, and 2150 is sent to the 2105G for data storage and control. The 2105 then automatically sends the data to a server at the airport via GPRS where it is stored on a common database for viewing, screening, and analyzing with Isco's easy to use Flowlink Pro® server/client software. Threshold limits are set for each parameter, and SMS alarms are sent to a response team once these limits area reached, in order to initiate immediate action. Data can be accessed via the internet using the Isco Web User Interface (WebUI).



Flowlink WebUI: The web page above displays storm event data from an installation site where the flume's max level was surpassed, but flow was still measured using area-velocity rather than a level-to-flow calculation.

Comments

"Teledyne Isco's 2105G Interface Module and Flowlink Pro provide an integrated solution to continuous monitoring of remote surface water systems. The real time data and alarm functions allow clients to make quick decisions in order to limit environmental impacts."

-Finbarr Riordan, Water Technology, Ltd.

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