



Instrument Systems

collecting data, delivering solutions

Smooth-running irrigation

Over the past seven years, Instrument Systems has automated five major irrigation schemes in the Canterbury region in conjunction with Attewell Irrigation Ltd.

In the most recent project, Instrument Systems and Environmental Consultancy Services Ltd built, installed, and commissioned a flow monitoring and control station on the Glenroy Irrigation Scheme. The Glenroy scheme, near Darfield, has resource consent to divert up to 3.5 cubic metres of water every second from the Rakaia River, and uses this to fill a large reservoir. Two dairying companies, Canterbury Grasslands Ltd and Lynton Dairy Ltd, use water from the scheme for irrigation.

Glenroy has two batteries of pumps; one takes water from the reservoir, the other feeds four farming units from the main water race two kilometres downstream from the control station. The flow rate through the downstream pumps is changed each time a farmer starts or stops an irrigator, so the automated system continuously monitors the flow rate, sending this information via radio link to the gate control station.

The operation can be monitored and the target flows programmed remotely, reducing the need for the scheme manager to visit the site. Any critical out-of-range event, such as a stuck gate, generates a text message alarm sent to a pre-programmed list of people, including the scheme manager and Instrument Systems, minimising response times.



Photo: Mike Hodkin, NIWA

Monitoring groundwater with bubbles

Instrument Systems recently extended the scope of its usual environmental monitoring activities by introducing a new instrument to monitor water-level –160 metres underground.

We installed a new, self-contained, 'compressed-air bubbler' water-level instrument (the Levelpro 6150) and a Unidata Datalogger at a groundwater bore in mid Canterbury. The work was done under contract to Attewell Irrigation Ltd. It assists Lynton Dairy Ltd to meet the requirements of its resource consent for groundwater abstraction administered by Environment Canterbury.

The system records the groundwater level, transmitting these data by cellular modem to Lynton Dairy. This enables the company to manage its water usage and comply with the consent by progressively reducing its intake, should the 10-day moving average water-level fall below specified consent thresholds. Environmental Consultancy Services (Timaru) carries out routine site inspections of the bore and publishes the data on the web for Lynton Dairy.



A 'bubbler' or 'gas-purge' water-level instrument, such as the Levelpro 6150 (pictured), is well suited to groundwater monitoring, as no sensitive equipment needs to be underwater. Just lower a simple plastic tube, through which compressed air is bubbled. The pressure on the gas from the weight of water is measured by a sensor above ground, and converted into a water level reading.

[Photo: es&s]

Improving air quality

NIWA Instrument Systems has been working with the Tasman District Council and the Nelson City Council to help tackle urban air quality problems.



Together, we have been working to install five urban meteorological monitoring stations and link existing air quality monitors to them. Over time, the data from these stations will be used to create a baseline against which future air quality can be compared, as the councils implement air quality initiatives. The data will also be used to allow robust meteorological modelling to identify contributing sources of pollution.

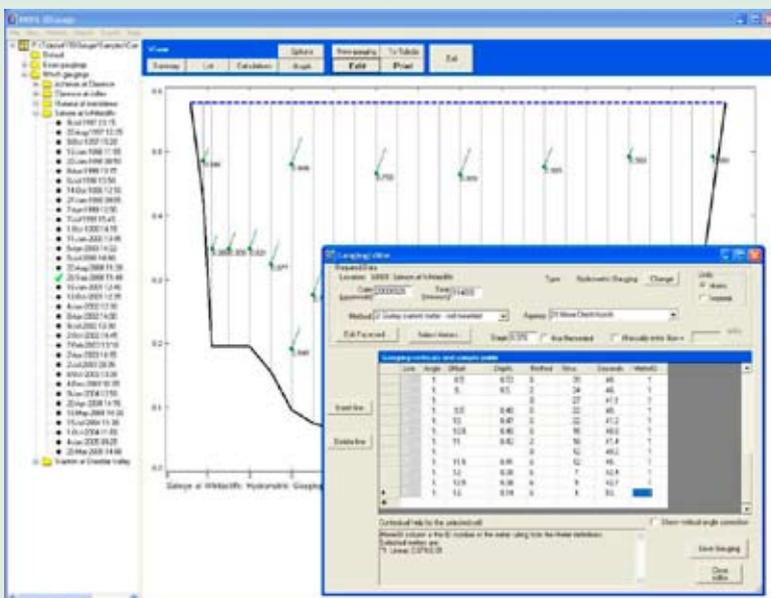
The Ministry for the Environment assisted the councils with funding for this project.

This urban meteorological monitoring station, linked to air quality monitors, was installed by Instrument Systems for the Nelson City Council. [Photo: Bob Newland, NIWA]

Hassle-free gauging management

NIWA's TDGauge software is used by hydrological staff to enter, process, and store data from river gaugings.

'The key is our use of a relational database to store the gauging data', says developer Tony Hill. 'You don't have to search back through old files to find previous data for the same location; navigation is easy and all the information is at your fingertips.' Users can import gauging files created by a range of other gauging loggers and software. TDGauge can also directly transfer gauging results into Tideda, the NIWA software that stores and analyses time series data.



Example screen from TDGauge showing data from one location on the Selwyn River, Canterbury. Length and direction of vectors on the graph show the strength and relative direction of currents at gauged points. Here the gauging editor screen is being used to modify the selected gauging. Note the context sensitive help that explains what should be entered in the current field.

Cost-effective climate stations

NIWA's National Climate Network operates within World Meteorological Organization guidelines, which set stringent data quality standards. Now NIWA has developed a cost-effective 'second tier' climate station for clients who need general-purpose data.

These lower cost, self-contained climate stations provide wind statistics, barometric pressure, air temperature, humidity, and soil temperature measurements every 10 minutes, using the Unidata Crossramp data reporting system. Additional parameters, such as soil moisture, multi-depth soil temperatures, solar radiation, and rain volume, may be added. Powered by a small solar panel, and using solid state sensors, these climate stations are compact and require very little maintenance.

Data are captured and stored by the Unidata Crossramp XRT data logger, then delivered via GPRS communications to the server. A Tideda (Time Dependent Data) data transfer ensures the data reach EDENZ (Environmental Data Explorer New Zealand) for display on the web.
<http://edenz.niwa.co.nz>



Photo: Mike Hodkin, NIWA

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