Unidata Newsline

Unidata Newsline No. 8, July 2009

Unidata assists with Climate Change Observatory for the Conservation Council

Dr Nic Dunlop, Biodiversity Conservation Officer for the Conservation Council advises that much of the preliminary work to establish a climate change and biodiversity observatory on the Bush Heritage Australia's Charles Darwin Reserve is nearing completion.

The reserve, formerly known as White Wells Station, straddles the mulga–eucalypt line on the north-eastern Wheatbelt, four hours' drive north east from Perth. Climate models universally predict the area will become warmer and drier.

Bush Heritage Australia manages the reserve for biodiversity conservation, making it possible to limit grazing impacts and other stress variables in these environments that would otherwise confound the detection of climate change responses.

A joint venture with the Conservation Council and Bush Heritage Australia, the Observatory will be a key component of the Council's citizen science program.

Over the past two years, citizen scientists having been working with CCWA to make a biodiversity inventory at a number of long-term study sites. Three of these sites are in the northernmost outliers of the Wheatbelt–interzone salmon gum and gimlet woodland. The other two are in southernmost outliers of mulga woodland–shrubland. Indicator plant and animal species or communities will ultimately be selected so that they can be monitored for potential responses to climate change. These changes may involve the acclimation to changing conditions (or doing things differently), micro-evolution (changes in adaptive gene frequency), re-distribution (shifting to another area), or local extinction.

In mid-January, the Observatory commissioned a new automatic weather station to track weather and climate patterns at Charles Darwin Reserve. The station is funded by Lotterywest as part of the citizen science project and provided to CCWA at cost by Unidata,

a Perth-based supplier of meteorological technology. As well as continuously measuring temperature, humidity, wind-speed and direction and rainfall, the station is equipped with a radiometer to measure solar radiation. Coupled with remote sensing techniques, this sensor may allow changes in land-system and vegetation productivity to be measured, along with the capacity of the rangeland to sequester carbon.

A research plan and long-term management structure will be developed for the Observatory during 2009.

Article courtesy of the Conservation Council. To find out more about the Charles Darwin Climate Change Observatory and the Conservation Council visit www.conservationwa.asn.au

Surface Water Runoff Monitoring in Rural Western Australia

DAFWA Technical Officers James Newman (left) and Kevin Denham install a TELS unit in Perenjori similar to those planned for SWCC towns.

Department of Food and Agriculture Western Australia (DAFWA) Uses Unidata Equipment- for Telemetry Equipped Logging System (TELS) – "Going with the flow down the Blackwood".

RT-LA towns in the **South West Catchments Council** (SWCC) region are the latest to be provided with a new water management tool with the installation of new high technology surface water monitoring systems. The systems will monitor surface flows which are captured and used to supplement irrigation water for the townsite.

Six new Telemetry Equipped Logging System (TELS) units, designed by DAFWA Research Officer Chris Boyes, have been assembled and tested ready to be deployed through the course of the year.

Sites for the next three units have been selected in **Nyabing**, **Wagin** and **Woodanilling**. The TELS equipment has been designed to measure surface water quality and quantity and transmit the information via the mobile phone network. Once stored on DAFWA's database, it can be analysed to make meaningful water management decisions.

Another three TELS units will be installed in the SWCC region and will provide shires with valuable information to help achieve water self-sufficiency. This should lead to better designed stormwater irrigation schemes to alleviate waterlogging, salinity and flooding problems. The information would also help relieve shires and communities of the financial burden of irrigating sporting facilities with expensive drinking water supplied by the scheme.

Many towns suffer shortages of irrigation quality water because traditional surface water catchments are no longer reliable or groundwater sources have become saline. So shires are increasingly turning to schemes which collect stormwater from streets, roofs and hardstand areas such as those surrounding CBH bins. Water from these ready-made high yielding catchment areas can be harvested, stored and recycled for watering ovals or sports grounds.

The TELS units will provide a more accurate picture of yields and water qualities, and assist shires in planning for water shortfalls and future irrigation needs. Each unit can measure water depth, flow velocity, temperature, pH and electrical conductivity.

When runoff events occur, these units can assess how much water flows along drains which collect water from streets, roofs and other hard surfaces found within towns. The TELS system will help assess how best to capture water to benefit the community.

The low salinity, low sediment runoff collected would be 'fit for purpose' water, meaning it was suitable to use, for example, as an irrigation supply. However, the water would **not** be fit for human consumption.

Even if used only for watering the town sports grounds, parks and gardens, this would be of enormous benefit, as in many shires these areas generate the greatest demand for town water.

(Unidata Note: this system comprised Prologger, NRT Next G as ancillary logger, Neon Server. Instruments included Starflow, Conductivity, PH and automatic sampler)

(Article reprinted courtesy of DAFWA)

Environmentally Friendly Power in Canada

Unidata joined with our partner in Canada, Geoscientific Inc in Canada for the recent Independent Power Producers Conference held in the city of Vancouver.

This conference was a meeting of key players in the power industry in Canada and focused on clean power, especially micro hydro systems, which produce clean hydro power without disturbing the environment.

geo scientific ltd.
watershed monitoring instrumentation

These micro hydro power stations divert a small amount of river flow through a pipe, through the power station down stream, and then return the water to the river without the need for a large dam which disturbs the environment. There are approximately 25 active independent power producers, and most have several small power stations feeding the national power grid.

Another major attraction of these systems is their diversity. There is no need to rely on one or two major power stations, which can fail causing a major outage. With many smaller power stations the failure of one or two stations does not bring down the grid.

There are tight regulatory controls on this industry as they need to ensure they do not affect the water flow, quality and temperature. Unidata supplies monitoring equipment to this industry in Canada especially Neon based systems, with cell phone satellite based telemetry in remote areas.

Unidata Staff Profile - Luke Missak

Luke Missak is Unidata's main Neon Support person, and is the person most likely to respond to you for Neon Applications Software support questions sent to neonsupportperth@unidata.com.au

Luke completed a diploma in Software Engineering at Central TAFE in 2005 and has been with Unidata for more than 5 years. Luke writes some software modules for Unidata's Neon Application and provides IT Administration for Unidata. Recently Luke completed the real time data interpreter which we use for examining data received from Neon Remote Terminals in the field.

Luke is a keen cook as well, and brings some very nice pre prepared lunches to work. Luke is also studying Japanese at night school and at times is seen in the staff room with his Japanese phrase book, studying up for the next session at night school.

Streamline Measurement

Streamline Measurement in the UK have been a partner of Unidata for many years and are very active in the water measurement industry, providing Unidata equipment and services in the UK, Europe and more recently in Africa and the Middle East. Streamline also offer repair and supports services for Unidata equipment throughout the UK.

One recent installation by Streamline Measurement was to measure weather and water parameters using Neon technology at West Kirby Marine Lake Monitoring Station in the UK. Pictured is Streamline's Peter Dodd at the monitoring station. The photos illustrate the huge tidal flows in this large inland lake.

Streamline Measurement

Unidata's Clint Barnes Neon Training in Thailand

Unidata engineers Clint Barnes and Luke Missak recently provided detailed Neon training to Royal Irrigation Staff in Bangkok Thailand for the recently installed Neon server installation.

Royal Irrigation Department staff from the provincial regions of Thailand travelled to Bangkok for this training program. Unidata covered the instrumentation and webserver technology aspects of the system over several days to a large audience.

Our engineers delivered the training in English, with assistance from our local partners who translated where required. The technical ability of the Royal Irrigation Department staff was very high indeed, and as computer language is universal, the language differences did not cause difficulties.

Unidata was very impressed with the level of understanding the Royal Irrigation Department staff had of the system and while language was an issue, they all completed the course, passed with flying colours, and were presented with course certificates. Clint and Luke were also shown the best places to eat and they enjoyed the local cuisine.

Starflow in a Partially Filled Ovoid Pipe

Unidata Starflow is a cost effective instrument to measure depth & flow in a circular pipe or an open channel. If the channel / pipe you are measuring cannot be defined in the Cross-Sectional Area File (such as a partly filled ovoid pipe) you must supply your own Area Rating Table. This is called a User Area Rating Table. This is only necessary if you cannot create a Cross-Sectional Area File. For most applications, the Area Rating Table is generated automatically from a Cross-Sectional Area File you create.

User Area Rating Table is a look-up table of depth versus cross-section area of the channels/pipe/Oval being measured.

A User Area Rating Table is a text file with 1,000 entries spread evenly over the table range (as specified in the scheme) representing the cross-sectional area for each depth. For example, if the table range is 2m (2,000mm) then with 1,000 entries spread evenly, each entry is 2mm apart.

This table shows the depth for which each entry in the file represents an area:

Table Range	1m	2m	5m	10m
Entry 1	0mm	0mm	0mm	0mm
Entry 2	1mm	2mm	5mm	10mm
Entry 3	2mm	4mm	10mm	20mm
...	...	...	...	...
Entry 1000	999mm	1998mm	4995mm	9990mm

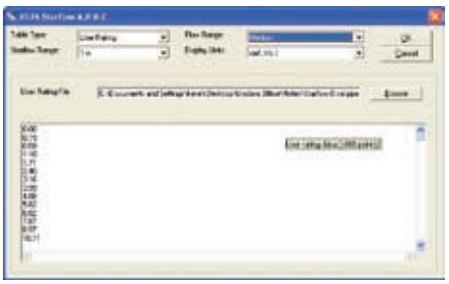
There is no special format for the file, only that each entry must be separated by whitespace (spaces, tabs or new lines) and that there are exactly 1,000 entries. The numbers must be positive (zero or greater) and may include a fractional part. The area values are in mm squared.

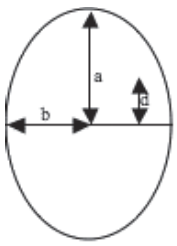
Formula

The next step is to work out the formula to calculate the cross section area of the partially filled ovoid pipe.

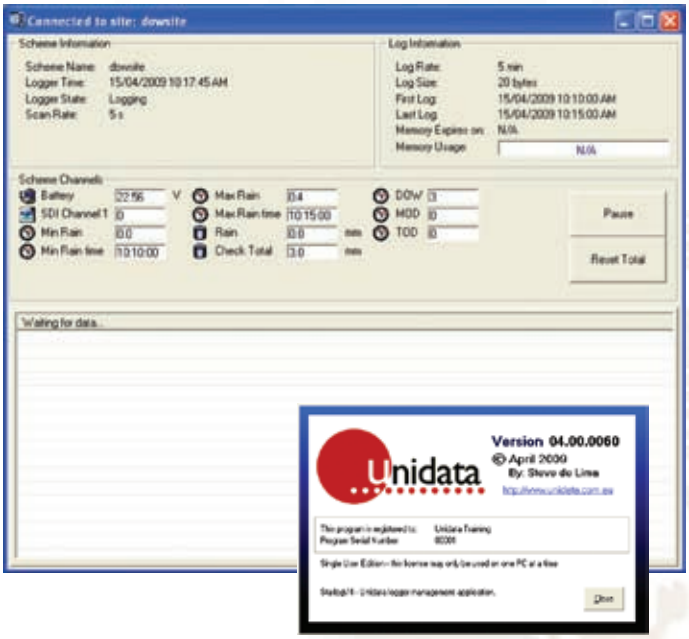
The formula for cross section partially filled ovoid pipe
A = a*b*(Pi/2 + Arcsin[d/a]) + b*d*sqrt(a ^ 2-d ^ 2)/a

where –a <= d <= a . Once you have generated the 1000 data points, stored them in a text file with xau extension. Browse the location of the file and import the data into the scheme.





Starlog 4 Software Major Update



Many customers have been long term users of Starlog 3 software. Starlog 4 was released some 5 years ago, but users of Starlog 3 have continued to use Starlog 3 as they were more familiar with it and Starlog 3 had several features which were not included in the initial Starlog 4 release.

Unidata has continued to build the feature base for Starlog 4 and we recently released a new version, Starlog 4 version 60.

This new version is much more feature rich and we encourage customers to see what is now included in Starlog 4, and consider making the transition to Starlog 4.

The latest version of Starlog 4 can be downloaded from the Unidata website, along with the updated manual, which has also been updated to match the new feature set.

Some of the new Starlog 4 features are detailed below:

- SiteID support - program different sites using the same scheme and keep data from each site separate using the site ID.
- Phonebook to manage sites, including telephone number and telemetry switch settings.
- Model 2010 NRT support.
- Automatic modem configuration utility.
- Test mode buttons - set channel values, control outputs, pause/restart logging (event schemes only).
- Output control instrument - in combination with test mode buttons you can now manually control outputs from the test display.
- Event counter instrument.
- SDI-12 support of high-resolution conductivity data.
- Log time of minima/maxima

Technical Tips

McVans Analite NEP395 Turbidity Sensor SDI-12 Connection

Unidata's range of loggers support the USGS SDI-12 standard for serial data interchange between the logger and intelligent instruments. McVans Analite NEP 395 Turbidity sensor can be connected using the SDI-12 interface in 2 steps. First you need to wire them correctly and then create the Scheme to support it.

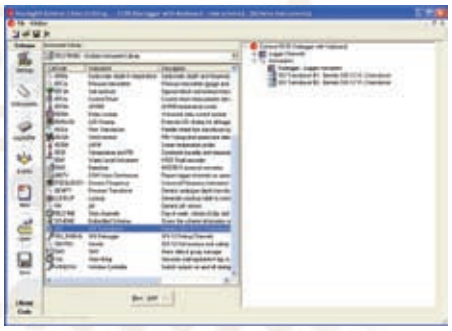
1. Wiring them together

Wiring Instructions			
Prologger FTS	**Starlogger FTS**	**Micro-logger (8010)**	**ANALITE NEP 395**
Terminal 42 (Any digital Ground)	Terminal 14 (Any digital Ground)	Ground	**Green** Wire (Common – 0V)
Terminal 43	Terminal 44	SDI	**White** Wire (SDI-12 Data)
Connect external 12Vdc power source to Brown Wire			

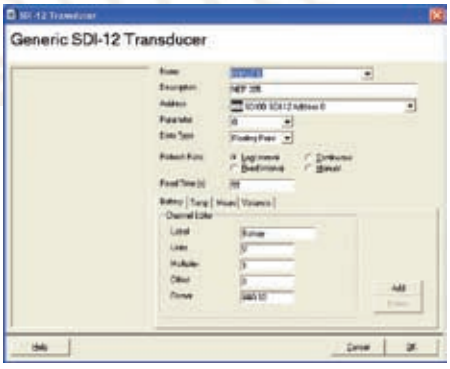
2. Creating SDI-12 Instruments using StarlogV4

Launch Starlog V4 and select Scheme Editor. Add 2 SDI Transducer instruments. We will use one instrument for activating the Wiper and other for reading the measurements.

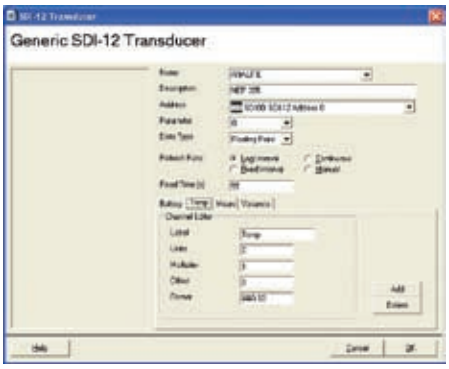
Edit the 1st SDI-12 instrument to capture measurements. Here we are using **aM0!** which return Battery, Temperature, Mean, Sample Variance.



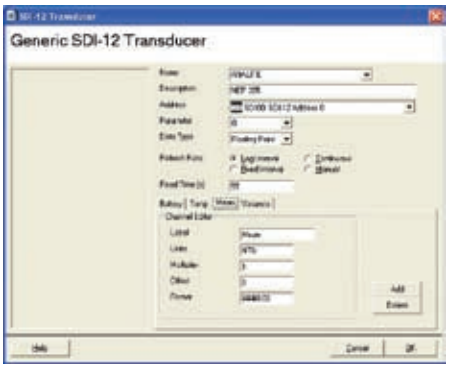
Screen 1



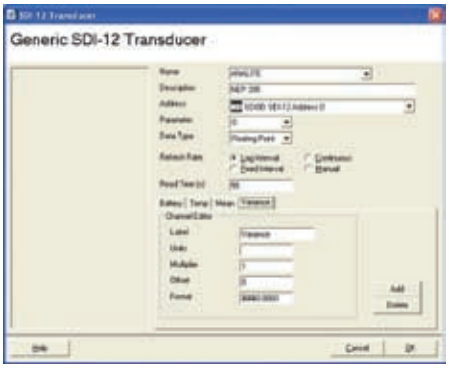
Screen 2



Screen 3



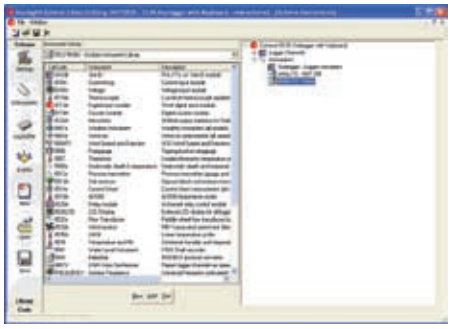
Screen 4



Screen 5

Edit the 2nd SDI-12 instrument to create a Wiper command to wipe every 1800 seconds or 30mins. Please note the parameter is set to 8 – according to Analite 395 SDI-12 command for wiper.

Screen 6



Screen 7

Electrostatic Discharge - Take Great Care!

One of the most common problems Unidata sees in the service area is damage from static discharge. This can result in the damage of sensitive electronic equipment such as the humble data logger. Even though the loggers are protected from such events, continued exposure to these Electro Static Discharges cause a gradual breakdown and eventual failure of the device.

There are two main causes of Electro Static Discharge (ESD), Static Electricity and Electrostatic induction.

Static electricity is often generated through tribocharging, the separation of electric charges that occurs when two materials that are brought into contact and then separated. Examples of tribocharging include walking on a rug, rubbing plastic comb against dry hair, getting out of a car, or removing some types of plastic packaging. In all these cases, the friction between two materials results in tribocharging, thus creating a difference of electrical potential that can lead to an ESD event. Once contact takes place with another item such as a data logger, a static discharge can take place, damaging parts of the circuitry. The most common damage we see is in the RS-232 port of data loggers. Symptoms include difficulties in communicating with the logger or total communications failure.

Electrostatic induction occurs when an electrically charged object is placed near a conductive object isolated from ground. The presence of the charged object creates an electrostatic field that causes electrical charges on the surface of the other object to redistribute. Even though the net electrostatic charge of the object has not changed, it now has regions of excess positive and negative charges.

An ESD event may occur when the object comes into contact with a conductive path. For example, charged regions on the surfaces of Styrofoam cups or plastic bags can induce potential on nearby ESD sensitive components via electrostatic induction and an ESD event may occur if the component is touched with a metallic tool.

These problems can be partially avoided by touching something metallic such as a water pipe or large metal object. This helps to dissipate the charge before it has a chance to damage your data logger (and loose your valuable data). Careful choice of clothing and footwear can also help. Don't wear nylon garments and synthetic soles on your shoes. This allows static to build up as there is no discharge path to ground. In these situations, contact with a data logger can lead to the demise of the unit. Be especially careful on hot dry days as the potential for trouble is greatly increased. Humid conditions prevent electrostatic charge generation because the thin layer of moisture that accumulates on most surfaces serves to dissipate electric charges.

We can not avoid the problem totally but by careful management of our working environment and the awareness we have of the dangers involved all help us to reduce the risk of damage. This helps to extend the life of the equipment we rely on in our day to day duties.

This article was prepared by our service manager who regularly encounters ESD damage to equipment returned for repair to Unidata.

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