Unidata Newsline

Unidata Newsline No. 6, September 2007

Unidata – a good 12 months

Unidata Pty Ltd has experienced good growth in the past financial year. Sales and profitability improved significantly, and internal processes also picked up as we received ISO 9000 accreditation for our quality systems. We have undertaken customer satisfaction surveys, and they indicate greater customer confidence, but we know we can always get better!

Unidata's research and development activity focused on our Neon Web Server project, which is now complete; also the development of new Neon Remote Terminals and Loggers.

As we start another financial year we are embarking on new research and development programmes – these include adding new functions to Neon Web Server, continuing with Neon Remote Terminal development, and further developing and improving our Starflow and Precision Water Level products.

We would like to thank our customers and partners for their continued support, and we look forward to continuing to meet your needs into the future.

Matt Saunders, General Manager

Neon Server - Now available!

Unidata has been working hard for almost 2 years on the second generation server platform to support multiple IP-based loggers in the field. The Neon product incorporates Neon Remote Terminals in the field and a Neon Central Server.

Neon operates as a 'push data' model over the internet, because logged data is pushed from the logger up to the server. This is a newer concept than the traditional dial-up modem, where the modem pulls the data from the logger into the server.

This project is now complete and the Neon Server product has been released. The scope of the project was widened considerably, as a result of collaboration between the Neon and the Flosys development teams. The product is offered as either an Application Software package to run on a customer's server, or as an Applications/Data Service Provider package to run on Unidata's secure servers.

The system allows people in the field to use either the NRT Terrestrial Remote Terminal, or the NRT Satellite Remote Terminal, to push logged data from loggers or other instruments such as water-level and water-flow instruments, at various intervals - for example, every few minutes, every hour, or once a day – to a web-based system which allows the user to view logged data in near-real time.

Users can set various alarm conditions, which result in any out-of-limits data being noted. The user can be advised by email or SMS text message of the out-of-limits condition. Reporting can be set up via email, or via file transfer on a periodic basis to upstream analysis systems.

Please contact us if you would like more information on this exciting new system. We can provide you with a user name and password to log into our demonstration area, enabling you to view the system and samples of collected data.

A flood monitoring and warning system in Thailand: a pilot project using Starflow

Flooding is becoming a major problem in many countries around the world. Although we are able to forecast rainfall and track storm paths very precisely using satellite images, the need to have real-time monitored data such as water flow, precipitation levels, or water level, is essential so good decisions to minimise the risk of flooding can be made.

In Nakhon Si Thammarat, a southern province in Thailand, flooding is a recurrent event affecting the entire province, especially the urban areas. Every year, floods cause deaths, damage infrastructure and agricultural production, and severely affect local economic development. Over the past ten years, poor forest management practices have made the problems worse. A significant reduction in forest area means that flood peaks travel more rapidly, increasing risk and reducing warning times for populated areas. Other problems include unpredictable heavy local rainfall and insufficient drainage capacity, which cause household water-logging. Floods also jeopardise low-lying areas and estuaries in the province.

As a result, flood management is a crucial challenge. Local authorities and experts need access to a vital infrastructure system that is able to provide accurate, reliable, timely, flood-related information and timely warnings to assist them to respond to flood events.

Addressing the problems

In Nakhon Si Thammarat, we are piloting a wireless flood monitoring system. The objective is to use remote sensing data in the operative process of early warning, mitigation and management of flood disasters in both urban and suburban areas at risk from floods.

The system is designed to monitor crucial flood-related information (water level, flow, and precipitation) and then trigger timely warnings using Short Message Service (SMS), fax, and email, which are distributed to local stakeholders. These flood warnings are based on the results of a point prediction model. The communication function of the system has two main advantages:

- it serves as an information channel between authorities and experts in their task of producing and sharing up-to-date information of the flood risk and any flooding
- the system serves as a web-based information source for the public, providing them with information on water condition and flooding.

Advance sensors equipped with wireless network devices make it possible to obtain accurate real-time data without having to manually collect these data from remote sites. With these advance sensors, we can monitor flood information without any geographical constraints and can use data from various locations to make decisions in controlling floods and issuing warnings to the public.

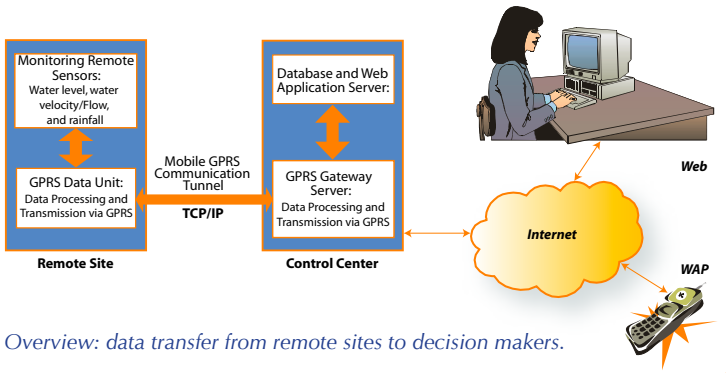
Network overview

The network is the base on which to construct a regional wireless sensor network for distribution of flood data and warnings. The wireless sensor network is composed of one or more flood monitoring devices at 15 remote sites located around the flood-risk areas in the province. We have developed the network with internet-based real-time monitoring, visualisation, forecasting, and warnings. It will provide real-time crucial flood-related information and broadcasting functionalities to different levels of federal, state, and local agencies, as well as local communities. The network utilises long-range mobile GSM communication to provide data communication continuity.

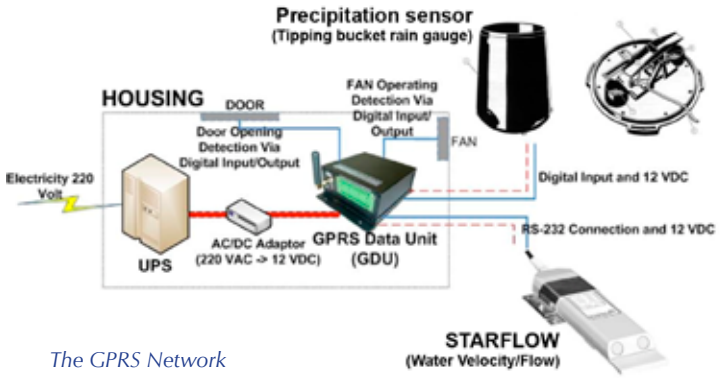
System components

The system for real-time monitoring of flood data is composed of three major parts:

1. Sensor network
2. Data transmitting and processing
3. Database and application server/computer



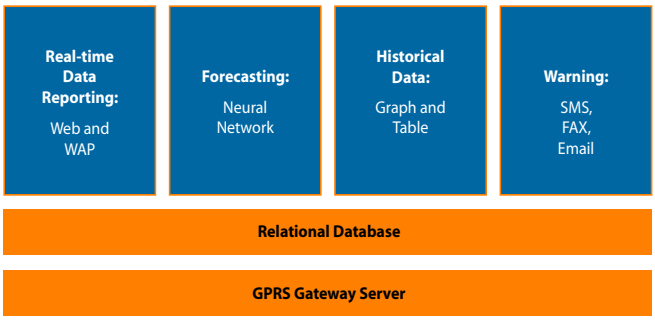
Overview: data transfer from remote sites to decision makers.



The GPRS Network

Piloting the system

In a pilot project, sensors were installed to measure three types of data: water level, flow level, and precipitation level. Starflow sensors measured water level and flow, and a Fischer precipitation sensor used a tipping bucket rain gauge system to monitor precipitation data. Data were then sent to the server by the data transmitting and processing module, via the GPRS network.



System architecture of the database and application server.

In data transmission we employed a so-called VirtualCOM, a middleware that enables the application server to communicate with the remote sensors connected to a GPRS data unit (GDU). With VirtualCOM, a GDU behaves as if it is a cable directly connecting the remote sensors to the application server. The database and application server process the measured data in real-time and make them accessible online, via either a web browser or WAP-enabled mobile phone.

Our conclusions

In this pilot project, we demonstrated the use of advance sensing technology in performing real-time monitoring of water information. The system comprised three major components: the sensor network, processing and transmitting modules, and database and application server. The sensor network measured water-related data, while the processing and transmission module implemented as a VirtualCOM was used to transmit measured data to the database and application server. The database and application server was implemented as a web-based application to allow users to view real-time water-related data as well as historical data. The application server was also able to send warnings to authorities in case of emergency.

We learned that, with today's technology, the use of sensors to record information remotely, especially water information, is possible and reliable. We used the Unidata Starflow and Fischer precipitation sensor because these sensors come with excellent management software, enabling them to be managed remotely. Moreover, these sensors come with an API that we can employ to customize their behaviors to suit our needs. It should be noted that implementing a sensor network in a remote location can cause some difficulties if the GPRS in those areas is unstable. The GPRS connection failure can cause difficulty in connecting the sensor at the remote site. However, with good sensor management software, remote sensors can be rebooted remotely.

We plan to extend the system to equip the geographic information system (GIS) to provide map-based interface to users, especially managers. We also would like to provide analysis methods for supporting more accurate flood model and prediction. This will enhance the decision making process to the authorities that are in charge of issuing warnings in case of emergencies.

This paper kindly provided by Dr. Chaiwat Ootamakorn
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An installed rain gauge in Thailand.

Product News

6509X Precision Water Level Instrument Upgrade Package

Do you have any ageing 6509 water level instruments? If you would like to update the electronics without disturbing the mechanical arrangements and mounting, then read on! We have an upgrade package available for you.

The 6509 is an encoder-based precision water-level measuring instrument. Measurement of the water level is achieved using a float suspended on wire cable which runs over an encoder-mounted pulley. This workhorse has been in service for many years and some units are reaching the end of their serviceable lives.

This 6509X upgrade package provides a way to replace aging 6509 instruments without having to modify the stilling well hardware to accept the base mounting arrangement of a 6541B or other water-level encoder instrument.

The 6509X has a completely new circuit board based on a low-power microcontroller, and has added SDI-12 capability as standard. An HSIO interface port is also provided. The water-level datum point, which is continuously updated on the low-power LCD display, is set using a weather-proof switch. The circuit board assembly is compatible with the existing 6509 enclosure. This means that the existing stilling well mounting hardware can be maintained without modification.

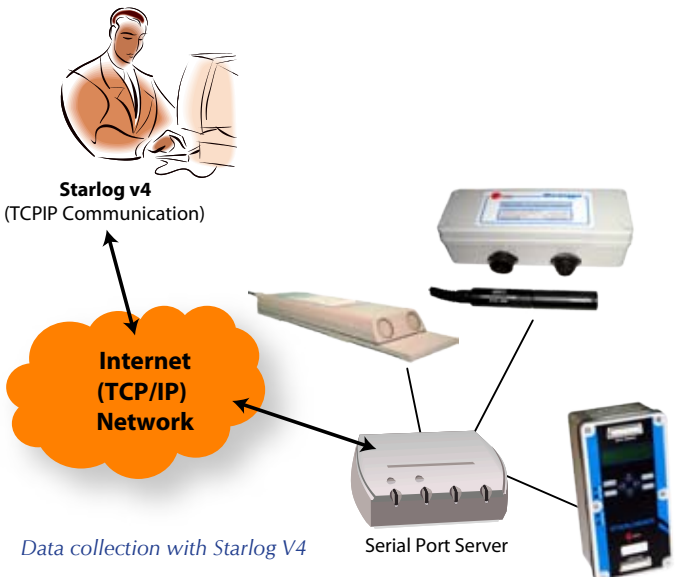
A new plastic enclosure, encoder, and all electronics are offered as a fully tested, installation-ready upgrade kit. Pulleys, floats, stainless float lead, and all other accessories are available as needed.

So you can upgrade the 6509 water level instrument, giving the instrument similar capability as the current generation 6541 water level instrument, while maintaining the existing instrument mounting arrangements!

Technical Tips

Using Starlog Version 4 TCP/IP Communication

Connecting to Unidata Logger is becoming easier and easier. Traditionally loggers are connected to the office using a dial-up modem or RS 232C cable. With internet and TCP/IP networking, more and more offices are connected using Virtual Private Networks (VPN) taking advantage of cheap internet infrastructure. To take advantage of this existing infrastructure, at Unidata we have added TPC/IP support to our Starlog V4 software. We have recently introduced a TCP/IP SerialServer to allow logger communication via LAN/WAN infrastructure which often already exists in a client's premises.



Data collection with Starlog V4

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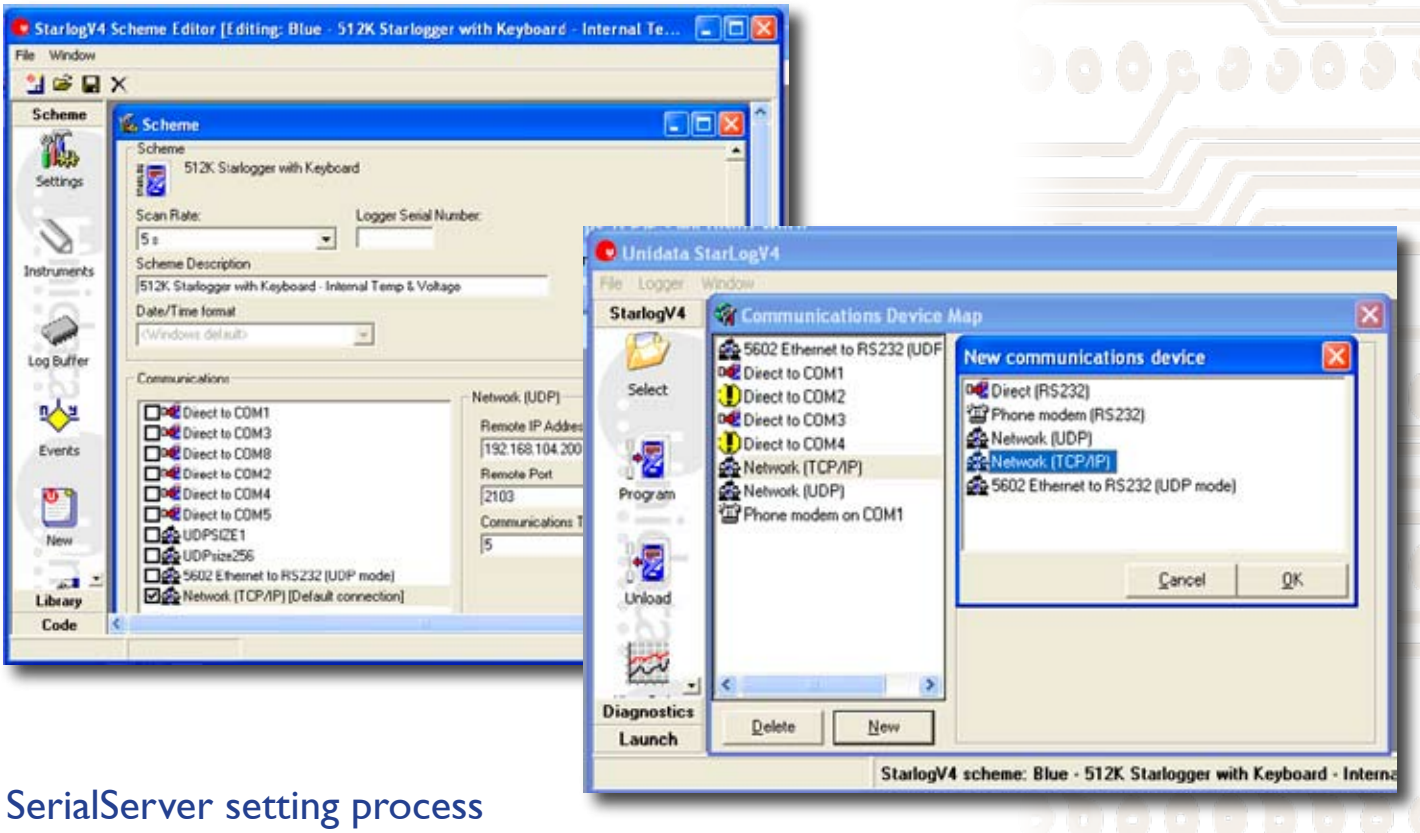
Technical Tips

STARLOG setting process

You must add the network communication option in Starlog V4. From the top left windows select <File> <Options> <Communication Map> Add New, Network (TCPIP)

The default communication option of a logger is defined in its Scheme file. Now select Scheme Editor. After selecting your Scheme, click on Setting to define the default communication method to access the logger using this Scheme. Add a new Communication method, choosing Networking TCP/IP. Now edit the Networking TCP/IP to define the IP address of the SerialServer and the TCP port number.



SerialServer setting process

When configuring the IP address of the SerialServer, ensure that it has a fixed IP address and do NOT assign by the DHCP server. Unidata's SerialServer can be configured as follows:

1: Connect the SerialServer to the network using standard LAN cable & power up the unit
2: Insert CD on PC and locate the server & assign an IP address to the unit
3: Access the setup page on the SerialServer using a browser (IE) or Firefox
4: After user i.d. and password authentication....
5: Select Serial Port & change Port Profile = TCP Socket; click Apply
6: Select Basic Serial Settings - baud rate 9600,8,N,1 None; click Apply
7: Repeat until all ports are configured
8: Now the SerialServer is ready to accept connection to logger
9: Using STARLOG V4, change the SCHEME connection option to TCP connection
10: Enter the SerialServer's IP address, TCP Port number. By default Port 1 is 2101 & port 2 is 2102 ....

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