Online

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CAMPBELL SCIENTIFIC Australia, Pty Ltd
WHEN MEASUREMENTS MATTER

In this Issue...

CS Marketing Conference

Steve, Simon & Ron visit CS headquarters for the annual marketing conference

September brings the annual CS conference where managers and staff from the seven affiliate organizations of CSI (USA), CSL(UK & Europe), CSC(Canada & India), CSA(Australia & SE Asia), CSAfrica, CSB(Brazil) and CSCC(Caribbean) gather to discuss business practices and reporting, explore opportunities, and generally touch base with what is going on around the globe with CS affiliates.

An exciting part of the conference covers the unveiling of new products, including our very own Hydrosense II, as well as a substantial number of other products that will be released in the coming year.

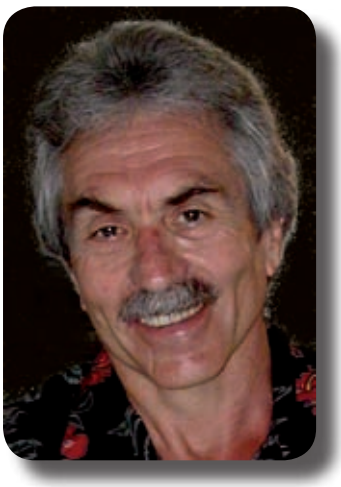
CSI headquarters are nestled in beautiful Cache Valley which for much of the year is surrounded by snow-capped mountains. This year has been 10 Deg (F) hotter than usual for this period, so unfortunately we had no snow in the valley this trip. However, it was great to see all the Campbell teams and get to know the workings of our US manufacturing processes - truly a sight to behold!

Bert Tanner, CSA Champion

April 24, 1943 - Sept 16, 2008

It is with deep sadness that we announce that Tuesday, September 16, 2008, Campbell Scientific Australia's Chairman of the Board and our good friend and mentor, Bert Tanner passed away peacefully, following a four month battle with esophageal cancer. It is difficult to summarise the life of this man or to describe the impact he made on other's lives. Bert's integrity, loyalty, and leadership will be greatly missed.

From the ski slopes of Utah, to outback Australia, and to the world of science, Bert brought a remarkable passion to every activity. Bert received a Bachelor of Science in Mathematics, with a minor in Physics at the University of Wisconsin (UW) and a Master of Science in Biometeorology at Utah State University (USU). He was a member of the football, hockey and rugby teams at UW, served in the US Army Reserve and worked for the UW Department of Geophysics in college. From his A-frame in Aspen, Colorado as a ski bum, to the smokejumper years in Missoula, Montana, living in the Chesapeake Bay area working for the US Department of Navigational Oceanographics, and being a research meteorologist at the US Forest Service Central Sierra Snow Lab in Berkeley, California – Bert definitely lived life in the fast lane. Making his home at the base of the beloved Wellsville Mountains, Bert joined Campbell Scientific, Inc. in 1978 as the 14th employee to begin his 30-year career as Vice President of Marketing and Customer Service.



Bert was the inaugural Chairman of the Board of CSA, a position he held for more than 15 years until his passing. Bert had a passion for Australia and all things Australian. He loved our landscape, our pubs, our beer, our laconic sense of humour, and most of all our irreverence. Bert had a particularly close relationship with the Australian flux research community and regularly spent time travelling at home and abroad with many of our eminent scientists. It was a measure of this great man that Bert was also equally at home sitting on a bar stool at the local country pub discussing sports and politics with anyone who would listen.

Bert's honours include an Honorary Ph.D. in Meteorology from the American Meteorological Society (AMS), American Society of Agronomy (ASA) Fellow and a Certified Consulting Meteorologist with AMS.

Training Schedule 2009

CSA has released their new training schedule for 2009 - including the addition of a second day in our advanced course!

Our CRBasic 3 day training course offers users the chance to learn how to use and program Campbell data loggers in a hands on environment. Our trainers will teach you software, hardware and programming components of Campbell loggers, and assist you with any questions you may have relating to your specific application.

Our new two day advanced course takes users to the next level of programming, and is only suitable for those who are up to speed with LoggerNet and the CRBasic programming language. The new two day course covers advanced LoggerNet features, internet transfer protocols and much more. Registrations for our advanced course are not guaranteed. We recommend that at least you must have attended our 3 day course, or have a strong background in logger programming.

Below is our training schedule for 2008, for all pricing and info please contact bree@campbellsci.com.au

COURSE	WHERE	WHEN	SEATS
CRBASIC PROGRAMMING 3 DAY	Gold Coast	16-18th MAR	18
CRBASIC ADVANCED 2 DAY	Gold Coast	19-20th MAR	7
CRBASIC PROGRAMMING 3 DAY	Melbourne	4-6th MAY	18
CRBASIC ADVANCED 2 DAY	Melbourne	7-8th MAY	7
CRBASIC PROGRAMMING 3 DAY	Townsville	6-8th JUL	18
CRBASIC ADVANCED 2 DAY	Townsville	9-10th JUL	7
CRBASIC PROGRAMMING 3 DAY	Sydney	26-28th OCT	18
CRBASIC ADVANCED 2 DAY	Sydney	29-30th OCT	7

New Price List Available

CSA have released their new price list, effective immeadiately. Due to the decline in the Australian dollar all products purchased through the US will be subject to a slight increase.

Any current quotes with old pricing are still valid until their expiry, however any other purchases will be subject to the price changes.

To obtain a copy of the new price list simply contact info@campbellsci.com.au

Michelle Douglas Leaves CSA...

Our trusty sales woman Michelle Douglas has left CSA to pursue a career in human resources, taking the position of HR Coordinator for Serco here in Townsville.

Michelle has been a great asset to CSA over the years, both professionally and personally. Her sunny outlook on life and positive attitude made her extremely popular with her colleagues and customers.

However, as she was also the chief company prankster we can all breathe a sigh of relief, knowing our belongings and offices are now safe from ambush! We wish Michelle only the very best in her future career - we know she'll do a great job.

CSA Team Building

The team take on the pottery wheels and suprisingly make more than just a mess!

As a reward for working hard over the past busy months (as we always do!) the team were treated to a surprise team building day last quarter. Speculation was rife throughout the office as to what, who or where the surprise may be, until we were taken to a small building – filled with pottery wheels!

So ensued a very fun but messy afternoon, learning to use the wheels and after many tries most of the team were able to make something resembling a bowl, no matter how wonky it may have been. Let's just say it's a lot harder than it looks – much harder.

And while we know we're the experts when it comes to data loggers, a couple of the team were surprised to find they could fall back on a prestigious pottery career should they ever need too!

CS431 Submersible Pressure Transducer

The CS431 Submersible Pressure Transducer, measures both water level and water temperature in one compact package – ideal for most hydrological and water quality applications.

It uses piezoresistive strain gauge technology to measure water level and an on-board thermistor to measure temperatures. Piezoresistive transducers include a strain gauge bonded to a pressure-sensitive diaphragm and as the pressure changes on the diaphragm so too does the electrical resistance. Campbell Scientific data loggers measure the resistance then convert the measured value to the desired units.

The CS431 is now available through CSA and is suitable for all CRBasic model data loggers as well as the older CR10X logger

109SS Temperature Probe for Harsh Environments

The 109SS temperature probe is the latest release from CSI and is now available in Australia. Consisting of a thermistor encased in a stainless-steel sheath, the rugged stainless-steel sheath protects the thermistor while still maintaining a fast time response. Due to the design of the probe, the 109SS can be buried or submerged in harsh, corrosive environments.

The 109SS measures temperature from -40° to +70°C. The thermistor can survive temperatures up to 100°C, but the overmolded joint and cable should not be exposed to temperatures hotter than +70°C. The 109SS is only compatible with our CRBasic model loggers.

LWS Decagon Leaf Wetness Sensor

CSI have recently added Decagon's leaf wetness sensor to the CS range. Designed for plant science & environmental studies the LWS-L can detect small amounts of water or ice on the sensor surface.

Because the LWS measures the dielectric constant of the sensor's upper surface, it can detect the presence of water or ice anywhere on the sensor's surface. Due to the design, the sensor replicates real leaf wetness in the field, giving users a more precise method over other forms of measurement.

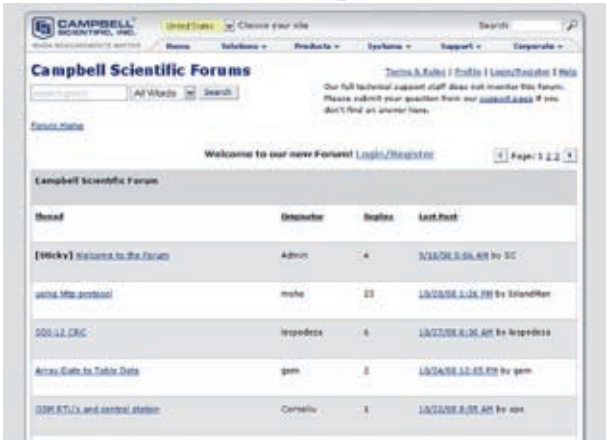
The LWS is compatible with all new CRBasic loggers as well as our older CR10X & CR23X loggers.

CSI Introduces Web Forum Open to Worldwide Campbell Users

CSI have introduced a user forum on their website, open for worldwide users of Campbell Scientific equipment. Established about a month ago the forum aims to give users the platform to discuss all things Campbell's, and to date there are already quite a few threads up and running.

Using the forum is also a great way to ask questions and receive quality information from both Campbell employees and other users, such as programming queries, HTTP protocols etc.

There will be a link from our Australian website very soon, but in the meantime check it out at -
http://www.campbellsci.com/forum



Customising the Keypad Display

Create custom user settings for your system...

Using a keypad display to interact with a Campbell Scientific data logger is not a new concept. Many of the earliest CS loggers were programmed exclusively with a single-line display and a keypad that was mounted in the front panel of the logger itself, or with a handheld keypad that connected to the logger through the CS I/O communications port. As the logger firmware and PC software developed, the keypad display became much less common in the logger-user's bag of tools.

But the keypad display continues to be a useful tool for on-site testing and troubleshooting. It offers the ability to view and change various site and data logger settings without the need for lap top PC's, external power supplies or communication settings such as baud rates to worry about.

The current keypad display (CR1000KD) has a backlit, graphical, bitmapped LCD with adjustable contrast which allows a data set to be plotted graphically against time to view the data set quickly. Access to different areas of the logger memory is done by navigating to particular menu items with the cursor buttons and using the Enter and Esc keys to move in and out of the menus.

By default, the keypad gives access to all the logger settings and in some cases this can prove un desirable as critical logger settings can be altered by mistake. To control access to various menus and settings in the logger memory, a custom menu structure can be created in the data logger program.

A custom menu set could be programmed to give an operator access to a predefined set of tasks. For example, recording status information such as Battery Voltage and the number of times a certain event has been triggered, resetting a counter and setting a new event trigger point. All of these tasks could be configured by a single set of custom menus, without the user having to navigate through numerous menus to find the relevant data that is needed. As the menu structure is in the logger program, a single keypad display can be taken from site to site and the custom menu for the particular site will be displayed when the keypad is connected to the logger.

A custom menu structure is created using the instructions in Table 1.

Instruction Name	Purpose
DisplayMenu()/EndMenu()	*Define the beginning/end of a custom menu set*
SubMenu()/EndSubMenu()	*Define the beginning/end of a submenu set*
DisplayValue()	*Define the name and associated data table value or variable for an item in a custom menu*
MenuItem()	*Define the name and associated measurement value for an item in a custom menu*
MenuPick()	*Used to create a list of selectable options that can be used when editing a MenuItem value*

Table 1. Instructions used to create a set of custom keypad menus.

The DisplayMenu() instruction is also used to define the interaction of the custom menu set with the logger's standard menu set. The custom menu can be a submenu of the System menu or vice versa. Alternatively, the custom menu can replace the system menu altogether.

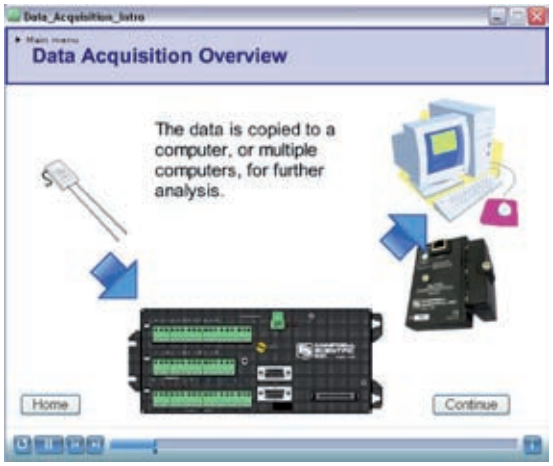
For example programs on how to create a custom menu set, review the CR1000 manual or contact one of the CSA Technical and Sales team.

Web Tutorials Now Available from our Website

CSI have introduced a number of new tutorials for Campbell Scientific equipment and data acquisition in general.

These tutorials are ideal for users new to Campbell's equipment or those wanting a refresher on the features & shortcuts Loggernet and CRBasic have to offer. Below is a list of current tutorials available, with more to come...

- CRBasic Help Tutorial 1.0
- CRBasic Features Tutorial 1.0
- Data Acquisition Intro 1.0
- Backup and Restore Tutorial 1.0
- Tasks Tutorial 1.0
- Data Table Memory Allocation Tutorial 1.0



All are availble from our downloads section - http://www.campbellsci.com.au/25/1/12

Introducing the New OBS Sensor Range

In late 2007 Campbell Scientific purchased D&A Instruments, and now produces their existing OBS sensors. Since then CS has also released three new sensors - here's a quick look...

The New range...

The heart of the OBS® units is an Optical BackScatter sensor for measuring turbidity and suspended solid concentrations by detecting near infrared radiation scattered from the suspended particles. Due to the small size and sample volume, the linear response and wide dynamic range, the insensitivity to bubbles and organic matter as well as rejecting the effects of ambient light and temperature change, OBS sensors perform better than most in-situ turbidity sensors.

As was the case with the OBS3PLUS, the OBS3+ is still a sensor-only device with a high and low output voltage range, but the second voltage output channel of the OBS3+ is now calibrated when the sensor is ordered as a 4-20mA version. When this output option is selected, the channel with the 4-20mA output measures the lower turbidity range, and the channel with the 0 to 5V output measures the upper turbidity range. A titanium body option is available which allows the sensor to be submerged in both fresh and salt water to a maximum depth of 1500 meters. Also submersible, the OBS3A and OBS5+ have built-in batteries and dataloggers, making them stand alone measurement systems that can be used in either fresh or saltwater environments. The OBS3A combines the measurement of turbidity with temperature, depth and conductivity for the ability to get a more comprehensive picture of the water quality on site. For highly turbid environments, the OBS5+ uses multiple detectors and an embedded controller. Combined with a sediment calibration, the measurement method of the OBS5+ allows for suspended solid concentration (SSC) values greater than the normal peaks in response, extending the measuring ranges to 50,000 mg/l (mud) or 200,000 mg/l (sand), depending on the size of the particles. Other innovative options of the OBS3A and the OBS5+ include the possible usage of lithium batteries instead of Alkaline batteries and extended pressure ranges (20m/28 PSI maximum; 500m/711 PSI available as a Special).

NTU vs mg/l

Turbidity is the "cloudiness" or "haziness" of a fluid caused by individual particles (suspended solids) that are generally invisible to the naked eye, analogous to smoke in air. The measurement of turbidity is a key test of water quality. The common method used for measuring turbidity is by using a nephelometer. The principle of measurement is that particles in the water will scatter a light beam focused on them. Both OBS3+ and OBS3A will focus on measuring the turbidity of the water based on this property and as a result, the default measurement unit of the OBS sensors is NTU (Nephelometric Turbidity Units). On the other hand, the OBS5+ is more specifically designed for measuring total suspended solids, incorporating a high suspended sediment concentration monitoring system with a pressure sensor using an infrared laser and a proprietary dual photo-detection system. The default measurement unit for the OBS5+ after calibration is in mg/l.

NTU units and suspended sediment concentration are not necessarily directly related as the area of a particle and its ability to reflect light will be affected by the size, the colour, the shape and the reflectivity of the particle. For this reason (and because of the fact that heavier particles settle quickly and do not contribute to a turbidity reading), a correlation between turbidity and total suspended solids (TSS) is somewhat unique for each location or situation. One cannot convert from NTUs to mg/l (SSC – suspended solids concentration) and vice versa without doing estimations and averaging the size of the particles. The advantage of the OBS technology and its backscattering system is that there is a linear relationship between the output signal of the sensor and the SSC, depending on the size of the particles of the water sample measured (refer to Figure 1.). To calculate SSC accurately, it is recommended that a specific calibration to the medium being measured is done. Using water samples that have been taken immediately adjacent to the sensor are the best way to calibrate an OBS sensor, but where these calibrations are impractical, dry samples can be sent to Campbell Scientific, Inc for a 5-point sedimentation calibration. There can be some limitations to the calibration that is done using dry samples, such as disaggregation. For more information, refer to the Application Note Sediment Calibrations of OBS sensors. Further details on OBS measurements and the effects of particle sizes, shapes and reflectivity can be found at the following link: http://campbellsci.com.au/app-notes

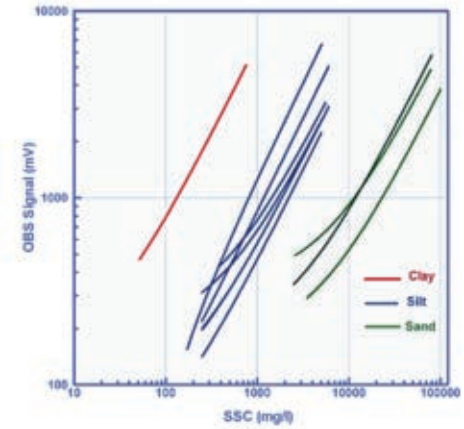


Figure 1. Graph shows the sample calibrations for sand, silt and clay

Fouling

As all OBS sensors rely on the reflection of light against the particles, so any chemical or biological growth or dirt (known as fouling) that alter the light scattering phenomena, can affect the accuracy of the sensor. Campbell Scientific, Inc is currently working on a unique anti-fouling system to be released on the future OBS probes. So keep an eye out for this new cleaning system and until then, hydro-wipers are available for the OBS3+ sensors.

Bridge Condition Monitoring

Bridge monitoring plays an important role in managing road and rail infrastructure, especially under extreme weather conditions. Recently our technical team was asked to assist in designing a wind monitoring system suitable for rail bridge monitoring. The site had sustained failure of a bridge pier during an extreme rainfall event in February of 2008. Due to temporary repairs made to the bridge, traffic across the bridge is not permitted under certain wind conditions.

Campbell Scientific Australia was consulted to design a wind monitoring system that accurately gauges the current wind conditions at the site, communicating with an existing telemetry system networked to the locomotives - allowing it to alert drivers to unsafe conditions when necessary.

Based on the site locations, the RM Young Wind Monitor was selected as the wind sensor due to its propeller style configuration and practical maintenance requirements. In order to provide the interface between the sensor and the SCADA communications network, the CR800 Campbell Scientific data logger, with its Modbus protocol support was installed.

Application at a Glance

Application
Bridge Condition Monitoring

Project Area
QLD, Australia

Data Logger
CR800

Sensors
RM Young Wind Monitor

Communication
Modbus w Radio Link

Measured Parameters
Wind Speed
Wind Direction

The data loggers were configured to measure both wind direction and wind speed. Once the nominated wind speed threshold is exceeded the data logger flags an alarm which is passed on to alert operators in the vicinity. All traffic across the rail bridge is halted until conditions return to a safer level. Access to this information in advance allows the rail operators to minimise down time and disruption to travel schedules.

The data logger system distributes data to a centralised depot and onwards, through to the locomotive drivers, using the Modbus protocol over a radio network. The long range telemetry equipment at each of the sites adds a requirement for a significant power supply. Due to the remote location and a lack of existing power infrastructure at the site, the only suitable option for powering the system was solar power. The high consumption of power led to the design of an impressive solar panel system. Each monitoring site was equipped with 190W of solar panels and batteries to provide a capacity of around 200 Amp hours.

The installation of the monitoring sites allow for more accurate, real time, reliable measurements that can be easily distributed to the relevant parts of the rail network and has led to safer driving conditions. Alternative sampling techniques with handheld wind instruments by locomotive drivers were also proposed. Handheld measurements would have caused inefficiency and provided justification to installing a permanent site system. The new system allows the client to save on fuel costs of stopping and starting locomotives unnecessarily and allows them to maintain a better management of their travel schedules, without sacrificing the critical safety aspects of the operation.