



## MARCH 2018 NEWSLETTER

Silkwood Sugarcane Crop-soil Nutrient Monitoring Site <u>Read the Case Study</u>

Photo by Marcus Bulstrode

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# MESSAGE FROM THE GENERAL MANAGER



From all of us at Campbell Scientific Australia (CSA) we genuinely hope you have bounced back from the festive season with a lot of passion and vigour for 2018. We certainly have and we look forward to working with you again as your trusted data acquisition partner in 2018. Our focus remains clear, to provide data acquisition solutions that meet your needs. Backed up by quality and reliable products and great service.

Soon after our last newsletter went out I spent 11 days visiting our South East Asia (SEA) distributors in Singapore, Malaysia, Indonesia, Brunei and Philippines. A busy trip but a very useful one to see the many good things happening in SEA, a region eager to improve themselves with a real thirst for technology. I thank all our distributors for their engaging hospitality and also hosting a number of excellent, existing and potential, customer visits.

Special mention to our distributors PT Cerna in the Philippines for a number of their recent wins including 53 high quality, reliable Campbell Scientific automatic weather stations that will be installed across the Philippines. Via the Philippine's National Meteorological and Hydrological Services Agency PAGASA, over 100 million people will have access to quality and reliable data regarding wind speed, wind direction, air temperature, humidity, barometric pressure and rainfall. Well done PT Cerna and a number of CSA staff who worked so diligently on this for some time - in particular our SE Asia Sales Manager Corinne Malot, Application Engineer Kahill Mitchell and our fantastic support team.

Thank you for choosing to read our newsletter – some interesting articles we hope you enjoy including your opportunity to <u>win a</u> <u>Google Home</u>. As always if there is anything you would like to suggest for our newsletter please do not hesitate to drop our marketing guru Nikki Hains an email <u>marketing@campbellsci.com.au</u> We got a new team happy snap!









# **NEW PRODUCTS:** CR-PVS1 Photovoltaic Soiling-Loss Index RTU

Campbell Scientific is excited to annouce the CR-PVS1, a remote terminal unit (RTU) designed specifically for photovoltaic (PV) soiling-loss index applications.



The PV soiling-loss index quantifies the loss of PV module power output due to accumulation of dirt or snow on the PV module surface. This information allows solar energy professionals to better evaluate and manage the impact of soiling on PV-plant performance.

The CR-PVS1 can be the heart of an independent soiling measurement station or included as an addon peripheral to any new or existing meteorological station. The RTU is preconfigured and field-ready for operation—the user only needs to update the station time. It is designed to primarily communicate via the Modbus RTU protocol.

The CR-PVS1 calculates soiling-loss index by measuring short-circuit current and back-of-module temperature on a reference PV module, which is kept clean, and a test PV module, which is kept dirty. Two high-quality 110PV sensors are included with the CR-PVS1 for measuring back-of-PV module temperature. The reference and test PV modules can be usersupplied or ordered with the CR-PVS1 as an option.

The CR-PVS1 continuously makes and stores measurements. However, soiling-loss index calculations are only performed under certain atmospheric characteristics, avoiding differences in soiling due to environmental instability, cloud influence, zenith angle of the sun, module-current dependence on irradiance level, and spectral effects. The CR-PVS1 calculates a quality factor to give the user some feedback on the number of qualified measurements that went into calculating the soilingloss index.



### CCFC Field Camera - Featuring new NDVI Capability

In 2016, Campbell Scientific introduced the CCFC field camera, which captures high-resolution photos and videos using an internal timer, motion detection, or a trigger from a datalogger. This ultra-rugged camera features low power consumption, wide operating temperature range, high-quality 18x optical zoom lens, low-light capabilities, and Wi-Fi compatibility.

The new CCFC Firmware 2.5 upgrade makes the camera even better by offering:

- > Faster 5 MP image captures
- > More lense positions (15 positions instead of 4)
- > Normalised difference vegetation index (NDVI) image capture capability

A complete list of changes is provided at <u>www.</u> <u>campbellsci.com/revisions?dl=379</u>.

Campbell Scientific is especially excited about the NDVI capability. This new feature was added at the request of customers interested in crop phenology—the analysis and understanding of crop development.



The images above depict a scene with normal image settings and the equivalent in NDVI mode.

NDVI uses visible and near-infrared light to show the health of vegetation. Healthy vegetation mostly absorbs visible light and reflects near-infrared light. While, unhealthy or sparse vegetation reflects more visual light and absorbs more infrared light. The images above show both a standard and an NDVI image of the same location.



FIND OUR MORE ABOUT THE NEW FIRMWARE UPGRADE



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## **TRAINING COURSES**

Campbell Scientific offers several different multi-day training for our data loggers and software.

These comprehensive courses are designed for those without much data logger experience, or for those wanting to increase their knowledge.

#### Field Operators Training Course - 1 Day

This course covers an introduction to using Loggernet software, best practice for installation of a weather station and significant discussion regarding troubleshooting and maintenance procedures when conducting site visits.

#### Programming & Software Training - 2 Days

This courses provides an introduction to using our software to administer, program and collect data from the new generation of data loggers. You will also learn the basics of customising a data logger program to suit your sensor and data storage requirements.

#### **Communications Course - 2 Days**

Aimed at intermediate to advanced users wanting to learn how to program for and connect their data loggers to communication networks. The course covers cell phone modems, ethernet networks and spread spectrum radios and how to connect them to the data logger.

#### **Upcoming Courses for 2018**

- > Sydney: April 16 20
- > Townsville: May 21 25
- > Melbourne: September 17 21
- > Townsville: November 12 16



## #WhenMeasurementsMatter Photo Contest Enter for your chance to win a Google Home Smart Speaker

give us your best shots!

To celebrate our 25 years of providing Australia and South East Asia with quality and reliable data acquisition system, we are running a contest to showcase the important and amazing places our customers use our gear.

Your work will be showcased on our website, social media channels, and the winning photo will become the feature in our limited edition 25th Birthday Booklet.

The contest is a great opportunity for the environmental measurement community to share what is happening.

#### **ENTER HERE**

PHOTO BY GOOGLE



# Silkwood Sugarcane Crop-Soil NUTRIENT MONITORING SITE

The Silkwood sugarcane water quality monitoring site was established in 2014 as part of the Paddock to Reef Integrated Monitoring, Modelling and Reporting Program (<u>reefplan.qld.gov.au</u>).



Photo by Marcus Bulstrode. Aerial shot of the silkwood site.

#### **APPLICATION**

To monitor nutrient losses from sugarcane crop-soil systems; which contribute to the water quality of aquatic and marine ecosystems within the Great Barrier Reef catchment area.

#### LOCATION

Silkwood, Queensland

**CONTRIBUTORS** Department of Natural Resources and Mines

#### PARTICIPATING ORGANISATIONS Department of Natural Resources and Mines, MSF Sugar

PRODUCTS USED CR800 RF412 CS451

**MEASURED PARAMETERS** Water Quality

The program has been funded jointly by the Australian and Queensland governments, and is a collaboration involving governments, industry bodies, regional natural resource management bodies, landholders and research organisations. The Silkwood site was developed to monitor nutrient losses from sugarcane crop-soil systems; which contribute to the water quality of aquatic and marine ecosystems within the Great Barrier Reef catchment area. The site is located within the Wet Tropics region of north Queensland, and is monitored by the Department of Natural Resources and Mines. Farming practices are managed by MSF Sugar.

- > Determine the amount of Nitrogen lost through various pathways in a sugarcane crop-soil system, with varying application rates and forms of applied Nitrogen fertiliser;
- > Trial a range of Nitrogen application rates and forms, and assess impacts on crop production and quality;
- > Assess differences in Nitrogen loss between application rates and forms; and,
- > Improve current understanding of Nitrogen loss pathways from agricultural production systems in the Wet Tropics region, and determine critical loss mechanisms

The site has been fitted with four monitoring stations designed to measure runoff and deep drainage from four Nitrogen application treatments. Each station is fitted with a nine inch Parshall flume, and rubber wing walls. They are instrumented with a CR800 data logger, automated refrigerated water sampler, pressure transducer, telemetry, and power equipment to measure and record flow and collect runoff water samples. The site was also fitted with two tipping bucket rain gauges (pluviometer) to record rainfall volume and intensity, and below-ground lysimeter system to measure and collect deep drainage of water and nutrients below the root zone of the crop.

Data collected from the pressure transducers is used to calculate volumes of water lost from the system as surface runoff. These volumes are combined with nutrient concentrations collected by the automated samplers to produce total losses of Nitrogen per unit area from each of the treatments throughout each crop cycle.



The measurements collected by the Campbell Scientific equipment are combined with several other factors to produce a comprehensive nutrient budget for the sugarcane crop-soil system at the Silkwood trial site. Since establishment, accurate measurements of nutrient loss have been recorded over three complete crop cycles, and the information produced has contributed to the greater Paddock to Reef Program (Technical Report 2014-16). The site is continuing to operate, increasing the data pool and enabling the modelling of Nitrogen losses from the system into the future.

#### **Related websites:**

http://www.reefplan.qld.gov.au https://www.qld.gov.au/environment/coasts-waterways http://www.reefplan.qld.gov.au/measuring-success/ paddock-to-reef/assets/paddock-to-reef-overview.pdf



Aerial shot of the Silkwood Stations. Photo by Marcus Bulstrode.



Silkwood's Sugarcane water quality monitoring sites



# DEALS FOR THE QUARTER

**FIND OUT MORE** 

Campbell Scientific is extending our limited time offer to get your hands on some quality equipment with some great savings on our quality sensors and data loggers.

### Products on offer:

- CS610-L4m Rod TDR Probe with RG8 Cable
- OBS-3A-N4-NP-NS Turbidity and Temperature Monitoring System
- > TDR100 (Loan Unit)

# Hydro**Sense II**

#### For Real-Time Soil Water Content Measurements

Easy and portable, the HydroSense II is a key instrument in the hand of any Greenkeeper or Superintendent. Easy-to-use handheld display and probes boasts precise water content measurements and GPS tracking so you can make better informed decisions for your greens.

It is a cost-effective tool for many industries including Turf Farms, Golf Courses and Sports Stadiums to maintain optimal performance of your turf and an increase in water use efficiency. Saving you money and time, with a simple to use product.

#### Want to know more information? Learn more

#### **Benefits and Features:**

- Compact and lightweight
- Read real-time soil-water content and measurements in the field
- Large LCD display for easy operation
- > Onboard data storage for up to 1500 points
- > Onboard GPS for geotagging measurements
- > Bluetooth connection to PC software
- > Export to Google Eart, GPX, and CSV
- > Probe redesign for easy insertion and removal from soil



## **TECHNICAL TIP Functions and Subroutines**

Independent sections of code that perform a specific task, and optionally return a value of modifies and argument. They can be called multiple times from within both the Main Scan and SlowSequences. This allows for programs to be simplified as code does not have to be repeated as it is reused whenever required. It also allows for the logical separation and modularisation of a program. Subrotuines must be declared before they are used. They are usually declared just after variable declarations.

#### ANATOMY OF A SUBROUTINE

```
Sub ExampleSubroutine (argument1, argument2,
...)
...
EndSub
ANATOMY OF A FUNCTION
Function Example Function (argument1, argument2,
```

#### ...) As ReturnType ... Lines of code ... Return (ValueToReturn) EndFunction

#### **Subroutines**

Subroutines can take arguments, execute multiple instructions and change the value of its arguments. Common uses for subroutines include:

- Data Transfer (FTP & Emails)
- Calculations and Calibrations
- Alarming & Control activation

In the example below this simple subroutine measure a Ponsel pH sensor and returns the value of the three values measured via the subroutine parameters.

```
' -- Measure Ponsel -----
*****
* * * *
* * This subroutine measures the pH using the
****
Sub MeasurePonsel(mp pH, mp temperature, mp
redox)
 Const PONSEL PORT = 1
 Const PONSEL ADDRESS = 0
 Dim mp_ponsel(5)
  SDI12Recorder (mp ponsel, PONSEL PORT, PONSEL
ADDRESS, "M!", 1, 0)
 mp_pH = mp_ponsel(2)
 mp_temperature = mp_ponsel(1)
 mp redox = mp ponsel(3)
  2
      ₩ 68 🖛 🖆
```

#### Functions

Functions are very similar to Subroutines but Functions return a value upon conclusion whereas Subroutines do not. This allows for the result of a Function to be used later in the program. Functions are commonly used for processing and/or categorising measurements.

' -- Measure DL10 -----χ. \*\*\*\*\* \* \* \* \* \* \* This subroutine measures the depth using an EchoPod DL10, returning the depth in 1 + meters. ١. \*\*\*\*\* \*\*\*\* Function measureDL10(md\_20maDepth,md\_4maDepth) As Float Dim md depth VoltSe(md\_depth, 1, mV2500, 3, 0, 0, \_50Hz, 1, 0) md depth = (md depth - 400) \* (md 20maDepth md 4maDepth) / 1600 If  $md_depth < 0$  Then  $md_depth = 0$ If md depth > md 20maDepth Then md depth = md 4maDepth Return (md depth)

```
EndFunction
```

#### **Subroutine vs Function Implementation**

Although you could construction programs to always use subroutines and pass values back via the parameters, its best practice to use functions when you only want to return one value and protect the parameters from inadvertently being modified.

```
' -- Measure Depth & calculate discarge
    depth = MeasureDL10(U 20MA DEPTH, U 04MA DEPTH)
    If depth >= U MIN ACCUMULATING LEVEL Then
     volume = VolumePassed(depth,MAIN SCAN INT,U
PIPE TYPE)
   Else
     volume = 0
    EndIf
Vs
    ' -- Measure Depth & calculate discarge
    Call MeasureDL10(depth,U 20MA DEPTH,U 04MA
DEPTH)
   If depth >= U MIN ACCUMULATING LEVEL Then
     volume = VolumePassed(depth, MAIN SCAN INT, U
PIPE TYPE)
   Else
     volume = 0
   EndIf
```

# VISITING OUR SOUTH EAST ASIA DISTRIBUTORS 2018

### Growing our market in the region

Our delight seeing the first of many installations of 53 automatic weather stations throughout the Phillipines.

In mid-November 2017, Adam Parsons and I went on our yearly South East Asia (SEA) distributor visit. With Adam newly appointed as our General Manager and our recent larger project wins in the region, the 12 day tour was the perfect opportunity to cement our growing popularity with local customers as well as presenting Adam's fresh focus for our business in the region.

We stopped at every country of our territory: Singapore, Malaysia, Indonesia, Brunei and the Philippines, some of which were first time visits for Adam. We were received with the incredible warmth and hospitality the SEA region has always showcased to Campbell Scientific Australia (CSA).

In Malaysia and Singapore, some University groups have been using our data loggers solutions for some very interesting research projects. From studying the effects of urban paint on buildings on meteorological parameters and human comfort, to modelling landslide and flash flooding risks for electrical poles installed in the jungle. It is always so rewarding to discuss first hand with our end customers, on how our reliable data collection solutions are used in state of the art research for the benefit of mankind.

In the Philippines, Malaysia, Indonesia and Brunei, we were presented with opportunities reaching a wide range of markets such as structural dam monitoring for agriculture, wind farm prospecting, water quality monitoring, wind safety on a maritime bridge and road weather monitoring. As our distributors (Wetec – Singapore, Surechem and GDS – Malaysia, PT Gistec Prima – Indonesia, ESC Engineering – Brunei, PT Cerna – Philippines) have strengthened their knowledge and confidence in the versatility and reliability of our datalogging systems to almost any environment, the range of applications and projects types have widened significantly thus offering our market growth a good kick for the region.

The highlight of our journey was visiting our first PAGASA Automatic Weather Station site after PT Cerna's award of the 53 systems supply and installation for collection of national weather data. Although we visited the site at night and only the concrete pole foundation was implemented, it was so exciting to see the first step of this major CSA success come to fruition.

The busy and eventful trip saw Adam and I come back to Australia sleep deficient but all for the right reasons, as our SEA market is such an exciting and promising part of our business. Let's hope our next distributor visit to be even more interesting!

Corinne Malot – South East Asia Sales Manager





## **PHASE TWO TRIALS**

Gaining critical market research

Following on from the award of a Queensland Government Ignite Ideas grant, our second phase of automated refrigeration temperature monitoring trials are now underway to obtain further market feedback through real-world use of our Altoview IoT temperature monitoring product.

We are delighted to have a number of new businesses on board for this marketing feedback phase of the project, including the Townsville branches of recognised nationwide brands such as Coffee Club and Discount Drug Stores. We thank all the businesses who have engaged in these trials, and look forward to receiving and analysing further market feedback from these trials in the coming months.

Our Altoview temperature monitoring product provides automated temperature monitoring and alarming of critical appliances such as commercial food display cabinets, commercial refrigerators and freezers, vaccine fridges and walk-in cold rooms. The product can also be used for general temperature monitoring in locations where temperature needs to be closely monitored (e.g. warehouses, pharmacies, medical laboratories).

Businesses wanting more information on our automated refrigeration monitoring product should contact info@altoview.com.

We are looking for market research participants, if yourself or someone you know works in the industry please get in contact with us! We want to know how we can better help your business be more informed.

www.altoview.com +61 7 4401 7700 info@altoview.com

# CRITICAL ALARMING SOFTWARE

Altoview's automated refrigeration technology was developed to help small, medium and large businesses reduce wastage costs and identify risks quickly to their appliances.

With a simple interface and continuous data (no manual recordings needed) Altoview can alert you to when your appliance is out of the safe range. This means you can uncover issues with your appliance before you lose stock or risk your customers health.

Want to trial our software? Get in contact with us today.





# **MEET OUR STAFF: DANE**

Dane grew up in the snowy mountains of NSW where he spent most of his childhood with his family on their small farm before moving to Canberra to complete his secondary schooling. After finishing school, Dane joined the Australian Defence Force (ADF) in 2008 where he served for 9 years in the Royal Australian Armoured Corps as a Cavalry Crewman posting first to Darwin and then to Townsville. During this time he was lucky enough to deploy on an exercise to several countries as well as having the honour of serving a 9-month tour in Afghanistan for Operation Slipper 2010-2011.

During his last five years in the ADF, Dane began studying a degree in Electrical Engineering majoring in Computer Systems at James Cook University Townsville. Graduating in 2017 with Honours and Academic Medal and discharging from the army at the same time, Dane was fortunate enough to be selected for the Knowledge Transfer Partnership program which saw him hired as a research and development engineer at Campbell Scientific Australia (CSA). Being a junior engineer has brought Dane many rewarding challenges, first working on CSA's Altoview Flood Warning System before more recently taking on the development of environmental sensors aimed at the traditional Campbell Scientific dataloggers.



While not at work, Dane enjoys the outdoors including rockclimbing, hiking, and travelling with his partner Emma.

# Connect with Dane on LinkedIn in

# WANT TO CONNECT WITH CAMPBELL SCIENTIFIC?

There are lots of ways to stay up to date with what we're doing.



# **CONTACT US**



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