

# **ET107—New Preconfigured Weather Station**



The new ET107 provides a research-grade sensor set in an easy-to-install package.

Here at Campbell Scientific, we help our customers configure weather stations for many different projects—from evapotranspiration monitoring on golf courses, to fire weather monitoring, to an unending variety of research studies. Custom weather stations are often required to meet project measurement requirements. In many cases, however, preconfigured stations can do the job and at the same time simplify almost every aspect of purchasing and owning a weather station. This is the role of our newest preconfigured weather station, the ET107.

The ET107 monitors temperature, relative humidity, wind speed and direction, solar radiation, and precipitation. Its components include meteorological sensors, an aluminum pole for mounting, and an environmental enclosure that houses a CR1000 datalogger, a modem, and a rechargeable battery.

The station offers a few options for matching varied site requirements.

These options provide a choice of recharging the station via AC power or solar panel and a choice of either a 2- or 3-meter mounting pole. Both telephone and short-haul modem options are available for remote communication, and a spread-spectrum radio option will be added soon. For wind measurements, options include a sonic anemometer with no moving parts (minimizing routine maintenance) and a traditional cupand-vane anemometer.

As a preconfigured station, the ET107 really does simplify things. The station is easily configured by choosing from the small set of options mentioned above. We've already taken care of determining which of our hundreds of components to use, their compatibility, and how they interface and mount.

Much of the station is assembled at the factory. For example, the datalogger, modem, and power supply arrive installed in the enclosure, and the sensors come attached to the crossarm. This allows the entire station to ship in a single box, and the lower part count makes installation simpler and faster. Instead of having to wire sensor leads to specific locations on a datalogger, sensor cables terminate in connectors that are clearly matched to sealed connectors on the outside of the enclosure.

All of these benefits come without sacrificing measurement quality, as the station features our usual high-quality sensors and one of our newest dataloggers. The ET107 also looks great and fits well in public settings.

A preconfigured station isn't ideal for everyone and many customers benefit from the versatility of our custom stations. In situations where project requirements don't match the sensor set included with the ET107 or where measurement needs are expected to grow, we can help you configure a station that fits your specific application. If, however, your measurement requirements match the defined sensor set and you are looking for a simpler path to the finish line, the ET107 provides a great choice for a research-grade weather station.

#### ET107 Features

- CR1000-based system—our latest in datalogging technology
- Commonly used suite of sensors that supports many applications
- Watertight enclosure that protects electronics and enhances long-term reliability
- Low power consumption that allows extended field use
- Slim, vertical profile for a more attractive station
- Simple, integrated design for faster installation

To learn more about the ET107 and get a brochure with specifications, visit our Web site at www.campbellsci.com/et107.

# Automatic Weather Stations— A Centerpiece of Our Business

#### Message from the President

#### by Paul Campbell



Campbell Scientific serves a broad diversity of markets with a variety of products. Our datalogger products are known not only for their reliability, but also for their flexibility. They are

designed for use with different sensors in markets ranging from monitoring machine performance to logging temperature and rainfall. Operation over a wide temperature range while consuming very little power makes them ideal for remote weather monitoring. For over 25 years and counting, automatic weather stations built around a Campbell Scientific datalogger have been a centerpiece of our business. The ET107 (see front cover) continues this fine product tradition for customers looking for a preconfigured automatic weather station.

The market for automatic weather stations roughly falls into three categories. The low-end range starts with hobbyists and homeowners, but also includes significant numbers of schools and businesses that might include a display of time and a few weather parameters in their signage. A priority is low cost, and there is limited product flexibility. Campbell Scientific addresses this market through the WeatherHawk division. (See more at www.weatherhawk.com.)

The middle range includes agriculture and agricultural research, climate records and research, and irrigation for golf courses and parks. Measurements are of high quality, suitable for most research and public broadcast purposes, and they include at least air temperature, relative humidity, rainfall, wind speed, wind direction, barometric pressure, and solar radiation. Systems are designed for optimized value with high-quality sensors and measurement electronics at a reasonable price. The ET107 falls into this category.

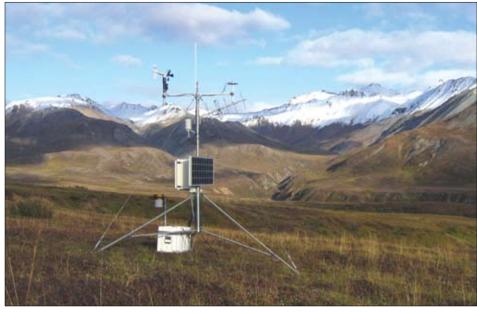
The high-end range of products includes automatic weather stations for alpine and polar conditions, fire weather, airports, and road weather—applications where there are special considerations for deployment and operation. The cost of sensors for these stations may increase significantly in order to increase the likelihood of valid measurements during extreme storm events.

Preconfigured weather stations such as the RAWS for fire weather have specialized cabling and deployment provisions. Many other high-range automatic weather stations are customized with appropriate sensors to the application or to a particular site. The flexibility of Campbell Scientific dataloggers is a great benefit when putting together such stations. Campbell Scientific's application engineers often work with customers to configure specialized weather stations that meet the most demanding requirements on the planet. Automatic weather stations used for the U.S. Climate Reference Network are such specialized, highly configured stations.

Our approach to building automatic weather stations has been to use the best value sensors from independent manufacturers, and integrate the system around a suitable Campbell Scientific datalogger. This approach gives you the following benefits:

- · High-quality measurements
- Consistent gateway to a variety of data telemetry means
- · Long product life
- Excellent technical support
- Value for your investment

If you have a need to monitor the weather, Campbell Scientific probably has a solution. Feel free to visit us at www.campbellsci.com/weather-stations or contact us by email or phone for detailed information about an automatic weather station that suits you.



One of our high-end, custom stations, Denali National Park, Alaska, USA



# **Featured Application: Wind Energy**



Wind power is the world's fastestgrowing energy source. In the past five years, wind-power capacity in the United States has grown dramatically, now exceeding 11,603 megawatts. Technological improvements to wind turbines, favorable economics, and public demand continue to drive this remarkable growth. Measurements definitely matter in this industry as multimillion-dollar decisions must be based on reliable data. Because of the need for quality measurements, Campbell Scientific products are ideally positioned to impact all three phases of wind-farm development: prospecting for wind, monitoring wind turbine performance, and wind forecasting.

#### Wind Prospecting

The word prospecting is often associated with the 1849 California gold rush, when miners would stake claims using a best-guess method then start looking for gold. In 2007, wind is gold if you can find a location with wind speeds over 12 mph average.

How do you prospect for wind? Wind consultants use Campbell Scientific measurement products to evaluate potential sites. To accomplish this, several 164- to 260-foot towers are erected and wind speed and direction sensors are installed at three or four different heights. A datalogger and telemetry equipment are installed at the base of the tower. Based on the data from an assessment period of at least one year, a decision can be made about the suitability of the site for wind power and the best wind turbine to use. The rugged, low-power design of Campbell Scientific equipment, combined with multiple telemetry and sensor options, makes it ideal for the long-term, stand-alone monitoring required by this application.

#### **Turbine Performance**

Once wind turbines are installed, our systems can monitor power generated by the turbines to help verify manufacturer specifications. This is accomplished by comparing data from the assessment tower to the electricity generated by the turbines. Often, the same dataloggers used for prospecting can be used for turbine performance. Data is critical here because undergenerating by even a few percentage points will make the difference between black and red on the corporate balance sheet. This data can also be used to detect potential problems with turbines.

#### Wind Forecasting

To sell wind power once a wind farm has been established, operators need to accurately predict how much power their turbines will produce. The ability to predict power generation requires advanced, location-specific models. Weather stations placed strategically across a wind farm provide local meteorological data. This data is combined with regional weather patterns to predict wind 12 to 72 hours in advance.

Measurements matter in the windpower industry. Visit our Web site at www.campbellsci.com/wind to learn about our products, read case studies, configure a system, or request a quote.

#### Elements of Wind Energy

#### **Typical Measurements**

- Wind speed (multiple heights)
- Wind direction (multiple heights)
- Barometric pressure
- Temperature
- Current
- Voltage
- Power

#### **Recommended Products**

- CR1000 Measurement and Control System
- Met One, RM Young, or NRG wind speed and direction sensors
- LLAC4 4-Channel Low-Level AC Conversion Module

## Lightning in the Highlands of Peru



Lightning kills about 40 people a year in the highland areas of Peru. This startling fact motivated Barrick Gold Corporation, the world's largest gold mining company, to set high standards for lightning protection at its Lagunas Norte facility, a high-elevation, open-pit mine in this lightning-prone region.

Hundreds of workers at this facility operate mining and processing equipment around the clock, all year long. Some of the work areas are protected from lightning strikes with catenary wires strung to attract and absorb lightning, but mine managers depend heavily on the CS110 Electric Field Meter to warn of dangerous lightning conditions.

This safeguard was implemented in 2006, when engineers from Campbell Scientific designed and supervised installation of a comprehensive lightning warning system. Campbell supplied CS110 systems (with embedded CR1000 dataloggers), tripods, enclosures, power supplies, and solar panels.

CS110 systems monitor lightning potential at two locations. The primary

system is positioned near the dispatch center and includes a Strike Guard lightning detector from Wxline. The other is about 3 kilometers away, near the housing structures. Both systems communicate through fiber-optic modems, and the data is displayed on the Internet and viewed at the dispatch center.

When either of the CS110 systems detects rising potential for lightning, it sends alarms to the dispatch center and personnel are put on alert via radio. If the danger increases, vehicles are positioned near workers for quick evacuation, and when the danger reaches a red alert all people are moved to safe shelters.

The season for frequent lightning lasts nearly half the year, and the warning system proves its value nearly every day during that season. Evacuations are frequent, but the system allows work to recommence as soon as conditions are safe again. Safety and productivity are not based on guesses, but on well-researched and closely monitored standards that protect the workers and let mine operations continue as much as possible.

## Lahar Studied in New Zealand

All of our years of effort have paid off. We have collected a world-class data set that will make this the best-studied lahar ever. — Dr. Vern Manville

Dr. Manville's words describe the success of a unique study of a volcanic rock slide and mud flow, called a lahar. When a volcanic crater fills with rainwater, the walls of the crater sometimes collapse, releasing a catastrophic flood of mud and rock. The word lahar comes from Java in Indonesia, where the frequency of volcanoes and the abundance of rain make these mud flows a common occurrence. Lahars are usually hard to study because their occurrence is unpredictable and their flow is violent.

Knowing when and where to place instruments is a tough guess, as the dense, rock-filled lahars often damage or destroy instruments in their path. Because of this, Dr. Manville and his team from New Zealand's GNS Science agency and Massey University considered it rare good fortune to be able to set up monitoring equipment in advance of a recent large-scale lahar at Crater Lake on Mount Ruapehu. The volcano was close enough to the study centers that extensive preparations could be made at the site. The path of the expected flow was predictable enough to allow placement of sensors where they could gather the most information without being destroyed.

Campbell Scientific gear was a big part of the effort. Our CC640 digital camera connected to a CR1000 datalogger captured the dramatic collapse of the crater wall and the flood of lake waters through the opening. Sensors and CR1000 and CR800 dataloggers were positioned down the path of the lahar to collect data about its level and sediment content. The instruments had to be mounted on hardened towers or canyon walls to survive the tremendous force of the lahar.

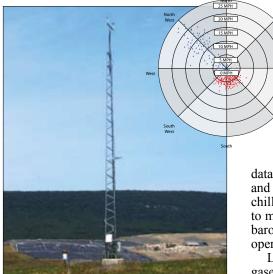
Dr. Manville said, "The gear worked perfectly, and the weather was just good enough to allow us to see the collapse of the dam and the Crater Lake pouring out through the breach." Scientists will spend months gathering follow-up data, and years analyzing it all. The intensive study of New Zealand's Ruapehu lahar may enable us to better predict and prepare for these dangerous phenomena.



## **Monitoring Pennsylvania Landfills**

Landfills present many environmental challenges, ranging from odor control to groundwater quality. Continuous, accurate monitoring of site conditions provides data that landfill managers can use as they address these challenges.

Landfill managers in Pennsylvania collect and analyze meteorological data to help them optimize operations while minimizing impacts on the community. Ambient Air Quality Service (AAQS), a Campbell Scientific consultant and integrator, has installed and maintains



multiple landfill monitoring locations in Pennsylvania.

AAQS set up the Waste Management Alliance landfill in Taylor, Pennsylvania, with three meteorological monitoring locations. They use AC and solar power, Campbell Scientific's CR510 dataloggers, 10- and 20-foot tripods, RF401 radios, and sensors that measure wind speed, wind direction, temperature, relative humidity, and barometric pressure. SRM-5A short-haul modems extend the distance from the radio and datalogger to the base-station computer.

At the Wayne Township landfill, AAQS installed a CR200 datalogger connected to a wind vane to control the "misting system so that it only runs when the winds are from certain directions, curbing odors and conserving odor neutralizing products. Although Pennsylvania

regulations require only wind data, landfills also collect temperature and relative humidity to calculate wind chill and heat index, precipitation data to manage waste-water treatment, and barometric pressure to help analyze and operate flares.

Landfills operate flares to burn off gases. CR1000 dataloggers and sensors

have been added to flares to monitor temperature, flow, and oxygen.

Much of the data collected at these Pennsylvania landfills is available on the Internet for staff, state regulators, and the community. LoggerNet software collects the data from the dataloggers, generates a daily report, uploads the daily report and current data to a Web site developed by AAQS, and displays 48-hour trend graphs on the Web.

In addition, AAQS has developed a LoggerNet-based alert program that will notify landfill personnel in case of high winds or heavy rains. Alerts are sent to landfill staff via cell phones or email.

Some landfills also use a LoggerNet program developed by AAQS to display the wind corridor of the most recently collected wind values. The program has successfully shown that an odor detected in the area could not have come from the landfill because wind did not flow across the landfill during or prior to the odor complaint.

Landfill managers would much rather prevent environmental problems than have to deal with them after the public has been inconvenienced. Continuous monitoring of environmental variables can be an important part of this effort.

## **Trout Hatchery Updates Its Flow Control System**

South

Moving clean, cold water through a trout-rearing facility is essential to its success. A live product like trout requires detailed care 24 hours a day, 7 days a week, with little margin for error. Campbell gear has helped make control of the water at Pequest Trout Hatchery precise and reliable.

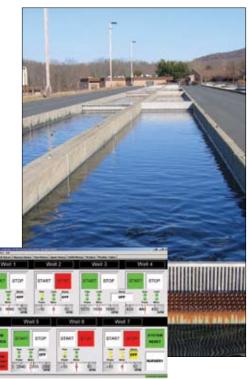
The facility used to depend on outdated hard wiring and touch-tone telemetry to coordinate and control the water flow. The old system had to control pumps, gates, and valves as the water came from six wells, through the aerators, and finally to the fish raceways. As it became harder to repair the old equipment, and as new technology matured, Pequest's managers contacted Campbell Scientific because of our worldwide experience in aquaculture instrumentation.

The new instrumentation made several major improvements in the monitoring and control system. One problem that needed to be addressed was the distance between the wells, pumps, and control center. Our engineers implemented spread-spectrum radio technology to connect all of the hatchery system components and avoid the problems and maintenance costs of land lines.

Dataloggers connected to the radios at each location monitor and control pumps, flow meters, alarms, and an integrated meteorological station. Duplicate home bases were set up at two locations for backup and for wider access to data and control features. When alarms are activated, the new system can sound sirens, automatically make phone calls to staff members, and even shut down equipment if conditions require it.

One benefit of the new system is that its low power use and backup batteries ensure uninterrupted data collection, even during power outages. Another benefit is that the system is expandable, allowing new wells to be added and new monitoring and control components to be brought on line.

Pequest Trout Hatchery has become, with some help from Campbell Scientific, one of the most modern and efficient hatcheries in America.



# The RF450: A Long-Range, Spread-Spectrum Radio



The RF450 Spread Spectrum Radio is the latest addition to our line of wireless telemetry products—transmitting over distances up to 60 miles. The RF450 is a 900megahertz, license-free radio specifically designed to work with Campbell Scientific CRBasic dataloggers (the CR800 series, CR1000, CR3000, and CR5000). The RF450 radios consist of a radio module manufactured by FreeWave Technologies and a Campbell Scientific interface board. The RF450 is optimally used in a pointto-multipoint network. Traditionally, a multipoint network is used in applications where data is collected from as few as one or up to many dataloggers and reported back to one central site. The central site is typically a PC running LoggerNet, but could be a datalogger.

An RF450 in this type of network is designated as a master, where it is able to simultaneously communicate with numerous slaves. In its simplest form, a multipoint network functions with the master, broadcasting its messages to all slaves. The slaves respond to the master only when given data by the datalogger.

Point-to-multipoint applications take advantage of the low-power mode available in the RF450. This reduces the required power at remote sites from about 75 mA to less than 10 mA in most applications.

	RF450	RF401 series	RF310 series
Туре	Spread spectrum	Spread spectrum	Narrow band
Individual FCC license required	No	No	Yes
Single station transmit range *	Up to 60 mi	Up to 10 mi	Up to 25 mi
Network type	Point-to-multipoint	Point-to-point Point-to-multipoint	Point-to-point Point-to-multipoint
Average power	Less than 10 mA	1 mA (standby) up to 75 mA (transmitting)	35 mA
RF data rate	140 kbps	10 kbps	4.8 kbps

\*Radio location is likely to have a significant impact on its performance. The key to the overall robustness of a radio link is the height of the antenna.

## 43502 Aspirated Radiation Shield

Featuring compact size, easier mounting, and lower cost, the 43502 Aspirated Radiation Shield from R.M. Young has replaced the previous Model 43408 aspirated shield.

The 43502 uses a continuous-duty brushless blower that pulls ambient air into the shield and across the temperature sensor. This reduces measurement errors caused by solar radiation during the day, and errors caused by outgoing radiation at night.

The new shield is typically used with the 43347 RTD probe, but accommodates temperature and humidity sensors up to 0.9 inch in diameter. The mounting bracket and U-bolt attach the shield to a vertical or horizontal pipe up to 2 inches in diameter.



# New Products

The SDM-SIO1 expands the number of serial devices that can communicate with a CR800, CR850, CR1000, or CR3000 datalogger. You can attach up to 15 SDM-SIO1 modules to the datalogger, which allows a CR800 or CR850 datalogger to communicate with 17 serial devices and a CR1000 or CR3000 datalogger to communicate with 19 serial devices.

#### SDM-CD16S



The new SDM-CD16S provides 16 control ports for driving DC loads. It uses three control ports on the datalogger and is compatible with all datalogger models except for the CR200 series, CR500, and CR510.

#### **RTDAQ** to Replace PC9000

We will soon release a new real-time data-acquisition software package, RTDAQ, that will replace PC9000. RTDAQ will support programming, communications, and data display for high-speed data collection applications. In addition to our higher-speed dataloggers, the CR9000X and the CR5000, the new software will also support the CR800/850, CR1000, and CR3000. Watch our Web site for information on this release.

#### **CNR2** Net Radiometer



The CNR2 is our newest radiometer, featuring a unique design with separate outputs for short-wave (solar) and long-wave (atmospheric and terrestrial) radiation. The CNR2 fits in the Kipp & Zonen product line between the single output NR-LITE and the four-component CNR1. The glass domes and silicon windows protect the thermopile detectors from environmental factors, minimize the effects of wind and rain on measurements, and are easy to clean.

# **Product Updates**

Increase of Memory for CR200-Series



We are replacing the 1-megabit flash chip in our CR200-series dataloggers with a 4-megabit flash chip. This change increases the final storage memory from 128 to 512 kilobytes. The data format of the CR200-series is 4 bytes per data point, resulting in 128,000 data values available. Dataloggers with the 4-megabit flash chip have "512K" on their labels.

#### LoggerNet 3.4

This summer Campbell Scientific will be releasing LoggerNet 3.4. The main focus of this release is to improve LoggerNet and LoggerNet Admin performance on Windows Vista.

Users of any version of LoggerNet 3.X can download a LoggerNet 3.4 patch from the downloads page on our Web site (www.campbellsci.com/downloads).

#### SR50A: Updated Sonic Sensor



The SR50A Sonic Ranging Sensor is the smaller, better-performing upgrade of the SR50. The SR50A is made of stainless steel instead of the aluminum of the SR50. Stainless steel provides a totally conductive outer body that creates an EMF shield, resulting in more stable measurements over time. The echo processing algorithm has been improved and the size is greatly reduced.

#### CompactFlash Cards

We have lowered the prices of our current 64-megabyte, 256-megabyte, and 1-gigabyte CompactFlash cards, and have introduced a 2-gigabyte card. These cards are manufactured by Silicon Systems, which has passed Campbell's ESD testing.

#### **Improved ESD Protection**

Campbell Scientific has replaced the AM16/32 multiplexer with the AM16/32A and redesigned the MD485 Multidrop Modem. The addition of a ground lug and gas tubes to these products provides better surge and electrostatic-discharge (ESD) protection. These improvements allow both products to pass IEC61000-4-2 test Level 4 for both contact and air discharge, as well as IEC61000-4-5 test Level 3 for surge immunity.

#### CD295 Display Supports PakBus<sup>®</sup> Dataloggers



With the release of Version 2 of its operating system and software, the CD295 DataView II Display (a twoline, 32-character LCD) now supports all PakBus<sup>®</sup> dataloggers, as well as their new data types (long integers, Booleans, strings, and time stamps). This adds the CR1000, CR800, CR850, and CR3000 dataloggers to the already-supported CR200 series. To use the new capabilities, upgrade to Version 2 or higher of the CD295 OS and PC295 software.

#### CM110 Series Tripods Redesigned

The CM110, CM115, and CM120 tripods are now made of corrosion-resistant stainless steel. The change from the previously used aluminum to stainless steel provides better grounding. The redesigned tripods also feature a shortened fold-up length of 5 feet, reducing shipping costs. Other features of these tripods remain unchanged:

- Minimal time and tools required for installation
- Tilt-down mast
- Adjustable mast height
- Individually adjustable tripod legs with locking pins

## New Loggers Support DNP3

To better serve our customers in the electric utility, water resource, oil and gas, and transportation industries, we have implemented DNP3 in our CR1000, CR3000, and CR800-series dataloggers.

What is DNP3? Distributed Network Protocol (DNP) is an open protocol used in applications where data integrity over minimal data bandwidth is important. DNP3 implementation in Campbell Scientific dataloggers is Level 2 slave compliant, with some of the operations found in a Level 3 implementation.

A standard datalogger program with DNP3 instructions will take arrays of real-time or processed data and map them to DNP3 arrays in integer or binary format. The datalogger can then respond to any DNP3 master with the requested data or send unsolicited responses to a specific DNP3 master.

DNP3 communications are supported in the dataloggers through the traditional RS-232 or COM1-COM4 ports, or over TCP, taking advantage of the multiple communication options already compatible with Campbell Scientific dataloggers (e.g., radio, satellite, landline or cellular phone).

How will this help me? If you have a SCADA package that speaks DNP3, you can now integrate data from a Campbell Scientific monitoring system with your existing data. This opens the door to bringing in data from a wide variety of sources. Examples include monitoring the weather near power transmission lines, monitoring and controlling irrigation from a wastewater treatment plant, controlling a remote pump, measuring river flow, or monitoring air movement and quality for a power plant. Our mesh networking protocol (PakBus®) also provides the ability of integrating data from an entire monitoring network with your existing data.

How do I get a DNP3 compatible datalogger? If you already have a CR1000, CR3000, or CR800 datalogger, you can add this capability simply by downloading the latest OS from the Campbell Scientific Web site. In addition to the new OS, the download updates LoggerNet or PC400 with other DNP3 support files.

Campbell Scientific has had Modbus capability for SCADA applications for years. Now we have DNP3 as well.

## **New Instrument Mounts**

#### CM300 Mounting Pole

The CM300 series provides a stainless-steel, 1.5-inch IPS vertical pole for mounting sensors, enclosures, or other instrumentation. Standard pole lengths are 23, 47, and 56 inches. The basic structure consists of a stainless-steel pole and an optional base configuration.

The mounting poles can be placed directly into a concrete foundation (no base option), attached to a concrete foundation with j-bolts (j-bolt option), or selfsupported with legs (short- or long-leg options).

#### CM240 Leveling Base

The CM240 is a new leveling base for our TB4, 385, and CS700 rain gages, and clamps directly to the CM300-series pole or a usersupplied, 1.5-inch IPS (1.9-inch outside diameter, unthreaded) pipe.

The CM300 features short-leg, longleg, and j-bolt options. The CM240 mounts on top of the CM300 (center).



#### **Campbell Scientific Calendar**

Date	Event	Location
July		
29-01	American Phytopathological Society	San Diego, CA
August		
05-10	Ecological Society of America	San Jose, CA
20-23	StormCon	Phoenix, AZ
27-28	NY Bridge Conference	New York, NY
September		
07-08	Mount Washington Symposium	Bretton Woods, NH
09-12	ASDSO—Dam Safety	Austin, TX
24-27	Field Measurements in Geomechanics	Boston, MA
24-29	AEG	Los Angeles, CA
30-02	U.S. Committee on Irrigation & Drainage	Sacramento, CA
October		
15-17	WEFTEC	San Diego, CA
16-18	Sunbelt Ag Expo	Moultrie, GA
24-26	Automotive Testing Expo North America	Detroit, MI
28-31	Geological Society of America	Denver, CO
29-03	NALMS	Orlando, FL
November		
04-08	American Society of Agronomy	New Orleans, LA
December		
06-08	Performance Racing Industry Trade Show	Orlando, FL
09-11	International Irrigation Association Meeting	San Diego, CA
10-14	American Geophysical Union	San Francisco, CA
11-13	Power-Gen International 2007	New Orleans, LA
12-14	Colorado River Water Users	Las Vegas, NV

Visit our Web site for training class schedules and additional listings.

## **Training Offered**

Campbell Scientific offers comprehensive training courses on our dataloggers and software. Visit our Web site at www.campbellsci.com/training to see the current schedule and to register on line. These courses emphasize datalogger programming and use hands-on exercises to reinforce concepts.

Each training course is taught by experienced Campbell Scientific application engineers. Class size is limited to ensure personalized instruction and assistance. Course fees include a training manual and the use of a datalogger, computer, and sensors. Lunch is provided on all course days, and there will be a tour of Campbell Scientific's facilities as time permits.

If you have questions about which course will best meet your needs, please contact an application engineer. We can also help you arrange a selfstudy course or a customized course at your location.

## **Suggestions?**

Our goal is to keep you informed of our latest product offerings, product changes, and interesting case studies. If you have suggestions for improving this newsletter, please let us know at www.campbellsci.com/customer-feedback.



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