Campbell Scientific

Corporate Profile

CAMPBELL SCIENTIFIC, INC.®

WHEN MEASUREMENTS MATTER

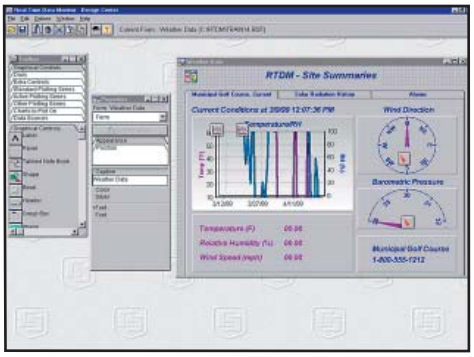
At Campbell Scientific, we manufacture dataloggers, data acquisition systems, and measurement and control products used worldwide in research and industry. Our instrumentation is known for its flexibility, precision measurements, and dependability—even in harsh, remote environments. Since our inception in 1974, we have manufactured approximately 150,000 systems. We continually strive to develop innovative products that meet the needs of our customers.

Products

We design and manufacture a range of dataloggers, from the most basic system with just a few channels, to expandable systems that measure hundreds of channels. Our systems feature wide operating temperature ranges, low power use, and the ability to store a large number of measurements. They can also operate independent of ac power, and human or computer interactions. Most sensors connect directly to our dataloggers, eliminating external signal conditioning. Scan rates can be programmed from a few hours to 100,000 times per second, depending on the datalogger model. Measurement types, processing algorithms, and recording intervals are also programmable. Onboard instruction sets contain statistical and mathematical functions that provide on-site data reduction and output results in the desired units of measure.

Our dataloggers not only provide advanced measurement capabilities, but can also control external devices. Unattended measurement and control decisions can be based on time or conditional events. Phones, pagers, radios, and other devices can be used by the dataloggers to report site conditions.

Because our dataloggers have many channel types and programmable inputs, they can measure almost any commercially available sensor. Datalogger channel types include analog (single-ended and differential), pulse counter, continuous analog output, digital I/O, anti-aliasing filter, and switched excitation. Multiplexers and other peripherals can be used to increase the number of channels.



Support software facilitates programming, communications, and data display.

A full line of telemetry and on-site data storage and retrieval products allow you to retrieve data from the office or in the field. On-site options include direct connection to a PC or laptop, PC cards, storage modules, PDAs, and displays. Telemetry options include Ethernet, short-haul, multidrop, telephone (land-line, voice-synthesized, and cellular), radios (UHF, VHF, and spread spectrum), meteor burst, and satellite.

Campbell Scientific software gives you the option of controlling our data acquisition systems from your computer. Programs are available that facilitate datalogger programming, communications management, and graphical display and analysis of data. For first-time users, starter software simplifies programming and data retrieval. Our starter software can be downloaded, at no charge, from our Web site.

Mission Statement

"We at Campbell Scientific are committed to satisfying the instrumentation needs of our customers..."

Cover photos from top left: (1) Energy balance studies, McMurdo Dry Valleys, Antarctica, courtesy of Gayle Dana, Desert Research Institute (2) Oil field monitoring, Alberta, Canada (3) Weather monitoring, Denali National Park AK, USA (4) Aquaculture, Laguna CA, USA (5) Vehicle performance testing, Pocatello ID, USA (6) Lacustrine monitoring, Australia (7) Evapotranspiration monitoring, Smithfield UT, USA (8) Hydrometeorological monitoring, western Argentina (9) Weather monitoring, St. Mary's Lake, Glacier National Park MT, USA (10) Viticultural monitoring, Australia (11) Water level and gate control, Richfield UT, USA (12) Structural monitoring, joint damping experiment, Space (13) Acid rock drainage and groundwater monitoring, undisclosed location (14) Bowen ratio study, Lincoln NE, USA (15) Historical preservation and restoration, Castillo de San Marcos, St. Augustine, FL, USA (16) Trace gas monitoring, the Bahamas.

Systems

With our dataloggers at the core, we have developed innovative measurement and control systems for a variety of applications. These systems include:

Weather and climate stations: measure wind speed and direction, precipitation, barometric pressure, temperature (air, water, and soil), snow depth, soil moisture, relative humidity, solar radiation, and more. Our weather stations can monitor general weather conditions, estimate ET_O, or supply data for crop models. We offer both pre-configured and custom stations that operate individually or in networks. Also available is an electric field meter that provides measurements for thunderstorm research or assessment of lightning hazards.

Hydrological stations: measure and record water level, flow, and water quality parameters, as well as automatically control gates, alarms, motors, valves, and other electrical devices.

Industrial systems: measure RPM, vibration, acceleration, position, frequency, strain temperature, pressure, etc. Our systems can be configured with an appropriate combination of sensor types to provide critical, real-time information in applications such as vehicle and equipment testing, HVAC, utilities, structural monitoring, and manufacturing.

SCADA systems: perform advanced measurement and control—independent of, or in conjunction with a supervisory computer. Each control unit provides multiple channel types and its own UPS. PID control continues even if communications with the main computer are lost. Communication options include Ethernet, radio, and cellular phone.

Time domain reflectometry systems: measure soil water content, bulk electrical conductivity, rock-mass deformation, and slope stability with superior accuracy and precision. Multiplexers allow hundreds of probes to be measured using a single reflectometer and datalogger. We offer a handheld TDR probe with a digital display unit that can provide soil water content measurements during on-site visits.

Aquaculture systems: continuously monitor water quality parameters such as dissolved oxygen, temperature, and pH, as well as automatically control pumps, injectors, aerators, and other devices. Our buoy-based systems consist of a wireless, floating, self-contained package that allows fish farmers and water resource managers to monitor critical water quality parameters from the convenience of their offices.

Air quality systems: monitor meteorological parameters, ambient gas and particulate concentrations, stack emissions, and visibility.

Micromet systems: use eddy covariance and Bowen ratio techniques to measure water vapor, CO_2, and heat fluxes. A tunable diode laser absorption spectroscopy (TDLAS) enables our trace gas analyzer to measure many trace gas concentrations and fluxes.

Applications

The open design of our dataloggers makes them useful in a large number of applications including:

Meteorological / Agricultural
- Weather and climate
- Air quality and diffusion
- Micrometeorology
- Agriculture/ag research
- Soil Science
- Evapotranspiration monitoring
- Ecology/natural resources
- Wind and solar energy

Water Resources
- Water level and flow
- Water quality and pollution
- Aquaculture
- Water management districts
- Water/wastewater (SCADA)
- Flood warning (ALERT)
- Aquifer testing
- Oceanography

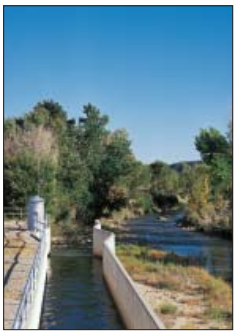
Industrial
- Vehicle and equipment testing
- HVAC
- Process control
- Mining and geotechnical
- Earth Science
- Structural and fatigue analysis
- Transportation
- Utilities and energy

Application Snapshots

Mt. Sajama, Bolivia - Climate Research

Climatologists from the University of Massachusetts are collaborating with scientists from Ohio State University to study ice cores from two mountain peaks in Bolivia. Their goal is to better understand global-scale climate changes. In support of the research, weather stations are operating near the drill site on Sajama (21,464 ft), the highest peak in Bolivia, and on Nevado Illimani (20,555 ft). Both stations measure snow accumulation and ablation hourly, along with snow temperature and a variety of meteorological variables.

Emery County - Water Quality and Level



Nearly 60 monitoring stations record water level and quality parameters at reservoirs, canals, pipelines, and springs in Emery County, Utah. The purpose of the project is to document the quantity and quality of water as it moves through the county. Data is collected automatically via RF telemetry. The system is also used for irrigation scheduling and flood control. Gates can be opened and closed via RF telemetry according to irrigation needs, or as water levels reach preset values, the dataloggers will perform corresponding control operations.

Aston Martin DB7 - Vehicle Testing

Aston Martin used a Campbell Scientific datalogger for environmental testing on its DB7. Ford, General Motors, Chrysler, Daewoo Motors, Land Rover, Volvo, and Jaguar are also on our customer list. Our dataloggers are used for hot or cold temperature, high altitude, off-highway, and cross-country performance tests. The dataloggers' compact sizes facilitate installation in the trunk, engine, or passenger compartment. Systems are powered by internal batteries or the vehicle's power supply. Data is displayed during testing, stored for later retrieval, or transmitted to a base station.

Confederation Bridge - Structural Monitoring

A research project is currently under way on the Confederation Bridge, which links Prince Edward Island to mainland Canada. The purpose of the project is to study the short- and long-term performance of the 12.9 km bridge and develop strategies for operating, maintaining, and upgrading it. Campbell Scientific dataloggers monitor ice force, deformation in the bridge structure, thermal stress, traffic load, and vibration. Data is transmitted to Carlton University and the University of Calgary for further analysis.

Long Island Sound - Oceanography

The University of Connecticut, Department of Marine Sciences is overseeing a project in Long Island Sound that provides water quality information to the public. The project, called MYSound (Monitoring Your Sound), consists of three data buoys and a weather station. A Campbell Scientific datalogger is at the core of each measurement station. Monitored parameters include: dissolved oxygen, conductivity/salinity, and temperature. Future measurements may include transmissivity, chlorophyll A, nutrients/nitrate, and surface hydrocarbons.

U.S. National Parks - Air Quality Monitoring

When Air Resource Specialists, Inc. needed a datalogger to withstand the remote extremes of our U.S. national parks and wilderness areas, they turned to Campbell Scientific. The Clean Air Act of 1977 initiated a goal to protect visibility in 156 national parks and wilderness areas. From scorching Arizona summers to icy northern Montana winters, our dataloggers have played a key role in monitoring the atmosphere's ability to scatter and absorb light. There are currently over 20 monitoring sites.

Cedar River Watershed - Turbidity Monitoring

For the Cedar River Watershed, Bonneville Power Authority and Electronic Data Solutions developed an alarm system consisting of a CR10X, an FTS DTS-12 turbidity sensor, a low band radio from Meteor Communications Corp. (MCC), and solar charged batteries. This alarm system ensures water quality for Seattle, WA, and several nearby cities by allowing the city to turn off the water supply intakes during high turbidity conditions in the river or selected tributary streams. The system's low band radio can transmit through Seattle's heavy timber, which hampered typical radio communications.

2002 Winter Olympic Games - Weather Monitoring

Forecasting and weather-data recording in preparation for the 2002 Olympic Winter Games allowed a unique partnership to evolve since 1996, with government, commercial, and research communities sharing weather information in northern Utah and throughout the western United States. Initially referred to as the Utah Mesonet, the collection of data outside of Utah led to its redesignation as MesoWest in January 2000. During the span of the Winter Games, February to March of 2002, weather observations were available from over 278 weather stations in the northern Utah region.

North Hoyle Offshore Wind Farm - Wind prospecting

Photo courtesy npower renewables

United Kingdom's leading wind energy developer and operator, npower renewables, is using a Campbell Scientific datalogging system to monitor the site of an offshore wind farm. The wind farm resides in North Wales between Rhyl and Prestatynin at about 7 to 8 km out to sea. Although operating in harsh conditions, the system has provided better than 99% data recovery. The system includes a Campbell Scientific datalogger that measures seven anemometers, three wind vanes, two temperature sensors and a pressure transducer.

Perugia, Italy - Road Weather Modeling

The Province of Perugia set up a program for forecasting ice formation on road surfaces. The program is operated by the University of Perugia and Ecosearch, a Campbell Scientific systems integrator based in Italy. The first part of the program will verify the relationship between meteorological parameters indicating possible ice formation and the actual formation of ice at three selected sites. An additional objective is to determine the variability of road surface temperature.

Mawson's Hut - Historical Preservation

Mawson's Hut is comprised of four buildings (Main Hut, Magnetograph House, Transit Hut, and Absolute Magnetic Hut) that are associated with the 1911-1914 Australian Antarctic Expedition. Located on Cape Denison, the site experiences daily maximum wind speeds of 44 mph, and temperature ranges from 0° to -20°C. In the main hut, our CR10X datalogger measured eight temperature/RH sensors, 16 thermocouples, and a solar radiation sensor. The measurements were used for pre-conservation planning and for post-project data analysis to determine the success of preservation efforts.

The Oklahoma Mesonet - Climatological Network

The Oklahoma Mesonet has 115 automated weather stations situated throughout the state. The Mesonet stations are polled every 15 minutes and data is relayed to the Oklahoma Climatological Survey in Norman. There, the data is checked and distributed by bulletin boards, print and electronic media, and interactive public displays. All of this occurs moments after the measurements are taken. Another 42 stations make up the Agricultural Research Service's Micronet over the Little Washita watershed.

Corporate Headquarters

Our U.S. factory in Logan, Utah, employs over 200 individuals in Engineering, Production, Marketing, and Administration departments.

Our corporate offices and factory encompasses three buildings covering 104,000 sq. ft. The building at the left houses our technical support, sales, research & development, and administration personnel.

Technical and Sales Support

More than 40 applications engineers provide multi-lingual technical and sales support. These employees know our products, and have degrees in a wide range of scientific and engineering disciplines. They often give input relevant to customer concerns during new product development. Our applications engineers supply both sales and technical support, which means you will get consistent, reliable service before and after purchase. In addition, our Order Entry Group provides quick courteous turn-around on quotes, orders, and invoices.

Research and Development

Thirty engineers design products to meet customers' measurement needs. Our team consists of mechanical, electrical, and software engineers.

Machine Shop

Machining, welding, punching, and fabricating operations are performed in our in-house shop, where most of our parts are fabricated. We use state-of-the-art equipment operated by skilled craftsmen.

Assembly

Our product line is manufactured by specialized work groups, including configured systems and weather stations, sensors and cables, mechanical and printed circuit boards, surface mount electronics, and customer specials. We maintain an inventory of over 10,000 components and subassemblies.

Testing, Calibration, and Quality Control

Our dataloggers and many other Campbell Scientific products are CE compliant. To ensure consistent, dependable performance, we calibrate each datalogger against standards traceable to NIST. Most of our products are tested and warranted to perform within published specifications over the -25° to +50°C range. Extended temperature ranges are often available.

Shipping

Using quality packing materials and careful order-checking procedures, our shipping department ensures that you get what you order, in perfect condition.

Training

Our monthly training classes provide at least one instructor for every five students. Courses cover use of our dataloggers and software. Those who attend can also work one-on-one with instructors to answer application-specific questions.

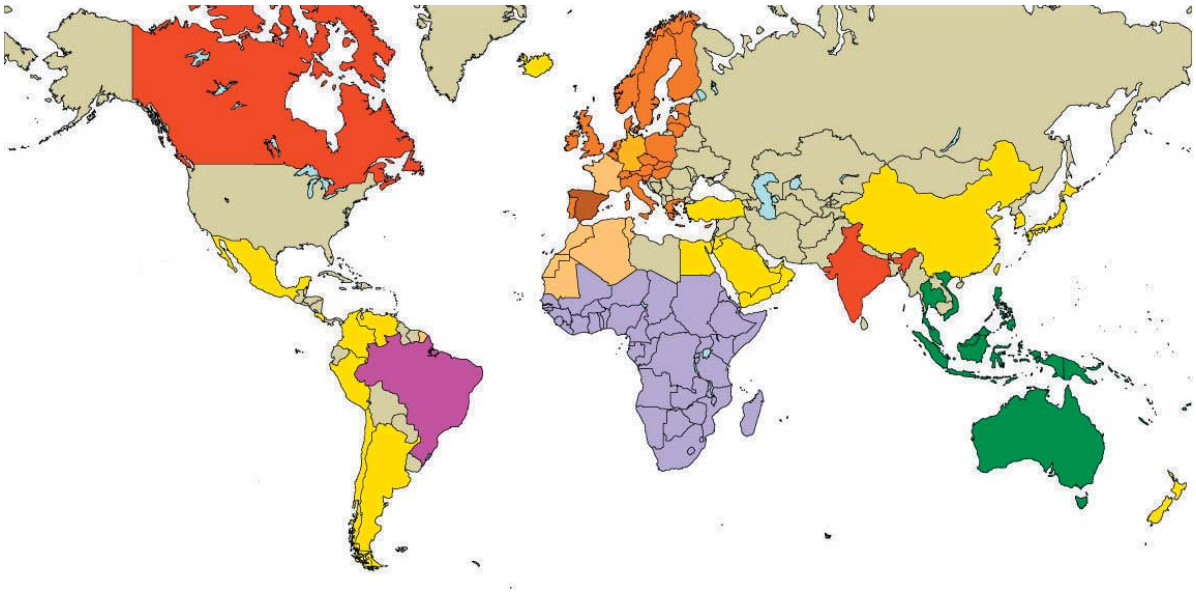
Warranty

Products manufactured by Campbell Scientific have a warranty that covers parts and labor. Most dataloggers are warranted for three years. Other products typically have a 12 month warranty. We also offer a four-year warranty extension for many of our products.

Repairs and Recalibrations

Our repair department consists of a professional staff of technicians that repair equipment and recalibrate dataloggers to their original specifications.

Worldwide Organization



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Canada


England

Australia


Africa


Brazil

The Campbell Scientific Story

Campbell Scientific, Inc. was organized in 1974 by Eric and Evan Campbell with initial capital from themselves, six brothers, and their father.

Eric had an interest in science at an early age. His high school science project (class of 1964) consisted of measuring the surface temperature of the moon by using an infrared sensor that he designed and built from scratch. He was introduced to making field measurements while working part time as a student at Utah State University. The research farm at the University provided an excellent environment for testing new ideas. Soon he had his own business, Logan Scientific Instruments, which produced soil psychrometers and the electronics to read them. He eventually sold his company, allowing him to finance his degree in physics with a minor in electrical engineering.

CA9

Evan became a strong asset during this time because of his interest and involvement in mechanical systems. He loved mechanical design and was pursuing a degree in manufacturing engineering.

The Campbell brothers combined their experience and education, focusing their efforts on establishing an emerging company, Campbell Scientific. Dr. Gaylon Campbell, the oldest brother and a professor at Washington State University, provided direction and help with new product ideas and conceptual development.

The first product marketed by Campbell Scientific (1974) was the Model CA9 Path Averaging Laser Anemometer, which was developed for the U.S. Army, White Sands Missile Range, New Mexico. The CA9 was also used to study wing-tip vortices. It confirmed that under common wind conditions these spiraling air shafts caused by aerodynamically clean, but heavy aircraft would sporadically relocate in the center of the runway.

The Model CR5 Digital Recorder was introduced in 1975. The CR5 was a portable, battery-powered datalogger of modular design using CMOS logic technology. It was the first battery-operated system that could make time-averaged measurements from thermocouples, solar radiation sensors, and wind sensors requiring vector averaging. The CR5 was well received by agricultural researchers interested in remote monitoring.

Since the introduction of the CR5, Campbell Scientific has developed increasingly powerful dataloggers as noted on the time line to the right. To date, around 150,000 dataloggers have been manufactured, and customers all over the world have come to depend on their reliability and accuracy.

Through quality products, excellent customer support, and innovative product development, we at Campbell Scientific endeavor to meet the instrumentation needs of our customers.

CR3000

CR5

CR21

CR7

CR10

CR9000

CR10X

CR5000

CR200

CR1000

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Printed April 2006