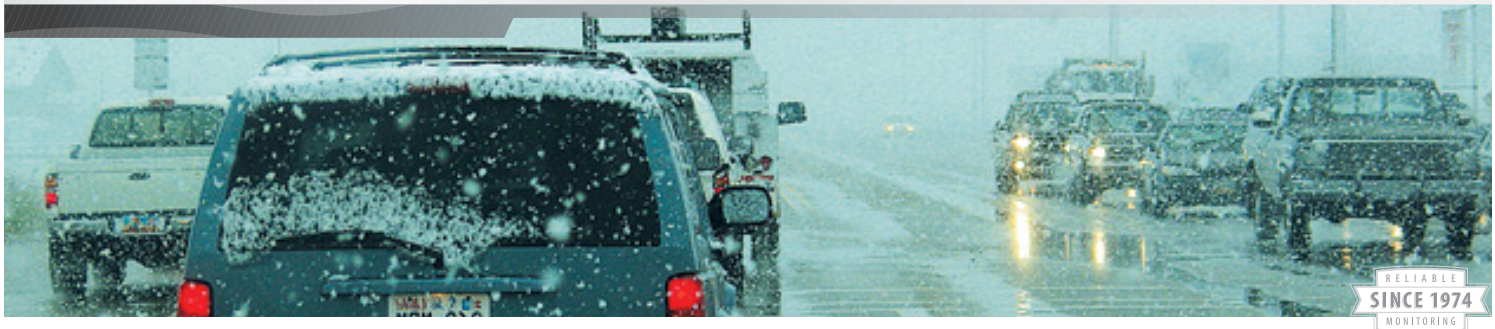
CAMPBELL SCIENTIFIC®
WHEN MEASUREMENTS MATTER

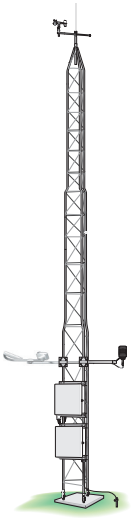
ROAD WEATHER—RWIS

Road Weather Information Systems and Weather Stations



Campbell Scientific environmental sensor stations (ESS) play a vital role in monitoring road weather conditions. With their ruggedness and low power use, they can function for long periods in harsh conditions. Our systems are very versatile, allowing customization to meet changing needs. They can measure, record, and communicate (NTCIP compliant) numerous types of road weather information for road alerts and maintenance scheduling.

MAJOR SYSTEMS



	Measurements	*Datalogger*	*Communications Supported*	*Benefits*
ESS | Environmental Sensor Station Typically includes tower, RPU, road sensors, meteorological sensors, camera, and remote communication hardware	wind speed & direction air & road temperature relative humidity road surface visibility precipitation	CR3000 CR1000	cellular DNP3 email fiber optic field display FTP Modbus NTCIP radio satellite serial TCP/IP Wi-Fi	◦ Customer-owned data ◦ Flexibility ◦ NTCIP compliant ◦ Web-based software ◦ Nonproprietary/ open architecture ◦ Low cost ◦ Proven reliability in harsh weather conditions

Custom Systems

Campbell Scientific RWIS stations provide precision measurement capability, rugged construction, wide operating temperature range, and low power consumption. They offer the flexibility to easily change sensor configurations, data processing, and data storage and retrieval options. The flexibility of our products allows you to select only the components you need, in the quantity you need. Tell us what you require and we'll help you configure a system that meets your exact needs.

Hardware

PWS100 Present Weather Sensor

- Identifies many precipitation types, including drizzle, rain, snow, hail, and graupel
- Designed for continuous, long term, unattended operation in adverse conditions
- Laser-based sensor

IRS31 Lufft Intelligent Road Sensor

- Road temperature (with up to two additional subsurface temperature measurements, optional)
- Residual salt content and calculation of freezing temperature
- Road surface condition—dry, moist, wet, ice, snow
- Water film height

Software

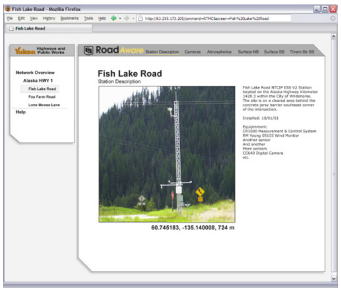
LoggerNet Datalogger (RPU) Support Software

LoggerNet is a full-featured software package based on a server application and several client applications. LoggerNet's open architecture allows a customer to directly modify RPU application programs or to develop new custom instruction sets entirely under customer control. LoggerNet collects NTCIP data and camera images on demand or by schedule (including diagnostic information about the ESS hardware and software) at the ESS or remotely via a number of telemetry options.

Telemetry options include Ethernet, Wi-Fi, land line, cell, LOS RF, and satellite. All collected data may be exported to second-party analysis packages. Retrieved data is owned by the customer and may be redistributed to other users with no obligation to Campbell Scientific.

RTMCPro Real Time Monitor & Control Software

RTMC Pro is used to create and run graphical screens that provide real-time monitor and control capabilities. The displays are easily designed using its large library of components including alarms, switches, status bars, charts, and gauges. Simply select a component, place it on the workspace, and specify the data value to be displayed. Each component has properties that can be set by the user giving maximum design control.



RWIS Case Studies

Our RWIS systems have helped a variety of organizations reach their goals. The following are just a few of these:

Above shows the instruments used in one of the AWS that monitors the Channel Tunnel.

Eurotunnel, which owns and operates the Channel Tunnel, awarded a contract for an entirely new RWIS system to the team of Campbell Scientific Ltd. (CSL, Campbell Scientific's affiliate in Europe) and Weather Services International. CSL designed and installed a replacement hardware and software system, named IceWatch, to be user friendly and appealing to the operators tasked with the safety of the facilities. The system includes seven automated weather stations (AWS), a server and multiple displays at the terminal in each country, and documentation and training.

www.campbellsci.com/chunnel-ice-warning

The Province of Perugia set up a program for forecasting of 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 verifies the relationship between meteorological parameters indicating possible ice formation and the actual formation of ice a three selected sites. An additional objective is to determine the variability of road surface temperature.

www.campbellsci.com/perugia-italy

In 2008, Douglas County in Colorado decided that their next ALERT site should also include a camera to monitor stream and road conditions, and a road-temperature sensor to aid the Public Works department with winter maintenance. Water & Earth Technologies of Fort Collins, Colorado, worked with Campbell Scientific to design and build such a system. The new system includes a cellular router for remote data access and transmission to Weather Underground (WU) and uses a camera to send images to WU and to the Public Works department. Campbell's CR1000 datalogger is at the heart of this system.

www.campbellsci.com/colorado-alert

This site in Douglas County, Colorado provides both ALERT and RWIS information.