CAMPBELL SCIENTIFIC®
WHEN MEASUREMENTS MATTER

UK Met Office MMS Project

240 systems installed in major upgrade of the UK Met Office's weather station network.

When the UK Met Office wished to replace its network of around 200 automatic weather stations it awarded the contract to a partnership between Campbell Scientific and system integrator CSE-Servelec*. Campbell's weather station hardware was integrated with telemetry and software from CSE-Servelec* who led the successful partnership bid.

The contract was awarded following a competitive tender process via the Official Journal of the European Union. The partnership solution offered by the Campbell Scientific and CSE Servlec* was deemed to provide the best fit to the Met Office specification at the lowest cost and with the lowest risk.

The total cost of ownership (TCO) across a 15 year life of the system was a major factor in the tender review. The high reliability of Campbell Scientific dataloggers helped provide the winning system with a low TCO.

The project scope was to upgrade the four existing different networks, including the CS logger based Climate Data Logger (CDL) network, with a single more uniform platform known as the Meteorological Measurement System, or MMS. As well as supplying the new dataloggers with bespoke logger software, Campbell Scientific also undertook the installation of the systems working in conjunction with Met Office engineers. The updated network will provide accurate weather data for the Met Office for at least 15 years.

Campbell Scientific's weather stations field-proven ability to operate reliably for extended periods at remote sites on low-power was a key factor in the decision. In this project, Campbell Scientific's feature packed CR1000 Measurement and Control system was chosen as the main datalogger with the CR800 series and CR3000 loggers also in use.

Paul Arthur, MMS Project Manager for the Met Office said: "I am delighted that Campbell Scientific will be providing this vital component of our surface observations network. This is the first phase of a major refurbishment of the overall Met Office observations network. This contract will supply a versatile observations delivery system that will more efficiently meet customer needs."

A Campbell Scientific spokeperson, said: "The contract to supply and install logging equipment across the UK Met Office's Surface Observation Network reinforces the role of Campbell Scientific products at the leading edge of environmental measurements. Working with the prime contractors CSE-Servelec*, Campbell Scientific will be supplying and installing data logging equipment as part of the overall solution. The system will represent one of the most advanced national surface observation networks in the world. It is expected to provide the UK Met Office with a data acquisition and distribution system that will transform their business and research models over the coming 15 years. It provides Campbell Scientific with an outstanding reference from which to grow its business into Europe."

Main Benefits of the Campbell Scientific Solution

Case Study Summary

Application
This was a Met Office project to update its network of weather stations across the UK. Campbell Scientific, who were awarded the contract in partnership with CSE Servelec, installed 420 dataloggers in 240 systems upgrading each to the new Meteorological Measuring Station (MMS) standard

Location
United Kingdom

Products Used
GRWS100

Participating Organisations
UK Met Office, Campbell Scientific Ltd, CSE Servelec

- Single software solution across whole system eases maintenance and configuration

For the main MMS project CS developed a single program solution deployable into multiple loggers (CR800/850, CR1000 & CR3000) which adapts itself to the task of Master or specialised remote logger within the on-site logger network. This allows for varied configurations from a single program deployment.

The system can also be augmented with additional MMS specialist programs/loggers and has been since its initial inception.

- Central configuration

The central system generates a site configuration file which is passed to the master logger on site, this contains all the site specific information including deployed sensors. The program uses this to adapt what it is measuring and to perform site specific operations such as wind height correction, barometric pressure corrections and also to produce derived values for use on site such as QFE, QFF and QNH to name but a few.

- Calibration tracking of sensors

A sensor change procedure is incorporated into the program.This allows an on-site engineer to put a site into maintenance mode, carry out sensor changes and enter serial numbers of new sensors. This procedure then triggers the central system to update its sensor tracking and to regenerate site information configuration with the related calibrations where necessary.

- Data quality checked at source (ie in the logger)

All raw values and derived values in the logger are subject to a number of defined quality control (QC) checks, these include range checks and step changes to name but a few. This ensures the integrity of the data right from measurement onwards. All data is retained but flagged as to its quality.

- High metadata content

The sensor change procedure captures metadata relating to the deployed sensor.

- Data averaging and standardisation

The logger performs many statistical functions on the measured data, including averaging, totalising etc. These are all carried out to UKMO and WMO standards where denoted. In addition, there are many implemented algorithms to produce derived values on site in the event of a communications outage to allow site operations to continue (many are RAF bases). These include pressure calculations, marked discontinuity of wind and visibility, two, ten and sixty minute averages and backing/veering of wind again to name but a few.

- CRBasic - new instructions and enhancements

There were many additions and tweaks to CRBasic resulting from this project, including... AcceptDataRecords, Conditional Compilation, SerialInRecord. It also inspired requests for Function and Encryption capabilities which, whilst not used in early versions, have been utilised in later enhancements.

Campbell Scientific's software lead for this project commented: "The program used in this project is one of the most complicated CRBasic programs ever written and certainly one of the most adaptable/flexible.

It pushes the loggers, utilises single and multi-logger configurations, utilises a multi-drop RS-485 network to interlink loggers, has centralised data collection in a master logger, operates broadcasts to push data to other devices listening on the system (including remote displays created by CSE-Servelec* using our Java-PakBus-SDK which was also initially created for the project). It also maintains runway information which is used to power legacy ATC systems on sites with an airfield"

The Director of Business Solutions for CSE-Servelec* at the time of the award stated this was a major project for both CSE-Servelec* and Campbell Scientific Limited. "The coming together of our two companies for this project provides a strong solution of established data logging equipment from Campbell Scientific and CSE's own extensive expertise in data collection based on our SCOPE product and our business integration skills."

* Note CSE-Servelec is now called Servelec Technologies